J Orthopaed Traumatol (2008) 9:1–3
DOI 10.1007/s10195-008-0096-1

EDITORIAL

How to write an original article for the *Journal of Orthopaedics and Traumatology*

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Published online: 17 March 2008

An original article (OA) is the publication of a study. Thus, it might be alternatively named "study report", by analogy with "case report". The *Journal of Orthopaedics and Traumatology* welcomes OAs based on clinical or preclinical studies relevant to the musculoskeletal system.

Although medical research methodology is not the object of the following writing, proper planning and performing of investigations are necessary requirements for any good article. Three points have to be clear in the author's mind: the hypothesis, the materials and methods through which the hypothesis is tested, and the results [1]. Only studies logically structured according to this sequence will be successfully transformed into worthwhile reports.

Precisely discussing the level of evidence is beyond the aims of the present editorial, but authors need to be aware that the design of their study affects the quality of the scientific information that is conveyed. Clinical studies may be roughly listed in order of decreasing evidence, as follows: randomized controlled trials (RCT), non-RCT prospective comparative studies, retrospective comparative studies, case-control studies and, lastly, case series [2].

Case series, characterized by a low level of evidence, deserve publication only if the sample size and follow-up are strictly adequate. Sample size has to be at least similar or possibly larger than previously reported series. Minimum follow-up (not the mean follow-up) has to be long enough to allow observations of steady clinical and radiological outcomes. This means, for instance, 1 year for long bones fractures and 2 years for articular fractures with possible secondary degenerative joint disease.

Special features are requested if the purpose of a case series is to estimate long-term survival of patients in relation to death or recurrency (e.g. musculoskeletal tumours), of organs in relation to prosthetic replacement (e.g. joints after corrective surgery or articular fracture reconstruction), and of prostheses in relation to failure (e.g. total hip or knee replacement). These series need not only an adequate minimum follow-up (generally several years), but also a proper survival analysis.

As far as prosthetic case series (standard total hip or knee arthroplasty) are concerned, the Editorial Committee sets a minimum follow-up of 8 years and a minimum sample size of 150 implants. Survival analysis should be preferably performed with the Kaplan-Meier estimator [3]. New and original prosthetic designs may represent an exception, for which smaller series and shorter follow-up could be accepted if the literature does not contain larger or longer studies.

OAs submitted to the *Journal of Orthopaedics and Traumatology* have to be arranged in 5 sections: Abstract, Introduction, Materials and methods, Results and Discussion. A limit of 3500 words is far beyond the needs of most good papers [4].

The medical writing style, officially set by the *Manual of Style* of the American Medical Association, should be grammatically correct, clear and not redundant. In one word, essential. [5]

Any possible conflict of interest has to be disclosed. Otherwise, the authors should clearly declare that no funds were received in support of the research that researchers had no financial interests related to it.

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Abstract

The abstract is the precise summary of the article, not a preface. As Baue wrote in a popular editorial of the *Archives of Surgery* in 1979, "writing a good abstract is not abstract writing" [6]. The main data have to be represented, as they allow readers to understand contents clearly. Sentences like "The paper reports…" or "The authors describe…" have to be avoided as well as any generic statements.

In order to help writers avoid generalities, the recently revised version of this journal's "instructions to authors" [4] requires the abstract to be no longer than 300 words and structured in 4 paragraphs: the *Background* declares the hypothesis, the *Materials and methods* impart the study design and quote the relevant numerical features of the samples, the *Results* report the main data and their statistical significance, the *Conclusions* state whether the hypothesis is verified or not. One or two sentences per paragraph are usually sufficient.

The abstract is frequently recommended to be written after the text, as "the process of writing changes thought and perhaps even purpose" [7]. Nonetheless, in my view, preparing the abstract first is a useful exercise that forces the authors to organize their thoughts and guides the organization of the article. However, the abstract should be always revised after the manuscript has been completed.

Introduction

The Introduction is a critical section, as it needs to be finely balanced to allow a proper approach to the subject matter without anticipating the contents of the subsequent parts. Important topics of the Introduction are the state of the art and the hypothesis (or hypotheses). The state of the art should be briefly described with essential papers. Deeply commenting on a single reference is better postponed to the Discussion, since the purpose of this section is to inform, not to discuss.

The hypothesis has to be clearly expressed in the last paragraph, and its relevance should be logically deducible from the previous state of the art description. In other words, the Introduction aims at showing that a problem exists, and that previous investigations did not offer any adequate solutions, so justifying the reported research [8].

Materials and methods

This section should contain the detailed description of the study. The more careful this description is, the more reliable the results are.

As for clinical studies, the following contents cannot be omitted:

- Declaration that the study was carried out in accordance with the World Medical Association's Declaration of Helsinki [9], that it was approved by the institutional ethics committee and that all the patients gave informed consent to be enrolled.
- Study design. Is it a prospective or retrospective study? Is it a case-control study or a case series? Is it double-blinded, single-blinded or open?" Were the patients samples randomized or not? These are some of the questions that need to be answered here.
- Inclusion and exclusion criteria.
- Characteristics of the patients (mean age and range, male-to-female ratio, diagnoses, confounding variables, etc).
- Outcome measures (clinical variables, radiological variables, combined scores, etc) should be broadly accepted in the representative literature. In case of a different choice, this decision has to be justified.
- Statistical methods.
- Significance level (e.g. $\alpha = 0.05$) and power (e.g. $\beta = 0.8$).

As previously indicated, cases series regarding total joint replacement and malignant tumours need a survival analysis.

Results

The purpose of this section is to provide numerical data without comments [10].

Clinical studies should always report the number of cases lost to follow-up. Variables have to be reported as averages and 95% confidence intervals. Units should be always indicated and abbreviated according to the metric or SI system. Frequencies (e.g. frequency of complications) have to be described both by absolute number and percentage, the latter being in parentheses, e.g. 6 (2.5%).

If the sample size is small (up to 20 cases), a detailed table is requested that displays the most remarkable measured variables of each case. Authors should remember that such a table ought to be available anyway, as referees might ask for it during the reviewing process.

Since the aim of tables is to save space, they should be avoided if the same data may be presented more concisely in the text or if they just duplicate text contents.

Results that are relevant to the hypothesis have to be associated with their statistical significance. The exact p value has to be reported close to "significant" or "non-significant", while "$p < \alpha$" cannot be accepted, as it does not allow readers to understand the true risk of type I error

(the risk of observing a difference that does not exist) and reviewers to check the calculations.

Results not relevant to the hypothesis have to be reported only if they show unexpected findings or might be useful for further investigations. Otherwise they will divert attention from the main results.

Discussion

The Discussion is the section in which previously reported results are discussed, not repeated nor summarized. Here, the author is asked to achieve four fundamental goals:

- Compare the study to the relevant literature,
- Acknowledge possible weak points,
- Draw conclusions about the hypothesis (verified or not), and
- State the clinical relevance of these results.

The first task is obtained through a careful review of available studies regarding the subject matter, which should be briefly referred to in the text, without getting lost in excessively detailed analyses. Discrepancies and unexpected findings have to be explained, or at least attempted to be explained.

The second issue is an essential step of any scientific paper. Author who do not highlight limitations of their study (bias, short follow-up, small sample size, etc.) show superficiality and lack of self-criticism, so compromising their own credibility and reliability of the results.

The third point is the manuscript's conclusion, where the authors are expected to state if the experimental hypothesis was verified or not on the basis of the results. This cannot stand alone without the fourth part, in which the clinical relevance of the conclusions are set forth.

The multiple issues of the Discussion usually make it a long section. Thus, authors should pay attention to avoid repetitions, redundancy and digressions.

References

Every statement that is not proved by the results of the study nor can be logically drawn by a previous one needs to be supported by a specific reference. References should be pertinent and recent. No mentions to personal communications or to proceedings older than 3 years are permitted, in order to allow readers to consult the sources easily.

Up to 50 references are permitted in OAs of the *Journal of Orthopaedics and Traumatology*. The authors should remember to check the intructions to authors for their structure and order of citation [4].

Summing up

Writing an OA for the *Journal of Orthopaedics and Traumatology*, as for any other peer-reviewed journal, first requires a reliable study. Poorly posed hypotheses, badly planned study protocols, inaccurate data collection and wrong statistical analyses compromise the quality of the final manuscript much more than do writing errors, often irreversibly.

On the other hand, if a sound study was performed, transforming it into a good article is barely a matter of form. Although the suggestions provided here are intended to help authors with manuscripts preparation, an effective writing style is mainly an achievement of experience. The only way to shorten the learning curve is by reading. Every author and especially the future ones should keep in mind that the best medical writers are the most assiduous medical readers.

References

1. McGaghie WC, Bordage G, Shea J (2001) Problem statement, conceptual framework, and research question. Acad Med 76:923–924
2. Oxford Centre for Evidence-based Medicine (2001) Oxford Centre for Evidence-based Medicine levels of evidence. Available at http://www.cebm.ne
3. Kaplan EL, Meier P (1958) Nonparametric estimation from incomplete observations. J Am Stat Assoc 53:457–48
4. Journal of Orthopaedics and Traumatology. Instructions to Authors. Available at http://www.springer.com/cda/content/document/cda_downloaddocument/Instruction%20to%20Authors.-pdf?SGWID=0-0-45-489199-p1150918
5. Iverson C, Flanagin A, Fontanatosa PB et al (2007) American Medical Association manual of style: a guide for authors and editors, 10th edn. Oxford, New York
6. Baue A (1979) Writing a good abstract is not abstract writing. Arch Surg. 114(1):11–12
7. Brand RA (2003) Writing for Clinical Orthopaedics and Related Research. Clin Orthop 413:1–7
8. Provenzale JM, Stanley RJ (2005) A systematic guide to reviewing a manuscript. AJR Am J Roentgenol 185:848–854
9. World Medical Association Declaration of Helsinki. Available at http://www.wma.net/e/policy/pdf/17c.pdf
10. Regehr G (2001) Presentation of results. Acad Med 76:940–942