Editorial

Meta-analyses: How to judge?

1. Meta-analyses: definition, methods and means of production and control

Meta-analysis (a term introduced by V.G. Glass in 1976 [1]) is a statistical method, combining results from several independent studies on a given topic. It is considered to be the methodology with the highest level of evidence from the point of view of evidence-based medicine [2]. Meta-analyses are useful when it is difficult to bring together studies with sufficient minimum follow-up, as is the case in orthopedics. However, meta-analyses have their own intrinsic biases, and notably publication bias, as negative and interrupted studies, which are rarely published, cannot be included. Simply running the search-term “meta-analysis” in the medical literature data-bases shows that they have considerably increased in number, sometimes with repeated meta-analyses on the same subject but with discordant results, which is worrying for the scientific community [3]. Even so, when there is a meta-analysis in a given field, reference has to be made to it to back up one’s arguments and make informed choices in clinical practice.

Like any clinical research study, meta-analyses need to be conducted with a strict methodology. There are some essential tools for conducting, writing and assessing a meta-analysis:

- a methodology guide, with specific analytic software such as that published by the Cochrane Collaboration [4];
- a registry to deposit meta-analysis protocols in the health field (PROSPERO);
- guidelines for writing up the study (PRISMA: Preferred Reporting Items for Systematic reviews and Meta-Analyses) [5];
- a checklist for assessing the quality of published meta-analyses (AMSTAR: Assessing the Methodological Quality of Systematic Reviews) [6].

Collaborations have been set up between expert clinicians, methodologists and statisticians to update these tools, with open access (PROSPERO: https://www.crd.york.ac.uk/PROSPERO; PRISMA: http://www.prisma-statement.org/Default.aspx; and AMSTAR: https://amstar.ca/index.php). The growth of this methodology inspired certain authors to assess the journals publishing meta-analyses, and we are now confronted with “analysis analysis”.

2. Has the quality of meta-analyses in orthopedic surgery and traumatology been improved by PRISMA?

In the present issue, you will find an article on the quality of meta-analyses published in orthopedic-traumatology journals before and after the introduction of the PRISMA guidelines [7], showing a distinct improvement. According to the article, the quality of the meta-analyses published in Orthopaedics & Traumatology: Surgery & Research seems satisfactory on many criteria compared to other orthopedic journals. Since 2013, Orthopaedics & Traumatology: Surgery & Research has required PRISMA guidelines and the Cochrane library methodological criteria to be implemented. Notably, a flow-chart showing how articles were selected and assessed is mandatory. The PRISMA checklist shows whether all requisite items have been taken into consideration in the meta-analysis, and assesses the quality of the article’s writing. PRISMA, however, does not assess the quality of the meta-analysis as such; this can be done using AMSTAR.

3. Meta-analysis is a multidisciplinary undertaking, requiring methodological skills

According to the article in the present issue [7], 87 of the 154 meta-analyses included (56.5%) were signed by 4 to 6 authors, while 27 (17.5%) were signed only 1 to 3, which is not enough [7]. Meta-analysis requires: double reading of the articles to be analyzed, with consensus in case of disagreement; document search (including search for unpublished or ongoing studies and of the gray literature), performed by a documentalist; assessment of each study, by methodologists; and mathematical analyses, by statisticians. Analysis of 195 systematic reviews showed that it took on average 67 weeks and 5 authors, and that the inclusion rate for articles was 3% [8]. These findings can be extrapolated to meta-analyses.

New tools have been developed: PRISMA now has guidelines for drawing up meta-analysis protocols [9], and a 12-item checklist for writing the abstracts to systematic reviews and meta-analyses [10].

Improvement may come from access to individual data, which journals should in future make easier by requiring source data to be deposited in a dedicated registry. There is a specific guideline for this: PRISMA-IPD (Individual Patient Data) [11]. For example, 65,000 articles from PLOS ONE (all disciplines and research fields) contain links to their source data [12].

Meta-analysis at first seemed to be a means of coming to a definitive conclusion on a given question. But readers need to
keep a sharp eye open, considering the level of the meta-analyses assessed in the present systematic review [7], and not to leap to conclusions.

Disclosure of interest

Sophie Putman and Alain Duhamel declare that they have no competing interest. Philippe Clavert is, outside the present article, a consultant for Wright and associate editor of Orthopaedics & Traumatology: Surgery & Research. Hervé Maisonneuve is a consultant in scientific writing and associate editor of La Presse Médicale.

References


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