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SESSION 0-01

PRIMARY HIP ARTHROPLASTIES I

QUALITY OF LIFE EVALUATION IN PATIENTS AFFECTED BY HIP OSTEOARTHRITIS SECONDARY TO CONGENITAL HIP DYSPLASIA UNDERGOING TOTAL HIP REPLACEMENT

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Background The aim of this study is to assess the changes in Quality of Life (QOL) in patients affected by hip osteoarthritis (OA) secondary to congenital hip dysplasia (CHD) after total hip replacement (THR).
Materials and Methods We prospectively evaluated 40 patients affected by CHD undergoing THR, admitted to our hospital between 2000 and 2005. 31 patients was finally enrolled (28 female, 3 male), mean age 51,19 years (33 to 70). Mean follow-up 36, 32 months (4 months to 5 years). Each patient was asked to answer to 2 questionnaires: WOMAC and MOS SF-36. Patients were evaluated 4 months before THR and once achieved postoperative rehabilitation. Pre and postoperative results were analysed and compared with the international literature about patients affected by OA and healthy population.
Results Pre and post-operative results:
- WOMAC: pain 14.06–0.84; stiffness 4.26–0.52; function 42.68–5.39.
- SF-36: physical function 18.55–84.52; role physical 28.33–87.10; body pain 23.26–83.39 general health 55.19–81.74; vitality 32.74–72.10; social function 43.55–84.66; role emotional 68.82–93.55; mental health 48.77–79.35.

All results were statistically significative.
Discussion In literature not many attentions are given to patients affected by OA secondary to CHD. Only 2 to 3% of patients evaluated in other studies belong to this group. In this study we found that these patients normally oversize their postoperative condition when compared with patients affected by OA and healthy population. It may be explained considering the patient's characteristics: young age, sex, social function.
Conclusions As shown in this study by both questionnaires, THR in patients affected by CHD lead to an important improvement of QOL. QOL evaluation can't replace either clinical and instrumental evaluation or physician experience but give weight to patient's expectation and it may be considered an efficient instrument for medical and surgical treatments.
Suggested readings
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CORRELATIONS BETWEEN OUTCOMES AND HRC RESTORATION IN TOTAL HIP REPLACEMENT FOLLOWING CDH

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Background During THR the restoration of the hip rotation centre (HRC) affects the muscle leverage, the range of motion, the polyethylene wear. This goal is really difficult to get in the CDH. Several methods to evaluate and to plan the HRC reconstruction have been described as well as surgical techniques.
Aim of this study is to evaluate the HRC preoperative and postoperative and to compare the relationship between the HRC and the outcome.
Materials and Methods 88 primary THR have been implanted in 66 patients with CDH in the last ten years by the same surgeon; gender: 91% female; mean age 56 y (min 38 y-max 75 y). The joint defect classified upon Crowe's rates: type I 27%, type II 58%, type III 12%, type IV 3%. An hemispherical cup has always been implanted, 95% patients had uncemented stem, 20% needed autologous bone graft. The posterior surgical approach has been performed in all the cases. The Pierchon's method has been adopted. The HSS, the Trendelemburg-Duchenne sign and the limping have been registered, preoperatively an postoperatively.
Results The mean HSS postop has been 92.68 (54.70): $p<0.05$. The Trendelemburg-Duchenne sign has been negative in 78,4% (21.6%): $p<0.05$. Limping has been present in 20%, due to gluteus weakness. The comparison between the preoperative and postoperative Pierchon's A/E and C/D axis showed a $p<0.05$. There was one patient with a fleeting femoral nerve lesion. We noticed in three cases of detectable poly wear, associated with focal osteolysis in two cases. One of them, symptomatic, has been revised by bearing exchange and bone grafts.
Discussion The outcome relies on the HRC proper positioning, which means a correct preoperative plan. The Pierchon's method is simple to perform, cheap and reliable. To get it intraoperatively the anatomical bone landmarks are: transversal acetabular ligament and the ligamentum teres.
Conclusion There is clear relationship between HRC proper positioning and the clinical outcome. The most important coordinate to look at in Pierchon's axis is the medio-lateral (C/D), fair deviations in proximal direction might be accepted.

THE CONICAL MODULAR STEM IN 50 TOTAL HIP ARTHROPLASTY WHO HAD DEVELOPMENTAL DYSPLASIA

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Background The considerable variation in anatomical abnormalities of hip joints in the developmental displasia of hip, makes a difficult reconstruction with a total hip arthroplasty. The purpose of this study was to evaluate the utility of the conical modular stem in this hip joint reconstruction.
Materials and Methods 50 patients with different types (Crowe class.) of the developmental dysplasia of hip treated with conical modular stem (Lima Lto) for joint arthroplasty. Radiographic and clinical data were collected at six weeks, at three months, six months and at yearly follow-up visits.
Results Harris Hip Score preoperative and a latest follow-up were evaluate. This improve significantly (42 to 89.8). The range of flexion, abduction-adduction improved. No aseptic loosening of the femoral component were found. There were no cases with cementing technique.
Conclusions The conical modular stem is very helpful for total hip arthloplasty who had developmental dysplasia. The conical modular stem restore best off-set, correct limb length, to make up for acetabular antiversion and correct femoral version defect.
Suggested reading
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METAL-ON-METAL TOTAL HIP ARTHROPLASTY WITH LARGE FEMORAL HEAD IN SEQUELAE OF CONGENITAL HIP DYSPLASIA

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Background Surface and traditional metal-on-metal hip implants show a low wear in steady-state phase and allow the use of large femoral head. Large diameter increases hip mobility and stability by means of greater jump distance and head-neck ratio. The risk of dislocation in primary total hip arthroplasty (THA) has been reported as 2 to 3 %. Some risk factors, such as female sex, previous surgical interventions and muscle weakness, are related to hip dysplasia. Therefore several patients with hip arthritis in congenital hip dysplasia are have higher risk of dislocation. In this group of relatively young people, metal-on-metal total hip prosthesis with large femoral heads are recommended. We evaluate short-term results of THA in patients with arthritis secondary to congenital hip dysplasia.
Materials and Methods In 12 months, from 2005 to 2006, 54 metal-on-metal total hip arthroplasties with a diameter of 36 mm have been implanted. 14 Implants were in patients with sequele of congenital hip dysplasia. Our case series includes 12 patients with a mean age of 50,3 years (range 41–62). The acetabular component was in all cases Jump coupled with Alloclassic SL (8 cases), Versys ET (5 cases) and Profemur R modular stem (1 case).
Results Patients were evaluated during periodical clinical (1–3–6–12–18 months) and radiographic (1–3–12 months) with use of Merle d'Aubignè-Postel score system. Clinical results were: very good in 10 cases and good in 4 cases. We never observed dislocation and infections of the implants.
Conclusions In our experience short term results with the use of metal-on-metal total hip arthroplasty with large femoral head are very positive. The concept of big femoral head in patients who had recurrent instability or chronic dislocation following THA has been reported. Moreover, metal-on-metal hip prosthesis have a low wear rate after initial running-in wear phase. These features make these implants suitable for young adult patients as those included in this study. Biological and thermal effects related to local temperature and metal ion release from implant are not clear. Blood ion concentrations are well within the limits identified as dangerous for health but the local concentrations of particles and metal ions may exceed and cause tissue damage.
Suggested readings

1. Burroughs BR, Hallstrom B, Golladay GJ, Hoeffel D, Harris WH (2005) Range of Motion and stability in THA with 28–32–38–44 mm femoral head size. J Arthroplasty 20:11–19
2. Soong M, Rubash HE, Macaulay W (2004) Dislocation after Total Hip Arthroplasty. J Am Acad Orthop Surg 12:314–321

CHANGES OF THE PERIPROSTHETIC BONE MINERAL DENSITY IN CEMENTLESS TOTAL HIP ARTHROPLASTY: A 10-YEAR FOLLOW-UP

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Background The aim of the study was to assess periprosthetic bone mineral density (BMD) changes after implantation of cementless total hip arthroplasty (THA) over a period of 10 years.
Materials and Methods Objects of the study were 19 cementless THAs implanted in 19 patients (11 female, 8 male, age range 57–71) operated between January 1990 and July 1994. Periprosthetic BMD was measured using dual-energy X-ray absorptiometry (DEXA) in the seven Gruen's regions of interest (ROIs). The BMD was measured within 24–16 months after surgery as well as 10,9–1,4 years later.
Results We found a mean reduction of the periprosthetic BMD of -11% within 10,9–1,4 years after surgery. There was a significant decrease at the proximal femur, ROI R1 (-18,6%) and ROI R7 (-18,2%). The minimal loss was found in ROI R3 (-12,7%) and ROI R4 (-9,4%). The ROI R5 was the one to show a positive value in almost all patients (mean increase +6,3%). The BMD losses have been correlated with age, sex, weight, height, calculate percentage of stress shielding, indirect index of stress shielding, periprosthetic BMD within 24 16 months after surgery, with a correlation R between –0,287 and 0,029.
Discussion The mean decline of the periprosthetic BMD of –11% within 10,9–1,4 years after surgery corresponds to the expected value based on the physiological aging (annual BMD loss of 0,9%) [1]. Periprosthetic BMD variation at distal femur is negligible, while at proximal femur the bone loss was twice that expected based on the aging processes. The observed bone loss is mainly due to stress shielding. It arises questions about the mechanical competence of periprosthetic bone on the long run and about an increase in the risk of periprosthetic fractures [2, 3, 4].
Conclusions The improved survival of total hip prosthesis requires careful evaluation of bone mineral changes throughout prosthesis lifetime.
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CANCELLOUS BONE COMPACTION MULTICENTRIC STUDY WITH THE ABGII FEMORAL HIP PROSTHESIS

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The authors expose preliminary multicentric study results of the use of a new instrumentation that allows the compaction of the cancellous bone of the third proximal part of the femur. The study has been followed by total hip arthroplasty centers distributed in Italy [Prof. Carfagni, Dr. D'Imperio (Saint Carlo di Nancy Hospital - Rome)], France [Dr. Rameh, Dr. Lasseur, Dr. Prudent], Polonia [Dr Obrebski], Rumania [Pr. Botez] and Great Britain [Dr Power].
The authors put in evidence the operative technique aspects that use smoother bone compactors instead of the traditional ABGII (Stryker) femoral broaches, evidencing the remarkable conservation of the metaphyseal cancellous bone.
Good prosthetic stability and an optimal bone remodelling comes out from the first X-ray short term evaluations.
Varus positioning of the stem, over/undersizing, femoral crac and calcar crac are the main issues arose during the learning curve. Time will confirm the validity of such technique.

ANATOMIC CEMENTLESS TOTAL HIP ARTHROPLASTY WITH MICROPORE COATING: LONG TERM RESULTS

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Introduction Cementless total hip arthroplasty (THA) has been shown to produce a stable direct fixation of the metal prosthesis to

the bone, giving the potential of reduction in the rates of aseptic loosening. Osseointegration can be enhanced further by a hydroxyapatite (HA)-coated prosthesis in a short period even under loaded conditions. The aim of this study was to access the changes in bone tissue directly adjacent to the cementless stem adaptive remodelling. This stem is corresponds in shape to the femoral bone canal.We have evaluated clinically and radiologically 220 consecutive antega total hip prostheses (braun aesculap), performed in two general district hospital by 2 senior surgeon in 210 patients (follow up 11–5 year).

Materials and Methods Between July 1996 and December 2002, a total of 210 patients 127 female e 93 male (220 hips) average age 69.5 years old (range, 26–82 years) received a proximally hydroxyapatite-coated femoral prosthesis with a hemispheric metal-backed, hydroxyapatite-coated acetabular cup (antega aesculap), with an average follow-up of 8 years (range, 11–5 years). All operations were performed by 2 surgeon in 2 different district general hospital. Preoperative diagnosis was primary osteoarthrosis (80%), avascular necrosis in twenty (12%), posttraumatic arthritis in (6%), post displasic arthritis (2%), All patients were operated by the 2 senior author. All patients were operated with a direct lateral approach, and acetabular and femoral preparation was performed as suggested by the manufacturer, using a chevron-type cut of the femoral neck and wide capsulectomy. Prophylactic antibiotics, a first-generation cephalosporin unless contraindicated, were given preoperatively and continued for one to two days postoperatively. Suction drains were typically removed twenty-four to forty-eight hours postoperatively. All patients received a four-week course of heparin for prophylaxis against venous thromboembolism. All patients walked with partial weight-bearing with two crutches for 4 weeks and then with full weight-bearing with crutches for an additional 4 weeks. Radiographic evaluation was performed with an immediate postoperative radiograph and one obtained at the longest follow-up. Ectopic calcification was graded according to Brooker's classification. The acetabular cup and proximal femur were divided into zones as described by DeLee and Charnley and Gruen. The acetabular component was evaluated for subchondral sclerosis, subsidence, gap filling, bone remodeling according to strain distribution, appearance of surrounding bone, angle of lateral opening, and position of the cup. The femoral stem was evaluated further for appearance of the surrounding bone, bone resorption, cancellous and cortical thickening, lysis, and position and size of the implant (correct, oversized, undersized). Patients were asked to complete in the clinic, the Harris hip scores were completed. In 100 patients Densitometry was performed basing on computer analysis of the X-ray images taken in standard conditions in the antero-posterior projection and a biochemical study about the markers of bone remodelling.

Results The average Harris hip score increased from 52 points (range, 24 to 76 points) preoperatively to 95.1 points (range, 48 to 100 points) at the time of final follow-up. Of the 220 hips that were followed for more than eight years, 80% had an excellent result; 14%, a good result; 5%, a fair result; and 1%, a poor result with only 2 patients complaining of intermittent thigh pain. At the time of latest review, 45.1% were employed in heavy manual work, 30.6% were employed in light manual work, and 19.3% were employed in light nonmanual work; only 5% claimed sedentary occupations. There were 2 revisions, one to reposition an acetabular cup and one patient required revision of the femoral component to a cemented prosthesis because of persistent lateral thigh pain. Radiographs of these patients had shown an undersized femoral stem with significant subsidence of the prosthesis. The inclination on the coronal plane was calculated for all patients on postoperative and longest follow-up radiographs with a range of the position of the cup between 40 and 50 degree. No screws were used in this series. Radiographic changes were consistent with bone remodeling. There were no radiolucencies around the acetabular cup in 93%, but we noted in 7 patients (3,2%) a radiolucent line (1 mm in zone 1 e 2 Charnley). There were radiographic evidence of no loose femoral stems. Osseointegration was achieved in all cases, Cancellous densification was found to be mainly in zones 2 and 6 (67.2% and 55.7%), extending distally in zones 3 and 5 (52.4% and 50.8%). Hypertrophy of the femoral shaft was less prominent and was noted mostly distally, in zones 3, 4, and 5. Subsidence between 2 and 4 mm was noted in 5 hips. Correct sizing was considered when the prosthesis was filling <90% of the femoral medulla at the level of the diaphyseal shoulder of the stem. According to these criteria, 6 femoral stems were noted to be undersized on the immediate postoperative radiograph. 4 of these femoral stems was inserted in varus. There was no evidence of ectopic ossification in 80.1% of the patients. 11.1% were noticed to have changes corresponding to Brooker grade 1, and 8.9% patients had grade 2 changes. There were no cases with grade 3 or 4 changes. Changes in bone tissue density were noted after 1 year in the area ROI 1 and 7 using Densitometria software. Bone remodelling directly adjacent to the implant was correlated to the Antega stem construction. Big changes in bone density in the area surrounding the stem with micropore coating may indicate that the intense bone remodelling processes are related to the osteoinductive properties of micropores and load-transmission to the bone in that area. The biochemical study (Osteocalcina, fosfatasi alcalina ossea e fosfatasi acida tartarato reistente) it has evidenced a maximum peak to 3 months directly connected to the percentage of bone remodelling processes.

TEN YEARS RESULTS OF 150 HYDROXYAPATITE-COATED PRIMARY HIP ARTHROPLASTIES

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Background Conflicting results have been reported for the ABG I when observing factors such as wear, osteolysis and survivorship of this implant.

Materials and Methods We utilized a prospective study of 157 consecutive primary total hip replacements (100 female and 43 male patients) with an 8 to 13 years follow-up. One hundred and twenty-five hips were assessed at mean 10 years of follow-up.

Results Polyethylene wear remains the weakest link in the prosthesis's construct. In 7.2% tight pain occurred. The survival rate for the implant was 92.6%: 92.6% (CI 78.55 to 96.47) for the acetabular component and 96.3 % (CI 85.67 to100) for the stem.

Discussion Within the literature, several studies evaluated the ABG I system. Some studies highlight the benefit of the implants by reporting positive results, especially in terms of thigh pain and survivorship. However, in Duffy et al and Blacha studies a more pessimistic picture emerged.

We noticed polyethylene wear in 93.6 % of the acetabular inserts. No correlation was identified between polyethylene wear and the years after insertion of the prosthesis, gender, age, body weight and type of employment of the patient.

Conclusions In summary, we are satisfied with the implant design of the ABG I system showing the potential for stem long term survival, nonetheless overall the success of the implant depends upon the rate and severity of the polyethylene wear.

Suggested readings

1. Blacha J (2004) High osteolysis and revision rate with the hydroxyapatite-coated ABG hip prostheses: 65 hips in 56 young patients followed for 5–9 years. Acta Orthop Scand 75:276–282
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MIDTERM RESULTS OF HYDROXYAPATITE-COATED DUAL RADIUS CUPS

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Outcome of hydroxyapatite-coated cups have not been as consistently successful as outcome of hydroxyapatite-coated stems and, therefore, we studied a newer generation acetabular design with dual-radius geometry and with a plasma-sprayed hydroxyapatite coating on an arc-deposited rough titanium substrate (Securfit, Styker Orthopaedics). 67 consecutive hips in 57 patients implanted with this acetabular component without screw fixation were followed up for average 5,2 years after surgery (range 3–8).
Clinical outcome was assessed by Harris Hip Score. Implant stability was determined using the criteria described by Manley (1998). In sequential radiographs radiolucent lines, migration of the cup and osteolysis were evaluated. Location of radiolucent lines and bone erosions were analyzed using the three zones desribed by DeLee e Charnley on the acetabular side and the seven zone described by Gruen on the femoral side.
Harris Hip scores improved from a preoperative mean of 35,2 points to final follow-up mean of 94,5. No hips were revised for asepting loosening. Incomplete lucent lines were noted on early postoperative radiographs. With follow-up, all acetabular components were evaluated as stable with osseus ingrowth and there are no cases of acetabular and/or femoral osteolysis. Our study presents encouraging midterm results of dual-radius acetabular design with hydroxyapatite coating on a rough substrate. Improvement in bone fixation and absence of wear's osteolysis suggests a beneficial effect of hydroxyapatite coating on osseointegration of the cup.

A POROUS TANTALUM MONOBLOCK ACETABULAR CUP TOTAL HIP ARTHROPLASTY: A 5 TO 7 YEARS MINIMUM FOLLOW-UP

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Porous tantalum is an alternative metal for total joint arthroplasty components that offers several unique properties. It has a geometric structure similar to trabecular bone. Its high volumetric porosity (70% to 80%), low modulus of elasticity (3 MPa), and high frictional characteristics make it conducive to biologic fixation. Tantalum has excellent biocompatibility and is safe to use in vivo.
The aim of this study was to analyze the mid-term (5–7 years) results of total hip arthroplasty (87 hips in 81 patients aged 65.2 years on average) using a porous tantalum elliptical monoblock acetabular cup.
The need to convert to an acetabular component with screw fixation because of poor press-fit is was about 1%. A low rate of revision for aseptic loosening (1.3%), and predictable results with respect to radiographic evidence of fixation, clinical pain control, walking ability, range of motion, and function were found. Only one cup was revised in the other cases there was no progression of any postoperative gap, no evidence of periacetabular interface radiolucencies, no evidence of lysis. Although these short-term results are encouraging, further follow-up will be required to assess whether the elliptical monoblock design and the low modulus of elasticity of porous tantalum will reduce the incidence of periacetabular stress shielding and occurrence of osteolysis.

SESSION 0-02

PRIMARY HIP ARTHROPLASTIES II

MODERN CONCEPT AND ACTUAL EVOLUTION IN TOTAL HIP RESURFACING ARTHROPLASTY

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Background Resurfacing replacement represents the most conservative solution available for total arthroplasty of the hip. Its extreme preservation makes this implant definitely indicated for young and active people, saving most of bone stock for future revisions and conceding a functional joint restoration similar to physiologic range. However, these implants are not suggested in advanced femoral head avascular necrosis, in which generally the main surgeon's choice is more oriented to conventional total hip arthroplasty. Actually even in these femoral head diseases, preservation of bone stock is still available, by using a cementless resurfacing arthroplasty (BMHR) that provide a mid femoral head resection, with positioning of a press-fit stem (in the head-neck junction) on which femoral head component is applied.
Materials and Methods We are performing these implants since January 2007. Young age (included between 30 and 60 years), advanced avascular necrosis of femoral head (Steimberg III and IV) have been considered as indication for this implants. Each of them has been implanted using a postero-lateral approach performed always by the same surgeon. Clinical evaluation has been based upon Harris Hip Score (HHS) pre-operatively and post-operatively, radiographic findings (radiolucency, osteolysis, bone thickening, femoral notching) have been analyzed and registered on the basis of Gruen scheme, while implant orientation of femoral components has been related to neck inclination (varus/valgus).
Results Post-operative HHS1 for the whole cohort was 77.8 in the first month, 94 in third month, Implant orientation has shown a proper positioning defined as a variation from physiologic axis in AP included between ±5 degrees, the most of the implants shown a valgus orientation (mean 6.4°, range 6–8°). Radiographic evaluation in accordance to Gruen2 method has shown in all cases the absence of radiolucency.
Discussion The mid head resection resurfacing arthroplasty (BMHR) can be considered an efficient alternative to conventional hip arthroplasty in advanced avascular necrosis of femoral head (Steimberg III or more). It represents the less invasive femoral solution available for primary procedures in these femoral diseases, saving most of bone stock for future revisions and conceding a functional joint restoration that falls within physiological range as for conventional resurfacing.

CONCEPT AND PRELIMINARY RESULTS OF HEMICEFALIC METAL ON METAL (MOM) HYBRID RESURFACING THA

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Background Total hip replacements with a MoM articulation were commonly used until the mid-1970s. Metal on metal Resurfacing

THA is an attractive treatment option for young patients because it saves the femoral head and is easily revisable. Because the risk of femoral neck fracture or aseptic loosening with conventional MoM resurfacing THA, we developed a innovative surface arthroplasty prosthetic system. The femoral component has high diameter femoral head assembled on structural femoral neck cementless stem. The inner surface of femural head is cemented while the femoral stem is in titanium plasma sprayed. The present study describes concept and preliminary clinical and radiographic results.
Methods Between December 2002 and November 2006, 82 MoM hybrid surface arthroplasties were performed in 79 patients. The patients had an average age of 58 (range 32–79 aa), 63 THA implanted (76,8%) were in man. All the acetabular component were flattened (165°) press-fit vacuum plasma sprayed cementless component, all the femoral hemicephalic head were cemented and assembled with rounded press-fit femural neck component.
Clinical and radiographic follow-up were performed at 45 days, 3, 6, 12, months postoperatively and yearly thereafter.
Results The 57% of the patients regularly participate in very active events including sports, 97 % of patients were satisfied with results of hip replacement surgery. One patient had some discomfort on trochanteric region. Kaplan-Maier survivorship curves demonstrated a 100% of survival at an average F-up of 48 months.
Radiographic evaluation is still running and evaluate the position of components, femoral fracture, stem demarcation, radiolucency, osteolysis, bone hypertrophy on femoural neck and on acetabular bone.
Conclusions The preliminary experience with this hemicephalic hybrid metal-on-metal bearing is encouraging in young, active, adults. Of course we will receive new data at the end of radiographic evaluation. We await medium-long term results to see if these early results are maintained.

PATTERNS IN CEMENT DISTRIBUTION IN TOTAL HIP RESURFACING ARTHROPLASTY

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Background Currently accepted concepts in the area of total hip replacement are becoming increasingly focused on conservative procedures, both in surgical approaches and implants. Resurfacing hip replacement represents the less invasive femoral solution available for primary procedures, saving most of bone stock for future revisions and conceding a functional joint restoration that falls within physiological range. However, fixation at the bone-implant interface and preservation of biological integrity of retained bone have been questioned as a result of early failures due to neck fractures and avascular necrosis.
Materials and Methods 92 consecutive resurfacing hip replacement performed between 2001 and 2007 have been prospectively evalutated with mean follow up of 39 months. Young age, high functional activity level, good bone stock and absence of morphologic changes in femoral head and neck have been considered as indication for this implant. Pre-operative diagnosis was primary osteoarthritis (95%) and post traumatic arthritis (5%).
Four different kind of implants have been analyzed in this study, all implanted using a postero-lateral approach.
Two type of cement have been used (low and high viscosity), two different cementing technique have been performed: direct, with apposition of cement directly on the femoral head and indirect, in which cement has been applied inside the femoral component. Clinical evalutation has been based upon HHS pre-operatively and post-operatively, radiographics findings (radiolucency, osteolysis, bone thickening, femoral notching) have been analyzed and registered on the basis of Gruen scheme, while implant orientation of femoral components has been related to neck inclination (varus/valgus).
Results Indication to revision procedure has been loosening of femoral component in 2 cases, femoral neck fracture in 3. Anatomo-pathologic and hystologic examination has revealed extended signs of necrosis in all the epiphysis and polar cement concentration with lack of equatorial distribution. 1 case in particular has shown fracture of the neck with pseudo-arthrosis that probably could be explanation for pain.
Discussion Resurfacing arthroplasty is actually considered the most conservative option for young adult total hip joint reconstruction. But, only the respect of a 360° proper surgical tecnique, based on a careful dissection of peri-articular soft tissue, an optimal positioning of femoral component, an adeguate choice of cement viscosity and cementing technique in relation to implants' geometry could lay the foundations for the biological and mechanichal success of femoral resurfacing components, while a wrong management of even one of these variables could explain failures not clearly referable to crude surgical errors.

METAL ON METAL RESURFACING OF THE HIP: EARLY EXPERIENCES

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Background Metal on metal resurfacing hip arthroplasty is being performed frequently as an excellent alternative to THR in younger patients,with ostheoartritys. Our initial experiences with BHR are encouraging to go on this way and we can also extend the indications to older active patients and to other hip disease taking care of patient selection.
Materials and Methods 50 BHR in 49 patients were analyzed. The patients had an average age of 50,7 years, 38 (77.5%) were men, 11 women (22.5%), 72% had a diagnosis of ostheoartritis. Clinical and radiographic follow-up were performed at six weeks postoperatively, at six months and at one year.
Results At one year four hips (8%) were converted to total hip replacement because of fracture of femoral neck. We performed radiologicoal and clinical evaluation of the other 46 cases.
Clinical evaluation by Harris hip score had a mean of 96.3 points (range, 65 to 100). There was no pain in 94% of patients.
Discussion and Conclusions We are not able to draw conclusions about our first experience with the use of the metal on metal hip resurfacing, because of the short follow up, but the early results are encouraging, Excellent long term results, published by authors with resumption of high level of activity, make hip resurfacing an attractive solution for the treatment of hip disease in active patients preserving femoral bone stock. On the other hand the fracture of the femoral neck (partially due to the stepp lerning curve) represents the fearful complication of tjhese implants. During the early phase of this curve, there are many potential risk of suboptimal component placement wich can adversely affect outcome.
It is very important to optimize the alignment of femoral component with the anatomic main axis of the femoral neck to avoid notching and to cover all of the reamed bone with the femoral prosthesis.
Suggested readings

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DEXA EVALUATION OF PERI-PROSTHETIC STRESS SHIELDING OF HEMICEFALIC METAL ON METAL (MOM) HYBRID RESURFACING THA

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Background Metal on metal Resurfacing THA is an attractive treatment option for young patients because it saves the femoral head and is easily revisable. Because the risk of femural neck fracture or aseptic loosening with conventional MoM resurfacing THA, we developed a innovative surface arthroplasty prosthetic system. The femural component has high diameter femural head assembled on structural femural neck cementless stem. The inner surface of femural head is cemented while the femural stem is in titanium plasma sprayed. The aim of the study was to determine prospectively the bone mineral density and evidence of stress-shielding around the femoral component in this new type of hemicefalic resurfacing THA.
Materials and Methods Between agoust 2002 and dicember 2006, 54 MoM hybrid surface arthroplasties were performed in 52 patients. The patients had an average age of 55 (range 42–79 aa), 41 THA implanted (74,5%) were in man. All the acetabular component were flattened (165°) press-fit vacuum plasma sprayed cementless component, all the femural hemicephalic head were cemented and assembled with rounded press-fit femural neck component. Dual energy X-ray absorptiometry (Dexa) analysis was performed with Hologic QDR 4500 to define the Bone Mineral density (BMD). We define 7 different Gruen region around the femoral stem and one area on the acetabular side. Dexa analysis of femoral neck was performed pre-operatively on the operative and unaffected side; thereafter dexa follow-up were performed at 3,45 days, 3, 6, 12, months postoperatively and yearly thereafter.
Results This study is still running. Total periprosthetic BMD was similar to the healthy side; small difference did not reach statistical significance. On Roi 2 and Roi 4, lateral aspect of femoral neck, the median BMD was similar to the preoperative value. On ROI 7 and ROI 6, medial aspect of femoral neck the median BMD was greater 0,35 % than the control. On ROI 5 (at the prosthetic tip) there was an increase 0,49% in the median BMD. We need further analysis of different parameters, and patients to obtain results with statistical significance.
Conclusions The clinical preliminary experience with this hemicephalic hybrid metal-on-metal bearing is encouraging in young, active, adults. Dexa is a precise method of measuring small changes in the BMD around femoral component. Of course we will receive new data at the end of radiographic evaluation. We await medium-long term results to see if these early results are maintained.

RESULTS AFTER 300 HIP REPLACEMENTS USING A MINI-INVASIVE POSTERO-LATERAL APPROACH

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Background We describe a results of the hip replacements using a mini-invasive Posterior-Lateral Approach. This mini-approach saves the piramidalis and quadratus muscles, by detaching only the tendon of the obturator in the rotator muscles compartment and by reinserting in anatomical way the capsula and obturator tendon. Cecked and dislocated the tendons of the piramidalis msc. and of the quadratus msc, the obturator tendon is isolated at the trochanter joint and detached. The capsula is definitely visible at the neck junction and it is detached.
Materials and Methods We developed a modified method of the posterior-lateral surgical approach in the hip joint replacement since 2002. We carried out 300 hip surgeries by this technique. We used all the sizes of femoral and acetabular prosthetic components.
Results and Conclusions This procedure is performed without major sacrifice of soft tissue (TTS). Piriformis is an important stabilizer of the hip and your detached is unnecessary. We report a less blood loss, improved function in the first 6 months. we never had wrong stem positions in varus and valgus (within 5°) and for the first 20 cases we had 4 cased in valgus position (>45°<55°) for the acetabular prosthetic component. The cutaneus wound covered a length 6.8±1,2 cm. We had one case of anterior dislocation, for displastic related coxarthrosis.
Suggested readings

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TOTAL HIP REPLACEMENT: COMPARISON BETWEEN MINIMALLY INVASIVE AND STANDARD ANTEROLATERAL APPROACHES

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Minimally invasive approach for total hip arthroplasty (THA) is increasingly adopted. Many studies about this topic were presented in the last years, but reports regarding a comparison between the results of THA, performed with minimally invasive and standard approaches, using the same prosthetic device, in the same orthopedic centre, by the same orthopedic surgeon, are lacking.
Minimally invasive THA performed using an anterolateral approach with the patient in supine position would offer several anaesthesiological and surgical advantages over standard THA: in this study results obtained with both techniques in a series of THA performed employing the Synergy/Reflection prosthesis between January 2003 and June 2006 are reported. 62 patients were retrospectively evaluated (30 treated with standard technique – Group 1- and 32 with minimally invasive technique –Group 2 -).
Demographic characteristics (age, gender, BMI) and follow-up time (26 months; range: 3–42) were similar in both groups.
Surgical and hospital data were similar as well, with particular regard to surgical time, intra-operative and post-operative blood loss, length of hospital stay. The mean incision length was 16 cm (range: 14–20) in Group 1 and 8.5 cm (range: 7–10) in Group 2.
Clinical results obtained in Group 2, scored according to the Merle d'Aubigné Scoring System, were excellent or good and not different from those obtained with the standard procedure (Group 1). In Group 1 the aesthetic advantage (especially in females) was clear.
Significant differences in radiographic features, with regard to socket and stem alignment, zones of radiolucency, heterotopic bone formation around the hip, were not observed.
Only one intra-operative complication was observed in Group 2: a diaphyseal fracture occurred during femoral head dislocation and treated with plating before implanting the prosthesis.
Two post-operative complications occurred in Group 1: 1 case of DVT and 1 case of prosthetic loosening.
In our cohort the minimally invasive approach showed some interesting features compared to the standard technique, but only late results will confirm if this technique offer substantial advantages over the traditional procedure.

SHORT TERM EFFECTS ON HIP MUSCLES IN TOTAL HIP ARTHROPLASTY FOR OSTEOARTHRITIS, RELATED TO THE DIMENSION OF SURGICAL SKIN INCISION

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Background Several authors studied clinical results after total hip arthroplasty using minimally invasive tecnique (<10–12 cm), compared to larger surgical approach to the hip. Results are controversial [1, 2, 3] and there are no evidences that the use of a shorter skin incision can give clinical advantages. Also muscolar damage after

total hip replacement, evaluated by variation of interleukin-6, fatty acid binding protein, did not show significant differences in relation to dimension of skin incision [4]. No previous study of muscolar damage has been carried out with EMG.
Materials and Methods 20 patients surgically treated with total hip artrhroplasty for osteoarthritis were randomized to receive incision of 12 cm or less (group A: 10), or a larger one (group B: 10). All the patients were evaluated by electromyography of Gluteus Medius and Vastus Lateralis before surgery, one month and three months after surgery.
Results EMG results of 13 patients were avaiable at one month: 5 of group A (minimal incision) and 8 of group B (standard incision). Electromyography of Medius Gluteus and Vastus Lateralis muscles before and after surgery showed a mean improvement of the Recruitment Pattern larger in group B than in group A.
Discussion and Conclusions Less soft tissue damage has been used in promoting minimally surgery in total hip arthroplasty, however the biochemical evaluation of the muscolar damage did not showed any difference in relation to skin incision length [4]. EMG study at one month after surgery registered better results for what concerned the Vastus lateralis and Gluteus medius muscle demage using a skin incision larger than 12 cm. The complete data on 20 patients at 3 months will be reported in the final presentation. The skin incision lenght did not showed in this study correlation with lower damage of muscles.
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LEG LENGTH DISCREPANCY IN TOTAL HIP REPLACEMENT: STEM AND CUP NAVIGATED TECHNIQUE VERSUS CONVENTIONAL

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Introduction The Authors performed a matched paired study between 2 groups: computer assisted THR (Ca-THR) versus conventional freehand techniques for primary hip arthritis. They hypothesized that Ca-THR permits a real better control on leg length discrepancy with significant fewer cases of unacceptable levels of disparity. Furthermore they compared the 2 groups according to hip function and number of post operative dislocation.
Materials and Methods 42 patients with primary hip arthritis who underwent to a Ca-THR from February 2003 to September 2006 were included in the study (groupA). At a 6 months follow-up every single patients in group A was matched with a patient who had undergone to a conventional freehand THR (groupB) between August 2002 and May 2006 in our hospital. Criteria of matching were age, sex, arthritis grade, BMI and pre-operative limb length discrepancy Pre and postoperatively limb discrepancy was assessed radiologically using the method of Woolson et al.. The clinical outcome was evaluated using the Harris Hip Score and any dislocation was registered.
Results There were no significant differences in pre-operative limb length discrepancy between the 2 groups. The surgical time was statistically longer in group A. Post-operatively in group A the mean discrepancy was reduced to 0.6cm with no cases of discrepancy greater of 1cm In group B the mean discrepancy was reduced to 1.1cm but with 5 (11.1%) cases of discrepancy greater of 1.5cm.
At the latest follow-up no there were no statistically differences in the Harris Hip Score but with an higher score in group A. In group B 2 patients experienced hip dislocations and one patient was scheduled for a THR revision because of 3 dislocation. No case of dislocation was registered in group A.
Discussion According to authors experience, despite a longer surgical time, navigation of both stem and cup navigation in THR permits a further significant better control of limb length discrepancy.
In the computer assisted group they did not registered any dislocation. The Authors believe navigation in total hip replacement as a valuable tool to lower complications and improve implant performances.

HIP REPLACEMENT PERFORMED BY A DIRECT LATERAL APPROACH WITH USE OF COMPUTER-ASSISTED NAVIGATION

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Introduction In the last fiftheen years the use of navigation system in hip replacement has became more popular among orthopaedic surgeons because of less morbidity and greater accuracy.
For this reason many different types of software and systems have been developed in the last few years.
Materials and Methods We evaluated the first thirty hip replacements performed with the use of the navigation system. The study group was of 18 males and 12 females with a mean age of 67 yo. In all cases the diagnosis was of primary osteoarthritis. In all cases we detected the pelvic landmarks in supine position and used a lateral standard approach in lateral decubitus. We used a cementless stem Excia and Metha with cementless cup Plasmacup (Aesculap) and cementless stem ABGII with cementless cup Trident (Stryker-Howmedica). The data supplied from the navigation system were compared with the values of CT examination. The following parameters were evaluated: intra and post operative complications, time of surgery and components placement.
Results No dislocations, infections and early aseptic loosening were detected. In the evaluation of the cup position (inclination, antiversion) we detected significant differences between the navigation values and the CT data results. This result seems to be affected by the modifications of the pelvic parameters detected in supine position which could change at surgery in lateral decubitus. The parameters "lengthening" and "off-set" were similar in the navigation data and CT values.
Conclusions The use of navigation system in hip replacement seems to be a promising method. However the anatomical parameters detected in supine position are not reliable at surgery in lateral decubitus.

EARLY RECOVERY OF GAIT IN TOTAL HIP REPLACEMENT PATIENTS FOLLOWING THREE DIFFERENT SURGICAL APPROACHES

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Background Total hip replacement (THR) with a minimally-invasive (MIS) anterior approach is claimed to allow the patient a very rapid functional recovery being particularly conservative with respect to the gluteus medius and external rotators. The purpose of this

study is to compare three groups of patients operated with the same kind of hip prosthesis but with different surgical approaches (direct lateral, posterior and MIS anterior). The hypothesis is that the MIS anterior approach provides earlier and better gait performance.
Materials and Methods Thirty patients will be enrolled for this longitudinal study, randomised for the MIS anterior (10 patients), posterior (10 patients) or direct lateral approach (10 patients). Inclusion criteria are: age 60–75 years, arthritis, no involvement of other joints, no neurological diseases, and no obesity. A Medacta Quadra stem and Versafit Cup, both uncemented will be implanted in all patients. Ceramic on ceramic coupling with a femoral head diameter of either 32 or 36 mm is used. Surgery is performed by the same experienced surgeon. Rehabilitation starts immediately after surgery and three days later patients walk with two crutches, and full weight bearing. Patients are assessed by means of HSS. Gait analysis during level walking is performed using a Vicon 612 system for kinematics, two Kistler forceplates for ground reaction forces and joint moments, and the STEPPC for muscle activity during gait. Patients will be controlled before surgery, 7 days, after surgery and compared to a control group of healthy subjects matched for age and sex.
Results Preliminary results after 7 days evidence a slow gait, with reduced stride length and cadence in all groups. Hip kinematics show limited hip extension during terminal stance in the anterior approach group. Dynamic range of motion of the hip during gait is limited in all groups, according with reduced velocity. Hip joint moments are reduced in the sagittal plane, with differences in the anterior group for extension moment during stance. Adduction moment at the hip is reduced in all groups, mainly in the direct lateral approach according to a greater trunk displacement on the coronal plane. Surface EMG shows a prolonged activity during stance of thigh muscles and, only in the direct lateral approach group, of gluteus medius.
Conclusions A very early assessment of THR by means of gait analysis provides relevant information on the functional outcome with respect to the surgical approach. The best performance on the coronal plane of the group with MIS anterior approach, relative to a lesser damage of either abductor or external rotators muscles, however requires to be confirmed in a larger series of patients.

SURGICAL TREATMENT OF FEMORO-ACETABULAR IMPINGEMENT: PRELIMINARY RESULTS

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Background We have surgically treated 19 patients with femoro-acetabular impingement in the period 2005–2007.
Materials and Methods The average age was twentyseven years (range, twentythree to fifty years). Of these nineteen patients, ten were men and nine were women. All the patients were symptomatic for femoro-acetabular impingement, with persistent hip pain and mechanical symptoms, with a positive impingement test. In four of them the impingement was consequent of an acetabular fracture. The last ten patients were studied with conventional X-rays, 3D CT scans and arthro-MRI with radial scans. With arthroMRI we evaluated the femoral head-neck morfology, the labral lesions, the acetabular rim ossification. Twelve were "Cam"type impingement, with a femoral "pistolgrip" deformity, nine were "Pincer"type impingement. In two of them we found the cross-over sign. All of them were surgically treated with surgical dislocation, according to Ganz technique. A femoral head-neck reshaping, with trimming of the nonspherical part of the head, and acetabular rim trimming and labral refixation were performed. In five patients we performed a partial resection of the labrum. We found five condral lesions during surgery. Three patients were treated through a Smith-Petersen approach. Two fifty year's old patients, with grade II arthritis, were treated with surgical dislocation and autologous condral transplantation.
Discussion ArthroMRI is the best tecnique for labral tears, the femoral head-neck junction lesions, but not for chondral lesions. Surgical dislocation with femoral head-neck reshaping, and acetabular rim trimming should be performed in the initials steps of the impingement, when we can remove the mechanical impingement, that is the cause of the fibrocartilage lesions and of pain.
Results All the patients of the series recovered the hip R.O.M. and the hip pain. We didn't observed great trocanter pseudoarthrosis.

SESSION 0-03

KNEE TRAUMATOLOGY

RETROGRADE NAILING FOR THE TREATMENT OF ARTICULAR AND PERIARTICULAR DISTAL FEMURAL FRACTURES

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Background The incidence of distal femur fractures is approximatively 37 per 100.000 person years in USA and about 30 per 100.000 in U.E. Tipically, distal femur fractures are caused by high energy injury in young men or low energy mechanism in elderly women. These lesions need to be treated surgically in order to achieve an early good functional result. Retrograde nailing and Minimally Invasive Percutaneous Plating Osteosyntesis have become, in the last years, consolidated techniques even if there is still only limited evidence on which parameters to base treatment choices. A recent metanalysis on 963 femora fractures treated with retrograde nailing shows a rate to union > 95% in an average time of 3, 4 months with low rate of major complications (septic arthritis, deep infection, malunion).
Retrograde nailing represents a good alternative to M.I.P.P.O. technique in particular in elderly and osteoporotic patients because of minimal intraoperative bleeding, short operating time and minimal surgical approaches.
Materials and Methods We reviewed 35 patients with 35 distal femoral fractures treated from 2002 to 2005 with an average age of 43 years (range 19–62).
The average follow-up was of 16 months. Fractures were classified according to AO classification. Clinical and functional knee evaluation was performed at the last follow-up associated with standard X-ray films.
Conclusions The Authors will show the results of this retrospective study and discuss the most important aspects of the technique and implants in usual indications and in particular cases.
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TIBIAL PLATEAU FRACTURES: THE LONG TERM FUNCTIONAL OUTCOMES – RETROSPECTIVE STUDY OF CASES BETWEEN 2001–2006

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Background Tibial plateau fractures are common injuries and they are often associated with soft tissue injury. These fractures affect patients during the productive years of their lives and inadequate treatment may result in joint instability and deformity with a loss of range of motion.
Materials and Methods We examined the long term outcomes of the treatment of tibial plateau fractures between January 2001 and December 2006. All aspects of their care were documented (fracture type, associated injuries, surgical treatment). Preoperative radiographs were analyzed for fracture classification according to Schatzker's classification.
Results At the time of control we examined the range of motion of both knees, anterior-posterior stability, varus-valgus stability and limb lengths. We used Short Form-36 to measures health related quality of life and Iowa Knee Score to measure specific joint outcomes.
Discussion The outcomes of the radiological and clinical results show a difference in relation to the anatomical type of fractures and the age of the patients.
Conclusions The treatment of tibial plateau fractures is important to restore the normal function of the knee and to prevent the onset of progressive post traumatic arthrosis.
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ORIF IN TIBIAL PLATEAU FRACTURE

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Background Tibial plateau fractures make up about 1% of all fractures, yet continue to challenge orthopaedic surgeons because of the large amount of energy imparted to the knee during injury. The goals of treatment include anatomic reduction with restoration of the articular surface and mechanical axis combined with stable fixation to prevent secondary complication. These injuries often involve ligamentous lesions in combination with osseous fracture. Excellent results, regardless of choice in treatment, are dependant on near anatomic reconstruction of injured soft tissue and osseous structures. We report here our experience with open reduction and internal fixation of these difficult injuries.
Materials and Methods The University of Catania Hospital treated 96 tibial plateau fractures from January 2004 to December 2006. Fourty-five of these fractures were treated with open reduction and internal fixation by plate and screw. The averaged age was 40,3 (range 24–72 years). Most of these injuries involved high energy mechanisms. CT scans with 3D reconstruction were used to define the injury and guide treatment decisions. Postoperatively, the knee was protected with a hinged brace and ROM 0–30° for the first fifteen day. The patients were followed with serial radiographies at 1, 3, 6, 12 months. All patients was evaluated by SF 36.
Results Satisfactory reduction was achieved at the time of operative fixation for all forty-five fractures. The mean radiographic healing time was 5–6 months with all the patients returning to near normal activity at 10–12 months. One patient required hardware removal because of concern for deep infection but on inspection only superficial inflammation was found. No other complications, deep infections or repeat surgeries were encountered.
Discussion We employed open reduction and internal fixation for the treatment of Shatzker III, IV, V and VI fractures. The benefits of anatomic articular surface reconstruction via open reduction techniques should restrain infection risks, soft tissue complication and mal-union and non-union risks to a minimum.
Conclusions We submit that the gold standard treatment for high energy tibial plateau fracture continues to be ORIF. However, significant soft tissue may preclude the opportunity to employ ORIF. For this reason the surgeon should be familiar with alternative methods (external fixation and mini-invasive technique) to treat these injuries with severe soft tissue lesions.

TREATMENT OF COMPLEX TIBIAL PLATEAU FRACTURES BY TENXOR MODULAR HYBRID SYSTEM IN OUR EXPERIENCE

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Background Out of all fractures the tibial plateau ones are 1,5% even if their frequency is continuosly increasing. They reach a maximum peak between 30 and 50 years of age with a male/female ratio of 2:1. External fixation is a relatively simple and rapide method. It has been used since many years in tibial proximal metaepiphisys fractures. The more used classification system for this type of fracture are: the AO one and the Schatzker one. We prefere the latter one because it correlates better with this type of fracture and with its treatment.
Materials and Methods From January 2000 until March 2006 in the Orthopeadic University of Pisa, 53 patients have been operated on for reduction and synthesis of fractures by the hybrid modular system of external fixation (Hoffman II Tenxor). The majority of these patients had type VI Schatzker fractures and a minority had type IV-V fractures. 48 of them have been revisioned in time with an average follow-up of 2,5 years by the Knee Joint Score schedule.
Results The clinical and functional results were satisfying in 82% of patients, while the radiographic results were satisfying in 91% of patients. We had no important complication of treatment and the average healing time was 95 days.
Discussion The results obtained show that the ibrid implantation is a valid mean of sinthesys as also described by many authors in several studies on biomechanics. Furthermore the external fixation allows immediate mobilization with a trophic and smoothing action on the articular surface as described by Salter and this explaines why no patients had pain neither needed a new prostethic surgery within 5 years from the previous operation, eccept for just one case which had already been scheduled for surgery before the trauma event.
Conclusions We belive that external fixation of tibial proximal metaepiphisyis fractures is a byologic treatment very little invasive, simple to perform, well accepted, which can offer the same results as with other ostesynthesis methods, provided that it is well managed in the post-operative period. This method gives better functional results in those cases where reduction of fractures is not perfectly anatomical.
Suggested reading

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OPERATIVE STRATEGIES IN TIBIAL PLATEAU FRACTURES

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The incidence of tibial plateau fractures is steadily increasing. Motor vehicle accidents and especially motorcycle accidents being the main culprits. High energy trauma is responsible, aside from the fracture itself, for associated soft tissue and neuro-vascular injury. Operative strategies in this context are quite varied as well as often being multi-step procedures.
The Authors present their clinical experience as seen through the current classifications, in order to relate surgical treatment with exsternal fixation with Hofmann and screws with miniinvasive technic and their clinical results.

THE ARTICULAR RECONSTRUCTION IN THE TYPE C AO/OTA PROXIMAL TIBIA FRACTURES WITH THE PERI-ARTICULAR LOCKING PROXIMAL TIBIA PLATES

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Background Open reduction and internal fixation (ORIF) is the gold standard treatment for complex fractures of the tibial plateau. They represent about the 2% of all fractures and they can be very devastating for the stability of the knee, level of functioning and development of early osteoarthritis if anatomic reduction of the fracture is not achieved. A fixed angle device has been used to fix difficult fractures in which comminution or poor bone quality has been an issue.
Materials and Methods 34 patients between january 2003 and december 2005 were included into the study; mean age 47 years; follow up included an evaluation of the rom, pain level and functional recovery for adl's.
Results Mean healing time of 100 days, full recovery of rom in 88% of the cases, 90% returned to the baseline functionality level, 44% continued to feel occasional pain, 7 complications.
Discussion and Conclusions A priority in the surgical treatment of complex proximal tibia fractures is the anatomical reduction of the joint. Many studies have proved the development of an early oa in cases of incomplete reduction of the joint. The perilocking devices are able to provide an accurate fixation of these difficult fractures either on a poor bone quality.
Suggested readings

1. Wegener M et al (2004) New concept for bone fracture treatment and locking compression plates. Surg Tech Int 14:179–190
2. Ruth Jt (2001) Fractures of the tibial plateau. Am J Knee Surg 14:125–128

ARTHROSCOPIC TREATMENT OF TIBIAL PLATEAU FRACTURES WITHOUT BONE GRAFTING

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Background In tibial plateau fractures arthroscopy eases reduction with a minimal surgical trauma arousing the question if bone grafting is really necessary.
Materials and Methods In 1989–1994 26 patients were operated under arthroscopic monitoring for tibial articular fractures: 5 Schatzker type I, 4 type II,3 type III, 2 type IV, 2 type V and 8 intercondilar eminence fractures. Mean age 31.6 years (14–67). Internal fixation was obtained with kirschner wires and screws. In no case an osseous graft was used. After surgery followed 30 days of cast immobilization and 3 months of no weight bearing. Minimal follow up 36 months (36–96). All the patients were subjected to a functional (Rasmussen's Grading Score) and radiological evaluation.
Results A complete functional and radiological recovery was obtained in 24 patients without any complication or loss in the range of motion. A fair result was obtained in two elder patients with a Schatzker type III fracture in porotic bone. Cast immobilization was non related with any limitation of motion.
Discussion and Conclusions Arthroscopic treatment of tibial plateau fractures is feasible: an anatomical reduction is possible with minimal surgical damage easing postoperatory rehabilitation. In type III Schatzker fractures with porotic bone an osseous graft may improve results.

FAILURE OF OSTEOSYNTHESIS AFTER TIBIAL PLATEAU FRACTURES IN PATIENTS WITH GONARTHROSIS: TREATMENT BY KNEE ARTHROPROSTHESIS

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Background Tibial plateau fracture in patients with gonarthrosis may imply its worsening, owing to its complexity and difficulty of surgery technique, eventually leading to invalidating outcomes.
Objective the aim of this study was to evaluate failure cases of osteosynthesis in tibial plateau fractures in elderly patients already suffering from gonarthrosis, who were later treated with knee arthroprosthesis.
Materials and Methods From December 2004 to February 2007 we analysed 5 cases of tibial plateau fractures in patients over 65, who already showed x-ray signs of knee arthrosis; the fractures, classified according to Schatzker, were treated with cannulated screws; after a follow up between 6 and 24 months (average 13 months) and having obtained inadequate results, knee arthroprosthesis was implanted in 4 patients.
Results Screw removal and prosthesis implant both performed in one operation, presented some technical difficulties, particularly in those cases with deep lowering of tibial plateau and valgus deviation of weight-bearing axis > 10°. Criteria of admission to surgery were a varus-valgus deviation < 15° and flexum < 15°. The results in ongoing follow up show no residual pain, deambulation and axial deviation improvement, while knee ROM does not increase.
Discussion In severe gonarthrosis, tibial plateau fracture, even when treated surgically, may have invalidating consequences, not only due to the pre-existent knee arthrosis but also to a poor surgical technique. Under these circumstances, further surgery by prosthesis implant is recommended to restore axis and articular balance.
Conclusions In our experience, after overcoming the impasse of poor ostheosynthes results, further prosthesis implant led us to satisfactory clinical results.
Suggested readings

1. Rasmussen PS (1972) Tibial condylar fractures as a cause of degenerative arthritis. Acta Orthop Scand 43:566–575
2. Schatzker J, McBroom R, Bruce D (1971) The tibial plateau fracture. The Toronto experience 1968–1975. Clin Orthop 138:94–104

SESSION O-04

LOWER LIMB TRAUMATOLOGY

LESS INVASIVE STABILIZATION SYSTEM FOR DISTAL FEMORAL FRACTURES: RESULTS AND COMPLICATIONS

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Background The ideal treatment of distal femoral fractures consist in anatomical reduction of the articular surface and stable synthesis, so as to allow for an early knee mobilization. This kind of fracture represents an important therapeutic challenge, since it traditionally comes with a high complication rate.
Materials and Methods Out of 43 patients treated in our institute (Traumatology Department, CTO Hospital, Turin) with the L.I.S.S. since october 2003, 40 have been included in this study, with a minimum follow-up time of 6 months. All fractures have been classified according to the AO system. All patients were considered during the follow up period through evaluation of clinical and radiographical parameters through KSS (knee society score). Every patient has been also asked to express a subjective functional evaluation by filling the KOOS (knee injury and osteoarthritis outcome score) questionnaire.
Results Mean follow-up has been of 21.15 months (range 6–43). Clinical recovery whith full weight bearing was obteined, in general 90 days after surgical treatment. The average value of "knee score" (KSS questionnaire) has been in concordance with the literature reviewed; the KOOS questionnaire revealed major disappointment as for as ability to restart sporting activities is concerned. Better results were obtained in the case of extra-articular fractures, especially for low energy fractures.
Discussion The results of the study, according to clinical and functional evaluation questionnaires, were satisfactory. The L.I.S.S. seems to contribute to a stable synthesis that increases consolidation percentages.
Conclusions Results demonstrate that the L.I.S.S. combines an efficient synthesis and stability with the advantages of a less invasive surgical approach.

DISTAL NAIL LOCKING: A FREE-HAND TECHNIQUE

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Background Authors describe a new surgical technique that permits an easy distal locking in nails that haven't specific devices for that purpose. In literature (Krettek et al.) is demonstrated that the difficulty in making a distal locking device for the nails (especially in femoral nails) is due to the deformation of the nail during its insertion in the bone. So, very often, when the fracture is reduced and the nail is well positioned, it begins a new surgery for the distal locking.
Materials and Methods In the Trauma Unit of the Humanitas Institute of Milan Italy we use this technique since 2005. We present the results of 41 cases of femoral shaft fractures treated with statically locked nail. The technique was applied for different kinds of nails (Synthes Co., Zimmer Co., Stryker Co.).
The patient should be in a supine position with a traction device applied. The image intensifier is positioned at the distal femur oriented at 45° in respect of the inferior limb. One shot for the ap view and identification of the level of the hole is made. Identified this site in the same position of the image intensifier an axial view is taken at 0°. In this second shot the projection of the drill bit should be perfectly overlied on the nail (forgotting any image of the hole). At this moment the drill bit is actioned and the hole is always centered.
Results Every nail was locked in few minutes with few radiological shots. After a quite short learning curve actually every surgeon of the Unit is able to apply this technique with a medium time of 5 minutes and 10 radiological shots.
The most frequent complication in the first cases (not considered in this study) was the rupture of the drill bit (3 cases) that was overcome with the removal of the drill bit and a correct final position of the screw.
Conclusions The advantages of the technique are: the distal locking always succeeds and it happens in a very little time; it is useless to have a perfect round hole and so every nurse in the OR is able to simply moving the C arm from ap to axial view; the only device needed is a common drill bit.

OUR EXPERIENCE IN THE TREATMENT OF INTRA-ARTICULAR PILON FRACTURE OF THE TIBIA

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Background The tibial pilon fractures, a term which defines articular fractures of distal tybial third represent only about 1% of inferior limb fractures, but they potentially have a worse prognosys, showing a high risk of arthritic degeneration at a short-medium term.
Materials and Methods we report our experience in 12 cases of tybial pilon fractures, associated to distal tybial metaphisys, treated with a minimal ostheosynthesis and external fixation.
Results according to our experience, we believe that such technique present manifold advantages: minimally invasive surgical approach and respectful of vascularisation, anatomical reduction of articular fragments, stable ostheosynthesis and early mobilisation.
Discussion Pathogenesis of tibial pilon fractures has two important traumatic mechanisms, which can either combine or act separately: compressive and twisting forces. Their different combination implies different morphological aspects and affects prognosis of these fractures. The main causes are falls from above but also road accidents contributed to their increase and differentiation. The most popular classifications are by Ruedi, Allgower and Muller & coll. Diagnosis of tibial pilon fractures is simple and clinically and radiographically determined by Xray and TC scan, to highlight articular damage. In order to schedule an efficient therapy, it is necessary to evaluate several connected problems, among which: soft tissue and articular damage, fracture comminution and vascular condition.
Conclusions this technique can prove to be an effective alternative in the tybial pilon fractures, as we observed no incompatibility between external fixation and minimal ostheosynthesis; instead we believe that the latter may represent a useful counterpart of the former, provided it is performed respecting soft tissues, so to avoid algodistrophy, consolidation delay, and/or pseudoarthosys and vascular damage.
Suggested reading

1. Dall'Oca C, Bortolazzi R, Lavini F, Bartolozzi P (2004) Utilizzo del Fissatore esterno ibrido nel trattamento delle fratture del pilone tibiale. Aggiorn Club Ital Osteosint 10:222–224

USE OF EXTERNAL FIXATION IN THE TREATMENT OF PILON TIBIAL FRACTURES

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Aims Medium-long term results in pilon fractures treated with bridging or hybrid external fixation.
Materials and Methods From 2000 to 2004 34 patients affected by 13 Ruedi-Allgower type I fractures, 14 type Ii, 7 type III, whose average age was 47 have ben treated using external fixation. C.T. was performed preoperatively. Ovadia-Beals evaluation form has been used at follow up performed after an average period of 27 months.
Results 32 fractures healed in av. 107 days. We do not report non union or skin sloughing. 13 patients showed at the latest x ray clear signs of arthritis. In 2 case we observed screws osteolysis followed by fixator removal and plaster cast application. 1 case of deep infec-

tion occurred in a Gustilo 3b fracture taht required a BKA.1 case of early arthritis required ankle fusion.
Conclusions Post traumatic arthritis (30%) is comparable with the percentage reported by other Authors and it seems correlated by articular cartilage damage, the energy of trauma and soft tissues involvement. External fixation helps to reduce the early complication such as deep infection, amputation, non union. This method doesn't reduce the incidence of posttraumatic arthritis, even in the case of anatomic and stable reduction radiografically evident.

THE USE OF EXTERNAL FIXATION IN THE TIBIAL PILON FRACTURES

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Background The mechanism of injury and the prognosis of tibial pilon fractures are linked to many factors and their proximity to ankle makes surgical treatment more complicated. Different methods have been suggested for these injuries, including nonoperative treatment, external fixation, intramedullary nailing, and plate fixation. We evaluate the use of minimal invasive surgery with external fixation.
Materials and Methods Between 2003 and 2006, we treated 151 distal tibia fractures, 54 treated with external fixation. Both hybrid and bridging external fixation were employed, depending on involvement of the joint and/or methaphysis. Routine demographic data, clinical and radiographic findings as well as reduction, outcomes and complications were recorded.
Results There were 21 closed fractures and 33 open. Twenty-five articular and methaphysis were managed with Hybrid Fixation and twenty-nine intrarticular fractures with bridging Fixator. All fractures achieved complete healing. Reductions of C-type fractures were within 0–2 mm in 21 cases,3–5 mm in 7 cases and >5 mm in 4 patients. External Fixator was removed at an average of 17.5 weeks. Full weight bearing was achieved at a mean of 7.8 weeks. There were no intraoperative injuries to nerves or major vessels. Using the outcome scale of Ovadia and Beals, good-excellent results were achieved in 67% (n=36) subjectively and 77% (*n*=41) objectively. Two poor results occurred in patients with a varus malunion.
Discussion The optimal treatment of tibial pilon remains controversial. Open reduction and internal plate fixation results in extensive soft tissue dissection and may be associated with wound complications and infections. Benefits of early external fixation include preliminary fracture reduction, maintenance of fracture length, and control of edema.
Conclusions External fixation is a satisfactory method of treatment for fractures of tibia pilon and is associated with fewer complications than internal fixation, because it limits the amount of soft tissue. It provides adequate stability and allows early motion.
Suggested readings

1. Patterson MJ, Cole JD (1999) Two-staged delayed open reduction and internal fixation of severe pilon fractures. J Orthop Trauma 13:85–91
2. Dirschl DR (2004) Use External Fixation and Limited Internal Fixation. I.C. 235 – 71st AAOS
3. French B, Tornetta P 3rd. (2000) Hybrid External Fixation of tibial pilon fractures. Foot and Ankle Clin 5:853–871

DISTAL TIBIA FRACTURES: LOW PROFILE LCP VERSUS EX-FIX

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Background The treatment of the distal tibia fractures has always been a subject of discussion. Having no muscles, this anatomic area is characterized by a critical vascularization. The soft tissues, skin and subcutaneous tissue, are often very swollen and contused because of the twisting and tractions they get with the trauma. This damage of the tissues has always caused important infective and necrotic complications that can lead to a failure of the osteosynthesis.
For this reason the surgical approach has to be very attentive in evaluating the status of the soft tissues from which depends timing and treatment procedure.
The anatomic reduction of the tibial joint surface is mandatory in order to avoid painful arthritis with future evolution into articular ankylosis.
Discussion and Conclusions After a large case report revision we compare the results of the treatment of these fractures with two different methods: Ex-Fix versus LCP.
Suggested readings

1. Koulouvaris P, Stafylas K, Mitsionis G, Vekris M, Mavrodontidis A, Xenakis T (2007) Long-term results of various therapy concepts in severe pilon fractures. Arch Orthop Trauma Surg 127:313–320
2. Aggarwal AK, Nagi ON (2006) Hybrid external fixation in periarticular tibial fractures. Good final outcome in 56 patients. Acta Orthop Belg 72:434–40
3. Kapukaya A, Subasi M, Arslan H (2005) Management of comminuted closed tibial plafond fractures using circular external fixators. Acta Orthop Belg 71:582–589
4. Helfet DL, Suk M (2004) Minimally invasive percutaneous plate osteosynthesis of fractures of the distal tibia. Instr Course Lect 53:471–475
5. Borrelli J Jr, Ellis E (2002) Pilon fractures: assessment and treatment. Orthop Clin North Am 33:231–245
6. Francois J, Vandeputte G, Verheyden F, Nelen G (2004) Percutaneous plate fixation of fractures of the distal tibia. Acta Orthop Belg 70:148–154

FRACTURES AND NON UNION OF LEG WITH MASSIVE BONE LOSS: TREATMENT BY ILIZAROV METHOD

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Background Treatment of non-unions with massive bone and soft tissue loss is a challenging work. In this topic Ilizarov method has growing its importance. It permits fast recovery, weight bearing, tissue regeneration without plastic surgery. If bone distraction is started seven days from compactotomy and traction rating is near one millimetre a day, regenerated tissue rapidly become bone and soft tissues quickly repair in the same time. So other operations such as skin flaps or vascularized bone or tissue transfer become very rare.
Materials and Methods Among 1989 and 2006 we treated 33 patients affected by non union with massive bone and soft tissue loss in the leg segment. Non-union was often associated with osteomyelitis or extensive skin loss. Treatment principles include surgical debridement, stabilization, and bone regeneration for correction of defects. Bone loss was 2–20 cm. long; skin loss was 7–60 cm^2 large.
Results All fractures and non unions healed at final control. Average time of treatment was 9 months. It was relied with extension of bone loss. Minimal complies were frequent, but we haven't seen major (neurologic or vascular) complications.
Discussion Ilizarov method is difficult for the surgeon and hard and long for the patient. An orthopedic surgeon with good experience and a correctly informed and compliant patient are necessary for a good result. Other classic methods of treatment have 50–80% rate of success in massive bone losses; only this has a rate success of near 90–95% of cases.

Conclusions Ilizarov method is very useful in treatment of nonunions of the leg, especially in high-energy trauma and skin losses where other methods of treatment often failed.

Suggested reading

1. Catagni MA, Camagni M, Combi A, Ottaviani G (2006) Treatment of massive tibial bone loss by fibula transport with the Ilizarov frame. Clin Orthop Relat Res 448:208–216

FEMORAL RECONSTRUCTION USING EXTERNAL CIRCULAR FIXATION

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Background Can external fixation be used to accomplish femoral recostruction for deformity, non unions, bone defects, open fractures and leg length discrepancy?

Materials and Methods Adopting Ilizarov method concepts. Since july 2003 we treated in our Trauma Center in Milan,13 consecutive surgical procedures. The patients were affected by femoral fractures (7) or by malunion, delayed union and non-union with or without infection of the femora (6). We treated 9 males (2 pediatric) and 4 females (1 pediatric), with an average age of 32 years (range, 7–75). Quadricepsplasty was done in 2 patients for knee contracure. Additional tibial surgery was done in 4 patients. Bone grafting was not done. Circular frame were used for 13: Sheffield fixator(10), TSFrames(2) and traditional Ilizarov(1). We always used hydroxyapatite coated screws. Clinical and radiographic data were analysed. Average follow-up 18 months (range, 7–30).

Results All femurs are healed and free of infection. Average time in frame was 6 months (range, 2–24). There are not refracture complication. One shaft femoral osteomyelitis treated at the beginning with plate and screws synthesis was undergone.in second step. at hardware removal, infected bone resection and bone trasport (5 cm) by ex.fix.. After the distraction phase of lengthening the frame was removed and patient healed with orif.

Discussions External fixation of femur is a valuable technique for deformity correction, lengthening, repair of nonunions/bone defects and management of complex fractures.

Conclusions External fixation is particularly useful for minimally invasive deformity correction, lengthening,bone transport, and management of complex and infected nonunions. Additional procedures may be needed to manage obstacles and complications.

CORRECTION OF POST-TRAUMATIC DEFORMITIES BY OSTEOTOMY AND EXTERNAL FIXATION

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Introduction In post-traumatic deviations, the operative realignement of the joint axis is mandatory to prevent an early joint degeneration.1 Moreover, the angular deformity may cause a reduction in the normal R.O.M when it lies close to the joint. Post-traumatic deformities are usually multiplanar and deviations on the frontal, sagittal or horizontal plane can be mutually associated. The aim of this paper is to report on the results of surgical treatment of these deformities by osteotomy and unilateral external fixation (EF).

Patients and Methods We reviewed the files of all patients affected by long bones post-traumatic deformities treated in the 2000–2006 period. We selected only patients in whom the correction was obtained by osteotomy and EF. A total of 16 patients fulfilled these inclusion criteria. In all cases a MMF or Orthofix device was used. Fourteen deformities occurred in tibia and two in humerus. The osteotomy level was set preoperatively according to Paley et al. The postoperative angular correction, the mechanical axis, as well as the development of osteoarthritic changes were clinically and radiographically evaluated on follow-up controls.

Results No patient had undergone total arthroplasty or reported disabling pain in the joints nearby the operated bone segment. A nearly normal ROM was detected in these joints in all patients but one, affected by preoperative knee osteoarthritis. The mean time until consolidation of the osteotomy was 3.8 months (2.2– 4.8). Complete normalisation of the frontal axis of the involved bone was observed in 12 tibial and in the 2 humeral cases. In two tibial deformities we were forced to carry out the osteotomy far away from the centre of rotational angulation (C.O.R.A.), because of a skin dystrophy. In these cases a clinically silent translational deformity developed.

Discussion and Conclusions The results of surgical correction of posttraumatic deformities with osteotomy and EF were satisfactory. The main advantage of EF is represented by its flexibility which enables the surgeon to correct even complex deformities, allowing postoperative adjustments of the bone axis.3 Moreover, no iterative surgery is required to remove the hardware.

Suggested readings

1. Gladbach B, Pfeil J, Heijens E (1999) Correction of leg deformities. Definition, estimation and realignment of axis deviation and misalignment. Orthopade 28:1023–1033
2. Paley D, Herzenberg JE, Tetsworth K, McKie J, Bhave A (1994) Deformity planning for frontal and sagittal plane corrective osteotomies. Orthop Clin North America 24:425–465
3. Price CT (1994) Unilateral fixators and mechanical axis realignment. Orthop Clin North America 24:499–508

TRAUMATIC DISTAL FEMORAL BONE LOSS TREATED BY ALLOGRAFT AFTER EXTERNAL FIXATION: CASE REPORT

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Background Massive traumatic bone loss of articular surface in the lower limbs in young patients are challenging for the orthopedic treatment. The use of prosthetic arthroplasty is not always appropriate in young patients. The use of allograft bone substitutions is common in resection surgery for bone tumors, but not so used in traumatology. Allograft substitution of skeletal segments is now more available in Italy through Regional Tissue Banks.

Materials and Methods Authors report about a young patient affected by serious exposed fracture of the left knee (supraintercondylar) with loss of the major part of the lateral femoral condyle after motorcycle accident. Emergency treatment was carried out by external fixation until the healing of the medial and supracondylar femoral fracture. After one year, reconstruction of the entire lateral femoral condyle by massive allograft, sized by TC measurement and fixed by a locking plate, was performed in order to reconstruct the knee joint.

Results At one year follow-up no infection was detected and a complete bone integration of the allograft was instrumentally demonstrated. The patient was able to progress to full weight bearing and the articular range of motion was from 5° to 90°. Daily living and working activities were completely resumed by the patient.

Discussion Joint arthroplasty in traumatic cases is not always the best choice. Among different treatment options for reconstruction of serious traumatic articular bone loss in the lower limbs in young patients, allograft reconstruction of the articular surface is a valid option also in our country.

Conclusions Allograft bone substitution of large fragments lost due to traumatic injuries in young patients is a choice.

COMPLEX PROXIMAL FEMORAL FRACTURES (3.1 A2, A3; 3.2 A,B,C) TREATED WITH CEPHALOMEDULLARY NAILS

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There is no better clinical evidence to treat pertrocantheric, subtrocantheric femoral fractures with cephalomedullary nails. Our proposal is a second generation nails (205 mm long, 4° prox-distal angle, 125°–130° inclination angle, 11 mm distal diameter, antirotational wire hole, pushing screw, subtrocantheric 4.5 mm screw slot, two distal 4.5 mm screw holes, fluted-end distal tip) for the treatment of 3.1 and 3.2 AO proximal femoral fractures not randomized study (40 - vs – 40, 3.1 AO fractures treated with Gamma 3 and Supernail) was done to compare 40 pertrocantheric fractures treated with Gamma 3 nails vs 40 similar fractures treated with Supernail (our first generation cephalomedullary nail).
The results (healing time, blood loss at 1th and 3th postop. day, rehabilitation recovery) were the same.
The second step of our study has been to add an intermediate slot (at the level of subtrocantheric area) in a cephalomedullary long nail (Supernail long). This slot allows a three directionable 4.5 screw for an interlocking synthesis.
Thirty-three unstable per-subtrocantheric fractures (13:3.1–A2.2; 8:3.1–A2.3; 4:3.1–A3.3; 8:3.2 A and B) were treated with the shortest lengt of Supernail long (27 cm).
Thirty-one healed; 2 failed (1 not reparated; 1 reparated with Uninail); 4 complications (1 loss of reduction; 2 DVT; 1 distal fracture).
The third step has been a one size lengt (205 mm) cephalomedullary nail named uninail.
Uninail has a four directionable 4.5 screw intermediate slot.
Our aim is an extensive use (arounde 95% of proximal femur fractures) of this unique size nail for easy devices indication, reduction of storage and prize.

SESSION 0-05

ANKLE ARTHROPLASTIES AND REVISIONS I

FEMORAL COMPONENT ROTATION AND SOFT TISSUE BALANCING IN TKA: STATE OF ART

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Background Soft tissue balance as well as the femoral rotation are crucial parts of total knee artrhoplasty (TKA). To ensure proper kinematics, balance must be achieved in flexion and extension.
Failure to do so might result in poor range of motion, early polyethylene wear, patello femoral problems, early loosening and painful knee. [1, 2, 3]. To get this goal the navigated technique combined with a quantitative method soft tissue tension should be the solution[6].
Materials and Methods The objectives of this study are: a) to evaluate, by a CT-Less navigation system, the liability of the usual parameters, used in determination of femoral component rotational alignment, in TKA; b) to compare the clinical outcome in a TKA conventional technique vs. a computer assisted TKA, combined with a tensor-sensor device, in two groups of patients homogeneous for age, gender, type of deformity, pathologies. The surgical technique is based upon the "tibia cut first", utilizing the same prosthesis.
Results In all the CAS patients it's got an aligned and balanced knee, both in flexion and extension. The comparison between two groups of patients has underlined less outliers in the CAS group than in the conventional one; the analysis of the IKSS shows a statistical meaningfulness (CAS vs. STD) in all three aspects:pain score $p<0,03$, functional score $p<0,018$, knee score $p<0,007$.
Discussion In our hand we noticed that any single reference to align femoral component isn't suitable. The guidelines to control femoral rotational alignment is the tibial cut with ligament balancing integrated by the APLline The CAS provides the surgeon with quantitative feedback on gap balance and soft tissue tension. The reliability of estabilishing femoral rotational alignment by CAS compared to the traditional techniques is controversial [4, 5], but in our study the best clinical outcome has been in CAS group rather than the conventional one.

IN-VITRO PATELLAR TRACKING IN TOTAL KNEE ARTHROPLASTY. EFFECTS OF PATELLAR RESURFACING ON KINEMATICS

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Background Clinical literature for total knee arthroplasty (TKA) reports contrasting evidence on the efficacy of patellar resurfacing. Patellar mal-tracking after TKA, generally associated to prosthetic component misalignment in both tibio-femoral (TF) and patello-femoral (PF) joints, introduces anterior knee pain and patellar subluxation. Femoral and tibial components are implanted with no care of patella tracking. It is still unclear whether the resurfaced patella adapt better to the prosthetic femoral trochlea. The aim of this study was to identify whether or not patellar resurfacing restores better natural patellar tracking.
Materials and Methods Eight amputated legs with the knee joint free from anatomical defects, intact capsule and full quadriceps tendon were analyzed using the Stryker® Knee Navigation System (Kalamazoo, MI-USA). In addition to standard trackers, a prototypal tracker was manufactured for the patella. Flex/extension, intra/extra rotation, ad/abduction were calculated at the TF joint according to standard mathematical conventions. Flex/extension, medial/lateral tilt, rotation and shift were also calculated at the PF joint according to a recent proposal from these authors. Five trials of passive knee flexion were performed with a 100N pulling-force on the quadriceps, before and after TKA (cruciate-retaining Scorpio®, Allendale, NJ-USA), both with and without patellar resurfacing.
Results The mean difference over the TF flexion arc between the intact and replaced knee, both before and after resurfacing, was calculated for each of the kinematics variables as above. For the three TF rotations, the difference between intact and replaced joint were smaller than 2°, no matter on resurfacing or not resurfacing TKA. Before resurfacing, PF flexion, rotation, tilt and shift had mean differences equal respectively to 1.8°, 2.6°, 5.2° and 1.5 mm averaged over the eight knees. These become respectively 0.7°, 4.8°, 2.9° and 3.2 mm after resurfacing. In the intact knee, the patella shifts slightly medially in 0–30° TF flexion, and, afterward, markedly laterally; in resurfacing TKA, this trend is opposite with peak differences between intact and replaced knee of about 10 mm.
Discussion This in-vitro study is among the very few reporting comparisons between resurfacing and not resurfacing TKAs. Patellar resurfacing changed knee kinematics limitedly for most the degrees of freedom, except for PF shift which was less physiological in our resurfaced TKAs. Unfortunately large shift is in fact cause of high stress to the retinacula and can result in anterior knee pain, important reason for TKA failure.
Conclusions Studies are in progress to detect possible different effects in posterior-stabilised TKAs.

RELIABILITY OF LIGAMENTOUS BALANCING DURING NAVIGATED TKA

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A poor ligamentous balanging may affect the results of TKA by causing instability, stiffness and/or pain. Instability alone accounts for 10% to 27% of all revised TKA. Current techniques for ligamentous balancing include the symmetric rectangular extension and flexion gap and the gap equalization techniques. Both techniques provide high rates of satisfactory results; however, they entail well known limitations including difficulties in quantifying the soft tissue imbalance during surgery and determining the correct rotation of the femoral component which eventually affects flexion stability. Navigation may theoretically overcome these issues but, at present, the beneficial effects of the computer have to be demonstrated. In two different studies the authors analyzed the reliability of ligamentous balancing and the accuracy in identifying the correct rotation of the femoral component with navigation. In the first study, the accuracy of a currently used manual spreader was compared to that of a load tensioning device in measuring the medial and lateral gaps at 0° and 90° in 40 consecutive navigated knees. The results showed that flexion/extension gaps measured with the 2 devices differed more than 3mm and more than 5 mm in about 30% and 10% of cases, respectively. Moreover, a linear correlation was found between the severity of the deformity and the discrepancy in the measure obtained with the two instrumentations. In the second study the accuracy in determining the correct rotational alignment of the femoral component using correct or incorrect bony landmarks for navigation was investigated. The results showed that even small errors in palpating the medial and lateral epicondyle led to significant errors in the rotation of the femoral component.
In conclusion, navigation may improve ligamentous balancing but a load tensioning device, rather than current manual spreader, should be used. Navigation does not seem to improve the rotation alignment of the femoral component.

INTRAMEDULLARY FIBULAR ALLOGRAFT FOR MANAGEMENT OF PERIPROSTHETIC FRACTURE ABOVE TOTAL KNEE ARTHROPLASTY

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Background Fracture of the distal femur involving total knee arthroplasty is a difficult orthopaedic problem particularly in patients with poor bone stock. Such fractures may occur with minimal trauma and are usually associated with comminution.
These fractures can be treated by both conservative and surgical methods. Conservative treatment is generally used for undisplaced fractures. Surgical options include open reduction and internal fixation external fixation, retrograde supracondylar nailing, minimally invasive internal fixation, revision arthroplasty, primary arthrodesis, distal femoral allograft or prosthesis.
Materials and Methods We report a series of comminuted displaced low periprosthetic fractures above total knee arthroplasty in three patients treated by using an intramedullary fibular strut allograft and a lateral buttress plate. The patients ages ranged from 74–90 years and all were grossly osteopenic on radiographs.
Results All three fractures healed within a period of 12 to 24 weeks. A satisfactory alignment was achieved in all cases. There were no postoperative complications and no case of loss of reduction or implant failure at the last follow-up.
Discussion The aim of treatment in these fractures is to achieve a painless and stable knee without residual malalignment. Fracture associated with loose implants can be treated by revision total knee arthroplasty but if implants are well fixed rigid internal fixation is recommended. Although some studies have reported good results after nonoperative treatment, several authors have recommended open reduction and internal fixation using conventional plates or supracondylar nails to treat these fractures. The supracondylar nail is becoming the treatment of choice in the majority of displaced periprosthetic fractures of the distal femur as it is a simple, safe and a less invasive procedure, having limitations in presence of severe comminution and in an extremely distal fracture.
In patients with poor bone stock and comminution bulk structural allograft or a custom made distal femoral prosthesis may be required. These procedures are demanding and need access to bulk allograft and customised implants.
Previous studies have reported the use of fibular autograft or allografts with good results but concerns regarding donor site morbidity, devascularization of the fracture site and biomechanics of the bone-graft construct. Our technique is simple, allows accurate reduction and rigid internal fixation and help to restore bone stock.
Conclusions This technique can be a feasible treatment option for periprosthetic fractures in this difficult group of patients, having both biological and mechanical advantages.
Suggested reading
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MANAGEMENT OF INFECTION AFTER TOTAL KNEE ARTHROPLASTY: A TREATMENT'S ALGORITHM

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While infection after total knee arthroplasty is a relatively infrequent complication, it can be devastating in terms of patient morbidity and institutional expenses.
Such strategies should focus on establishing a rapid and accurate diagnosis and developing clear and effective treatment algorithms that yield favorable long-term results according to clearly defined criteria.
The clinical presentation of an infection at the site of a total knee arthroplasty can be used as a guide to treatment, including the decision as to whether the prosthesis should be retained or removed.
In fact the management of infection after total knee arthroplasty depends on the chronicity of the infection, host factors, sensitivity of the infecting bacteria and stability of the implant.
Once the diagnosis has been established, the variables that must be considered before treatment is initiated include (1) the type of surgical site infection (superficial or deep), (2) the time that has elapsed between the arthroplasty and the diagnosis of infection, (3) whether the implant is fixed or loose, (4) the pathogen(s) responsible for the infection, (5) host factors that may adversely affect the treatment of the infection, (6) the condition of the soft-tissue envelope surrounding the knee (specifically, the integrity of the extensor mechanism), (7) the ability of surgeon, and (8) the patient's expectations and functional requirements.
Goals of treatment of an infection at the site of a total knee arthroplasty include eradication of the infection, alleviation of pain, and maintenance of a functional extremity. The six basic treatment options include (1) antibiotic suppression, (2) open débridement, (3) implantation of another prosthesis, (4) arthrodesis, (5) resection arthroplasty, and (6) amputation.
We propose an algorithm of treatment for an infection on the site of total knee arthroplasty drawn on the base of our experience and an analysis of the literature.

TWO STAGE REPLACEMENT ON SEPTIC TOTAL KNEE ARTHROPLASTY

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Background In septic TKA cases we use the two - stage technique. Our survey is composed by 55 cases have been treated with this method to obtain healing outcomes.

Materials and Methods Just one case, among the 55 treated cases, was an unicompartmental-knee prosthesis while the others were all total prostheses. The replacement was performed after a period ranging from 40 days, as low point, to 80 days, as high point, starting from the time when the explant was removed and after the normalization of the septic hematic parameters and scintigraphy osseous with marked leucocytes. In 47 cases a semibonded prosthesis with fixed meniscus was utilized which was always stabilized with taproots and cemented by using antibiotic cement. While in the unicompartmental-knee prosthesis revision case a first surgery prosthesis was utilized. A retraction of patellar tendon with patella baja has often been noticed at the time of explant. For this reason the tibial tuberosity was detached 22 times for patella positioning, while in just one case we used the V opening technique of the quadriceps with patellar distal flip.
Results At the moment there has been 2 re-infection treated with arthrodesis. As to other complications we found that two screw's decubitus placed to stabilize the tibial tuberosity, removed without troubles, and an important flex extension defect partially retrieved after new surgery. The radiological alignment supported by taproots centrage is excellent even if we observed one case of cortical reaction.
Conclusions In spite of the difficulties of treated cases the outcomes are convincing. The combination of the type of prostheses utilized and the GAP technique gives high stability to the system. The tibial tuberosity detachment is fundamental for a good exposure of the operatory field and to the patella positioning.
Suggested readings

1. Hart WJ, Jones RS (2006) Two-stage revision of infected total knee replacements using articulating cement spacers and short-term antibiotic therapy. J Bone Joint Surg Br 88:1011–1015
2. Volin SJ, Hinrichs SH, Garvin KL (2004) Two-stage reimplantation of total joint infections: a comparison of resistant and non-resistant organisms. Clin Orthop Relat Res 427:94–100
3. Infection after total knee arthroplasty (2004) J Bone Joint Surg Br 86:688–691
4. Nazarian DG, de Jesus D, McGuigan F, Booth RE Jr (2003) A two-stage approach to primary knee arthroplasty in the infected arthritic knee. J Arthroplasty 18[7 Suppl 1]:16–21

USE OF AN ARTICULATING SPACER IN TWO-STAGE REVISION FOR INFECTED KNEE ARTHROPLASTY

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Background The aim of this study is to review our experience with antibiotic loaded articulating spacers, in order to estimate the treatment effectiveness and the functional outcomes.
Materials and Methods Between 2001 and 2005, 8 patients with infected TKA were treated with two-stage revision.
The therapeutic protocol included a first procedure to remove the prosthetic components, sampling of tissues for microbiological examination, debridement and implant of an articulating spacer, Spacer K® (Tecres, Sommacampagna, Italy). A wide spectrum antibiotic treatment was started during surgery. Once antibiogram result was available, antibiotic therapy was modified according to sensitivity of the bacterial strains isolated and carried on for at least 4 weeks. The patient were supervised monthly, with x-ray of the knee and white cells count, ESR and PCR were tested every 15 days. At the laboratory parameters normalisation antibiotic therapy was suspended and a joint aspiration for microbiological investigation was carried out. The indication to revision was given when cultural tests resulted negative. The patients' clinical records provided information on clinical evaluation before surgery, duration of surgery and period of hospitalization. At follow-up the patients were evaluated using clinical, laboratory and radiographical data.
Results The mean follow-up time was 31 months. Signs suggestive for deep infection were absent in 7 patients (87.5%). Only 1 mechanical complication was observed: breakage of the femoral component of the spacer. Before the treatment, the mean KSS was 36 and 39, with a mean ROM of 61.2°. Extension defect was present in 4 patients. At follow-up, the mean KSS was 83,6 and 60, with a mean ROM of 100°. Extension defect was present only in the patient with persistent infection.
Discussion Antibiotic loaded cement spacers are considered useful thanks to their biological and mechanical action. The industrial production gives well-defined physical and chemical properties. The use of a spacer helps to preserve bone stock, limits growth of retracting scar tissue making easier the revision.
According to our experience, advantages are also the reduction of surgical time, of blood loss and the shorter hospital stay, thanks to early joint and patient mobilisation, even between surgical stages. All patients showed good functional outcomes at follow-up time.
Conclusions In our experience the articulating Spacer K® is a safe and effective device for the management of the infected TKA.

MANAGEMENT WITH CIRCULAR EXTERNAL FIXATION OF A COMMINUTED FRACTURE OF THE DISTAL FEMUR ON TOTAL KNEE ARTHROPLASTY

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Fractures of the distal femur near a total knee arthroplasty are challenging clinical problems; moreover, the complication rate after treatment is high (25 %–75% in the literature).
In a recent classification system in three types proposed by Kim et al (2006), taking into account prosthesis status, bone stock and fracture reducibility, therapeutic modalities include immobilization, retrograde intramedullary nailing, ORIF, revision arhroplasty. Treatment with external fixation is not frequently reported in the literature.
We report a case of comminuted fracture of the distal femur on total knee arthroplasty successfully treated with circular external fixation.
A 59 years old woman with severe arthritis of the left knee was treated with total arthroplasty. Two years later she sustained a comminuted fracture of the distal femur due to a low-energy trauma. The X-ray picture showed a fracture classified as Type IB (according to the classification of Kim et al), without any sign of prosthetic loosening. The patient was treated with close reduction and synthesis by means of an Ilizarov external fixation device (with femorotibial fixation during the first two months) and gradual weight-bearing was allowed. Afterwards, the distal part of the assembly was removed, and gradual knee mobilization was started. After further two months, X-ray analyses showed fracture healing; the external fixation device was removed and the patient continued physiotherapy.
Today, 3 years after the removal of the external fixator, the patient is pain-free and the knee is stable with a ROM of 90°. Recent X-ray examinations confirm the complete fracture healing with a good lower limb axis, and don't show any sign of prosthetic loosening.
The use of circular external fixation in traumatology offers many advantages, such as simple and atraumatic surgical technique, early functional weight bearing and active joint motion, realignment action on any point of the bone circumference and in any phase of the treatment, easy removal of the apparatus at the end of treatment. Moreover, this case presented neither early or late complications but a slight limitation of the knee joint motion, confirming that circular external fixation can be considered a valid option for the treatment of these injuries.
Suggested reading

1. Kim KI, Egol KA, Hozack WJ, Parvizi J (2006) Periprosthetic fractures after total knee arthroplasties. Clin Orthop Relat Res 446:167–175

TOTAL KNEE ARTHROPLASTY COMPUTER – ASSISTED SURGERY PERFORMED BY DIFFERENT NAVIGATION SYSTEMS: PROBLEMS SOLVED AND PROBLEMS TO SOLVE

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Background Total knee arthroplasty surgery performed with navigation - system assistance has become a common procedure for few years. Different navigation systems with different softwares are nowadays available with values and defects.
Discussion and Conclusions Bone morphing, mechanical axes, bone cutting, ligamentous balance, joint line are just some of the questions we are asking for. Different navigation systems give us different answers. Authors present their own surgical experience of TKA computer assisted with two different navigation systems (De Puy and Zimmer).
Suggested readings

1. Seon JK, Song EK (2006) Navigation-assisted less invasive total knee arthroplasty compared with conventional total knee arthroplasty: a randomized prospective trial. J Arthroplasty 21:777–782
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3. Tria AJ Jr. (2006) The evolving role of navigation in minimally invasive total knee arthroplasty. Am J Orthop 35[7 Suppl]:18–22
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SESSION O-06

HIP TRAUMATOLOGY I

FRACTURE – DISLOCATION OF THE FEMORAL HEAD

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Background Fracture – dislocation of the femoral head are very uncommon. Traumatic hip dislocation accounts for 2 to 5 percent of all dislocations. Hip dislocation is usually associated with acetabular fractures. The most frequent is the posterior dislocation. Bilateral dislocation is very rare and even more unlikely is asymmetrical dislocation. Pipkin report in 1957 the classification of this kind of fracture.
Materials and Methods From 2001 to 2006 we report a series of 22 cases in 20 patients, 2 bilaterals: 1 symmetrical and 1 asymmetrical. In 7 cases an acetabular fracture was associated, 4 omolateral, and 3 controlateral. 6 cases were treated with osteosyntesis, 15 cases with the remotion of the fragment and 1 without surgery.
Results We evaluated the results with the Thompson and Epstein score. The medium follow up was 2 years for 17 patients. 1 patient was excelent, 8 good, 4 sufficient.
Discussion The "Pipkin" fractures are very rare. It is necessary a correct diagnosis with Rx and CT. It has been widely demonstrated that the risk of necrosis is correlated to the length of time the hip is dislocated. The surgical approach is anterior with a Smith-Petersen if the fragment is good for reduction. A Kocker posterior approach must be done to remove the fragment. The immediate complications of this patology can be sciatic nerve strain in the posterior dislocation, or iliac vessel compression in the anterior dislocation. The late complications are avascular head necrosis, post-traumatic osteoarthrosis, or periarticular ossifications.
Conclusions These fractures must be treated surgically. When the fragment is big and not so damage it is necessary to fix it. If the fragment is damage or small it is necessary to remove it. In delayed reductions of the hip the risk of necrosis can be as high as 40%. Therefore, in this case it is absolutely necessary to recognize and reduce hip dislocation.

ARTHROPLASTY IN FRACTURES OF THE FEMORAL NECK WITH LARGE FEMORAL HEAD SIZE: THE ACETABULAR CUP "AVANTAGE"

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Background Since 2004 we have been dealing with the medial femoral neck fractures by employing, not only the conventional endoprosthesis, but also the total hip arthroplasty in elderly patients, making use of the acetabular cup "Avantage". Besides its elasticity, it allows the use of large femoral heads as well as the metal-polythylene biarticular coupling. The large diameter of the heads is useful to avoid the incidence of dislocation of the implant, which represents the worst direct complication.
Materials and Methods Patients were selected with respect to their biological age rather then their real age and their real physical and rational power.
Results Evaluated with the Harris Hip Score, are extremely encouraging, since the functional recovery has been considerably quicker and generally better as compared to the recovery of patients, who had been implanted either cemented or noncemented biarticular endoprosthesis, and patients who had been implanted an arthroplasty with heads of conventional diameter.
Discussion Our results and medical literature have been critically analysed both taking into consideration the pure clinical records (joint mobility, material wear, personal satisfactory rating), but also cost estimation, which confirmed the correctness of our choice, that is, nonetheless, reserved only for fit patients.
Confirmation of our selected approach has also been supported by the need of implant revision of biarticular endoprosthesis in patients, who had developed cotyloiditis. These patients had been implanted with an acetabular cup Avantage.
It is important to point out that a patient that is surgically treated for fractures of the femoral neck has greater functional needs than a patient who undergoes arthroplasty to treat coxarthrosis. In these cases, the acetabular cup Avantage is the best solution.
Conclusions The results achieved so far are encouraging and spur us to continue to treat medial femoral neck fractures using arthroplasty with large-diameter heads, also because this kind of fractures is more and more frequent, due to the increasing population average life expectancy.

THE EVOLUTION OF ENDOMEDULLARE NAILING IN THE LATERAL FRACTURE OF THE NECK OF FEMUR

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Background The frequency of lateral fracture of neck of femur continues to rice in direct proportion to the rice of the average age of the population. Such fractures are seriously incapacitating and prolonged bedrest leads to serious complications. Therefore the patients must be helped on to their feet as soon as possible.
Materials and Methods In the Orthopaedic department of Ostuni (BR) treatment of this fractures has undergone an evolution in recent years. At the end of the 90's we had abandoned the Ender nails to begin use the Gamma nail. Subsequently the PFN nail has been used whit good results and lately we used reduced size nails such as Endovis B.A., Gamma 3 and ATN in titanium alloy.

Results The size-reduction has lead to a reduction of bleeding and of operation time and the use of titanium alloy permits a more flexible knitting, better than the older nails.
Conclusions Endomedullar nails are the preferred method in the treatment of lateral fractures of neck of femur due to its rapid application and biomechanical advantages. The latest generation of the reduce nail are less rigid in order to reduce complications.

SURVEY ON THE APPLICATION OF VERONAIL ON PERTROCHANTERIC FRACTURES

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Introduction Pertrochanteric fractures are common in elderly people; for this reason early results are based on: mortality rate, functional recovery, biological and mechanical complications.
Materials and Methods 80 patients aged between 47 years and 98 years (mean age 79,4 years) sustained 39 fractures type A1, 35 fractures type A2, 6 fractures type A3 (AO classification). They were treated with Veronail, an I.M. device that offers the option of applying two cephalic screws in parallel configuration (allowing controlled compression) or convergent configuration (firmly anchored to the nail). Early evaluation (4–6 months follow-up) are based on: operating time, necessity of reaming, postoperative blood transfusion, functional recovery using a modified Harris hip score, mechanical complications, mortality.
Results 16 patients died, in 96,25% of patients nail has been inserted without diaphyseal reaming, in 38% of cases, 1,62 I.U. of blood have been infused postoperatively, mean application time (skin to skin) was 37 minutes, preoperatory modified Harris hip score was 72 (scale maximum is 91), at discharging was 45% of the preop, at 6 weeks 87% of the preop, at six months 95% of the preop, 1 cut-out, followed by hip prosthesis and 1 case of screw head protrusion are reported.
Discussion and Conclusions The observations based on the reported results and the literature, allow to conclude that the system has a low degree of invasivity, ensures a quick functional recovery and shows a minimal percentage (2%) of mechanical complications.

MINIMALLY INVASIVE PLATE OSTEOSYNTHESIS WITH DHS IN THE TREATMENT OF STABLE PERTROCHANTERIC FRACTURES

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Introduction In the treatment of stable pertrocantheric fracutres, sliding-compression extramedullary devices are the technique of choice. Patients who sustain such fractures are usually frail, elderly and in poor general conditions. Reduction of the surgical impact on these patients is mandatory.
Some authors have proposed to treat these fractures with a MIPO technique, reducing the surgical time, blood loss and the need for transfusions.
The use of a standard implant such as the DHS have shown to give comparable results to dedicated ones with the advantage of a better confidence of the surgeon and no need of extra storing space.
We compared the results of the treatment of stable pertrochanteric fractures with a DHS inserted through a standard or a MIPO technique in a series of patients. We registered the surgical time, blood loss, drop of haemoglobin and saving of transfusions units.
Materials and Methods At our institution between January 2006 and January 2007 forty patients have been operated for stable pertrocantheric fracture of the hip. All the patients received a 4 holes DHS plate an were randomly assigned to the Standard Group (SG) or MIPO Group (MG). In the SG the DHS was inserted through a standard incision while in the MG the incision was reduced to a maximum of 7 cm. The surgical time, drop of haemoglobin and need of transfusion was registered. Statistical significance in differences between the groups was set for P values of <0,5.
Results There were 23 patients in the Standard group and 17 in the MIPO group. There were not statistically significative difference between the two groups.
The mean surgical time and mean drop of haemoglobin in the MG were significantly lower than those of the SG. Also the need for transfusion was significantly reduced in the MG as was the mean hospital stay. No major complication occurred in both groups.
Conclusions Treatment of stable pertrocantheric fractures with a DHS through a MIPO technique has shown to be time saving in the OR and to limit the perioperative bleeding, reducing the need of transfusion and consequently leading to an earlier discharge of the patient. The benefits these savings are clear but yet to be quantified.

TREATMENT OF INTERTROCHANTERIC FRACTURES WITH MINI-INVASIVE SURGICAL APPROACH: THE GOTFRIED'S PC.C.P

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Introduction Trochanteric region fractures are a very commmon injury in elderly. The aim of this study is to evaluate the mortality, the factors which condition the mortality, the level of indipendence, and the deambulatory ability in patients affected by fracture of the trochanteric region surgically treated with Gotfried's PC.C.P.
Methods Since October 2002 to December 2006 we treated 981 patients with proximal femur fractures.
Between the 473 interthrocanteric fractures we have considered the 229 treated with PC.C.P. All fractures have been classified according to the AO system. Minimum follow-up time was 6 months. We evaluated the pre-injury and post-operative health conditions and level of independence with the Parker's Mobility Score.
We evaluated the mortality and his relations with age, sex and pre-injury functional status.
Results The mortality has been of 20% (31% in the males, of 16% in the females); the 15% of the patients died in the first 12 months, 5% in the subsequent months. The mortality has been bigger in the patients with more than 80 years and in patients with a pre-injury low functional status. The risk of death increases with the follow-up time. These results are statistically significant. 35% of the patients has recovered the same performances of before the trauma, 47% has had a partial worsening, 18% has had a heavy worsening.
Conclusions The rate of mortality in the first post-operative year was 20% in our experience, to the lower limits of the published values in literature. The male sex, the age higher than 81 years and a low pre-injury functional score are risk factors for an increased death risk. Proximal femur fractures in the elderly represent however an important challenge for the surgeon: only the 35% of the patients has recovered the same performances of before the trauma.

TREATMENT OF PROXIMAL FEMURAL FRACTURES: BLOOD LOSS IN PCCP VS. GAMMA-NAIL

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Introduction Trochanteric region fractures are a very commmon injury in elderly. These fractures require a considerable public investement and seems to represent a major cause of health conditions worsening. The aim of this study is to evaluate the difference in the

fracture handling with gamma nail or PC.C.P. in terms of blood loss, to allow the choice of the less traumatic procedure.
Materials and Methods Since October 2002 to December 2006 we treated 981 patients with proximal femur fractures. Between 473 interthrocanteric fractures 229 were treated with PC.C.P, 208 with gamma nail, 36 with other treatments. We have considered 45 patients treated with PC.C.P (21 patients) or gamma-nail (24 patients) with homogeneous values of age (mean: 81 years) and preoperatory haemoglobin (mean: 11.3) We have evaluated the haemoglobin values in the first and second day after the surgical treatment and the number of transfusions needed.
Results In the 1st post operative day, the mean haemoglobin values were 10,3 gr/dl in patients treated with PC.C.P. and 9,7 gr/dl in patients treated with gamma nail. In the 2nd post operative day, the mean haemoglobin values were 10,1 gr/dl in patients treated with PC.C.P. and 9,5 gr/dl in patient treated with gamma nail. These results was'nt statistically significant. The mean number of blood units transfused was 0.85 in patients treated with PC.C.P. and 2.0 in patient treated with gamma nail: the difference was statistically significant (p 0.02).
Conclusions The PC.C.P seems to be less traumatic for the patient, even if the little number of patients considered does not allow drawing definitive conclusions. It is important to evaluate well every single case and give the right surgical indication. If possible, it is better to choose the less invasive treatment to allow a better functional resume and a smaller surgical trauma.

THE USE OF PROSTHESIS IN THE TREATMENT OF THE LATERAL FRACTURES OF THE FEMORAL NECK

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Backgrounds the treatment of the lateral fractures of the femoral neck is usually internal fixation (plate and screws or intramedullary nailing). The instability of the fracture (Type A2 of AO Classification), the poor bone stock and an important osteoporosis are threats that can have a negative influence on the prognosis, even in case of lack of technical mistakes. Moreover, if we add to all this the need of an advanced and delayed period of load off, as a consequence of the kind of surgery applied, we believe and warmly suggest.
Materials and Methods Since January 2004 until February 2007 at the Orthopaedic Department of The Hospital of Lugo di Romagna have implanted 40 prosthesis (8 biarticular, 29 trocantero-diafiseal and 3 THA) on a total amount of 188 lateral fractures of the femoral neck. In three cases this treatment was applied to repair the failure of internal fixation. The target was made of 31 female and 9 male, with an average age of 84.2.
Results the case history shows, for all the patients, the chance to walk with load 3 days after the operation.
Discussion and Conclusion Literature shows that the percentage of failures in the treatment with internal fixation of the instable fractures of the proximal femoral waves from 24% to 36%, due to several reasons (cut-out of the cervico-diafiseal fragment, pseudoarthrosis, rupture of the implants). On the other hand, using prosthesis the failure is only around 2%. Comparisons on the mortality using these two kinds of surgery are not relevant. For everything mentioned above and stating the good results obtained with prosthesis, we believe that in some specific cases (old people with good walking capabilities affected from instable fractures and/or important reduction of the bone stock) this choice can reduce the risk of complications and can help getting better results.
Suggested reading

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SURVIVORSHIP MANAGEMENT IN SEVERE PELVIC TRAUMA

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Background Pelvic fractures are about 3% of all fractures observed in emergency rooms. They are often associated with abdominal, thoracic and head lesions. Blood loss, as the result ob bone bleeding or lesion of arterious or venous vessels, can often bring to death (37%) the patient affected by these fractures. Haemorrhagic syndrome is the most important complication that threatens the life of patients with pelvic lesions.
Materials and Methods Blood loss control is the key of the treatment of complicated pelvic fractures, and must be the very first step of the prehospedalization patient's management. This can be achieved with adequate "filling" with different devices. The pelvis must be stabilized with either external fixation or C-clamp to stop or control the bleeding (venous); this has to be done as soon as possible because it is a life saving treatment.
Results and Discussion In some cases bleeding is mostly due to artery lesion (12%–80%) and thus the priority is to find the lesion site by means of angiography and proceed to embolization, delaying the open surgical treatment.
Conclusions It is controversial the priority, in the very first stress of treatment, of external stabilization versus angiography.
Suggested readings

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COMPLICATIONS OF THE POSTERIOR WALL FRACTURES OF THE ACETABULUM

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Background Posterior wall fracture is the most common traumatic lesion that interested the acetabulum. Usually is associated with a posterior dislocation of the hip. These fractures are the most common but often not very simple to treat. A not reducibile dislocation, intra-articular fragments, a comminuted or impacted fracture, a not perfect reduction, a not correct osteosyntesis could determinate a failure and consequently a bad result. Other possible complications are correlated with the dislocation of the hip with a damage of the sciatic nerve or an aseptic necrosys of the femoral head.
Materials and Methods From 1998 to 2006 we treated surgically 209 acetabular fractures. 77 cases (36,8%) were posterior wall fractures. Posterior dislocation of the femoral head was present in 67 cases. 62 cases was observed at a minimum follow-up of 12 months.
Results We evaluated them with the Thompson and Epstein score. 21 cases were excellent, 31 good, 5 sufficient and 5 bad. The most

frequent complications was eterotopic ossification: 8 cases (12.9%). Neurological paralisys of the sciatic nerve after surgery: 3 cases (4.8%). 4 cases (6.4%)of aseptic necrosis of the femoral head, 2 artrosis (6.2%).

Discussion Complications of the posterior wall fractures are mostly correlated with the dislocation of the femoral head. All the patients that presented an ossification had a dislocation of the hip. Aseptic necrosis of the femoral head was determinate by the lesion of the vascularization during dislocation. The paralisis of the sciatic nerve happen after surgery for a compression of the oman during reduction.

Conclusions An immediate reduction of the femoral head, a correct planning, a good reduction of the fracture with an appropriate osteosyntesis have taken excellent and good result in 52 cases (83,8%).

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SESSION 0-07

HIP TRAUMATOLOGY II

MORBIDITY OF ACETABULAR FRACTURES: OUR RESULTS

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Background Fractures of acetabulum are associated with significant morbidity due to high energy transfer and complexity of treatment. Numerous authors have noted the strong correlation between accuracy of reduction of acetabular fractures and outcome. Other important factors are timing of surgery, patient's age and a good patient's compliance to rehabilitation treatment. Aim of this work was to evaluate morbidity and factor that influence outcome in our experience.

Materials and Methods 173 patients with an acetabular fracture and displacement of at least 3 mm were surgically treated during a 9-year period. According to the classification of Letournel and Judet, associated fracture types accounted for 66% of the fractures, with both-column fractures being the most common type; while elementar type fracture were 34%. The mean duration of the follow-up was 22 months. The Harris Hip Score (HHS) of all patients has been evaluated by telephone interviews.

Results Mean Harris Hip Score was 90%,: mean score at pain item was 92%, support's score was 98%, limp 86%, walking distance 91%, wearing shoes and socks 87%, sitting 95%. Post-traumatic osteoarthritis was observed and treated with total hip prosthesis in 40 patients. The most common complication was heterotopic ossification, observed in 16 patients. Transient sciatic nerve palsy was observed in 9 cases, iatrogenic damage of the superior gluteal artery occurred in 3 cases.

Conclusions Surgical treatment of the acetabular fractures aiming at anatomic reduction of the acetabulum and congruency with the femoral head is the prerequisite for a favorable functional outcome in the long term. Patients in which a greater portion of the acetabular roof has been reconstructed have a considerably better result to the follow up. The clinical result was also adversely affected by associated injuries of the femoral head, an older age of the patient, and operative complications.

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PREOPERATIVE PLANNING FOR TREATMENT OF ACETABULUM FRACTURES

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The reduction of the fractures of the acetabulum constitutes the moment key of the surgical procedure: to such care it turns out indispensable taking care of planning preoperative that concurs with the surgeon, after to have reconstructed graphically the fracture it is on the mediale pelvis that lateral, to program the type of approach (ileinguinale, ileofemorale, posterior) the type of decubitus (prono, supino, lateral) methodical of reduction and the types of synthesis. The preoperative planning is realizable only after one adapted understanding of the morphologic and mechanical characteristics of the fracture. To such care it is fundamental an axial study CT with fratturative sections of 5mm; axial study CT is completed from the executed study 3D of norm with eight (front, posterior, mediale, lateral, anterolaterale, anteromediale, posteromediale and posterolaterale projection) with which currency threedimensionally the extension of the fracture and the relationships between several fragments dislocated. The preoperative planning is still more necessary in the fractures to two columns in which a transcutaneous step is wanted to be tried with a single direct time (front or posteriore) in order to obtain the reduction and fixation also of the controlaterale fracture, that it can also demand modification of the surgical decubitus. It comes introduced a wide casuistry of acetabular fractures with relative surgical reconstruction: every case is introduced from rx traditional, axial CT and 3D chosen between most meaningful of the series and post-operative control or at a distance in projection AP and the two oblique. The planning on base CT demands a deepening of the axial radiografic anatomy of the pelvi with identifications of some anatomical reperi in order to estimate extension, dimension and fragmentation of the fracture. The preoperative planning in how much virtual procedure obligates the surgeon to a repeated and extended study of the anatomomeccanical characteristics of the fracture from which optimal understanding of the same one achieves one. Such understanding is to the base of the resolution of the acetabulum fracture operation.

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ANTERIOR WALL AND ANTERIOR COLUMN FRACTURES OF THE ACETABULUM

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Background Anterior wall and anterior column fractures of the acetabulum are very rare. These fractures are usually associated with an anterior dislocation of the hip.
Materials and Methods From 1998 to 2006 we treated surgically 209 cases of acetabular fractures. Anterior column fracture were 13 cases (6.2%); 3 cases presented an associated anterior dislocation of the hip. Anterior wall fracture were 5 cases (2.3%). 4casi presented an associated anterior hip dislocation. One case of dislocation was possible to reduce only after the reduction of the fracture.
Results We evaluated the results with the Thompson and Epstein score. Anterior column: 8 cases have a medium follow up of 14 months. 6 cases were excellent and good, 1 case sufficient and 1 case bad. Anterior wall: 4 cases have a medium follow up of 20 months. 2 cases were excellent, 1 case good and 1 case bad.
Discussion Fracture of anterior column and anterior wall are uncommon. Usually these kind of fracture is associated with a rupture of quadrilateral lamina. The fragment of the iliac wing is characteristic extraruotated and the fragment of quadrilateral lamina is intraruotated. An ileo-inguinal approach is necessary to reduce these fractures. In particular cases of anterior wall fracture is possible to utilize the Smith-Petersen approach.
Conclusions Fracture of anterior column and anterior wall must be treated with a surgically approach. A correct diagnosis and a good reduction of the joint determinates excellent and good results in some cases.
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EX-FIX VERSUS ORIF IN THE TREATMENT OF PELVIC RING FRACTURES

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Background Pelvic ring fractures resulting from high-energy and/or mass mechanisms can cause life-threatening severe bleeding, however, external fixators or pelvic binder can be applied at the emergency scene to help slow or reduce that possibility. However, these devices lack control of the applied circumferential compression. Vertical shear and open book fractures above all need to be stabilized at least with ORIF.
Materials and Methods 22 patients with pelvic ring injuries treated in the last five years were enrolled and divided in two groups. First group (8 Patients): Pelvic fractures were stabilized with an Ex-Fix definitively. Second group (14 Patients): Pelvic fractures were temporarily stabilized with an Ex-Fix until definitive stabilization with ORIF was provided. Anteroposterior pelvic radiographs were obtained before and after Ex-Fix application, and after definitive stabilization with ORIF. These radiographs were analyzed to quantify pelvic reduction.
Results Acetabular fracture were associated in 5 cases. Vertical shear displacement occurred in 6 cases. 8 was Politrauma patients with several long bones fractures associated. 2 cases were open fractures, 1 developed infection and needed limb amputation. 4 patients are limping.
Discussion and Conclusions Ex-Fix may be useful in the acute phase of resuscitation but it is of limited value in the definitive treatment of an unstable type-C injury and in type-B open-book injuries. In these cases, stabilization of the pelvis is mandatory achieved by ORIF.
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MINIMAL-INVASIVE APPROACH IN THE TREATMENT OF THE POSTERIOR WALL FRACTURES OF THE ACETABULUM

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Background In this article we examine patients affected by a posterior wall fracture of the acetabulum treated with a minimal invasive posterior approach (from 12 to 18 cm). This kind of surgery can be performed also for transverse fractures according to Zinghi classification.
Materials and Methods From 2004 to 2006 we treated with this approach 19 patients; four of these had a combined surgery with the ileo-inguinal approach. The osteosinthesys was performed with reconstruction plates and screws. All the patients were studied in the pre-operative planning with the typical x-rays projection for pelvis and iliac oblique view and obturator oblique view (Judet), CT scan with 3D reconstruction.
Results The most important advantages we have evaluated using this approach were a lesser splint of the gluteus maximus, no risk of damage for the superior gluteal nerve and the inferior gluteal artery, less blood loss. In the early post-op rehabilitation we have examined the trophism of the gluteus maximus in seventh day after surgery and it resulted better than in patients treated with the typical Kocher-Lagenbeck incision. In the immediate post-op we made conventional radiology and about the 30% of our patients made a CT scan after 3 months that demonstrates the perfect healing of the fractures. The only absolute controindication is for obese patients. The post-operative complications include a case of heterotopic ossification of the minus gluteus which didn't affect the ROM of the hip affected, and a case of neuropraxia of the ischiatic nerve healed after 3 months.
Conclusions According to our experience this kind of approach could be used for posterior wall fracture of the pelvis and it can be extended also in transverse fractures. In the post-operative the

greatest advantage is the lesser muscle damage and so a most effective rehabilitation.

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MINIMALLY INVASIVE FIXATION OF ACETABULAR FRACTURES

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Background Anatomical reduction of the joint is the primary aim in the treatment of acetabular fractures as any other articular fracture. The current standard approach provides open reduction and internal fixation (O.R.I.F.) through a variety of surgical approaches which have been associated with relatively high complications rate such as haematomas, deep infection, and neuro-vascular lesions. These procedures need long operative times with significant blood loss.

Many authors have demonstrated the feasibility of closed reduction and percutaneous fixation (C.R.P.F.) for minimally or non displaced acetabular fractures; this technique can be considered a valid alternative to O.RI.F. in order to decrease the morbidity related to surgical approaches.

Materials and Methods Between 2001 and 2006 we performed C.R.P.F. for acetabular fractures in 15 patients; the reduction has been controlled with fluoroscopy during the operation and with CT scan after the operative procedure. The osteosinthesis has been performed with cannulated screws and In more complex cases the reduction has been achieved and maintained with ileo-femoral external fixation (ligamentotaxis technique).

Conclusions According to our experience the use of external fixation in the treatment of acetabular fractures must be reserved for very selected cases in which for general or local condition the joint the distraction associated with minimal internal fixation can guarantee good reduction and fracture stability avoiding the poor results of conservative treatment or the risk of major complications related to ORIF. The best reduction can be achieved when the treatment is carried out early while the best stability is achieved with the association of percutaneous cannulated screws. The use of external fixation has never compromised the range of movement of the hip.

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THE MATTA SYSTEM FOR THE PELVIC RECONSTRUCTION AFTER COMPLEX ACETABULAR FRACTURES (TRANSVERSE AND BI-COLUMN TYPES)

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Background Complex fractures of the acetabulum are the results of high energy injuries and they often require a multidisciplinary approach. The role of the orthopedic surgeon, after the initial resuscitation measures, is to restore the anatomic joint congruity in order to avoid catastrophic complications. The availability of a reliable system of plates and reduction tools optimize the surgical effort and improves the surgical outcome. The matta system includes a complete set of modular plates and specifically designed reduction clamps to simplify the management of these difficult fractures.

Materials and Methods 23 complex fractures (transverse and bi-column types by letournel-judet classification) have been treated in the period between June 2003 to June 2005. The matta system (stryker howmedica) has been utilized for orif in all cases. Follow up included radiological observation and functional level assessment.

Results 20 results as good; 1 case with significant rom reduction because of brooker typer 3 hip ossification; 1 transient superficial peroneal nerve palsy; 1 hip protrusio acetabuli.

Discussion and Conclusions Complex fractures of the acetabulum are frequently life-threating conditions requiring a multidisciplinary treatment. Early and late sequelae of unreduced fractures have been associated to the development of severe osteoarthritis and functional limitations. We believe that the matta system is a reliable, reproducible and affordable system able to assist the surgeon in the difficult fixation of these fractures and to improve the clinical results.

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FACTORS AFFECTING MORTALITY AFTER SURGICAL FIXATION OF HIP FRACTURES IN THE ELDERLY

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Background The factors responsible for increased mortality after surgery for hip fracture have been subject to extensive investigation, however the subsequent conclusions are often contradictory.

Aim To identify which patient and management variables are associated with increased mortality after surgery for hip fracture.

Patients and Methods We performed a prospective, multi-centre, observational study using the Scottish Hip Fracture Audit Database. Data is collected by dedicated coordinators on site at the time of admission, at 120 days after the injury and on any re-operations within 4 months. Our patient cohort consisted of 18817 patients. We divided variables into two categories depending on whether they were patient characteristics or management variables. Patient characteristics were termed case-mix factors and

include: age; gender; ASA score; fracture type; pre-fracture residence and mobility. Management factors include: time from fracture to surgery; time from admission to surgery; grade of surgical and anaesthetic staff undertaking the procedure and anaesthetic technique. We performed a multivariate logistic regression analysis which showed that all case-mix variables were significantly and strongly associated with post-operative mortality while controlling for the effects of the remaining variables. Inclusion of the management variables into the case-mix base regression model provided no significant improvement to the model.

Conclusions Hip fractures occur predominantly in the elderly population who frequently have multiple existing medical co-morbidities. Patient case-mix variables have the most significant effect on post-operative mortality. Unfortunately such variables cannot be modified by medical interventions prior to surgery.

Suggested readings

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INTERTROCHANTERIC FRACTURES TREATED BY A NEW CEMENT AUGMENTATION IN OSTEOPOROTIC ELDERLY PATIENTS

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Introduction Intertrochanteric fractures are common in elderly people and their treatment has a rate of complications due to technical failure (cut out- head rotation).

Materials and Methods 20 patients (14 females, 6 males) aged between 82 and 94 years (mean age 86,4 years) with severe osteporotic bone (Grade 3 or less – Singh classification) were treated with Gamma Nail and MetilMetacrilate (MENDEC SPINE, Tecres) augmentation inserted through the cannulated cephalic screw at its apex. Early evaluation (6 months follow-up) is based on: operating time, early functional recovery using a modified Harris hip score, mechanical and biological complications.

Results Mean application adjunctive time was 7 minutes. Total weight bearing was allowed in all patients from the first post-operative day. Preoperatory modified Harris hip score was 67 (scale maximum is 91), at discharging was 40% of the preop, at 6 weeks 90% of the preop, In one case we reported a cement migration through the femoral head. No cases of cut-out have been reported at the follow-up.

Discussion and Conclusions Literature review and the observations based on the reported results allow concluding that the cement augmentation in severe osteporotic bone could improve the mechanical stability of the implant, ensuring early functional recovery.

STUDY ON THE INCIDENCE OF NEW FRACTURES IN PATIENTS TREATED WITH BISPHOSPHONATES AFTER FIRST FRACTURE IMPUTABLE TO OSTEOPOROSIS OF THE WRIST, RACHIS OR FEMUR

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Background Teraphy with bisphosphonates can reduce the risk of new fractures after a first fracture in osteoporotic patients [1–4]. In this study we evaluated the incidence of new fractures in patients treated for 1 year with bisphopshonates (alendronate) after a first fracture of the wrist, rachis or femur, caused by a trauma of low-middle energy and with radiological signs of osteoporosis.

Materials and Methods 131 patients (85 women and 45 men, age from 66 to 85 years) treated (conservative or surgical) in the Orthopaedic Clinic of Brescia for a first fracture of wrist (17), femur (83) or rachis (31) were randomized in two groups:

Group A (71 patients) received a therapy with alendronate 70 mg/week for 1 year.

Group B (60 patients) did not received any teraphy for osteoporosis. Patients undergone a phone interview after 6 and 12 months and they were questioned on the occurrence of new fractures of the wrist, femur or rachis (confirmed by a clinical and radiological diagnosis). Results were evaluated with the "z" statistical Test.

Results After 12 months 6 new fractures (3 wrist, 1 femur, 2 rachis) were observed in the bisphosphonates teraphy group and 10 fractures (4 wrist, 3 femur, 3 rachis) in the untreated control group. The statistical evaluation of results show that the risk of new fracture was 25 % greater in patients without therapy than in those who recieved alendronate.

Discussion and Conclusions The largest study on re-fracture risk in osteoporotic patients is the F.I.T. study [1] with 2027 patients evaluated with a follow-up of 3 years wich reported a risk of new fracture a 31% lower in alendronate treated patients. In this study similar results were observed after a shorter time of therapy of 12 months, with a 25 % decrease of risk.

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SESSION O-08

MISCELLANEOUS I

SPONTANEOUS GAIT RECOVERY IN DENERVATED RATS MAY IMPAIR THE EVALUATION OF ARTIFICIAL NERVE GUIDES

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Background Authors started investigating the topic of peripheral nerve regeneration by artificial nerve guide with the aim to adress basic questions like: which should be the characters of the outer-tube of the guide or, which should be the filler of the guide. Anyway, very soon they faced problems related to the set-up of an in-vivo animal model.

Materials and Methods Inbreed male Wistar rats weighing about 300 g were used as animal model. To avoid tension is an imperative requirement, so only 4 mm in length of the sciatic nerve were ablated. Surgical operation required the assistance of optical magnification by a Zeiss OP MI 1 operative microscope. Twice a week all the animals where individually taken out of their cage and let walk freely on a 0,5*2,0 m board; their walking was video recorded by a Nikon CoolPix 7900 camera in the video modality.
Results It was noted that there is a spontaneous gait recovery in denervated rats; this may, obviously, impair the evaluation of artificial nerve guides performances when the physiological recovery in gait function is the main parameter taken into account. Discussion. The study of the morphology of the in-vivo regeneration of a nerve, made by purely histological methods, may require such a high number of animals to pose serious problems of technique, ethics and funding. From the above considerations it is obvious that cheaper analysis is seeked with favour and several studies in the literature relied on the neuroelectric examination performed on the same animal along the duration of the experiment or in the study of its gait pattern and eventual recovery after trauma, or both, thus avoiding the use of far more animals.
Conclusion With the present study we want to highlight that in the male Wistar rat sciatic model a spontaneous recovery in gait pattern occurs very early and this impairs any possible subtle discrimination about a possible benefit derived from the use of an artificial nerve guide.

MANAGEMENT OF FRAGILITY FRACTURE PATIENTS IN ITALIAN HOSPITALS: RESULTS FROM THE "BJD SURVEY ON MEDICAL RECORDS"

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Background The BJD, in cooperation with the IOF, conducted a survey on medical records, to verify how fragility fracture patients are managed in the hospitals of France, Germany, Italy, New Zealand, Spain, United Kingdom and United States.
Materials and Methods Ten hospitals from each country took part to the study: 3 large hospitals (more than 20 orthopaedic surgeons), 4 medium (between 10 and 20) and 3 small (less than 10 orthopaedic surgeons). They had to collect medical records for patients over 55 years admitted for a fracture of the humerus, wrist, spine, ankle or hip from November 2005: 10 for each small, 30 for each medium and 40 for each large hospital. The records were sent to a national assistant, trained to fill in paper and electronic forms for each record. The forms asked information about the patient (age, comorbidities, previous fractures or osteoporosis drugs) and about the orthopaedic management (surgery, new drugs added, listing of osteoporosis as a diagnosis at discharge). The University of Lund analyzed the data.
Results In Italy there were 10 hospitals joining the study:

1. large (University Hospital of Genoa "San Martino", University Hospital of Perugia "Santa Maria della Misericordia" and University Hospital of Rome "Tor Vergata")
2. medium (General Hospital of Rome "Sant'Eugenio", General Hospital of Monza "San Gerardo", General Hospital of Turin "Maria Vittoria" and University Hospital of Padua
3. small (General Hospital of Naples "Santa Maria di Loreto Nuovo", General Hospital of Tricase "Cardinale Panico", General Hospital of Anzio and Nettuno)

Among the other results, it was found that the most frequent fragility fractures in Italy are hip fractures, especially lateral, even because few fractures of the wrist and of the spine are hospitalized. Most patients have cardiovascular comorbidities, take anti-hypertensive drugs and are over 70 years of age. Previous fractures and walking ability before fracture are seldom recorded and in very few cases osteoporosis is listed as a diagnosis at discharge. A minority of patients receive osteoporosis drugs at discharge and a follow-up visit or a BMD testing are rarely planned.
Discussion and Conclusions The management of osteoporotic patients would require a more accurate evaluation of the patient's global condition, of the risk factors for fragility fractures, and a close follow-up. If the surgeon is not willing to treat the patient for osteoporosis himself, he should give the patient the right indications at discharge.

TERIPARATITE (FORSTEO): ADHERENCE AND SAFETY

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Long-term adherence and persistence with any therapy are very poor. Adherence with a medication regimen is generally defined as the extent to which patients take medication as prescribed by their healthcare providers and expressed as a percentage of prescribed doses taken over a specified period. Persistence with a medication is defined as continuing to take prescribed medication. Monitoring of individuals allows the identification of poor responders. The most common cause of poor response is poor adherence. Recent study have shown that less than half of osteoporosis patients are adherent with current bisphosphonate therapy regimens. Only one-third of women over 50 years old and prescribed daily bisphosphonates, and just less than half on weekly bisphosphonate therapy, had adequate adherence. The most frequent reasons for discontinuation were drug related side effects, insufficient motivation to treatment and fear of adverse events. Recent findings on patient adherence are supported by earlier work showing that poor adherence and persistency to treatment are common among osteoporosis patients.
We studied global adherence and safety of teriparatide 20 ug/day with 500–1000 mg/day calcium and 400–800 UI/day vitamin D for 18 months in 137 postmenopausal women (mean age 72.8±8.3 years) referred to 5 Italian Centres for severe osteoporosis management. The patients were asked to complete a questionnaire. The following information was obtained on treatment adherence and safety, adverse events, self-administered subcutaneous modality and rule of the training for self-administered injection.
Our data showed that adherence to teriparatide therapy is high (100%). Most common adverse events (dizziness, nausea, headache and leg cramps) during treatment had reported in 8 % of patients. None patient discontinued therapy because adverse events. Only the 2.5% of patients reported that the self-administered subcutaneous injection of teriparatide was difficult. Infact, over the 86.6% of patients reported that the self-administered subcutaneous injection were easy and that the training for self-administered subcutaneous injection of teriparatide was very good. We concluded that: 1) adherence and safety of teriparatide was high; 2) adverse events were modest (LIEVE); 3) the self-administered subcutaneous injection of teriparatide was easy; 4) the training self-administered subcutaneous injection of teriparatide was very important.

ANALGESIC EFFECT OF TPTD (TERIPARATIDE) IN THE TREATMENT VCF (VERTEBRAL COMPRESSION FRACTURE) PAIN48

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Background Vertebral fractures are the most common osteporotic fracture and may result in back pain with functional reduction and worsening of quality of life.
The efficacy of Teriparatide (TPTD) in reducing risk of back pain in patients affected by severe osteoporosis with vertebral compression fractures (VCFs) is well documented; it is also known the antalgic effect of vertebroplastic procedures.
Materials and Methods Back pain was evaluated with VAS at 0, 1, 3, 6, 12, 18 months with the following score: 3 severe (10–7); 2 mild (6–4); 1 little (3–1).
We treated 75 female patients, mean age 74 y. At baseline 57/75 patients suffered back pain due to recent VCFs (approximately 30 days) with VAS score 3 (group A), 18/75 patients due to not recent VCFs (at least 6 months) withr VAS score 2 (group B).
All patients underwent lumbar spine X-rays at the time of the vertebral fractures with evaluation of the SDI; dosage of calcium, ALP, PTH, Vitamin D and 24 hours calciuria at base line; dosage of calcium, ALP and calciuria after 3, 6, 18 months of treatment; lumbar spine X-rays, spinal and femural BMD at the end of the study.
Results All patients had a reduction in overall back pain: after 6 months treatment the VAS pain score was 1 for all patients.
57/75 patients (recent VCFs) reported rapid and significant pain reduction after 1 month treatment.
18/75 patients (non recent VCFs) reported significant pain reduction after 3 months treatment.
Right now 10 patients concluded the 18 months planned treatment showing stable SDI without worsening.
No patient had to recourse to vertebroplastic procedures to reduce back pain.
Discussion The analgesic effect of TPTD was demonstrated in both patients group (recent and non recent VCFs). This is attributable to the ability of the TPTD to stimulate bone formation and thereby increase bone mass and strength with osteoinductor effect; the rapid and significant reduction of pain is probably explainable with the acceleration of the healing fractures process.
The persistence of pain in non recent VCFs before treatment, is presumable due to the pseudosteoarthritis evolution; also in these patients TPTD analgesic effect is significant and due to is meccanism of action, in these cases, in addition of vertebroplastic procedures, TPTD can have a rational use. The study is still ongoing and further results will be presented at the meeting.

INCREASED BMD OF SPINE AND HIP IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS TREATED WITH TERIPARATIDE

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Background Osteoporosis is a skeletal disorder with altered bone strength leading subjects to increased risk of fractures. Human (1–34) parathyroid hormone fragment, teriparatide, is a new therapeutical approach for postmenopausal osteoporosis.
Objectives Aim of our study was to examine the change in bone mineral density in spine and hip in 97 outpatient postmenopausal women with osteoporosis and multiple vertebral fractures treated with 18-months teriparatide.
Materials and Methods We considered 97 outpatient postmenopausal women (mean age 69.43±8.7ys) with severe osteoporosis (mean vertebral Tscore -3.25) and multiple vertebral fractures (mean of number of fractures: 3.14±2.19) who received daily, self-administered, subcutaneous injections of teriparatide 20 microg/day, supplemented with 500–1000 mg/d calcium and 400–800 UI/d vitamin D. All patients had previously been treated with various antiresoptive drugs. Vertebral radiographs and Bone Mineral Density (BMD) were performed at baseline and at the end of treatment. BMD was measured by dual X-ray absorptiometry (DEXA) in the spine and hip regions. Biochemical markers were assessed at baseline and at 1, 6, 12 and 18 months. Physical examination and vital signs were recorded every six months, serious and non serious adverse events were registered.
Results The BMD of the spine and hip increased +5.52% and +1.09% respectively. This increase was statistically significant for the spine ($p<0.001$). We recorded none new vertebral fractures.
Conclusion In according with the literature, teriparatide treatment determines the expected increase in BMD at the axial skeleton and reduces vertebral fracture risk. Increased bone strength would be explain with the improvement in trabecular bone microarchitecture. These observational data indicate that the use of teriparatide might be considered useful in patients with severe osteoporosis, multiple vertebral fractures and previously treated with antiresorptive drugs.
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IMPORTANCE OF BONE MINERAL DENSITY AND SINGH INDEX IN EVALUATION OF BONE MECHANICAL PROPERTIES

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There are several causes of failure of internal fixation of the proximal femoral fractures: severe osteoporosis is one of these.
The aim of the present preliminary study is to evaluate the relationship between SI, bone mineral density and bone mechanical properties of cancellous bone cylinders from human femoral heads of male and female and, hence, to analyse possible differences in bone densitometric and mechanic properties between sexes.
22 femoral heads of patients that underwent arthroplastic for fracture of femoral head were collected. 5 males 17 females. A pelvis X-ray was performed to estimate Singh Index. From 2 to 3 bone cylinders of cancellous bone were obtained from each femoral head.
In each specimen densitometric scans and compression tests were performed.
Statistic analyses Data were analysed using one way ANOVA: patient's age, maximum failure load, Young modulus, BMC and BMD were analysed as distributed according to sex; Pearson's coefficient correlation between biomechanical features and densitometric parameters was done; linear regression model with stepwise analyses between maximum failure load, age, sex, Young modulus, BMD and BMC was performed.
There were no differences between males and females in age, BMC, BMD and Young modulus, while there is a significant difference in maximum load and SI. As regards SI values, there were significant differences among different categories of SI for age, sex, BMC, BMD, Young modulus and maximum failure load. The Pearson's coefficient demonstrated a high correlation between densitometric parametres and mechanical properties while age is inversely related. Maximum load predictors are Young modulus and BMD Maximum failure load is lower in females than in males with similar BMD but lower SI.

This preliminary work allows to validate the use of SI in the first surgical evaluation, being this value a predictor of failure load; further more may suggest the employment of bone densitometry in right surgical approach evaluation.

Suggested readings

1. Krischak GD, Augat P, Watcher NJ, Kinzl L, Claes LE (1999) Predictive value of bone mineral density and Singh Index for the in vitro mechanical properties of cancellous bone in the femoral head. Clinical Biomech 14:346–351
2. Leichter I, Margulies JY, Weinreb A et al (1982) The relationship between bone density, mineral content, and mechanical strenght in the femoral neck. Clin Orthop Relat Res 163:272–281
3. Watcher NJ, Augat P, Mentzel M et al (2001) Predictive value of bone mineral density and morphology determined by peripheral quantitative computed tomography for cancellous bone strenght of the proximal femur. Bone 28:133–139

PERIACETABULAR OSTEOTOMY FOR THE TREATMENT OF ADULT HIP DYSPLASIA

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Background Acetabular dysplasia is one of the major causes of ostheoarthritis in young adults. Therefore it's important to recognize patients with hip dysplasia, before the developement of OA, because they may be candidates for conservative hip surgery, such as derotational acetabular osteotomies, with the aim of restore a normal joint anatomy and load distrbution. These treatments are directed to young adult patients, with closed triradiate cartilage, not obese and without signs of incoming ostheoarthritis, which report a clinical history of hip snapping, locking, or instability. Several techniques of derotational acetabular osteotomy are reported in literature. We prefer the Bernese Periacetabular Osteotomy because it allows to modify the orientation of acetabulum, preserving blood supply, maintaining the posterior column intact, and not changing pelvic diameters.

Materials and Methods Between 2003 and 2005, 14 patients (12 F, 2 M) were treated at our department with Periacetabular Osteotomy for hip dysplasia. The average age was of 33 years. Mean follow-up was of 2 years.

Results Radiographical results showed an improvement of mean Wiberg angle (from 9° pre-operatively to 31° post-operatively) and mean Tonnis angle (from 24° pre-operatively to 8° post-operatively). Merle-D'Aubigne score increased from 14,3 (range 5–16) to 16,5 (range 11–18). Complications were observed in one case (7%).

Conclusions Periacetabular Osteotomy is an effective treatment in adult hip dysplasia: candidates to surgery have to be strictly selected, and learning curve remains difficult; results, however, are satisfactory and encouraging, in our experience such as in other series reported in literature.

Suggested readings

1. Stulberg SD, Harris WH (1974) Acetabular Displasia and the Development of Osteoarthritis of the Hip. In: Harris WH, ed. The Hip. Proceedings of the Second Open Scientific Meeting of the Hip Society. St Louis: CV Mosby; pp 82–93
2. Salter RB (1961) Innominate Osteotomy in the Treatment of Congenital Hip dislocation and Subluxation of the Hip. Br JBJS 43:518–539
3. Steel HH (1973) Triple Osteotomy of the Innominate bone. Am JBJS 55: 343–350
4. Ganz R (1988) A New Periacetabular Osteotomy for the Treatment of Hip Dysplasias. CORR 232:26–36

ENDOMEDULLARY NAILING IN OSTEOTOMIES FOR CEREBRAL PALSY

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Background Treatment of torsional deformities in cerebral palsy is performed by osteotomies with plates. Bone of these patients is very ostoporotic and so plates rarely consent fast weight bearing. We have performed some derotative osteotomies with endomedullary nails to evaluate comparative results in bone healing, post-operative pain, complications.

Materials and Methods Among 2004 and 2006 we treated 12 patients affected by cerebral palsy with torsional defects of the legs. Treatment included correction of defects by transversal osteotomy of femur or tibia and ostheosynthesis by endomedullary nailing. No immobilization was used. Results were related to osteotomy by plates.

Results All ostheotomies healed at final control. Average time without weight bearing was about 45 days and bone healing was obtained in 90 days. Extension of neurologic impairement conditioned the time of recovery. Minimal complies were observed; we haven't seen major (neurologic or vascular) complications.

Discussion We studied the outcome of derotative osteotomies by plates and endomedullary nails; both can obtain bone healing, but nailing has a fewer morbility and is tecnically less demanding.

Conclusions Endomedullary nailing is a method that consents a good correction of torsional defects of the legs in cerebral palsy and shorts recovery time. Correction of deformities by osteotomy with interlocked nail has the advantage of not limiting joints.

Suggested reading

1. Chapman ME, Duwelius PJ, Bray TJ, Gordon JE. (1993) Closed intramedullary femoral osteotomy. Shortening and derotation procedures. Clin Orthop Relat Res 287:245–251

A CONTRIBUTION OF THE STEREOPHOTOGRAMMETRY TO THE SIMULATION OF THE MOTION WHEN THERE IS A PROSTHESIS INSERTION

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A proposal to use the motion tracking measurements obtained from passive markers placed on a patient's anatomical points of interest to perform simulation of motion where a specific prosthesis will be implanted will be discussed.

The motion data collected are imported in a specific software where is also possible to import CAT Scan data (in DICOM format) and CAD drawings of the proposed prosthesis.

The combination of the set of information simulates in a three dimensional view the motion of the anatomical part of interest.

REMOVAL OF METALLIC MEANS OF SYNTHESIS FROM THE ORGANISM WITH THE USE OF AN ORIGINAL ELECROMAGNETIC PROBE. CLINICAL AND MEDICAL/LEGAL ASPECT

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Background The increasingly widespread use of bone synthesis in traumatology and orthopedics has consequently increased the number of surgical operations for removing the means used for such synthesis. Such an operation is sometimes investigative, above all if the means of synthesis are covered and incorporated by newly formed bone tissue. It is necessary for the surgeon to use ionizing radiation to locate the foreign bodies, with excessive exposure and damaging effects at times.

Materials and Methods The authors present the results of thirty operations carried out using an original electromagnetic probe, which is innocuous and can be sterilized, capable of locating metallic bodies used as means of synthesis (screws, staples, nails, wire etc.) or detained in the organism (metal chips or splinters).

Results A preoperative search was carried out with the Iron Probe, completed by a further search during the operation itself, using a sterile probe in six cases. Ionizing radiation was never used.

Discussion The use of the Sonda Iron allowed a rapid and precise localization of metallic elements, with accurate and more limited incisions. This permitted the possibility of using local anesthesia, without having to use ionizing radiation with doubtful functional and esthetic advantages.
Conclusions It is a common observation, above all in INAIL revision, to note that the removal of the means of synthesis implies a recovery also on the level of permanent damage to the individual, both in terms of work capacity and biological damage. In the classification of work impairment, approved with the Legislative Decree 38/2000, entry 306 allows for three points of disability for permanent biological damage for "the presence of means of synthesis in situ, not including damage resulting from limited functionality of the corresponding osteoarticular segment".
Finally, in terms of prevention, it must not be underestimated the feasibility of this operation without exposing the surgeon and OR personnel to dangerous ionizing radiation. In fact, INAIL requires obligatory insurance for doctors and technicians against diseases and lesions caused by x-rays and radioactive substances.
Suggested reading

1. Catamo L, Ferruzzi A (1994) L'ausilio di una sonda elettromagnetica nella individuazione di corpi metallici nell'organismo:casistica preliminare. Atti SERTOT 36:149–151

INTEGRATED SISTEMS OF CONTROL AND PREVENTION OF THE CLINICAL RISK IN ORTHOPAEDIC PROTHESIC SURGERY

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Background Since some years ago there is a transformation process in the Italian Health toward the direction of reconstructing the relationship of confidence between sanitary field and citizens in terms of quality, guideline to the customer and appropriateness of performances. One of the issues which stands at the base of such relationship is to respect the right to the emergency, in other words this is the right to enter in relation with a structure or a professional who guarantees organizational modalities and professional behaviours to control the risks and to reduce errors in the course of medical treatments. On the other hand in the modern society and, in particular way, in hospitals, every action is potentially connected to a risk. Obviously is it not possible to eliminate every danger completely, tehrefore a coherent objective must be the one that reduces the probabilities that this is becomes a concrete trouble.
Materials and Methods From such a point of viewthe risk management must be in the centre of a system activities that, in their entirety, must be finalized to the culture of emergency, in a position that improves the performance of an organization. For this it is indispensable that every sanitary field, including prothesic surgery, know and analyze this aspect of the sanitary attendance, than is placed in the more general topic of Quality and appraisal of the Outcome.
Discussion and Conclusions only an integrated management of the risk can carry changes in medical practice by promoting the increase of health culture more careful biside patient and operator, and contribute indirectly to the lessening of performances cost and, at last, to favour the destination of resources on participations for developing organizations and solid efficient sanitary structures.

DAMAGE CONTROL ORTHOPAEDICS

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Early fixation of long bone fractures in the multiple injured patient has been recognized for much of the past three decades as beneficial in minimazing secondary lung and remote organ failure.
This treatment philosophy called "Early total fracture care" is thought to decrease remote organ injury by limiting release of secondare mediators of inflammation associated with the ongoing soft-tissue injury caused by fracture instability. It is further thought to prevent pulmonary complications by allowing patients to avoid the enforced supine position mandated by traction and plaster splints.
The goals of damage control include stopping or limiting ongoing injury including both local soft-tissue injury and olso remote organ injury secondary to the local relase of inflammatory mediators to the systemic circulation.
A second goal is to facilitate nursing care and preserve the ability to examine the extremities in polytraumatized patients. Split and cast may provide excellent immobilization in certain circumstances but they are necessarily cumbersome and limit the ability to mobilize patients thus. In combination with skeletal traction they constitute the basis for the "Enforced supine position" implicated by Seibel et al as contributing factor to the polmonare failure septic state.
Fasciotomy for treatment of compartment sindrome must be consider a priority when engaging in damage control. High-energy limb trauma is associated with a higher incidente of limb compartment sindrome. A second priorità should be debridment of open fractures. Gross contamination must be eliminated as it will serve as a surce of both local and systemic infection in this particulary vulnerable patient population. Devitalized tissue will become necrotic and serve as a surce of release of pro-inflammatory mediatore if not excised.
Early stabilization of long bones fractures, particulary in the lower extremities should be accomplished expeditiously with the fewest possibile systemic consequences. In same circumstances, this can be accomplished with the use of bridging external fixation.
Timing of secondare procedures remains the controversial issue.

THE USE OF A BIPOLAR SEALER FOR HAEMOSTASIS IN MAJOR ORTHOPAEDIC SURGERY. TOTAL HIP AND KNEE ARTHROPLASTY AND SPINAL SURGERY

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Background Authors used a new bipolar sealer system (TissueLink Medical Inc., Dover, New Hampshire) for electrocoagulation in major orthopaedic surgery such as total hip and knee arthroplasty and spinal surgery. The bipolar sealer is an electrosurgical device which delivers radiofrequency energy to saline for haemostatic sealing and coagulation of soft tissue at the operative site providing haemostasis at much lower temperatures than conventional electrocautery (<100°C).
Materials and Methods Since October 2004 through December 2006 the authors conducted a randomized study on 600 patients - total hip or Knee arthroplasty or spinal surgery- to compare the clinical outcomes in two groups. In the study cohort the bipolar sealer device was used, in the matching group conventional electrocautery. Both cohorts were evaluated for intraoperative blood loss, transfusion rate, postoperative drainage, number of transfusions and haemoglobin levels. Patients with known coagulation and peripheral circulation disorders were excluded. No preoperative autologous blood donation was utilized.
Results All patients recovered without complications and no re-operations became necessary in both groups. A significant reduction in post-operative and total blood loss (p=0.05 and p=0.02, respectively) occurred, as well as absence of tissue charring and smoke production in the bipolar sealer group. The mean decline in haemoglobin was significantly lower for the treatment group compared to the control group. The allogenic blood transfusion rates were extremely low in both groups (4.4% control vs. 0% treatment group). The mean volume of post-operative drainage was 451 ml (range, 1500 to 815 ml) for the standard electrocautery group and 256 ml (range, 0 to 743 ml) for the bipolar sealer group (p=0.002).

Discussion and Conclusions Results suggest that use of this bipolar sealing device is at least as effective as standard cautery devices and may reduce blood loss, tissue damage and smoke production in major orthopaedic surgery without affecting outcome. Lesser bleeding results in faster recovery of the patient, better wound healing and lower complication rates

Suggested reading

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STRONTIUM AND BONE INGROWTH IN ARTHROPLASTIES

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Several studies showed that strontium positively affects bone metabolism to promote bone formation and decrease bone resorption,leading to normalized bone density. Strontium-ranelate is now being used as an effective treatment of osteoporosis in elderly patients and postmenopausal women. Recently it was studied the effect of strontium on hMSCs and osteoblastic lineage. Concentration of strontium ranelate between 0.2107–21.07 g/ml has been recommended to be optimized effect on osteoblastic differentiation with delayed expression on Cbfa1 and osteonectin. In addition, strontium could help cell expansion by maintaining cell proliferation rate of hMSCs and osteoblast lineage.
Recently a bioactive bone cement, strontium containing hydroxyapatite (Sr-HA) bone cement, was developed. Using this cement, in an animal model, new bone bonded to the surface of Sr-HA cement and grew along its surface, confirming a good bioactivity of Sr-HA bioactive bone cement in revision hip replacement model in animals.
These promising experimental results suggest a clinical use of strontium to enhance bone ingrowth around implants.

SESSION O-09

MISCELLANEOUS II

EMBRIONIC OR MESENCHIMAL STEM CELLS: WHICH ONE FOR TREATMENT OF EXPERIMENTAL CARTILAGE DEFECTS?

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Background Stem cells are self renewing, unspecialized cells that can give rise to multiple cell types of all tissue of the body. They can be derived from the embrio, foetus and adult. The aim of our study was to verify if the stem cells, seeded on fibrin glue, maintaining them properties, and grow and form cartilage in chondral defects, when used for repair the lesion.
Materials and Methods Pluripotent cells derived from inner mass cell of embryos (ES) at the first stages of development (blastocysts) and mesenchymal stem cells (MSC) isolated from bone marrows aspirates, are investigated.
In 6 sheeps, in correspondence of medial femoral condyle on both knees, we performed a hole 5 mm diameter and 3 mm in depth with anatomic drill be careful to avoid bleeding, obtaining an chondral full thickness lesion. After this time, on right knee ES was implanted. In other 6 sheeps we perform the same procedure implanting MSC. Left knee was used as control.
The new tissue obtained was tested using the ICRS classification, and analysed biomechanically by the Artscan 200 series. We performed besides immunohistochemical evaluation of cartilage to check collagen type I.
Results The ES, being rapidly proliferating can be maintained in vitro for a infinitely long time and can differentiate into all cells of adult organism; the MSC have a limited capacity for differentiation and probabily, a limited proliferative potential.
Specific attention was directed toward the determination of the presence of teratoma in the reparative tissue but this positive labeling was not found in the specimens from defects that underwent to stem cells cartilage procedures.
Six months after transplantation, in each group, the cells were largely distributed on the area of defect and were round and arranged in numerous small clumps. In the control group the repair tissue implanted was fibrous with prevalence in extracellular matrix of Type II collagen.
Conclusions MSC represent an important and easily available source of non-hematopoietic stem cells and can be isolated from different sources. Moreover, in contrast to embryonic stem cells, the utilization of these cells avoids most of the ethical, religious and political questions and concerns.

TREATMENT OF CARTILAGE DAMAGES: HYALOGRAFT C AND CHONDRO GIDE, COMPARISON OF 2 TECHNIQUES

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Background It is well known that the cartilage has very few possibilities to heal when damaged. This is why new techniques have been studied to improve or give at least any hope on healing in young patients.
A big step was made thanks to new bio-engineer knowledge that provided new kind of tissues as matrix on which growing up cells for cartilage differentiation.
Many techniques base their rational on the possibility of implanting cells on inductor to stimulate the cartilage healing towards a new tissue with biomechanical features closer with native joint cartilage.
Materials and Methods From October 2002 to January 2007 we treated 20 patient with chondrocytes implant on matrix of Hyalograf C (group 1) and 9 patient with microfractures associated with Chondro-Gide membrane (group 2). The average age of group 1 was 27.4 years old (between 18 and 50 years), 14 male and 6 female. 4 patients had medial meniscal tears and 5 had ACL tears. The most of the lesions were traumatic. The average follow up was 2 years (from 2 to 4 years). In the group 2 the average age was 38.2 (between 18 and 50 years), 6 male and 3 female. Only one patient had a varus knee, no meniscal tears or ACL lesion. The most of the lesions were traumatic. The average follow up was 1.3 years (from 6 months to 3 years) The follow-up was at 3, 6, 9, 12 months and every 6 month. We performed clinical test, ICRS. We performed MNR pre-op and between 6th and 9th months after surgery. In 6 cases we performed a second look arthroscopy between 6th and 12th month.
Results In the follow up the two groups showed good clinical results and a good satisfaction of the patients with a excellent result on pain. The MRN showed a sufficient healing of the cartilage. The second look showed a good cover of the subchondral bone with a soft simil cartilage tissue. The edges of the implants were well connected with the normal cartilage.
Discussion Our result showed good response from patient in both groups. The best improvment was during the second 6 months after surgery. This technique gives a new method of treatment but many other steps have to be done.

Conclusions We thinks this method gives good possibility on improve the symptoms of cartilage damages if the indications are strictly observed.

IN VITRO STUDY ON A TISSUE ENGINEERED OSTEOCHONDRAL COMPOSITE

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Background The purpose of this work is to create an in vitro model of tissue engineered osteochondral composite by combining a cylinder of calcium phosphate and a neocartilaginous tissue produced by isolated swine articular chondrocytes embedded in fibrin glue.
Materials and Methods Swine articular chondrocytes were enzimatically isolated and embedded in a fibrin glue gel. Immediately before gel polymerization, the fibrin glue was placed in contact with the calcium phosphate scaffold. The osteochondral composites were left in standard culture conditions and retrieved after 1 and 5 weeks. At the end of each experimental time, samples were macroscopically analyzed and processed for histological (ematoxylin-eosin and safranin-o), immunohistochemical (collagen type I and type II), biochemical (DNA and GAGs) and biomechanical evaluation (compression testing).
Results Preliminary data showed a macroscopic integrity of the osteochondral samples. Histology showed cartilage like tissue maturing within the fibrin glue scaffold. Moreover, GAGs seemed to penetrate microscopically into the scaffold, determining an interface area of microscopic integration between the porous of the scaffold and the cellular fibrin glue. Immunohistochemical analysis demonstrated the presence of type II collagen fibers. Biochemical assays confirmed the presence of vital cells, and a production of GAG matrix. Biomechanical compression testing demonstrated an increase of the biomechanical properties after in vitro culture.
Conclusions The results of this study demostrate that isolated chondrocytes, seeded onto fibrin glue, produce a cartilage-like matrix that integrates with a cylinder of calcium phosphate. Moreover, we noticed a microscopic penetration of the newly synthesized GAGs inside the structure of the calcium phosphate, confirming the importance of an in vitro maturation of the engineered tissue.
This tissue engineered osteochondral composite could represent a valuable model for further in vivo studies on the repair of osteochondral lesions.
Suggested readings

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MUSCLE-DERIVED HUMAN STEM CELLS: PRELIMINARY STUDY FOR CLINICAL APPLICATIONS IN ORTHOPAEDICS

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Background Stem cells are considered to be the frontier of research and raise great hopes for therapy of a number of severe diseases. Stem cells can differentiate into cells lines of various tissues and reproduce [1].The aim of this study was to produce an osteogenic line from stem cells derived from human muscle tissue for clinical use in orthopaedics.
Materials and Methods The study sample consisted of eight male patients treated at the Institute of Clinical Orthopaedic of Catania between April 2004 and May 2005. The muscle tissue biopsies were removed using sterile techniques and placed in Hank's balanced solution.To obtain primary cultures, two phases were required:1) the tissue biopsies were fragmented into small pieces and 2) the resulting cell suspension was enzymatically digested. Cell differentiation was accomplished as follows: 1) vitamin C, 2) B-glycerol-phosphate, 3) desametason, and 4) vitamin D.Osteogenetic differentiation was verified by means of the presence of desmina and the activity of alkaline fosfatasica.
Results The cells differentiated had a limited proliferative capacity, and were slow-growing, which made expansion difficult.To compensate for these conditions, growth factors were used.The final part of the process consisted of the deposition of the growth factor-treated cells in plates, from which osteogenic-derived cells were produced. The most common cells were osteoblasts and osteoclasts.
Discussion The use of stem cells from muscle tissue is more practical due to the great availability of these tissues [2]. Stem cells thus have the potential to treat various skeletal pathologies, both degenerative and traumatic [3]. These cells could also be used for the treatment of osteoporosis, osteogenesis imperfecta, spondylolysis or spondylolisthesis, bone development defects, meniscus lesions, and epiphysial deachment. Traumatic events could have an effective and quick treatment avoiding complications and generally long periods of convalescence [4].
Conclusions Stem cells could be an alternative treatment to the classic treatments, above all to those that are not very effective or lasting. For numerous other pathologies, the use of these cells is not a substitution to current treatments, rather an adjunct.Without a doubt, however, more time is needed and more research is necessary before we will have clinical confirmation of safety and efficacy in humans.
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DEVELOPMENT OF ARTIFICIAL NEURAL GUIDES FOR PERIPHERAL NERVE REGENERATION

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Background The effects of the repair of nerve gap injuries are still unsatisfactory, despite the great progress in microsurgery. The success of peripheral nerve regeneration is dependent on the survival of axotomized neurons, the efficacy of axonal outgrowth from those neurons, and the specificity of reinnervation of peripheral targets by those neurons. Recent efforts in the field have been directed towards the development of artificial nerve guides.
Materials and Methods Various materials have been studied. Nanotechnology has been advocated by means of photolithographic and microprinting techniques which could be used to make patterns of organofunctional groups for culturing neurons.

Results Whether the guide should be semi-permeable is still a matter of debate. Accurate fascicular matching is not an imperative requirement. Also bioresorbable collagen nerve guides filled with magnetically aligned type I collagen gel are promising.
Discussion The problem of the healing of nerve injuries, both recent and inveterate, remains difficult to tackle but the associated permanent damage and social costs are everyday less acceptable. Patients will certainly benefit from the news that an improvement can be reached for lesions which are often referred as little- or not-curable. Manufacturing technology of such delicate devices and surgical techniques will both progress in case an effective solution could be envisaged by the use of novel-designed nerve guides.
Conclusions Questions remains in the field of artificial nerve guides for nerve regeneration: 1-which are the characters of the outer-tube of the guide?; 2-which should be the filler?; 3-are different types of guides needed to treat fresh instead of inveterate lesions? The experimental activity will require both material-science and in-vivo testing facilities. A new class of products is likely to ensue from the accomplishment of the outlined tasks.

ITALIAN ORTHOPAEDIC SURGEONS AND OSTEOPOROSIS: WHAT HAS CHANGED FROM 2003 TO 2006?

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Background The BJD, in cooperation with the IOF, performed a study in 2003 in order to evaluate the interest and knowledge of orthopaedic surgeons about osteoporosis through a questionnaire to the members of the National Societies of Orthopaedics and Traumatology from France, Germany, Italy, Spain and United Kingdom. Over 4580 questionnaires were delivered to the SIOT members, and 980 (21%) were returned. To verify the effect of the initiatives taken in the following years, a new questionnaire was created in 2006, similar to the previous. Also New Zealand and the United States joined the study.
Materials and Methods The SIOT distributed 4685 questionnaires from April 2006. They were delivered by ordinary mail and e-mail. They were also available at the Annual Congress in November 2006. The 32 questions-questionnaire asked general information about orthopaedic experience and more precise details about osteoporosis knowledge and management. 1150 questionnaires (25%) returned. They were sent to the University of Lund in December 2006 to be analyzed. The data processed were delivered to the national coordinators at the Final Meeting in Zurich on March 9, 2007. Here we present the results of this survey and compare them to the 2003 survey.
Results Among the other results, the majority of orthopaedic surgeons answering (34%) have completed their training in Orthopaedics between 10 and 20 years ago and no one of them has over 30 years' experience. 68% believe they have received moderate training on osteoporosis, 74% is working in a hospital and 50% is treating over 20 fragility fractures a month. 45% perform a BMD measurement. Most have a rather good knowledge of risk factors for osteoporosis and falling, and Alendronate is the most used drugs (by 90% members). Italian orthopaedic surgeons (73%) tend to feel moderately knowledgeable about osteoporosis, they are interested in courses and seminars (60–70%), and they declare they often treat patients themselves.
Discussion and Conclusions In comparison with the 2003 Survey, SIOT members seem to be more involved in the subject, and more willing to learn about it. The great number of fragility fracture patients that come to orthopaedic attention is surely one of the main reasons why, together with the national and international initiatives taken. Still much has to be done, because the best mean against this "epidemic" is prevention, and the orthopaedic surgeon still is the first if not the only specialist who has this opportunity.

AVASCULAR NECROSIS OF THE PROXIMAL FEMORAL EPIPHYSIS: PRELIMINARY RESULTS OF RECONSTRUCTION WITH REGENERATIVE MEDICINE

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Background Avascular necrosis of the femoral head is a common problem, often leading to joint arthroplasty in young patients.
We illustrate the preliminary results of an innovative surgical technique using various methods of regenerative medicine for the non-prosthetic treatment of high-grade necrosis of the femoral head (Stage III Arco) in patients under 45 years old, with the purpose of preserving the femoral epiphysis.
Materials and Methods We used a technique that combines various methods: bioceramic cylinders (Trufit®Smith-Nephew) and lyophilized bone mixed with platelet gel and packed medullary cells; and engineered autologous cartilage on scaffold obtained from hyaluronic acid (Hyalograft®C, Fidia) to reconstruct the articular surface.
A small cartilage biopsy was harvested from a non-bearing area of the knee during arthroscopy. Chondrocytes were isolated, expanded in monolayer up to 3–4 passages and seeded onto three-dimensional non-woven matrices derived from hyaluronic acid. Engineered scaffolds were then cultured for 7–9 days before grafting.
Cell manipulation was performed in a production facility located inside Rizzoli Orthopaedic Institute and including clean rooms of different classification up to A in B work places, according to the EU guidelines of current "Good Manufacturing Practices" (GMP). Quality control testing on individual production lots was performed.
Clinical-radiological evaluation were performed at 12, 24 and 48 weeks after surgery.
Results Six months after the operation, and 3 months after weight bearing, the instrumental tests (CT and MRI) highlighted good preservation of the morphology of the femoral epiphysis and an initial reconstruction of the subchondral bone and the articular cartilage.
From a biomechanical viewpoint in 3 cases out of 5 a functional limitation was caused by the incongruity of the articular surface and pain at the extremes of movement.
Conclusions The preliminary results are presented of the first 5 cases of a study that will involve 20 patients for a 3-year duration.
Considering the severity of the cases treated we are encouraged by the results and therefore consider the technique effective, although better results might be achieved with scaffolds that can recreate the spherical profile of the femoral epiphysis
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CORE DECOMPRESSION +AGF+MSCS IN THE TREARTMENT OF OSTEONECROSIS OF THE FEMORAL HEAD

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Background Osteonecrosis of the femoral head leads to bone death due to the lack of blood supply in the bone. The uncertainties about aetiology (multifariousness of the risk recognised as ever increasing - diagnosis of idiopathic necrosis in 30%9 and the shortage of clinical symptoms at the very beginning (often asymptomatic) can preclude the conservative surgical treatment, which is scientifically proved to be useful only in the first stages (I-II a by ficat) and leads to more invasive operations in high percentages (10% of all arthoprosthesis). Core

decompression of the hip is one of the most surgical procedure for the treatment of early stages. The employment of the angiogenetic proposals of AGF (autologous growth factors) and mscs(mesenchymals stemm cells) might raise osteonegenesis in collapsing femoral head.
Materials and Methods The authors report the results conscerning 9 cases (7IIA-2IIB) treated with combination of core decompression + AGF+ MSCS, whith follow-up from 20 to 38 months, and checked with rx-rnm at 4–8–12 months. And at last check.
Results 6 patients keep on being healty (good deambulation, no pain, total rom; 3 patients - 1 suffering from ar- showed a less favourable result, low pain walking, but no evident bone collapse or illness advancement.
Discussion The disease develops in young patients (average 38 y) and it is bilarealin 50%. The goal of the treatment is preservation of the femoral head.
Conclusions The good results obtained, in line with literature, leads the authors to suggest this conservative and integrative operation in advanced illness stages.

PRELIMINARY EXPERIENCE ON UTILIZATION OF SYNTHETIC OSSEOUS SUBSTITUTE FINCERAMICA AT THE UPPER LIMB

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The clinical presence of biomaterials is quickly changing the indication and the reconstructive surgical techniques. In literature many publications are present more frequently about biomaterials. In the hand for the complexity of the apparatus, the dimension of segment, the ratio vascularization-dimension and the motivation of patients to the functional recovery, there is an ideal field of application. The complexity and the difference of biomaterials requires the presence in the team of professional dedicated figure.
The pathologies of the upper limb need of a multidisciplinary therapeutic approach, where the different professional figure have a relevant role in the diagnosis phase, in the definition of therapeutic strategy and in particular in the pre and post surgical program.
Our Unit intends to activate a therapeutic way utilizing the bone synthetic substitute FINCERAMICA for the treatment of bone's loss at the hand, wrist and forearm level.
In this "sperimental" phase we have utilized bone synthetic substitutes in more different pathologies: in the post-traumatic bone's loss, in non-union at the hand, wrist and forearm level, in the aseptic necrosis of the carpal bone, in the congenital deformities and in a case of toe to thumb.
On the basis of our preliminary experience the advantages are undeniable: the utilization of biomaterials allow us to pull down the donor site morbility, to decrease the consuming operatory time and with an acceptable recovery time.
A short follow-up doesn't permit us a definitive opinion, bu the preliminary results thrust us to a cautious optimistic judgement on utilization of bone synthetic substitute.

EFFICACY AND SAFETY OF HYALURONIC ACID ADMINISTRATION IN HIP OSTEOARTHRITIS: PERSPECTIVE MULTICENTRIC STUDY

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Background To assess the safety and efficacy of administering hyaluronic acid (1700 KD Hyalubrix®) on painfull symptomatology, joint function and NSAID consumption in patients with symptomatic hip osteoarthritis.
Materials and Methods Between March 2005 and May 2006, in our multicentric study, 126 patients with a mean age of 65 years and suffering from symptomatic hip osteoarthritis, received ultrasound-guided, intra-articular injections of 4 ml / 60 mg (2 ampoules) of hyaluronic acid. These patients were assessed at baseline and at three months (126 patients) and six months (61 patients) for pain (evaluated by VAS), Lequesne index and NSAID consumption.
35 patients were also evaluated with Harris Hip Score, at baseline and at three months (35 patients), at six months (19 patients), at one year (11 patients).
Results When assessed after 6 months of follow-up, the group of 61 patients showed a statistically significant reduction in VAS pain scores (from 6.02 to 3.95 and 4.40 respectively at 3 and 6 months, $p<0.00001$ in both cases), in Lequesne score (from 6.92 to 5.09 and 5.43 at 3 and 6 months respectively, $p<0.00001$ in both cases) and a reduction in NSAID consumption that almost reached statistical significance (from 6.70 to 5.60 and 3.00 respectively at 3 and 6 months, $p=0.22897$ and 0.01717). The 19 patients evaluated at 6 months with HHS showed a statistically significant improvement of the score (from 45.44 to 70.48, $p<0.0001$). The 14 patients evaluated at 1 year showed a statistically significant improvement of the score (from 45.3 to 60.15, $p<0.0001$).
No systemic side effects were recorded.
Conclusions The data from our multicentric study seem to demonstrate the long-term efficacy and safety of intra-articular treatment with hyaluronic acid (1700 KD Hyalubrix®) in symptomatic hip osteoarthritis. They do, however, need to be confirmed by further data to be collected after longer follow-up times.
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A DOUBLE-BLIND, RANDOMIZED, PLACEBO-CONTROLLED EVALUATION OF THE EFFICACY AND SAFETY OF A SINGLE DOSE OF 6 ML OF HYLAN G-F 20 IN PATIENTS WITH SYMPTOMATIC OSTEOARTHRITIS OF THE KNEE

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Objectives To compare the safety and efficacy of a single 6mL intra-articular (IA) administration of hylan G-F 20 (Synvisc) against placebo in treating patients with symptomatic OA of the knee.
Methods Prospective, multicenter, randomized, double-blind study comparing 1 IA injection of 6mL of hylan G-F 20 (H) or saline (P). Patients must have documented diagnosis of OA of the target knee made at least 3 months prior to screening. Total follow up was 26 weeks with an optional hylan G-F 20 1x6mL injection at week 26 for both groups. The primary efficacy analysis was performed on the ITT population and based on a repeated-measures model over 26 weeks.
Results 253 patients were randomized (HN=124, PN=129). Mean age 63 years (42–84), BMI 29.4 (19.5–52.4), 71% female, primary knee OA Kellgren Lawrence grade 2 (45%) or 3 (55%).
Patients in the H group experienced a mean change from baseline in their WOMAC A Likert pain score over 26 weeks (primary efficacy criteria) of -0.84 which was statistically significantly different from the change reported in the P group (-0.69, $p=0.047$).
Statistically significant differences were also reported for most of the secondary efficacy criteria: WOMAC A1 (estimate Odds Ratio over

26 weeks P/H 0.64, p=0.013), patient global assessment (0.69, p=0.029) and clinical observer global assessment (0.71, p=0.041); WOMAC C changes were not statistically significant between groups. The responder analysis for WOMAC A1 Walking Pain (defined as >1 category improvement and no knee related adverse event (AE)) indicated that 71% of the patients were responders at week 18 in the H group (versus 54% in P, p=0.003) and 64% versus 50% at week 26 (p=0.028). There was no significant difference in rescue medication use (paracetamol) during the study between the 2 groups.
There was no serious AE related to the treatment. Overall 57% and 61% of the patients reported an AE of any type, including 3.3% and 0.8% of the patients reporting treatment related target knee AEs after the first injection in the H and P groups respectively. There was no increased incidence of target knee AEs after the second injection of hylan G-F 20 administered 26 weeks after the initial injection.
Conclusion This double-blind placebo-controlled study demonstrated that a single injection of hylan G-F 20 is safe and effective in providing symptomatic relief up to 6 months in patients with knee OA.

EVALUATION OF THE EFFICACY OF VISCOSUPPLEMENTATION WITH HYLAN G-F 20 (SYNVISC) FOR POST-TRAUMATIC OSTEOARTHRITIS OF THE ANKLE: A PROSPECTIVE STUDY AT 18 MONTHS FOLLOW-UP

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Objectives Viscosupplementation, in which hyaluronan derivates are injected into the intra-space of osteoarthritic joints, is now widely used for the treatment of knee osteoarthritis. This study evaluated the results in term of pain and disability of intra-articular injections of hyaluronan derivates into the ankle joint in patients suffering from grade II osteoarthritis of the ankle.
Methods 21 patients with a painful ankle and radiographic evidence of grade II osteoarthritis undergo three weekly intra-articular injections of 2 ml of hylan G-F 20 (10 mg/ml) into the ankle joint. The primary outcome measurement was the ankle osteoarthritis score (AOS) at the baseline, 6, 12 and 18 months. Adverse reactions and the use of analgesic drugs were also recorded.
Results Significant improvement of the AOS from baseline was seen at 6 months follow-up for disability (p=0.0001). This improvement was maintained over time with no further changes at 12 and 18 months follow-up. Regarding pain, the AOS improved over time from the baseline to 18 months follow-up and became statistically significant at 12 and 18 months follow-up (p<0.05).
Conclusions This prospective study demonstrates that three weekly intra-articular injections of 2 ml of hylan G-F 20 are a safe and effective therapy in providing symptomatic relief up to 18 months in patients suffering from grade II osteoarthritis of the ankle.

THE TREATMENT WITH EXTRACORPOREAL SHOCK WAVE THERAPY IN SOME OF MOST FREQUENTLY MUSCULOSKELETAL PATHOLOGIES

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Background The aim of this study is to evaluate the efficacy of Extracorpereal Shock Wave Therapy (ESWT) in some of most frequent musculo-skeletal pathologies.
Methods From July 2004 to August 2006, 471 patients were treated with ESWT suffering from the following pathologies: 152 plantar fasciitis, 138 achilleous tendinopathy, 123 patellar tendinopathy and 58 groin pain.
Each patients was treated with 1700 pulses having a medium energy (0.28–0.6 mJ/mm^2) with Wolf Piezoson 300 Dornier Medtech 6,5 MHz with ultrasounds for three times in a month. Patients were evaluated clinically and instrumentally before the first application and at one and three months of follow-up.Three pain and disability scales we utilized (NRS, McGill Pain Questionnaire and Chronic Pain Grade Questionnaire).
The evaluation was done by using X-ray, Ultrasound and MRI.
The scores before and after treatment were compared statistically using a Wilcoxon signed rank test and statistical significance was set a P value of <0.001.
Results We observed a statistically significant reduction of the pain and an increase of the articular functionality: plantar fasciitis average pre-treatment NRS 5.58 MPQ 12.13 CPG 2.23 and average post-treatment NRS 2.62, MPQ 7.31, CPG 1.04; achilleous tendinopathy pre NRS 5.95, MPQ 12.54, CPG 2.38 and post NRS 1.44, MPQ 5.91, CPG 0.58; patellar tendinopathy pre NRS 4.05, MPQ 9.54, CPG 1.62 and post NRS 1.43, MPQ 5.75, CPG 0.56; groin pain pre NRS 3.99, MPQ 11.02, CPG 1.63 and post NRS 1.82, MPQ 3.50, CPG 0.71.
The main outcome measure was patient satisfaction according to four-step score at three months: A very good, B good, C sufficient, D unsatisfactory. In palantar fasciitis 75% (A=60; B=54; C=20; D=18) of patients referred a good result from ESWT, 84% of achilleous tendinopathy (A=63; B=53; C=15; D=7), 82% of patellar tendinopaty (A=55; B=46; C=12; D=10) and 78% of groin pain (A=31; B=15; C=8; D=4).
Discussion These results confirm that ESWT therapy is efficient in some of most frequent musculoskeletal pathologies, with variable outcome in the different pathologies investigated.

SESSION 0-10

UPPER LIMB TRAUMATOLOGY

HUMERAL PROXIMAL EPIPHYSIS FRACTURES: MARCHETTI-VICENZI NAIL FIXATION

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Introduction Retrograde intramedullary fixation of proximal humerus fractures with Marchetti-Vicenzi nail was evaluated in a prospectively study.
We analyse the results of Marchetti-Vicenzi retrograde nail in proximal epiphysis fractures.
Different treatments are available for displaced humeral proximal epiphysis fractures: from the conservative treatment to the surgical approach. Surgical treatment of displaced humeral epiphysis fractures can be performed with wires, plates, anterograde and retrograde nails up to prothesis.
The Marchetti-Vicenzi nail allows reaching a stable reduction of the fracture and early mobilization of the shoulder. The proximal end of the nail locks automatically by diverging the secondary nails in the proximal humeral epiphysis; distally, the elastic nail is locked with a crossbolt.
Materials and Methods We examined 50 traumatic fractures of the proximal humerus treated with Marchetti-Vicenzi nailing: 38 were female and 12 were male, medium age was about 68 years (minimum 42- maximum 89).
The indications for surgery included non-union, pathological fractures and poor fracture position.
Results Final results were taken out from the clinical and radiological evaluation: all the fractures healed with good clinical results.

For clinical evaluation we used the Constant score: Excellent-good outcome was achieved in 43 cases (87%), and satisfactory in 6 cases (11%) and poor in 1 case (2%). There were no major complications exept 1 transitory palsy.
Discussion and Conclusions The choice of an elastic, retrograde nail allows a solid fixation for proximal fractures has proven to be useful and safe for an early shoulder function because of distal insertion wich saves the rotator cuff, damaged by anterograde nails.
The Marchetti-Vicenzi nail can be considered an excellent osteosinthesis device for proximal epiphysis humeral fractures and we can have elastic and stable osteosinthesis by fast and easy surgery.
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TREATMENT OF PROXIMAL HUMERUS FRACTURES: PLATE VERSUS NAIL

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Background Proximal humerus fractures are the third most common type of injury seen in patients over 65 years old. We analize the vantages and disadvantages using plates or short intramedullary nailing. Both techniques gives more stability then closed reduction and percutaneous fixation in proximal humerus fractures.
Materials and Methods Twenty-seven patients with displaced three-part proximal humeral fractures have treated surgically in the period 2000–2004. The average age of patients was 54.3 years. The operative indications were persistent severe displacement, intact or minimally displaced lesser tuberosity, and adherence to rehabilitation programs. The CT scan was used to identify the pattern of fractures and displacement fragments. By transdeltoid or deltoid-pectoral approach, the fractures were reduced and fixed. Locked nailing was used to treat 17 patients and plates with locking screws in 10 patients. The mean follow-up was 24 months.
Results All fractures achieved union. Three patients with proximal screw loosening required screw removal. According to Neer criteria, excellent or satisfactory results were obtained in 21 patients, 6 patients had unsatisfactory outcomes. Two patients with complication of avascular necrosis still had a satisfactory outcome.
Discussion Achieving mechanical support of inferomedial region of the proximal humerus seems to be important for maintaining fracture reduction, as well as meticulously placing a superiorly directed oblique locked screw in the inferomedial region of the proximal fragment, may achieve more stable medial column support and allow for better maintenance of reduction.
Locked nailing can be an effective treatment for selected severely displaced three-part proximal humeral fractures.
Conclusions The present study supports use of open locked plating for selected severely displaced three-part proximal humeral fractures. Intramedullary nailing, with the advantage of low invasiveness, was particularly useful for fractures with diaphyseal extension or comminution.

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PROXIMAL HUMERAL FRACTURES IN THE OLD PATIENT WITH MINIMALLY INVASIVE TECHNIQUE

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Above all in the old patient with many fragments fracture of the prossimale epifisi of the omero, the authors stretch themselves to privilege a result adapted to the reduced requirements works of the patient, rather than an anatomical reduction with stable osteosynthesis, obtainable with participations to open sky and with means of synthesis. The authors report the treatment of the proximal humeral fractures in the old patient with minimally invasive technique (transcutaneous wires of K. or cannulated screw) dealt in last the 5 years, with particular regard to technique notes.

ANGULAR STABILITY PLATING IN THE TREATMENT OF PROXIMAL HUMERAL FRACTURES

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Background The number of fractures affecting proximal humerus has increased by three fold in the last 30 years. Such increasing disease has led to new classification systems along with new treatment options. Aim of the present study is to evaluate prospectively the clinical efficacy of a innovative specific device used for fixation of displaced proximal humerus fractures.
Materials and Methods An angular stability fixation plate S3 (Hand Innovations, Myrmex, Italy) was used for open reduction-internal fixation of closed displaced proximal humeral fractures in 32 patients from 2005 to 2006. The patients' ages ranged from 38 to 62 years (mean 50 years and median 56 years) being 30 female and 2 male. As defined using the Neer classification 18 patients had two part, 10 three part and 4 had four part fractures. Median follow-up was 19 months (11–38). The outcome was assessed using radiographs, American Shoulder and Elbow Surgeons (ASES) score and Hospital for Special Surgery (HSS) scoring system.
Results Union was achieved in a median of 8 weeks in 28 patients. The median cumulative score of activities of daily living of ASES was 25,6/30 (18–29). According to HSS, 21 scored excellent, 9 good, 2 fair and none scored poor. Two patients had partial fixation failure and none developed avascular necrosis. No infections were detected. As for the relevant fixation stability, early active rehabilitation was started in all patients from the third post-operative week. The two partial fixation failure patients were revised surgically for further collapsing of the bone and ended with a good final result.
Discussion Numerous options are available for treatment of proximal humeral fractures. For nondisplaced proximal humeral fractures, conservative treatment generally produces a satisfactory result. Treatment of comminuted and displaced fractures is cur-

rently addressed with open reduction–internal fixation. Four-part proximal humeral fractures, particularly those in patients with osteoporotic bone, are generally treated with prosthetic replacement. The goal of open reduction–internal fixation is to stabilize the fracture to promote healing while allowing early shoulder mobilization to reduce the risk of stiffness. Several plating techniques are available for open reduction–internal fixation. The most commonly used devices are semitubular blade plates, T plates, and cloverleaf plates.

Conclusions The use of an angular stability plate along with pins provided excellent to good results in our case study.

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THE TREATMENT OF HUMERAL SHAFT FRACTURES WITH THE T2® INTRAMEDULLARY NAIL. FIRST CLINICAL RESULTS

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Background Usually fractures of the humeral shaft are caused by high-energy trauma; we have investigated the clinical outcome and complications associated with the use of a locking intramedullary nail (T2 Stryker ®) for the treatment of these fractures.

Materials and Methods From January 2005 to January 2006 we have used this nail for 22 fractures, classified on the basis of anatomic location and pattern. Post-operatively healing and alignment of the fracture were assessed with radiographic and clinical evaluation.

Results The mean follow-up time was 18 months. Clinical healing was achieved with a mean time of twelwe weeks; radiographic after ten weeks. There were not occur significant mal-alignment, iatrogenic nerve lesions and post-operative infection of the surgical wounds. The mean shoulder Costant score was 92.

Discussion Actually there's not a largely accepted gold standard for surgical treatment of the humeral shaft fractures. Some authors report good results while others describe some problem associated with this technique, like shoulder pain or dysfunction, especially with antegrade approach. From review of the letterature, the use of intramedullary nailing has been strongly suggested for the treatment of humeral non-unions as well as pathological fractures.

Conclusions We can conclude that T2® humeral nail is a good device, quite easy to apply, even if sometimes the distal locking can result difficult. We consider it the gold standard for the treatment of pathological fractures and for the non-union of the humerus in osteoporotic bone. We have not had significative relevance of shoulder problem after anterograde nailing, that's why we consider the T2® anterograde nailing a good solution for treatment of quite all humeral fractures situated between the proximal one sixth and the distal one forth.

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TREATMENT OF HUMERAL NON-UNION

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Background Humeral non-unions are usually the consequence of a surgical treatment. The ethiology of humeral non-union are open fractures, bone loss, comminution of the medial cortex, failure of conservative treatment, uncorrect indication and inappropriate surgery. It is possible to recognize biomechanic and biologic causes.

Materials and Methods From 2001 to May 2006 we performed 22 cases of humeral non-union in 21 patients, 1 bilateral. 5 cases of proximal humerus, 14 of the diaphysis, 3 of distal humerus. 18 cases were previous treated surgically, 10 with open reduction and internal fixation, 7 with intramedullary nailing, 2 with external fixator, 1 with kirschner wires. 3 cases were previous treated conservative. After the failure 14 cases were treated with plates and omoplastic cortical bone graft, 7 cases with plates and autoplastic cancellous bone graft, 1 case with vascularized fibula.

Results We review 21 cases. 1 case is on treatment still. All cases treated with plate and bone graft were healed. The patient treated with vascularized fibula carried out other 4 surgical operations and at the end healed. We had 2 transitory paralisis of the radial nerve after surgery but both healed.

Discussion and Conclusions Humeral non-union is an uncommon pathology, difficult to treat. Bone graft is absolutely mandatory to achieve healing. The omoplastic cortical bone graft protects the medial cortex and increase the stability. The autoplastic cancellous bone graft is fondamental when is present a loss of bone, always in the non-union of ephifisis.

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THE SURGICAL TREATMENT OF THE FRACTURES OF THE HUMERUS: OUR EXPERIENCE WITH THE HOFFMAN 2 EXTERNAL FIXATION

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Introduction In three years 2003–2006 the Authors have dealt 45 interesting humeral fractures the diafisi and the metafisi to be distant them by means of the use of the external fixation system Hoffman II.
Materials and Methods 44 (97.8%) fractures are committees to guarigione and the external fixation has been removed after the medium time of 100 days (minimal 85 days, maximum 155 days). After such period the system comes progressively dinamic with the removal first the cross-sectional bar and then those longitudinal ones monitoring the state of consolidation, with xray examinations and estimating the feelings reported from the patient. The recovery has happened in relatively short times, also when the reduction (particularly in the comminuted fractures) has not been optimal. The removal of the system and the bony lives has never demanded anesthesia or shelter.
Results In our experience the external fixation Hoffman 2 has been demonstrated relatively simple to apply in all the types of fractures, a lot very tolerated from the patient, allows an immediate mobilization is of the shoulder that of the elbow that, to the end of the treatment, has not shown some limitation works them residual in no patient.
Conclusion The system comes preferred in the humeral fractures because poured them, with infinite adaptable possibilities of assembly to every type of fracture and, above all, with the possibility to vary, in course of treatment, the rigidity of the system until transforming it in the minimal system progressively transferring the load to the bone, what a lot important for the humerus segment, not subordinate to the load.
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INTRA-ARTICULAR FRACTURES OF THE DISTAL HUMERUS: SURGICAL TREATMENT AND RESULTS

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Background In this retrospective study we present the results achieved in 32 patients over a period of three years (2004–2006), operatively treated in our hospital.
Materials and Methods The fractures were classified following the AO/ASIF classification (C) and the Mehne and Matta classification. There were 19 males and 13 females with a mean age of 41 years. In all cases we used a standard posterior approach with olecranon osteotomy and an internal fixation with unilateral or bilateral DHP-LCP plates (Synthes) and screw or titanium FFS wires (orthofix). The functional results were evaluated using the scoring system of the orthopedic trauma association and addictional parameters taken from the system of Aitken. Range of motion and McKee rehabilitation programme was initiated as soon as possible (post-operative first week).
Results The results were graded as excellent in 14 patients, good in 16, fair in 2, poor in none. Complication included one superficial infection, one loss of olecranon osteotomy reduction treated with early revision osteosynthesis and addictional injectable HA bone substitute (hydroset Striker).
Discussion Intra-articular fractures of the distal humerus are complex injuries. The purpose of the treatment must be a correct restoration of the articular surface to avoid and to limit the risk of poor functional results and secondary osteoarthritis.
Conclusions A careful preoperative planning, transolecranon approach, stable internal fixation and early active rehabilitation remain the gold standard for the treatment of complex intra-articular fracture of distal humerus in adult patients.

RESULTS OF SURGICAL TREATMENT OF SIMPLE AND COMPLEX ARTICULAR FRACTURES OF THE ELBOW

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Treatment of articular fractures of the elbow is difficult and the results are often unpredictable. The aim of this study is to determine whether satisfactory results can be obtained when the treatment is based on 1) accurate anatomical reconstruction, 2) stable internal fixation, 3) use of dynamic external fixator, 4) use of autologous bone graft, 5) immediate postoperative joint motion.
Materials and Methods 44 patients, aged 57 years on average, with an articular fracture of the elbow who underwent surgical treatment were studied prospectively. Of the patients under study, 12 had a fracture of the olecranon, 4 a fracture of the radial head, 13 a bicolumn fracture of the distal humerus, and 15 a complex instability of the elbow, i.e., a comminuted fracture of the distal humerus and a fracture of the olecranon, radial head and coronoid process. In all patients, active joint motion started was on the 1st or 2nd postoperative day and administration of indomethacin was continued for 4–5 weeks after surgery. The mean F.U. was 14 months. The results were evaluated using the Mayo Elbow Performance Score.
Results All patients, except for 3, regained the functional arc of motion. Of the 15 patients with a complex instability, only one, with a terrible triad who had a prosthesis of the radial head and ligamentous repair, showed mild clinical and radiographic evidence of elbow instability. Complications included one transient paresis of the radial nerve after application of the dynamic external fixator, one proximal migration of one Kirschner wire of a dynamic cerclage of the olecranon and one mobilization of the medial plate in a 81-year patient with a fracture of the two humeral columns, which did not required reoperation.
Discussion Adequate preoperative diagnosis carried out, when necessary, by bi -or tri- dimensional CT is of paramount importance for accurate planning of the operative treatment.
In complex elbow instability, the first surgical step is to transform complex instability into simple instability by accurate anatomical reconstruction of the articular surface and a stable internal fixation, performed by pre-modelled plates.
Autologous bone grafts allow bone defects, often found in comminuted fractures of the distal hmerus, to be filled. In one of our cases, the posterior part of the troclea was reconstructed with a pre-modelled monocortical graft. In fact, anatomical reconstruction of the troclea, and restoration of its normal orientation is indispensable to obtain a satisfactory functional result.

Reconstruction and ostosynthesis of the coronoid is of paramount importance since it is a primary stabilizer of the elbow.
The collateral ligaments should always be repaired when torn. After repair, the stability of the elbow should be checked and, when unsatisfactory, a dynamic external fixator should be applied. The fixator allows the articular congruency to be maintained, the osteosynthesis of small articular bone fragments and the ligamentous reconstruction to be unloaded, and immediate active joint motion to be carried out after surgery.

SURGICAL TREATMENT OF DISTAL RADIUS FRACTURES WITH VOLAR PLATES: EVALUATION OF THE RESULTS AND ANALYSIS OF THE PROGNOSTIC FACTORS

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Background According to recent literature, open reduction and internal fixation is the preferred technique for the treatment of distal radius fractures. Several plating options are now available to help the surgeon obtain anatomical reduction, stable fixation and early mobilization in order to achieve better intra-articular reduction and satisfactory functional results.
The aim of this study is to identify the best surgical treatment options for the different types of fracture and to evaluate prognostic influence of age, trauma, fracture anatomy and intra/extra-articular reduction on functional outcomes.
Materials and Methods This review was carried on 31 patients (16 men and 15 women; mean age, 54 years) treated for distal radius fractures from 2000 to 2006. They underwent open reduction and fixation with four different plating systems. The mechanism of injury was a low energy trauma in 13 cases and high energy trauma in 14 cases. There were 8 type B and 23 type C fractures. The average follow-up was 32 months. Objective evaluation included wrist range of motion and grip strength. Functional outcomes were assessed with the DASH questionnaire and the Gartland and Werley (modified by Sarmiento) scoring system. Follow-up x-rays were investigated for the presence of step-off (Knirk and Jupiter), gap (Gliatis), radial inclination, volar tilt and distal radio-ulnar index (Van Der Linden and Ericson).
Results Excellent and good results were achieved for 29 (94%) patients according to the score of Gartland and Werley. The mean score on the DASH questionnaire was 24 points.
Flexion averaged 46°, extension 51°, pronation 80°, supination 75°, radial deviation 20° and ulnar deviation 36°. The grip strength reached a mean 82% of controlateral unaffected limb. Fracture consolidation was obtained in all cases in a mean time of 45 days.
Discussion The outcome of the patients was generally satisfactory and was correlated with the patient's age at trauma: younger patients should be expected to have better functional recovery. In addition, the fixation obtained by steel plates associated with k-wires was correlated with better functional outcome. On the other hand, the mechanism of trauma and the morphology of fracture did not significantly influence final outcomes.
Conclusions Plating proved to be an adequate mean to achieve anatomical reduction and healing of both type B and C distal radius fractures. In addition, very few complications were reported, thus suggesting that this technique could be safely employed in the treatment of complex distal radius fractures.

TREATMENT OF INTRA-ARTICULAR FRACTURES OF THE DISTAL END OF THE RADIUS IN ELDERLY

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Background The fractures of distal radius are the most common fractures of the upper extremity. In the older and osteoporotic patients, simple falls with outstretched hand can cause a distal radius fracture.
Materials and Methods We analyze results of treatment of unstable distal radius intra-articular fractures in elderly .In agreement with LaFontaine, 56 wrists in 56 patients older than 60 years (8 males, 48 females) with unstable distal radius intra-articular fractures were treated in our operating room in 2005 and 2006. Mean age was 75.2 yrs, (range 60 to 88). 5 patients had other associated fractures. Fractures were classified as follows (AO-ASIF): 32 type B, 24 type C (16 C3). 52 patients returned for follow-up. Mean follow-up was 11 months (range 3 to 24 mos). We performed conservative treatment with long cast in 9 cases, external fixation (EF) in 27 cases, ORIF with angular stability plates in 17 cases, ORIF with associated EF in 2 cases, dorsal nail plate fixation in 1 case.
Results Results were evaluated according to a scheme which analyzed pain, mobility, strength, radiographic measurements, return to occupation and homework. Results were deemed optimal in 34 patients, good in 12, fair in 4, poor in 2 (one case with reflex symphatetic dystrophy-RSD after cast and one case with EPL rupture). Nevertheless, subjective patient assessment did not show poor results.
Discussion and Conclusions With a progressively older yet healthy population, more and more frequently patients remain physically active and engaging in sports. In our as well as other Authors experience, evolution of distal radial fractures shows that these fractures can and should be treated according to the same principles that apply to other intra-articular fractures.
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TREATMENT OF DISTAL RADIUS FRACTURES WITH ARTHROSCOPIC ASSISTANCE

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Introduction Treatment of intra-articular Distal Radius Fractures (DRF) has improved following the introduction of wrist arthroscopy, due to a higher accuracy in detection and reduction of articular step-offs and evaluation of associated lesions.
Materials and Methods In our series of 27 patients operated on from January 1998 to March 2007, indication to arthroscopy was an articular defect greater then 1 mm in patients which failed conservative treatment. Arthroscopy was used in order to get reduction of the articular fracture and to evaluate and eventually treat associated ligamentous or chondral lesions.
Results DRF have been treated with different procedures: volar or dorsal plates, K wires and/or cannulated screws. Articular step-off was reduced in all cases. We obtained 23 good/excellent results according to Mayo Wrist Score. Associated lesions were found in the majority of patients, such as TFCC tears, scapholunate rupture or chondral lesions.
Conclusions Arthroscopy of the wrist allows a complete evaluation of the joint with a minimal surgical exposure. However, a high experience in both wrist arthroscopy and in management of DRF it is mandatory for a proper evaluation of the lesions and correct indication to further treatment.

ARTHROSCOPIC REDUCTION AND PINNING WITH NONBRIDGING EXTERNAL FIXATION FOR ARTICULAR FRACTURES OF THE WRIST

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Background Recent advances in wrist surgery techniques and instrumentation determine that fragment specific external fixation could provide sufficient stability to allow immediate wrist motion. An external fixator with supplemental pins provides stability which approaches that achieved with a dorsal 3.5 mm AO plate and inserting the pins at 60–90° to each other significantly increases the rigidity of the construct.
Purpose To determine the usefulness of arthroscopically assisted reduction and pinning with nonbridging external fixation for displaced intra-articular fractures of the distal radius.
Study Design Clinical study in a prospective case series with control group
Methods From 2005 to December 2006 we treated with arthroscopic reduction and pinning with nonbridging external fixation 10 patients with intra-articular fractures classified according to AO classification: 3 fractures B2, 3 fractures B3, 3 B4, 1 fractures C1. Patient inclusion criteria were: articular step off or gap formation greater than 2 mm after closed reduction, age less than 50 years old. Technique: Vertical traction was used, with no more than 5 Kg to avoid to over-reduce the radioulnar inclination and cause dorsal tilt of the fracture fragments. The arthroscopic reduction of articular surface was performed. Depressed fragments were elevated using dental pick or probe or with K wire with out-side joy-stick technique. The subcondral K wire were placed directly while the articular reduction was maintained. Then fractures were pinned and nonbridging external fixation was used to stabilize the K-wire.
Range of motion, grip strength, VAS, Mayo modified wrist score, and standard radiographs were registered at 2, 3, 6, month after the treatment. All patients were matched to control group B of 20 patients for fracture pattern, age and gender treated with arthroscopic reduction and pinning and plast immobilization for 35 days.
Results No perioperative complications occurred. The scores for overall outcome demonstrated that the group A had better outcomes and better ranges of motion and grip strength ($p<0.05$) than the group B. The radiographic results showed that the patients of group A had better reduction of ulnar variance, and articular displacement than patients of group B.
Conclusions On the basis of our prospective comparative study, we found that the arthroscopically guided procedure and pinning with nonbridging external fixation was superior to arthroscopically guided procedure and pinning with conventional cast immobilization.

SESSION 0-11

FOOT I

CHRONIC ANTERO-LATERAL ANKLE INSTABILITY: EARLY FUNCTIONAL RECOVERY AFTER RECONSTRUCTION WITH AUTOLOGOUS PERONEAL TENDON

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Background Only 1% of all ankle sprains occurred in athletes determines a chronic joint instability. This is characterized by incapacity to substain a regular traininig program for contiunuing injuries. In fact the lesions of ligaments (anterior talofibular, calcaneofibular, sometimes the anterior tibio-peroneal) cause also the interruption of afferent fibers that determine the loss of protective stabilizing effect for which the joint can't respond to axial and rotational stimuli.
Even if the complex biomechanics of ankle joint is difficult to reproduce with non-anatomic reconstructive technique any study has been previously conducted to detect the functional and proprioceptive effects.
The aim of this study was to evaluate the early functional recovery of reconstruction with autologus peroneal hemitendon on antero-lateral chronic ankle instability.
Materials and Methods Fourteen athletes (11 males and 3 females ranged in age 25 to 42, mean 28.7 years) were undergone to clinical examination (talar tilt and anterior drawer), and asked for subjective evaluation in accordance to Karlsson Score. The dynamic X-rays, executed with TELOS device, were performed to assess the mechanical stability before and three months after operation. MRI was executed before operation to confirm the diagnosis and to detect the integrity of peroneal tendons.
To evaluate the proprioceptive recovery it was adopted a device (KAT-2000 Breg Inc., USA) constituted by a tilting platform equipped with a digital transformer connected to a special software. The testing procedure was made in four different conditions: two monopodal e two bipodal stance before and after 1, 2, 3, 4, 5, 6, 12 and 24 months from operation.
Results At Karlsson Score decreased significantly from 2nd month. At stress radiograms demonstrated a significant reduction of talar tilt and anterior drawer; since 3rd month and maintained at 2nd year. At stabilometric test the stabilized ankle revealed a significant difference at 2nd month while bipodal exercises at 3rd month.
Discussion Tenodeses are more invasive and more complex procedure than anatomic reconstruction of lateral ankle ligaments in chronic instability. But the Karlsson scale, dynamic x-rays, stabilometric tests have revealed a significative improvement of functional capability. The present study has confirmed the reconstitution of mechanical stability may convert the altered joint proprioception. This is confirmed by the recovery of physical activity at 3rd-4th month by operation and maintained at two years of follow-up.
Conclusions In chronic ankle instability, the tenodesis surgery seems to be safe procedure to permit the early recovery of sports capability and lasting benefits on daily-life.

ARTHROSCOPIC SURGERY FOR CHRONIC ANKLE PAIN IN NON PROFESSIONAL ATHLETES

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Ankle chronic pain is a common disability syndrome involving capsular, tendinous, chondral and bony tissues. Conservative treatment is in most cases first option but sometimes it doesn't allow to obtain prefixed clinical target. In these cases a chronic painful ankle may importantly reduce daily activities. Sports addicted patients do have, of course, a limitation. We perform this study in order to evaluate the results of arthroscopic treatment in chronic painful ankles that did not improve their functionality after conservative treatment in non professional athletes.
Our case series include 16 patients performing several sport disciplines (soccer in most cases). All patients were non professional but 9 did competitiveness. MR, clinical and Rx evaluation was requested. We did perform arthroscopic procedures and evaluate clinical results with AOFAS-AHS score, NPI score and McGuire-Branca score. Chondral injuries were treated with shaving or Steadman procedure with very good results even in (Bauer-Jackson) grade 4 cases. Sinoviectomy was accomplished in all cases. Some postoperative and temporary complications are possible. Clinical results were very good particularly in

young males and were comparable to current literature. Pain improving was obtained in all patients; they all did return to sport activities (in one case with role-changing from external player to goalkeeper). A longer follow-up will reveal if good results are mantained in time.

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ARTHROSCOPIC TREATMENT OF THE ANTERIOR ANKLE IMPINGEMENT: A PROSPECTIVE STUDY

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The anterior ankle impingement syndrome is a clinical pain syndrome that is characterized by anterior ankle pain on (hyper) dorsiflexion. The plain radiographs often are negative in patients who have anteromedial impingement. In case of evidence in x-rays of spurs or osteophytes, the diagnosis is anterior bony impingement. A lot of authors reported good to excellent results after arthroscopic management with removal of the offending tissue. We performed a prospective study to assess the mid-term outcome of 14 arthroscopic debridement procedures carried out to treat anterior impingement in the ankle. All patients referred preview trauma at the ankle, reduction of the ROM and pain on walking, in spite of a period of 6 months of conservative therapy (NSAID, local infiltrations, rehabilitation). We excluded the patients with evident instability signs. For every patient we filled out a form using "ankle score" and VAS score. At the follow up (average 12 months) in the 83% of the patients we observed the improvement of the "ankle score" and a relief of pain statistically significant (p>0.0001 - T test). We conclude that the arthroscopic debridement is an effective method for the treatment of bony and soft-tissue anterior ankle impingement syndrome and has minimal morbidity.

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THE POSTERIOR IMPINGEMENT OF ANKLE DUE TO OS TRIGUNUM: MANAGEMENT, ARTHROSCOPIC TECHNIQUE AND RESULTS

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Background The posterior impingement of ankle recognizes a series of causes between which there is the os trigunum syndrome with the involvement of the FHL tendom. This pathology is frequent in young sporty subjects who practice classic dance and that use a prolonged plantar flexion of the ankle during the sporting practice. Clinically pain is present in the posteromedial portion of the ankle behind of the medial malleolus long the FHL, exacerbated by the forced plantar flexion of the ankle (hyperplantar flexion test). There aren't limitations of the ROM, there aren't clinical signs of the tarsal tunnel syndrome and there are excluded pathologies of the anterior compartment. The diagnostic checks foresee x-rays, CT and MNR.

Materials and Methods It's described the arthroscopic surgical technique that foresees the use of the posteromedial portal and of the posterolateral portal. Through the two portals the posterior compartment of the ankle is visualized in its articular (tibiotarsal and subastragalic) and periarticular aspect. The technique expects the removal of the os trigunum and the release of the retinaculum of the FHL. We have revalued 5 cases with a maximum follow-up of about 3 years.

Results All the treated patients have resolved the painful symptoms and they have returned to their own working and sporting activity.

Discussion and Conclusions The posterior impingement of ankle due to Os. Trigunum is a pathology that is often underestimated or to pass unknown in the clinical practice; in conclusion the surgical arthroscopic technique, well born from the patient, allows a complete evaluation of the posterior compartment and the resolution of the pathology most of all of the FHL.

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TREATMENT OF OSTEOCHONDRAL LESIONS OF THE TALUS WITH AUTOLOGOUS STEM CELLS

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Background Surgical treatment of the osteochondrosis dissecans of the talus by means of microperforations, condroabrasions or microfractures has allowed the repair of the osteocartilaginous defect with fibrocartilaginous tissue. The recent "plasticity theory" suggest that adult stem cells can differentiate into a wide range of specialized cell types, therefore they could take part in the processes of repair of the osteochondral damage.

Materials and Methods we have implanted autologous stem cells in two male patients of 19 and 23 years, suffered from osteochondrosis dissecans of the talus. The osteochondral lesion of the first patient was located on the medial side of the "cupula tali" (lesion size was 2.5 cm^2); in the other patient the lesion was located to the center of articular surface (size 4 cm^2). Before the operation, the patients must make one RMN, to repeat to 3,6,12 months from the operation; and one biopsy after 18 months.

We used adult bone marrow stem cells isolated from cristae iliacae (6x106 in the first patient and 7x106 in the second patient). Then stem cells are processed using MACS® immuno-magnetic technology to obtain high rate of CD 34+/CD 133+ purified stem cells. The osteochondral lesions were filled with blood clot containing stem cells previously processed. We used Chondro-gide collagenic mem-

brane to cover the site of lesion, to prevent intrarticular stem cells dispersion. Microenvironment can drive stem cells to differenziate in chondrocytes.

Results and Discussion Both the patients have not had serious post-operative complications (deep venous thrombosis, articular infection, etc.).There are not reliable outcomes because the group that we have is too much small and the follow-up is short. At 3 and 6 months RMN shows that the repair tissue emits variable and heterogenous signals.

These preliminary human experiences can be useful to understand the real resources of stem cells and also to intrigue the scientific community. The mean limits are the absence of ideal scaffolds and high cost of this technology.

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ARTICULATED DISTRACTION OF THE ANKLE IN THE TREATMENT OF POST-TRAUMATIC ARTHRITIS

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Background The incidence of osteoarthritis is between 25–50% in adult population. Tibiotalar joint is involved in more than 6% of the cases. In late stages it causes functional limitation to the patient due to both pain and articular impairment. In tibiotalar joint the articular distraction by means of external fixation (arthrodiatasis) is a valid alternative to major procedures like arthroplasty or arthrodesis.

The clinical outcome of this surgical procedure is nevertheless strictly correlated to the age of the patient, to appropriate indication and to a correct tecnique.

Materials and Methods Authors will present a review of 9 cases with a minimum follow-up of 9 years (up to 22 years). The patients were operated for post-traumatic arthritis using arthrodiatasis associates to open or arthroscopic articular reconstruction.

At follow-up, they have been evaluated with the Kitaoka score.

The results have been compared with the outcomes of a previous early follow-up (36 months after surgery).

Conclusions At the early follow-up seventy-six per cent of the patients recovered from 10° to 30° of range of motion, while 24% only 10° degrees. Seventy-five per cent of the patients referred a pain relief improvement and wlked without any support.

Radiological evaluation showed preservation of the joint space in 10 out of 12 patients (83%).

At the last follow up, according with the Kitaoka score, we observed progressive loss of joint motion in absence of severe pain.

None of the patients has been operated of arthroplasty.

We can conclude that arthrodiatasis associated to intra-articular ancillary procedure (arthroscopic or open) can be considered a good alternative to arthrodesis inn young and high collaborating patient in order to delay arthroplasty or joint fusion.

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MINIMALLY INVASIVE ANKLE ARTHRODESIS WITH A RETROGRADE LOCKING NAIL AFTER FAILED FUSION

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Background To correct deformity and achieve fusion after failed fusion a retrograde nail with posterior-to-anterior (PA) locking into os calcis, talus and tibia was used.

Methods A variety of methods have been published to achieve union of the ankle and subtalar joint in a failed fusion situation. We have studied a retrograde locking nail technique through a 2.5 cm incision in the non-weigthbearing part of the sole of the foot. Remaining cartilage in the ankle joint, where necessary, was percutaneously removed through an anterior approach and the locking nail was inserted after reaming of os calcis, talus and tibia. Locking screw insertion was in the sagittal plane (p.a. direction), in talus os calcis and tibial diaphysis using a nail mounted jig. Ten patients were entered in the study (age 27–60 years). The initial aetiology for attempted fusion was posttraumatic in nine cases and rheumatic in one case. There were 25 previous operations in the cohort not leading to fusion. An additional temporary external fixator was used in four cases to reach and maintain the optimum position for the procedure. The intervention time was 30–75 minutes. Dynamization of the nail was performed after four months under local anaesthesia.

Results The mean duration of follow-up was 4 years (3 to 5,5 years). Radiologically and clinically, fusion was achieved in 16 weeks (range, 12 to 20 weeks). There was no loosening of the implant nor implant failure. A leg length discrepancy was avoided using this technique. There was one complication with varus malunion in a heavy smoker which united after corrective osteotomy, revision nailing and bone grafting. Patient satisfaction was measured on a scale (not visual analog) of 0 (not satisfied) to 10 (completely satisfied), overall satisfaction averaged 9.5 points (range, 6 to 10 points). The postoperative ankle-hindfoot score of the American Orthopedic Foot and Ankle Society averaged 73,5 points (range, 61 to 81 points).

Conclusions Retrograde locked nailing with locking in the sagittal plane is a reliable minimally invasive procedure to achieve fusion of the ankle and the subtalar joint after failed fusion.

EARLY CLINICAL RESULTS OF BOX ANKLE PROSTHESIS

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Total ankle (TAA) is still not as satisfactory as total hip and total knee arthroplasties. For the TAA to be considered a valuable alternative to ankle arthrodesis, an effective range of ankle mobility must be recovered. The disappointing clinical results of the current

generation of TAA are mostly related to poor understanding of the structures guiding mobility. A new design has been developed by these authors, uniquely able to restore physiologic ankle mobility and a natural relationship between the implanted components and the retained ligaments.
According to prior research, the design features a spherical convex tibial component, a talar component with radius of curvature in the sagittal plane longer than that of the natural talus, and a fully conforming meniscal component. After computer-based modelling and preliminary observations in several trial implantation in specimens, 162 patients were implanted in the period July 2003 – December 2007, mean age was 60,7 years (range 31–81), mean follow-up 11 months. The AOFAS clinical score systems were used to assess patient outcome.
Radiographs at maximal dorsiflexion and maximal plantar flexion confirmed the meniscal-bearing component moves anteriorly during dorsiflexion and posteriorly during plantarflexion. A mean additional range of flexion of about 15 degrees was measured in the operating room between pre- and post-implant. Frontal and lateral radiographs in the patients at 6 month follow-up, show good alignment of the components, and no signs of radiolucency or loosening. The mean AOFAS score was observed to go from 41 pre-op to 65 at 3 month follow-up, with further improvement at the following 6 and 12 month follow-up.
The meniscal-bearing component moves in the direction and approximately for the distance predicted by the computer-based models. The original physiological role of the ligaments must have been restored. Because the function of the ligaments in controlling the passive mobility of the joint is restored, their physiologic contribution to joint stability also should be restored, as predicted by a computer model of the anterior drawer test. As full conformity of the three prosthesis components was observed over the entire motion arc, it is encouraged the prospect of minimizing wear of these components. Slight misplacement of the bone-anchored components does not affect considerably the above observations. The satisfactory though preliminary observations from this novel TAA encourage continuation of the implantation.

TALO-CALCANEO-NAVICULAR ARTHRODESIS FOR PRONATION DEFORMITIES OF THE HINDFOOT: A REVIEW OF 50 CASES

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Background Talo-calcaneal and talo-navicular are, from an anatomical point of view, different joints with independent capsular and synovial structures; nevertheless they are foctionally a unit articular complex with a common axis of movement. Many pathological conditions induce deformities and dislocations aroud the axis of the talo-calcaneo-navicular joint (TCNJ); the most common situation includes the pronation deformities of the hindfoot caused by degenerative or inflammatory diseases.
In this case combined fusion of both the involved joint is justifyed in order to obtain a correct and complete alignement of the foot.
The purpose of the report is to present a retrospective review of 50 cases of TCNJ arthrodesis.
Materials and Methods In the period 2001–2005 72 TCNJ were performed in 62 patients; there were 21 males and 41 females; the average age was 62 yrs (min 43 max 78). The most common pathologies were stage III degenerative flat foot with tibialis posterior insufficiency (x cases) and rhumatoid arthritis with pronation deformity. All the patients had pain, stiffness and limitation in walking. In 3 cases there was a true dislocations of the TCNJ. In all cases the arthrodesis was performed through two different incision; a medial approach for the talo-navicular and a lateral approach for the talo-calcaneal joint; the articular cartilage was excised and the foot was placed in neutral position; fixation was done by screws (or staples for the talonavicular joint). 50 cases were reviewed with an average follow-up of 45 months.
Results The patients underwent to a clinical and radiographical control. The results were rated with the AOFAS score for the hindfoot in addition to subjective assesment of pain, function, shoewear and overall satisfaction. Radiographic evaluation included measurement of the lateral talo-calcaneal angle and lateral talo-first metatarsal angle and notation of arthritic changes in ankle and calcaneocuboid joints.
Fusion occurred between 6 to 8 weeks.
The average AOFAS score improved from 43.2 preoperatively to 75.4 postoperatively.
Subjectively all patients were satified and would have the procedure again.
Radiographycally all parameters statistically improved.
In one case talonavicular joint nonunion occurred. Minor degenerative changes occurred in ankle and calcaneocuboid joints.
Conclusions Combined arthrodesis of subtalar and talonavicular joints is a simple and effective procedure of treatment particularly in patients with valgus malalignment of the hindfoot.

SERI VERSUS "EN-CHEVRON": A COMPARATIVE STUDY OF TWO SURGICAL TECHNIQUES FOR CORRECTION OF HALLUX VALGUS DEFORMITY

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Background "En-chevron" osteotomy is widely used for correction of mild to moderate hallux valgus. Since 2003, a new surgical technique named S.E.R.I. has been described, as a distal metatarsal osteotomy with minimally invasive procedure.
Aim Compare indications and results of En-chevron osteotomy and S.E.R.I. technique.
Materials and Methods Between January 2003 and December 2004, 30 patients (35 feet) have been randomly selected for "En-chevron" procedure or S.E.R.I. technique.
The mean age was 56.
En-chevron osteotomy was performed in 19 feet, S.E.R.I. technique in 16.
The mean follow-up was 2 years.
Preoperative and postoperative clinical and radiographical evaluations have been collected using AOFAS score system and Anteroposterior and Lateral weight-bearing radiographs, calculating hallux valgus angle (HVA), intermetatarsal angle (IMA) and sesamoid position.
Results significance of results was determined using the Student t test.
En chevron group: mean HVA improved from 30.1°(±9.3 SD) to 15.1°(±9.7 SD), mean IMA from 12.6°(±15.1 SD) to 8.9°(±3.5 SD), sesamoid position from 2.4(±2.6 SD) to 1.4(±3.2 SD); AOFAS hallux score improved from 66.7(±17.4 SD) to 82.1(±16.4 SD), AOFAS pain score from 28.4(±9.6 SD) to 36.3(±7.6 SD), AOFAS function score from 6.7(±2.4 SD) to 8.7(±2.3 SD), AOFAS alignment score from 5.0(±3.9 SD) to 10.9(±4.4 SD).
S.E.R.I. group: mean HVA improved from 30.9°(±9.3 SD) to 18.1°(±8.7 SD), mean IMA from 13.1°(±4.2 SD) to 9.7°(±15.7 SD), sesamoid position from 2.3(±2.9 SD) to 0.9(±3.6 SD); AOFAS hallux score improved from 67.4(±14.7 SD) to 81.3(±13.1 SD), AOFAS pain score from 29.3(±10.0 SD) to 36.2(±7.2 SD), AOFAS function score from 7.2(±2.3 SD) to 9.2(±1.7 SD), AOFAS alignment score from 5.0(±4.0 SD) to 10.1(±4.4 SD).
Discussion and Conclusions Despite small number of patients, radiological results and patient satisfaction suggest both techniques are successful in treating mild to moderate hallux valgus

deformity, for IMA less than 20° and HVA less than 40°. Allowing a simple and repeatable mini-invasive approach with reduced surgical time, S.E.R.I. technique seems to be preferable to "En-chevron" osteotomy.

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THE CINDERELLA SHOE SYNDROME

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The Cinderella-Shoe-Syndrome specifies a commonly observed, not yet labeled disproportion of footwear and the morphologic conditions of the wearer. Disproportioned shoes and socks are worn – frequently unconsciously - due to personal reasons, fashion trends, misinformation and wrong advice, they can induce severe foot disorders. 3 different studies on Civinini-Morton neuropathy, Freiberg-Koehlers disease and Hallux valgus showed the influence of non adapted footwear as pathogenetic.

The Cinderella-Shoe-Syndrome has an important significance within the development, the treatment and the recurrence-prophylaxis of foot disorders, as well as in the assessment of possible reasons for recurrence after footsurgery. To recognize it, to treat individual psychologic reasons, to support in the choice of footwear, to inform about and to change social reasons, all these are challenges of the footsurgeon.

SESSION 0-12

FOOT II

MISSED FRACTURES OF LATERAL PROCESS OF THE TALUS

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Aims The purpose of this presentation is to report our experience in diagnosis and treatment of missed fractures of lateral process of the talus presenting as chronic ankle pain.

The fractures of lateral process of the talus are uncommon lesions that are frequently overlooked; they can be classified according to Hawkins into 3 groups: type 1 simple fracture-separation, type 2 comminuted fracture, type 3 chip fracture.

Methods In the period 1996–2003 we observed 11 cases of missed fractures of the lateral process of the talus; in all cases the patients had pain in the lateral aspect of the ankle and during inversion-eversion movements; in two cases varus position of the hindfoot was observed and in 3 cases stiffness of subtalar joint was present.

In all cases the patient had a trauma in the ankle, generally with mechanism of external rotation-eversion; in all cases the fracture was missed in the first time and diagnosed as ankle sprain.

There were 3 cases of type 1, 2 cases of type 2 and 6 cases of type 3.

In 3 cases the treatment was an arthrodesis of subtalar joint, in the other 8 excision of the fragment was performed.

Results The 3 arthrodesis fused in 2 months with resolution of the pain; in the other 8 cases 2 had occasional pain during motion or sport activities.

Conclusions Missed fracture of the lateral process of the talus must be considered in case of persistent pain after ankle trauma expecially in eversion-external rotation; oblique rx rays and TC scan can be used in the diagnosis.

Excision is recommended in cases of fragment of small dimension; comminuted fractures can develop degenerative arthritis of the subtalar joints that can be required an arthrodesis.

THE ARTICULAR RECONSTRUCTION OF THE COMPLEX TALAR BODY LESIONS

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Talar fractures are infrequent but present high complications rate such as osteonecrosis and post-traumatic arthritis. The lesion involving the body rappresents about 25% of this rare fracture's category and has major probability of complication. This is due to anatomic characteristics of talar bone: the 60% of surface is covered with articular cartilage, and is a region where the trauma can easily interrupte blood supply.

Six talar dislocation-fractures, surgically treated (2 type II, 3 type III and 1 type IV according to the classification of Marti-Weber), are presented in this work. The objective of surgical treatment was the articular reconstruction. Aim of this work is discussing indications, therapeutic strategies and comparing our experience with the few cases published in literature.

Suggested readings

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FOUR YEARS OF EXPERIENCE WITH MINIMALLY-INVASIVE FIXATION OF DISPLACED INTRA-ARTICULAR CALCANEAL FRACTURES

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Background The appropriate treatment of displaced intra-articular calcaneal fracture is still a controversial topic. This kind of fracture is a severe injury for complexity of local anatomy and limited soft tissue protection. Intra-articular fracture account for approximately 75% of all calcaneal fractures. In the late period minimally-invasive techniques has gained popularity especially for patients with severe soft tissue compromising and local or systemic contraindications. Authors report their experience with a new minimally-invasive fixation technique.

Materials and Methods Goals of surgical treatment are restoration of congruency of posterior facet of the subtalar joint; restoration of height of the calcaneus (Bohler angle); realignment of the tuberosity into a valgus position; reduction of the width of the calcaneus. Operative treatment consist in two parts. First time reduction of the fracture by Essex-Lopresti technique and stabilization with cannulated screws. Second time through the lateral incision at

the sinus tarsi is possible to reduce the posterior facet of subtalar joint and stabilization with cannulated screws.
Results From January 2002 to December 2006 we treated 39 displaced intra-articular calcaneal fractures (mean follow-up of 12 months). In 10 patients we performed a podoscopic examination to evaluate the restoration of the normal foot support. We performed ORIF through a limited sinus tarsi approach, with minimal fixation of the fracture by 3 or 4 cannulated screws. We do not experienced infection, wound necrosis or dehiscence and we could begin mobilization of talar joint in an early period.
Discussion Surgical treatment is the only reliable option in case of comminuted or displaced extra-articular fractures and all intra-articular fractures. Several possible complications related to open surgery are described. Many minimally-invasive techniques had been developed to reduce complications without reduce the good quality of the treatment.
Our follow-up showed good functional results and patient outcome in the majority of cases.
We believe that the operative technique described may be a good option for management of complex calcaneal fractures.
Suggested readings

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SURGICAL TREATMENT OF CALCANEAL FRACTURES: OUR EXPERIENCE

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Background Calcaneal fractures represent one of the most frequent traumatic events of tarsal injuries and usually observed in men 35–45 of age. The fractures are generally unilateral and with a male to female ratio of 5:1. The most common mechanism of injury is falling from a height and direct trauma from a motor vehicle accident.
Materials and Methods At the Orthopaedic Clinic of Catania University, between January 2000 and December 2005, a total of 180 calcaneal fractures were treated with the use of open reduction internal fixation. In our retrospective study, 120 patients were treated with the use of a calcaneal plate and screws and the other 60 patients with the use of only screws. The mean age was 37 (range 25–68). The sex distribution showed an absolute male prevalence (80%). The Sanders Classification for calcaneal fractures was used to evaluate our study group. Our findings consisted of 60 patients presenting with Type 1 fracture, 40 patients with Type 2 and 80 patients with Type 3. Clinical evaluation (SF-36, AOFAS, Maryland Foot score) was applied and imaging assessments were performed at periodical interval of time.
Results Clinical results were 30% excellent, 54% goods, 16% sufficient. All the patients reported having no major pain. After clinical examination was performed during the post-operative period, we found no signs of "subtalar joint" instability. After radiographic evaluation of Bohler's angle we found an average decrease of approximately (30°) in our patient population.
Discussion Calcaneal fractures represent a controversial topic. The final outcome after surgical intervention will depend on the fracture type presentation, amount of soft tissue damage and adequate anatomical reduction of the posterior facet. The comparison between different studies is difficult for the variations of the classification systems, the etherogenity methods of treatment [1, 2].
Conclusions The surgical treatment of the calcaneal fractures represents, in our opinion, a proper balance between the morphology restoration of the segment, congruency of the "subtalar joint" and minimizing the pain phase and algo-dystrophic series. Surgical approach is extremely valid if indications respected rigorously, even if sometimes there is a discrepancy between clinical and radiographic results [3, 4].
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TALAR FRACTURES OF THE CALCANEUM: TREATMENT WITH MINIMALLY INVASIVE TECHNIQUE

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The treatment with miniinvasive technique introduces numerous advantages regarding methodical traditional and in particular the meaningful reduction of the incidence of the cutaneous suffering with the consequent reduction of the rate local infections, allowing also one sufficient anatomical reduction of the talamica fracture.
We have adopted this technique for 6 years and in the follow-up we have found almost a very good results. The authors report of the treatment of the talamiche fractures with mininvasiva technique (MIPO with threads of k. and\or cannulate lives) from 2001.

THE "BRIXIAN BRIDGE". A TECHNIQUE STILL GOOD FOR CLOSED REDUCTION AND SYNTHESIS OF CALCANEAL FRACTURES

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Background Open reduction and internal fixation (ORIF) of displaced intraarticular calcaneal fractures in patients older than 50 years is controversial, because of fear of loss of fixation, the risk of implant failure in osteoporotic bone [1] and possible secondary wound healing followed by osteomyelitis [2]. According to the traditional Brixian Italian school it is possible to achieve a good outcome with a simple and cheap technique that uses only 2 or 3 Steinmann pins.
Methods We have analysed 20 patients affected with calcaneal fractures and treated with the previously reported technique. Under fluoroscopy one Steinmann pins is introduced percutaneously and posteriorly into the heel bone along its major axis, using it as a joystick in order to obtain the reduction of the bone fracture with the Bohler angle restoration. Then a second or even a third Steinmann pin is introduced percutaneously into the heel bone as well as into the talus, in order to obtain the fracture stabilization. Then a plaster cast is applied to maintain the position of the operated foot.
Results A large percentage of the operated patients obtained a good outcome with personal satisfaction.
Discussion While traditional open reduction and internal fixation techniques are time-consuming, at risk for sural nerve lesion and

often manifest slow-healing of the scar incisions [3], this technique permits to avoid these drawbacks.
Conclusions In the opinion of the authors, the illustrated technique, that authors named "Brixian Bridge" due to the bridge shape of the pins into the heel bone and the talus, should be recommended in the treatment of scomposed fractures, especially in elderly patients.
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THE SUBTALAR JOINT RECONSTRUCTION: DOUBTS OR CERTAINTIES?

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Objectives We evaluated the midterm results of surgical treatment for intraarticular calcaneal fractures.
Methods This study included 18 feet of 14 patients with intraarticular fractures of the calcaneus. Ten patients were males and four were females. The fractures were bilateral in two patients. In two patients the contralateral foot was treated conservatively. Anteroposterior, lateral, and tangential radiographs and computed tomography (CT) scans were obtained in all patients preoperatively. According to the Sanders CT classification, there were six type II, four type III, and four type IV fractures. An extensile lateral incision was performed in all patients but one to provide an anatomic reduction with the use of plates, screws, and K wire. The patients were followed-up by radiographs and CT. The results were evaluated using the Maryland Foot Score. The mean follow-up was 24 months.
Results Radiographs and CT scans obtained in the early postoperative period showed that a complete anatomic reduction was achieved in 10 feet. According to the Maryland Foot Score, the results were excellent in four, good in six a, fair in two, and poor in two feet. In two patients were required a subsequent operation due to surgery-associated causes.
Conclusions The success of surgical treatment of intraarticular calcaneal fractures depends only on the achievement of an anatomic reduction and on maintaining it with a stable osteosynthesis using appropriate strength hardware. Often but, in spite of a good reconstruction, it turns out to you are not good persisting the pain and the reduced function to articulate.

A NEW TENDON TRANSFER TECHNIQUE FOR THE CORRECTION OF DROP-FOOT IN COMMON PERONEAL NERVE PALSY

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Background Common peroneal nerve (CPN) palsy has been reported as the most frequent lower extremity palsy, characterized by a supinated equino-varus foot deformity and drop of the fingers and ankle-foot orthoses or brace to prevent plantar flexion past 90° are often poorly tolerated by the patients. Dynamic tendon transposition represents the gold standard to restore functional dorsiflexion of a permanently paralysed foot. The great number of publications and studies on this argument during the last century has proved the interosseous route and the posterior tibialis tendon to be the most accepted reconstructive methods to restore drop-foot. On the contrary, the site of tendon insertion and how to fix the transferred tendon into the bone or onto the tendon, represents some controversies upon which the debate is still open. We report our experience in the treatment of drop-foot following CPN paralysis describing a new technique to restore and balance the dorsiflextion of the foot reanimating the extension of the five digits.
Methods Between 1998 and 2006 we operated on 16 patients with compete CPN palsy. In all cases we performed a double tendon transfer through interosseous membrane of the posterior tibialis tendon pro tibialis anterior tendon (rerouted transosseous on the 3rd cuneiform) and the flexor digitorum longus pro extensor digitorum longus and extensor hallucis longus tendons. Tenodesis at the retromalleolar grove of the distal half of posterior tibialis tendon is also performed to prevent flat foot.
Results At the end of 2006 we reviewed 12 out of 16 patients to assess the results for this study. Mean follow-up was of 65 months. The results of tendon transfer were assessed by the Stanmore System and by clinical evaluation of the posture of the digits and their active movements and implemented with both static and dynamic baropodometric evaluations. Results were excellent in 9; good in 2 and fair in 1. The results of fingers dorsiflexion were: fair in 3; good in 6 and excellent in 3.
Conclusions Need of a longer tendon with a proper line of pull for a balanced foot dorsiflextion avoiding difficulties related to the methods of fixation, drove first author to reroute the tibialis anterior tendon transosseous on the 3rd cuneiform. According to our experiences and supported by the data showed on this paper, this procedure proposed is a reliable method to restore a balanced ankle and fingers dorsiflexion producing a normal gait avoiding the needs of orthoses.

TUBERCULAR OSTEOMYELITIS OF THE METATARSAL BONE: CASE REPORT AND REVIEW OF THE LITERATURE

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Introduction Skeletal tuberculosis is relatively uncommon when compared to the pulmonary form.
Case Report A 29 year-old male presented with a history of pain, swelling and ulcer of the dorsal region of the left foot, and was admitted to the Authors' Department. An x-Ray of the left foot showed a cystic, expansive lesion of the second metatarsal bone: there were internal septations and cortical sclerosis. The margins were well defined, and periosteal reaction was present. A CT scan showed an osteolytic area involving the entire second metatarsal bone, with an expansive mass above the bone that invaded the second metatarsal space. Bone sequester was visible inside the metatarsal bone. The CT scan of the chest showed a pulmonary lesion. The authors performed an open biopsy, with debridement and curettage of the lesion. The histological examination of the tissue showed acid fast bacilli. The culture grown, combined with genoma amplification (PCR technique), confirmed the presence of Mycobacterium tuberculosis. Anti-tubercular treatment was started. After two weeks of therapy the cutaneous ulcer and the bone lesion healed completely, and after four weeks the radiological image showed that the lesion had healed. At six months follow-up the patient did not show any local nor systemic recurrence.
Discussion The most commonly affected sites of tuberculous osteomyelitis are the spine, femur and tibia. Less frequent are the localizations of the hand. Skeletal tuberculosis of the foot is uncommon.

The diagnosis depends on clinical and radiological aspects, laboratory tests, microbiological and histological features.
The Radiological pattern usually are osteoporosis, bone expansion with reactive sclerosis, periosteal reaction, reduced joint space, soft-tissue swelling and progressive destruction of the joint, with a typical aspect of cystic expansion of the short tubular bones named "spina ventosa".
The biopsy is indicated for differential diagnosis of several bone diseases.
A long-term course of antitubercular drugs is the basis of the treatment. Debridement and curettage without resection of destroyed or sequestrated metatarsal bone may be indicated in non-healing lesions. In the case described in this paper, the large involvement of soft tissue suggested to performe a debridement and curettage, followed by an antitubercular treatment. In the literature there are descriptions of good functional results by conservative treatment in cases affecting the metatarsal and phalanges, and a good rehabilitation even when joint destruction is present. Resection of the destroyed metatarsal bone is rarely necessary.

MESENCHYMAL STEM CELL ARTHROSCOPIC TRANSPLANTATION IN CYSTS OF THE TALUS: SURGICAL TECHNIQUE AND FIRST RESULTS

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Background The stem cells are not specialized cells that renew themselves through the cellular division for an indefinite period of time and can turn into specialized cells of various tissues of the organism; it has seen to increase the orthopedic interest in them thanks to the mesenchymal line that is multipotent and can bring to the differentiation in osteocytes and then to the formation of bone (studies of Burwell, Friedenstein and Owen). In literature applications are described for lesions of the tendons and the ligaments, bony avulsions of small dimensions, not consolidated fractures and non unions and cartilagineous lesions.
Materials and Methods Our experience foresees the sample of stem cells from the iliac crest to which autologous serum is added; all this is put in culture for 3 weeks, to have an enough quantity of tissue to use. We will describe the surgical arthroscopic treatment of grafting of mesenchymal stem cells in the cysts of the talus. It is described the surgical technique and the imaging pre and post-operating of the treated cases (radiographic, CT and NMR). In a case, bilaterally treated, an arthroscopic second-look has been performed after over one year. The revalued patients are 3:2 females and 1 male with a over 30 months follow-up.
Results All the treated patients have resolved the painful symptoms, recovering a good ROM of the ankle. The arthroscopic second look has underlined the notable regression of the bony gap of the talus and a filling of the cystic area.
Discussion and Conclusions This methodic results therefore minimally-invasive and it allows a precocious functional recovery. However the follow-up still results brief and the treated cases still in limited number. Profit results therefore a multicenter study and a hold collaboration with the hematologous colleagues, that is already in action in our clinic, to deepen the histological aspects of the integration and the differentiation of the stem cells once implanted in the cysts of the talus.
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SESSION 0-13

SPORT AND ARTHROSCOPY I

RECONSTRUCTION OF THE ANTERIOR CRUCIATE LIGAMENT BY BIO TRANS -FIX FEMORAL FIXATION

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Aim of the study was to evaluate the results of the reconstruction by gracilis and semitendinosus tendons, quadruplicated, fixed by BIO TRANS-FIX technique and tibial interference screw.
Materials and Methods From January to December 2006 at the "Fondazione San Raffaele Ospedale G. Giglio" in Cefalù', 40 patients have been treated for lesion of the anterior cruciate ligament. Twenty seven were males and 13 were females, 28 years old of mean age. Thirty cases have had the right knee, 10 the left, and the average time from the lesion to surgery has been 6 months.
We utilised the reconstruction technique of the tibial unitunnel. X-ray control has been taken after surgery. CMP has been used since the first day. Partial load has been allowed from 2 weeks, and full weight bearing in 4 weeks after surgery. A so called "accelerated" rehabilitation program has been used and return to "at risk" sports activity has been permitted in six months. Clinical evaluation has been done by the IKDC scale.
Results All the procedures have not had any surgical complication but one has had screw removal. The renge of motion has been fully restored within 4 weeks. At 3 months follow-up all patients increased IKDC (88% A e B).
Conclusions The reconstruction of the anterior cruciate ligament by graciclis and semitendinousus tendons, quadruplicates, fixed by femoral BIO TRANS-FIX and tibial interference screw has been safe and reliable.

MINIMIZING INTERNAL ROTATION STRENGTH DEFICIT AFTER USE OF SEMITENDINOSUS FOR ACL RECONSTRUCTION: A MODIFIED HARVESTING TECHNIQUE

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Background In the last years the use of hamstring tendons for ACL reconstruction has become always more and more popular. However many Authors have focused their attention on the possible weakness resulting by the harvest of these tendons on knee flexion and internal rotation strength.
Materials and Methods We prospectively selected 35 patients surgically treated for anterior knee instability. The patients were randomly assigned to the study group (group A, 19 patients) or to the control group (group B, 16 patients). In Group B a "standard" hamstrings harvesting technique was performed. In Group A the semitendinosus was detached 4 cm proximally to the tibial insertion and its proximal end was sutured to the sartorius fascia, in order to leave a guide for the semitendinosus regenerating tendon.
Post-operatively, clinical examination, isokinetic tests (S/S flexion/extension and internal/external rotation evaluation) and MRI were performed.
Results At a mean follow-up of 13 months, clinical examination, KT-1000 and all the evaluation scales performed showed a satisfactory knee stability in both groups. Isokinetic tests showed a statistically significant deficit in internal rotation strength in patients of

group B (S/S evaluation). No S/S deficits were reported in the isokinetic tests in patients of Group A.
MRI showed a higher percentage of anatomical reinsertion and visibility of the regenerated tendon in patients of group A.
Discussion Tendon regeneration represents a pre-requisite to allow a full post-operative recovery. Despite some studies showed a complete post-operative recovery of flexion and internal rotation strength, some other showed a post-operative weakness of the regenerated tendon, probably because of a non anatomic reinsertion site, as demonstrated in previous studies [1, 2].
The hypothesis of our study was that the lack of strength in internal rotation could be related to the incomplete regeneration of semitendinosus with a non-anatomic reinsertion site. For this reason we proposed this new method of semitendinosus tendon harvesting.
Conclusions This study seems to demonstrate that the proposed harvesting technique could be able to minimize the post-operative loss of strength in internal rotation after ACL reconstruction using semitendinosus and gracilis tendons.
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ANATOMIC RECONSTRUCTION OF THE ANTERIOR CRUCIATE LIGAMENT. DOUBLE BUNDLE PROCEDURE USING TRANSTIBIAL TECHNIQUE. CADAVER STUDY

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We present our experience in a cadaver study to develope a new arthroscopic surgical technique for anatomical double bundle ACL reconstruction with transtibial technique.
First aim of this study is to verify the possibility to perform a femoral half tunnel for postero-lateral (PL) bundle through tibial PL tunnel; second aim of this study is to verify recent biomechanical datas where a single cross pin by Rigid-Fix system (Mitek) 3.3 diameter provides enough fixation strength in a small tunnel (5, 6 and 7 mm).
We developed an original tibial guide with two aimers for drilling independent tunnels for PL bundle (close to medial collateral ligament) and AM bundle (close to anterior tibial apophysis) and converging in to the original tibial footprint of ACL.
Finally we developed two new rods for the Rigid-Fix guide system; this new rods allow the creation of tibial and femoral small size tunnel (5 and 6 mm).

ACL RECONTRUCTION WITH SINGLE AND DOUBLE BUNDLE: CLINICAL RESULTS

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Background ACL reconstruction is one of the most common procedures in knee surgery. Modern surgical techniques often yield excellent results despite non-anatomic reconstruction of the ACL. Recent anatomical and biomechanical studies have demonstrated how anatomic restoration of ACL function via double bundle reconstruction should provide better stability and rotational control.
Materials and Methods From January 2005 to June 2007 we selected 40 of our patients. The patients were divided in two group of 20, A and B. The first group was treated with single bundle technique. The Group B was treated with double bundle technique. We used Endobutton for femoral fixation and interference bioscrew for tibial fixation. The average age was 33 years old (between 19 and 41 years), 24 male and 16 female. None had associated lesion, postero-lateral instability and meniscal tears. The ACL lesion was fresh. The follow up was at 3, 6, 9, 12 months and every 6 month. We performed clinical test, IKDC, KT 1000. We performed MNR pre-op and between 6 and 9 months after surgery.
Results In the follow-up the two groups showed similar result in order of satisfaction of patients and objective knee stability. The anterior translation of both groups were similar. Regarding the limit of internal rotation we found a little significant improvement in the group B.
Discussion A review of literature shows a better control of internal rotation using double bundle reconstruction comparing with single bundle reconstruction in vitro. In the same time the double bundle gives back a bigger tibial anterior translation at 90° than single bundle. This seams to be not important for the global knee stability.
Double bundle reconstruction techniques need of a longer learning curve and experience, and give to the surgeon any risks more.
Conclusions The double bundle reconstruction seams to give a better stability of the knee, but the single bundle reconstruction is still the gold standard for ACL lesions. We must go on studying and comparing our result in order to be sure if this new double technique, more difficult and expensive, is really better the old single bundle.

MINIINVASIVE MEDIAL PLASTY AND ACL RECONSTRUCTION IN COMBINED CHRONIC ANTERO-MEDIAL INSTABILITY OF THE KNEE

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In some cases ACL reconstruction alone is not sufficient in presence of combined antero-medial laxities. The recent tendency to double tunnel ACL surgery demonstrates the need to improve knee stability. Several invasive surgical techniques to repair medial ligamentous structures are actually utilized. We present a new simple mini-invasive medial ligamentous plasty that may be easily associated with ACL reconstruction in combined antero-medial instabilities.
Materials and Methods Since May 1998, 30 patients (6 females and 24 males), mean age 34.33 years (56–18) were operated on with this technique. We evaluated the first 13 subjects (12 males, 1 female), mean age 31.16 yrs (15–46). Mean time trauma-surgery 24.7 months (1–72). Valgus stress: 0 and 30° positive before surgery. Positive Lachman and Jerk tests were found in all. Mean follow-up 24.6 months (14–57).
In all of them a two incisions arthroscopic ACL reconstruction with patellar tendon was performed then a short longitudinal incision centered on medial femoral epicondyle. A medial ligaments plasty was made plicating the elongated tissue with stitches up to the femoral epicondyle. Then an elastic bandage or a light cast was applied.
Results Results were evaluated with the IKDC 2000 score. (minimum follow-up 24 months).
Subjective: mean 93.4 (100–88,6) Objective: A:10; B:3. In all of them the side to side manual max KT 1000 evaluation was <2mm.
Conclusions In some cases ACL reconstruction alone is not sufficient in presence of combined anteromedial laxities. The recent tendency to double tunnel ACL surgery demonstrates the need to improve knee stability. With this simple non invasive technique a medial plasty can be done safely.

ACL RECONSTRUCTION USING THE RIGIDFIX FEMORAL FIXATION DEVICE VIA ANTEROMEDIAL PORTAL: THE RISKS

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In ACL reconstruction, a reliable alternative option to interference screw femoral fixation is cross-pin technique. This method ensures a high fixation strength. The femoral tunnel is performed using the trans-tibial technique. The trans-tibial femoral-tunnel drilling does not reach the 10 o'clock position, that allows a better rotatory knee stability. For this reason, a new technique has been described, passing the femoral drilling guide of the cross-pin instrumentation through the anteromedial portal. The aim of this cadaver study is to evaluate the risk of chondral damage using the Rigid Fix device through an anteromedial portal for femoral-sided fixation during ACL reconstruction.

Materials and Methods Arthroscopic ACL reconstruction using the Rigid Fix cross pin femoral device (Mitek) through the anteromedial portal was performed on 20 (10x2) fresh-frozen cadaver knees. There was no evidence of arthritic change or deformity in any of the knees tested prior to reconstruction. The cross pin holes were drilled with three different femoral guide positions at 0°, 45°, and 90° to the horizontal plane (groups A, B, and C, respectively). Pin positions and technical difficulties were recorded. Group A (0°): 30% (6 Knees) had two pins inside the lateral condyle, 50% (10 knees) had one pin inside the lateral condyle and 20% (4 Knees) had both pins out of the cartilage. Group B (45°): 35% (7 Knees) had two pins inside the cartilage, 60% (12 knees) had one pin inside the condyle and 5% (1 Knee) had pins outside the cartilage. Group C (90°): 35% (7 Knees) had two pins inside the cartilage and 65% (13 knees) had one pin inside the condyle. The risk of chondral injury using the Rigid fix device through the anteromedial portal is high. We do not recommend routine use of this technique.

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SOLVING FEMORAL INTERFERENCE SCREW DIVERGENCE IN ACL RECONSTRUCTION: GEOMETRICAL APPROACH AND CADAVERIC STUDY

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Background The aim of the study is to minimize femoral interference screw divergence, identifying the correct knee flexion allowing alignment between i screw and femoral tunnel, drilled with transtibial technique

Materials and Methods

1. Geometrical approach: we determine a trigonometrical relationship between starting knee flexion (when drilling the femoral tunnel), ACL tibial guide angle and final knee flexion (when inserting the interference screw through the AM portal); a formula is shown allowing to calculate the amount of final knee flexion to obtain coaxiality between interference screw and femoral tunnel.
2. Cadaveric study: 18 cadaver knees were used to test the formula.

Extraarticular entry point of tibial tunnel was at anterior border of MCL (on a plane 30° medial to tibial sagittal plane). ACL tibial guide angle was 55°. Intra-articular exit point was identified with standard anatomical landmarks. Entry point for femoral tunnel was at 11o'clock for right knees and 1 o'clock for left knees; femoral tunnel axis was marked with guidewires.

In group A, 70° starting flexion was used; in group B and C, 80° and 90° respectively.

At 130° final knee flexion, we measured, on sagittal plane, divergence between femoral tunnel longitudinal axis and direction of interference screw inserted through anteromedial portal.

Results Divergence angles were: group A, 5°±2°; group B, 12°±4; group C, 15°±3° group A only was respecting the previously mentioned formula and was related with the least divergence.

Discussion and Conclusions In ACL reconstruction with transtibial technique, excessive interference screw divergence is theoretically and practically preventable, if respecting the relationship between starting flexion when drilling the femoral tunnel, ACL tibial guide angle and final flexion when inserting the screw through AM portal.

Moreover, as maximal flexion intraoperatively obtainable is 130°, it is advisable to drill femoral tunnel close to 70° of knee flexion.

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RULE OF PULSED ELETTRO-MAGNETIC FIELD (PEMF) IN POST-OPERATIVE TREATMENT AFTER ARTHROSCOPIC ACL RECONSTRUCTION

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PEMF efficacy both in pseudo-arthrosis and in delayed healing fractures is still wide known. However recent in vitro and in vivo studies have shown their therapeutical effects both on articular cartilage, favoring biophysical anatomical condro-protection, and on subcondral bone, permitting osteocondral implant fixation and in preventing resorption areas. Moreover, after knee arthroscopic surgery, PEMF reduce pain killer assumption.

Here the Authors present their cohort of 31 patients pertaining to National Study Group of C.R.E.S..

They all undergone surgical operation of ACL arthroscopic reconstruction with quadruplicated flexors tendons (four-strand semitendinosus/gracilis) with bio-transfix and rigid-fix technique. The post-operative rehabilitation program has been the same for each patient.

In this prospective and randomized study, all patients have been treated in post operative period with CBA for 5 hours/day for 60 days (2 groups: active and placebo). Post operative controls have been done at the baseline and then at 1, 2, 6, 12, 24 months. Clinical evalutation criterias have been based upon a subjective (ROOS and IKDC) and objective (IKCD) schedules, instrumental investigation have been based upon x-rays and MRI controls.

In active group all the cases have shown a clean pain reduction with decreased articular swelling with consequential improvement in ROM.

At 12 months from surgery the x-rays and MRI differences between 2 groups have been in particular the bone-tendon integration, the tunnels enlargement and the bone cysts formations.

These results can't be considered as definitive because of the meagre number of patients needed to complete follow-up to 24 months, however preliminary data seem to be encouraging.

GAIT ADAPTATION AFTER ACL RECONSTRUCTION: PATELLAR VERSUS HAMSTRINGS TENDONS

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Purpose To determinate how kinetic and kinematical parameters may change as a result of ACL reconstruction using patellar tendon versus hamstring tendons.
Background Gait parameters shift towards normal value patterns after ACL reconstruction with patellar tendon.
Methods The study was conducted on 24 ACL reconstructed subjects two years following ACL reconstructive surgery using the bone-patellar tendon-bone or the doubled semitendinosus and gracilis tendons. Gait analysis was performed using the ELITE three-dimensional system and two Kistler force platforms. Kinematic data were recordered for the principal lower limb joints (hip, knee, ankle). The results obtained from the operated subjects were compared with those of 10 normal knees.
Results The analysis of sagittal plane joint moments shows: normal knee flexion moment at loading response and during preswing in operated subjects compared with normal knees; normal value of joint kinematics during all phases of gait cycle for both techniques compared with those of healthy subject.
Conclusions these data suggest that gait parameters tend to shift towards a normal value pattern after ACL reconstructive surgery using both techniques, bone-patellar tendon-bone or doubled semitendinosus and gracilis tendons.

MORPHOLOGICAL ANALYSIS OF FAILED DOUBLE BUNDLE ACL GRAFTS

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Background Recent clinical and biomechanical studies have demonstrated better results with double-bundle ACL reconstruction with respect to anterior and rotator stability of the knee when compared to single-bundle reconstruction. Little is known about the healing process after double bundle ACL reconstruction. The objective of this study was to observe the ACL double bundle graft remodeling process in four traumatic failed grafts. These morphological appearances were then correlated to normal tendon allograft and ACL. The hypothesis of the study was that a different maturation process occurs between the two bundles.
Materials and Methods Four ruptured ACL double bundle reconstructed remnants were obtained from 4 patients undergoing revision surgery. In 2 cases, both bundles were torn, with only the AM bundle torn in the remaining 2 cases. In all patients, the lesion occurred during sport activities at an average follow-up of 11 (9–14) months.
Three different intact ligaments (positive control group) was obtained during total knee arthroplasty procedure. Three different tibialis anterior tendon allografts, the same type of graft used for ACL reconstruction, were used as negative control group.
Each biopsy was analysed with light and transmission electron microscopy to count the number of cells and to measure the diameter, the density, and the percentage area of collagen fibrils.
Results For all the variables analyzed, there was a statistical difference between AM and PL groups and AM and allografts groups ($p<0.05$). No difference was observed between AM and ACL groups with exception of collagen fibrils density ($p<0.05$). There were differences between PL and allograft groups exclusively for density and area of collagen fibrils and between PL and ACL groups for diameter, density and area of the collagen fibrils ($p<0.05$).
Discussion The presence of cells, the density and the percentage of area occupied by the collagen fibrils of the two bundles when compared to control groups demonstrate an evolution of the grafts from tendon to ligament. The different maturation stage of the two bundles is suggested by the differences in all the variables considered. The AM portion appears more mature than the PL one. Our results suggest that the grafts are still immature at an average of 11 month postoperatively. Long term prospective randomized studies between single and double bundle reconstruction will likely demonstrate if an anatomic reconstruction is able to restore the normal structure and ultrastructure of the native AM and PL bundles.

SESSION 0-14

SPORT AND ARTHROSCOPY II

OSTEOTOMY AND PCL INSTABILITY

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Background Limb alignment is the most important factor to consider in lower limb reconstructive surgery. Sagittal plane has generally been ignored in HTO literature. Slope alteration has significant impact on biomechanics.
Materials and Methods Sixteen patients (17 HTO) underwent HTO with Puddu plate (Arthrex, Naples, FL, USA). Inclusion criteria: "posterior" instability, exclusion criteria: medial arthrosis, anterior (ACL) instability, combined HTO and meniscus reconstruction or transplantation, follow-up <2yrs.
Results
- Mean follow-up: 3.2 years (2.0 to 6.9)
- Activity score (Tegner & Lysholm)
  - Mean pre-op: 3.3 (0 to 7)
  - Mean post-op: 4.9 (1 to 9)
  - Mean increase in score of 1.6
  - 14/16 had an increase in score* (* 2 WCB patients)
- Functional Results

Questionnaire: 15/16 improved stability (9/16 significantly better, 6/16 somewhat better,
1/16 same), 15/16 satisfied, 15/16 would have surgery again
- Radiographic Results

Osteoarthrosis: No significant changes
Femorotibial axis alignment: Mean change of 6 degree valgus
Posterior tibial slope: Mean increase of 8 degree inclination
Ratio of patellar height: Mean decrease 0.17 (2 patella infera <0.54)
Discussion
Chronic PCL ± Posterolateral Instability ± malalignment
- Difficult problem.
- PCL reconstruction without PLC reconstruction is often unsatisfactory.
- Soft tissue procedures alone are often unsatisfactory.

Conclusions We recommend correcting lower limb alignment in sagittal and axial planes before performing a soft tissue reconstruction.
Suggested readings
1. The effect of lateral closed wedge high tibial osteotomy on tibial slope: a radiographic study. Hohmann, Bryant, Imhoff, KSSTA 2005
2. Accuracy of frontal and sagittal plane correction open wedge high tibial osteotomy. Marti, Gautier, Wachtl, Jakob, Arthroscopy 2004

3. Arciero et al (2006) Am Medial opening wedge high tibial osteotomy and sagittal plane: The effect of increasing tibial slope on tibial femoral contact pressure. J Sport Med
4. Effect of high tibial flexion osteotomy on cartilage pressure and joint kinematics: a biomechanical study in human cadaveric knees.Agneskirchner, Hurschler, Imhoff, Lobenhoffer Archives Orthop Trauma Surg 2004
5. To quantify the effect of increasing tibial slope (by opening wedge HTO) on knee stability in the PCL deficient knee in vitro. Naudie, Amendola, Fowler, presented at COA Annual meeting 1997
6. Opening wedge high tibial osteotomy for symptomatic hyperextension varus thrust. Naudie, Amendola, Fowler; Am J Sports Med 2004
7. Principles of Deformity Correction, Paley 2002

FEMORAL TRANSFIXION PIN SYSTEM FOR PCL RECONSTRUCTION

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Purpose This investigation was conducted to assess the use of a transfixion pin system (Rigidfix-Mytek) for femoral fixation of quadrupled hamstring grafts (QHTG) in PCL reconstruction and identify any complications or technical difficulties.
Type of Study A cadaveric study.
Methods Twenty fresh anatomic specimen knees (10 cadavers, 8 male 2 female) were used for testing. There were no evidence of arthritic change and deformity in any of the knees.
The femoral tunnel was drilled through the anterolateral portal. In each cases with the Rigidfix instrumentation the transverse drill tunnels were positioned at three different degrees (0°, 45°, 90° from the horizontal position) and technical complications noted.
Results
Group A (0°)
- 10% (2) two pins were inside the medial femur condyle, 65% (13) one pin was inside the medial femur condyle, 25% (5) both pins were out of cartilage.

Group B (45°).
- 30 % (6) two pins were inside the cartilage, 55% (11) one pin was inside the condyle, 15% (3) were outside the cartilage.

Group C (90°).
- 85% (17) two pins were inside the cartilage, 15% (3) one pin was inside the condyle.

Conclusions Technical difficulties with this technique are identified and practical tips are offered to overcome them. The pins were outside from the cartilage surface of the medial condyle when the tunnel guide was closed to the lateral border of the patellar tendon. We don't recommend this kind of technique for femoral tunnel PCL fixation. We suggest modifying the femoral guide, but further investigations are needed.
Suggested readings

1. Brand J Jr, Weiler A, Caborn DNM, Brown CH Jr, Johnson DL (2000) Graft fixation in cruciate ligament reconstruction. Am J Sports Med 28:761–774
2. Hantes ME, Dailiana Z, Zachos V, Varitimidis SE (2006) Anterior cruciate ligament reconstruction using the Bio-TransFix femoral fixation device and anteromedial portal technique. Knee Surg Sports Traumatol Arthrosc 14:497–501
3. Marx RG, Spock CR (2005) Complications following Hamstring anterior cruciate ligament reconstruction with femoral cross-pin fixation. Arthroscopy 21:762.e1–762.e3
4. Zantop T, Welbers B, Weimann A et al (2004) Biomechanical evaluation of a new cross-pin technique for the fixation of different sized bone-patellar tendon-bone grafts. Knee Surg Sports Traumatol Arthrosc 12. DOI-10. http://www.springerlink.metapress.com

ARTHROSCOPIC IMPLANTATION OF AUTOLOGOUS CHONDROCYTES AND HIGH TIBIAL OSTEOTOMY IN THE TREATMENT OF THE VARUS KNEE

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Background A high tibial osteotomy is a well established procedure for the treatment of the varus knee, a condition which determinates progressive degeneration of the articular cartilage due to medial deviation of the mechanical axis.
Arthroscopic autologous chondrocyte implantation has emerged as an interesting viable treatment option for chondral defects in the Knee, but as every chondral resurfacing technique, it is contraindicated in the presence of tibio-femoral malalignment which infact subjects the intended repair tissue to mechanical overload.
Materials and Methods Between 2002 and 2003 we performed 9 arthroscopic implantations of autologous chondrocytes in conjunction with an opening wedge osteotomy on the medial side of the proximal tibia in patients with chondral defects of the medial tibial plateau in varus knee.
Each patient was evaluated for clinical history, clinical examination, conventional radiographs, MRI and arthroscopy, pre and postoperative IKCD (International Knee Documentation Committee), pre and postoperative Lysholm, pre and postoperative Tegner score and pre and postoperative VAS.
Results The Lysholm Score, IKCD, Tegner score used for evaluation showed a statistically significant improvement from preoperative average rating to postoperative average score.
Discussion Treatment of chondral lesions involving the articular surface of the knee remains a formidable therapeutic challenge because articulate cartilage has limited capacity for regeneration.
HTO alone and conventional treatments that abrade or penetrate the subchondral bone (drilling or microfracture) are known to produce fibrocartilaginous repair. On the weightbearing surfaces of the knee large areas of fibrocartilage are mechanically inferior and usually deteriorate, necessitating additional intervention. Only the autologous chondrocyte implantation and the transplantation of osteochondral grafts provides adequate hyaline articular cartilage, which is better able to restore the durability and natural function of the knee joint.
Conclusions Despite the small size of the group and the need for larger series, our surgical study shows that the association of arthroscopic implantation of autologous chondrocytes in conjunction with an opening wedge osteotomy on the medial side of the proximal tibia is a good option for the treatment of chondral defects in varus knee.

FIRST EXPERIENCES IN THE ARTHROSCOPIC TREATMENT OF THE OSTEOCHONDRAL DEFECTS OF THE KNEE WITH THE USE OF A BIODEGRADABLE SCAFFOLD (TRUFIT®)

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Background We have begun to treat in some cases the osteochondral defects of the femoral condyles of the knee with aid of a biodegradable scaffold that allows the reparation of the defect both bony that cartilagineous.
Materials and Methods The substance used, denominated TruFit, is constituted by cylinders with different diamenters that, once prepared the lodging, comes positioned with suitable instruments to level of the osteochondral lesion. These cylinders of porous substance stimulate the growth and the remodelling of the tissues and are composed of a patented blend of polylactide-co-glycolide, calcium sulfate and polyglycolide fibers; the material is absorbable and is progressively replaced by healing tissue. We will describe the

surgical arthroscopic technique of grafting and we will illustrate our results from the clinical point of view and from the imaging (X-ray, CT and MNR) and in some cases with an arthroscopic second look to evaluate, in alive, the graft's evolution. We have revalued 15 cases with a follow-up minimum of 8 months and maximum of 18 months, using the IKDC schedule and the Knee Score.
Results Even if the number of the treated cases statistically is not still remarkable and the follow-up is brief, the use of the TruFit® has given us good clinic impressions with the complete resolution of the knee pain in all the cases and also the histological results that we have gotten with the arthroscopic second look are very encouraging. Moreover also the imaging demonstrates the good integration of the scaffold in the greater part of the cases.
Discussion and Conclusions We can affirm then that the use of this scaffold represents a fascinating solution in the treatment of the osteochondral defects of the knee that, if confirmed with a longer clinical follow-up and with further histological and histochemical comparisons, it is set decidedly in the foreground as the best methodic for this type of lesions. Besides we have had good results also in over-sixty subject with wide lesions.
Suggested readings

1. Kelly DJ, Prendergast PJ (2006) Prediction of the optimal mechnical properties for a scaffold used in osteochondral defect repair. Tissue Engineering 12
2. Uematsu K, Hattori K, Ishimoto Y et al (2005) Cartilage regeneration using mesenchymal stem cells and a three-dimensional polylactic-glycolic acid (PLGA) scaffold. Biomaterials 26:4273–4279

OUTCOMES OF OSTEOCHONDRAL LESIONS OF THE KNEE REPAIRED WITH A POROUS, RESORBABLE SCAFFOLD

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Background Bone graft materials are diffusely used in orthopaedic surgery. In this study we present surgical technique and early results obtained with preformed in shape and size bone graft substitutes in repair of III and IV degree full thickness osteochondral defects of the knee.
Methods The utilized implant is a cylinder composed of poly(D,L-lactide-co-glycolide) to which calcium sulphate and surfactant are added to enhance bone in-growth and make implant's surface more hydrophilic. The three-dimensional porous cylindrical implant with interconnected pores is press fit into the site for close apposition and encourage migration of repair tissue as blood and marrow into the scaffold. The plugs are available in different sizes (5, 7, 9.11 mm) and can be contoured at the time of surgery in order to match the individual joint surfaces. 15 patients were included in the study (12 women, 3 men). Every patient has underwent arthroscopic knee assessment to evaluate size, location and degree of defects and has underwent implantation of TrufitTM cylindrical resorbable scaffold. Majority of synthetic bone substitutes implanted were 11 mm in diameter.
Results All surgical procedures have been completed uneventfully. Patient have been controlled clinically and by serial knee MRI's and showed statistically significant improvement of IKDC and WOMAC scores associated to healing of defect and integration of bone plugs in absence of adverse reactions.
Conclusions Today several methods are available for surgical treatment of hyaline cartilage defects frequently incidentally encountered during arthroscopies, especially in the knee, as reported by various authors. At our institution, among other treatments, we recently have decided to use TrufitTM synthetic implants, retaining interesting to use a scaffold that enables bone and hyaline like cartilage in-growth before of it's resorption. Preliminary results enable us to conclude that porous, resorbable scaffolds can be used in treatment of cartilage defects offering a secure support to secondary bone in-growth with the advantage of being applied in one single step procedure, enabling patients to quickly move back to previous daily and sport activities.

GRADUATED COMPRESSION STOCKINGS (GCS) VERSUS LOW-MOLECULAR-WEIGHT HEPARIN (LMWH) FOR PREVENTION OF DEEP VEIN THROMBOSIS (DVT) AFTER KNEE ARTHROSCOPY (KA). A RANDOMISED STUDY (KANT)

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Introduction In absence of prophylaxis, the incidence of venographically proven DVT after KA is reported to be as high as 18%. Clear indication for antithrombotic prophylaxis after KA is lacking.
Methods We randomised patients undergoing KA to wear GCS or to receive once-daily sq LMWH, for 7 days. All patients underwent bilateral whole-leg ultrasonography at day 8±1, or earlier if clinically indicated. Suspected symptomatic pulmonary embolism (PE) was ruled-out according to accepted standards. Patients with a normal diagnostic work-up were followed-up clinically for 3 months. As primary efficacy outcome we chose the combined incidence of symptomatic PE, symptomatic and asymptomatic proximal DVT and symptomatic isolated calf DVT. The primary safety outcome was the incidence of major and clinically relevant bleeding. Secondary outcome were the overall incidence of proximal and distal DVT and of symptomatic PE and the overall incidence of bleeding. Data were analysed with the Chi2 test.
Results Overall 1317 patients were randomised (GCS, n=660; LMWH, n=657). The incidence of the primary efficacy outcome was 3.18% in the GCS group and 0.91% in the LMWH group (difference 2.3%, 95%CI 0.6 to 3.9%; p=0.005 2tailed); the incidence of primary safety outcome was 0.30% in the GCS group and 0.91% in the LMWH group (difference -0.6%, 95%CI -1.6 to 0.4%; p=0.178 2tailed). The incidence of the secondary efficacy outcome was 3.3% (43 out of 1317; 95%CI 2.4 % to 4.3%; 1.1% proximal). The incidence of the secondary safety outcome was 3.9% (51 out of 1317; 95%CI 2.9% to 5.0%). There was no significant statistical difference in bleeding complications between the two treatment groups (3.3% of patients in GCS group and 4.4% of patients in LMWH group; absolute difference -1.1%; 95% CI -3.3% to 1.2%; p=0.322, two-tailed).
All patients with a normal diagnostic work-up experienced a totally uneventful follow-up.
Conclusions One-week fixed-dose sq LMWH is more effective than GCS for prevention of VTE after KA, without increased bleeding risk.

SHOULDER INSTABILITY IN ATHLETES: CONSERVATIVE OR SURGICAL TREATMENT?

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In 1991 Walch then Jobe developed the concept of posterosuperior impingement to explain lesions observed arthroscopically. This impingement between the deep aspect of the supraspinatus tendon and the glenoid occurs during loaded arm movements. The theory of internal impingement holds that, in overhead athletes, repeated contact between the undersurface of the rotator cuff and the posterosuperior glenoid rim leads to articular-sided partial-thickness rotator cuff tears with flexibility deficits, strength deficits, or both along the kinetic

chain. So it is very important to protect as soon as possible the athlete's shoulder from the impingement to avoid the complete lesion of the rotator cuff and successive surgical treatment. We studied a team of volleyball top level athletes to demonstrate that most rotator cuff injuries may be treated conservatively by using regimens functional rehabilitation therapy. Injury prevention programs are essential for the long-term care of patients with rotator cuff disease, for primary prevention, and for prevention of recurrent injuries, unless a traumatically torn rotator cuff is present. Surgical management is reserved for refractory cases that have exhausted conservative measures.

Suggested readings

1. Blevins FT (1997) Rotator cuff pathology in athletes. Sports Med 24
2. Williams GL, Kelley M (2000) Management of rotator cuff and impingement injuries in the athlete. J Athl Tran 35
3. Bytomski JR, Black D (2006) Conservative treatment of rotator cuff injuries. J Sirg Orthop Adv 15

TENDOSCOPY AND PERONEAL VINCULA: A CADAVERIC AND HISTOLOGICAL STUDY

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Background Peroneal tendons possess a vascular supply through a mesotendineal structure named vinculum; vincula are identifiable with tendoscopy and are supposed to play a role in tendon healing response, due to prominent vascularity; aim of the study is to verify the feasibility of tendoscopy in evaluating peroneal tendons, to clarify the histological structure of peroneal vincula and to investigate the presence of nervous tissue, so formulating a hypothesis regarding the functional role of vincula.
Materials and Methods Cadaver study was performed on 8 fresh-frozen ankles; dissection were conducted to verify accessibility of endoscope, proximity with superficial peroneal nerve and presence of vincula; samples of vincula were obtained; light microscopy and immunohistochemistry (anti-humanS100antibody) were performed, describing structure of vincula and identifying peripheral nerve fibers.
5 peroneal vincula biopsies were analyzed from patients affected by ankle instability and undergoing tendoscopy for peroneal tenosynovitis.
Results Peroneal tendons are accessible along the whole common tendon sheath and a discrete distance between the endoscope and the superficial peroneal nerve is present in all specimens; a membranous mesotendineal structure was found in all specimens between both tendons and tendon sheath; macroscopic inspection revealed the presence of a vessel network, arising from the sheath toward the tendon; light microscopy of cadaver samples confirmed the presence of multiple vessel branches crossing the entire structure of the vinculum and identified nervous structures close to the vessels, resembling a neurovascular bundle; immunohistochemical analysis revealed nerve fibers in each specimen; tendoscopy in patients affected by ankle instability showed lesions of the vincula and histology from intraoperative biopsies showed presence of nerve fibers.
Discussion and Conclusions Tendoscopy is a useful tool to visualize peroneal tendons and to diagnose and treat different disorders; although literature provides no data about innervations of peroneal vincula, the study shows nervous fibers consistently present inside the intimate structure of vinculum; besides its function in repair and healing processes, this suggests a proprioceptive role of the vinculum in peroneal tendon physiology and lesion of vinculum could be an important element acting synergistically with joint capsule and surrounding tissues lesions and ultimately leading to clinical pictures of ankle instability.

Suggested readings

1. Scholten PE et al (2006) Foot Ankle Clin 11:415–20
2. van Dijk CN et al (1998) Arthroscopy14:471–478
3. Sobel M et al (1992) Foot Ankle13:469–472

SESSION 0-15

TUMORS

THE TREATMENT OF BONE METASTATES FROM CARCINOMATA

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The treatment of the metastasis of bone, to the moment, be turn out always much a instrument such a must assure to the patient a better control to the pain and quality life. In last years the life expentancy of patient affected with metastatic carcinoma has improved considerably because of advances in immunotherapy, chemotherapy, hormonal treatment and radiotherapy. Bone metastates from cancer are medical and social issue; epidemiological study proved that of 1.2 million new case of cancer each year in the USA, 300.000 will eventually develop a bone metastatis. The sites most usually involved are, the spine, pelvis, ribs, skull and proximal long bones.
Materials and Methods In our department from two years treating the metastatis of bones,are operate patient with metastatis from carcinoma of lung, breast, kidney, prostate and involved are, femur humerus, tibiaspine, pelvis.
We used a protocol for the treatment of bone metastates of the appendicular skeleton studied to Capanna et al. for offer adequate individual treatment, avoiding undertreatment or overtreatment, to achieve control pain and to manage impending and pathological fractures so that the longer survival is associated with a better quality of life.
Results We treated patient with metastatis to the femur, humerus, spine, tibia; alternating surgical option or conservative method in order with the principles of Capanna et al. The results are kind and make hope for the future.
Discussion The treatment of the metastatis of bone is very diffucult for the orthopaedic surgeon because the prognosis is extremely variable depending on the site of the primary growth. The study showed the possibility of follow the patients in basis to his condition and to the consistency of the metastatis and they delivery. Is very important initial lesion and the time of appearance of the first metastatis, if solitary or not and the survival expectation.
Conclusions The treatment of metastatis of bone have rappresentation for our department a challenger that have beginner to not much years and the results at moment are kind; the knowledge and the experience can't that to help the care of these lesion.

Suggested readings

1. Capanna at al (2001) The treatment of metastates in the appendicular skeleton. J Bone Joint Surg Br 83:471–481
2. Cancer facts and figures. Atlanta: American Cancer Society 1999:1–36
3. Silverberg E (1986) Cancer statistics 1986. CA Cancer J Clin 36:9–2–25
4. Pugh J, Sherry HS, Futterman B, Frankel VH (1982) Biomechanics of pathologic fractures. Clin Orthop Relat Res 169:109–114
5. Miller F, Whitehill R (1984) Carcinoma of the breast metastatic to the skeleton. Clin Orthop Relat Res 184:121–127

SURGICAL TREATMENT OF BONE METASTASES FROM RENAL CARCINOMA

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Renal carcinoma frequently gives metastases to skeleton (32% in the various series). Adjuvant therapies, as chemo and/or radiother-

apy, according to the literature are not effective in these bone lesions. Therefore, where possible, the treatment of choice should be wide surgery. The Authors report their experience in the treatment of bony metastases from renal carcinoma, localized to the pelvis and the limbs, reviewing 7 cases observed in Clinical of Orthopaedic of Catholic University during two years 2002–2004. They were 7 patients (6 males and 1 female, medium age 62 years). Lesions were localized to the proximal humerus (1), proximal femur (1), femoral diaphysis (1), tibial diaphysis (1), distal tibia (1) and 2 wide acetabular localizations. A preoperative artery embolization of lesions has been always executed, because, as it is well-known, kidney carcinoma is a very hemorrhagic tumour. Wide resection has been always executed in limbs localizations without contemporary visceral metastases. The reconstruction was different according to bone site: in particular modular prosthesis in proximal humerus and femur, modular spacers in diaphyseal localizations of femur and tibia, arthrodesis with locked nailing and bone cement in distal tibia localizations were used. In pelvic localizations, also for the presence of visceral metastases, a curettage by ileoinguinal approach and filling of cavity with cement (1 case), or cement and plate (1 case) has been executed. Survival of patients affected from limbs lesions was 42 months, while patients affected from pelvic lesions was 24 months, because contemporary visceral metastases negatively influence the prognosis. The Authors also underline the role of preoperative embolization followed by wide surgery in bony metastases from renal cell carcinoma as a treatment that can improve the surgical results in hemorrhagic tumours; in limbs localizations wide surgery should be obtained in all cases, while in pelvic localizations, especially if visceral metastases are present wide surgery is not indicated.

THE ROLE OF SURGICAL RESECTION IN SKELETAL MUSCLES METASTASES FROM RENAL CELL CARCINOMA: ANALYSIS OF 4 CASES AND REVIEW OF THE LITERATURE

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Background The incidence of clinically evident metastases to muscles is extremely rare. Nevertheless, renal cell carcinoma (RCC) can spread to skeletal muscles and about 20 cases are reported in literature. However, the true incidence of skeletal muscle metastases is difficult to determine as they are rarely symptomatic. Moreover, in the reported cases no preferred site was identified and several hypotheses on the biological mechanism behind these unusual localizations were done.
Materials and Methods We retrospectively reviewed 4 patients with skeletal muscles metastases from RCC (clear cell). All patients had a low grade primary tumor (Furhman grade I or II) with a stage IV tumor at the time of the diagnosis of the metastases. All metastases had a late onset (7 to 14 years after the diagnosis of the primary tumor). The metastases were localized in the psoas (ipsilateral to the primary tumor) in 1 patient, in the quadriceps in 1 patient, and in the gluteus maximus in 2 patients. Adjuvant immunotherapy was performed in all patients and the response of these metastases was always poor. We performed surgical resection in all patients with negative surgical margins. Minimum follow-up was 8 months.
Results One patient died by progression disease and 1 by unrelated cause. Two patients are currently alive with a good control of the systemic disease with adjuvant therapies. No local recurrence was noted.
Conclusions The unpredictable behaviour of RCC makes lifelong follow-up mandatory. The response of muscular metastases to adjuvant therapies is usually poor, consequently surgical resection is the treatment of choice. Selective arterial embolization is recommended as these lesions are highly vascularised.

Suggested readings

1. Linn JF, Fichtner J, Voges G, Schweden F, Storkel S, Hohenfellner R (1996) Solitary contralateral psoas metastasis 14 years after radical nephrectomy for organ confined renal cell carcinoma. J Urol 156:173
2. Nabeyama R, Tanaka K, Matsuda S, Iwamoto Y (2001) Multiple intramuscular metastases 15 years after radical nephrectomy in a patient with stage IV renal cell carcinoma. J Orthop Sci 20016:189–192

VERTEBROPLASTY AND KYPHOPLASTY FOR THE TREATMENT OF VCF IN MULTIPLE MIELOMA

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Vertebroplasty (VP) and kyphoplasty (KP) are surgical procedures for the treatment of the intense pain caused by vertebral compression fracture (VCF) in Patients whose pain has been refractory to medical management or bracing. Vertebroplasty and kyphoplasty involve the injection of an acrylic cement under fluoroscopic guidance to control the pain of vertebral fractures associated with osteoporosis and other pathologies like Multiple Myeloma (MM).
While VP is a simple cement injection, the baloon KP can lead to a correction of the kyphotic deformity of the vertebral body.
We report our experience in the tratment of the pathological VCF in Patients with MM, by using both the vertebroplasty an kyphoplasty surgical procedures.
Pain reduction or elimination was immediate, and no clinical complications were detected.
The only one complication we observed was the cement leakage outside the spinal canal, with no clinical rilevance, and so we begun to use the KP with the egg-shell technique in selected cases.
We concluded that VP an KP are safe and effective procedures for the treatment of VCF in MM and that KP besides kyphotic correction is safer, expecially associated with the egg-shell technique, than VP in reducing the risck of cement leakage.

TREATMENT OF METASTASES TO THE VERTEBRAE WITH RADIOFREQUENCY ABLATION: DETERMINATION OF EFFECTIVENESS BY EVALUATION OF TUMOR NECROSIS – A PRELIMINARY RESULT

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Aims Estimation of the efficacy of thermablation using radiofrequency methods to treat metastases of the vertebrae.
Materials and Methods 12 metastatic lesions in 11 patients had undergone surgical intralesional excision and stabilization of the spine. During the surgery, tumor tissue samples were removed pre- and post-thremablation for analyses using histological and ultrastructural studies.
Results The percentage of necrosis of the total analyzed tissues under the light microscope showed 75% of necrosis, and went upto 83% necrosis under the electron microscope. This was mainly due to incomplete necrosis in the renal carcinoma metastases.
Conclusion Thermablation with radiofrequency treatments seems to cause necrosis of the tumor tissues in nearly all the cases, as shown by the histological and ultrastructural studies.

FAILURES AFTER EN BLOC RESECTION IN ONCOLOGIC SURGERY OF THE SPINE: CAUSES AND TREATMENT

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Aims Failures in the treatment of bone tumors of the spine are related to common surgical complications, but the most relevant complication is the recurrence of the tumor. The purpose of this study is to stress on the risks of revision surgery.
Materials and Methods From January 199O to December 2006, on 976 patients affected to bone tumors of the spine, were performed 129 en bloc excisions by the same surgical team. They were 68 male and 61 female with an average age of 44 (range 3 to 82 years). Primary tumors where most represented with 88 cases (29 benign and 59 malignant), followed by metastases (41 cases). Favourite location was the lumbar spine (71 cases), followed by the thoracic spine (54 cases) and the cervical spine (4 cases). Surgical procedures included 47 posterior and 2 anterior approaches (2 transthoracic). Posterior and anterior simultaneous approach was performed in 80 cases.
Results The average follow-up (FU) was 64 months (range 0 to 366 years). Eighty-eight patients (68.2%) have FU equal or greater than 24 months.
Complications after surgical treatment were observed in 43 patients (33.3%). Twenty-seven patients suffered to one complication only; in 13 cases 2 complications were recorded; 2 patients suffered to 2 complications; 5 complications were recorded in 1 patient only.
According to McDonnel et al. we observed 42 major complications on 25 patients.
Conclusions The rate of complication in spine tumor surgery remains high although new surgical techniques and new surgical instrumentations are now available in most hospitals. The incidence of local complications and recurrences is significantly higher in revision surgery, therefore, the first treatment is determinant for the final outcome. Radiation therapy remains important, in the treatment of radiosensitive metastases, limphomas or plasmocytomas. However it should be performed in the post-operative period when the surgical wound has completely healed.

SURGICAL TREATMENT OF THE BONE METASTASIS OF THE TIBIA: REVIEW OF THE LITERATURE AND OUR EXPERIENCE

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Metastatic localization of the tibia is a rare event that occurs in the late stage of the neoplastic disease. This localization constitutes a complex and controversial biomechanical and therapeutic problem, because of a real risk of pathological fracture. There are several options of treatments: external radiotherapy, therapy with hormones, diphosphonates, radioisotopes, curettage with acrylic cement, plates, intramedullary nail, prosthesis and amputation. Surgical technique should be chosen according to the metastasis localization in the osseous segment, primitive tumour, adjuvant therapy results, life expectancy. The aim of the present study is to review the percentage of tibial metastases from carcinoma, the most common histotype causing these lesions, the possible surgical approach of this osseous segment and the results after surgery. For this reason, a review of the Literature and a retrospective analysis of all patients affected from tibial metastases and undergone surgical treatment at the Authors' Departments from 1998 to 2005 have been performed. In particular 10 patients: 6 males and 4 females. Each patient had a pathological or an impending fracture. Histo types were mieloma (1 case), lymphoma (3), breast (2), kidney (2), colon (1), bladder (1). Different surgical options were performed, depending on histotype and site of bone involved, coming from simple curettage and bone cement to bone resection and tibial spacer. From the analysis of the Literature and from our experience can be deducted that surgical treatment of the metastases of the tibia can be done in patients with a life expectancy longer then 3 months. The surgical treatment enables pain relief, improvement of the quality of life, of lower limb function, of nursing assistance and helps in keeping such a personal independence of the oncologic patients. In conclusion authors think that choosing a surgical treatment of these metastases, should consider the systemic extension of the neoplastic disease, therefore it should be less invasive except for some histotypes as the carcinoma of the kidney having a better prognosis in terms of survival.

ACETABULOPLASTY FOR THE TREATMENT OF BONE ACETABULAR METASTASIS: INDICATIONS, TECHNIQUE AND RESULTS

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Acetabular metastatic lesions influence negatively the oncologic patient's quality of life. They, in fact, in addition to a severe pain, also cause a considerable functional limitation of the hip reducing or preventing the ability of walk. In most of the cases aggressive surgical treatments are unwary or even contraindicated due to poor general conditions of these plurimetastatic patients and high risk of morbidity related to surgery. Radiotherapy alone may not be effective in controlling pain and/or restoring structural integrity of the acetabolar bone, so that to allow an early weight bearing avoiding the pathologic fracture risks. Percutaneos injection of acrylic cement in acetabular osteolysis, so called acetabuloplasty, is considered one of the palliative mini-invasive procedures. It is indicated in plurimetastatic patients due to carcinoma, usually different from renal one, with wide symptomatic acetabular lesions and less two years life expectation, because these patients have clinical conditions, so that they are not able to tolerate a major surgery. Another indication is the failure of the analgesic palliative radiotherapy. Up to now no systematic clinical revision has been reported in the literature. From 2003 to 2006, 25 patients (11 males and 14 females) afflicted with acetabular osteolysis were treated at Authors' Department. They showed pain not controllable with drugs, walking limitation and, according to a multidisciplinary team, they couldn't be underwent to a major surgery. Five cases showed bilateral acetabular osteolysis (30 procedures). The histotypes were breast (14), lung (7), prostate (2), myeloma (2). In 9 cases it also has been performed a biopsy. Five patients showed ipsilateral acetabular and femoral lesions: of these two were pathological fractures of the femoral neck. Three cases of femoral osteolysis were treated with recon intramedullary locked nailing and the remaining two fractures with cement bipolar endoprostheses combined with acetabuloplasty. The max follow-up has been 24 months. The results have been evaluated with several questionnaires: ECOG, VAS, Harris Hip Score and Womac. Up to six months an improving of clinical performance has been found in every questionnaires, after this period owing to the worsening of the general conditions it has been observed a decreasing of the analgesic effect of the procedure. In any cases pathological fractures has never been verified. Minor complications have been observed: 8 cases of transitory fever and postoperatory pain (48 h), 2 cases of asymptomatic venous injection.

MODULAR PROSTHESIS IN THE TREATMENT OF PROXIMAL HUMERUS METASTASES: OUR EXPERIENCE

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Background Metastatic bone disease is the most common cause of malignancies to the skeleton in adults. Tumors which have a predilection for dissemination to bone are those of the prostate (32%), breast (22%) and kidney (16%) followed by the lung and the thyroid. The treatment of bone metastases is frequently palliative aiming to achieve a satisfactory control of pain and to prevent or to treat pathologic fractures. In selected cases, the resection of a single bone metastasis may improve the survival of the patient. The aim of this study is to retrospectively review our experience with modular prostheses in the treatment of proximal humerus metastases.
Materials and Methods Thirty-seven patients who had resection of the proximal humerus for metastatic bone disease and reconstruction with a modular prosthesis are reported. Indications to surgery were reported, oncologic outcome was evaluated and functional results were obtained by the Musculoskeletal Tumor Society (MSTS) scoring system.
Results Metastases were detected 6 months to 13 years after the diagnosis of the primary tumor in 30 patients (81.1%), and in 7 of 37 patients (19.9%) the metastasis was the first sign of the malignancy. In 31 patients (83.8%) the prosthetic replacement was the primary treatment of the lesions and in 6 patients (16.2%) surgery was performed to treat a pathologic fracture. We implanted 1 I.O.R. prosthesis, 33 RPS modular prosthesis and 3 SMR reverse modular prosthesis. The Enneking score was good in 11 patients (30.6%) and fair in 25 patients (69.4%).
Conclusions The aim of this approach is to perform a radical excision of the metastasis in order to achieve control of pain and to manage impending and pathologic fractures, giving the patient a better quality of life. This is desirable because the advances in the management of cancer prolonged the survival of these patients, often leading to the need of a definitive and radical surgical treatment. Moreover, the evolution in the design of the prosthetic devices gives now the patient the possibility to achieve satisfactory functional results, especially when the rotator cuff can be spared or when a reverse prosthesis is implanted.
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THE USE OF A MODULAR MEGAPROSTHESIS IN REVISION SURGERY OF HIP AND KNEE

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Background Modular megaprostheses have been widely used after resection of bone tumors. Good results achieved expanded their indications in non oncologic settings.
Materials and Methods From October 2003 to December 2006 in 43 cases a GMRS® Stryker prosthesis was used in revision surgery. In 23 patients this prosthesis was implanted: 8 non oncologic patients (2 hips and 6 knees:2 aseptic loosening of THA, 1 aseptic loosening of TKA, 3 infections in TKA, 2 non unions of the distal femur) and 15 patients previously treated for bone sarcomas requiring revision for failure of the primary implant (infection, allograft fracture, non union, graft fracture in arthrodesis, aseptic loosening). In further 20 pts. (all knees) revision was needed for failure of a previous modular HMRS® prostheses implanted for bone sarcomas (15 aseptic loosenings, 3 stem breakages, 2 infections), where an Hybrid GMRS-HMRS® implant was used.
Information was obtained by clinical charts and all imaging studies were reviewed. Results were judged good if no complication was observed and functional results were evaluated according to the MSTS system.
Results In the 8 non oncologic patients results of revisions were good and stable at a follow-up of 11 months (min.4-max. 28) and functional results were good in 7 and excellent in 1 pt.
In the 15 patients with a pure GMRS implant as secondary reconstruction results were good and stable at a follow-up of 16 months (min. 4-max.33) and functional results were excellent in 11, good in 3 and fair in 1 pt.
In the 20 patients revised with a hybrid implant results were good in all but 2 patients at a follow-up of 16 months (min.3-max.33) and functional results were excellent in 12, good in 6 and fair in 1 pt. of the 19 evaluated pts.. One pt. required further revision for patellar instability.
Discussion Indications to the use of modular megaprostheses are well defined in orthopaedic oncology, while their indications is investigable in a non oncologic setting, including patients healed from sarcomas still exposed to failure of major reconstructions. The Rizzoli series of revisions with this type of prostheses show promising results.
Conclusions The experience of the Rizzoli and the advances in materials and design of modular megaprostheses seem to encourage the widened indications also in non oncologic selected cases. Further studies at a longer follow-up are required to confirm and better define these indications.
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RECONSTRUCTIVE THERAPEUTIC POSSIBILITIES OF JUXTARTICULAR BENIGN NEOPLASTIC LESIONS

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Introduction Bone benign neoplastic lesions are mainly localized in the metaphysis and rarely take their start at the epiphysis in a juxtarticular setting. When it arrives therapy of these lesions has to take into consideration not only oncological and biological indications but also all the problems related to a mechanical failure with the risk of a pathological fracture consequently associated to arthritic degeneration. Surgery of choice in benign neoplasms is “curettage” and this technique is independent from local biological aggressiveness of the lesion. Skeletal continuity reconstruction, in Authors’ opinion, is entrusted to autologous bone graft either in “one step” or in “two steps” surgery. The choice of the method depends on the histology of the lesion and consequently the necessity of using or not the PMMA either as a local adjuvant or as a mechanical support.
Materials and Methods Authors refer to a personal series of 32 benign juxtarticular tumors that underwent to a surgical treatment out of a total of 84 cases studied in the period 1995 and 2005. Among the cases that underwent to surgery 12 were located in the upper and 20 in the lower limb and, from an histological point of view, 2 were osteoid osteomas, 3 enchondromas, 8 giant cell tumors, 7 aneurismal bone cysts, 5 simple bone cysts, 2 ganglions, 5 chondroblastomas.
Discussion and Conclusions “One step” surgery used autologous bone graft alone in 15 cases; in 5 cases autologous bone graft was associated to “growing factors”. “Two steps” surgery was chosen in the remaining 12 cases and among them in 8 cases the use of PMMA was preceded by another local adjuvant as liquid nitrogen. Mean fol-

low-up was five years and recurrence was observed in 1 GCT and 1 solid aneurismal bone cyst. In both, recurrences were observed two years after the first surgery. Authors used curettage+PMMA+liquid nitrogen employing the same method used in the previous treatment .Biologic healing of the lesions was always obtained and no evidence of disease was observed in a mean follow-up of five years recurrences excluded. No infections were observed. In 2 GCT and 2 aneurismal cysts, around the knee joint, an axial deviation of the lower limb was observed as consequence of an early weight bearing after removal of the PMMA and its substitution with cancellous autologous bone graft. In these cases precocious arthritic changes were put into evidence. Pain in the donor site was present in all cases for a period of three months. In upper limb locations no mechanical complications were put into evidence independently from surgery employed either "one step" or "two steps".
In lower limb, "two steps" surgery, using liquid nitrogen, can create an ischemic suffering and bone remodelling, that reduces tensile strength, making easier the possibility of pathologic fractures with consequent axial deformities mainly in juxtarticular lesions.
So far Authors were unable to really understand the importance of "growing factors" for the dishomogeneousness of "data" and the short period of employment.
In Authors' experience no bone bank grafts were used for the poor biological and mechanical qualities of this "filler" in comparison to autologous bone; nevertheless the absence of donor site morbidity must take into consideration this possibility.

INFLUENCES ON SURVIVAL AFTER TREATMENT BY INTRAMIDULLARY NAIL FOR METASTATIC FEMORAL DESEASE

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Background The femur is a common location metastatic disease. Actual as well as impeding fractures at this site are frequently due to mechanical instability after tumor invasion and are usually treated surgically with intramidullary nail.
The objective of this study was to analyze influences on survival after intramidullary nail for metastatic femoral desease.
Materials and Methods Fyfteen patients who had undergone intramidullary nail Procedures for treatment of pathologic femur fracture between 2003 and 2007 at our institution were included in this study.
Results and Conclusions Patients undergoing intramidullary nail for metastatic femoral desease have a limited life expectancy, with only 35% ofr the fyfteen in our series still alive at one year after the surgery. By identifying prognostic factors regarding life expectancy, this study provides surgeons and oncologists with information with which to weigh risks and benefits of intramidullary nail for individual patients preoperatively.

RARE CASE OF AN OSTEOCHONDROMA OF THE STERNUM

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Background Osteochondroma is by far the most common of the benign tumors of the bone, comprising 9.3%% of all bone tumors A solitary osteochondroma usually arises in the areas where cartilage is ordinarily found.
Also called osteocartilaginous exostoses, osteochondroma is an overgrowth of cartilage and bone near the end of the bone near the growth plate. This type of overgrowth can occur in any bone where cartilage eventually forms bone. Most commonly, it affects the long bones in the leg, the pelvis, scapula and rarely in the sternum.
Many adults find out that they have had an osteochondroma during their whole life in this fashion. Treatment for osteochondromas varies significantly depending on the size of the overgrowth and the symptoms of the individual.
Materials and Methods 44 year old female with 3 year history of pain in the sternum, zone of the manubrium, where observer a mass with swelling and pain to manipulation with pressure or irritation with exercise; the patient maked like investigation: x-ray, ct, mri, scintigrafy t.b. and biopsy where confirm diagnosis of osteochondroma. Treatment may include surgery (to remove the mass) and medications (to control pain). If there is no sign of bone weakening or increased overgrowth, observation only may be suggested. Careful follow-up to monitor bone growth may be recommended. To the patient maked surgery treatment to remove the mass about 5 cm and putting in the space of the sternum bone-graft from ilium crest and ostheosynthesis with plate a screws, skeleton stabilization have been accomplished with a mesh patch to cover the site.
P.O. is ok, pain is reduced, no temperature, no superficial and deep infection, good postoperative pulmonary function. The patient is discharge in 7th day.
Discussion Atypical or very large lesions should be fully investigated to exclude the remote possibility of underlying malignancy. The treatment for symptomatic lesions is resection. Don't make conservative treatment to control the pain with medication because the lesion is painfull and estimately visible. Care must be taken to ensure that none of the cartilage cap or perichondrium is left in the resection bed, otherwise recurrence can occur. Ideally, the line of resection should be through the base and above of the seat; thus, the entire lesion is removed en bloc with its fibrous covering.
Conclusions Specific treatment for osteochondroma of the sternum will be determined by the orthopaedic surgeon based on age, overall health, medical history, extent of disease.
This lesion is rare and on the basis of research and documentation, the surgery, to remove the mass is the gold standard.

THE TREATMENT OF OSTEOID OSTEOMA OF THE MOBILE SPINE: HISTORICAL ANALYSIS OF A SERIES OF 79 PATIENTS

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Aims Osteoid osteoma (OO) is a benign tumor infrequently found in the mobile spine. The authors present a series of 79 patients with OO of the mobile spine and the treatment with different methods.
Materials and Methods A study of 79 patients was carried out retrospectively, consisting of 51 males and 28 females with an average age of 18 years. In 25 cases, OO was noted in the cervical spine; 26 cases in the thoracic; and the remaining 28 cases in the lumbar spine. In more than 90% of the cases, OO was found in the adjacent to the facet joints (sectors 2, 3, 4 or 9, 10, 11 of the WBB classification).
There were 84 surgical interventions, including 5 for local recurrences. Curettage was used in 80 of the interventions, 65 cases with the posterior approach, and 15 with anterior approach. In 3 cases required posterior instrumentation, and in one case both anterior and posterior reconstruction was carried out.
In 4 cases, mini-invasive techniques were used: in one case, thermoablation with radiofrequency was used: and in 2 cases, OO was removed via video-endoscopy. In the 4th case, microscope was used.
Results The average follow-up was 41 months. There were 5 recurrences in 4 patients, between 2 and 70 months.
Conclusions OO of the spine is mostly found adjacent to the fact joint. The historical review of our series shows that careful treatment will decrease recurrences (as in the extremities OO), and newer techniques are evolving for the management of benign tumors.

DIAGNOSTIC AND THERAPEUTIC CONSIDERATIONS IN WELL-DIFFERENTIATED LIPOSARCOMA WITH AREAS OF BONY AND CHONDROID METAPLASIA

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The liposarcoma is a very common malignant tumour, and it is the second one for incidence following to the fibrous malignant histiocytoma. It affects both sexes with the same frequency, usually after 40 years old, even if it can arise in all the ages. It is localized mostly to the extremities, in particular in thigh and the popliteal fossa, but also to the back and in the retroperitoneum. Well-differentiated liposarcoma is a low grade malignant tumour, with high incidence of local relapse and low tendency to metastasis. The volume is variable, and sometimes these lesions can reach remarkable dimensions. The presence of mature fatty cells and mixoid or fibrous tissue is peculiar to atypical lipomatous tumours. The Authors report a case of a 76 years-old woman with a not hurting soft tissue mass with some solid areas in the anterior medial side of left thigh. Tumour was grown slowly in about 10 years. X-Ray pointed out areas of ossification in the context of the mass, while MRI showed typical aspects of adipose tissue. Lesion of 28 cm x 15 cm of dimension and 4 kg approximately of weight was en bloc excised. Histology revealed the presence of not malignant bony and chondroid areas within the well differentiated liposarcoma. The Authors focussed the importance of studying the histologically different areas within well differentiated liposarcoma in order to differentiating metaplastic foci from centres of dedifferentiation in extra skeletal condrosarcoma or osteosarcoma that obviously have therapy and prognosis.

SESSION 0-16

UPPER LIMB I

SONOGRAPHIC EVALUATION OF BICEPS AFTER BRISTOW-LATARJET PROCEDURE FOR SHOULDER INSTABILITY

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The aim of this study is to evaluate the size of the Biceps muscle after Bristow-Latarjet procedure for recurrent dislocation of the shoulder.
Methods In this retrospective case-control study, we compare a group of 26 patients (Group A, subdivided in group A1 - patients operated in dominant limb - and group A2 - in non-dominant limb), who underwent Bristow-Latarjet procedure, and a control group (Group B) of 23 people with no shoulder diseases. We use in all cases a US machine (ATL 5000 HDI, probe 4.2 MHz) to examine and determine Biceps section Area rate (BA) and Biceps Echogenicity rate (BE) between the dominant limb and the non dominant limb. Statistical analysis is performed with SPSS 13.0 and we use Mann-Whitney test to compare group A and B.
Results No significant values were found as regards to BA and BE differences, in case-control analysis. The probability level for statistical analysis was set at $p<0.05$.
Conclusions Bristow-Latarjet (BL) procedure for recurrent dislocation of the shoulder seems not to change the size and the ecographic patterns of the Biceps muscle.

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RANDOMIZED CLINICAL TRIAL COMPARING THE EFFECTS ON SHOULDER FUNCTION OF SINGLE ROW OR DOUBLE ROW SUTURE ANCHOR REPAIR

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Background Restoring of anatomic footprint may improve the healing and mechanical strength of repaired tendons. A double row of suture anchors increases the tendon-bone contact area, reconstituting a more anatomic configuration of the rotator cuff footprint.
Materials and Methods We recruited 60 patients. In 30 patients, rotator cuff repair was performed with single row suture anchor technique (Group 1). In the other 30 patients, rotator cuff repair was performed with double row suture anchor technique (Group 2). 8 patients (4 in the single row anchor repair group and 4 in the double row anchor repair group) were lost at follow up.
Results 8 patients did not return at the final follow up. At the 2 year follow-up, no statistically significant differences were seen with respect to the UCLA score and ROM values. Post-operative MR arthrography at 2 years of follow up in group 1 showed intact tendons in 14 patients, partial thickness defects in 10 patients and full thickness defects in 2 patients. In group 2, MR arthrography showed an intact rotator cuff in 18 patients, partial thickness defects in 7 patients, and full thickness defects in 1 patient.
Discussion Recent studies focused on the original insertion anatomy of the rotator cuff tendons and anatomy of the surgically reconstructed insertion, suggested that restoring of normal anatomy of rotator cuff footprint may improve the healing and mechanical strength of repaired tendons.
The footprint cannot be adequately restored with a single row of suture anchors, while an anchor suture arthroscopic repair technique based on a double row of suture anchors which increases the tendon-bone contact area restores the anatomic rotator cuff footprint.
Conclusions Restoring the anatomical footprint is appealing, but in our work we did not found a better clinical functional outcome in patients underwent double row suture anchor technique versus single row suture anchor repair.
However double row repair excelled in structural outcome when compared with single row repair.

ULTRASOUND ASSISTED NEEDLING OF CALCIFYING TENDINITIS OF THE SHOULDER

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Background Calcifying tendinitis of the shoulder is a frequent cause of shoulder pain. The treatment of this disease is still controversial. Conservative treatment still represents the gold standard. The aim of the study is to highlight the value of ultrasound assisted needling of the cuff in patients resistant to conservative treatment of calcifying tendinitis.
Materials and Methods From 2005 to 2007 we treated, with ultrasound assisted needling of the cuff, 213 patients affected by calcifying tendinitis of the shoulder. We excluded from this study all the patients already treated with shockwave therapy and steroid injections. We selected 100 (46.9%) of patients (mean age 37 years, females 73%, males 27%). Calcium deposits were classified for: dimension and localization 1, ultrasound and X-Ray shape 2, 3. SST and Constant scores were used for follow-up examinations associated to ultrasound and X-Ray imaging.
Results All the calcium deposits of this study have a mean dimension of 1.5 cm, in 52 cases the affected tendon was supraspinatus, infraspinatus in 35 cases, in 11 cases subscapularis tendon and in 2 cases teres minor. Calcium deposits were classified in A type 42%, B Type 20%, C Type 21%, D type 17%. 90 % of patients obtained a pain relief. Constant score increased from a mean of 25 points to 65 points (57 to 65). SST score increased from a mean of 4 to 7. In 70 cases (70%) calcium deposits disappeared. The worst results were obtained in patients affected by calcifying tendinitis of the infraspinatus and of the subscapularis and in calcium deposits type D. In 15 cases (15%) the persistence of the symptoms lead us to arthroscopic surgery. No cuff lesions were detected at follow up ultrasound examinations.
Discussion and Conclusions Outcomes of ultrasound assisted percutaneous needling of the cuff in case of calcifying tendonitis of the shoulder permits us to assume that this is a valid therapeutic approach. This technique increases the number of the good results obtained without a surgical approach and we suggest its use before a surgical approach.
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OUTCOME OF SHOULDER REPLACEMENT IN PROXIMAL HUMERAL FRACTURES

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Background Shoulder prosthesis is generally indicated in shoulder osteoarthritis and in selected three or four-part fractures of the humeral head.
The outcome of shoulder replacement in proximal humeral fractures has been studied in large series, but there is no general agreement and no clear prognostic factors exist. Moreover, reported clinical outcome are not comparable with the outcome in shoulder replacement for osteoarthritis. Many are the variables which influence the final clinical outcome, such as tuberosity healing, rotatory cuff repair and function, difficulties in prosthesis positioning for the lack of physiologic landmarks and bone quality.
The literature is relatively poor of data on the outcome of these procedures.
Materials and Methods The aim of this prospective study is to evaluate the outcome of 40 patients undergoing to shoulder emiarthroplasty for proximal humeral fractures. Quality of life assessment evaluated through SF-36, specific shoulder patients perspective data through DASH and Simple Shoulder Test and objective parameters in term of active and passive ROM and muscles strength were correlated to surgical and anatomo- pathologic data. Prosthesis position, the height and version of the stem, evaluated through CT scan, as reported in Literature, and an accurate assessing of preoperative picture including fragment measuring on CT scan were studied and correlated whether with the other side or with subjective and objective data. A rigorous statistical analysis was performed.
Results No statistically significant correlation between prosthesis position and subjective outcome were detected. Different data were found for objective data, that appear correlated with stem position.
Conclusions In literature there is no paper about these aspects of shoulder replacement.
The authors believe that better knowledge of correlation between outcome and technical aspects in shoulder replacement could be important to define surgical practice criteria.
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OUR EXPERIENCE IN THE FRACTURE SHOULDER PROSTHESIS

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Background Despite the tendency to vary selected indications, the fracture shoulder prosthesis is still essencial in some cases.
Materials and Methods From 2002 to May 2006 we have implanted 38 shoulder prostheses: 36 were acute fractures, 2 osteosynthesis failures (type 1 and type 3 for Boileau), 20 cases concerned the main limb. We have implanted 32 cemented endoprostheses (Bigliani – Zimmer), 5 inverse prostheses (2 Anatomical – Zimmer; 3 SMR-Lima), 1 arthroprosthesis (SMR-Lima). The group (34 women and 4 men) had a high average age (78.68), despite a young polytraumatized man (32 years old) affected by pseudoarthrosis and with a wide cuff injury after osteosynthesis operated in a different hospital and that we have treated with a inverse prosthesis.
Results and Discussion We have radiographically and clinically revised 31 patients (Constant score and Simple Shoulder Test) with a average follow-up of 22 months (max. 50, min. 9). The absolute average Constant score was 63 points. 77% of patients was satisfied-very satisfied. We report lack of articular dislocations and mobilization of the components; 3 cases of inferior subdislocation due to a insufficient height restoration, 4 asymptomatic cases of partial reabsorption of the tuberosities. We report frequent peri-prosthetic ossifications of mild entity. In inverse prostheses we report very good articular recover in elevation and abduction and limited recuperation of the rotations.

Conclusions According to the literature we report on the whole good functional results but variable results in anatomical prostheses. These ones show traces of the technical difficulties (reconstruction of the tuberosities and re-establishment of the right height) and of the scarce compliance of the elderly patient during the rehabilitative phase. Concerning the inverse prostheses we point out that the functional recovery is faster and more constant except for rotations, that's why we are thinking to associate prostheses with muscular transfer in the future. In the two secondary prostheses we report a very good improvement of the range of motion and the satisfaction of patients.

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STATISTICAL SIGNIFICANCE OF RESULTS AFTER TOTAL SHOULDER ARTHROPLASTY

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Background Shoulder osteoarthritis is estimated to affect up to 32.8% of patients over the age sixty years. Arthroplasty is advised as the standard treatment for advanced osteoarthritis. Goal of this study is to check the statistical significance of results after shoulder anatomical arthroplasty.

Patients and Methods From January 1999 to December 2002, 30 cemented Total Shoulder Arthroplasty (TSA) have been performed at our Shouder and Elbow Surgery Unit. Surgery was carried out under combined scalene block and general anaesthesia. Pre and post-operative values of Constant-Murley score have been compared by three independent observers at a minimum of 4 years follow-up. Statistical analysis included paired Student t test. Confidence Interval (CI) on mean difference was built using t distribution. For CI95% ? value is 0.05 (statistical significance 5%). Bravais-Pearson r Correlation Coefficient (PCC) analized interobserver variability.

Results Comparision of Constant score values showed statistically significant results for every subscores:
DLA: [(CI95%: 9.03; 8.51); (Student t Test: 5.95); (p<0.01)]
ROM: [(CI95%:24.65; 25.48); (Student t Test: 3.43); (p<0.01)]
Pain: [(CI95%11.01; 10.10); (Student t Test: 4.48); (p<0.01)]
Strenght: [(CI95%: 5.02; 5.91); (Student t Test: 5.31); (p<0.01)]
Total score: [(CI95%: 48.94; 47.87); (Student t Test: 2.74); (p<0.05)]
PCC fell within 1 value highlighting poor variability for every independent observation.

Discussion In this paper arise a positive trial balance in patients treated with TSA; they referred satisfaction for DLA and strenght restore. Pain relief was found in 90% of patients.

Conclusion This study emphasizes the role of statistical analysis for a critical approach to the results of shoulder replacement in order to understand the real improvement in quality of life of patients who underwent to shoulder arthroplasty.

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THE SHOULDER RESURFACING PROSTHESIS: OUR EXPERIENCE

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II Clinica Ortopedica; Pisa, Italy

Background We illustrate some passages of surgical technique related to the implant of the resurfacing prosthesis of the shoulder Durom™ Shoulder Cup.

Materials and Methods Besides the classical surgical indications (young subject with primitive arthrosis and integrity of the rotator cuff) we have begun to use the Durom™ Shoulder Cup also in more aged subjects following the same indications of the younger patients. We have revalued 20 patient (among them a bilateral case), with a maximum follow-up of over 3 years.

Results The Patients are revalued radiographically and with a clinical-functional evaluation, with the Constant score. We have obtained good results in over the 80% of the cases.

Discussion and Conclusions In our experience we believe that this type of implant is very interesting above all for some peculiarities: simple and precise instrumental, short surgical times, "minimally invasive" technique, reduced blood loss, easy conversion in standard prosthesis and precocious functional recovery. Moreover we have obtained satisfactory results in patients with a cuff tears arthropathy.

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MID TERM FOLLOW-UP OUTCOMES OF METAL BACK GLENOID IMPLANT

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Since 1996 to 2004, 23 patients complaining about concentric glenohumeral arthritis underwent a total shoulder arthroplasty at our institute. One case was a reumatoid arthritis (RA), 3 cases were posttraumatic arthritis and the remaining 19 were primary arthritis.
All the patients were operated on by a single surgeon. There were 12 female and 11 male with a mean age at time of surgical procedure of 60.5 years.

At the preoperative time, shape of glenoid erosion was classified according to Walch criteria using an MRI standardized protocol. We found 18 A1-A2; 4 B1 and 1 B2.
The MRI allows us also to evaluate the rotator cuff. In no case there was a rotator cuff tear. Twenty-two cases had a grade 0–1 of fatty degeneration while the patient affected by RA was a grade 3.
We implanted a total shoulder arthroplasty with a press fit uncemented humeral stem and a metal back uncemented glenoid. In particular, glenoid implant was a titanium alloy shell with hydroxyapatite coating. The glenoid has a slightly covex metal-back glenoid surface and a concave glenoid-polyethylene surface in order to reproduce the normal concave anatomy of the glenoid with a non conforming and a less constrained interface.
Initially the stabilization is granted by 2 screws, but the main stability factor is the big hollowed central peg.
The patients were evaluated radiologically with a true postero-anterior x-ray view at a mean follow up of 5.2 years (min 2 year) by an independent observer. In particular the positioning of the implant and the presence of radiolucent lines were evaluated.
The glenoid component was judged at risk for radiological failure when complete lucent line surrounding the implant was >2mm.
No cases of polyethylene-glenoid disassembly were found.
In 3 cases (14%) the superior screw was outside the glenoid bone without any evidence of radiolucent lines.
In 5 cases (21%) radiolucent lines < 2mm with reactive bone sclerosis near the peg were observed and in 2 of these cases there was also a resorption area near the superior screw.
In the other 15 cases (65%) no radiolucent lines were observed.
The interface polyethylene-glenoid is strong enough and the shape of the glenoid component grant a correct distribution of the load. The main stabilization system is the central peg and it provides a good integration between glenoid and bone. A larger series and a longer follow up is need to better define if this glenoid component can assure a safe implant.

SPRENGEL'S DEFORMITY OF THE SCAPULA

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Background Congenital high scapula is a rare disorder characterized by failure of descent of the scapula. The anomaly has been called Sprengel's deformity since 1891 when Sprengel described 4 cases. In 30% of cases the deformity is accompanied by an omovertebral bone which articulates between the medial border of the scapula. In this study we go over the literature and we describe a case.
Case Report Clinical and 3-D CT findings in a case of congenital high scapula are presented.
Discussion The elevation of shoulder was reduced of 40°. The scapula was longer and narrower than normal and was rotated on the coronal plane so that the glenoid surface look caudally.
Conclusions Sprengel's deformity is a bone anormality with clinical relevance on shoulder function. CT scanning with 3-D reconstruction is an accurate method to study the bone morphology and plane the appropriate treatment.

THE SNAPPING SCAPULA

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Background The "snapping scapula" is a rare condition that affects young patients characterized by painful scapula motion and "crepitus". Etiology can be brought bach to abnormal bony anatomy such as osteochondroma, exostoses, Luschka's tubercle, deformity after scapula or rib fractures; soft tissues pathologies has been advocated when produce chronic scapulothoracic bursitis (G/O instability, impingement syndrome, cuff tears).
Patients and Methods 5 (12.5%) of the 40 outpatients with snapping scapula, 3 female and 2 male, with a mean age of 25 years (19–38 years) underwent operative procedure. Preoperative imaging included Rx and CT (axial and 3-D reconstruction). Results assessment: clinical examination ("crepitus" and ROM) and VAS scale (min: 0; max:10) for pain. Surgery was carried out under scalene block and general anaesthesia with patient in lateral decubitus. Open surgery was undertaken in 3 cases (60 %), arthroscopy in 2 cases (40%). The goal of the treatment was to remove the scapulothoracic bursa and bone abnormality.
Open technique Incision at medial border of scapula from the level of the scapula distally. The dissection is between Rhomboid Major (RM) and medial scapula border to excise the scapulothoracic bursa and underneath bone.
Arthroscopic technique Using the landmark from the scapula and landmark created by using the superior (Bell) portal, the resection of superomedial scapular corner has been performed reducing the risk for iatrogenic nerve damage.
Results At a mean follow-up of 2 years, patients who underwent open surgery referred pain relief with a mean increase of 5 points to VAS scale ($p<0.01$). ROM increased from preoperative to postoperative without significant difference ($p>0.05$). The cases arthroscopically treated had good results for pain ($p<0.05$); partial persisting of "crepitus" and no difference in ROM has been observed
Discussion and Conclusion Snapping scapula is disorder rare and not easy to diagnose. Clinical examination and CT allow us to identify the etiology and to choose the best therapy. Arthroscopical approach is a good option for its better cosmesis, less aggressiveness and lower cost of hospital confinement.
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NO ADVANTAGES IN REPAIRING A TYPE II SLAP LESION WHEN ASSOCIATED WITH A ROTATOR CUFF TEAR IN PATIENTS OVER 50

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Background Several studies the efficacy of arthroscopic repair for Type II SLAP lesions without other associated lesions, but the only data reported on the association of arthroscopic repair of Type II SLAP lesion and rotator cuff tears involve young and active patients. No studies have been focused on patients over 50.
Materials and Methods We recruited 121 patients older than 50 years in whom a symptomatic rotator cuff tear had failed nonsurgical management and was affecting daily activities. The lesions of the rotator cuff and Type II SLAP lesion were confirmed at arthroscopy, and follow-up was at least three years.
We assigned them retrospectively to one of the two groups: Group 1 underwent arthroscopic repair of the rotator cuff and repair of the type II SLAP lesion. Group 2 underwent arthoscopic repair of the rotator cuff tear and a tenotomy of the long head of the biceps.
Results There was statistically significant difference in total postoperative UCLA scores and ROM when comparing the two groups postoperatively ($p<0.05$).

Discussion Several surgical techniques to repair superior labrum anterior to posterior (SLAP) lesion have been developed. Arthroscopic management has been recommended for some SLAP lesions. Although good results have been reported with debridement alone for type I and type III lesions, surgical repair is preferred for type II lesions when the biceps anchor is unstable.
Moreover, the findings associated with Type II lesions differ according to the patient's age: Type II lesions in patients 40 years of age or younger were associated only with a Bankart lesion, whereas those in patients older than 40 were associated with a supraspinatus tear and osteoarthritis of the humeral head.
Several studies the efficacy of arthroscopic repair for Type II SLAP lesions without other associated lesions, but the only data reported on the association of arthroscopic repair of Type II SLAP lesion and rotator cuff tears involve young and active patients. No studies have been focused on patients over 50.
Conclusions We compared the clinical outcome of patients over 50 affected by the association of rotator cuff tears and Type II SLAP lesion, in whom both the defects were repaired, or the rotator cuff tear was repaired and the long head of the biceps tendon was tenotomized. In our hands, the association of rotator cuff repair and biceps tenotomy provides better clinical outcome compared with the association of Type II SLAP lesion repair and rotator cuff repair.

SESSION O-17

UPPER LIMB II

MECHANICAL DISTRACTION FOR THE TREATMENT OF POSTTRAUMATIC STIFFNESS OF THE ELBOW IN 100 ADULT PATIENTS

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Aim of the Study One hundred consecutive patients who had posttraumatic stiffness of the elbow were treated by closed intraoperative distraction of the elbow joint followed by monolateral external fixation with motion capacity after a prospective standardized protocol.
Methods After intraoperative distraction (humero-ulnar Distraction fixator screws via a *t*-clamp in the olecranon; DAF Orthofix, Italy) and a subsequent relaxation phase, mobilisation of the elbow joint under distraction (Elbow fixator Orthofix, Italy) was employed for a mean of 6 weeks. Operative release of ligaments and joint capsule was not performed routinely, resection of heterotopic bone formation when necessary via limited approaches. In all patients ulnar nerve decompression was performed at the index operation.
Results The mean preoperative arc of total motion was 36 degrees. At follow-up examination, of all patients, the mean arc of total motion was 108 degrees. All patients were followed for fourty- eight months or more (mean 64 months) and were satisfied with the results of the procedure. At final follow-up the mean Morrey Performance Index was 88 (70 to 96): This translated into four fair, 55 good and 41 excellent results. Twenty- one patients developed radiologic mild degenerative changes. There were no deep infections or pin track infection. There were two complications in one patient, notably the disruption of fixator pins of the ulna requiring resiting and ulnar-nerve paresthesia managed by revision ulnar nerve decompression.
Conclusions Closed distraction of the elbow joint followed by monolateral external fixation with motion capacity shows gratifying results wit h a moderate to low rate of complications.

JOINT REPLACEMENT WITH THE COONRAD-MORREY SEMI-COINSTRAINED IMPLANT

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Background Since 1995 we performed 48 prosthetic replacements of the elbow joint in 45 patients. The main indication for surgery was rheumatoid arthritis followed by articular fractures and secondary post-traumatic arthritis.
Materials and Methods In all cases but one we used a Coonrad-Morrey semiconstrained prosthetic device implanted through a posterior surgical approach. The ulnar nerve was always transposed.
Results 34 patients were reviewed. All patients but two were subjectively satisfied. Post-operative R.O.M. had an average increase of 40°. 4 patients showed an ulnar neuropathy which resolved spontaneously. Revision of the ulnar component was necessary in one case for aseptic loosening. A wound dehiscence was treated with a muscular rotation flap in one case. In two cases (A.R.) septic complications required prosthetic revision.
Conclusions Total elbow prosthetic replacement provides pain relief and improved function in severe articular pathologies. Most common indication is rheumatoid arthritis followed by articular complex fractures and post-traumatic conditions.
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RECURRENT ANTERIOR DISLOCATION OF THE ULNAR NERVE AT THE CUBITAL TUNNEL

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Background Recurrent anterior dislocation of the ulnar nerve at the cubital tunnel represents an underestimated cause of nerve sufferance. Its clinical presentation is similar to the well-known compressive syndrome, but often is characterized by vague symptoms making the diagnosis very difficult confusing with outlet thoracic syndrome, discopathy, leading sometimes the unaware surgeon to treat a wrong disease. Diagnosis can be reached with accurate anamnesis and clinical evaluation. Electric conductions studies are not always useful.
Materials and Methods Clinical evaluation, EMC studies and dynamic sonography confirmed the anterior dislocation partial (22 cases) or total of the ulnar nerve at the elbow in 38 symptomatic patients over 95 operated on from January 2001 to December 2005. All patients have been treated with surgical anterior submuscular transposition.
Results At a mean follow-up of 38.5 months in all cases we registered complete relieve of symptoms. Mean post-op ROM was 177° (elbow ext) and 34° (elbow flex); mean grip strength was 79.2% and adduction pinch 92.5% compared with the contra lateral side. DASH score 22.5.
Discussion Anterior dislocation of the ulnar nerve at the elbow is due to an iper-mobility of the nerve at the cubital tunnel for Osborne's ligament laxity or its traumatic rupture or hypoplasia of the medial epycondile. The repetitive snapping of the nerve over the epycondile sustains chronic irritation of the nerve. Patients complain of different symptoms, sometimes those typical of ulnar nerve compression, but most of time aspecific and vague with EMG studies

negative, with pain referred at the elbow irradiating to the hand or often to the shoulder, in this latter case patients describe a precise painful anatomical area around the spine of the scapula. As this pathology evolves with time and since anterior dislocation of the ulnar nerve involves younger patients than those affected by the most common compression syndrome, we believe that the surgical approach in those patients represents a valid choice after the failure of conservarite treatments.

Conclusions Knowledge of this pathology may help orthopaedic surgeon to make a correct diagnosis avoiding useless treatment. Dynamic sonography represents a valid diagnostic support mostly in those cases with persistent symptoms with negative EMC studies.

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THE ANGULAR STABILITY AND LOCKED PLATES IN THE SURGERY AT THE WRIST AND HAND LEVEL

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The management of fractures with traditional plating techniques has undergone a paradigm shift over the past 20 years. The same principles have been recently applied also at the metacarpal bones.

The locked plates, analogous to rigid internal fixators, can provide relative stability, avoiding soft tissue and vascularity compromise. The key to this new generation of plates is the locking mechanism of the screw to the plate, which provides angular stability and avoids compression to the periosteum. The compressione plating requires absolute stability for bone healing. In contrast, locking plates converts axial loads across the bone to compressive forces across fracture sites, minimzing gap length and strain. On these bases anatomical reduction is not required for bone healing, and tolerable strain (2–10%) can promote secondary bone healing. However, anatomical reduction of the articular surface remains paramount. The possibility in the newly developed plates to fix the screws within a 30° angular range also improved the indication in highly comminuted, unstable metadiaphyseal fractures, permitting a better reduction of the articular surface.

The high stability provides by these plates and the reduction of the vascular damage to the bone, achieves a more rapid healing with callus formation, even in segmentally deficient or osteoporotic bones.

The authors report their experience particularly referring to the original multidirectional locking system that permits to select the angular fixation of the screws within a range of 30°. This system has been applied also to the metadiaphyseal fractures, segmental bone loss, and pseudoarthrosis of the metacarpal bones. The authors present also the angular stability locked plates associated to a preliminary experience in synthetic bone substitutive tissues (granular, segmental, or custom made ones) utilization at the wrist and hand level.

THOMPSON'S SUSPENSION ARTHROPLASTY IN TRAPEZIOMETACARPAL ARTHRITIS: FOLLOW-UP OVER FIFTEEN YEARS

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Background The Authors reports their experiences in the treatment of the arthritis of the trapeziometacarpal joint (TMJ) with Thompson's s suspension arthroplasty.

Materials and Methods Here is presented a follow-up over 15 years,to prove the high efficacy of this treatment.

We have checked 34 patients (24 women 10 males) treated between January. 1990 and March 1992 aged at time between 64–70 years old.We have checked the pain frequency, the grip, the deftness, thumb's lenght, daily function and the Patients' satisfactions according to the Buck-Gramcko score.

On the radiograms we have considered the current space between scaphoid and first metacarpal mean arthroplasty space and mean arthroplasty index), possible symptomatic arthritis in thein the nearest joints and we have compared the currents radiograms with pre and post operatives radiograms.

Results 23 pateients with excellent results, 7 good results, 2 fair results and 2 with poor results for an important loss of grip and occasional pain.

Mean arthroplasty space was about 4.0:2.8 mm, while mean arthroplasty space index was about 1.0:0.07 mm.

Discussion In spite of the years thompson's treatment remains a good solution for arthritis of the TMJ in Eaton's II and III class.

Conclusions We found a great satisfaction in Patients'outcomes we an excellent controll of pain and gain of deftness.

A loss of space between scaphoid and the first metacarpal due to a tendon release in not significance for pain.

This long follow-up is a good indicator for the high quality of the treatment.

PRELIMINARY EXPERIENCES IN SURGICAL TREATMENT OF RHIZOARTHROSIS WITH CMC PROSTHESIS

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Surgery of arthritic trapezial-metacarpal articulation is evolving day by day. Many options have been proposed in the past, producing different and differently evaluable clinical and instrumental results. A lot of materials have been proposed in prosthetic surgery. Recently, different kinds of pirocarbon prosthesis have been introduced in surgeon's operative options. We performed 8 prosthetic substitutions with CMC Ascension prosthesis, positioned previous perpendicular osteotomy of first metacarpal base. Capsular plasty and, if necessary, reefing is always necessary. A postoperative temporary immobilization was performed with a simply cast for 4–5 weeks. CMC Ascension prosthesis is provided with a semi-constrained hemi design with open saddle-shaped head and is cementless implanted. Pyrocarbon should provide with implant durability and stability. Clinical and instrumental early results were good in our first series even if we observed some complications due to an imperfect operative technique. Clinical evidence, subjective and objective (score scales were employed) was good particularly on pain relief. Some strength loss was seen; this was not limiting daily activities. Anatomical and functional details maybe have to be considered and improved. Accurate surgical technique and patient selection is mandatory in order to obtain the best. Physiotherapic continuative end correct assistance is due in all cases. A longer follow up is of course necessary to accurately evaluate real clinical results.

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THE EUROPEAN JOINT SCAFFOLD PROJECT: DEVELOPMENT AND CLINICAL EVALUATION OF BIOREPLACEABLE JOINT SCAFFOLD IMPLANT IN THE TREATMENT OF FIRST CARPO-METACARPAL JOINT OSTEOARTHROSIS

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Purpose The aim of this study is to compare the clinical, radiological and functional results of an innovative bioreplaceable small joint scaffold for the correction of destructed small joints in the rheumatoid arthritis and osteoarthrosis versus silicon implants at the metacarpal and metatarsal phalangeal joints and arthroplasties at the I CMCj.
Materials and Methods The randomised, multi-centre parallel groups study, conducted in collaboration with other rheumatologic, orthopaedic and hand surgery European teams, is based on the treatment of almost 150 patients recurring to a poly-L,D-lactide copolymer (PLDLA 96:4) is smelt-spun to 4-ply multifilaments, knitted to tubular jersey and the knitted tube is rolled to cylindrical scaffold. The authors performed 42 trapeziectomies following osteoarthrosis of the I CMCj, adding the scaffolds in 25 cases, according to a personal surgical technique, and the AbPL arthroplasty in the 17 cases of the controlled group.
Results The preliminary report showed encouraging outcome studies, presenting better results then the controlled group. However, because of the incomplete controlled cases and follow-up (less then 11 months) it's necessary wait since to the end of the study for reasonable results.
Conclusions The joint scaffold for the treatment of the I CMCj osteoarthrosis, added to the stabilization technique proposed by the authors, should lead to an enduring interposition tissue, stabilising the I metacarpal bone, avoiding its proximal migration to the scaphoid, and reducing post-operative tenosynovitis.

IPP JOINT ARTHROPLASTY WITH CHROMO-COBALTO AVANTA IMPLANT. A MULTICENTRIC EXPERIENCE

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Purpose To retrospectively review the surgical technique, clinical indications, postoperative protocols and clinical outcomes of patients who had Avanta proximal interphalangeal (PIP) joint arthroplasty.
Methods From November 2003 to October 2006 a total of 32 joint replacements in 27 patients were performed with a minimum follow up period of 10 months.Indications for surgery included post traumatic arthritis of ipp joint, reumathoid arthritis, osteoarthritis. Contraindications where lack of stability, infections and non reconstructable extensor tendons.
Technique Dorsal approach to the proximal interphalangeal Joint with splitting of extensor tendons was performed in all cases. The Joint surfaces are resected in order to mantain the palmar plate and the collateral ligaments intact.
The final unconstrained prosthetic component is inserted using a press-fit technique.
Reconstruction of extensor tendon is performed.
A new individual postoperative protocol is presented in order to achieve better results.
Results No major complications are reported. In one case surgical management was changed fom unconstrained prosthesis to Swanson prosthesis dur to malposition of proximal component.
For the remaining prostheses we reported significant decrease of pain in all cases, the mean range of motion of the PIP joint improved from 43 degrees to 60 degrees (p=0.001), and the mean grip strength from 169–199 N (p=0.002). On the visual analog scale 85 % op patients were satisfied. Radiographic findings confirmed complete osteointegration of the implant with absence of loosening.
Conclusions The results of this study demonstrate that arthroplasty of IPP Joint is a demanding tecnhique but reduce pain and is functionally superior to arthrodesis.

GUIDELINE IN THE MANAGEMENT OF THE LIFE-THREATENING INFECTIONS OF THE UPPER LIMB

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The infections in the upper extremity induce a variety of problems, including severe life and limb threatening complications. They can progress rapidly and spread to the other areas of the body, even under antibiotic therapy and life-supporting measures.
The authors report their experience in the management of the life threatening infections at the upper limb discussing 8 cases of severe sepsis. The proposed classification ranges from the necrotising fasciitis and gas gangrene to the toxic shock syndrome and various infective diseases, underlining the peculiar aspects of the infections in the immunocompromised population. The cornerstone of the treatment is a multidisciplinary effort in the care of these severe pathologies, in collaboration with the intensive care unit and infectious diseases service in the acute phase, and the physiatrist in the early following phases. The authors propose common guide-lines for the prompt diagnosis and medical and surgical treatment of the potential life threatening infections. The first line medical therapy has been drawn on different bases, according to the general health condition of the patient, newborn, and elderly. Clinical appearance of the soft tissue infection commonly starts with acute cellulitis and lymphedema. By delaying diagnosis or therapy, the pathogenic microorganisms develop progressive and aggressive liquefaction and necrosis of the superficial and deep structures, dissecting the limb along the soft tissue planes. The process can become self-perpetuating and culminate in the release of increasing quantities of systemically acting toxins. Direct invasion "in contiguity" through the vascular and lymphatic systems contributes to the bacterial dissemination and may develop septic thrombophlebitis, septic emboli and/or distant metastatic infections.
During the acute phase of the management supportive care in the Intensive Unit is often necessary, where mechanical ventilation, fluid supply, cardiac monitoring and adequate nutritional support will be provided. This must be added to the prompt, radical and complete removal of the necrotic tissues, necessarily extended beyond the visible margin of the infection until the subcutaneous tissue can no longer be separated from the deep fascia, and to the early antibiotic therapy.
The Hyperbaric Oxygen (HBO) treatment is very useful as an adjunctive to surgery and antibiotics.
Improvements in life-saving procedures extended the goals of the treatment towards achieving maximal preservation of function, highlighting the relevant role of the rehabilitation program and the treatment of the early and late sequelae of the life threatening infections of the upper limb, such as skin defect, stiffness, and tendon and nerve disruption.

SESSION 0-18

ANKLE ARTHROPLASTY AND REVISIONS II

ANTERIOR KNEE PAIN IN TOTAL ARTHROPLASTY

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Total knee arthroplasty is a well-established procedure and has proven to be durable and effective for the treatment of advanced arthritis of the knee joint. Anterior knee pain after total knee arthroplasty is an occasional problem conditioning final result. Causes of anterior knee pain can be inflammation of tendon or bursa, neuroma, patellofemoral problem as patellar clunk syndrome, tethered patella, patellofemoral osteoarthritis, complications of patellar resurfacing. Patellar clunk syndrome is development of a fibrous nodule at the junction of the posterior aspect of the quadriceps tendon and the proximal pole of the patella. With flexion of the knee, this nodule enters the intercondylar notch of the femoral prosthesis. As the knee is extended, the nodule becomes entrapped within the notch as the quadriceps tendon and the patella migrate proximally. Tethered patella is development of fibrous rope around patella.
Whether or not to resurface the patella during primary total knee arthroplasty is still a controversial topic in literature. There are authors who recommended routine resurfacing, some who do not recommend resurfacing and some who suggest selective resurfacing.
Patellar resurfacing can reduce anterior knee pain although new complications can emerge. These complications include component failure, instability, fracture, tendon rupture and soft tissues impingement.
Clinical evaluation of anterior knee pain after total arthroplasty must be accurate and treatment can be conservative (quadriceps strengthening, isometric, stretching of retinacular structures, …) or surgical (arthroscopic lateral release and debridement of fibrous tissues, open debridement or revision arthroplasty).
From May 1989 to December 2006 in 581 total knee arthroplasty we observed 32 cases of anterior knee pain (5, 2%). All of these complications were observed from 6 to 22 months postoperatively. All cases were approached by conservative treatment. In 10 out of 32 cases pain persisted after 60 days of physical rehabilitation. We performed arthroscopic debridement in 6 cases, open release in 1 case, patellar component revision in 2 cases and revision arthroplasty in 1 case.
Anterior knee pain is a complication to evaluate accurately for a correct treatment but is above all a complication to prevent by a correct choice of implant design and proper surgical technique of first implant.

INTRAOPERATIVE EVALUATION OF TIBIAL ROTATIONAL ALIGNMENT IN TOTAL KNEE ARTHROPLASTY. A CADAVERIC STUDY

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Background Rotational alignment of both femoral and tibial components can affect functional results and longevity of total knee replacement (TKR) [1, 2].
In the femoral side, some referencing axes have been established as rotational references. Various techniques exist for establishing tibial rotational alignment during TKR and some authors showed a reproducible line connecting the mid-posterior cruciate ligament (PCL) and the medial edge of the patellar tendon considering an useful anteroposterior (AP) axis for TKR [3].
Purpose of this study is to establish the most precise and reproducible method to obtain the correct internal rotation (IR) of the tibial component comparing the flexion-extension method (FET) with the TKR insert and the rotation of the tibial trail locked (TTL) on the lateral side.
Materials and Methods Twenty cadaver knees were used for testing. Knee replacement surgery with a posterior stabilized system was performed. A digital Calliper slider micrometer was used for all measurements. The AP axis of the tibia and the rotation angle of the tibial components were measured.
Results The angle between the AP axis and the FET method averaged from 5.7° of external rotation (ER) to 7.5° of IR, (SD=4.5°) and the angle between the AP axis and the TTL method averaged from 7.4° of ER to 4.5° IR, (SD=3.4°).
Discussion The FET is dependent to the correct position of the femur component and the flexion-extension gap and the soft tissue balancing should be performed with particular care.
Conclusions We believe the TTL method is easier, but great attention must be taken during the exposure of the lateral compartment of the knee.
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ROTATING HINGED KNEE (RHK) FOR REVISION KNEE ARTHROPLASTY AND TKA

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Introduction The number of revision knee surgery is increasing worldwide due to the great diffusion of TKA and the increasing age of population [1, 2]. Despite the diffusion, this kind of surgery is often complicated because many troubles can occur, like lack of bone stock, ligamentous instability and tissues necrosis in the case of septic revision [2–4]. For these reasons revision implants are more complex than primary implants and provide stability with hinged devices and fixation with long stems, also they have modular components for specific case adaptation [4–6].
Materials and Methods We implanted 31 RHK™ from 2003 (23 females, 5 males, 3 bilateral; mean age 67 years – range from 19 to 79 years) for 25 revisions (19 aseptic loosenings, 3 septic loosenings, 3 TKA ruptures, 1 TKA dislocation) and 6 TKA in instable arthritic knees.
Clinical analysis, according to the HSS (Hospital for Special Surgery Knee Score), and radiological evaluation according to the "Knee Society, Total Knee Arthroplasty Roentgenographic Evaluation and Scoring System" for sings of implant's rupture and mobilization have been performed at regular intervals.
Results 27 patients showed good clinical results, with increased walking ability, acceptable range of motion (100%>95°) and pain relief. Radiological analysis did not show sings of mobilization and rupture of the implants. Of the remaining: two cases needed knee arthrodesis (one for persistence of infection and one after fracture and ligament lesion), one case had a tibial fracture and one had a cutaneous necrosis.
Discussion and Conclusions Revision knee arthroplasty is a high-risk surgey. Correct planning, wide range of instruments and modular implants and knee experience are needed. The RHK revision knee arthroplasty provides complete stability thanks to the hinged mechanism and good fixation to the bone, with cementation of the meta-epyphisis and long press-fit stems. This kind of implant gave to our patients a good recover of functionality; nevertheless in this kind of surgery complications are always severe and can lead to inability or to loss of the knee; in this case biological or non-biological arthrodesis can be the solution. It is mandatory to select and to inform patients before revision knee surgery.

TOTAL KNEE ARTHROPLASTY FOLLOWING HIGH TIBIAL OSTEOTOMY

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Background High tibial osteotomy is an efficient treatment for medial compartment osteoarthritis of the knee; it is used for middle aged patients with high activity levels and can delay the need for total arthroplasty.
The results of total knee arthroplasty after failed high tibial osteotomy are controversies; several authors reported inferior outcomes, but others have concluded that tibial osteotomy doesn't bias following total arthroplasty. The aim of this study was to evaluate the results of failed high tibial osteotomy subsequently converted to total knee arthroplasty and compare the results to group of patients underwere primary arthroplasty; the authors evaluate some of technical problems that a previous high tibial osteotomy can generate, like scar tissue, patellar tendon shortening and changes of proximal tibial anatomy.
Methods 50 total knee arthroplasty performed after a previous closed wedge osteotomy were matched with 50 patients operated with primary knee prosthesis for osteoarthritis. The time from a proximal tibial osteotomy to a prosthesis operation was in mean eight years.
Results The Knee Society clinical and radiographic score system and W.O.M.A.C. evaluation were used to evaluate knees before surgery and at each follow up (average 5 years).
At an average of five years follow up, the clinical results of total knee arthroplasty after high tibial osteotomy were similar to those of primary knee prosthesis.
Conclusions In our study revision of failed proximal tibial osteotomy appears to have more technical difficulties but with overall outcomes that remain comparable at results after primary total knee arthroplasty, so tibial osteotomy is considered a valid option in younger and very active patients with unicompartmental arthritis.

KNEE ARTHROPLASTY RECONSTRUCTIONS IN COMPLEX PRIMARY AND SECONDARY DEFORMITIES

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Background The main goals of knee replacement procedures are pain relief and range of motion restoration, while providing knee stability. In severely deformated knees, or in cases when bone loss is expected (as in tumor surgery), rotating hinged knee prosthesis are the most modern solution [1, 2].
Materials and Methods Between 1995 and 2005, 151 patients with arthritic knees were subjected to primary total knee replacement. Twenty-two patients (25 knees), received a rotating hinged knee prosthesis. Indications were serious varus or valgus joint laxity, important ligament instability, or rheumatic disease. Functional outcome was assessed by using the Knee Society Clinical Rating System (KSCRS).
Results The clinical results for 16 (72.7 %) knees were excellent, 3 (13.6 %) had a good result, 3 (13.6%) was fair. Clinical results revealed a significant improvement in KSCRS from a preoperative 42 points (range 4–62 points) to an average postoperative score of 84 points (range 42–93 points). The patients' average functional levels increased from 9 (range 0–35 points) to 44 (range 0–100 points).
At the middle follow-up (54 months) was a considerable improvement of pain and function.
Discussions The use of a hinged knee prosthesis in patients affected by knee arthritis should be restriceted in patients with severe axial deformities or ligament instability. Multicentrical studies have reported a revision rate of 8% at ten years follow-up, 46% of which were due to aseptic loosening [3, 4]. In our series, only one patient (4%) presented an aseptic loosening at 7 years from surgery.
Conclusions The rotating hinged knee prosthesis provides an acceptable solution for primary total knee arthroplasty in patients affected of rheumatoid disease, varus or valgus joint instability, and bone stock loosening. Because of the presence of the rotating hinge, we obtained an early recover of function.
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PRIMARY TOTAL KNEE REPLACEMENT (TKR) IN PATIENTS WITH HEMOPHILIA: A SINGLE CENTRE EXPERIENCE

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Introduction TKR represent the treatment of hemophilic arthropathy not responding to conservative approaches.
Methods Clinical data on 106 primary TKRs performed at a single Center in 84 patients with hemophilia A or B (7 with inhibitors) were reviewed. Adult hemophiliacs were eligible if they had pain, poor functional range of motion and/or axial deviation. The Hospital for Special Surgery knee-rating scale (HSS), data on knee flexion contracture and range of motion (ROM) were collected before, after surgery and during a long-term follow-up.
Results The median duration of follow-up per implant is 4.7 years (range 0.2–13.2). Four patients died at a median of 6.8 years (range 5.7–9.2) after surgery for causes unrelated to TKR. Thirteen prostheses have been removed after a median of 4.3 years (range 0.7–10.8). The median HSS score were 39 (range 10–72) and 91 (range 60–96) before and at last follow-up visit, respectively. Deep infection occurred in 8 implants (7.5%). Three of 8 patients with TKR infection and 27 of 76 without implant infection had HIV infection (37.5% vs 35.5%).
Conclusions In this series, followed-up for a prolonged period, the higher risk of infectious complications is not associated with HIV infection.

HEMOSEALING IN TOTAL KNEE PROSTHESIS

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Background The aim of this study is to evaluate how a new bipolar radio frequency sealer can reduce blood loss after primary total knee prosthesis (TKP).
Materials and Methods From October 2006 to December 2006, we have analyzed in this prospective study blood loss during and after TKP. The surgical approach was midvastus without ischemic lace. In some patients was used for haemostasis a new bipolar sealer (TissueLink). In all blood salvage for 6 hours postoperative (OrtoPAS, Euroset). Post-operative (PO) program had control of pain, low weight heparin, muscular exercises and deambulation from the first dayPO. We analyzed haemoglobin value before and for 5 days PO, blood loss for 3 daysPO, the circumference of limb on surgical wound and the number of transfusions. For the statistical evaluation were used the paired „t-test‰ with significance set at 95%.
Results In 28 knees it has been used the TissueLink. For the blood loss evaluation, the presence of no homogeneous preoperative haemoglobin led us to analyse the decrease percentage of preoperative haemoglobin (%CHb). The incidence of transfusion (TI; limit Hb<8g/dL) has been related to the preoperative Hb and the age. In prostheses implanted associated to the use of the TissueLink has been a significant reduction of the blood loss. In fact haemoglobin decrease was low (%CHb medium of 19,60 to 1 day PO, 2 3,39 to 2 day PO, 2 6,18 to 3 day PO and

26, 62 to the 5 day PO), the transfusion index was only 14%, with 11% of eterologus blood. We registered reduction of knee oedema of 23% and in the reduction of the pain during rehabilitation of 34%.
Discussion Knee prosthesis is usually related with a slow resumption and high post-operative blood loss. The bipolar sealer Tissuelink denatures proteins heating water, without carbonization. The reduction of blood loss, associated with decrease of oedema and pain promote fast resumption. Other studies remain necessary.
Conclusions The use of a bipolar sealer in prosthetic surgery of the knee is associated with reduction of transfusions and with fast resumption.
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IMAGING IN PAINFUL UKA

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Background Many conditions can determine pain following unicompartmental knee arthroplasty (UKA) surgery. Mostly pain is related to complications such as polyethylene wear, aseptic loosening of tibial component, arthritis in non involved compartments and patellar impingement. In case one of these problems appears, decision is easy and revision surgery recommended as soon as the diagnosis is clear.
Materials and Methods To critically evaluate the painful UKA, the treating physician should perform a thorough history and physical examination, as well as radiography. Nevertheless, in painful UKA, cases where no complication are detectable are not infrequent, neither at physical examination nor at standard X-ray (numerous cases of painful UKA are associated with a normal radiographic appearance), and that could generate doubts in making decision regarding indication of revision surgery. More investigations such as fluoroscopy, sonography, MRI, CT and nuclear scanning are often carried out, but none of them is reported as really effective. Reoperation, without a clear indication, is unwise and frequently associated with suboptimal results. The aim of this study is to review indications and timing of available diagnostic and imaging tools and review the appearance of most commons complications after surgery.
Results and Discussion Furthermore, we experienced the use of CT scanning in patients with unexplained UKA postoperative pain. CT scan evaluates the dimensional congruity of tibial and femoral components, possible conditions of impingement (patellar impingement or impingement between components) and the rotational alignment with much more accuracy than standard radiography. These are possible causes of unexplained pain in the early post-implantation period and could lead to a rapid polyethylene wear, aseptic loosening, particle-induced osteolysis and components subsidence.
Conclusions Periodic repeat evaluations are recommended until the etiology of pain is clearly determined, so to assure the proper timing in indications for revision surgery and for the kind of revision, if mono or total knee.
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UNICOMPARTIMENTAL KNEE ARTHROPLASTY AND INFLUENCE OF ALIGNMENT ON CLINICAL RESULTS

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Background The unicompartimental prosthesis of the knee allows the substitution of the damaged portion of the knee with maximum respect of the ligamentose structures and of the articular biomechanics for the narrow group of patients who are middle way between the corrective ostheotomy and the total knee replacement with regard to their pathology and their functional requirements.
Materials and Methods 31 patients who underwent prosthetic surgery of the medial compartiment of the knee in the Orthopeadic University Hospital of Pisa between September 2003 and December 2006, have been considered in our study. An Allegretto (Zimmer) cemented fixed plate prosthesis as been used in all patients. All patients underwent clinical-functional evaluation (correction of femoral-tibial angle, and alignement of the prosthetic components in anterior-posterior projection and tibial slope) to verify the effectiveness of treatment and the correlation between clinical and radiographic results.
Results The following results have been obtained by evaluation of the Knee Functional Grading System: optimum 72%, good 16%, discret 8%, bad results 4%. The average degree of correction of the femoral-tibial angle was 5.12°. Alignement of the femoral component was correct in 15 patients, and the tibial alignement was correct in 16 patients. The tibial slope was in average 3,36°.
Discussion The aim of our study is to find a correlation between the clinical-functional results to the radiographic evidence so that we can identify the radiographic parameters which mainly influence the short-term results. This study shows that small defects of positioning of the tibial component (alignement and slope) and small defects of correction of the femoral-tibial angle, are well tollerade while alignement defects of the femoral component are more important for the clinical-functional result.
Conclusions This study has shown that for us to obtaine good results, we need a strict patients selection, but the surgeon must respect the joint dynamics. The radiographic results show that most important parameter is the placement of the femoral component. However we think that a simple radiographic study has to be supported by the study of the tridimensional positioning of the prosthesis in order to also evaluate axial rotation defects of both prosthetic components.
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MEDIAL UNICOMPARTIMENTAL VS TOTAL KNEE ARTHROPLASTY PATIENTS PERFORMANCE DURING GAIT: A FOCUS ON MUSCULAR ACTIVITY AT THE KNEE

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Background The lack of the anterior cruciate legament seems to play a major role in the loss of control of the roll back pattern of the condyles on the tibial plateau in TKA patients. Previous works on unicondylar knee artrhoplasty (UKA) demonstrated better gait performance when anterior cruciate ligament was preserved allowing the patients to maintain normal quadriceps mechanics. The aim of the present work is to evaluate UKA patients' knee function during gait compared to TKA with the hypothesis that UKA ensures more physiological knee loading response pattern of movement and a more phasic muscular activation, thus reducing the risk of failure.
Materials and Methods Twenty patients with Oxford/Exactech UKA (mean age 70 (SD 7.9), mean follow-up 2 years) were evaluated by means of a Vicon 612–8 cameras system, two Kistler forceplates and Telemg respectively for knee 3D kinematics, kinetics and muscular activity. Data of UKA were compared to those of a control population of ten healthy subjects and ten patients with TKA matched for age and follow-up.
Results Mean UKA-IKS score at the time of gait analysis was 90. Time-distance parameters evidenced a slight slow gait with reduced stride length and cadence and a symmetric longer stance phase with respect to TKA and controls. Knee kinematics on the sagittal plane showed knee flexion during loading response very close to controls and a reduced but phasic pattern of joint moments on the sagittal plane. Adduction moment at the knee was normal. EMG showed controversy results as some patients had a regular pattern of activation of rectus femoris and hamstrings without co-contraction whereas other patients had co-contraction.
Conclusions Results indicate that UKA allows in most patients a quite normal knee kinematics and kinetics, although some abnormalities persist in quadriceps activation. The presence in most of patients of a regular knee absorption phase during stance controlled by phasis quadriceps activity implies physiological loading at the knee.

TOTAL KNEE ARTHROPLASTY: FIXED BEARING OR MOBILE BEARING PROSTHESIS

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Objective The purpose of this study is to evaluate the biomechanical features of the mobile-bearing total knee prostheses and we report the results of comparing mobile-platform and fixed-bearing total knee arthroplasty (TKA).
Materials and Methods At the Department of Orthopaedic Surgery of the University "Federico II" of Naples a retrospective study was conducted to compare clinical results between a fixed-bearing total knee design (AGC - Biomet Merck) and a mobile-bearing total knee design (TMK - Biomet Merck). Between February 2002 and April 2006, 65 TKA (30 TMK and 35 AGC) were performed in 65 patients. All implants were cemented, while the patella has never been resurfaced. Mean follow-up was 23 months (10–55 months). All the prostheses were performed by the same surgeon. Clinical results were assessed using the Knee Society Scale (IKS score) and the assessment of anterior knee pain using the Visual Analogic Scale (VAS score); moreover all patients have been evaluated by the presence or absence of a "click" in the replaced knee and the level of satisfaction. The quality of the implantation was analysed on long-leg X-rays.
Results Among patients with AGC prosthesis, Functional Score (FS) was 78.3 (preoperatively 54.2) and Knee Society Score (KKS) was 89.2 (preoperatively 44.2); at follow-up of TMK-replaced patients FS was 81.3 (preoperatively 55.6) and KKS was 88.6 (preoperatively 43.2). The degree of subjective satisfaction was excellent and good in 90% of the cases and fair in 10% of patients. No important difference was found on the flexion examination and the radiographic evaluation of the two implanting designs.
Conclusions The results of this study revealed no statistically significant difference at mid-term follow-up between mobile-bearing and fixed-bearing replaced knees.
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EVALUATION OF THE RESULTS WITH TOTAL KNEE PROSTHESES WITH TMT TIBIAL COMPONENT VS CEMENTED

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The aim of our study was to verify clinical and radiographical results at 3 years on 34 patients suffering from primary and secondary gonarthrosis who underwent a TKA with TMT monoblock tibial plate with a porous femoral component.
Patients were compared to a control group of 34 people who underwent TKA with both femoral and tibial cemented components, in order to evaluate any difference in the result.
The choice of material was motivated by the will of using materials as much similar to bone as possible and with major potential for osteointegration.
From March 2003 until June 2007 we evaluated our patients with clinical and radiographical evaluation and referring to HSS in order to evaluate knee functionality, to TKR to monitor the patients' ability in A.D.L, to One-page Knee Society Roentgenographic Evaluation and Scoring System to evaluate radiographical results with a minimum follow-up of 3 years.
The results were statistically analyzed and we compared the data from TMT Group with data from control group with cemented prostheses, with an improvement of clinical and readiographical parameters of TMT Group. No statistical inference was made.

SESSION 0-19

SPINE

HYBRID INSTRUMENTATION WITH 3 OR 4 PEDICLE SCREWS ON THE CONCAVE APEX OF THE CURVE IN POSTERIOR SPINAL FUSION FOR LENKE 1 ADOLESCENT IDIOPATHIC SCOLIOSIS

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Background In adolescent idiopathic scoliosis (AIS) there is still no consensus on the optimal surgical plan for each curve type. Pedicle

screws permit more complex, sturdy and corrective instrumentations than hooks [Suk, 1995; Storer, 2005], but their placement in the thoracic spine is often technically demanding or impossible [Gilbert, 2005], especially in the proximal and convex ones [Smorgick, 2005]. To obtain a reliable and effective surgical protocol, reducing complications but maintaining the biomechanical advantage of pedicle screw constructs for main thoracic scoliosis (Lenke 1), we develop posterior fusion with hybrid instrumentation based on the placement of 3 or 4 pedicle screws on the concave apex of the curve (according to the grade and the stiffness of the deformity), and hooks on the upper terminal vertebrae. We also develop a new kind of rod (called "nested rod") able to prevent any slippage of the linked elements.
Materials and Methods Between January 2003 and November 2005 15 patients with Lenke 1 AIS were treated in our Spine Center using this method. 12 (80%) were female, 3 (20%) male. Mean age was 14.3 (9–22) years. Patients were evaluated by preoperative and postoperative standing radiographs, demographic and clinical data, operative procedure.
Results A posterior spinal fusion was always performed upper the level L4. An average of 10.1±1.6 (8–13) vertebral levels were included in the spinal fusion. Sometimes intraoperative ORBIC CT scan was necessary to correctly place the pedicle screws in the small thoracic pedicles. An average thoracic curves correction of 68.2%±15.4% (31.7%–91.1%) was established using this technique. Among the 9 (60%) patients with 40°–80° curves the mean correction was 66.6%±17.6%, among the 6 (40%) with >80° curves mean correction was 70.4±12.8%. There was no significant difference between the 2 groups (Pv=0.6550). Compared with other reports, our hybrid instrumentations revealed better results than hook constructs, and similar to pedicle screws instrumentations. There were 3 (20%) complications: 1 neurologic deficit; 1 dural tear; 1 wound dehiscences. Most of the patients reported improvement in terms of pain and self image as well as overall satisfaction with the procedure.
Conclusions Hybrid instrumentation with 3 or 4 pedicle screws on the concave apex of the curve and hooks in the upper terminal vertebrae should be considered an effective, safe, and reliable treatment for Lenke 1 AIS. Even in curves >80° our "nested" rod, versus conventional rods, showed superior mechanical property on laboratory tests.

THE SURGICAL TREATMENT OF SCOLIOSIS IN DUCHENNE MUSCULAR DISTROPHY

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Background Scoliosis is observed in approximately 90% of patients with Duchenne Muscular Dystrophy (DMD), after stop walking. The main consequences of the progression of scoliosis are: 1) the impossibility of remaining in a comfortable sitting position; 2) back pain; 3) pressure sores; 4) difficulties in nursing care; 5) worsening of the respiratory deficiency. Several data indicate that conservative treatment with braces or spinal supports is unable to control the progression of the scoliosis, while surgical treatment appears to be the only effective way of treating such a pronounced and rapidly-evolving deformity.
The goal of our study was to evaluate the results of surgical treatment of scoliosis in DMD patients.
Materials and Methods We retrospectively reviewed the records of 33 DMD patients who underwent spinal surgery between 1991 and 2006. A spinal fusion from T2 or T3 as far as the sacrum and transiliac pelvic fixation was always performed. The surgical instrumentations used were: Luque in 25 patients and Plus in 8 patients. Postoperative support with a plaster cast or brace was not used in any patient. The patients were re-examinated 3 months after the operation and then every 6 months; an X-ray was done 3 months, 1 year and 2 years after the operation.
Results At the time of surgery, the mean age was 13.1 yrs and the mean Cobb angle was 45°.The mean postoperative angle was 16°. The mean loss of correction at follow up was 10°. All patients achieved the sitting position within 7–10 days after surgery. Discomfort in sitting position or prolonged back pain were observed in 3 out of 33 (10%) patients. No significant differences in the respiratory function were observed between surgically-treated and control patients. When asked, the majority of patients and their parents (80%) would give again the consent to surgery.
Conclusions Surgery successfully corrected the curve and the pelvic imbalance of DMD patients with scoliosis. This also caused a more comfortable sitting position, an easier application of respiratory aids and a simpler nursing care. All these aspects significantly ameliorated the quality of life for these patients, as also acknowledged by patients and their parents. However, respiratory function was not affected by surgical correction.
Significance We describe the outcomes of spinal surgery in patients with Duchenne Muscular Dystrophy and scoliosis, adding new evidences on the efficacy of the surgical strategy, especially on the quality of life of these patients.

DIRECT SCREW REPAIR FOR SPONDYLOLYSIS - OUR EXPERIENCE ON 90 CASES

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The treatment of spondylolysis in childhood is usually conservative and includes physical therapy, cast immobilization and temporary reduction in sport activities. After at least six mounths of conservative treatment, the persistance of lumbar pain is an indication for surgical procedures.
A lot of surgical thecniques were proposed by many surgeons, the one's that we choose is the isthmical repair with the Buck's technique. This procedure allows the direct repair of the pars defect, using bone autograft and titanium screws.
For the right managment of this patients is very important an adequate radiographic work-up, based pincipally on plain and dinamic radiographyes, TC and MRI scans. This last radiographic examen is foundamental for the evaluation of the discs and, as a consequence, for a right preoperative planning.
Our indications for this procedure are: spondylolysis and very low grade spondylolystesis (at least 4 mm. of slippage), failing of an adequate conservative treatment (six mounths), early age and normal idratation of the intervertebral discs.
The goal of this treatment is to save the Functional Spinal Unit, in order to preserve function and prevent possibly discs degeneration at adiacent levels.
We report our experience on 90 cases (93 levels of isthmic reconstruction) with a mean age of 25 years old (11–36). We observed excellent clinical results on 89% of patients at 5 years of follow-up. The complication rate was 6.4%: 5 pseudoarthroses underwent a removal of the hardware with posterolateral fusion and 1 hardware failure (broken screw).
In addition we reviewed some cases with a control MRI after few years in order to check the discs status at adjacent levels.

RECONSTRUCTIVE SURGERY OF THE ARTICULATION IN THE SPINE. RESULTS IN LUMBAR DISC PROSTHESIS

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The treatment of the low back pain of discal origin has been modified in the last years thanks to the improved bio-mechanical knowledge and therefore to the position which the intervertebral disc has in the unit of motion.
Arthrodesis is a technique which is still applied but the overload of the discs above and below is a common complication.
Herniated disc and disc degeneration are two diverse anatomo-pathological entities, even if sometimes consequential, which are treated differently.
It is very frequent today to meet young patients with severe low back pain without root soreness.
X-rays often indicate the reduction of the discal height with retrolisthesis.
MRI demonstrates the massive degeneration of the disc which is often diagnosed as discitis and it could provoke a medical-legal problem.
In between conservative treatment and arthrodesis we think that the disc prostesis has an important role.
Since November 1998 we began this treatment with selected cases.
The patients underwent the following diagnostic exams: standard and functional X-rays, MRI, CT. Discography was used in the first cases but then it was abandoned because of the difficulty of having an exact clinical answer.
From November 1998 to December 2006 we implanted 48 lumbar disc prostheses on 32 women and 16 men. Age: min. 21 years old – max. 58 years old (mean age 34 y). Levels: 2 cases L3/L4, 31 cases L4/L5, 15 cases L5/S1.
Type of prosthesis: in 4 cases we used Charitè (Link), in 9 ProDisc (Aesculap) and in the remaining 35 cases Maverick (Sofamor Danek) using the frontal instrumentation (28) as well as with the oblique (7).
The follow-up starts from a min. of 5 months to a max. of 8 years. In 3 cases we had a paresis of the abdominal recti muscles. In one of them was necessary to re-operate the abdominal wall with plastic surgery.
In 4 cases there was a sufferance of the paravertebral sympatic chain with an alteration of the termical sensibility of the inferior limb. There were no problems with the pre-sacral plexus.
The pain which was present before the operation was solved in 95% of the cases.
In 6 cases we had an asymmetric positioning of the prosthesis in AP views with no clinical consequences.
We retain there are no big differences between the three kind of prosthesis, even if Maverick and ProDisc are the easiest for the method of implantation.

SECONDARY ARTHRODESIS AFTER LUMBAR DISC PROSTHESIS FAILURE

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Introduction Lumbar disc replacement is one of the challenges of the near future. Its principle seems to be adapted for the treatment of lumbar discopathy. Since november 2003 until march 2007, we implanted 120 disc prosthesis; 4 unsatisfying results (3,3%) led to a revision by posterior fusion. The purpose of this study was to analyse clinical and radiographic evolution to better understand contra-indications of lumbar disc replacement.
Materials and Methods We utilized a non-constrained prosthesis (Mobidisc®) in 120 patients. The 4 failures were 2 women and 2 men (40–47 years old) operated for low back pain. The preoperative MRI showed a Modic I or II signs. The discography led to a positive memory test in all cases. The operated levels were: L3/L4 and L4/L5, L3/L4 (SB Charité® L4/L5 before), L4/L5, L5/S1. Low back pain recurred during the first 3 months. The revision surgery was a posterior spinal fusion after 15 to 32 months. We reanalysed the preoperative computed tomography. A facet joint infiltration was performed before spinal fusion. A joint biopsy was done during the spinal fusion. We measured lordosis, segmental range of motion and prosthesis position on pre- and postoperative anterior-posterior, lateral and dynamic radiographs.
Results Computed tomography did not evidence facet joint degeneration. The facet joint infiltration with lydocaine and corticosteroids alleviated low back pain in all cases. The biopsy confirmed a beginning osteoarthritis of facet joints. Prosthesis positioning was centred in 3 cases; the L5/S1 prosthesis was lateralised by 4 mm. Average lordosis was 44° (36°–60°) preoperatively, 46° (38°–66°) postoperatively. Segmental lordosis was increased by 3° at L3/L4 and L4/L5, 6° at L5/S1. Average flexion/extension range of motion was 4° (2°–6°). No wrong sagittal position was observed.
Discussion and Conclusions Overall results of all patients treated by lumbar disc replacement were good at short-term follow-up with an average flexion/extension range of motion of 4° at L4/L5 and 9° at L5/S1. The critical review of the failures showed that a non constrained prosthesis may lead to a decompensation of a beginning facet joint osteoarthritis by means of increasing lordosis and segmental mobility. Computed tomography does not seem to be sufficient to diagnose minimal osteocartilagenous degeneration. A preoperative facet joint infiltration could be helpful to precise the indication between lumbar disc prostesis or posterior arthrodesis in the treatment of lumbar discopathy.

MINIMALLY INVASIVE APPROACH IN THE TREATMENT OF LUMBAR SPONDILOARTHROSIS

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Background Comorbidity associated to the open spine surgery are opening the way to the diffusion of the mininvasive surgery. A shorter skin incision is not the only advantage of this approach; the limited muscle dissection reduces dramatically the postoperative pain and improve the blood amount for the wound healing. If this fact was already clear in the treatment of the herniated disc, swithcing from macro to micro approach, it had a greater impact using this mininvasive approach for the treatment of the major lumbar spondiloarthrosis.
Materials and Methods From January 2005 seven patients referred to our department underwent lumbar spine fusion by a mininvasive approach. All patients were affected by a mild or severe discopathy, insensitive to the conservative treatment (drugs and physical therapies). In all cases is performed an interbody fusion by cages and bone grafts associated to a posterior fixation. Three were females and four males, all relatively young (mean age 28.4 y.) and with heavy jobs.
Results All patients walked in the second day after surgery and went home between the fourth and fifth day. None needed blood transfusions. All patients had an improvement from the preoperative situation (VAS pre-post difference=6.2; SF36 pre-post bodily pain improvement [24.1–55.4, p=0.0007] and funcion [15.5–51.3, p=0.0009]). All patients came back to the same job. Results were maintained during follow-up (mean 9.4 months).
Discussion The development of mininvasive surgical techniques and of biomaterials properly designed for this kind of approach to realize the posterior pedicular fixation, and the posterolateral and interbody fusion permit today to treat discopathy and grade I spondylolisthesis.

CERVICAL DISC REPLACEMENT: CRITICISMS, REAL INDICATIONS AND CAUSES OF FAILURE

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Background In the last 30 years, cervical fusion has been considered as necessary and functionally indispensable after decompressive surgery [1]. On the opposite, in recent years, a big effort has been addressed toward the implant of disc replacement devices for segmental motion preservation, and adjacent level degeneration avoidance [2].
Materials and Methods A critical review of the literature on cervical arthroplasty and biomechanics, and personal anatomical and clinical studies is presented.
Results
- Posterior Longitudinal Ligament– Intervertebral Disc is the major stabilizing element of the cervical spine; this is often interrupted during cervical osteophyte removal [3].
- In the cervical spine only 40% of range of motion (ROM) is sustained by the C3-C7 cervical vertebrae [4], so a fusion of one or two levels in that segment will lead to minimal effects on cervical spine ROM.
- Differently from other studies [2], in our casuistic all disc degenerations adjacent to a previous fusion were clinically asymptomatic [5].
- Complications in cervical replacement surgery range from loss of ROM due to periprosthetic ankylosis, persiting neurological deficits or new deficits, device mobilization and failure, and also the worsening of cervical kyphosis when the kyphotic sagittal alignment is encountered preoperatively [6].

Discussion and Conclusions Taking into account also the short follow-up of the clinical studies, cervical disc replacement technology cannot be considered as substitutive of cervical fusion in all cases; moreover, even in candidate patients, surgical indications should depend on the intraoperative findings of the patient.
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MEDIUM-TERM RESULTS OF BRYAN CERVICAL DISC REPLACEMENT

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Background Clinical reports of success of cervical total disc replacement for symptomatic degenerative cervical disc disease are encouraging but are also quite preliminary [1–3].
Materials and Methods 25 Bryan cervical disc replacements were implanted in 17 patients with symptomatic cervical radiculopathy and/or myelopathy in our Spine Center between April 2002 and February 2005. Mean follow-up period was 42.24±10.56 months (24–58). Mean age was 41.4±9.4 years (27–57). 7 (41.2%) patient had 1-level replacement; 8 (47%) patients had 2-level replacement, 2 (11.8%) patients had 1-level replacement associated with a single adjacent level fusion. Replaced discs were C4-C5 in 2 (8%) cases; C5-C6 in 14 (56%); C6-C7 in 9 (36%). Clinical and radiological data were prospectively collected and retrospectively analyzed.
Results There was no statistical difference between preoperative (-1.23±4.46 degree) and postoperative (-0.51±6.86 degree) mean segmental angle (Pv=0.6219). There was no statistical difference between preoperative (9.03±11.04 degree) and postoperative (9.58±7.39 degree) C2-C7 cervical sagittal angle (Pv=0.8700). Mean range of motion increased significantly after surgery, from 6.2±4.54 degree to 9.57±5.26 degree (Pv=0.0045).
Complications were 1 (5.9%) incomplete decompression necessitating revision, 1 (5.9%) dysphagia, 7 (41.2%) decreased but continue pain, 2 (11.8%) transitory dysphonia, 1 (5.9%) junctional pathology. Neck Disability Index improved from 40.00±7.57 to 22.71±15.58 (Pv=0.0003). Visual Analog neck pain Score improved from 65±18.71 to 44.29±28.95 (Pv=0.0040). 88.23% (15/17) of patients were satisfied.
Discussion and Conclusions Cervical disc arthroplasty is a good technique in the treatment of cervical radiculopathy and/or myelopathy, but it have to be considered still in the stage of evolution. Its advantages are maintainment or improvement of the cervical ROM, especially in young patients, with good reduction of neck pain. Disadvantages are the accurate selection of patients for its success, and the high rate of complications, also due to the surgical approach. For the first time in the peer-reviewed literature 1 of our patients showed junctional pathology. More medium- and long-term results are necessary to make conclusions about efficacy and safety of cervical disc arthroplasty.
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POSTERIOR SHORT INSTRUMENTATION FOR THE TREATMENT OF THORACO-LUMBAR SPINE FRACTURES

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The incidence of spinal injuries has been increasing over the last decade and the vast majority of these are the consequence of high-energy trauma due to a road traffic accidents, falls and sports injuries.
Mechanical failure of the spinal column following high-energy trauma frequently occurs at the thoracolumbar junction as a result of its transitional anatomy and biomechanical environment.
In order to well analize and consequntly understand a spinal fracture, it is very important to apply a comprehensive and prognostic classification system. In our opinion the most usefull classification is the one proposed by Magerl et Al in 1994. The AO classification associated with the McCormack classification points system are, in our hand, the best way to better analize and consequently treat a spine fracture.
We report our experience in the treatment of thoracolumbar spine fractures on 18 Patients treated with posterior approach from January 2004 in our Department.
The casistic is composed of 12 type A fractures (A1=2, A2=1, A3=9), 2 type B fractures (B1=1, B3=1) and 4 type C fractures (C1=3, C2=1); 15/18 had a load-shearing classification system of less then 7 points.
All patients (14 male and 4 female) underwent a posterior spinal short segment and monosegmental instrumentation for thoracolumbar injuries caused by high energy trauma.

The mean age of the patients was 45 years old (28–63) and 13 of them (72%) had a T12 or L1 fracture. The mean spinal canal stenosis due to a retropulsed fragment was 25.6% (0–56,3) with a mean kyphotic deformity of 11.4° Cobb (0 – 17) measured at the end plate above and below of the fracturated level.
All patients underwent a short-segment spinal instrumentation with posterior wall indirect reduction (ligamentotaxis) and kyphotic deformity correction. One Ppatient required a direct canal decompression with a two levels laminectomy. Two patients underwent a monosegmental fixation. The mean value of kyphotic correction was 9.8° Cobb with a mean value of residual kyphotic deformity of 1.6° Cobb.
In 15/18 (83%) we performed a posterolateral fusion with autologous bone mixed with bone substitutes. All patients used a thoracolumbar othosis during the two months postoperatively; no complication rate was detected regarding the procedure.
We report our clinical and radiological results.

PERCUTANEOUS TRANSPEDICULAR FUSION WITH AGF IN THE TREATMENT OF TRAUMATIC SPINAL FRACTURES

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Background Authors present their experience in percutaneous transpedicular fusion with AGF and cancellous chips allograft combined in the treatment of traumatic compressive vertebral fractures (VCFs).
Materials and Methods 15 traumatic compression vertebral fractures at risk of kyphosis were treated by means of vertebroplasty with AGF, and cancellous chips allograft. Mean age was 31 years, mean follow-up 40 months. Orotracheal intubation was needed only in the cases of upper thoracic vertebral fractures (5 patients). In lumbar and lower thoracic spine fractures peridurale anesthesia was preferred. Patients were ambulant just a few hours after operation and they were discharged on 2nd day with a cast for 30 days. In all cases X-ray and CT were performed on 45th day, 3rd and 6th month, in first treated cases X-Ray was performed also 1, 2 and 3 years after surgery.
Results Fusion was early reached in all patients. Clinical outcome was favorable in all patients but two who complained persistent back pain. No major complication was observed. Average 2° loss correction was observed at 1 year follow-up, 3° loss at 3 years control.
Discussion and Conclusions In selected cases percutaneous transpedicular fusion with AGF and bone cancellous chips seems to be an excellent method of treatment in compressive vertebral fractures even though further studies and more detailed statistical validation are needed.
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CHARACTERIZATION OF INTERVERTEBRAL DISC AGING: LONGITUDINAL MRI, HISTOLOGY AND GENE EXPRESSION IN A RABBIT MODEL

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Although there is a correlation between aging and the onset of intervertebral disc degeneration (IDD), evidence suggests that distinct pathways are involved in these processes. Previously, a reproducible rabbit model of IDD by MRI, histology, and mRNA expression has been characterized. However, to date, no similar analysis has been performed longitudinally for intervertebral disc aging to allow comparison of these two important processes. The objectives of this study were to determine the changes related to normal aging in the intervertebral disc, and how these compare to intervertebral disc degeneration.
Four skeletally mature NZW rabbits were housed for 2.5 years, and lumbar spine MRIs were obtained and characterized serially. This was followed by histological and quantitative gene expression analysis of these aged animals, and compared to adult, skeletally mature and young rabbits.
Through 120 weeks, mean MRI Index decreased by <25%. The histological analysis showed changes in cell composition, with a high abundance of notochordal cells in the young, chondrocyte-like cells and notochordal cells in the adult, and clusters hypertrophic chondrocytes in the aged. The PCR analysis showed that collagen Ia and IIa gene expression decreased with aging, whereas aggrecan and byclycan increased with aging. BMP-2, TIMP-1, and SOX-9 expression was significant lower in the young discs compared with the adult discs and TGF-β1 demonstrated bimodal expression with a decreased expression with aging.
Although dramatic cellular changes occurred in the aging model, age-related MRI changes occurred in this rabbit model of normal aging at a much slower rate than previously observed degeneration-related MRI changes. In addition, the gene expression analysis demonstrated remarkable differences between aging and degeneration. The results of our current study and previous studies on injury induced disc degeneration demonstrate key differences in the processes involved in aging and degeneration.

ANALYSIS OF BODY VERTEBRAL FRACTURE SEVERITY IN OSTEOPOROTIC PATIENTS

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Vertebral fracture arises as a stochastic event from minor trauma acting on skeleton that has reduced bone strength, tipically in postmenopausal osteoporosis women. Recently, a modified visual approach known as algorithm-based qualitative assessment of vertebral fracture (ABQ) has been proposed for the identification of prevalent vertebral fractures. Identification of prevalent vertebral fracture using ABQ is depression of the central endplate (apparent height reduction of less than 20%). We analysed the frequency of vertebral fractures in post-menopausal women using ABQ.
Materials and Methods We examined 130 post-menopausal women with prevalent vertebral fractures (>20% of reduction of anterior, middle or posterior heights of vertebral body). Their mean age was 67.1 (47–86). We measured vertebral body deformities

with computerized morphometric examination on the dorsal and lumbar spine radiographic images.
Results The total number of fractures (>20%) was 242. Only 35 (14.46%) vertebral bodies presented both anterior height and middle height (wedge plus biconcave deformities). 18 (7.43%) vertebral bodies presented "crush fracture". Only 24 (18.47%) fractured women presented both deformities. Most common vertebral body that presented simultaneously wedge and biconcave fracture was D6 (17.64%). L1 was most frequently affected by crush fractures (22.2%).
Conclusions The percentage of women with wedge plus biconcave deformities is low, and this double deformity is more frequently placed around the apex of the dorsal kyphotic curve. The most frequently crushed vertebral body is L1.

VERTEBRAL COMPRESSION FRACTURES IN PATIENTS WITH POOR BONE QUALITY: WHEN AND WHICH OSTEOPLASTY? THE NEEDING FOR A GLOBAL APPROACH

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Introduction Osteoporosis is estimated to afflict 200 million women worldwide. About 1.7 million vertebral compression fractures (VCFs) occur every year in Europe and in the US. Vertebral fractures are the most common type of fragility fractures due to alterations in bone quality, quantity and microarchitecture. Usually they occur with low energy trauma and result in pain about the fracture site, loss of vertebral body height, and, in many cases, kyphotic deformity due to progressive vertebral collapses. Some patients gain benefits using conservative treatments (drugs, bracing, bed rest and rehabilitation) but many other patients do not.
The aim of our study is to establish when there are the conditions to perform a vertebral osteoplasty and which technique, based on personal experiences and on omogeneous datas from the international literature, is suitable for each patient.
Materials and Methods Vertebroplasty and balloon kyphoplasty are two minimally invasive surgery approaches developed for the management of symptomatic VCFs.
Vesselplasty is a new minimally invasive surgical technique which provides pain relief, stabilization of the vertebral body, and it has the ability to provide some correction of deformity with partial restoration of vertebral body height.
During vesselplasty procedure an artificial "vessel" system, the Vessel-X®, is introduced into the vertebral body to achieve augmentation after which low-viscosity bone cement mixed with calcium phosphate is injected into the vertebral body: the Vessel-X® are expanded to their predetermined configuration and a few bone void filler material penetrates through the "vessels" interdigitating the vertebral body, reducing one of the most common adverse effects of other minimally invasive techniques such as cement leakage.
Discussion Treatment of osteoporosis has made enormous advances in the past years, resulting in a wide range of options. We remind the importance of a global approach to the osteoporotic patients: the best treatment remains early diagnosis evaluating bone remodelling markers, lumbar and femoral Dual-energy X-ray absorptiometry (DEXA), thoracic and lumbar x-rays imaging and risks fracture assessment to ensure an individual and best appropriated therapy as specific as possible.
Vesselplasty is a safe and effective minimally invasive procedure for relief of pain associated with VCFs, and improves mobility decreasing the potential risks associated with immobility.
Future trials evidence should investigate if the association of vertebral osteoplasties with specific drugs acting on bone quality, for example teriparatide (an anabolic drug), and rehabilitation could improve clinical outcomes reducing comorbidities and restoring a good and reasonable quality of life.

THE KIPHOPLASTY IN THE TREATMENT OF THE VERTEBRAL FRACTURES: EFFECTS ON THE ADJACENT SEGMENT. REVIEW OF OUR EXPERIENCE AFTER THREE YEARS AND STATE OF THE ART

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Introduction The authors introduce the results of their experience in the treatment of the vertebral fractures by Kiphoplasty after three years since the introduction of this technique.
The introduction of the Kiphoplasty, a percutaneous technique that allows the immediate remission of the painful symptomatology and the rapid return of the patient to its normal activities without aid of orthopaedic garrisons, has opened new perspectives in the treatment of this pathology.
Materials and Methods The study we have carried out involved a group of 20 patients, selected among those submitted to Kiphoplasty, affected from vertebral fractures from osteoporosis.
It dealt with fractures in compression type 1A (16 cases) and type 1B (4 cases) according to the classification of Denis that we have adopted.
Levels interested by the fracture: D9:1 - D12:2 - L1:2 - L2:7 - L3:6 - L4:1 - L5:1.
We have excluded from this study the lesions where an open surgical intervention was required as the back wall of the vertebral burden was interested.
We have performed the follow-up by evaluating the possible effects that the burden treated with Kiphoplasty could have generated on the adjacent segment.
We have used the card VAS, and for the diagnostic, the radiography in the standard and dynamic projections as well as the RMN examination.
Results In two cases, after one year, a fracture of the superior adjacent segment has been recorded, in one case following a new trauma, in another one due to a new spontaneous fracture.
In 4 cases the patients reported sporadic pain of probable origin from the disk without however noticing alterations to the examination RMN.
Discussion The Kiphoplasty in terms of social costs, apart from a rather large initial expense for the instruments, allows, on the long run, for a considerable saving if compared to the expense one would sustain for the conservative treatment.
The advantage provided by the express recovery and the instant remission of the painful symptomatology is undeniable. However, one must not underestimate the possible effects in the long run that the segment treated with cement PMMA - polimetilmetaacrilato - can also happen on the adjacent levels considering also the result obtained, even after one year, comparing the group treated with Kiphoplasty to other homogeneous group conservatively treated that result to practically overlap as it concerns the painful symptomatology. We consider essential that the medical treatment of the osteoporosis to be associated to the surgical one, besides the periodic control of the adjacent structures disco-somatic.

MINIMALLY INVASIVE PERCUTANEOUS OSTEOSYNTHESIS IN THE TREATMENT OF ADULT AND OLD PATIENT SPINE FRACTURES

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Introduction Old patients with both traumatic and osteoporotic vertebral fractures are often compelled to lye in bed for a long time. This condition is often associated to a wide range of serious complications, better known as "bed rest syndrome". In order to face this problem and let patient walk as soon as possible after trauma, clinicians are looking for less invasive and debilitating spine osteosynthesis surgical procedures. Vertebroplasty and kiphoplasty have partially solved the problem related to Magerl A1 fractures, while the debate is still opened about A2 and less serious A3 fractures treatment. Is it better to perform a classical vertebral osteosynthesis or decide for a prolonged conservative treatment, either with orthopaedic corset or a cast? A possible answer to this question is a third option, that is the mini-invasive technique.
Materials and Methods From July 2005 to January 2007 we have treated 25 patients affected by Magerl A2 and A3 vertebral fractures in the thoraco-lumbar spine. Percutaneous pedicles fixations with associated vertebroplasties have been performed. 18 patients were females and 7 were males. Mean age was 57.2 years. Procedure has been always performed under radiological control. Patients have been assessed with self evaluating tests.
Results They showed an improved clinical setting in the immediate post-operative period, statistically significant about main parameters (mean VAS 89→31; SF-36:1. General Health 38→60; 2.Pain 19→64 [p=0.0005]; 3. Mental Health 46→74; 4. Social Activities 44→59; 5. Sensitivities 29→51; 6. functional limitations 20->66 [p=0.0008]; 7. physical health 33→67 [p=0.0008]; 8. vitality 41→64). During a mean follow-up of 5.8 months, results have remained the same and no complications happened.
Discussion These preliminary data show how a mininvasive approach in A2-A3 vertebral fractures osteosynthesis could have a possible good effect in the old patient care.

VESSELPLASTY IN THE TREATMENT OF TRAUMATIC VERTEBRAL COMPRESSION FRACTURES

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Background A teleftalate artificial vessel, the Vessel-X®, is used to restore the height of the vertebral body in VCFs. Teleftalate is a porous material (80–100 micron diameter per pore) so that a few bone void filler material can penetrate through it interdigitating the vertebral body. It is introduced in the vertebra in a reduced configuration. Then it is expanded and filled with PMMA combined with calcium sulphate (osteo-G) so raising the vertebral endplates.
Materials and Methods Since May 2005 through December 2006 8 osteoporotic VFCs and 6 myeloma VCFs; 9 females and 5 males, were treated with this technique at the S. Eugenio Hospital and CTO hospital in Roma. Mean age was 73 years and mean follow-up 15 months. In 2 patients vesselplasty was performed at 2 levels.
Results All patients recovered without serious complications. No PMMA leakage was seen. Mean hospitalization was 1 day. No brace was needed- Mild back pain was observed in the first days in 5 patients.
Discussion Teleftalate and Osteo-G contribute to make safer the procedure. The teleftalate vessel does not need to be removed because of its porosity. PMMA can slowly flow through its pores interdigitating with the bone and increasing osteointegration. Osteo-G reduces PMMA polimerization temperature to 35°C decreasing high temperature local damage.
Conclusions Vesselplasty, thoroughly solves the fatal problem of cement leakage out of the vertebral body and can be considered a procedure of choice in the treatment of VCFs. The technique is no more difficult than vertebroplasty or kyphoplasty while risks are fewer.

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INTERBODY EXPANSION CAGE PERCUTANEOUS USE WITH THE NEW SYSTEM CM1 IN LOCAL ANAESTHESIA: INITIAL EVALUATIONS

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Interbody cages employ today can be significantly increased.
Stand-alone or in association with other stabilization techniques, with CM1 system that allows percutaneous treatment in local anaesthesia, hence even in those patients for whom an open surgery could be contraindicated.
The system is composed by cannulas with increasing diameters, with instruments for site's predisposition and positioning of the cage.
Today we achieved definitely provisional evaluations of the first 50 cases in 9 month follow up.
Results are extremely encouraging.

SURGICAL APPROACH TO LUMBAR SCOLIOSIS IN THE ELDERLY

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Lumbar scoliosis in older adults can be either degenerative or progressive from adolescence. Independently of the origin, the evolution is always the rotary dislocation of the intervertebral discs. This dislocation is also responsible for the arthrosis of the posterior articular fascia. In addition, this articular arthrosis can cause the compression of the nerve roots.
After a ten-year follow-up, performed on 30 patients with an average age of 61 years, we can propose a surgical approach for these scolioses.
We shall now describe the three techniques proposed:
- We can make a correction without opening the canal. This correction can be performed with both anterior and posterior approaches but whenever we can stop the instrumentation at vertebra L3 or L4 we prefer to use the anterior approach.
- We can just carry out a decompression by opening the canal but without stabilization. This technique is very popular with neurosurgeons and is chosen for the most debilitated patients.
- We can carry out a decompression by opening the canal and correcting the scoliosis.

It is important to stress that:
- The stenosis can be dynamic and only disappear with the correction of the scoliosis without liberating the nerve roots, Besides MR or CAT, other tests may be necessary such as dynamic myelography.
- We have to discuss carefully whether or not to go down as far as the sacrum; albeit sometimes indispensable this increases the risk of pseudoarthrosis.
- Double anterior and posterior fusion is preferable because circumferential fusion is a guarantee of stability.
- We also have to keep an eye open for thoracic kyphosis because it is occasionally necessary to extend the instrumentation to the chest to correct this kyphosis. Sometimes a lumbar kyphosis is present and it has to be corrected to recover a sagittal balance. We can also propose a lumbar osteotomy to correct the lumbar kyphosis.

SESSION 0-20

ANKLE ARTHROPLASTIES AND REVISIONS III

LATERAL PARAPATELLAR APPROACH IN PRIMARY TOTAL KNEE ARTHROPLASTY OF THE VALGUS KNEE

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Background Anatomic and pathological characteristics of the valgus knee deformity represent a challenging issue for the implant of a total knee arthroplasty. The surgical approach in such cases should allow a direct ad easy exposure of the joint, easy lateral soft tissue balancing and adequate patellar tracking.
Materials and Methods Twenty-four total knee arthroplasties were implanted in valgus knees between January 2002 and September 2005. A mean preoperative valgus deformity of 18° was assessed on standing x-rays. Four posterior stabilized, eighteen posterior stabilized rotating platform prosthesis and two superstabilized prosthesis were implanted in 21 patients. The surgical approach has been in all cases a lateral parapatellectomy. Follow-up assessments were obtained for all patients at a mean 23 months. They consisted of a Knee Society Score and a Patellar Score evaluation, standing AP and lateral radiograms and skyline x-rays obtained at a flection of 45°.
Results A mean preoperative Knee Society Clinical Score of 32,7 points (range, -4 to 64 points) significantly improved at follow-up to an average 88,8 points (range, 57 to 99 points; $p<0,05$). The Knee Society Function Score significantly increased from a preoperative mean score of 32,7 points (range, -20 to 75 points) to an average follow-up score of 81,2 points (range, 30 to 100 points; $p<0.05$). The Patella Score revealed absence of anterior pain in all cases but one that reported severe pain. A satisfactory patello-femoral alignement of 4.7° (range, 1° to 10°) was obtained at last follow-up x-rays. One intraoperative condilar fracture occured and was treated with a single screw.
Discussion The lateral approach of valgus knees led to satisfactory results in primary total knee arthroplasties in a percentage of cases comparable or superior to those presented in literature for different approaches. In addition, lateral release is performed as a part of the approach itself, allows preservation of the blood supplies of the extensor apparatus and an optimal patellar tracking in most cases.
Conclusions In conclusion, the lateral approach for a primary total knee arthroplasty could be recommended in valgus knees affected by osteoarthritis because as it proved to be effective in achieving a satisfactory implant positioning and functional outcome while reporting minor complications.

TOTAL KNEE ARTHROPLASTY: MEDIAL PARAPATELLAR VS MIDVASTUS APPROACH – A RANDOMIZED STUDY OF 25 CASES

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Background The knee osteoarthritis is a mechanical disease. It leads to a destruction of the articular cartilage and then of the bone. It affects the adults over 40 years old and it is the most important cause of invalidity in the elderly. The total knee arthroplasty is the means to reduce the pain and to restore the function.
Materials and Methods From November 2004 to February 2007 we made a randomized study on two groups of patients with knee osteoarthritis. We treated the first group (12 patients) by a standard approach (medial parapatellar) and the second group (13 patients) by a midvastus approach.
Results The outcome analysis is based on the radiological images (three projections) and clinical evaluation by a Knee Society Score (KSS) and Western Ontario Macmaster Osteoarthritis Index Score (WOMAC).
Discussion The outcomes didn't show a statistical difference between the two groups for the radiological and clinical results.
Conclusions It needs a lot of patients and a longer follow up to obtain a better significant outcomes. At this moment the choice of the different approach depends on the ability of the surgeon.
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RESULTS OF COMPARISON BETWEEN STANDARD MEDIAL PARAPATELLAR, MEDIAL MIDVASTUS, SUBVASTUS AND LIMITED MEDIAL PARAPATELLAR APPROACHES IN TOTAL KNEE ARTHROPLASTY

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Background Standard medial parapatellar approach is certainly the most used approach for TKA, due to its versatility and relative easiness of execution. We have examined other surgical approaches in TKA, they are: medial midvastus, subvastus and limited medial parapatellar, a variation of the medial standard parapatellar approach.
Materials and Methods This study compared surgical and clinical parameters of 690 knee prosthesis cruciate retaining (Profix, Smith & Nephew) implanted between 2002–2006 by using standard medial parapatellar (SMP) (260 cases), medial midvastus (MMV) (260 cases), subvastus (SV) (65 cases) and limited medial parapatellar approaches (LMP) (105 cases). The minimum follow-up was 6 months. We evaluated all patients using the Knee Society Rating System. The parameters taken into consideration for this study include: quadriceps strength recovery, ROM, Q angle, prosthesis component positioning, blood loss, intensity and duration of pain, degree of satisfaction of patients.
Results We have noticed an easier respect of the Q angle, a faster strength recovery of the quadriceps, a lesser intensity and duration of post-operative pain, a better patellar tracking in the groups SV, MMV and LMP if compared with the group SMP. In the MMV group it has been found an profile alteration of medial vastus profile, lasting even for many years after the operation and without a reduction in the strength. When comparing the groups MMV and SV with the group LMP, we have noticed an even faster strength recovery of the quadriceps and a lesser intensity and duration of pain, though, this happened only in the first postoperative week and with a tendency towards equality of values within the eighth week.
Discussion MMV and SV are very good approach for a faster postoperative recovery if compared to SMP, although the latter is more versatile. Besides, the SV can not be used on every kind of patient. The LMP seems to be the most versatile among approaches we have examined, considering the preservation of the extensor apparatus and the easiness and extensive applicability of the technique.
Conclusions The findings of our study seem to suggest that the LMP access is the one to be preferred in TKA.

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IS THE LATERAL "INSIDE-OUT" RELEASE TECHNIQUE OUT OF RISK OF PERONEAL NERVE INJURY IN TOTAL KNEE ARTHROPLASTY?

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Background Several methods have been described to correct a valgus deformity during total knee arthroplasty. The "inside-out technique" to correct a valgus deformity in total knee arthroplasty may place the common peroneal nerve at risk for direct injury [1, 2]. The purpose of this study is to define the three dimensional anatomy of the nerve.
Materials and Methods Twenty cadaveric dissections were used to identify an anatomic landmark on the cut tibial surface to help in localizing the nerve. The distance from the postero-lateral corner of the tibia and the closest margin of the nerve (PLCN) was measured with the knee fully extended. The diameters of cut tibial surface in the medial-lateral (ML), anteroposterior (AP) and diagonal (DG) planes were measured as well as the distance from the posterolateral corner to the posterolateral cortex of the fibular head (PLCF).Then the PLCN was correlated with all the other measurements.
Results The average distance from the posterolateral corner of the tibia to the closest margin of the nerve was 13.54 mm (range 11.20–18.60 mm).
The distance from the bone to the nerve was strongly correlated to the PLCF distance (Pearson correlation coefficient 0.928, $p<0.01$), as well as to the AP distance (Pearson correlation coefficient 0.753, $p<0.01$) and the ML distance (Pearson correlation coefficient 0.739, $p<0.01$) of the tibial plateau.
Discussion The use of electrocautery, as described by Ranawat et al. may help prevent iatrogenic injury when releasing the postero-lateral capsule. Conversely, the knife may be used for "pie-crusting" the ITB as the nerve is not at risk and the knife provides a more controlled lengthening.
Conclusions This study shows that the nerve is at risk of direct injury using the inside-out release of the posterolateral capsule (danger zone), but not during pie-crusting of the iliotibial band (safe zone).
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SOFT-TISSUE MANAGEMENT IN MINIMALLY INVASIVE TOTAL KNEE ARTHROPLASTY

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The surgical goal of total knee arthroplasty (TKA) is to get a well-fixed and well-aligned implant. Besides some orthopaedics surgeons have emphasized that correct ligamentous balancing is an important determinant of the clinical outcome in TKA.
Nevertheless the use of minimally invasive techniques with smaller approach has complicated the soft-tissue management, especially for the surgeons with a little experience.
To individualize the tight bands of collateral ligaments or to perform a correct balancing in valgus knee without patellar eversion can result complex for the surgeon, above all after the implantation of final components.
For this reason we use the special spacer for MIS approach and two laminar spreaders to detect the correct tensioning of the knee in flexion and exstension.
Thus, it is imperative that the surgeon is familiar with knee soft-tissue balancing techniques to address the varus, valgus, and associated flexion contracture deformities commonly encountered in primary TKA, but more difficulties to be performed with minimally invasive techniques.
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MIS TKJR IS IT ETHICAL?

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Background Hip and knee arthroplasty surgery represent two of the most commonly performed elective orthopaedic procedures. Orthopaedic surgeons have attempted to improve outcomes after such surgery by introducing a variety of innovations such as computer navigation and minimally invasive surgical approaches.
Aims To examine the ethical issues surrounding the application of minimally invasive and computer assisted arthroplasty surgery.
Discussion Medical ethics is based on the principles of beneficence, non-maleficence, autonomy and justice. Conventional total hip and knee arthroplasty can be justified according to these ethical principles as each procedure is rigorously validated in terms of short and long-term outcome. However, poor implant alignment is associated with prosthetic failure and poorer functional results after arthroplasty. Computer navigated arthroplasty was developed to give reproducible alignment during hip and knee arthroplasty surgery and is validated in this respect. As it uses standard techniques it satisfies the main ethical principles. Minimally invasive arthroplasty has been reported to reduce post-operative pain, length of hospital stay, blood loss, with improved cosmesis and patient satisfaction. However, due to alternative and limited surgical access there is concern regarding implant placement, future revision rates and long-term functional outcome. If surgical navigation is used in conjunction with minimally invasive arthroplasty component positioning may be improved.
Conclusions Minimal access arthroplasty surgery without computer navigation cannot satisfy all 4 ethical principles as long-term outcome is uncertain. The temptation to widely introduce such techniques without fully considering the moral and ethical implications should be avoided until appropriate outcomes are validated.
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LESS INVASIVE TOTAL KNEE ARTHROPLASTY: EXTRAMEDULLARY FEMORAL REFERENCE WITHOUT COMPUTER NAVIGATION

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Femoral intramedullary canal referencing is utilized by most of the total knee arthroplasty (TKA) systems. Violation of the canal is performed in order to engage rod instruments in the femoral diaphysis and to refer of the anatomical axis of the femur. Fat embolism, activation of the coagulation cascade, and bleeding may occur from the reamed femoral canal. The purpose of our study was to validate a new set of "minimally-invasive friendly" instruments which allow to prepare the femur without violating the intramedullary canal. Twenty-five consecutive patients undergoing primary TKA through a mini-subvastus approach were enrolled in the study after informed consent had been obtained. Results of this cohort (group 1) were compared to another contemporary group (group 2) of 25 TKAs operated by the same surgeon using intramedullary instruments. The two groups were matched for gender, deformity, degree of arthritis, and surgical approach. Preoperative long weight-bearing AP and lateral view of the knee were obtained. Templates of the mechanical and anatomical axis were performed. Distal femoral resection was planned according to the template, and considering a bone cut perpendicular to the mechanical axis of the femur. Measurements from the template were reproduced on the distal femoral cutting jig. Flexion-extension control of the distal femoral resection was obtained using the anterior meta-diaphyseal cortex reference. Depth of resection, and varus-valgus angulation were selected according to the previous measurements and referring over the most prominent distal femoral condyle. A double check was performed using an extramedullary rod referring two and a half finger-breaths medially to the antero-superior iliac spine. Postoperative blood loss, pain, swelling, functional recovery, and complications were recorded. Radiographic alignment was measured with long film. Mechanical axis was within 0±2° in 88% of group 1 and 84% of group 2 ($p>0.05$). There was no difference between the two groups regarding the operative time. In group 1, postoperative blood loss (740 vs 820 mL) was reduced but this difference did not reach the statistical significance ($p=0.07$). No difference was found in terms of postoperative pain, knee swelling, and functional recovery. Extramedullary reference with careful preoperative templating can be safely utilized during total knee arthroplasty. Avoiding the violation of the femoral canal may enhance the benefits of a less invasive approach. Kandel L, Vasili C, Kirsh G. Extramedullary femoral alignment instrumentation reduces blood loss after uncemented total knee arthroplasty.

HOME-BASED REHABILITATION AFTER UNCEMENTED KNEE ARTHROPLASTY

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The experience acquired in the rehabilitation of sportsmen with rapid resumption needs has induced the use of the same procedures in joint replacement subjects, too. We retrospectively evaluated a casuistry of subjects operated on between 1996 and 1998 with joint replacements not bound with conservation of the anterior cruciate ligament. They were evaluated according to the type of fixation and to the type of rehabilitation.
Materials and Methods 108 patients (28 males and 80 females). 75 checked up. Mean age 72.3 (86–50. 7 deceased. 26 not traceable. 2 revisions. 7 bilateral cases. Mean follow up 60.16 months. They were distributed retrospectively into 4 groups:
Group A: uncemented knee arthroplasties: 41 cases; mean age: 71,52 (81–50); 46 joint replacements.
Group B: cemented knee arthroplasties: 34 cases; mean age 73,15 (86–54); 36 joint replacements.
Group I: 52 cases: home-based rehabilitation.
Group II: 23 cases: hospital-based rehabilitation.
All subjects were operated on by the same surgeon. Anteromedial via. The patella was never replaced. In all cases the posterior cruciate ligament was preserved. Elastic tights for 40 days. Progressive weight bearing from the day after surgery. No CPM but immediate active mobilization of the knee. General free gymnastics were always associated. Precocious resumption of usual everyday activities stimulated with constant respect of pain. HSS Evaluation Score.
Results Mean score group A: 92.09 (98–69); mean active flexion: 117°.
Mean score group B: 90.02 (100–49); mean active flexion: 118°.
Home-based rehabilitation: 91.5 (100–62).
Hospital-based rehabilitation: 82.7 (98–49).
In no cases was there limitation of extension.
Discussion Home-based rehabilitation after knee replacement surgery is practised in the United States with results which are not inferior to the hospital-based rehabilitation.
The results of this work confirm the possibility of carrying out a home-based rehabilitation programme. Precocious active mobilization of the knee favours functional resumption.
The best results in the home-based rehabilitation group may also be influenced by the possible presence of subjects with less autonomy or less possibility of domestic assistance in the hospital-based rehabilitation group. However, important differences of age and differences between cemented and uncemented arthroplasties did not emerge. The importance of precocious mobilization of the patient who has undergone knee replacement surgery immediately after surgery in order to favour rapid autonomy emerges.
Conclusions Home-based rehabilitation may be a positive opportunity to precociously reintegrate the elderly patient in active social life.

BI-UNICOMPARTIMENTAL KNEE PROSTHESIS A MATCHED PAIR STUDY OF TWO DIFFERENT ALIGNMENT SYSTEMS: EXTRAMEDULLARY VERSUS COMPUTER AIDED

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Introduction Since 1998, in selected cases, the Authors have been performing bi-unicompartimental knee replacements using an extramedullary alignment guide. Recently, they have been assisted by a computer navigation system to improve both a correct alignment and a soft tissue balancing. Aim of the trial was to evaluate the effectivness of this procedure according to 2 different alignment systems.
Materials and Methods From January 2001 to February 2005, the Authors have implanted 22 Bi-Unicompartimental Knee Replacement. Eleven of them were implanted using a navigation alignment system (CA-biUKR). All the patients complained a bi-comparti-

mental (medial and lateral) arthritis deformity with both ACL and PCL intact without any pain at the femur-patella joint. An equal number of knees treated with the same surgical procedure before 2001 using a totally extramedullary alignment guide systems were selected and matched with respect to age, sex, bone mass index, pre-op range of motion and radiological grade of classification.
Both groups were assessed according to Knee Society Score, number of complications and implant alignment.
Results Despite a non homogeneous follow-up the number of complications was significant higher in the extramedullary aligned group because of an unacceptable high rate of detachments of the central tibial bony block. Furthermore the limb alignment was statistically more precise in the CA-biUKR group with a lower number of outliners. At the latest follow-up there were no significant differences in Knee Society Score.
Conclusions According to Author experience CA-biUKR is an effective surgical procedure in the treatment of selected knees in terms of outcome, alignment and less invasive surgery.

DO WE REALLY DO EVERYTHINGS, FOR THE PREOPERATIVE DIAGNOSIS OF INFECTED TKA? AN ALGORITHM PROPOSAL

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Background The most feared complication after total knee arthroplasty is deep infection. Successful treatment needs early and good diagnosis preferably based on a microbial analysis, and adequate knowledge on the patient profile.
There is no single test that will consistently predict infection. Pathogen detection techniques often are difficult to interpret. False positive results may be caused by contamination, and false negative results often are a consequence of presumptive antibiotics in spite of evidently running infection. The WBC count in the synovial fluid presume the probability of infection, but give no specific information regarding the underlying diagnosis. The purpose of this study was to attempt a preoperative algorithm for the diagnosis at the suspicion of TKA infection.
Methods We considered all patients with a symptomatic total knee replacement (ex: painful knee or elevated levels ESR & CRP or suggestive bone scan).
Shut out the possibility of aseptic loosenig, all patients had undergone pre operative aspiration (culture & WBC count) and specimens (bone & synovial) from any area suspicious for infection, in operating room after sterile skin preparation and draping. No patients received preoperative (two weeks antibiotic wash out) or intraoperative antibiotics. Local anesthetics were not used because of their bacteriostatic properties. We repeat the procedure until the bacteria detection: if the bacteria were identified, the patient is to undergo (after a proper systemic antibiotic therapy) a two stage revision arthroplasty. If it is impossible to identify the bacteria, we perform a frozen section. If the results are more than 10 polymorphonuclear leukocytes per high power field we considered the TKA infected.
Conclusions The clinical tests currently used to identify infection after TKA, often fall short of establishing a firm diagnosis. We think that our algorithm proposal may be helpful in judging the probability of infection.
Suggested readings

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SESSION 0-21

ANKLE ARTHROPLASTIES AND REVISIONS IV

THE OXIDIZED ZIRCONIUM FEMORAL COMPONENT FOR TOTAL KNEE ARTHROPLASTY: 4-TO 6 YEARS FOLLOW-UP

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Oxidized Zirconium is a new material available for the femoral component of total knee arthroplasty. Laboratory studies have demonstrated a decrease in adhesive and abrasive wear using this new material, as compared with CoCrMo and a reduced friction against cartilage due to its increased lubricity.
Between June 2001 and December 2004, 98 primary total knee arthroplasties were performed in 94 patients at our institution using the Genesis II® total knee arthroplasty (Smith & Nephew, Memphis, TN) with the femoral component made of Oxidized Zirconium (Oxinium); three knees were lost to follow-up, so 95 knees were available for inclusion in the present report with a minimum duration of follow-up of two years, average 4.1 years (range, 2 to 6 years). The average age of the patients was 58.3 years (range, 22 to 65 years).
In 37 (38.9%) cases we resurfaced the patella, in 58 (61.1%) knees we left the patella unresurfaced.
No knee was revised; the mean Knee Society score improved from 42.7 to 87.7 points postoperatively and functional score improved from 47.5 to 82.5 points postoperatively.
In the non resurfaced group, knee anterior knee pain was reported only in 1 knees (1.7%) and the patellar score was higher than the resurfaced group ($p<0.5$).
The duration of follow-up did not allow us to validate the wear reduction properties of oxidized Zirconium, however we could already demonstrate a new distinct positive effect of oxidized Zirconium femoral component when articulating with the native patella, since the lower coefficient of friction against cartilage and the greater lubricity allowed a better coupling of the unresurfaced patella with the Oxinium femoral component.

TANTALUM TIBIAL PLATE IN NEXGEN TKA: SHORT TERM RESULTS AND OSTEOINTEGRATION

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Aim of the Study Provide a clinical and x-ray review of the NexGen tantalum tibial plate prostheses which have been implanted from 2004 to 2007 evaluating the short term osteointegration of the tantalum surface.
Materials and Methods We considered a total of 22 prosthesis implanted in 21 patients (1 bilateral implantation). In 100% of situations, the pathology at the origin of the implementation was the primary gonarthritis. For the clinic evaluation we used the HSS; for the X-ray evaluation we used the "Knee Society TKA Roentgenographic evaluation and scoring system". We compair results with 22 TKA Nen Gen CR implanted in 22 patients in the same period in a similar population
Results The average HSS score we got at control is 93.4 (OS±7.6). The difference between the pre-surgery and at control score is about 27.1 scores. At check up every patient was free from pain with a complete operational recovery (11.23/12 scores). Nobody was using aids. The average pre-surgery articolarity was about 92 degrees, at check up we measured an average inflection extension of about 115 degrees. All the score differences between pre-surgery and post-

surgery are statistically significant $p \leq 0.001$). To conduct our study we used the statistical program SAS (v.8, Sas inc., North Carolina, USA). The results with Nex Gen CR TKA were not significativly different.
In the x-ray evaluation didn't find any unstuck part, neither periprosthesis osteolysis nor prosthesis mobilisation. We didn't find any periprosthesis radiolucency line bigger than 1 mm and none of the previous ones had any complication at control.
During the follow-up we don't find any major complications.
Conclusions The optimal clinical and x-ray results, even if they are short term, considered as indices of a good osteointegration, push us to believe that the use of the tantalum tibial plate could be a good solution for any young patient with a gonarthrosis disease.

PATELLAR RESURFACING IN TOTAL KNEE ARTHROPLASTY: RATIONALE AND TECHNIQUE

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Patello-femoral performance of total knee arthroplasty (TKA) has evolved in the last decades. This aspect of TKA has represented the major source of complications for several years. Refinement in implant design and surgical technique improved patellar tracking, thereby reducing postoperative complications. The debate whether to resurface or not the patella is still ongoing, even if the most recent metanalysis studies of prospective randomized trials seem to favour patella resurfacing. The technique of patella resurfacing can be optimized, in the light of the numerous biomechanical and clinical studies available in the literature. Patella resurfacing does not represent a challenge for the joint surgeon, but in order to avoid suboptimal results or complications, it should be performed with meticulous attention and following some rules. This review describes the rationale for patella resurfacing, a summary of biomechanical studies on patello-femoral joint function in TKA, and the technical rules the surgeon need to know.
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THE SCORPIO TOTAL KNEE PROSTHESIS: PRELIMINARY RESULTS AT 4-YEARS FOLLOW-UP

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Background The main goal of the knee joint replacement surgery is to provide the patient with a stable implant able to guarantee an immediate stability and the full restoration of the articular function with a long term survival rate. Nowadays, modern prosthetic designs, such as the scorpio prosthesis, are mainly focused on reconstructing the joint more than simply substituting the area. We present our preliminary data with the scorpio prosthesis at four years follow-up.
Materials and Methods 105 cases from June 2003 to August 2005; 78 male and 27 female; mean age 1.2 years; 98 primary implants, 5 revision surgery; 93 cemented, 12 hybrid.
Results Mean preoperative lysholm knee scoring scale 52; mean postoperative lysholm score 91 at four years follow-up.
Discussion and Conclusions The scorpio design has the peculiar characteristic of a unique anteroposterior axis rotation to recreate the ligamentous isometry and of a deepened throclea with a posterior inclination of the insert for a complete rom restoration. These results can be optimized by a scrupolous tecnique assisted by a computerized navigation system. Our preliminary data are showing a significative improvement in functionality rate and level of acceptance from the patients.
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RESULTS OF COMPLEX PRIMARY TOTAL KNEE ARTHROPLASTY USING THE CONDILAR CONSTRAINED PROSTHESIS

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Background In primary total knee arthroplasty, we need to use the least constrained implant, sufficient to obtain a stable knee. (2)
- Possibilities include;
- Constrained poly-liner;
- Posterior stabilized (PS);
- Not linked hinge: CCK or VVC;
- Linked: rotator or fixed hinge (3).

Materials and Methods Between 1999 and 2002, 47 consecutive primary CCK prosthesis were implanted in 45 patients.
In the same period we implanted 732 CR or PS TKAS.
Indications were:
- valgus deformities >20° (18 cases);
- varus deformities >25° and medial bone loss (23 cases);
- rheumatoid arthritis (3 cases);
- distal femoral fracture in osteoarthritis (1 case);
- results of periarticular osteotomies (2 cases).

The minimum follow-up was 5 years.
Results Clinical results improved from preoperative score of 37 points to an average postoperative score of 88 points.
The results were excellent for 25 cases, good for 20, fair for 2.
The final average flexion was 100°.
Only one knee was revised for infection.
Surgical Technique No ligament release was performed; only bone resection balanced the knee. The CCK articulation dictated realignement and knee stability.
Core implants were cemented, femoral and tibial stem extensions were not cemented in press-fit.
Discussion Severe collateral instabilities constitute the main condition that require a constrained implant.
Constraint implies a restriction of rotational or transational movement, which can be achieved with a linked or not linked implant design.
The CCK design with a broad central peg and a corresponding femoral box provides constraint and multiplanar stability.
We agree with Easley and coll that the stem enhances resistance to bending stresses and allows load sharing.
Should revision be required, removal of a cemented stem extension would be more difficult.
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TOTAL KNEE ARTHROPLASTY IN OBESE PATIENT: PROBLEMATIC OF TREATMENT

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Background Excessive body weight contributes to the development of osteoarthritis, due to the increased functional load of the joints. Obese patients often need a joint replacement surgery that, due to co-morbidity of these patients, introduces to remarkable problematic of treatment, in the pre-operative as in the post-operative periods, and results are not always satisfactory.
Materials and Methods From January 2000 to February 2006 we performed TKA for 47 obese patients. There were 18 men (BMI of 39.15±2.27 Kg/m^2) and 29 women (BMI of 37.15±1.75 Kg/m^2) with an average age of 62 years at surgery. Co-morbidity with other pathologies like diabetes mellitus, cardiovascular and endocrine diseases was present in all patients. They were compared to a control group with normal BMI. We evaluated them to a medium follow-up of 24 monts (11–70) with Knee Society score. Moreover we evaluated problematic in pre-operative and post-operative period, and late complications.
Results and Discussion Knee Society score is lower in obese patients. Indeed normal results are present in 80% of obese patients versus 99% of control group. In the pre operative period obese patients needed more specialistic consults and instrumental exams, and they had an higher anaesthesiological risk. During surgery, they needed a bigger surgical incision or a major surgical exposure by means of tendinous, muscular or capsulo-ligamentous separation. It was more difficult to perform a good prosthetic alignment and ligamentous balance. In the post operative period infection rate was higher, related to longer operating time, more difficult surgical exposure and major soft tissue dissection. Infections were also related to lower blood supply in fat tissue and to a deficit in immune response. Finally the risk of DVT was higher in obese patients.
Debate on longevity of implants is still controversial: prosthetic components are over stressed by high weight solicitations, but this aspect is compensated by the lower level of activity of these patients.
Conclusions Total Knee Arthroplasty is a validated surgical procedure in the treatment of osteoarthritis of the knee with good clinical results. By the way, results are not so sure in obese patients. They have a higher rate of co-morbidity, so a multidisciplinary approach is favourable to improve and assess pre operative clinical conditions.

FIRST RESULTS OF A CONTROLLED PROSPECTIVE STUDY COMPARING TOTAL KNEE REPLACEMENT WITH FLEX AND STANDARD FEMORAL COMPONENT

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Introduction Minimal-invasive techniques in total joint replacement are perceived to reduce soft tissue trauma. In total knee replacement (TKR) we have combined minimal invasive surgical techniques with instruments, jig and prostheses devoted. The purpose of the study is to describe first results of a cohort study comparing flex femoral component (FLX) and standard femoral component (STD) with respect to alignment, patellar track, and range of motion (ROM).
Materials and Methods From September to December 2006, 32 primary TKR have been performed by one surgeon in an unselected group of patients. They have had a primary TKR for arthritis. The prosthesis was a postero-stabilized fixed bearing for all patients with the stemmed tibial plate mini keel (NexgenTM - Zimmer). Eighteen out of 32 received a FLX and 14 a STD femoral component prostheses. To control the safety and reliability of both procedures prostheses alignment, patellar track and ROM of the knee were compared between groups. Knee bend was measured before surgery and 4 weeks after. T Test 95% CI compared statistically the two groups.
Results Given informed consent, 24 females and 8 males were studied. No differences were found for age (average 69.8 years, from 58 to 78 years) and BMI: 29 kg/m2. Time for surgery, patellar track, component alignment and HSS showed no differences between groups. Knee flexion before surgery was 80.6° (65°–100) for FLX and 86° (70°–100°) for STD. Four weeks after surgery knee bend 110° (95–130) for FLX and 107° (90–120) for STD. Statistically significance difference (p=0,008) was found for the amount of knee bending gained. The FLX gained 30.3° (20°–40°) of bending and the STD gained 21.3° (10°–40°).
Conclusions Despite good ROM and flexion for the STD femoral component, to gain maximum ROM from the TKR the FLX component may achieves arc of movement larger. These preliminary results indicate, that flex femoral component is a safe and reproducible method.

TOTAL KNEE REPLACEMENT: BEFORE IS BETTER!

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Background In this kind of surgery, following our philosophy it's very important the timing.
An early revision simplifies the surgical gesture and improve the subsequent result.
It is fundamental to avoid the soft tissues retraction and particularly the patellar-tendon respect and the bone-loss.
Materials and Methods From 2001 to nowadays we have carried out 146 knee revisions.
In 2% of the cases the revision has been performed with a unicompartmental knee prosthesis, in 35% with a first implant postero-stabilized prosthesis, in 58% with a semi-bonded prosthesis and in 5% with a mobile-bearing bonded prosthesis.
Results Thanks to a surgical technique, that always try to achieve a correct capsulo-ligamentous tension, often using anterior tibial tuberosity osteotomy that enables a wide exposure and a patellar-lift with creation of an adequate articular spacing and the use of appropriate revision prostheses, the outcomes have been certainly satisfactory.
We got an average improvement of the ROM with an immediate ambulation recovery.
Discussion This is not a simple surgery that has to be faced with an adequate learning curve, always perform an accurate pre-operative planning and being sure of have available a complete prosthetic system with or without bonds and taproots with or without offset.
Conclusions We are reporting our experience of 146 prosthetic knee revisions treated with various types of prostheses, starting from the unicompartmental arriving at the use of the bonded ones, paying particular attention on early timing revision and surgical technique.
Anterior tibial tuberosity osteotomy technique has been used for obtain a wide exposure and when is possible we used the overturning of the hemi-tibial plateau for filling the bone-loss.
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TOTAL KNEE ARTHROPLASTY: INDICATIONS IN TWO CASES OF CHRONIC KNEE INSTABILITY

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Introduction Knee dislocation remains a rare injury and typically results from a high-energy trauma. Treatment goals of acute dislocation are aimed at obtaining and maintaining a reduced knee joint as well as addressing any concomitant neurovascular injuries.
Only few data are available concerning the treatment and outcome of patients with chronic knee dislocation.
This article reports our experience in 2 patients with chronic knee dislocation treated by total knee arthroplasty (TKA), focusing on the importance of the right clinical examination, appropriate surgical indication and choice of prosthesis, technical difficulties, and close clinical and radiographic follow-up to optimize patient outcome.
Description We describe 2 cases of chronic knee dislocations, resulting of an occupational trauma, one with a global instability, the other with a postero lateral instability.
Both patients were male, 56 and 62 years old.
The first was a 10 months chronic knee dislocation treated with a constrained total knee arthroplasty. The patient was able to walk only by two crutches and an articulate knee-pad supporting.
The second case was a 16 months chronic knee dislocation, with a good residual frontal stability, treated with a postero-stabilized total knee arthroplasty.
We show the clinical and radiographic examination, selection of prosthesis model and follow-up at one year.
Conclusions Chronic knee instability is a rare entity and no treatment guidelines have been established. The only described treatments are arthrodesis and total arthroplasty.
When considering the patient's age, preoperative passive and active range of motion, degenerative articular changes, and chronicity of the dislocation, we chosed to perform a total joint replacement to alleviate symptoms of pain, stiffness, and instability.
Accurate knee testing to determine the pattern of instability seems essential for an appropriate choice of prosthetic model. A revision prosthesis in young patients remains possible. However total knee arthroplasty represents a pain-relieving procedure, which preserves joint mobility and stability, with satisfactory short- and long-term results.

MANAGEMENT OF TKA INFECTION WITH PREFORMED ARTICULATED KNEE SPACER. 7 YEARS OF CLINICAL EXPERIENCE

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Background Two-stage exchange technique is currently considered the standard treatment for the infected total knee arthroplasty. The aim of our prospective study was to assess safety and effectiveness of preformed articulated knee spacer for the management of the infected total knee arthroplasty.
Materials and Methods The preformed articulated spacer have the characteristics of an ultra-congruent condylar knee-prosthesis, made of acrylic cement impregnated with antibiotic (gentamicin). The device has standardised mechanical and pharmacological performances. In 2000 we started the use the device for the treatment of infection of knee prostheses with the two-stage exchange arthroplasty procedure.
Here is reported a clinical series of 30 consecutive patients. All knees presented the integrity of extensor apparatus and of peripheral ligaments (medial), furthermore type I & II bone loss according to Engh's classification. Mean implantation time was 12 wks. Post-op following std. rehabilitation program as with primary TKR.
Minimum F.U. was 6 months, maximum 79 (average 45).
Results The KSS score, after definitive reimplantation, has been excellent or good in more than 70% of patients as well as the functional score. Pain was absent 77%, mild in 23% of the patients; ROM remained unchanged between first and second stage or improved after definitive reimplantation; patients judged the result excellent or good in 85%. The walk ability was good in 60%, excellent in 15%. Seventy seven per cent of patients used only one crutch. Neither breakage nor macroscopic wear signs were detected. No complications related to the use of the device were observed.
Conclusions More than six years of clinical experience has permitted to deem the use of an articulated knee spacer in two-stage septic revisions the preferred option.
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SESSION 0-22

PRIMARY HIP ARTHROPLASTIES III

NANOS: NECK PRESERVING SHORT STEM: INDICATION, IMPLANTATION AND RESULTS

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The Nanos hip stem was developed 2002. 7 authors designed the stem design in conjunction with Endoplant GmbH, Marl, Germany. The design based on the human anatomy and l on the evaluation of 578 CT slides to gain data for the prototypes. Biomechanical results in solid bodies and in cadavers gave the direction to the actual form of nine stems. During the multicenter study the indication for the Nanos stem has been considered for patients under 60 years, body weight index of 30, without osteoporosis, without Coxa vara or valga. Particularly the minimal invasive approach benefits of the short design. The instrument design is adjusted to the minimal invasive implantation. The results of the multicenter study of 183 patients from 5 hospitals are: Patients which have been checked in the interval of 12–24 months had the following indications: 28 cases showed primary arthritis, 18 cases dysplasia, 3 cases necroses of the femoral head and one case Perthes disease. The average height was 170 cm, the average weight was 83.26 kg, minimum 55 kg maximum 124 kg. The average age of the operat-

ed patients was 57.4 years, minimum 41 years, maximum 78 years. Migrations or dislocations of the stem have not been stated. The Merle D'Aubigne average mobility was 5.34 preoperative, 5.77 postoperative of 6 possible points. Merle D'Aubigne pain and ability to walk increased from 7.32 to 11.73 postoperative of 12 possible points. The Harris hip score increased from 47.12 preoperative to 95.77 postoperative of 100 possible points. Ettinger presented the datas of 107 patients, 33 of them after 12 months` control and 1 of them after 18 months'control. Among 34 measurable cases the Harris hip score was on average of 48 preoperative and of 95 post operative. Biomechanical studies showed that the Nanos neck preserving hip stem is favourable to the implantation because of a minimum entry with minimum unfavourable stresses. With this design the femoral neck can partly be saved and it is at the same time used as fixation element. The early experiences with a facilitated stable stem implantation in the short-term controls and a high satisfaction rate of the patients motivate to promote the use of the Nanos stem and to await long-term results.

PRELIMINARY EXPERIENCE WITH A NEW MODULAR SHORT STEM IN TOTAL HIP ARTHROPLASTY

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Background Short stems to represent a valid option for total hip replacement in young patient, preserving proximal bone stock and partially retaining the femoral neck. We present our experience with the last evolution of metaphyseal stems (Metha – B-Braun) characterized by neck preservation, improved surface finishing and modular prosthetic neck.
Materials and Methods Between October 2005 and January 2007 we have performed 60 total hip arthroplasty (THA) in 56 patients using this modular short stem. In 38 hips we used metal-on-metal bearing surface with large diameter femoral head, while in the other 22 cases we implanted a metal back with ceramic-on-ceramic coupling. The mean age of the patients was 53.4 years and the mean follow-up was 1 year (2 to 18 months). Clinical outcomes with a minimum follow-up of six months (41 patients) and radiographic findings of all patients at 1, 3, 6 months and 1 year were evaluated.
Results The implant showed a good versatility in all type of pathologies (primary or post-traumatic arthritis, low grade dysplasia, AVN, epiphysiolysis and one revision of met-on-met resurfacing), being excluded only femoral neck fracture (only two cases replaced with Metha stem for a medial intracapsular fracture) or severe changes in proximal femur (severe dysplasia). Radiographic imaging showed a good integration and a good bone remodelling around the stem; no measurable subsidence or mechanical loosening was detected. No implant required revision.
Discussion The short-term results of this new femoral component, able to preserve both metaphyseal bone stock and femoral neck, are encouraging. Moreover it offer a proximal modularity able to restore joint biomechanics ever in presence of altered femoral torsion and variable neck-shaft angle.
Conclusions We consider this stem suitable for young and middle aged patient, in particular where a resurfacing arthroplasty is not considered appropriate. Moreover, the neck modularity (adjustable after stem implantation) offers a further indication in presence of proximal femur morphologic changes.

THE FEMUR NECK PRESERVATION WITH THE T.O.P.-C.F.P. SYSTEM: MID TO LONG TERM CLINICAL RESULTS

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Background The preservation of the femur neck bone stock in hip replacement surgery is an appealing concept to be applied to selected patients. The T.O.P. - C.F.P. design (link, hamburg, germany) allow a physiological distribution of the mechanical loads through the bone stock preservation, primary stability of the implant, articular function and secondary osteointegration with a minimally invasive surgery.the resulting mechanical asset decreases the varism occurring with conventional stems and restores a physiological environment for better functioning. We have examined this natural stress distribution of the forces with dexa evaluation in a few patients and we present our clinical results in the mid to long term follow up.
Materials and Methods 150 cases; 85 females, 65 males; age 40–78 years; follow-up 1–8 years.
Results Mean preoperative harris hip score (hhs)46; mean postoperative hhs 96. Operative time 45 to 60 minutes; blood loss 150–250 cc. complications: 1 sine causa chronic pain; 1 periprosthetic fracture; 2 neck fractures; 1 lung microembolia; 2 dvt; 11 limb length discrepancies.
Discussion and Conclusions the great advantages of the neck preserving hip replacement surgery on conventional designs is the mainteinance of the natural neck anteversion, off-set, better function and physiological bone loading through a natural stress distribution of the forces. We have confirmed the clinical results with a dexa evaluation on a restricted group of patient, demonstrating minimal bone loss compared to the data observed with conventional stems. Our clinical results suggest the success of this mini-invasive total hip replacement system.
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CLINICAL OUTCOMES OF ZIRCONIA BALL HEADS IN TOTAL HIP REPLACEMENT

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Background Up to the year 2000, approximately 900.000 zirconia heads have been implanted in THR, with contradictory results. Some authors recommend abandoning the use of zirconia for the high penetration rate of zirconia head when coupled with PE, others report very positive clinical results. However, few papers are reporting clinical failures, leading to hypothesize that a large majority of zirconia-PE bearings are performing in the intended way. Aim of the study was to measure head-cup penetration rate in an homogeneous series of hip prostheses with zirconia-PE bearings, as index of increased risk of revision.
Patients From Jan 2000 to Oct 2001, 26 Synergy THR (Smith&Nephew) with 28mm zirconia heads (Prozyr®) coupled with metal backed UHMWPE inserts were implanted in 11 male and 15 female patients with average age of 58 years (23 osteoarthritis, 1 osteonecrosis, 1 rheumatoid arthritis, 1 revision surgery). Patients were followed radiographically at 1, 3, 6 months postop, then sixmonthly. Average follow-up was 5.8 years. SF-36 schedule was administered to the patients.
Methods Penetration of zirconia head in PE insert was measured on standard AP XRays using a specially developed software based on Delphi (Borland Corp). The penetration was measured as displacement of head - inlay rotation centres. Pixel-to-mm conversion is based on the knowledge of nominal head diameter.
Results In our series we obtained good clinical outcomes (good range of motion and no functional activity limitation) within the time limits of the follow-up. No head fracture nor osteolysis had been observed thus far. As only complication was reported a recurrent

dislocation treated incruently. We observed a penetration rate of zirconia ball heads (range: 100–170 µm/yr) lower than the critical limit for the expectation of implant failure.
The literature concerning clinical wear of zirconia-PE bearings reports contradictory results, likely due to the dishomogeneity in the implants (different technology stage and manufacturing processes of zirconia heads, different PE sterilisation routes) and in terms of patients (age, activity) implant design, implant fixation, surgical technique. We remark the importance of considering homogeneous series of implants, made of high quality materials.
On the basis of our results we confirm the opportunity to strictly follow patients with zirconia-PE bearings to achieve long-term follow-up data, and we remark that low clinical wear observed in our series challenges the reports of surface degradation due to lack of stability of zirconia ceramics.

METAL ON METAL TOTAL HIP ARTHROPLASTY WITH LARGE HEADS: PRELIMINARY RESULTS

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Background Today's metal-on-metal technology is the result of many years of intense research, technology development and clinical evaluation. The advantages of using large femoral heads consist of: increased range of motion, reduction of mechanical stresses to the bone prosthesis interface, decreased incidence of dislocation and impingment between femoral neck and socket 1, 2, 3.
The authors reported a preliminary study of a new metal-on-metal hip replacement (Durom Hip Sistem – Zimmer, Warsaw, Indiana, USA) using big diameter heads. The study aim was to evaluate: intraoperative and early postoperative complications, prosthetic components placement and the surgeon's learning curve.
Materials and Methods From March 2005 to November 2006, 48 Durom Cup were implanted in 48 patients. In 45 cases we used a CLS stem and in 3 cases a Conus stem. Twenty patients were men and 28 were women, and their mean age was 61 years (range 40–70 years). In all the cases a mini posterolateral approach was performed. Pre and postoperative clinical assessment has been performed using the Harris Hip Scores (HHS). The postoperative radiographic analysis has been performed to evaluate the correct position of the implants compared to preoperative planning.
Results At a mean follow-up of 12 months (range 4–24 months), clinical and radiographic results are good and satysfactory in all the patients. No dislocations or infections and early aseptic loosening have occurred. Until now no periprosthetic osteolisys or stress-shielding images have been found.
Discussion In spite of early excellent results, there are some concerns and discussions about in vivo long term behaviour of such implants.
Conclusions In our study we observed the decrease to 0% of dislocations and components impingment; moreover we evaluated an increase of the R.O.M. comparing with the previous standard components. In our short experience the metal on metal Total Hip Replacement with large heads represents a viable choice, a safe procedure with acceptable surgeon's learning curve even though further informations and long term clinical results are necessary to evaluate the long lasting failure rates.
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THE USE OF THE ALLOCLASSIC STEM AND LARGE DIAMETER FEMORAL HEADS IN HIP REPLACEMENT SURGERY: 10 YEARS EXPERIENCE

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Background The choice of the right implants in hip replacement surgery is based on many factors such as, the geometry of the prosthesis, the tribology of the components, the diameter of the femoral heads, the primary stability of the implant and the restoration of the biomechanical parameters. The rationale for the use of the alloclassic stem associated with large femoral heads is supported in the literature from the results of high friction resistance, long survival rate and good articular function. We present our ten years experience with the alloclassic stem associated with large femoral heads.
Materials and Methods 45 cases treated in the decade 1996–2006. Age range: 33–65, mean age 54 years. No statistically significant differences in sex or side operated. Minimum follow-up: 1 year.
Results Mean preoperative hhs 46; mean postoperative hhs 96. 1 aseptic loosening with metallosis. Zero dislocation rate.
Discussion and Conclusions The recent interest on metal-on-metal articulation in hip replacement surgery is supported in the literature from the introduction of new materials and a more comprehensive tribology association between the components. The alloclassic stem has shown a 94 to 100% survival rate up to 10 years. The association of a low friction system such as the alloclassic stem and large diameter femoral heads match a durable fixation system with the reduction in the early risk for dislocations. Our clinical results support similar positive data reported in the literature.
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RM PRESSFIT CUP. OUR EARLY EXPERIENCE

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Background The Robert Mathys (RM) acetabular component was introduced in 1973 as a monoblock, emispherical, uncoated, polyacetal than (1977) polyethylene socket (with two pegs cranially). After preliminary good results, it showed a catastrophic trend in the 5–10 year f.u. studies [1, 2]. With the same design and concept of isoelasticity, a layer of hydroxyapatite or powder of pure titanium were added to avoid the direct contact with bone. This kind of RM cup obtained very good results [3, 4, 5]. More recently the Mathys Ltd (Bettlach, Switzerland) have introduced a new evolution of RM Classic: the RM press-fit cup, an elliptical (with slight polar flattening), monoblock, titanium-coated socket, without blocking pegs. We report our experience using RM Pressfit cup.
Materials and Methods From January 2006 we applied 27 sockets in 27 patients (8 males, 19 females) with a mean age of 75 years (70 to 86). The diagnosis: OA in 10, femoral neck fractures in 17 patients. All the patients were reviewed postoperatively, at 45 days and for this study with a medium f.u. of six months.
Results All the patients were reviewed. No radiolucent line was noted in any of the three zones of De Lee and Charnley. There were no cases of cup migration or dislocation, no early or delay infection.

Conclusions We are very positively impressed using this socket because of easy application and instrumentation. The catastrophic results with the first RM cup were due to the polyethylene-back-side wear [6]. We are also encouraged by the very positive results reported in Literature with the RM titanium-coated classic cup.

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RADIOLOGICAL EVALUATION OF THE METAL-BONE INTERFACE OF A POROUS TANTALUM ACETABULAR COMPONENT

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Introduction Porous tantalum presents a bone-matched elastic modulus and an high coefficient of friction on cancellous and cortical bone. Furthermore, its open-cell tantalum structure of repeating dodecahedrons, similar to cancellous bone, should be favourable for bone ingrowth. These physical and mechanical properties should increase primary fixation and potential osteointegration of acetabular cups and should decrease periacetabular stress shielding. The purpose of this study was to radiographically evaluate the evolution of the metal-bone interface of porous tantalum acetabular components.

Materials and Methods Serial radiographic evaluation of 41 porous tantalum acetabular component has been performed in 40 patients. Twelve hips underwent total hip arthroplasty using a trabecular metal monoblock acetabular component and 29 hips using a trabecular metal modular acetabular system. All patients were clinically and radiographically evaluated at four, eight, 12, 24 weeks, 12 months and then annually. All cases were available for a minimum follow-up of two years (mean 35 months). On post-operative x-rays the metal-bone interface was investigated for areas in which the porous surface of the acetabular component was not in contact with bone. These gaps were measured and classified by location according to DeLee and Charnley zones. Evolution of post-operative gaps, presence of lysis or periacetabular radiolucencies and component migration were assessed during follow-up.

Results On post-operative x-rays 36 components (88%) had a gap between the outer surface and the host bone but only in 12 cases (29%) gaps were larger then 1 mm. The gaps were mostly situated in the polar region (zone II) when compared with the peripheral zones and no one was bigger then 5 mm in width. At last follow-up 23 (64%) of the initial gaps were no longer radiographically evident, 10 (28%) had a favourable evolution and appeared reduced in dimension but still present and 3 (8%) didn't fill at all and were unchanged when compared with post-operative controls. There was no progression of any post-operative gap and no evidence of new periacetabular radiolucent lines or lysis. No acetabular implant showed evidence of migration or needed revision for loosening. At last follow up the mean Harris Hip Score was 95. There were no dislocation or other complications.

Discussion Short term results with porous tantalum acetabular component are encouraging: the bridging of the interface gaps and the absence of periacetabular radiolucencies indicate good mechanical and osteoconductive properties. Further follow-up will be required to confirm these results in the long term.

THE COTILE TRILOGY. REVIEW OF OUR CASUISTRY AFTER 10 YEARS

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In the Complex Operating Unit of our hospital, they give approximately 10 years that we use the cotile trilogy for hip surgical total prosthesis participations in patients with fracture of the femoral neck or arthrosis of the hip. The authors have see again the cotili implanted in the period with minimal follow-up of 8 years, finding optimal results at a distance, with almost null relative data to the mobilization and usury of the polyethylene. They come indicated the characteristics of the cotile and the technical modifications that the house manufacturer has brought in the time with the introduction of new biomaterials.

THE TMT IN HIP PROSTHESIS: OUR EXPERIENCE

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Background The necessity of reduce the aseptic mobilizations of the prosthetic systems through the creation of more bicompatible materials and therefore able of osteointegration, has carried to the synthesis of the Trabecular Metal; its characteristics are similar to the trabecular bone, and it comes obtained through the infiltration and the successive tantalum gas vapor warehouse (a pure metal like titanium, highly biocompatible and resistant to the corrosion) on reticulated of glasses carbon, a material with low density and high percentage of empty volume (97%).

The physical and mechanical characteristics of this new material are unique in order to guarantee an effective primary stability and through a osteoinductive and osteointegrative ability it guarantees an optimal secondary stability, as demonstrated by the studies on animal executed by Bobyn.

In order to take advantage at the best and to value the property of the TMT it has been designed an elliptic geometry acetabular component, obtained with a 2 millimeters increase of the equatorial diameter of the goblet for an optimal primary stability of the system.

Materials and Methods Made curious from these "credentials" we have begun our experience with the TMT acetabular components in 1999 and at today we have treated a total of over 100 patients. They come classified by sex, age, operated side and pathologies. We have revalued over 50 operated patients. The Patients have been examined clinically, according to the Harris Hip Score, and from the instrumental point of view: radiographically and with an machine for densitometry (Lunar DPX Bravo-GE).

Results The minimum follow-up is 24 months and the maximum 96 months. It is been taken in consideration the eventual radiographical change of the superior portion of the goblet greater than 3 millimeter and/or than 8° in comparison to the post-operative x-ray and the eventual radiolucency lines, considering the 3 zones codified from Gruen, that is areas of 60° each one of the acetabular goblet. This Gruen's zones come estimated also with the densitometry.

Discussion and Conclusions The good obtained results, above all considering the instrumental data, underline that the osteointegrative abilities of these TMT implants guarantee an optimal secondary stability that improve the prosthetic survival.

SESSION O-23

PRIMARY HIP ARTHROPLASTIES IV

COMPLEX HIP ARTHROPLASTY AFTER ACETABULAR FRACTURE

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Background Hip prosthesis for sequelae of acetabular fracture can be a challenging procedure, has a higher percentage of complications and give worse clinical results in respect to the same procedure when performed in other pathologies. Our purpose was to review the intermediate-term results of total hip arthroplasty in patients with posttraumatic arthritis and compare them with data published in literature.
Materials and Methods Thirty-eight total hip arthroplasties were performed for the treatment of posttraumatic osteoarthritis after acetabular fracture. The median interval between the fracture and the arthroplasty was 27 months (range, eight to 444 months). The average age at the time of the arthroplasty was fifty-two years (range 26–78), and the average duration of follow-up was 27 months. All patients had had prior open reduction and internal fixation of their acetabular fracture.
Results At a mean follow-up of 27 months the mean Harris Hip score was 89. In three patients dislocation occurred; in patients with big diameter heads it was not registered any case of dislocation. Six patients developed heterotopic ossification degree I or II of the Brooker classification. Two patients required revision for loosening of the acetabular component.
Discussion According to us, emispherical press-fit cups can be used in the majority of the patients. The use of big diameter heads seems to reduce the incidence of prosthetic dislocation.
Conclusions The intermediate-term clinical results of total hip arthroplasty for posttraumatic osteoarthritis after acetabular fracture seems to be similar to those after the same procedure for nontraumatic arthritis when the acetabular fracture had been internally fixed initially.
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CONVERSION OF HIP ARTHRODESIS TO TOTAL JOINT ARTHROPLASTY

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Background Hip arthrodesis remains an excellent treatment for pain control and global articular recovery of function in patients affected with major hip traumatisms, congenital pathologies and sepsis outcomes [1]. This treatment permits to obtain a pain relief and joint stability. Nevertheless, the developing of degenerative arthritis of the spine, contralateral hip, and ipsilateral knee supplies the main indication for a takedown of the fused hip and conversion to a total joint arthroplasty [2].
Materials and Methods We performed a control in 72 patients (73 hips, 41 females and 17 males) who had conversion of a fused hip to a total joint arthroplasty (clinically and radiographically checked in 47 cases, contacted by phone or letter with a recent radiograph in 7 cases, contacted by phone in 4 cases, 14 patients were died, untraceable or unable to cooperate). Younger patient was 21 years old, while older was 79 years old. Average follow-up was 72 months (range: 4 months to 14 years).
Results A clinical check in 47 patients and a check by phone or letter in 11 patients using the HHS Score pointed out 38 highly satisfied patients, 14 quite satisfied patients and 6 unsatisfied patients. Two of these six patients showed positive Trendelemburg sign. Other two patients showed prosthetic socket loosening. The fifth patient was under antibiotic treatment for sepsis and the sixth patient reported a lesion of the ischiatic nerve.
Discussion Subjective unsatisfactory outcomes are related to common problems (sepsis, aseptic loosening, iatrogenic lesions) and to surgical techniques flaws. Subjective quite satisfactory outcomes are often due to muscles insufficiency (especially pelvitrochanteric ones). Low back pain and knee pain related symptomatology should get better by conversion of the arthrodesized hip to arthroplasty.
Conclusions Revision of a hip arthrodesis to a replacement arthroplasty can lead to satisfactory results, on condition that some parameters are respected, namely the respect of the muscles during the operation and the restoring of a good muscular balance with adequate abductors lever arm. Preoperative and intraoperative status of the gluteal muscles should be carefully evaluated [2]. Rehabilitation of the operated hip is equally important.
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MINIMUM 10-YEAR POSTOPERATIVE HEALTH-RELATED QUALITY OF LIFE AND HIP FUNCTION IN PATIENTS WITH TOTAL HIP ARTHROPLASTY

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Background In most previous publications surgeon-oriented criteria were used to evaluate total hip replacement (THR) results, whereas there is a paucity of data on patient-oriented assessment of the very long-term outcome of this procedure.

Materials and Methods We conducted this retrospective, multi-centric, follow-up cohort study to evaluate the minimum 10-year outcome of THR by validated instruments. A total of 486 patients fulfilling the following inclusion criteria underwent THR in two university hospitals in the 1983–1996 period: 1) age at operation = 70 years; 2) primary THR performed for elective or traumatic disease; and 3) use of cemented or cementless components. Exclusion criteria were 1) patients older than 70 years at operation; 2) revision hip arthroplasty; and 3) hip hemiarthroplasty. The patient-oriented assessment included: an SF-36 questionnaire, WOMAC, Functional Comorbidity Index, Harris Hip Score, and a study-specific questionnaire. The results were statistically analysed and compared with normative data or results of previously published series. Relationships between explanatory variables and outcomes of interest were also checked by multiple regression analysis.
Results The three WOMAC subscales and the SF-36 subscales showed significant improvements on follow-up. SF-36 scores were similar to age- and sex-matched norms. The WOMAC score was higher than 80/100 in 90% of non revised patients. 85% of patients were satisfied with the outcome of their surgery. Significant inverse association was found between comorbidities and subjective outcomes on multivariate analysis.
Discussion Both the SF-36 and the WOMAC scores of patients approximated the normative values or were remarkably similar to the postoperative data obtained using the same instruments in other studies that had much earlier follow-up dates.
Conclusions Patients who had undergone THR a minimum of 10 years earlier have a satisfactory self-reported health-related quality of life and good function of the operated hip.
Suggested readings

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OUR EXPERIENCE WITH THE SYMAX PROSTHESIS

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Background The philosophy of the prosthesis Symax is to combine the characteristics of a straight stem distally (reduction of the adverse strengths of reaction of the joint and the risks of dislocation, physiological restoration of the rotation center, better balancing of the soft tissues, more natural distribution of the loads) with those of an anatomical proximally (to favor the neutral alignment of the stem). The prosthetic design combined to modern materials has allowed to get a stem that results to be a good alternative is in case of fracture of the femoral neck that in the coxartrosis.
Materials and Methods We have clinically revalued, through the Harris Hip Score, and radiographically, 50 implants of over 80 patients treated both for fracture and for arthrosis, from January 2005; it will be considered the sex and the age; someone of this patients is bilaterally treated.
The follow-up has been least of 6 months and maximum of 34 months. Our evaluations have entered besides to belong to a European multicenter study (E.B.R.A.) what it is established to appraise the survival of the implants appraising the possible micromovements of it.
Results The resulted scores have been notably satisfactory, underlining a mean HHS at 6 months of over 93 and a mean HHS at 2 years of over 98; a successive appraisal will be executed in November 2007.
Discussion and Conclusions For this type of stem the surgical technique can be defined "simple" and well reproducible; any intra or extra-operative adverse event has never happened and the patients have not reported painful symptoms anymore; in all the cases the resumption of the functionality has been rapid. If besides the results of the study E.B.R.A. will confirm those that are the expectations, we can affirm that the philosophy of this implant has succeeded in finding the correct compromise to get a long prosthetic survival with good functional results.
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SHORT TERM FOLLOW-UP AND SERUM IONS LEVEL IN METAL ON METAL BIG HEAD (36 MM) HIP JOINT REPLACEMENT

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Background MoM implants have the advantage of lowering the wear, equivalent clinical results and a potential more stable joint, using larger femoral heads, compared with current generation metal on polyethylene bearings The concern is the production of metal ions and the subsequent elevated metal ion level detected in patient's blood [1, 2].
Aims of this ongoing study is to evaluate the clinical outcome and the ion level in the serum in a population of patients undergone to total hip replacement (THR) by a MoM, uncemented, 36mm diameters (Ø) with a mean f-u 18 months.
Materials and Methods 54 consecutive primary THR by the same staff and same surgical posterior approach from 2004 to 2006 have been implanted.
Gender: 52 males, 2 females; mean age 60 y (40–70). Cup size from 52 to 60 joined stem size from 2 to 7 have been used, a 36 mm Ø metal head always implanted.
All the cases will be evaluated preoperatively an postoperatively by HSS, Oxford HSS, X-ray and for 32 of them blood samples.
Results The mean HSS and Oxford HSS postoperatively vs. preoperatively has been statistical meanigfulness: $p<0.05$.
The blood samples to evaluate the ions (CrCoMo), analized by an independent laboratory in Germany, showed median levels superposable to the values described in the literature [1, 2].
We noticed 20% ectopic calcifications classified by Brooker's rate. Three patients are lost in the follow-up.
Discussion The ectopic calcifications, which are all painless and don't affect the joint function, are more often present in the patients very active and with a good muscle mass, maybe due to the better osteogenic capability of bone marrow smithereens spreaded during surgery.
Conclusions The use of Mom shows satisfactory clinical and radiographic outcome and fast recovery.
The Cr-Co-Mo levels don't show up to now to increase more than the levels described in the literature, even if the 36 mm Ø have been implanted rather than the smaller ones (28–32 mm Ø) . Surely the most important concerns about this kind of implant are the ion levels in the blood and a safe level has yet to be defined.
Suggested readings

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EARLY AMBULATION IN HIP PROSTHESIS: EPIDURAL ANAESTHESIA VS COMBINED ANAESTHESIA

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Background It is very well known how fundamental is a precocious "reactivation" after a hip prosthesis in order for the patient to have a fast functional recovery [1].
Our research team has debug an anaesthesiologyc technique, together with an antalgic post-surgery treatment with strong opioids (oral administration), which has allowed the patients to "reactivate" in 8 hours after the surgery [2].
Materials and Methods During this preliminary experiment, 30 patients (13 women and 17 men), average age of 54 (+12) have been treated with combined anaesthesia (22 patients) or with epidural (8 patients) and after the surgery they have been administered Oxycodone CR beginning with a dosage of 10 mg every 12 hours.
Conclusions This treatment enabled to keep an average NRS value of 1,2, with an excellent control of the side effects (only four patients reported light nausea) and therefore giving the possibility to begin the physiotherapy 8 hours after the surgery. The 86.6% of the patients have been "reactivated"; the average capability of bending and abduction has been respectively 75.17 and 29.17.
Twenty-eight patients were able to reach a sitting posture (17 needed help, 7 autonomously); 24 were able to reach a standing posture (9 needed help, 15 autonomously) and 22 were able to walk (9 needed help and 13 autonomously). The level of pain measured during the rehabilitation turned out to be: absent in 56.6% of cases; light in 26.6% of cases, medium in 10% of cases and severe in 3.3% of cases.
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TOTAL HIP PROSTHESIS AND TRANSFUSIONS WITH A NEW BIPOLAR HEMOSEALER

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Background The aim of this study is to estimate the effect of a new bipolar irrigated radiofrequency in the reduction of bleeding after total hip prosthesis (THP).
Materials and Methods In this prospective study, Oct.-Dec. 2006, we evaluated blood losses after primary total hip arthroplasty. Exclusion criteria were anti-aggregation drugs not suppressed 10 days before surgery, not-weight bearing indication after operation. We included total hip arthroplasty with the same posterior surgical approach, spinal anaesthesia, hypotensive anaesthesia and peri-operative blood salvage (Ortho PAS, Euroset). In some a new bipolar Radio-Frequency sealer (Aquamantys, Tissuelink). The post-operative (PO) programme had pain control, Low Weight Heparin for prevention of DVT, muscle exercises from the day of surgery and walking on crutches from the next day. We analysed blood loss after surgery and for 3 days, haemoglobin value(g/dL) before surgery and for 5 days PO, adverse events as transfusions and luxation. For the statistical evaluation were used the paired "*t*-test" with a level of significance set at 95%.
Results Tissuelink was used in 72 patients. For the blood loss evaluation, the presence of no homogeneous preoperative haemoglobin lead us to analyse the decrease percentage of preoperative haemoglobin (%CHb). The incidence of transfusion (TI;limit Hb<8g/dL) was related to oerative Hb and the age. In prostheses implanted associated to the use of the TissueLink there was blood saving. In fact the decrease of haemoglobin was reduced (%CHb medium of 22.64 to 1 day 27.03 to day 2, 27,90 to day 3 and 28.92 to day 5) and consequently also the transfusion index was low, with only 8% eterologus blood. Ulterior advantages are the reduction of the oedema of the thigh of 31% and pain during rehabilitation of 27%.
Discussion Reduced blood loss, reduced post-operative pain and a faster functional resumption are obtained with TissueLink sealer. In addition TissueLink sealer provides reduced post-operative swelling. Further studies are required.
Conclusions This study shows that the use of an irrigated RF bipolar sealer can lead to reduced blood loss and faster functional resumption following hip surgery.
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ADVANTAGES IN THE USE OF THE NEW BIPOLAR SEALING DEVICE IN TOTAL HIP ARTHROPLASTY

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Background The purpose of this study is to evaluate the influence of a new bipolar sealing (Aquamantys) on blood loss and postoperative recovery in patients undergoing total hip replacement (THA). Bipolar sealing system works in conjunction with an electrosurgical generator for simultaneous delivery of radiofrequency energy and saline. This technology reduces intraoperative and postoperative blood loss, provides a significant clinical benefit over standard electrocautery in patients THA and avoids the damaging of tissues due to cooling the tissue surface (with the temperature never exceeding 100°C).
Materials and Methods Eighty patients undergoing unilateral primary total hip arthroplasty were randomized into two groups. The first group consisted of forty patients in which the bipolar sealing device was used, while the second group consisted of forty patients in which the conventional electrocautery wound treatment was used. Parameters compared between the two groups included estimated intraoperative blood loss, postoperative wound drainage, change in hemoglobin levels, INR, transfusion incidence and postoperative recovery.
Results The use of bipolar sealing system resulted in a reduced drop in postoperative hemoglobin levels in first group patients (3.6 g/dl±0.6) versus the control group patients (4.8 g/dL±0.8). The combined intraoperative and postoperative blood loose was significantly less in the first group (647 mL±154.1) treated whit bipolar sealer device compared to the second group (976 mL±270 mL).
Conclusions At present time, few strategies are focused on blood loss reduction in THA while transfusion needs, postoperative hematomas and bruising still have a non negligible rate . The use of this bipolar sealing device results in a significant reduction in blood loss compared to conventionally electrocautery, decreases the transfusions rate, and lowers local complication rate.

THE PROTHESIC TREATMENT OF COXARTHROSIS: THE MEDICO-LEGAL OPINION OF THE ORTHOPEDIC

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Background The musculoskeletal system and the all organism consider an articular prosthesis like a foreign body. Therefore all strategy of surgery on hip prosthesis must be based on this assumption. The excessive enthusiasms must be moderate with a careful and scrupulous observation of the biological and dynamic phenomena that represent the cause of a defective result. If the generic operating risk is evident in its characters, the specific one, especially in a surgery like the prosthesic one, could almost be unpredictable. Therefore the not favourable outcomes of this surgery may vary from a

defective result to a complete failure through an arc of negative appraisals that induce the patient to contest the surgeon's action.
Materials and Methods And this is why we think is useful to analyze the possible causes of behaviour responsibility in relationship with risks and complications in the artroprothesic treatments of the coxartrosis (starting from the generic disappointment in the result, the insurgence of inflammatory processes, the painful simpthomatology to the functional failure) drawing some clinical and forensic considerations.
Discussion and Conclusions The prothesic surgery is always full of unforeseeable and often not valued difficulties. If the generic operating risk is known in its general characters, that specific one can be entirely unpredictable due to not enough experience on the individual biological reactions. So the objective requests to the surgeon are: skillness, precaution and diligence that comes from the experience in this particular surgery which meets the defective results coming from the underestimation of the complexity of the surgical intervention and the relative biological phenomena.
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SESSION 0-24

HIP ARTHROPLASTY REVISION

STRATEGY OF CUP REVISION IN MASSIVE ACETABULAR DEFECTS

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Background Reconstruction of massive acetabular defects in revision total hip arthroplasty is a challenging task.
Surgical reconstruction depends upon the extent of bone loss and consequently a correct preoperative classification of the type of defect is mandatory. We based our study on the Paprosky classification, the most suitable for the surgical planning.
The principles of acetabular reconstrutive surgery are to provide a stable acetabular component, to fill bone loss whenever possible and to restore biomechanics, that is the correct hip center of rotation.
Materials and Methods From 2004 to 2007 a series of 28 patients was studied. The age at the time of surgery ranged between 52 to 84 years with an average of 73. The mean follow-up was 2 years.
Cementless large hemispherical cups with or without screws were implanted in 57% of the patients. In the remaining cases, eccentric cups (18%) or special implants (25%) were used, sometimes with cement applied on morsellized cancellous bone graft.
In large osteolysis structural bone graft was fixed by screws inserted in the cup and advanced through the graft up to the host bone.
All the patients were evaluated clinically with the Harris Hip Score and radiographically at 1, 3, 6 months and yearly after surgery.
Results At 2 years follow-up patients had a mean Harris Hip Score of 75 points and radiographic controls showed a stable fixation in 93% of the cases.
The relationship between loosening (7%) and quality of the bone stock before revision was highly significant.
Discussion Our acetabular reconstruction strategy is based on standard or oversize cups when the host bone can provide sufficient stability to the implant, otherwise we resort to reconstruction rings or stemmed cups.
More precisely, in Paprosky type I we use cementless standard hemispherical cups; in type IIA large hemispherical cups with additional screw fixation and morcellized graft to fill in the cavitary defect; in type IIB eccentric cups, to avoid a structural graft to reconstruct the superior rim; in type IIC and IIIA oversize cups together to a structural graft fixed with screws, or reconstruction rings with iliac wings and caudal hook plus morcellized graft. In case of severe bone loss in the ischium, as in IIIB, we use stemmed cups, plus morcellized graft, which provide an eccellent iliac support.
Conclusions The revision surgery should be performed before significant symptoms manifestation and severe bone loss setup. The Paprosky classification can effectively guide the choice of the best surgical option.

THE "WALL-SOCKET" TECHNIQUE. PROPOSAL FOR A NEW SURGICAL PROCEDURE FOR REVISION ACETABULAR ARTHROPLASTY

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Background Acetabular cup revision procedures are frequently difficult and troubled by problems concerning loss of bone-stock often due to the osteolytic effects [1]. This bone deficit can be filled in different ways: (a) with morcelized allografts together with cement [2], (b) with a new cemented cup [3], (c) with acetabular cages [4] and (d) with revision cups (i.e. Jumbo or Oblong) [5]. However the (a) technique may lead to a high incidence of prosthetic migrations, the (b) and (c) techniques are associated with a high morbidity rate and the (d) technique affects long-term fixation because it does not repair the bone deficit. Lately, a new technique named "double socket" [1] has been proposed in order to enhance the stability of the prosthetic socket, removing only the polyethylene liner when the shell component is in an ideal position for loading (i.e. right antiversion and right tilt) and cementing the new liner inside the prosthetic shell. In the opinion of the author it is possible to extend this technique even in case the acetabular cup has undergone inferomedial migration in place, simply loading it by inserting a second cemented cup alongside.
Materials and Methods Two patients (37 years-old 120 kilogram male weight, 83 years-old 50 kilogram female weight) have undergone acetabular revision. Original cups (an uncemented version and a cemented polyethylene version) were both cephalad rotated and considerably resistant to repeated removal attempts, compelling the surgeon not to remove these sockets. A new cemented polyethylene cup was put alongside the previous cups with a physiological orientation.
Results The younger patients underwent a new revision procedure 7 years after, while the older patient still walks painless with full-load bearing.
Discussion This new acetabular revision proposal seems to be very useful in elderly patients. Infact the use of a polyethylene cemented

cup, a cheap surgical option, allows to achieve an immediate rigid fixation, allowing the patient to walk with 100% load by the second post-operative day [6], permitting to shorten surgical times and to diminish blood loss. The unremoved prosthetic socket, even better stabilised by the new cement, works as a support wall in Charnley and DeLee's zone 3, an acetabular X-ray sector notoriously subordinated to damaging destractive forces which can cause loosening of the original prosthetic socket.

Conclusions The analysis of two clinical cases illustrates the usefulness and effectiveness, especially in elderly patients, of the proposed method, that the author has named "wall-socket technique".

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CONSTRAINED CUPS FOR HIP DISEASES AND REVISION THA

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Background Constrained cups are used for dislocating THA, for THA revision and for selected hip first implants. Both good results and concerns are reported in literature; beside absence of recurrent dislocation in 96% at 2 years [1, 2] and reduction of a new dislocation rate from 32% to 2,4% [2, 3], elevated rates of failure due to aseptic loosening, sepsis and dislocation are reported: 6% at 10 years [4], 16% at 2 years [5] and 42% at ten years [6].

Materials and Methods We implanted 36 constrained cemented cups Lepine™ from 1999 to 2006 (29 females, 7 males, mean age 72 years – range from 49 to 85 years) for 16 dislocating THAs, 10 loosened THAs (7 aseptic and 3 septic), 2 THA revisions for periprosthetic fracture and 1 failed bipolar arthroplasty. In the remaining 7 cases the cup has been used as first implant.

Clinical analysis, according to the Harris Hip Score, and radiological evaluation for sings of implant's rupture and mobilization have been performed at regular intervals.

Results We evaluated 27 cases (4 died, 5 lost) with a mean follow-up of 3 years (min 8 months, max 7 years). We did not find re-dislocations and ruptures of the implants; 25 patients showed good clinical results, with increased walking ability, acceptable range of motion and pain relief, while the remaining two cases showed clinical failure (one due to persistence of infection, the other to pain). At this moment, none of the patients underwent new surgery for revision or implant's failure.

Discussion and Conclusions Constrained implants are not indicated in young and active patients, where the dislocating THA or the risk of dislocation following a revision THA must be treated with re-positioning of the components, with using large diameter heads and with other surgical techniques. In less active patients these implants ensure immediate and permanent stability; also they are indicated for THA in patients with neurological and cognitive diseases and muscular laxity. Since our cup allows a tolerance (1,2 mm) of the head into the locking device, we hypothesised that this movement could reduce the stresses at the bone-implant interface and therefore the mechanical failures.

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ACETABULAR RECONSTRUCTION WITH STEMMED CUPS IN PROSTHESIS REVISIONS: GUIDELINES, ADVANTAGES, A NEW EVOLUTION OF METHODOLOGY

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Background The Authors describe their experience on acetabular revision using different stemmed cups.

Materials and Methods 130 cases of acetabular reconstruction have been taken into consideration. Traditional Mc Minn cup was used at first; then, since 2002 a new modular system has been introduced. It's made of two different items, cup and stem linked through a Morse cone (Procotyl Z). The implantation of the two components in separate succession makes the surgery technique easier and in this way the ante-version can be regulated precisely after implanting the stem. Moreover, an easier reconstruction of acetabular osteolysis may be carried out through non structural bone grafts set before the final implantation of the cup.

This system has proved extremely reliable and it has allowed successful outcomes in the most complex cases. The basic stability of the implantation, which is feasible with correct stemmed cups, determines a high reduction of mechanical stress on the medial acetabular wall. This is confirmed by the constant x-ray evidence of the grafts rehabilitation with the reconstruction of structured acetabular bone tissue.

The complementary use of homologous bone has made the implantation of the cups with relatively small diameter possible, even with serious acetabular faults, obtaining a consistent increase in pelvic bone mass after full recovery.

Discussion The new experience presents a further evolution of the method through a stemmed cup (OMNIA) which adds characteristics of great modularity to the system. It is a hemispheric cup provided with 8 holes along its surface at different distances from the pole. These holes can receive indifferently two kinds of stems:

1. Conic stems with larger diameter set before the implantation of the cup. The choice among the different holes allows a precise modulation of the acetabular inclination, whereas the rotation of the cup regulates the ante-retroversion exactly.
2. Conic stems with a smaller diameter set from the inside after the implantation of the cup.

Both stems, which are available in different measures, have radial wings with antirotational effect.

After describing the surgical technique, the Authors will present their preliminary results.

Conclusions The versatility of this system, which offers the possibility to effect various types of fixations associated among them, and the hemispheric shape of the cup suggests a wider application of this method to all the acetabular revisions in the future.

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MINIMUM 10-YEAR FOLLOW-UP RESULTS OF ANTI-PROTRUSIO CAGE AND MASSIVE ALLOGRAFTS FOR THE MANAGEMENT OF PERIPROSTHETIC ACETABULAR BONE LOSS

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Background The treatment of periprosthetic acetabular bone defects with bulk allografts and reinforcement rings provided successful mid-term outcomes [1]. The present study evaluates the long-term results in the management of acetabular osteolysis using structural allografts supported with a Burch-Schneider Anti-Protrusio Cage (APC).
Materials and Methods From January 1992 to December 1996, 80 total hip replacements (THR) underwent revision surgery. Acetabular bone loss included III and IV types according to GIR classification. 16 patients (1 bilateral implant) died for unrelated causes with a well-functioning THR in situ and 3 were lost at follow-up. The study group consisted of 60 hips in 59 patients, 15 males and 44 females, aged from 29 to 84 years (medium 64). Average follow-up was 11.9 (10–14.9) years. Surgical technique included filling acetabular bone defects with bulk allografts supported with a Burch-Schneider APC. A polyethylene socket was cemented into the metal cage. Ambulation was allowed one week after surgery, but weightbearing was delayed two months. Clinical evaluation was performed using Harris hip score (HHS). X-ray examination assessed the signs of instability of the cage and the progression of the bone graft. Failures were considered revision of the acetabular component for any cause, migration or loosening of the acetabular implant, and severe resorption of bone allograft.
Results Deep infection occurred in 3 patients and 2 of them underwent resection-arthroplasty. In 5 cases an extensive resorption of bone graft followed by loosening of acetabular cage developed, requiring rerevision in 4. X-ray signs of graft incorporation were observed in 50 of the remaining 52 hips. Average HHS values of 30 (11–81) and 76 (28–100) points were assessed respectively in the preop and at follow-up.
Discussion In extensive acetabular bone loss the placement of reinforcement rings combined with massive allografts has been advocated in order to prevent bone graft resorption and cup loosening. Burch-Schneider APC is able to protect the graft spanning the defects and promoting augmentation of periprosthetic bone stock [2].
Conclusions With a cumulative survival rate of 83.3% at an average of 11.9 years, the use of APC and structural allograft proved out to be an effective procedure in the long-term reconstructive treatment of severe acetabular bone deficiencies.
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PRELIMINARY RESULTS OF THE REVITAN CEMENTLESS MODULAR REVISION STEM

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Background A retrospective study was conducted to review preliminary results of the Revitan (Centerpulse, Winterthur, Switzerland) modular revision stem. Some authors described the fixation pattern of the straight stem that showed a double-taper press-fit fixation with rotational stability provided by eight longitudinal fins that lock into the cortical bone. Other straight distal-fixation taper stems, already proved in literature their efficacy in bridging severe proximal bone defects or periprosthetic fractures. Particularly, these distal-fixation revision stems were indicated in those cases where because of a difficult primary removal the surgeon performed a transfemoral approach.
Materials and Methods From May 2005 to March 2007, 20 consecutive hip revision surgeries were performed with the Revitan straight stem at our institution in 20 patients. There were 12 females (60%) and 8 males (40%) whose mean age at surgery was The diagnosis was aseptic loosening in 12 cases (60%), septic loosening in 4 cases (20%), 3 periprosthetic fractures (15%) and one revision stem mechanical failure (5%). A Wagner's osteotomy was performed in 10 cases to remove primary implants.
Mean post-operative follow-up was 10,5 months (range, 1 to 21 months). The clinical assessment consisted of the Harris Hip Score, subjective VAS pain and satisfaction evaluation. Standard AP and lateral x-rays of the hip were obtained at each follow-up visit. Leg length discrepancy was also investigated as a factor possibly affecting outcome.
Results Clinical assessement showed a significantly improved mean Harris hip score from 48 points preoperatively to 76 points at follow-up (p<0,05). The subjective VAS and satisfaction scores at follow-up were respectively 2 and 8.3 points. Average postoperative leg length discrepancy was -4mm (range, -30 to +10mm).
Discussion The functional outcome had a significative improvement of the Harris Hip Score to an average 76 points. This represents just a fair result, but could reasonably be justified by the very short follow-up of some patients that were still undergoing their rehabilitation program. Thus, it should be expected to grow as the follow-up interval lengthens up. As far as pain is concerned, it was generally limited and patients showed an overall subjective satisfaction.
Conclusions Although these preliminary results need a longer follow-up validation, the Revitan stem proved to be a dependable revision system whose characteristics could be appreciated especially when facing major proximal bone defects.

CONSERVATIVE HIP REVISION WITH FEMORAL NECK/BONE STOCK PRESERVING IMPLANTS

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Background Principles of bone preservation, directed to maintenance of biological structures for implant fixation and integration, are currently experiencing wider indications (extended to procedures classically related to significant aggression of muscular and bony structures as revisions).
Spreading of conservative primary arthroplasty (resurfacing, neck retaining and bone stock preserving implants) has led to occasional implant loosening in absence of severe bone defects, able to be replaced with conservative stems.
The experience obtained with primary preserving implants has, on the other hand, given a proper background for implant selection for conservative revision arthroplasty.
Materials and Methods Our practice in this peculiar procedure is mainly based on revision of resurfacing prostheses (5 cases) and neck retaining implants (2 cases).
For each hip, the minimal resection level has been pre-operatively planned and intra-operatively verified: this level was intuitively related to primary implant and etiology of failure.
In 2 cases a conversion from hip resurfacing to CFP stem (Waldemar - Link) has been performed, in 1 case a Metha implant (B-Braun - Melsungen) substituted a loosed resurfacing femoral component, while in two more cases a Mayo stem (Zimmer, Warsaw) has been selected for revision. Moreover, two CFP stem have been revised with Nanos femoral implant (Endoplus -Reutcreutz).
Results No case except one has shown, in the following clinical and radiographic follow-up, signs of implant loosening (Mean F.U. 18 months, min 6 months, max 24 months).
One case out of 7 has undergone a second revision for septic loosening of the conservative revision stem (with a conventional primary implant: Platform - Smith&Nephew – Bruxell).

Discussion Even if based upon few cases with brief follow-up, our preliminary impression on reliability of Tissue Sparing Surgery even in hip revision is positive: however, mandatory is an accurate planning of femur resection level and intra-operative check of bone quality to reproduce biomechanic conditions, adequate to conservative stems needs.

FEMORAL REVISION WITH CEMENTLESS TAPERED MODULAR PROFEMUR R STEM

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Background Femoral revisions are complex procedures which require skill Surgeons able to use different operative techniques in order to manage bone loss. Many Authors support in these circumstances the use of uncemented femoral stems. In fact, even in case of bone loss located in metaphyseal and proximal diaphyseal area, long femoral stems are capable of stable primary fixation on femoral isthmus. When possible a non modular prosthesis should be used. If this is not allowed because of the amount of bone loss (Type III – IV GIR and Type III A-B e IV of Paprosky classification) or the difficulty in reach a stable fixation, a long stem is required. In these cases we used the Profemur R, (Wright-Cremascoli) femoral stem. A retrospective review of this prosthesis has been performed.
Materials and Methods The Profemur R, stem (Ti6Al4V alloy) is an implant provided of cervical, metaphyseal and diaphyseal modular components. In detail may be selected (a) length and version of femoral neck, (b) metaphyseal size and (c) diaphyseal size and length. The stem is straight (S) or curved according to femoral anatomy (M-L). Axial and torsional stability on the inner femoral walls are given by tapered stem profile and diaphyseal wings.
In 5 years, from March 2001 to March 2006, we used this stem in 34 cases of femoral prosthetic revisions (second revision in 4 cases). In 11 cases was an acetabular revision was associated. The reason for revision surgery was (a) aseptic loosening in 19 cases, (b) periprosthetic fracture in 10 cases, (c) stem rupture in 4 cases and (d) septic loosening in 1 case. A patient was lost to follow-up and another one deceased in the early postoperative days for heart disease. In our Orthopaedic Centers 32 patients were available for results evaluation. The study group included 24 women and 8 men with a mean age of 72 years (51–83) at the time of surgery. The mean time of follow-up was 38.4 months (12–67) with a minimum time of 12 months. The mean age at follow-up was 75 years (56–88). The clinical evaluation has been performed with the Merle d'Aubignè – Postel score system.
Results According to the Merle d'Aubugne – Postel score, which considers pain, mobility and ability to walk, clinical results were: very good in 11 cases, good in 8 cases, medium in 5 cases, fair in 4 cases and poor in 4 cases. Main complications included: (a) 2 intraoperative diaphyseal fractures treated with multiple cerclage and (b) 2 early infections treated with debridement and prolonged antibiotic therapy. A fracture with non-union required a revision of internal fixation (LCP plate) with success. An infection healed and the other (follow-up less than 12 months from debridement) is in course of observation without signs of recurrence. We observed 2 cases of subsidence (more than 2 cm) with significant leg length discrepancy and fair functional result in undersized stems. We never verified ruptures of modular prosthetic components. No patient underwent or planned for revision of femoral implant.
Conclusions Long femoral stems offer in complex femoral revision surgery some precious adaptative opportunities. In the proximal femur neck-metaphyseal modularity may improve implant stability and the control of leg length. Distally on the femoral diaphysis primary stable fixation may be reached on the isthmus using proper diameter and length stems. In selected cases preventive cerclage is suggested in order to reduce the risk of intraoperative fracture during femoral reaming. In our experience initial subsidence and thigh pain are the commonest problems. Clinical and functional results, unsatisfactory in 8 cases with 9 patients able to walk only with support, reflect the complexity of procedures and the high mean age of patients during last controls. In our case series the rates of infections and intraoperative fractures agree with those reported in the literature. On the contrary we never observed dislocation of the implants. We suggest that, at least in part, this is related to the use of proximal modular components. Nevertheless, considering difficulties faced in several revision procedures and the complexity in the use of modular femoral stems, it's advisable to address these operations to Surgeons experienced in this orthopaedic field.

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THE RESTORATION MODULAR STEM IN HIP REVISION SURGERY

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Introduction The main aim in hip revision surgery is to ensure implant stability and restore articular function. Nevertheless, it is often difficult to achieve a satisfactory result in the femoral component, particularly when large bone defects are present. The Restoration® Modular (Striker, Orthopaedics) allows good distal fixation and because of modularity, make restoration of correct limb length and an appropriate proximal muscular balancing easier, thus providing good implant stability.
Materials and Methods We assessed 29 hip revisions performed on 28 patients (12 men, 16 women) with a mean age of 59.6 years (range 31–82). Indication for treatment was: aseptic loosening (19 cases) septic loosening (7 cases) and periprosthetic fracture (3 cases). Revision was partial in 6 cases and total in 23 cases. According to the Paprosky classification for bone defects, femoral defects type I (3 cases), type II (7 cases), type III (10 cases) and type IV (6 cases); periprosthetic fractures were all type B2 according to the Vancouver classification.
Results In all cases we used a Cone-Conical assembled stem and a lateral approach to the hip, which was combined with a trans-femoral approach in 8 cases. Mean follow-up was 9.8 months (range 3–17). Short-term Complications were not observed. The mean Harris Hip Score improved from 38.5 (range 10.9–73.7) to 83.8 (range 56.6–95.0), while mean limb discrepancy decreased from 23 mm to 4 mm. Altogether we observed good or excellent results in 85% of the cases. The most recent radiographic follow-up showed a good distal implant fixation in all cases and a satisfactory proximal osteointegration in 79% of the cases; subsidence of the stem >5 mms was observed in 2 cases (6.8%).
Conclusions In our experience the use of modular revision stems is an effective alternative in hip revision surgery when there are large femoral defects or periprosthetic fractures that make the implant unstable at the metaphysis and isthmus. Distal fixation ensures good primary stability of the implant and therefore reduces failures, espe-

cially in the short term. Furthermore, modularity enables the implant to be adapted to the patient, allowing restoration of the limb length and correct muscular balancing. Nevertheless, further studies are necessary to clarify the characteristics of such devices in the mid and long term on larger series of patients.

PERIPROSTHESIC HIP FRACTURES: OUR EXPERIENCE

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Background The incidence of femoral periprosthesic fractures after total hip replacement has increased in the last 10 years, (1.5–2% for primary implants, 7% for revisions), due either to the remarkable hip prosthesis numbers that are implanted every year and for the continuous extension of the indications that include very old and young subjects, obese patients with osteopenic bone.
Aim of the present study is to evaluate clinically and radiographically patients affected by periprosthetic fracture.
Materials and Methods At the Orthopaedic Clinic, University of Catania, between January 1996 and October 2005, 32 patients affected by periprostesic fracture, 19 were women, 13 men, were treated. The group of study presented an age comprised between 84 and of 38 years (mean age 46 ys); cemented total hip replacement were implanted in 14 patients, while biological prosthesis in 18 cases. The classification of Beals and Tower, that consider fracture side and stem stability, was utilized.
Results Treatment options depended from several factors: type of fracture, bone stock, system stability, general conditions of the patient. All cases belonging to type A (5 cases) and B1 (5 cases) were treated conservatively, while patients affected by type B (16 cases) and C (6 cases) fractures were surgically treated either with revision prosthesis and/or with different systems of synthesis.
Discussions Risk factors predisposing to periprosthesic fracture can be divided in general (osteoporosis, co-morbidities) or local (periprosthesic osteolysis, cortical stresses or crackings and iatrogenic defects); often aseptic loosening of the femoral component can cause a periprosthesic fracture for minimal traumas.
Conclusions Periprosthesic fractures represent a major problem of hip arthroplasty with an incidence designated to increase; an univocal treatment does not exist and a correct therapeutic choice depends on level of fracture, bony quality, prosthesic stability and general conditions of the patient.
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EXPERIMENTAL OUTCOMES OF THE USE OF PLATELET GEL IN REVISION OF TOTAL HIP ARTHROPLASTY

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Background The aseptic loosening process, once known as "cement disease", is the most common cause of failure for the total hip replacement (THR). Aseptic loosening shows on X-rays as lines appearing around the prostheses or isolated cavities.
Materials and Methods Our case deals with the revision of the acetabular component with an osteolysis graded at the 3rd stage of the Paproski classification. The case, dating back to December 2005, is about a 74 years old lady. She had bilateral THR: the left one performed in 1996, while the right one in 1998. At the examination, the patient claimed pain at the left hip, a limited range of motion (ROM) and a quite complete functional impotency, (the Harris Hip Score was the 25 point). The X-ray showed the aseptic loosening of the cup due to the departure of the acetabular medial wall; we decided to use Tutoplast to fill the bone blank.
The Octopus-Lima acetabular component was chosen since its external ring assures, primary stability. Further, it excludes graft from the load: this is necessary for the inclusion in the host bone. We opted for the Tutoplast to fill the bone blank because there are many evidences that the morcelized grafts have faster and better results than the structural ones in the inclusion of the host bone. The platelet gel was used because there are many evidences in literature that it can improve the inclusion of the graft thanks to the concentration of growth factor (especially PDGF).
Results After 13 months from the revision the patient showed an Harris Hip Score of 87 point; the ROM: 95° bending, 10° extention, 35° abduction, 10°adduction, 15° intrarotation, 25° extrarotation.
Discussion Jumbo cup, oblong component or the high placement of the acetabular component are all used for the revision hip arthoplasty: However, in our case these implants could not be used because of characteristics of the osteolysis process (dimension and localization). In the management of a so large bone loss, an alternative could have been to use the Burch-Schneider ring. Please note that this kind of antiprotusion cage is not too different, in the concept, from the external ring used in our implant.
Conclusions The use of:
- mocellised allograft for the reconstruction of the medial acetabular wall;
- platelet gel to improve the inclusion of the graft;
- an acetabular component with an anchorage on the ilium and on the ischium, resulted in a very good outcomes.

TREATMENT OF PERIPROSTHETIC FEMORAL FRACTURES WITH DISTAL FIXATION MODULAR REVISION STEMS

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Background Late periprosthetic fractures of the femur are the third most frequently reported cause of surgery after total hip artroplasty. Revision total hip artroplasty can be difficult, especially when poor bone stock is encountered. The aim of this study was to examine the results of late periprosthetic fractures complicated with primary implant loosening performed with distal fixation modular revision stem.
Methods From November 1999 to May 2006, 16 late periprosthetic fractures were treated with distal-fixation, modular, straight stem. There were 13 females (82%) and 3 males (18%) whose mean age at surgery was 76.7 years (range, 48 to 95 years). Femoral revision surgery was performed with the Revitan (2 cases) and ZMR (14 cases) to get a stable distal primary fixation. X-rays were assessed accordingly to the Vancouver classification: there were 3 type B2 and 13 type B3 fractures.
Mean post-operative follow-up was 52 months (range, 10 to 88 months). At the time of the last follow-up visit 4 patients already passed away, all of them for causes unrelated to the procedure. The clinical outcome was monitored with the Harris Hip Score, subjective VAS, pain and satisfaction evaluation. Standard AP and lateral x-rays of the hip were obtained at each follow-up visit. Leg-length discrepancy was also investigated as a factor possibly affecting outcome. Complications included one septic loosening that was treated with a two-stage revision.
Results All the patients but one were finally able to walk and had minimal to no pain at all. A satisfactory functional outcome was achieved with an average 76 (range, 25 to 100) Harris Hip Scores points. The subjective pain and satisfaction scores were respectively 2.4 and 7.8 points.

As far as radiograms are concerned, all the sixteen femur did show a good healing of the fracture, with no secondary stem subsidence.
Discussion Generally, considering the severity of an event such as a periprosthetic late fracture in an elderly patient, results were satisfactory. The average Harris Hip Score and subjective satisfaction would have been even higher if one patient wouldn't have been so much disappointed because of her severe leg-length discrepancy, dependent on the acetabular side.
From a surgical point of view, the employed devices proved to be handy in bridging the fracture with distal fixation while adequately stabilizing it.
Conclusions According to the reported results, straight modular-revison stems provide an adequate treatment option of Vancouver type B3 and in selected cases of B2 type periprosthetic femoral fracture.

POSTER PRESENTATIONS

THE SUBVASTUS APPROACH FOR PRIMARY KNEE ARTHROPLASTY: OUR EXPERIENCE

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For years a progressive and constant research for improvement in the fields of the biomaterials, of the prosthetic designs, and mostly in the surgical prosthetic implantation techniques has been carried out. This research has particularly involved some joint prostheses, such as knee prosthesis.
The surgeons attention has been focused on the research for less invasive surgical approaches, in order to obtain an adeqauate joint exposure respectful for the soft tissues. This is all done in order to ensure patients a faster and more complete postoperative functional recovery. Among the many surgical approaches described, Authors find in the subvastus approach the possibility of adopting a lesser invasivity technique still providing a good surgical exposure of the knee joint.
A group of 92 osteoarthritic knees have been treated with primary knee arthroplasty using the subvastus technique between November 2004 and January 2006. Postoperative functional recovery for all the patients of this group has been faster than for those operated with the standard midline approach. Also intraoperative and postoperative complications rate has been considerably lower in the group operated with subvastus approach (6%) than in the other group (23%). The sole contraindications for subvastus technique are represented by obesity and by those cases in whom it is not possible to achieve a good patellar lateralization.

TWO-STAGE SEPTIC HIP REVISION WITH ANTIBIOTIC-LOADED SPACERS

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Background Two-stage revision was reported as one of the most successful strategies to treat hip periprosthetic infection; septic process eradication is obtained in more than 90% cases in most of previously reported series. The exact protocol to be followed still raises several controversial issues, particularly in patients with high risk of recurrent infection.
Materials and Methods We retrospectively evaluated 43 patients treated at our department by two-stage revision between 2000 and 2005 for late chronic infection. Patients underwent the same protocol of diagnosis and treatment. According to the Cierny-Mader staging system for adult osteomyelitis all patients were classified as B-host, while 3 or more comorbidities were present in 14 cases (33%). Infection was caused by S. Epidermidis (33%), S. Aureus (28%) Enterococcus (5%), Streptococcus (2%), polymicrobial flora (21%), while intra-operative cultures were negative in 2 cases (5%). Methicillin resistance was found in 12 cases (31%).
In all cases an antibiotic loaded cement spacer was implanted during the first procedure: a preformed spacer impregnated with gentamycin (Spacer G®,Tecres), fixed with bone cement additioned with vancomycin was used in 38 cases, whereas bacteria were Gentamycin-sensible; a spacer made with bone cement with vancomycin and meropenem, into a preformed mold (Biomet®), was used in 5 cases, whereas bacteria were Gentamycin-resistant.
All the patients underwent an antibiotic oral or intravenous administration, during the interim period. Criteria for reimplantation were a gradual improvement in the CRP and ESR levels and a negative bone scan.
Results The average follow-up was of 4,3 years. Protocol was applied in all cases: protocol deviations (interim period longer than 6 weeks) were observed in 9 cases; not significant differences were found if compared with patients whose interim period was of six weeks or shorter. Spacer substitution was needed in 9 cases for persistent infection; all patients but two were successfully reimplanted: a cementless stem was implanted in 35 cases Bone allografts were used in 6 patients; 2 patients underwent a definitive Girdlestone procedure. Complications were observed in 4 patients; no cases of recurrent infection were observed at the most recent follow-up; not significant differences were found concerning patients conditions, duration of antibiotic therapy, type of microbial flora involved.
Conclusions We consider the two-stage revision the gold-standard treatment for hip periprosthetic chronic infection, giving good functional results and eradication of infection also in patients with high risk of recurrent infection, and allowing reconstruction with cementless prosthesis and bone allografts if indicated.

ARTHROSCOPIC OSTEOCAPSULAR ARTHROPLASTY FOR PRIMITIVE ELBOW OSTEOARTHRITIS

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The Arthroscopic Osteocapsular Arthroplasty (AOA) is indicated to treat primitive arthritic elbow with stiffness, osteophytes and loose body when the joint space is conserved.
Especially if mobile, the osteophytes are the main cause of pain and should be removed. The success of this surgery is directly related to the amount of the capsulectomy and the osteophytes/loose bodies removal as well as to the correct rehabilitation program.
The traditional open surgery is:
- The Tsuge Arthroplasty: an high morbidity surgery that allows a complete capsular and osteophytes removal
- The Lateral or Medial Column Procedure: allows a good capsulectomy anterior and posterior, but limits the osteophytes removal to the lateral or medial side, respectively
- The Outerbridge-Kashiwaghi (O-K procedure): doesn't allow a complete anterior capsulotomy nor osteophytes removal

The Autors consider the AOA, suggested by O'Driscoll (Mayo Clinic), the best treatment for the arthritic stiffness of the elbow: allows the surgeon to reach all the joint recesses with a low morbidity for patients. AOA is a challenge technique, that needs a really long learning curve and a very fine knowledge of the anatomy to reduce portals risks.
The authors present the technique (from the patient positioning to the surgical steps) and the subsequent rehabilitation program.

MOBILIZED PROSTHESIS OF THE HIP: PREOPERATIVE EVALUATION

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Ultrasound guidance for needle aspiration in prosthetic surgery of the hip: clinical applications.
Nowadays, prosthetic mobilization of the hip is fast becoming a fundamental problem of the orthopedic clinic practice.
A series of clinical, radiology, laboratory, scintigrafical and bacterial check-ups must be performed in the presence of a painfulor or in any case "problematic" prosthesis because both mobilization has to be confirmed and reimplant surgery has to be planned; furthermore, a septic cause of failure has to be excluded.
It is common practice, expecially in uncertain cases, performing laboratory and instrumental investigations and needle aspiration of hip under fluoroscopic check.
Ultrasound guidance for needle aspiration of hip was conceived at Rizzoli Orthopedic Institute in order to avoid fluoroscopic time and radiation dose both to patient and medical staff.
Moreover ultrasonography allows drawing to be driven precisely even if liquid deposits are small increasing the accurancy.
Furthermore this methodology has been proved extremely useful in finding ceramic or metalic or polyetilen detritus due to the wear and tear of the prosthetic components.
The aim of the present study was to determine the sensitivy and specificity of preoperative ultrasound guidance for needle aspiration with the intraoperative drawing: in order to achieve this result 60 patients per year with prosthetic mobilization were selected.
Preliminary results seem encouraging because they put in evidence a 90.5% congruence between the 2 drawings.
The methodology would offer several advantages such as protection against radiations and accuracy of the preoperative evaluation of the mobilized prosthesis of the hip if preliminary data would be confirmed.

QUADS SPARING MIS TKJR IS A CHANCE OPERATION: THE ANATOMICAL REALITY OF VASTUS MEDIALIS OBLIQUUS INSERTION

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Background The vastus medialis obliquus (VMO) forms part of the vastus medialis muscle complex. The VMO muscle fibres pull at a relatively horizontal 50–55 degrees medially and act as a dynamic stabilizer of the patella against the lateral pull of the vastus lateralis. During minimal access total knee arthroplasty the VMO insertion is important as it may interfere with the quadriceps sparing approach. Population variation in the level of VMO insertion has not been reported.
Aim To assess the range of distal insertion of the VMO using magnetic resonance imaging (MRI) studies.
Patients, Methods and Results A total of 50 patients were selected who had undergone MRI studies of the knee for a variety of suspected pathology unrelated to the extensor mechanism. Coronal and sagital reconstructions were used to assess the most distal insertion of the VMO. All studies were assessed by a radiologist with a specialist interest in musculoskeletal MRI. The Anatomy is described with respect to the height of the patella.
Conclusions The fibres of the VMO have a variable level of distal insertion. This variability has profound implications when we consider those who may be suitable for minimal access total knee arthroplasty. A distal insertion of the VMO may preclude us from using a true quadriceps sparing approach and so a vastus split may be required. This is a form of patient selection criteria which has not yet been reported which proves that true Quads Sparing MIS TKJR is a matter of chance.
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WRIST ARTHROSCOPY IN INTRA-ARTICULAR DISTAL RADIUS FRACTURE

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Background There is no consensus that an arthroscopically guided operation can improve the anatomical and functional results.
Purpose To determine the usefulness of arthroscopically assisted reduction of displaced intra-articular fractures of the distal the radius.
Study Design Clinical study in a prospective case series, with control group.
Materials and Methods From 2001 to 2005 we treated with arthroscopic reduction 40 patients with intra-articular fractures classified according to AO classification: 12 fractures B1, 10 fractures B2, 6 fractures B3, 8 B8, 4 fractures C1. Patient inclusion criteria was: articular step off or gap formation greater than 2 mm after closed reduction, age less than 50 years old, associated evident lesion of intercarpal ligament or TFCC or DRUJ. Patient exclusion criteria were: open fractures, concomitant upper extremity injuries, initial carpal tunnel syndrome or compartment syndrome.
Technique The arthroscopic reduction of articular surface was performed; the radial stiloid fragment was usually reduced first. Depressed fragments were elevated using dental pick or probe or with K wire with out-side joy-stick technique. The subcondral K wire were placed directly while the articular reduction was maintained. at the end of procedure the associated lesion of intercarpal ligament or TFCC were treated. The fractures were pinned in 25 cases, and in 13 cases external fixation was used, only in 2 cases were performed open reduction and internal fixation and 18 patients were treated for associated lesions (SL, TFCC). Range of motion, grip strength, VAS, Mayo modified wrist score, DASH questionnaire and standard radiographs were registered at 2, 3, 6, 12 month after the treatment. All patients were matched to control group B of 40 patients for fracture pattern, age and gender treated with conventional procedure.
Statistical Methods Data from both group were compared using the Student t test for continous variables, and the level of significance was set to $p<0.05$.
Results No perioperative complications occurred. The scores for overall outcome demonstrated that the group A had better outcomes

and better ranges of motion and grip strength ($p<0.05$) than the group B. The radiographic results showed that the patients of group A had better reduction of volar tilt, ulnar variance, and articular displacement than patients of group B.
Conclusions On the basis of our prospective comparative study, we found that the arthroscopically guided procedure was superior to the conventional open procedure.

THE TREATMENT OF THE DISTAL FEMORAL FRACTURES WITH LISS PLATES: 4 YEARS EXPERIENCE

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Background The femur metaphiseal fractures are the 8% of all fractures. They are normally caused by a violent trauma to the knee at flexed hip (dashboard lesion).
The action of the strong muscular mass inserted in the area leads to a characteristic displacement of the fractured stumps. In particular, the combined action of the gastrocnemious and the quadriceps flex dorsally the condyles and this brings often to the fracture of the anterior metaphiseal area. When the trauma divides the two condyles, these flex dorsally with a rotating effect often very different between the medial and lateral condyle.
The osteosynthesis of this anatomic area has never offered strong stability guarantee of the progressive decrease of the cortical bony tissue.
Discussion and Conclusions LCP plates, thanks to the screw heads with the same thickness of the plate, guarantee the grip independently by the porosity of the bone. The forced multiplanar orientation of the screw increases, moreover, the pull-out strength of the whole system.
We have been using LCP system for 3 years. Results are shown here.

COMPLEX DISTAL HUMERAL FRACTURES: OUR EXPERIENCE

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Background Distal humerus fractures continue to be one of the most challenging injuries encountered in orthopaedic practice. The results depend on both the severity of the injury and the quality of the reconstruction. We performed a retrospective study to evaluate the clinical results of open reduction and internal fixation in the management of AO type B and C fractures of distal humerus.
Materials and Methods Between 2001 and 2004, 19 distal humeral fractures (14 male and 5 female) were treated by open reduction and internal fixation. The average age was 54 years (range, 14–87 years). 13 were Müller type C, and 6 type B.
Results We reviewed the functional outcome of distal humeral fractures managed with internal fixation with plates and screws. 15 patients (10 men-5 women) were reviewed over a mean of 29 months postoperatively. Patients were treated within 7 days of injury, using a posterior approach, with or without olecranon osteotomy. Postoperative mobilisation was prompt in all patients. All patients were satisfied with the outcome of the operation, as well as with the activities which could postoperatively be undertaken. The mean ROM for elbow was 118° in average, while muscle strength for elbow motion was moderately reduced. No case of ulnar neuropathy was observed. On the other hand postoperative complications were considerably frequent, yet they were mild and subsided eventually without further operation.
Discussion Open reduction and internal fixation gives the most favorable results of displaced comminuted articular fractures of distal humerus achieving anatomic reduction and stable osteosynthesis to allow early range of motion. The surgeon must be familiar with the local anatomy, understand the fracture pattern thorough appropriate imaging for preparing a good preoperative plan, identify any associated injuries, and be proficient with multiple treatment options.
Conclusions Distal humerus fractures are often more complex than appreciated, and challenging to treat, with respect to fracture union and functional outcome. Early stable internal fixation of distal humeral fractures by an experienced surgeon, gives excellent long term results with few complications, together with high rates of patient satisfaction and little functional morbidity.
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TOTAL KNEE ARTHROPLASTY WITH SCORPIO CR VERSUS SCORPIO FLEX CR IMPLANTS: A PROSPECTIVE EVALUATION

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Introduction A prospective study was done to compare the early clinical, radiographic outcomes between the Scorpio CR and Scorpio Flex CR primary total knee replacement.
Materials and Methods 130 Scorpio CR and 40 Scorpio Flex CR were implanted. Patients were prospectively evaluated with a mean follow-up of 3.9 years (2–8 years). Knee Society Score, W.O.M.A.C., range of motion and knee pain was compared. Patients age, level of activity, BMI, were criteria selection for implant of Scorpio Flex CR.
Results There was more pain in Scorpio CR group,mean flexion was greater in Scorpio Flex CR (112 vs 108); Knee Society score and WOMAC was better in Scorpio Flex CR group.
Conclusions The Scorpio Flex CR new design may be allow the significant increase in Knee Society score and the better ROM in Scorpio Flex CR group.

HIP ARTHROPLASTY USING A 36-MM HEAD. EVALUATION AFTER FIVE YEARS EXPERIENCE

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Background In this study we analyzed clinically and radiologically THA with our Follow-up of 5 years of experience with head the diameter of 36 mm.
Materials and Methods Since we have also had the availability of the cross-linked polyethylene for 36 mm coupling, we could extend the indication to almost the totality of the cases.
For our THA we use the Delta Acetabular Cup system by Lima Lto company, which allows such a coupling diameter starting from 50 mm acetabular size.
Results Clinically the advantages of a 36mm coupling are well known because of a low risk ratio of dislocation, of an high articular range of motion, of it proprioceptiveness and stability.
We have not had any ceramic incident or breakage.
We had one case of anterior dislocation, for displastic related coxarthrosis.
No signs of radiolucency for each case in correlation with the use of UHMWPE.
Conclusions According to our experience and the results we have been observing till today, we pursue continually the use of a 36mm head ball, when it's possible, in all hip joint replacement.

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NAVIGATED SHORTER INCISION OR SMALLER IMPLANT IN KNEE ARTHRITIS?

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Introduction The Authors performed a matched paired study between 2 groups UKR or CA-TKR implanted with a mini-incision (MICA group) in the treatment of isolated medial compartment knee arthritis. The Authors hypothesized that UKR offers a real less invasive surgery with lower economical costs despite a worse limb/implant alignment. Furthermore at a minimum 48 months follow-up they hypothesized that this small implant guarantees still both better clinical score and patient satisfaction than in the MICA group.
Materials and Methods Thirtytwo patients with isolated medial compartment knee arthritis who underwent to a medial UKR from February 2001 to September 2002 were included in the study (group A). At a minimum follow-up of 48 months, every single patients in group A was matched with a patient who had undergone a computer assisted TKR performed with a less invasive approach for an isolated medial compartment knee arthritis between August 1999 and September 2002 in our hospital (group B). The outcome was evaluated using both the Knee Society Score and the GIUM score. During the hospital staying we registered when each patients was standing comfortably in full weight-bearing according to a self-answered questionnaire. Statistical analysis of the results was performed using parametric tests.
Results Both hospital stay and operative time were statistically longer in MICA group. No statistically significant difference was seen for the Knee Society score between the 2 groups. A statistically significant difference was seen for the Functional score as well as for the GIUM score with superior results for group A. At latest follow up the mean HKA angle was 176.8° for group A and 179.3° for group B. The mean FTC angle was 86.9° and 89.4° for group A and B respectively. All TKR implants were positioned within 4 degrees of a HKA angle of 180° and FTC angle of 90°.
Discussion At the latest follow-up significant differences were seen between the 2 groups in the functional results and in the GIUM score with better results in the UKR group. During the hospital staying in this group the patients reported a statistically significant earlier full weight-bearing. This was despite a significant less accurate limb alignment. The costs of the procedure in the MICA group were obviously greater because of the expensive implants and technology along with statistically significant longer surgical times and hospital stay.

MINI-INCISION VS MINI-INCISION AND COMPUTER ASSISTED SURGERY TKR

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Introduction No comparison between minimally invasive TKR using traditional alignment guides and computer navigation systems has been documented in the literature. The aim of this prospective randomised trial is compare the radiological results of 2 different groups of TKRs performed with a less invasive surgical approach (mini-parapatellar) using either a traditional hand guided technique (MIS) or the assistance of a computer assisted alignment system (MICA).
Materials and Methods Since 2004 seventy-four patients undergoing TKR with the same implant have been enrolled in the study. Patients were randomly assigned to either the traditional or computer-assisted alignment group. In the MIS group (37 knees) a minimally invasive approach was performed using an intramedullary femoral guide and an extramedullary tibial guide. In the MICA group (37 knees) the implant was positioned using a CT-free computer assisted alignment system using the same minimally invasive surgical approach. The duration of surgery was documented in all cases.
Eight months after surgery each patient had long-leg standing anterior-posterior radiographs and lateral radiographs of the knee.
The radiographs were assessed to determine the frontal femoral component angle (FFC), the frontal tibial component angle (FTC), the hip-knee-ankle angle (HKA) and the sagittal orientation (slope) of both femoral and tibial components. The number and percentage of outliners for each parameter was determined. In addition the percentage of patients from each group with all 5 parameters within the desired range was calculated.
Results The mean surgical was statistically longer in the MICA group. Both the femoral slope the FTC angle were significantly better aligned in the MICA group. A statistically significant higher number of outliners was seen in the MIS group. The number of implants with all 5 radiological parameters aligned within the desired range was statistically higher in the MICA group. Thirty-three implants in the MICA group and 20 in the MIS group were correctly aligned in all measured parameters.
Discussion The desired femoral slope and FTC angle were achieved in significantly more patients in the MICA group than the MIS group. Furthermore the results demonstrated a statistically significant reduction in the number of outliners in the computer-assisted technique. The number of implants with all parameters aligned within desired values was statistically higher in the MICA group. The surgical time was statistically longer in the MICA group.

PROSTHETIC REPLACEMENT OF THE PIP JOINT THROUGH A LATERAL APPROACH

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Background Since 2001 we performed 28 prosthetic replacements of the PIP joint in 25 patients, using a Pyrocarbon unconstrained prosthetic device (Ascension). 10 of the patients were males, 15 were females. The main indication for surgery was primary or post-traumatic degenerative arthritis (21 cases).
Materials and Methods In all cases but five we used a tendon sparing lateral surgical approach to the joint. In all these cases a double flap opening of the ulnar collateral ligament was performed. The radial collateral ligament was preferably kept intact to permit an unprotected rehabilitation of T-L pinch. The volar plate was partially detached. Such an approach allowed us to preserve the anatomic integrity of the extensor apparatus sparing the central slip insertion on the base of P2.
Results Subjective results, ROM, hand grip and pinch strength, hand X-rays, long-term complications, reasons for revision or failures were evalueted. Postoperative pain was: absent in 19 cases, mild in 5, severe in one case. ROM increased 35° post operatively as an average.
Conclusions The lateral approach allowed us to obtain a stable postoperative reconstruction and a simpler and earlier rehabilitation of the joint motion.

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REVISION HIP ARTHROPLASTY WITH PROFEMUR STEM: OUTCOMES AT TEN YEARS

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Background THA revision is becoming a huge problem for orthopaedic surgeon. In most of these cases bone loss and articular geometry disruption make revision THA a demanding surgery.
We reviewed the clinical outcome following hip revision using the Profemur modular implant (Wright).
Materials and Methods Since 1993, we performed 245 cementless revisions THA using the Profemur stem: 82 have minimum follow-up ten year. We present the results of 39 patients, with a mean follow-up of 12 years (range 10–14 years). 34 were total revisions, in 5 cases we revised only the stem.
Radiological analysis, Harris hip scores and patient satisfaction were evaluated pre and post-operatively.
Results 92% of patients were satisfied and the improvement of Harris Hip score postoperative was more than 40 points. We performed three re-revision: one for stem sinking at seven year follow-up, one for a proximal femoral fracture due to bone resorption and one for the proximal component traumatic breakage. All the other stems were stable on the final follow-up.
Discussion The Profemur prosthesis allows an high primary stability due to its distal conical grip and good proximal femoral filling. Its modularity (stem, proximal-part, neck and head) is really useful in a surgery that is becoming always more "anatomofunctional". In the past revision arthroplasty was a rescue surgery; now our aims are to fill bone defect, restore the rotation centre of the hip, limb length and hip function.
Conclusion The use of Profemur stem in hip revisions, seems to be successful and reliable.
Suggested readings

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UNICOMPARTMENTAL KNEE REPLACEMENT IN THE OLDER PATIENT

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Background In our Hospital we utilize unicompartmental knee prosthesis in unicompartmental arthrosis independently of the patient age. As historically reported, it is used between the osteotomy and total knee arthroplasty.
Materials and Methods In the period ranging from Janaury 1995 to now 1046 unicompartmental prostheses have been implanted. In this group 202 patients (221 implants) were 75 years old or older.
We've contacted 125 patients, 85 of them are now undergoing to a clinical and radiological follow-up.
Results Outcomes are encouraging: average survival rate of the implants after 4 yrs is 96% and an average TKS is 80 points out of 200.
Conclusions The advantages are those already contemplated in the unicompartmental prostheses philosophy, such as less bleeding, minimally invasivity, early mobilization and shortage hospedalization.
In these old patients it is even preferable the use of this prosthesis as they can better tolerate such surgical treatment obtaining clinical and implant survival results that can be compared with the total prostheses results at the same age.
Suggested readings

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EXPANSYS ACETABULAR CUP. OUR EARLY RESULTS

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Background The experience with expansion cups was introduced by Spotorno in the early 80's (CLS) [1]. The clinical and radiographical results of these components are very encouraging [2, 3], even in displastic hips [4] or protrusio acetabuli [5]. In 2001 was introduced the ExpanSys cup (Mathys Bettlach, Switzerland), with the same philosophy of the CLS cup but with a new kind of application of the liner and an innovative rib design. We will report our experience with this cup from 2004.
Materials and Methods From 2004 we have performed 79 total hip replacements using the ExpanSys cup in 79 patients. Fourteen in men, 65 in women, 36 because of femoral neck fractures and 43 for OA. The average age was 74,5 years (from 63 to 87 years old). Patients were clinically and radiographically reviewed postoperatively, at 6 weeks and for the present follow-up. Function, pain, walking ability were evaluated according to the Merle D'Aubigne and Charnley criteria.
Results At a medium follow-up period of 18 months 50 patients were reviewed. We had no revision, none radiolucent lines at the radiographical exams. All the patients were satisfied of the implant.
Discussions and conclusion. From these early results we are very positively impressed using this socket. A very good implant (CLS) was improved (liner's positioning is easier) and we hope that the ExpanSys cup will obtain positive results even at longer follow-ups.
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THE EFFICACY OF TERIPARATIDE (TPTD) IN THE RECOVERY OF MIDDLE DIAFYSEAL NON-UNION OF FEMUR IN PATIENT AFFECTED BY SEVERE POST MENOPAUSAL OSTEOPOROSIS (PMOP) NO RESPONDER TO PREVIOUS ANTIRESORBITIVE TREATMENTS

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We reported the case of 70 years old woman, affected by severe post menopausal osteoporosis (PMOP) non responder to previous antiresorbitive treatments. On 02/28/60 the patient was submitted to osteosynthesis surgical procedure with endomedullar nail for traumatic middle diaphysial fracture of the right femur.
The patient presented an history of clinical fragility fracture from the age of 60, first with spontaneous fractures of the ribs and subsequently there have been complications also with the fracture of D6 at the age of 65. She has been previously treated with Clodronato (100 mg/weeck for three years). Five years before the fracture she started treatment with Alendronato (70 mg/week) plus calcium and vitamin D. BMD values (T-lumbar score=-4.2 DS and T-score FN=-2.3 DS) showing severe osteoporosis, were stable during the previous treatment.
During follow-up assestment, performed five months after surgical procedure, femur fracture showed radiological finding of delayed union with persistence of fracture line and from presence of wowen hypertrophyc callus. A new surgical procedure would be needed, but due to clinical patient condition, we decided to postpone surgical procedure and to treat the patient with TPTD (20 µg daily sc) and we planned radiological evaluation after 3 months from starting therapy. At follow-up radiological imaging showed full recovery of the injury with circumferential periosteal callus formation and complete fracture healing.
Conclusions This clinical case confirms the osteoinductor effect of TPTD, the rapid fracture healing effect even in non vertebral fractures affecting patient with severe osteoporosis and the potential use in treatment of delayed union or non-union.

CASE EFFICIENT SURGERY: TRIAL COMPONENTS ARE NOT REQUIRED IN TOTAL KNEE ARTHROPLASTY

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Introduction This prospective randomized study compared early results of two groups of total knee arthroplasties (TKA), performed using a standard technique (STD) or with a technique which emphasizes the preoperative planning in order to cut down surgical steps (Case Efficient Surgery: CES).
Materials and Methods One hundred consecutive patients who underwent TKA were enrolled in the study. Preoperative parameters did not differ between the two groups. In both series a limited parapatellar approach was used. All knees were implanted with the same Legacy PS hi-flex prosthesis by the same surgeon using the same set of instruments. Both groups received a the same postoperative management. In the CES group a careful preoperative radiographic planning was performed in order to predetermine correction angles, bone resections, and implant sizing. CES technique was focused to reduce intraoperative double-checks, to utilize essential instruments, to limit the number of holding pins to instruments on bone, and to use spacer blocks in the place of trial components.
Results Tourniquet time was 18 minutes longer in the STD group (55 vs 37 minutes). A significant difference was found in early quadriceps strength recovery in favor of the CES group (active straight leg raise at 1.4 days vs 1.9). A trend toward reduced blood loss was observed in the CES group (710 vs 830 ml). Postoperative radiographic analysis showed no major outliers in both groups. Components sizing was appropriate in all cases. The STD group had a higher DVT rate. No patellofemoral or tibiofemoral instability was observed at 6 months follow up in both groups.
Conclusions Reducing introperative double-checks and trial components use during total knee arthroplasty does not compromise the clinical and radiographic result. An expeditious procedure may result in lower postoperative morbidity and advantages in costs-related issues.
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HYBRID TECHNIQUE FOR PATELLA RESURFACING

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Introduction Patella resurfacing technique involves one single planar cut. Unfortunately patellar osteotomy is perhaps the most difficult cut to instrument, and cutting guides are always cumbersome and time-consuming.
Materials and Methods The principle of the patellar cutting jig which was developed at the Hospital for Special Surgery was to refer to the anterior surface of the patella, and not to the articular surface as most of the guides do. Two separate reference bars were positioned on the anterior arm of the clamp to fit on the medial and lateral aspects of the non articular portion of the patella. The resection is performed in a "hybrid" manner because the instrument is utilized only to begin the osteotomy, and once the path is created, the instrument can be removed and the osteotomy is completed free-hand. An instrument prototype was created and utilized in 10 cadaver knees performing patellar resections through the 13 mm slot. The patellar bone remnant was then removed from the extensor mechanism and measured in all quadrants (1.5 cm from the peripheral margin) with a digital caliper. The same instrument was then used for a prospective randomized clinical trial in 60 consecutive primary TKAs performed by the same surgeon. In thirty TKAs patellar resection was performed with the free-hand technique described by Lombardi et al, and in other 30 TKAs the HSS patellar cutting guide was utilized.
Results In the cadaveric study overall patellar central thickness was 12.9±1.4 mm. Symmetry was consistently obtained considering the medial, lateral, inferior and superior quadrants which measured on average: 11.9±1.3 mm, 11.6±1.3 mm, 11.7±1.3 mm, and 11.9±1.4 mm respectively. In the clinical study an asymmetric resection >4° was found in 3 (10%) of the free-hand group and in none of the instrumented group. No lateral release was performed in the two groups.
Discussion A simple and reproducible instrument to assist the surgeon during patellar resection was developed referring to the non-articular patellar surface. This is the first patellar cutting jig which focus not only on the overall thickness of resection, but also to the symmetry of resection.
Suggested reading
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AUTOLOGOUS BONE GRAFTING IN KNEE ARTHROPLASTY

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It is still unclear whether the tibial component of a total knee arthroplasty should be fixed to bone with or without bone cement. Some

studies state that the stability of uncemented implants is equal or better than cemented ones. The survival rate can be affected more by the model of prosthesis implanted than by the kind of fixation. The goal is to achieve osseointegration more than fibrous.
This is a retrospective study on 31 total knee arthroplasties with autologous morsellised bone grafts, without screw fixation, for tibial defects or advanced osteoporosis.
Materials and Methods 31 patients, 27 females 4 males, mean age 75 years (65–85) have been operated on for an uncemented knee replacement with tibial morsellised bone grafting. The patella was never resurfaced. Postoperative prescriptions included protected weight bearing for one month Mean follow up 50 months (60–44). Results were evaluated with the Hospital for Special Surgery Knee Score.
Results The knee score improved from an average of 40 points to 92 (82–99). Mean range of motion was 125 (90–140). Only one patient complains pain limiting her daily living activities. In this case a slight tibial radiolucent line can be seen. In no case we had to revise (survival rate 100%).
Discussion With autologous bone grafting primary stability can be favoured when the bone quality is not satisfactory. The grafts are revascularized and incorporated into a new trabecular structure.
Conclusions A better osseointegration could be promoted in elder people and in osteoporotic subjects with this technique.

CURVE-ON-CURVE MATCHING IS THE BEST LANDMARK FOR TIBIAL COMPONENT ROTATION IN TKA

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Rotational alignment of the tibial component during total knee arthroplasty can affect both patello-femoral and tibio-femoral postoperative function. The purpose of this study was to investigate the bone anatomy of the knee in determining the rotational alignment in total knee arthroplasty using magnetic resonance imaging.
Axial images of 150 normal knees were analyzed separately by two authors. MRI scanograms were obtained from patients with the knee in full extension and with the long axis of the foot (second metatarsal bone) aligned on the neutral sagittal plane. The surgical epicondylar axis was drawn and projected over the proximal tibia and tibial tuberosity slices. Multiple proposed anatomical tibial rotational landmarks were drawn and symmetric tibial component digital templates of different sizes were aligned according to each landmark. Alignment of the virtual tibial components was then compared to that of the projected femoral epicondylar axis. The best antero-posterior line to achieve rotational matching between the components was drawn on the proximal tibia slice of each patient. Tibial plateau coverage obtained using the different landmarks was calculated.
There was a tendency to align the tibial component in excessive external rotation relative to the femoral component. When the medial third-to the middle third of the tibial tubercle landmark was analyzed it showed an average external rotation compared to the epicondylar line of 4.7°±3.6. The AP tibial axis that more consistently matched the femoral rotation were the following lines:

1. Between the centre of the posterior cruciate ligament tibial insertion to the most medial part of the tibial tubercle.
2. Between the geometric centre of the tibial plateau to middle of the medial third of the tubercle.
3. The anterior curved tibial plateau cortex (curve-on-curve matching between the tibial template and the anterior cortex).

We observed a tendency to externally rotate the tibial component relatively to the femoral component with most alignment techniques. This possible mistake may account for postero-medial polyethylene wear in fixed bearing TKAs. The anterior curve of the tibial plateau cortex represents a realiable and reproducible landmark which may help aligning the tibial component with the femoral component and the extensor mechanism. New tibial linear landmarks may allow the surgeon to maximize matching between the components and to reduce patellar problems after TKA.
Suggested reading

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THE EFFICACY OF TERIPARATIDE (TPTD) IN HIP ARTHROPLASTY DISPLACEMENT (ACETABULAR CUP)

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Woman of years 78 with non cemented hip arthroplasty from 1995 for primitive arthrosis.
Radiological and scintigrafic controls are normal before 2004.
In July 2006 the patient can walk only with woods and is affected by severe pain and limitation in hip movements.
To the radiological control of the hip in 06.07.06: "…Displacement and protrusion of the acetabular cup. Femural stem right fit…"
To the scintigrafic control in 21.07.06: "…beginning of acetabular roof protrusion in right hip arthroplasty…". The acetabular cup replacement could be necessary to relieve patient's suffering.
According to recent literature, it has decided to delay at the moment at the surgical operation and to treat the patient with Teriparatide TPTD, to program a successive radiological control to 3 months from the beginning of drug administration.
In July 2006, after bone turn-over markers evaluation (osteocalcina, c-telopeptide, PTH, alkaline-phosphatasis bone isoenzima), the patient starts TPTD treatment.
To the follow-up we observe the periacetabular osteolysis recovery with radiological evidence for new bone growth and stop of bone resorption and acetabular cup migration. The patient walks correctly without any pain in hip movements.
Bone turn-over markers show increased activity.

CERAMIC: REVISION BIPOLAR AND NEW SOLUTION FOR BIG DIAMETER

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Alumina ceramic bearing couple implants are actually common and reliable (around 50% of implants). More then 4 million of ball-heads and more then 450.000 inserts BIOLOX® have been implanted. Studies, clinical experiences and new technologies gave the chance to develop a new ceramic material with higher mechanical characteristics. The latest alumina matrix ceramics BIOLOX®delta allowed developping revision ball-heads with a dedicated titanium slaves adaptable to 12–14 cones. BIOLOX®delta all-heads of 28, 32 and 36 mm can be implanted on stems that are well fixed and do not need to be removed. An XL neck length is also available. Bipolar prostheses are mostly used in old patients using a metal/Polyethylene bearing couple. The new ceramic bipolar system (Duolox®) gives the chance to reduce the wear problems introduced by the metal ions and poly debris. Duolox® is a full ceramic bipolar system with a 28 mm ball-heads articulated in a ceramic cup od external diameter starting from 42mm to 56mm with 1 mm of increasing. This solution is also suitable for young patient (es. neck fracture or metal allergy). Clinical experience are already available and promising.
The latest development in the production and design of ceramics products have permitted to produce a 40 mm bearing couple also. The final topic is to achieve the 44 mm. Is now under study and development a new system based on a pre-assembled cup (metal shell and ceramic inside surface) that will be a very thin solution. The dif-

ferences from the ball diameter and the external cup will be of 10mm. it means that will be possible to have a 44 mm ball in a 54 mm cup, with evident advantage for the stability and reliability of the prostheses saving as much bone as possible.

FACTORS INFLUENCING PRESSURE ULCERS IN PATIENTS AFTER HIP FRACTURE

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Background Despite the use of preventive measures and early mobilization after hip surgery, there is still a high incidence of pressure ulcers among patients with hip fracture. According to several studies the incidence of pressure ulcers in this population ranges from 32% to 66% [1, 2]. The purpose of this study was to investigate the factors affecting pressure ulcers in patients with hip fracture.
Subjects and Methods In a prospective study, 32 patients with subcapital hip fracture and 62 patients with interotrochanteric fracture, were participated. Participants were admitted with hip fracture to our hospital between August 2002 and August 2006 and get operated with hemiarthroplasty or g-nail intramedullary nailing respectivel. Data such as age, gender, length of stay in the emergency room, date of operation, time on the operating table, nutrition status, mental status, medical history and medication were collected. All patients were investigated by two doctors for the presence of pressure ulcers on a daily basis, from admission to discharge. Statistical analysis was performed using SPSS.
Results The incidence of hospital-acquired pressure ulcers was 41.4 % (39 out of 94 patients developed pressure ulcer, stage I or II). A prolonged length of time on the operating table was associated with higher incidence of pressure ulcers (R=0.92, $p<0.05$).
Also old age (R=0.83, $p<0.05$) and long wait for operation (R=0.81, $p<0.05$) were significantly correlated positively with high risk of pressure ulcers. Furosemide infusion was significantly correlated positively with low risk of pressure ulcers (R=0.78, $p<0.05$).
Discussion Extrinsic factors may be important markers for high pressure ulcer risk in hospitalized hip fracture patients. According to literature bad nutrition status, prolonged length time at the emergency room, long time waiting for operation and old age are associated with high risk of pressure ulcers [3].
Conclusions In order to avoid high rates of pressure ulcers after hip fracture, early operation and reduction of time on the operating table are strongly recommended. Besides furosemide infusion may reduce the rate of pressure ulcers.
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PERIPROSTHETIC FRACTURES OF THE HIP

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Background The increase of number of total hip implant for to the progressive lengthening of the average life is to the base of the increment of the periprosthetic fractures particulary in the old population. Such fractures place complexes either clinical problems for the advanced age of the patients often in critical conditions that biological and mechanical problems for the difficulty of revision on a fractured bone and the choice of the more suitable fixation. The purpose of the present study was to assess the results and complications of revision total hip arthroplasty or fixation for the treatment of periprosthetic femoral fractures.
Materials, Methods and Results We evaluated 16 patients who underwent revision total hip arthroplasty e fixation because of an acute periprosthetic femoral fracture. We evaluated the different surgical procedures and results in relation particulary to the bone stock and to the age of patient.
Discussion In the indication of surgical method the foundamental key is the clinical and radiological study for understanding the degree of stability of the implant since in a stable prosthesis a synthesis will be attempted, even if goes emphasized that sometimes a apparently stable implant during the surgical revision demonstrates to be mobilized. In the unstable implant, revision of total hip artroplasty is the only solution and it is discussed the vary types of procedures. Other important factor is the condition of the patient and its biological age and obviously more complex surgery is reserved to young patients while aged patients are treated with more simple technique, when is possible (i.e.cement on cement).
Conclusions The incidence of the periprosthetic fractures of aged patients depend on reduced physical activity and reduced bone mineral density and the incidence of periprosthetic fractures is not a lot in connection with the type of implant neither to the methods of fixation, but to the reduction of bone mass.
Suggested reading

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THE TREATMENT OF THE PERIPROTHESIC FRACTURES

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More and more frequently the Orthopaedic surgeon finds itself engaged to face the complex "understood it" of the periprotesiche fractures, than in last the 10 years incidence of 1% of the cases in the first systems has caught up one until a 6% of the cases in the surgery of review. In our experience, concerning us to the classification of "elaborated Vancouver" from Duncan in 1995 (one of the more complete continuations and) we have dealt some cases of periprothesic fracture of type To and B1 with "cable-grip system", a particular plate that it allows to maintain in situ the prosthesis stabilizing the fracture, with optimal turns out to you. The method previews the visualization of operating the radiografico control post, the postoperative clinical control and the follow-up to one and three months from the surgical participation. It turns out to you: all the patients from we deal to you show a good resumption of the daily habits in times expresses and with bonds she turns out to you.
Conclusions We want to evidence as the presence of some means of synthesis can help the Orthopaedic surgeon in facing the problem, more and more frequent, of such fractures.

CHRONIC ACHILLES TENDON PAIN: PARATENDON MICROCIRCULATION AND CLINICAL STUDY USING COLOUR AND POWER DOPPLER SONOGRAPHY AND EXTRACORPOREAL SHOCK WAVE THERAPY

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This study was designed to demonstrate the increase in the microvascularity of peritendon of the Achilles tendon in patients with chronic achilles tendinopathy and the efficacy of extracorporeal shock wave therapy (ESWT) for the treatment of this condition.

12 athletes with chronic tendonapathy were compared with 12 control subjects, all of whom were of a similar age, sex, and weight. Each group received the same treatment protocol with ESWT. Clinical evaluation was under taken prior to treatment and at one and six months after treatment was terminated. The microvascularity of all 24 subjects was evaluated with Color and Power Doppler echography both prior to treatment with ESWT and at one and six months following treatment. We observed an increase in the microvascularity of all 12 subjects with tendinopathy, and none of the control group participants. This hypervascularity was noted to be decreased when patients were evaluated one month after the initiation of ESWT. Clinically, 80% of patients experienced absence of pain and were able to return to sports activity beginning at one month after termination of ESWT. No significant clinically adverse effects were noted in normal patients who received ESWT.

THE EFFECT OF ACCELERATED, BRACE FREE, REHABILITATION ON BONE TUNNEL ENLARGEMENT AFTER ACL RECONSTRUCTION USING HAMSTRING TENDONS: A CT STUDY

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Background The mechanism of bone tunnel enlargement following ACL reconstruction is not yet clearly understood. Many authors suggest that its pathogenesis could be multifactorial1. Among the possible causes, some authors hypothesized that aggressive rehabilitation protocols may contribute to promote tunnel enlargement, especially in hamstrings autograft reconstructions.
The purpose of this study was to evaluate the effect of a brace free rehabilitation on tunnel enlargement after ACL reconstruction using doubled semitendinosus and gracilis tendons.
Materials and Methods Forty-five consecutive patients undergoing ACL reconstruction were selected. They were randomly assigned to the control group (group A, standard post operative rehabilitation) and the study group (group B, brace free accelerated rehabilitation). A CT scan was used to determine the diameters of both femoral and tibial tunnels at various levels. Measurements were done the day after the operation and at a mean follow-up of ten months (range 9–11).
Results The mean femoral tunnel diameter increased significantly from 9.04±0.05 mm (post op) to 9.30±0.8 mm (follow-up) in group A and from 9.04±0.03 mm to 9.94±1,12 mm in group B. The mean tibial tunnel diameter increased significantly from 9.03±0.04 mm to 10.01±0.80 mm in group A and from 9.04±0.03 mm to 10.60±0.78 mm in group B. The increase in femoral and tunnel diameters observed in the study group was significantly higher than that observed in the control group.
Discussion Despite many causes can be involved in tunnel widening, biologicals or mechanicals, we focused our attention on the post-op accelerated rehabilitation protocol, possible cause of both the above mentioned causes. To accurately evaluate this phenomenon we performed a CT study, rather than X-Ray or MR measurements, because of its more accurate capacity of measuring the diameters of the bone tunnels2. Even if many studies showed how a mild increase in tunnel diameters is not strictly related to poor post-op knee stability, however this phenomenon should always be avoid because possible cause of bone-tendon healing delay or hard ACL revision surgeries.
Conclusions Our results suggest that bone tunnels enlargement after ACL reconstruction using hamstrings autograft can be increased by an accelerated, brace free, rehabilitation protocol.
Suggested readings
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2. Iorio R, Vadalà A (2006) Bone tunnel enlargement after ACL reconstruction using autologous hamstring tendons: a CT study. Int Orthop 31:49–55

HIP ABDUCTOR TENDINITIS IN FOOTBALLERS AFTER ACL RECONSTRUCTION

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Background However ACL reconstruction remains a complex procedure with many possible complications, affecting mainly the knee function [1]. But no complications affecting hip function have been allready mentioned. The purpose of our study was to present four cases with hip abductor tendinitis, as a complication of ACL reconstruction.
Materials and Methods During the period (2004–2006), 4 male footballers with mean age 28±3.6 years, who sustained great trochanteric pain syndrome, 6–8 months following patellar tendon ACL reconstruction, were examined at our department.
Results On physical examination there was tenderness over the greater trochanter and pain was found on resisted leg abduction, in all patients. Echo showed trochanteric bursal distension and MRI revealed gluteus medius tendinitis. Symptoms were treated with local corticosteroid injection.
Discussion It has been hypothesized that injury and reconstruction of the ACL leads to alterations in lower extremity joint kinematics, as a result of muscle adaptation and neuromuscular reprogramming, possibly in response to pain or instability, to stabilize the knee and to prevent re-injury during gait [2]. So the patients use mainly the hip muscles in order to stabilize the knee.
Conclusions It is obvious that quadriceps activity, biceps femoris activity and knee flexion range during the phase of ball kicking are diminished. In this case, the player use hip muscles such as adductors and abductors to produce powerful kicking of the ball. So hip abductor tendinitis in footballers after ACL reconstruction may be a result of an overuse syndrome.
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TIMING DECISION IN ARTHROSCOPIC ANKLE SURGERY

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The treatment of painful ankle conservative therapy-non responsive is diagnostic and surgical arthroscopy. Surgery is always performed after clinical and instrumental evaluation. Conservative therapy is prolonged for a variable period correlated to clinical objectivity and surgeon's experience. There is no uniformity in evaluation of timing of arthroscopy. Many skilled Authors gave different answers to this basical question: when should I arthroscopically operate on the ankle? Should the surgeon wait and periodically re-evaluate or should he perform early surgery? In this study we expose the results of arthroscopic ankle surgery in 29 pazients with chronic ankle pain not responder to conservative treatment and we relationate it to the time from trauma to surgery. Clinical scores were considered; subjectivity was also evaluated. Our results are related to injuries and activi-

ty. We think that the timing of surgery have to be related to patient demand, grading of injury, clinical objective and subjective evaluation. We take in great consideration patient's desire and expectations. Speaking and debating about the single case always helps in making decision process. Our patients were all low or mid-demand cases: we think also that in high demand and professional cases, surgery, if necessary, may be frequently an "early surgery".

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HEMICALLOTASIS OPEN-WEDGE OSTEOTOMY FOR VARUS OSTEOARTHRITIS OF THE KNEE

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Opening wedge high tibial osteotomy (HTO) for varus knee osteoarthritis has shown several advantages over the classic closing wedge technique. The use of an external fixator device for medial opening wedge HTO is an alternative to obtain a progressive and precise correction. The aim of the current prospective study was to evaluate mid-term clinical and radiographic results, as well as complications, of medial opening wedge osteotomy using the hemicallotasis technique.

Forty-nine high tibial osteotomies were performed for unilateral varus primary osteoarthritis from 1999 to 2002 using the Castaman external fixator. A medial incomplete osteotomy was performed after elevating the superficial collateral ligament. The correction started 4 to 5 days postoperatively. The mean age of the patients was 57 years (range, 32–70 years). The mean follow-up was 5 years (range, 4–7 years).

The mean hip-knee-ankle angle (HKA) was 167 (range 164–171) deg preoperatively and 182 (range, 176–186) deg at follow up. Union was achieved in all patients, and the mean time to fixation was 69 (range 60–85) days. Knee Society score improved from 52 points preoperatively to 93 at follow up. Eighty-five percent of the patients showed excellent-to-good clinical outcome. None of the knees had required revision surgery at follow-up. No meta-diaphyseal mismatch was noted on both the sagittal and coronal plain at radiographic analysis. Patellar height (IS ratio) reduced, on average, from 1.1 (±0.4) to 0.9 (±0.4), but no patella was found to be baja. Complications included a number of superficial infection uneventfully healed such as two cellulitis with erysipelas-like rushes, and five minor (grade I-II) pin tract infections. There were two technical problems. One obese patient developed an undisplaced intercondylar fracture of the proximal tibial osteotomized fragment, which subsequently healed and the patient achieved a good clinical outcome. In another patient the anterior pin on the metaphyseal fragment was positioned too anteriorly, and was thereafter repositioned.

Using the hemicallotasis technique for HTO the authors obtained a precise correction with a relatively low complication rate.

EXPERIENCES IN TOTAL KNEE ARTHROPLASTY COMPUTER – ASSISTED: CORRELATION BETWEEN QUAD - SPARING SURGICAL PROCEDURES AND CLINICAL OUTCOME

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Background Total knee arthroplasty computer - assisted surgery is getting more and more common nowadays as testified by the increasing number of orthopaedic publications on the subject. Many Authors notice the accuracy of positioning prosthetic components is proportional to long - term good results. Navigation systems, during TKA implant, supply the surgeon with the opportunity of maximizing clinical results through his own technical surgery improvement.

Materials and Methods Authors present clinical, functional and radiographic results at 6 month mean follow-up of a consecutive group of patients undergone total knee replacement surgery computer - assisted performed through quad - sparing minimally invasive surgical procedure.

Discussion and Conclusions Early results with the quadriceps-sparing technique are encouraging. It appears to be less painful and more satisfying for the patient and entail a shorter recovery time.

Patients who have undergone these procedures have benefited short term from quicker recovery time and less pain and have benefited long term from the use of conventional prosthesis.

INTERNAL FIXATION AND NORIAN SRS CEMENT IN THE TREATMENT OF COMPLEX TIBIAL PLATEAU FRACTURES. A PRELIMINARY REPORT

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Complex tibial plateau fractures often require bone grafting in order to augment internal fixation.

The taking of the bone graft, usually performed from the iliac crest, necessitates an additional procedure that is often painful and with a well documented morbidity; moreover, cancellous bone grafts have a very low initial mechanical strength.

Norian SRS is a calcium-phosphate cement that can be used to fill contained defects in cancellous bone. It has a high compressive strength, sets in a non-exothermic reaction but, being a osteoconductive material, has no capability to form bone or induce its formation. It only provides a structure which the adjacent osseous tissue utilises to restore the normal bony architecture, even though complete resorption of the scaffold occurs very slowly.

During 2006, 5 patients with complex tibial plateau fractures OTA types 41.B2-B3 and C3, were treated with internal fixation (plate and screws) combined with the application of the mineral bone substitute Norian SRS in order to minimize the time of immobilization and of non-weight-bearing.

The mean volume of calcium-phosphate cement used was 6 ml (4 to 10). All the patients had the knee immobilised in a hinged orthosis for two weeks, then 90° of movement was allowed in the next two weeks, advising them to remain non-weight-bearing. Afterwards touch weight-bearing was conceded for a further two weeks and, eventually, they were allowed to progress to full weight-bearing.

At follow up, Rasmussen's radiologic score and visual analogue pain scales were used to evaluate functional and clinical outcome. Radiographs were evaluated to assess preoperative joint depression and residual incongruity after operation. All fractures healed without displacement.

There was one case of deep-venous thrombosis but no pulmonary embolism and no infections.

As a result of this preliminary study, we think that buttress plating augmented with calcium-phosphate cement in the treatment of the

complex tibial plateau fractures allows a reduction of the pain and morbidity often associated with using of grafts from the iliac crest, an earlier mobilisation of the knee and resumption of weight-bearing, avoiding loss of reduction, particularly in elderly patients, with reference to the standard treatment with bone graft.

AXIAL MALALIGNMENT OF THE INFERIOR LIMB: CLINIC, RATIONALE AND METHOD OF THE SURGICAL CORRECTION

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Background Between the deformities relatives to axial malalignment of the knee we have taken under Investigation varus knee and valgus knee that determine a pathological deflection of the axis of alignment with weight overload on an articular zone; such overload determines the genesis of the unicompartimental osteoartrosis.
Materials and Methods The rationale behind the osteotomy is to correct the angular deformity at the knee and therefore decrease the excessive weightbearing load across the affected compartment that is the most involved by the degenerative process.
The purpose of this study has been the clinical retrospective analysis and radiographic of 16 patients treated for axial deviation of the knee with valgus osteotomy for varus deformity and varus osteotomy for valgus deformity, stabilized with the plate of Puddu. The population object of our study was formed from 6 women and 10 men with a medium age of 40 years (range 14–58); the patients under investigation have been operated or for deformities that determined unicompartimental arthrosis or for results of fractures. The osteotomy has been always preceded by the arthroscopy for the treatment of eventual articular lesions (meniscal debridement, condroabrasion and/or subcondral perforations, partial sinoviectomy) and then are proceeded to a surgery to open sky. The follow-up medium it has been of 5 years.
Results and Discussion The patients have been estimated by means of clinical examination, functional and radiographic analysis. Concordant with results obtained, for all the patients it has been found a meaningful improvement of the painful symptomatology and the functions of the knee; they have not been recorded of vascular neither neurological complications nor fractures. All the osteotomies have consolidated and the correction degree has been conserved in the time, even if with light variations.
Conclusions This study indicates that tibial osteotomy and femoral one using the plate of Puddu, executed in patients opportunely selected (physiologically young, active patient), have turned out therefore a good technique in order to correct the femur-tibial mechanical axis and therefore for dealing the unicompartimental arthrosis of the knee. The reliability, the reproducibility and the semplicity of the technique, the stability of results to mean and long term propose this surgery like valid alternative to the unicompartimental prosthesis or total of the knee, but also to the traditional Coventry lateral closing wedge osteotomy or to that one of the hemicallotasis.

EFFECT OF DOUBLE BUNDLE ACL RECONSTRUCTION ON TIBIAL INTERNAL ROTATION: AN "IN VIVO" CAOS STUDY

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Background The biomechanical function of ACL reconstruction with semitendinosus and gracilis tendon graft and bone-patellar-tendon-bone graft was evaluated in a cadeveric study and the results showed that these procedures were successful in limiting anterior tibial translation, but were insufficient to control a combined rotatory load of internal and valgus torque. 11–30% of the patients had unsatisfying long-term results, especially regarding the control of rotatory stability with a glide or a positive pivot shift test post operatively. One possible cause could be that current single bundle procedures cannot realistically reproduce the complex anatomy of the ACL. The hypothesis of our study is that the addition of the PL bundle to the AM bundle, in an "in vivo" double bundle computer assisted ACL reconstruction, is actually able to reduce the internal rotation of the tibia at 30° degrees of knee flexion, minimizing the pivot shift phenomenon.
Materials and Methods Ten consecutive ACL reconstruction procedures were performed in our Hospital with double bundle gracilis and semitendinosus tendons graft using the 2.0 OrthoPilot ACL navigation system. Maximum manual A-P displacement at 30° of flexion,as well as maximum internal and external rotation of the knee were evaluated before surgery and after single (A-M) and double (AM+PL) bundle reconstruction. Moreover has been performed a clinical evaluation at one year of follow-up with clinical examination, KT1000 evaluation, Tegner score, Lysholm score and IKDC 2000.
Results There was no statistically significant difference in tibial internal and external rotation at 30° after single bundle (AM) and double bundle (AM+PL) reconstruction.The clinical examination showed no statistical differences between the two groups.
Discussion In this study the effectiveness of PL bundle in controlling the internal rotation of the tibia, responsible of rotational instability of the knee, was evaluated in "in vivo" ACL reconstruction. Our method allowed us to obtain the experimental data by using the same specimen thus minimizing the interspecimen variation and increasing the statistical power. Moreover the navigator system allowed us to obtain "in vivo" the real and correct value of AP displacement and internal and external rotation of the tibia before and after reconstruction.
Conclusions Our hypothesis that the addition of the PL bundle to the AM bundle is actually able to reduce the internal rotation of the tibia at 30° degrees of knee flexion, minimizing the pivot shift phenomenon better than the single bundle tecnique, on the basis of our study has not been confirmed. The clinical examination showed good results of both the single and the double bundle technique.

INTRAARTICULAR SODIUM HYALURONATE IN KNEE OSTEOARTHRITIS: A RANDOMIZED, SINGLE-BLIND, PROSPECTIVE STUDY

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The aim of this randomized, single-blind, prospective trial was to assess the safety and effectiveness of one, two or three intraarticular injections of high weight sodium hyaluronate (ORTHOVISC), in patients suffering from osteoarthritis (OA) of the knee.
We enrolled 82 patients randomly divided in three groups: GROUP 1 (13 male, 15 female), single injection with 60 mg HA in 4 ml); GROUP 2 (15 male, 15 female), two injections (30 mg HA in 2 ml) given at fifteen days intervals and GROUP 3 (11 male, 13 female), three injections (30 mg. HA in 2 ml) given at 7 days intervals. The inclusion criteria were:
- 40–75 years old;
- disease symptom duration 6 to 60 months;
- no other therapy during treatment;
- prymary knee arhrosis grade 1 or 2 of the Kellgren-Lawrence scale;
- absence of neurological or vascular diseases;
- ability to provide informed consent.

All patients underwent to the x-ray in a standing AP view or semiflex weight-bearing view and a physical examination. The assessment of treatment effectiveness was made using WOMAC score and VAS score for pain at six months from the end of the treatment by an indipendent observer.
Only two patients (group 1) didn't complete the study for the worsening of the knee pain. At the follow up (average 11 months) we ob-

served an improvement of the ROM and the ability to walk in the index knee and a significant relief of pain in GROUP 1 and 2 without statistically significant difference. A more significant improvement of the WOMAC score was been obtained in the GROUP 3. We conclude that HA was well tolerated and no complications were seen in conjunction with the treatment. The data reported suggest ORTHOVISC may represent a good alternative to NSAID and intraarticular injection of corticosteroids, but using the 3 injections is possible to obtain more benefit for patients with the same compliance.

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ANTIBIOTIC DIFFUSION IN PSEUDOARTHROSIC INFECTED BONE: GLYCOPEPTIDES, FLUOROQUINOLONES AND CARBAPENEMS

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Background Antibiotic concentration in infected bone is a major determinant of clinical response. As glycopeptides, fluoroquinolones and carbapenems are widely used for the treatment of bone infections, aim of our study was to assess their diffusion in infected human bone.
Materials and Methods Patients with a septic pseudoarthrosis undergoing debridement of infected tissue and treated with either a glycopeptide, a fluoroquinolone or a carbapenem iv for >1 week, were studied. Plasma and bone specimens were collected intraoperatively for PK and microbiologic assays at a mean of 4.7 h after antibiotic administration. Antibiotic concentrations were measured by HPLC-UV method.
Results Twenty patients (pts) were studied. Five received vancomycin: bone concentrations (mean) were 2.4 mg/L in cortical and 7.1 mg/L in cancellous bone, with a bone/plasma extraction of 12 % and 36 %, respectively.
Five pts were treated with teicoplanin for MRSA infection: bone concentrations were 3.1 mg/L and 7.7 mg/l respectively for cortical and cancellous bone (16% and 39% of plasma levels).
Five pts received a fluoroquinolone: ciprofloxacin concentrations were 1.8 mg/L in cortical, and 30.2 mg/L in cancellous and newly formed bone (respective bone/plasma ratios: 1.06, and 8.4). Levofloxacin concentrations were 0.3 and 2.69 mg/L in cortical and cancellous bone, with diffusion rates of 12% and 108% respectively.
Five pts received a carbapenem. Imipenem diffusion rates were respectively 7.5% and 58.3% for cortical and cancellous bone (bone concentrations: 0.09 mg/L and 0.7 mg/L). Meropenem bone levels were 1.2 mg/L and 5.2 mg/L in cortical and cancellous bone, with respective diffusion rates of 3.6% and 15%.
Conclusions Both vancomycin and teicoplanin provided concentrations exceeding the MIC of infecting agents and displayed satisfactory bone diffusion. Ciprofloxacin provided tissutal levels higher than levofloxacin, and both showed a good bone diffusion; ciprofloxacin concentrations in cancellous bone and in bony callus were far higher than in plasma, suggesting an accumulation into highly vascularized bone. Imipenem had higher diffusion rates than meropenem, but bone levels were under the MIC of susceptible agents. Glicopeptides and fluoroquinolones appear an excellent option for bone infections, while carbapenems should be considered a second choice treatment.

Suggested readings

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BIFOCAL AND TRIFOCAL TECHNIQUE WITH ILIZAROV METHOD IN THE TREATMENT OF TIBIAL NONUNIONS

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Background We reviewed the results obtained since 2003 by Ilizarov technique.
Materials and Methods Eleven bone transports were performed in ten patients by circular external frame. Nine were male and two were female. They had type II or III compound tibial fractures (Gustilo) in multiple injury 10(11), that were developing shaft / metaphiseal infected non union or delayed union with or without bone loss. In one case the Ilizarov recostruction has been used to treat an ankle fusion with limb-length discrepancy in septic osteoarthritis after failed ankle fracture treated by orif. Another patient was undergone to a second bifocal bone transport after that nonunion happened in the docking side point. The frames utilized were: Sheffield (7) and TSF (4). Foot fixation was extended in 6 patients. Focus resection are required in infected non union, necrosis and infection of the bone. Different procedures have been performed in order to treat major skin loss. Soft tissue coverage was obtained in a case with a latissimus and serratus anterior free flap. Because of 17 cm of tibial bony loss an external fixator was placed in according with converging trifocal bone transport technique and healed in 18 months. In other 3 patients after edge debridment bony union took place, soft tissue closure was obtained with the expansion related to the lengthening procedure. In a fifth case a reverse adipo-fascio-cutaneous sural flap was performed.
Results Consolidation of the primary and secondary foci was achieved in all tibial cases, while one patient required 2 surgical treatments. Lengthening achieved was from 3.8 to 17 cm. The treatment period time were from 6 to 20 months. Two (79) screws of the constructs crushed 4 and 10 months later the beginning of the cares.
Discussion Fractures of the tibia more frequently result in nonunions compared to other sites. The use of the Ilizarov method, when properly applied, results in almost a hundred percent rate of ultimate union.
Conclusions The patient with tibial malunion and non-union, infection, bone loss, limb discrepancy and deformity can be addressed with bifocal and trifocal Ilizarov techniques to achieve a solid union usually with a roentographic a clinically satisfactory results.

Suggested reading

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CPK LEVELS RESEMPLENCE IN PATIENTS WHO HAVE EXPERIENCED HEAVY HEART ATTACK AND HIP FRACTURE SURGERY

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Background The creatinine phosphokinate CPK and its co-enzyme CK-MB level fluctuation in patients who have experienced heart attack or surgical restoration of a hip fracture resemple in kinetics. By this study we try to opine for the use of these enzymes in the diagnosis of accute heart attack during theprompt postoperative period of patients who have been through a hip surgery.

Subjects and Methods Our study includes 30 patients having experienced a heart attack, 32 patients who have been operated for subcapital hip fracture using hemiarthroplasty of the hip and 26 patients who have been operated for intra trochanteric hip fracture using intra medullary nailing. The operated patients had no indication of a heart attack in the prompt postoperative period.
The rates of CPK, CPK-?? were measured on patients with heart attack during the first 5 days of their hospitalization. The rates of CPK, CPK-??, on operated patients, were measured at 24h, 48h, 72h, and 120h postoperatively.
The data analysis was carried out with statistics analysis package SPSS.
Results During the postoperative phase, in a period of 4 days after a subcapital or intratrochanteric hip fracture and with no indication of a heavy myocardium heart attack, an increase of CPK,& CPK-?? is observed in levels higher than normal. Levels of above enzymes statistically differ amongst operated patients without heart attack and non operated patients with heart attack ($p<0.005$). The highest rate of these enzymes was (CPK= 1078 ?a? CK-??= 84) after hemiarthroplasty, and (CPK =809 CK-?? =119) after intra medullary nailing.
Discussion and Conclusions We must have strong suspicions for myocardium heart attack after a hip surgery only when we observe rates such as CPK >1078 and CK-?? >119.

CONTROL OF THE POST SURGICAL PAIN IN PATIENT OPERATED OF HIP, KNEE, SHOULDER AND FEMORAL ENDOPROSTHESIS

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Background The treatment of pain in the post-operative phase is a fundamental element for a early mobilization of the patient. The object of our evaluation was to verify if the treatment with oral oppioids, with slow release formulation, allowed to improve the control of pain in the immediate post-operative and rehabilitation phases.
Materials and Methods In this study we have evaluated 43 patients, 31 women and 12 men, with avarage age of 73.32 aa, submitted to prosthesis of hip (22), knee (12), shoulder (1) and femoral endoprothesis (7); these patients have been treated with oxycodone CR 10 mg/12 h, immediately after the surgery and for an average period of 6.2 days.
Conclusions Only a patient has had the necessity of a dosage equal to 20 mg/12 h of oxycodone CR. The valutation of the pain, carried out through scale NRS, has confirmed an optimal control of the pain, with an average value equal to 1.39. No particular side effects have occurred, only 4 patients suspended the treatment. In one case the neurologist modified the therapy for a patient. The patients therefore have been able to begin promptly the fisiotherapy, maintaining an optimal control of pain.
Suggested readings

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USE OF TAYLOR SPATIAL FRAME IN DEFORMITY CORRECTION AND POST TRAUMATIC RECONSTRUCTION. OUR EXPERIENCE AT NIGUARDA TRAUMA CENTER HOSPITAL

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Background TSF is a multiplanar frame that combines easy of application with software accurancy. The aim of our beginning experiences is to assess the efficacy of treatment using the hardware with tsf rings utilizing, when useful, both the traditional Ilizarov bars than the six connecting struts device.
Materials and Methods From January 2006 to February 2007, 18 cases over 17 patients were treated with TSF ring frames both limb reconstruction (17) and tibia fracture (1). There were 13 men and 4 women with a mean age of 45.2 yrs (range 0–84). A 78 years old male had septic tibia and humerus non unions. Post traumatic malunions or non-unions (16) were: femur (3), tibia (12), humerus (1). 1 fork spine foot deformity was in 17 yrs old female. The femoral group has: 2 bifocal bone trasport (15 and 9 cm) in pseudoarthrosis with bone loss and 1 lengthening (3 cm) with varus post traumatic deformity correction. The tibial group has: 1 fracture (C32, Gustiloma), 2 deformity correction, 1 "rigeneratus" correction, 1 monofocal treatment in septic pseudoarthrosis, 9 bone trasport (0–3 cm) in non union (6 with infection), treated by techniques: 2 trifocal, 6 bifocal and 1 bifocal + lengthening and foot correction. The mean number of operations before the application of tsf was 2 (range 0–6 operations). The humerus was a septic atrophic non union.
Results 1 patient (84 years old) with tibial septic nonunion died of heart failure. 5 patients healed have been removed the hardware. 7 cases were given treatment by transport tecnique and they waiting for bone distraction consolidation. 6 (33.3%) cases were treated by tsf six connecting struts.
Discussion The TSF is valuble tool in the arsenal of the orthopaedic surgeon and the patient has good system compliance. It is an effective definitive method for treating deformity, neglected fractures, malunions, nonunions and bone loss.
Conclusions We advise the six axes analysis in deformity correction and in the final step of lengthening and bone transport, with several advantages over previously used devices. Adjustments during the postoperative period are possible without modifying the hardwares and when it is necessary, we adding and removing rings and struts length also.
Suggested reading

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TREATMENT OF THE PEDIATRIC DIAFISAR FEMUR FRACTURES

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Background Healthcare cost containment and a desire for early discharge of the pediatric patient to the home environment have become important factors in the treatment of femoral shaft fractures in children. As a result, newer techniques of treatment have become popular.
In the last two decades, there has been a strong trend toward treatment methods that allow rapid mobilization.
Materials and Methods In the period 1998–2006 in our clinic are treated 52 pediatric patients with below methods:
1. Traxion in Böhler-Broun splint+hip spica (29 patients);
2. External fixation (7 patients);
3. Internal fixation (plate and screws) (16 patients).

Patients treated in first method belong mainly to 0–6 year age group. The other two methods belong to 6–16 year age group.
The goal of this retrospective study is to get out the practical value of these three method in the treatment of pedriatic diafisar femur fractures.
Results Average day recovery is 17.5 days in first method; 5.6 days in the second and 8.4 days in third method.
Time of consolidation is 10 weeks in first method; 8.2 weeks in the second and 8.9 weeks in the third one.
The complications meet in these cases are: A- Overgrouth in 1.5 cm in the first method; 1.2 cm in the second method; and 0.9 cm in the

third method. B- We met 2 cases of skin irritation in first method; 1 case of infection of external fixator pins; 1 case of infectiose pseudoarthrosis in third method.
Conclusions Methods used in our hospital for treatment of the pediactric diafisar femur fractures show that consolidation is always secure, but the treatment in external fixation and internal fixation have a special value in early discharge, good hygienic conditions and fast patient rehabilitation.

HIGH LUMBAGO COMBINED WITH ANTALGIC SCOLIOSIS IN CHILDREN, ANEURYSMATIC CYST OF THE SACRAL BONE AS A CAUSE FOR IT

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Background High lumbago and rachialgia in children is a symptom usually combined with children or pubic scoliosis. In this paper we present a rare case of high lumbago-rachialgia and antalgic scoliosis on the base of an aneurysmatic cyst of the 4th Sacral Vertebra.
Materials and Methods The case presented here is the one of an 8 year old female which arrived in the clinic suffering from high lumbago for three months. The patient presented no other symptoms. The clinical examination showed painful mobility of the lumbar spine, antalgic scoliosis, without palpable sensitivity or neurologic semiotics. The hematologic and biochemical blood examinations were normal. The radiograph of the Lumbar spine showed no pathologic findings. Due to the diagnostic dilemma a computed and a magnetic tomography of the lumbar spine and pelvis were requested.
Results The CT examination came up with a lytic process of the 4th Sacral vertebra which expanded to the pre-sacral space and into the spinal canal. The Magnetic resonance showed diaphragms and liquid substance inside the lytic process, a view compatible with aneurysmatic bone cyst. A new Lumbar & Sacral Spine X-ray control, a posteriori, showed the cyst. Transcutaneous drainage of the cyst material, under radiological control, was followed by reduction of the patient's symptomatology.
Discussion and Conclusions On the differential diagnosis of high lumbago – rachialgia one should take into account the Sacral bone pathology. The X-rays taken, apart from the Lumbar spine, should indispensably interest the Sacral Spine as well.

INTRAARTICULAR OSTEOID-OSTEOMAS OF THE ANKLE

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Purpose of the Study The Authors present 8 cases of intraarticular osteoid osteomas of the ankle joint; the problems encountered in the diagnosis are discussed and the results of surgical treatment are evaluated.
Materials and Methods All the 8 patients were between 18 and 32 years old.There were 7 males and 1 female The symptoms and the clinical findings were atipical; in all cases synovial inflammation, articular efflusion and other manifestation of joint disease were present. In all cases the symptomatology was related to a previous trauma. Conventional x-rays had no abnormal findings in 7 cases; the diagnosis was confirmed by bone scan and/or MRI. Treatment consisted in "en bloc" resection of the nidus without reconstructive measures. Istological diagnosis was confirmed in all cases.
Results All patients had relief of symptoms after surgery with complete functional recovery.
Conclusions Although intra-articular osteoid osteoma is an uncommon lesion it must be considered in differential diagnosis in case of chronic pain of the ankle.
Bone scan and MRI seem to be effective in the diagnosis and in surgical planning.
Complete surgical excision of the lesion is the treatment of choice.

VOLAR FIXED-ANGLE FIXATION OF DORSALLY DISPLACED DISTAL RADIAL FRACTURES

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Background Dorsal plating has been an option for patients with dorsally angulated distal radial fractures; however the complication rate of this approach remains high.
A volar approach has been developed for fixing a dorsally angulated fracture of the distal radius. Since its introduction, it has provided an effective alternative for the management of dorsal and volar fractures of the wrist. It has several advantages: 1) more room for implant placement; 2) the quadratus pronatus act as a barrier to minimize irritation to flexor tendons; 3) anatomical reduction of the palmar cortex may avoid the shortening of the radius; 4) the volar cortex of the distal radius was very often not as severely comminuted when compared with dorsal cortex; the palmar cortex is also relatively flat and the plate is better contoured for application.
The anatomic design of the titanium volar fixed angled plate, in conjunction with precise screw positioning and locking capabilities creates an extremely stable construct with minimal soft tissue irritation
Aim To evaluate the functional and radiological results of treating dorsally displaced distal radius fractures with a volar fixed-angle fixation.
Study Design Clinical and radiological study in a prospective case series.
Methods From 2004 to 2005 45 patients (20 men and 25 women) mean age 48.8 years with distal radial fractures dorsally displaced were treated with open reduction and internal fixation using a volar fixed-angle plate: Acu-Loc(Acumed). Inclusion criterion was failure of closed reduction with residual radiographic displacement.
Physiotherapy and occupational therapy were started after 2 weeks of protection with a cast.
Follow-up radiographs of the wrists were taken to assess reduction and bony union. Modified Lidstrom radiological scores were used. Clinical outcome was evaluated at 1, 3, 6, 12, month after the treatment. Instruments for outcome evaluation included use of modified wrist-scoring system of Mayo Clinic and DASH questionnaire.
Results No complications were noted. Postoperative radiological assessment showed that the mean volar angulation of the distal radius was 5?, mean radial inclination 22°, and mean radial shortening 0.1 mm. No secondary displacement occurred. According to modification of Lidstrom's radiological scores at the last follow up the patients reported 39 excellent, 5 good, 1 fair. The mean score on the DASH questionnaire was 34.
Conclusions Volar Fixed-angle Fixation provides stable fixation to dorsally displaced fractures of the distal radius with excellent radiographic and functional results.

CONSIDERATIONS ABOUT CAPSULAR AND TENDON PLASTY IN SURGICAL PROSTHETIC REPLACEMENT FOR RHIZOARTHROSIS

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Anatomy knowledge of trapezio-metacarpal articulation is very important in all surgical approaches for rhizoarthrosis prosthetic treatment. Postoperative stability play a basic role in surgical procedure results and durability. Trapezial prosthetic substitution approach the articulation throw capsular and ligamentous tissues that have to be reconstructed and have to provide stability in early and late postop-

erative period. Wrong or insufficient reconstruction may cause surgical failures and revision due to subluxation or recurrent luxation of the prosthesis. These complications are often caused by an extensive and excessive intraoperative dissection of radial and volar capsular portion. Experienced surgeons avoid aggressive and hasty dissection of peritrapezial tissues while trapeziectomy. An anatomical and biomechanical review study has been performed to evaluate possibility for capsular stable surgical ligamentous and capsular plasty and to propose ideas based on recent literature. In all cases gentle and smooth surgical gesture help avoiding postoperative prosthesis mobilization. Physiotherapic (dedicated, if possible) continuative and progressive assistance is mandatory in order to obtain a full articular and functional recovery.

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TYPE AND SEVERITY OF VERTEBRAL FRAGILITY FRACTURES IN POST-MENOPAUSAL OSTEOPOROTIC WOMEN

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Vertebral fracture is a very common consequence of post-menopausal osteoporosis and can increase disability and mortality. We analysed the frequency of different types and severity of vertebral fractures in post-menopausal women.

Materials and Methods We examined post-menopausal women with prevalent vertebral fractures. We included patients with at least one morphometric vertebral fracture, with more than 15% of compression of anterior, mid or posterior heights. Their mean age was 62.7 (41–88). We measured vertebral body deformities with computerized morphometric examination on the dorsal and lumbar spine radiographic images. We used two different cut-offs to define spine fractures: 15% of reduction of vertebral heights (anterior, midldle or total) and Genant's method of spine fractures classification (fracture grade 1>20% of reduction of one of three heights).

Results We recluted 334 post-menopausal fractured women. The total number of fractures was 595, with a percentage of 57% of women with multiple fractures. Using a cut-off of 20% of vertebral deformity, the number of fractures was reduced to 159 with reduction of 72.8%. 31.1% of the patients had a single fracture, 21.25% 2 fractures, 12% 3 fractures, 3.9% 4 fractures, 3.6% 5 or more fractures. Most common fractured vertebral body was D8 (21.4%), following by D7 (19.4%) and D-6 (13.1%). Wedge was the most frequent deformity type (69.16%). In 40–49 years sub-group, D8 was the most frequently fractured vertebra; in 50–59 year group was still D8, in 60–69 year group D7, and in over 70 year group the most frequently fractured vertebra was still D8.

ADULT ROTATORY INJURY C1 C2 ASSOCIATED TO TYPE 3 DENS FRACTURE: CASE REPORT

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Study Design An uncommon case of post traumatic atlantoaxial rotatory fixation (type 3 according to Fielding and Hawkins) associated with odontoid fracture (Type 3 according to Anderson d'Alonzo) in elderly patient is reported.

Background Atlantoaxial rotatory subluxation associated with C2 odontoid fracture is a rare lesion especially in elderly people. Management can involve conservative methods and surgical intervention.

Patients and Methods A female 65 year old, who had a direct impact of her cycle with a car, reported an atlanto axial rotatory dislocation with type 3 dens fracture associated with fracture of the clavicle and neck of the scapula in the right side. CT scan and radiographic exams were performed in intensive care department where the patient was referred for brain concussion and incomplete neurological impairment of the right arm. A halo traction was positioned with good reduction of the lesion and afterwards a halo vest was assembled then worn continuously for three months.

Results 2 months and half after injury CT scan showed complete stabilization of dens fracture and good position of the C1-C2 complex without pain in the region of the head and neck. After one year the patient had improvement of neurological deficit and complete bony healing.

Discussion In literature few cases of this kind of lesion in elderly people are reported. Sometimes it is necessary to perform surgical C1-C2 stabilization. We considered that the aim of this treatment is the possibility, with a simple technique, to rapidly stabilize type 3 dens fracture and rotatory dislocation without using posterior C1-C2 arthrodesis. The dynamic views performed 8 months after treatment show absence of sagittal instability due to the integrity of transverse ligament and good bony healing.

Conclusions In the authors opinion the halo device is a useful tool for the treatment of this uncommon lesion with possibility to reach healing just avoiding surgery.

Suggested readings

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EVALUATION OF THE REDUCTION OF THE PAIN AND NEW FRACTURES IN PATIENT WITH SEVERE OSTEOPOROSIS TREATED WITH ANTIRIASSORBITIVI AND TERIPARATIDE

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Introduction The purpose of this job is to appraise the reduction of the pain and new fractures, in patient with severe osteoporosis treated with different medicines.

Materials and Methods 250 women have been selected with an inclusive age between 50 and 80 years. Those considered fit for the study should: "have been in menopause since at least 4 years" have at least a vertebral fracture from brittleness.

All the women affected from metabolic illnesses of the bone different from the osteoporosis, reduced liver and renal functionality and

with defects of the metabolism of the kick have been excluded from the study.
All the enlisted women have been sent to our observation by the doctors of family, with the following examinations of laboratory: all the patients were submitted to an evaluation of the pain with a staircase of Visual-Analogica autoevaluation (VAS).
Then they were divided into two arms or subgroups with homogeneous characteristics.
Group 1:45 patients GROUP 2:57 patients.
After an accurate anamnesis, the vision of the prescribed examinations and considered a T-score >-2,5 the women with a vertebral collapse (group 1) they were treated with Bifosfonati, those with two or more collapses, treated previously with antiriassorbitivi, (group 2) they were treated with Teriparatide 1–34. To all of them a supplement of Ca + Vit.D. was given. The evaluation of the pain was repeated 6–12–18 months. To the first follow-up, a new examination was asked for DEXA. To the 18° month the examinations of laboratory, the RX and the DEXA were repeated.
Results Reduction of the pain in the patients of the group 2 (Teriparatide 1–34) 80–90%, in comparison to 10–12% of the group 1 (Bifosfonati).
Reduction of the 86 % further fractures number in the patients of the group 2 (Teriparatide 1–34) and of 30% in the patients of the group 1(Bifosfonati).
Improvement of the quality of the life of patients, with a suitable clinic answer (group 2), according to the parameters of the questionnaire QUALEFFO - 41 (12).
Inhibition of the Interleuchines 1 and 6 (IL 1–6) from the Teriparatide 1–34, what probable mechanism of the reduction of the pain, matter that we will treat in way deepened in a following clinical evaluation.

NEW EX-VIVO APPROACH OF GENE THERAPY BY IMPLANTATION OF GENETICALLY MODIFIED AUTOLOGOUS DERMAL FIBROBLASTS EXPRESSING HLMP3 INDUCES ECTOPIC BONE FORMATION AND HEALING OF CRITICAL SIZE MANDIBULAR BONE DEFECTS

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Background A number of different factors such as bone morphogenetic proteins (BMPs), signaling/transcription factors, nuclear transcription factors as well as extracellular matrix components are involved in the complex process of bone formation. Recently, we and others have shown that gene transfer of the LIM Mineralization Protein (LMP), a novel intracellular positive regulator of the osteoblast differentiation program, can induce efficient bone formation. In humans, three different LMP splice variants have been identified, termed LMP-1, LMP-2, and LMP-3.
Materials and Methods Gene transfer of human LMP-1 and LMP-3 induces expression of genes involved in bone formation including certain bone morphogenetic proteins (BMPs). To develop a clinically relevant gene therapy approach to facilitate bone healing, we have used genetically modified primary, autologous dermal fibroblasts seeded on an HA/Collagen prior to implantation.
Results In this study we demonstrate that transduction of the dermal fibroblasts with Ad.LMP-3 induce ectopic bone formation, as determined by X-ray, histology and 3DμCT analysis, in three different animal models: - ectopic bone formation following implantation of the matrix into the triceps and the paravertebral muscles of immunocompetent mice; - efficient bone healing following implantation into a mandibular bone critical size defect in immunocompetent rats.
Discussion and Conculsions: These results demonstrate the effectiveness of the non-secreted, intracellular osteogenic factor, LMP-3, in inducing bone formation in vivo. Moreover, the utilization of primary, autologous dermal fibroblasts implanted on a biomaterial is a clinically relevant approach for facilitating new bone formation, with possible practical applications in the next years.
Suggested readings

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ANATOMICAL DESCRIPTION AND QUANTITATIVE ANALYSIS OF THE ANTERIOR CRUCIATE LIGAMENT OF THE GOAT KNEE

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Background The goat knee has been broadly used for anterior cruciate ligament (ACL) reconstruction models, including biomechanical and biological studies. Although the number of studies published using the goat as a model is relatively high, little is known about the ACL anatomy. Thus, the purpose of this study was to perform a detailed qualitatively and quantitatively assessment of the ACL, its bundles and its insertion site in the goat knee.
Materials and Methods Ten fresh-frozen non-paired adult goat knees were used in this study divided in two groups, five for each group. In the first group were measured the insertion site area of each bundle, the distances between the center of these areas and the anatomy landmarks and the length of each bundle. In the second group was analyzed the ratio between the femoral and tibial insertion site areas and the midsubstance cross-sectional area of the ACL. A digitizing systems, Microscribe 3D and 3D-laser camera, were used to record the data.
Results Three bundles could be clearly identified in each ACL; anteromedial (AM), intermediate (IM) and posterolateral (PL) bundle. Interestingly, the anterior horn attachment of the lateral meniscus divides the tibial insertion in AM and IM/PL bundles. On the tibial side, the insertion of the IM and PL bundles could not be identified separately.
On the femur, the area of insertion site for each bundle, represented as a percentage of the entire footprint, was 54.3±7.8% for AM, 9.9±3.8% for IM and 35.8±4.4% for PL bundle. The area of tibial insertion, represented as a percentage of the entire footprint, was 68.6±4.7% for AM and 31.4±4.7% for IM/PL bundle. The differences between the entire femoral (51.9±4.6 mm2) and tibial (81.1±11.9 mm2) footprint areas and between each bundle were statistical significant ($p<0.05$).
All insertions had significantly larger areas than the ligament midsubstance cross-sectional area (21.76±7.26 mm^2) ($p<0.05$).
The length of each bundle was 26.1±2.2 mm, 19.7±1.9 mm and 15.7±1.7 mm for AM, IM and PL respectively ($p<0.05$).
Discussion Although it shares some similarities with the human ACL, the goat has some specific features that must be considered. Further investigation should be conducted in order to determine the biomechanical role of each bundle in the goat knee.

FIBROBLAST AND BIOLOGICAL MEMBRANE FOR POTENTIAL TENDON REPAIR: AN IN VITRO PRELIMINARY STUDY

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Background Tendon repair is a current challenging clinical problem, as tendons have a poor intrinsic healing potential. Several surgical techniques have been proposed in order to improve tendon healing Cell-based therapy could represent a valid therapeutic solution for this issue. The aim of this study was to identify an in vitro model of collagen membrane seeded with fibroblasts, as a potential tool for improving the biological and biomechanical properties of the repair tissue.
Materials and Methods Achilles tendons' specimens were taken from young pigs. The specimens were cut in small pieces of approximately 1 mm of diameter, cultured in vitro, in order to allow the cells to leave the specimens and then to reach the confluence (approximately 1 month). The fibroblasts were then enzymatically isolated, resuspended and expanded since confluence was reached again. The cells were seeded onto membranes of collagen type I and III of 6 mm of diameter at 3 different concentrations. The membranes were cultured in vitro at standard culture conditions for 2 and 5 additional weeks, then retrieved from culture for macroscopic, histological and SEM analysis.
Results Macroscopically, the seeded membranes showed shrinkage and reduced biomechanical integrity compared to the unseeded membranes. The histological examination demonstrated the presence of vital cells within the membranes with a certain amount of matrix production.
Conclusions The results from this study demonstrate that the swine fibroblasts can be seeded onto a collagen scaffold. These cells remain vital during in vitro culture. The shrinkage of the experimental samples was probably due to a enzyme produced by the fibroblasts. Further studies will demonstrate the survival of the cells and the reparative potential of fibroblast transplantation in an orthotopic in vivo model. We believe this model could be a valuable tool for tendon lesions, working either as a cell-carrier and a as patch augmentation.
Suggested readings

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ACUTE SHOULDER POSTERIOR DISLOCATION WITH IMPRESSION FRACTURE OF HUMERAL HEAD: A NEW SURGICAL APPROACH

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Acute dislocation of the shoulder is a rare event frequently associated with anteromedial impression fracture, or McLaughlin lesion, that causes posterior shoulder dislocation functional disability and precocious arthritis.
The aim of this paper is to review the literature about the treatment of the humeral head impression fracture in the posterior shoulder dislocation. Moreover, we describe a new conservative surgical technique to allow the accurate reconstruction of the articular surface by an elevation of the depressed cartilage and subchondral buttressing.
The appropriate management of the posterior dislocation depends on the length of time from trauma to diagnosis, the age and activity of the patient and, above all, on the size of the humeral head defect. Defect that involves 20 to 50% of the articular surface of the humerus, the gold standard is still the not-anatomical surgical approach with the lesser tuberosity and subscapularis transfer into the defect. This approach, however, changes the shoulder anatomy, can limit internal rotation and complicate future prosthetic reconstruction.
This new technique represents an viable alternative in acute humeral head defects involving 40% of the humeral shape. It also avoids limits on the internal rotation and doesn't complicate future prosthetic reconstruction.
Suggested readings

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TREATMENT OF RADIAL HEAD FRACTURES: OUR EXPERIENCE

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Background Radial head fractures account for 5% of all fractures and are complicated by elbow dislocation in 10% of cases. A modified Mason classification, with an associated elbow dislocation modifier was used to compare our cases.
Materials and Methods From 2000 to 2004 the University of Catania Institute of Orthopaedics and Traumatology treated 67 cases of radial head fracture. Twenty-three cases were treated nonoperatively with 44 cases requiring operative fixation. Three different surgical solutions were employed including radial head resection, ORIF, and endo-prosthesis reconstruction.
Results Clinical and radiographic results were evaluated. The mean follow-up period was 34 mounths (range 5–73). All fractures demonstrated radiographic union. There was one case of ulnar nerve neuropraxia. One radial head prosthesis we observed a case of joint stifness. We evaluate the pain throught the American Shoulder and Elbow Surgeons Elbow Assessment Form, the ROM using ASES.
Discussion The medial collateral ligamentous complex represents the primary valgus restraint of the elbow. In complex elbow injuries it is necessary to repair or reconstruct this medial ligamentous complex to provide valgus stability in addition to radial head reconstruction or prosthetic replacement.
Conclusions At the University of Catania we employed ORIF alone as the most commmon technique to treat radial head fractures. Unstable fractures required ligamentous reconstruction in addition to ORIF with occasional augmentation by external fixation to achieve a stable construct. Highly comminuted non-reconstuctable radial head fractures were treated with prosthetic replacement.

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OPERATIVE K-WIRES OSTEOSYNTHESIS IN A2.2, A3.2, B AND C AO TYPES FRACTURES. OPERATIVE VERSUS CONSERVATIVE TREATMENT: A TWO YEARS PROSPECTIVE STUDY

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Background The treatment of the proximal humeral fracture is still controversial. Recent epidemiologic analysis has shown that one of the commonest humeral fracture is the A2.2 impacted-varus [1]. In this disease the functional results of nonoperative treatment are suboptimal [2]. In this study we compared the results of the non-operative management with k-wires osteosynthesis in patients with A2.2 fractures. We also analyzed the efficacy of k-wires technique in more severe displaced fractures.
Materials and Methods We prospectively followed 93 patients from 2002 to 2006. Inclusion criteria were enough communicative skill to complete a Constant score(CS), compliance to the physiotherapy. Follow-up examination: 6, 12, 24 months. Al the patients not suitable for operation due to general medical problems (ASA≥Grade 3) or that refused surgery were included in the non-operative group.
The patients in the operative group underwent a closed reduction and percutaneous fixation using threaded k-wires. An open reduction was performed if the fracture couldn't be reduced percutaneously.
Results Of the 93 patients initially included in the study 77 complete all the study: 49 in the treated group (27 A2.2; 8 A3.2; 7 B and 7 C) and 28 in conservative A2.2-group.
16 patients were excluded: 7 in the treated group, 9 in the conservative group. In the A2.2 group the data were comparable for age and controlateral CS.
Discussion In the A2.2 fracture the treated-group shown a CS significantly better that the conservative group in all the follow-up examination. The results on 24 months follow up were significantly better for pain, ability to sleep, abduction, ability to work at specific level, flexion and power despite the occurrence of one superficial and one deep infection. In three patients the wires slipped out but without compromise the final results.
For more displaced fractures the results of k-wires pinning were unpredictable but generally good for type B1.3, B2.1, C1.1, C1.2.
In case of high unstable fracture (A3.2 and B2.2) the complication rate was unacceptable with correlation between age and poor results.
Conclusions There is evidence that k-wires technique for A2.2 fractures confers benefits. For type B2.2 and A3.2 we recommended plate fixation. In case of type B1.3, B2.1, C1.1, C1.2 the data are inconclusive.
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THE "TRAFFIC LIGHTS" MODEL. A METHOD FOR RISKS EVALUATION IN MACAUSLAND POSTERIOR TRANSOLECRANON APPROACH TO THE ELBOW

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Background Posterior transolecranon surgical approach is often used for synthesis of humeral palette fractures. Infact it allows to visualize a wider articular area, if confronted with other elbow posterior surgical approaches [1], and to mobilize quickly the operated elbow [2]. Performing this access, the surgeon must keep in mind two basic pitfalls, namely, first the exposure of the ulnar nerve and then the osteotomy-osteosynthesis of the olecranon. Therefore the surgeon begins from the higher risk, represented by the ulnar nerve, that must be gently identified and isolated, passing through an intermediate risk, represented by the osteotomy-osteosynthesis of the olecranon and finishing in a zero-risk area represented by the exposure of the epicondyle. Due to the decrescent risks, in the opinion of the author, these surgical steps can be schematized with a traffic lights put transverse the elbow. Red light for the ulnar nerve (maximum risk), yellow light for the osteotomy-osteosynthesis of the olecranon (intermediate risk), green light for the exposure of the epicondyle (absence of risk).
Conclusions In the opinion of the author, this "traffic lights model" permits the surgeon both to acquire control and confidence and to evaluate at any time the entity of any possible mistake.
Suggested readings
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TREATMENT OF COMPLEX PROXIMAL HUMERAL FRACTURES: OUR EXPERIENCE

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Background The proximal humeral fractures are relatively frequent, especially in groups of old-aged people; they represent about the 4–5% out of the whole fractures. The complex proximal humeral fractures treatment represents a problem with a difficult solution for the orthopaedic surgeon. To classify these fractures, we followed either the Neer system dated at 1970 or the AO one.
Materials and Methods Since January 2004 to December 2006 in our Clinic we treated 40 patients who had complex proximal humeral fractures fragmented in three or four parts. In 34 patients we performed an internal fixation osteosynthesis with an angular stability LCP plate; we implanted a cemented endoprosthesis of Bigliani shoulder to 6 patients.
Results About the patients who have been treated with osteosynthesis we achieved good results under both the clinical and the radiological aspect. About the patients who have been treated with endoprosthesis we achieved satisfying results concerning the range of movement and the pain. We haven't noticed neither septic complications nor we had to operate again in any case.
Discussion For the fractures treated with endoprosthesis we consider as basical the condition that the humeral components have to be always cemented. Instead, we consider about LCP plate a good device of synthesis for the fractures at 3 fragments.

Conclusions We think that the four fragmented fractures don't have a conservative subscription whereas the three fragmented fractures in old-aged patients with less life expectations can be conservatively treated.

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THE "CHESS BOARD" TECHNIQUE. PROPOSAL FOR A NEW FREE-HAND AIMING DEVICE FOR INSERTION OF DISTAL SCREWS IN TIBIAL INTERLOCKING NAILING

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Background Many different methods are described and used to insert distal screws in interlocking endomedullary tibial nails, some grouped into those using nail tools fixed to an arm-mounted device [1] and some using free-hand techniques [2] The author presents a proposal for a new free hand aiming technique.

Materials and Methods The technique uses galvanised metal netting that has a negligible cost and that can be washed, sterilised and re-used. It can be attached to the skin by means of disposable adhesive sterile strips. Often a single fluoroscopy shot is needed to detect the nail static or dynamic hole.

Results This technique reduces radiographic exposure as the device is not held in place by hand by the surgeon.

Discussion A fixed (arm-mounted) device could lead to the surgeon trusting the device too much with a consequently incorrect screw path, while a free-hand device entails risk for the surgeon from exposure to radiations. The proposed technique reduces operating time and radiation exposure and lessens the difficulty of finding the nail holes.

Conclusions The "Chess Board" technique seems to avoid the traditional drawbacks of the known used aiming techniques, often permitting the surgeon to operate with a single fluoroscopy shot and obtaining good outcomes.

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VASCULAR LESIONS ASSOCIATED WITH PELVIC RING AND ACETABULAR FRACTURES

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Background Fractures of the pelvic ring and acetabulum could be associated with vascular lesions, sometimes fatal for the patient. Usually the lesion interested vein plessus in the 80% of the cases. In the 20% of the cases is it possibile to observe an artery lesion, usually the ipogastric artery or one of its ramus. Normaly the fracture associated with a vascular lesion are the open book of the pelvic ring. If the bleeding is from the vein the immediately closing of the pelvic ring could be stopping it with a re-estabilish of a stable emodynamic condition. The pelvic clamp is a fast instrument, to use in the emergency room, in these particolar cases. Another kind of fracture that could present a vascular lesion is the vertical shear or the acetabular fractures that involve the iliac wing or the great notch.

Materials and Methods From 1998 to 2006 we treated surgically 330 cases of pelvic ring and acetabular fractures. We reported a series of 23 cases of fracture of the pelvic ring treated in emergency with the pelvic clamp. In 12 cases was done an arteriography for a persistent emodinamic instability. In 8 cases was positive, in 4 negative. 14 patients was treated surgically, 7 with an external fixator, 7 with open reduction and internal fixation.

We present also few cases as example of acetabular fractures associated with a vascular lesion not reported in our series of pelvic.

Results After the application of the C-clamp 11 cases died, 5 for bleeding, 2 for infection, 3 for Multi Organ Failure, 2 brain lesions and 1 for hearth insufficiency.

Discussion and Conclusions Pelvic clamp is a fast instrument, to use in the emergency room in emodinamically instable patients.

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INTRAMEDULLARY NAILING OF THE SHAFTS OF BOTH FEMURS AND TIBIAS

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Background Intramedullary nailing is considered to be the method of choice for extraarticular fractures of the shafts of the lower limbs. Limitations exist concerning the risk of pulmonary embolism (especially during the reaming procedure and the insertion of the nail). In this paper we present the case of 4 simultaneous intramedullary nalings of the lower limbs in one patient.

Materials and Methods A male patient of 22 years old was brought to the emergency room with fractures of both tibias & femurs. The patient suffered pulmonary contusions as well. The fracture of the right tibia was an open fracture (IIIB Gustillo), the others were closed ones. The patient was brought to the operating theater were external fixators were placed over every fracture, The right tibial wound was primary closed after thorough surgigal debridement and lavage. Ten days later and after the pulmonary condition was ameliorated the patient returned to the surgery room and four separated nailings were performed to both femurs and both tibias. The External Fixators were removed just before every nailing took place.

Results After 25 days of nursing the patient received a ticket of release being able of partial weight bearing. His clinical situation was perfect and 1,5 months after the last surgery he could walk freely without any assistance. The primary closed wound of the right tibial fracture healed normaly, no heterotopical ossification occurred and no lack of joint movement happened.

Discussion Multiple nailings in the same patients is not a usual fact. In the contemporary literature it is very rare to finds such cases. The good postoperative result and the absence of complications in such

procedures is a guide of treatment for similar situations (especially in young patients).
Conclusions Intramedullary nailing remains the method of choice in multiple fractures in one patient. The multiple nailings can be performed during one surgery time. Prior external fixators may be removed just before the nailing as long as pin track infection has not beel established. Nailing allows the quicker mobilization of the patient with all its benefits. Pulmonary contusions or heavier pulmonary injuries should be taken into account and should be treated before the IMN takes place.

TRAUMATIC ANTERIOR SHOULDER DISLOCATION WITH CONCOMITANT BOTH TUBEROSITIES FRACTURED AND AXILLARY NERVE PARESIS. DIFFICULTIES TO RETAIN REDUCTION

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Background and Aim The axillary nerve is easily damaged due to anterior shoulder dislocation because of its close association with the glenohumeral joint and its course around the surgical neck of the humerus. Both of those structures enhance the stability of humeral head in glenoid. The purpose of our study was to present the difficulties to retain shoulder reduction, after anterior shoulder dislocation with concomitant both tuberosities fractured and axillary nerve paresis.
Materials and Methods A 52 years old man was admitted to our hospital, with anterior shoulder pain after a simple fall. Anteroposterior, scapular lateral, and axillary views of the right shoulder were obtained and the diagnosis of an anterior glenohumeral dislocation with both tuberosities fractured, was identified. Also axillary nerve paresis was diagnosed. Immediately the dislocation was reducted with Garnavos-modified Milch teqchnique, but the shoulder was redislocated whenever the arm adducted due the manipulation of reduction.
Results Finally we achieve permanent reduction of the dislocation by pushing the arm upwards, through the elbow, during the adduction moment of humerus. Herein the figures are shown all the stages for succesfull reduction in such a case.
Discussion Redislocation was evidenced because of the failure of main shoulder stabilizers such as anterior capsule, subscapularis tendon and deltoid muscle [1].
Conclusions Upwards pushing of the arm through the elbow, during anterior shoulder dislocation reduction and at the adduction moment of humerus, replaces the deltoid muscle function and helps to maintain the reduction.
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EXTERNAL FIXATION OF SEVERELY COMMINUTED TIBIAL PILON FRACTURES WITH STAR 90: OUR EXPERIENCE

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The Authors put in evidence the relative increase of the comminuted tibial pilon fractures, and bring back their experience, relative to the treatment of the comminuted fractures with External fixation STAR 90. The materials introduced are: 3 fractures of tibial pilon talar, to the C3 of AO classification.
The parameters of turn out to you have been: a) the subjective result b) mobility, c) the radiographic data, d) examination TC. From the analysis of the validity of treatment of the recent fractures of tibial pilon fractures with External fixation.
For the Authors, moreover the bonds turn out obtained to you have had to the program of "progressive-gradual" premature mobilization of the tibiotarsica, according to a precise outline.

A SPIRAL TIBIAL FRACTURE COMBINED WITH A HIDDEN POSTERIOR MALLEOLUS FRACTURE, PREOPERATIVE PLANNING AND INTRAOPERATIVE ALTERATIONS

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Background It is known that posterior malleolus fracture is often associated with tibial diaphyseal fractures. We aim to pinpoint the need of thorough examination for post malleolar fractures in combination with tibial diaphyseal fractures and present the way of treatment of such a case with synchronized intramedulary nailing and internal fixation.
Materials and Methods A 33 years old patient was brought to the Emergency room after a fall from his bike. The examination revealed a spiral fracture of the distal tibial diaphysis, reaching quite low into the metaphysis but without any radiological sign of intraarticular participation.
Results The patient was brought to the operating theatre for a typical intramedullary nailing to be performed. An S2 Tibial nail was chosen in order exploit the very distally placed holes of the nail. When the chosen nail of 11 mm diameter & 360 mm length started entering the distal fractured part an unexpected discovery occurred. A posterior malleolus fracture capturing about 50% of the articular surface emerged. The operative plan did not change since the malleolus fracture could be reduced by a cortical screw anteriorposteriorly placed through the nail. When though the nail reached its final position the malleolus fracture was becoming too much diplaced to be stabilized. The 11/360 nail was removed. By a posterior incision an Asnis cochlear screw was used to reduce and stabilize the posterior malleolus fracture. A new tibial nail of 11 m diameter and 345 mm length entered the medullary canal and was locked proximally and distally. The patient started partial weight bearing 14 days after the surgery and 2 months post-op was able to perform full weight bearing.
Discussion The posterior malleolus fractures that accompany distal diaphyseal fractures of the Tibia are usually underestimated or mistaken. In this case retrospectively the posterior malleolus fracture was detectable in preoperative plain films. There is a need for a meticulous preoperative x-ray control.
Conclusions The fractures of the posterior malleolus shall be suspected, especially in cases of low-energy spiral distal tibial diaphyseal fractures. The intramedullary nailing remains the method of choice in such cases as long as the malleolar fracture can be managed either through the IMN procedure or by a likewise internal fixation.

TREATMENT OF THE FEMUR PERIPROSTHETIC FRACTURES WITH DALL-MILES PLATE

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Background Cerclage fixation, plate fixation, cortical strut grafts & Intramedullary nailing are the most usual ways of treatment of periprothetic fractures. We present the use of the Dall-Miles plate in femur periprothetic fractures along with its complications & postoperative results.
Materials and Methods A 68 years old lady who had undergone THA 3 years ago presented to the Emergency Room after a fall. The X-ray checking revealed a transverse periprothetic fracture concerning the

femur diaphysis. The level of the fracture was exactly at the distal point of the femur component of the THA. The patient underwent a surgery procedure during which a Dall-Miles plate was used. Cerclage wires were used at the top half of the plate (through the plate) in order to avoid damaging the femur component of the THA. At the bottom half of the plates apart from cerclage wires cortical screws were used as well. The fracture was reduced and stabilized without any damage or affection of any of the components of the THA.

Results The patient was able to place full bearing weight on the fractured leg three months after the surgery. Nevertheless the X-ray check at the six months follow up brought to the surface the problem of medial femur cortex weakening at the points were the circlage wires were embracing the femur at the top half of the plate. A new surgery was scheduled during which the wires were replaced by wider. The THA components, the well placed Dall Miles plate as well as the formatted callus remained unaffected. Fifteen months after the last surgery the patient faces no problem and the material of the osteosynthesis as well as the callus are being checked radiologically to be in excellent position and shape.

Discussion The use of Dall-Miles plates in periprosthetic fractures of the femur needs a thorough follow-up since the combination of wires and screws on the same plate may cause unusual loads that may refracture the femur or affect the plate.

Conclusions In the case of a preexisting semi or total hip arthroplasty the combined use of screws and cerclage wires or bands through the Dall-Miles plate allows the preservation of the THA components and prohibits a total hip revision procedure. The advantages in terms of financial cost – surgery time – and health risks are of no doubt since the standard procedures have been followed.

THE EPIDEMIOLOGY OF HIP FRACTURES IN SCOTLAND. IMPLICATIONS FOR FUTURE SERVICE PROVISION

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Background Significant demographic changes in the future population of the United Kingdom are predicted as a consequence of increasing life expectancy and falling birth rates. Such changes are likely to have important effects on the incidence of hip fracture and subsequently for health care provision and resource allocation.

Aim To report the epidemiology of hip fracture in Scotland using the Scottish Hip fracture Audit Database.

Materials and Methods Data was collected for the year 2004 from all orthopaedic units across the country. Using this data we were able to accurately describe the epidemiology of hip fracture across the entire population. We then used population prediction data from the Registrar General's office to calculate future incidence of hip fracture by the year 2031. The incidence of hip fracture in Scotland was static between 1998 and 2004 so the prediction model assumed a stable fracture incidence.

Results The population of Scotland is likely to remain relatively stable in overall size, however it will undergo significant demographic changes. The population aged 50 years and above will increase by 28%, however the most significant increases will occur in those over 80 years. As such an additional 1741 institutional care places may be required to meet the relevant increase in the dependent elderly. The incidence of hip fracture will rise by a predicted 74%. As a consequence of this an additional 474 orthopaedic beds will be required. Without interventions to reduce the incidence of hip fracture the annual cost associated with this injury may rise from £ 75 million to £ 298 million by the year 2031.

Conclusions Changes in population demographics will have significant implications for health care resource funding an allocation.

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TIBIAL PLATEAU FRACTURES

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Background Treatment of articular fractures of the proximal tibia depends on fractures pattern and soft tissue involvement.

We have developed a strategy based on tibial Schatzker (Schtz) classification: we apply cannulated screw for Schtz 1–3 fractures, lateral locked plate for Schtz 2–5 with arthroscopic assistance reduction and internal synthesis when medial condile in Schtz 5 fx was interested, medial locked plate for Schtz 4 fx, external fixation on Schtz 5 if soft tissues conditions do not allow internal synthesis, external fixation on Schtz 6 fx.

Materials and Methods From January 2003 to December 2006 we treated 72 proximal tibia fractures (31 cannulated screw, 23 lateral locking plate, 3 medial locking plate, 15 external fixators) and reviewed them with VAS, ROM, complications, return to previous activities and follow-up of 25 months.

Results In Schtz 1–3 fractures we report average ROM of 120°, average pain of 2, 90% of return to previous activities, screw removal for local pain in 23 cases, no infections.

In Schtz 2–5 fractures treated by lateral plate we report average ROM of 105°, average pain of 3.6, 70% of return to previous activities, 1 case on infection, 2 cases of light collapse of tibial plateau, 3 cases of stiffness.

In Schtz 4 fractures we report average ROM of 120°, average pain of 3.4; 33% of return to previous activities, plate removal for local pain in 2 cases, no infections, no cases of stiffness.

In Schtz 5–6 fractures treated by eternal fixation we report average ROM of 95°, average pain of 4.3, 31% of return to previous activities, no infections, 12 cases of osteoarthritis 5 cases of painful stiffness.

Discussion Results are not comparable for fractures different patterns and different grade of articular injury. The importance of using a classification which correlates to severity and prognosis of fractures leads to choose a strategy to treat correctly each fracture.

Presented results are comparable to that reported in literature.

Damage of soft tissues may interfere with prognosis. It's absolutely necessary to chose internal or external synthesis according to soft tissues involvement and comminution of fracture.

TIBIAL SHAFT REPLACEMENT WITH MASSIVE BONE GRAFT IN DEEP INFECTION

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Background We have managed 1 patient with a fracture of the tibia complicated by bone and soft-tissue loss as a result of an open fracture and following debridement.
Materials and Methods We inserted a massive shaft bone graft to close the defect of an acute limb shortening achieved by resection of all the devitalised tissues (20 cm) because an infected nonunion. We stabilized however the tibia with an IMN for re-lengthening.
Results Weight-bearing was allowed 15 days after surgery using crutches.
The patient was able to walk without pain.
Discussion and Conclusions Treatment of complex bone loss associated with infection and soft-tissue damage must be integrated in the overall concept of treatment. Differentiated and situation-adapted action is necessary, depending on the particular situation, as well as the personnel and technical equipment.
Unfortunately infection removal is often necessary. Massive bone graft must be considered the extreme chanche when other devices failed.
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EVOLUTION IN TREATMENT OF PILON FRACTURES

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Object The treatment of tibial pilon fractures devolops, improves in implant's design and in surgical approaches.
Materials and Methods We studied in clincal advantage of new surgical approaches and new implants with angolar stability. We use antero-lateral approach with isolation of saphenal nerve alone or associated to a minimal invasive plating osteosintesis trought a medial approach.
Anterolateral way is prefered because of anterolateral comminution of the fracture evaluated on the axial CT scan views.
To plan an osteosynthesis with plate, treated with minimal invasive way, on tibial pilon fractures we need:
- simple articolar fracture;
- reducible articular fragments throug indirect tecnique;
- Intregrity and reducible medial and posterior malleolus;
- excellent conditions of soft tissue.

Results We present 26 pilon fractures treated with minimal invasive techinque from from January 2004 to September 2006 with an average follow-up of 14 months.
We treat 6 fractures Type A with fibualr plating and nailing and 6 fractures with minimally invasive plating osteosynthesis with good and excellent result; 4 fractures Type B1 and 5 type B2 with with good and excellent results, 5 fractures type C1 with 3 excellent and 2 good results, 3 fracture type C2 with 2 excellent and 1 good results and 2 fracture type C3 with good results.
Conclusions In the reduction of tibial pilon fracture we can use the antero-lateral approach thanks to the good result: few complications. We suppose that muscles and tendons protect the skin whithin the plate and help the subcutaneous blood supply.
Mipo technique in treatment of tibial pilon fractures allows goods results only in specific cases, taking care of instructions and technique with the respect of the soft tissue.
Finally, minimal invasive approach in osteosynthesis of articular fractures, as in other cases, is not an advantage "per se".
The choice of a minimal invasive approach should be considered carefully in front of the risk of a malreduction of the articular joint that is in any case unacceptable.
Anatomically reconstruction of the articular joint is mandatory so that we have to change the approach, during the operation, from a minimal invasive approach to an artrotomy through a classical view.

COMPLICATIONS OF DISTAL HUMERAL FRACTURES

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Background Distal articular humeral fractures have a low incidence in literature review, 7% of the elbow fractures. High energy trauma are the causes in the young patients, often polytrauma, with the high comminution, exposition and loss of bone. Instead in the elderly patients, altough they carried out the low energy trauma, the level of ostephorosis often causes the loosening of osteosynthes implants. Several complications are associated to theese kind of fractures such as: neurological and vascular lesions, infections, ossifications.
Materials, Methods and Results Nobody of the autors reports less than 15% of bad results in literature. The main neurological complication is the ulnar neurophaty in the early postoperative. Instead the isolated median nerve lesion is less frequent but more often jointed to the involvment of brachial artery. The non-union have a low incidence from 2,4% to11% in literature. The malunions, that are a low incidence in literature, are to find after a conservative treatment and did not need a surgical treatment only in a selectives cases. The instability has a 5% of incidence in literature and it is caused of a loss of articular surface anatomy and associated legament lesion.
Discussion and Conclusions The treatment of these fractures can be obviously surgical or conservative. It is performed the conservative treatment above all in the children, in the non displaced ephifisial detachments, in the one column fractures. The surgical treatment for all the articular fractures with a high comminution and displacement,in the high energy open complex fractures. Often the failure of a primary ostheosynthesis due to the grade of comminution, associated lesions and soft tissues damage. The treatment of this kind of complications depends of many factors, one the most important is the age and level of patient activity. In conclusion in these fractures is mandatory a severe preoperative planning, anatomical reduction and an early mobilization.
Suggested readings

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INTRAMEDULLARY NAILING: A NEW SYSTEM FOR DISTAL LOCKING

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Locked intramedullary nailing often requires a complex surgical technique to realize the distal locking. During last years different solutions have been studied to solve this problem. Authors present a new system for distal locking of the long Endovis B.A. intramedullary nail to use in the complex femoral fractures.

OPERATIVE VERSUS CONSERVATIVE TREATMENT IN OLDER PATIENTS WITH A2.2 PROXIMAL HUMERAL FRACTURE: A PROSPECTIVE STUDY

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Background The treatment of the proximal humeral fracture is still controversial, especially in older patients. Recent epidemiologic analysis has shown that one of the commonest humeral fracture is the A2.2 impacted-varus [1]. In this disease the functional results of non-operative treatment are suboptimal [2]. In order to establish the best treatment we compared in a prospective study the results of the non-operative management with percutaneous K-wires osteosynthesis.
Materials and Methods Inclusion criteria: patients older than 65, enough communicative skill to complete a Constant score (CS), at least 1 months of physiotherapy, inclination angle >25°-30° [2]. Follow-up: 6, 12 and 24 months. All the patients not suitable for operation due to general medical problems (ASA≥Grade 3) [3] or that refused surgery were included in the non-operative group. The patients in the operative group underwent a closed reduction and percutaneus fixation using threaded k-wires. Alternatively an open reduction followed by k-wires fixation was performed if the closed manipulation was unable to ensure an accurate reduction.
Results 54 patients were included in the study, 30 in the operative group and 24 in the non-operative group. Demographic data were similar in the two groups (age: non-operative group 76.8±9; K-wires group 73±6.81). In the K-wires group the CS and the individual relative CS (MCS) resulted significantly better than in the conservative group in all the follow-up. The results on 24 months follow-up were better for pain, ability to sleep, abduction, ability to work at specific level, flexion and power. (MCS:89.1 vs 69.8; $p>0.05$)
Some complications occurred: one superficial and one deep infection and three cases of wires mobilization.
Discussion The two groups were homogenous for baseline characteristics, including pre-trauma functional state.
The k-wires osteosynthesis lead to optimal results in older patients however the difference in the ability to work, ability to engage in recreational activities, external and internal-rotation was not significantly different between the two groups.
Conclusions K-wires technique for A2.2 impacted varus fractures leads to optimal results in older patients. The conservative treatment is a viable option in patients with low compliance to physiotherapy, severe medical problems and in low functional-demanding patients.
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THE DISTAL FRACTURE OF FEMUR: US ESPERIENCE WITH PLAQUES LISS

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The distal fractures have an incidence which ranges according to the various authors from 4% to 7%. This type of fracture is present in young people (males more because of traumas to high energy, road accidents, traumas from sport and on the work), what in elderly patients (prevalently women with osteoporosis) trick prosthesis bearers. After the abandon, pratically unanimous, of the bloodless treatment for the on the unsure and too many result often unsatisfactory, the surgical alternatives regard the choice of the means of central internal synthesis with stabilization, peripherals or endomidollaris, or external fixation. The search for the treatment optimization takes to the choice of means of syntheses which allow maximum stability fracture with the minimum biological damage. The demand to obtain an anatomic reduction of the articular surfaces with a minimum additional vascular trauma has oriented the research to synthesis means diferent from the traditional plaques which need a surgical technique too aggressive. In the search for this goal born the angular stabilization plaque (LISS).
This synthesis means is like a plaque which mechanically recalls the beginnings of external fixtor, infact screws are behind the plaque and the strengths are transmitted from bone to the plaques besides the screw has a limited or no contact with bone; besides with the specific strument as is possible to have the plaque run aunder the muscles through a little cut. Also the screw introduction can be for cutaneous cross little driven cuts. However plaques need a position near the bone, therefore are modelling according to the segment interested. It is possible get to a sufficient fracture stabilization with a limited biological damage and with good compliance of the patient.

TIBIAL PLAFOND FRACTURES WITH THE IBRYD EXTERNAL FIXATOR

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Fractures of the distal metaphysis of the tibia represent 7–10% of tibial fractures and less than 1% of the lower limb fractures.
Their treatment is difficult and presents a high percentage of bad results because of comminution of the metaphyseal bone fragments, articular involvement, poor circulation in the distal third of the leg.
Until few years ago, in presence of a comminuted fracture, the only surgical possibility was the use of plate and screws. The external fixation rapresented a temporaneous treatment in case of open fracture or severe soft tissue damage. The recent technology applicated to external fixation has transformed the external fixator in synthesis device less voluminous, to increase the compliance of the patiet, and more stable, to be used in the definitive treatment of this fractures. In the last years we transform the use of a external fixator with double ring in the use of a monolateral external fixator with single ring, in the “ibryd frame”.
The authors will present their experience and suggest the external fixation for the treatment of pilon fractures.

SYNOVIAL CHONDROMATOSIS PRESENTED AS KNOCKING SENSATION OF THE KNEE IN A 28-YEAR-OLD GIRL

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Knee joint is the most common site of synovial chondromatosis with the prevalence in middle-aged male. The following is the description of a 28-year-old girl presented with a knocking sensation during the motion of her joint, which is a less common occurrence at her age. She had have xray and MRI, showing loose bodies and synovial hipertrophy. In February 2005 we have practiced an open biopsy, which diagnosed synovial chondromatosis. We have practiced a synovialectomy and removed loose bodies by an anterior and posterior arthrotomy. Two months later, ROM of the knee was 0°–40°, and the patient did not attended the physiotherapist program. It has been indicated to proceed with an arthroscopic debridment and the arc of movement achieved was 0°–120° allowing the patient to be back at work in 2 weeks.
At 2 years down the line, the patient has regular clinical and radiological follow-up, in spite of the low possibility of malignant trans-

formation of synovial chondromatosis. At the last control: the knee was painless, ROM 0–120°, and rarely swollen; she was walking with no limp, and functionally active. At x ray there war not loose bodies and signs of arthritis.

SIMULTANEOUS AND CHRONIC RUPTURE OF THE QUADRICEPS TENDON AND CONTRA-LATERAL PATELLAR TENDON IN A PATIENT WITH TERTIARY HYPERPARATYROIDISM

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The spontaneous ruptures of the extensor mechanism of the knee are very rare. They tend to increase considerably in patients with metabolic diseases such as chronic renal failure, hyperparathyroidism, diabetes, gout and systemic lupus erythematosus.
The case presented here was a 48 year-old man with chronic, spontaneous and simultaneous quadriceps and contra-lateral patellar tendon rupture. The patient suffered from chronic renal failure and for the past one year from tertiary hyperparathyroidism. We repaired the tendons ruptures and we evaluated clinically both knee monthly for the next 12 month. Tree month after the tendons surgical repair, the patient underwent subtotal parathyroidectomy. Good functional recovery was achieved on both knees.
We review the literature about simultaneous mayor tendons rupture emphasizing the importance of long term high PTH values in the etiology of this lesion.

THE TREATMENT OF TIBIAL PLATEAU FRACTURES WITH A MINIMAL INVASIVE TECHNIQUE: OUR EXPERIENCE

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The aim of the study was review all the type B and Type C according with A.O. classification tibial plateau fractures from Genuary 1995 to August 2004 with a minimum follow up of six mounths. It has been selected all the patients treated without open surgery. In the treatment of type B fractures we used cannulated screws, sometimes with external fixator. In the treatment of type C fractures we used external fixator. As a result of the technical improvements, in the recent years external fixation has become a surgical technique not only for the treatment of open fractures but also for the management of comminuted fractures with percutaneous synthesis, since there is no need to open the fracture site. In our last recent cases, we have used a hybrid fixator which is single-use, pre-assembled and radiolucent.
The authors will discuss their experience in the treatment of tibial plateau fractures with this minimal invasive technique.

TREATMENT OF NON-UNION OF THE OLECRANON WITH AUTOGENOUS BONE-BRIDGE FOLLOWING ALBEE'S TECHNIQUE: A CASE REPORT

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Olecranon pseudoarthrosis is a uncommon complication secondary to a failed primary internal fixation. The purpose of surgical treatment of olecranon non- union is to issue a complete stabilization of bone fragments and provide a early mobilization of the elbow with a lower rate of loss of motion.
Albee described a surgical technique to treat olecranon non-union, that permit to take bone graft from the same site of fracture so limiting the co-morbidity due to any other donor site. Following this technique, two bone graft are taken from dorsal aspect of ulna and olecranon, reversed and then stabilized with a reduction plate.
We describe a case of a 25 year-old man presenting an olecranon pseudoarthrosis secondary to a type 2A Mayo fracture. The olecranon fracture was treated by Weber's wiring technique and secondary by intracanalicular screw. These treatments has failed resulting at 12 months in a olecranon non-union with pain, swelling and functional limitation.
Our surgical treatment of pseudoarthrosis associated with a earlier articular mobilization led to a good articular stability with a complete resolution of pain and an excellent functional outcome.