

Reading scientific literature

Readers often assume that what appears in print, particularly in scientific journals, is accurate, reliable, and scientifically valid. Yet this assumption is not always correct. Much that is published is not adequately peer reviewed and frequently represents opinion rather than sound conclusions based on valid data. Consequently, readers must assume the obligation of intelligent reading and critical questioning, rather than merely accepting what is written as fact. To assist with intelligent reading and to serve as a blueprint for critical evaluation, it might be useful for the reader to understand the rigorous review process used to ensure the accuracy of articles in this journal. Each manuscript is reviewed, anonymously and independently, by at least two consultants or members of the Editorial Board, as well as by the editor. Extensive revisions are usually recommended in order for a paper to be accepted for publication. The following questions are some of many that reviewers consider when they assess the merits of a manuscript.

- Title: Is the manuscript title brief, appropriate, and likely to guide the reader to the contents of the paper?
- Abstract: Is the abstract concise and can it stand alone in describing the study?
- Introduction/Literature Review: Has the author cited pertinent literature which justifies the study? Is the purpose of the study or the hypothesis clearly stated?
- Methods and Materials: Is subject selection appropriate and randomized? Is the sample of adequate size? Is the procedure described in enough detail for a reader to understand it? Are issues of examiner blindness and standardization dealt with appropriately? Is control properly used? Do the procedures reflect contemporary science and are they appropriate?
- Results: Are there errors of fact or calculation? Are statistical methods used appropriately? Are the results of statistical tests reported?
- Tables and Figures: Do authors portray data appropriately? Is statistical significance stated? Does each figure show what it is supposed to show?
- Discussion: Are study limitations stated? Are there errors of interpretation of the data? Are the results compared to others in appropriate studies? Is there discussion of clinical significance of the findings?
- Conclusions: Are the conclusions succinct and reflective of the data and the analysis of the data? Is each conclusion supported by the results of the study?

As readers we are indebted to authors who labor to communicate ideas. However, even the most conscientious authors can be susceptible to subjectivity and bias. Unwittingly, some authors search their data for statistically significant differences rather than being content to describe the reality of their findings. They attempt to derive meaning from obscure statistical results and avoid any mention of whether those statistical results are meaningful in a clinical context. For example, in a recent study an author reported that one dental material was statistically stronger than another material. However, the author failed to point out that the weaker material was quite adequate in a clinical situation; or conversely, even the stronger material was too weak to function clinically. It then falls on the reader to interpret the data. The reader must become an intelligent consumer of the written word.

