



## Systematic reviews: A stamp of approval for the “best available evidence”?



Sorin T. Teich

A (nonsystematic) search of the literature through Google Scholar revealed that the term “systematic review” was first used in a medical context in 1855 by Simpson et al:<sup>1</sup> “As the papers composing this volume have been published before in some shape or other, many of them years ago, and have received the approval or condemnation of the profession, it would be quite misplaced to enter into any lengthened consideration of their contents, or any formal criticism of their merits. Being released, then, from the necessity of giving anything like a regular or systematic review of this ponderous volume, we feel at liberty to follow the bent of our caprice, and to fix upon articles here and there, in a desultory manner, through the book, and to make such comments and extracts as seem worthy of being submitted to our readers.” In other words, although the authors understood the concept of a systematic review, they felt that previous peer review and professional acceptance of an article took precedence over the process of structured critique and synthesis.

The last decade of the previous century was characterized by a surge of initiatives around the concept of “best available evidence”. In 1992, the Cochrane Collaboration was formed in response to Archie Cochrane’s call to use evidence from randomized clinical trials (RCTs). This was followed by the formation of the specialized Cochrane Oral Health Group in 1994, with the aim of producing systematic reviews which primarily include all RCTs of oral health.

Since the pyramid of evidence was developed by Sackett et al<sup>2</sup> in 1996, it is widely accepted that articles designed as systematic reviews are the epitome of high-

quality scientific synthesis. The first conference on Quality of Reporting of Meta-Analyses (QUOROM) was held in 1996, leading to the acceptance of guidelines for meta-analyses;<sup>3</sup> these guidelines evolved in the currently used PRISMA guidelines published in 2009.<sup>4</sup> The increased interest from the clinical community to easily access systematic reviews to quickly find the best available evidence is also illustrated by PubMed’s search engine, which separates these manuscripts from other publications (<http://www.ncbi.nlm.nih.gov/pubmed/clinical>).

In an attempt to provide evaluation tools for critical appraisal of systematic reviews, a range of solutions was suggested. Some authors proposed empirical methods focused around a study’s validity and results’ relevance. However, the reliability of these methods was not validated. The first index of quality to be validated and to prevail for more than 15 years was the Overview Quality Assessment Questionnaire (OQAQ) developed by Oxman and Guyatt<sup>5</sup> in the early 1990s. This was followed in 2007 by a refinement of OQAQ by Shea et al<sup>6</sup> to create the Assessment of Multiple Systematic Reviews (AMSTAR). AMSTAR was determined to be valid and reliable, and most importantly practical: it takes on average less than 15 minutes to complete a systematic review evaluation with this instrument.<sup>7</sup>

In a recent article,<sup>8</sup> we used AMSTAR to evaluate systematic reviews related to all-ceramic crowns; we concluded that the tool is practical but that the evaluated systematic reviews show a wide range of methodologic and quality variability. These conclusions are supported in many recent publications that warn the readers not to accept systematic reviews without further scrutiny.



We all tend to try to find peer-reviewed articles that filter large amounts of information into a concise paper that can be easily digested. Although journal editors have the primary duty to determine if a systematic review is methodologically appropriate and worth publication, the buck stops with the clinicians who translate the information into practice. Today we are not “at liberty to follow the bent of our caprice” and it is our ethical duty to critically appraise any manuscript labeled as “systematic review” to determine if the summarized information can be safely used in the clinic for the benefit of our patients.

Sorin T. Teich, DMD, MBA  
Scientific Associate Editor

## REFERENCES

1. Simpson Y, Hayward G, Jones CH, et al. Reviews and bibliographical notices. *Dublin Q J Med Sci* 1855;20:96–168.
2. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *BMJ* 1996;312(7023):71–72.
3. Moher D, Cook DJ, Eastwood S, Olkin I, Rennie D, Stroup DF. Improving the quality of reports of meta-analyses of randomised controlled trials: the QUOROM statement. *Lancet* 1999;354(9193):1896–1900.
4. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Ann Intern Med* 2009;151:264–269.
5. Oxman AD, Guyatt GH. Validation of an index of the quality of review articles. *J Clin Epidemiol* 1991;44:1271–1278.
6. Shea BJ, Grimshaw JM, Wells GA, et al. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. *BMC Med Res Methodol* 2007;7:10.
7. Shea BJ, Hamel C, Wells GA, et al. AMSTAR is a reliable and valid measurement tool to assess the methodological quality of systematic reviews. *J Clin Epidemiol* 2009;62:1013–1020.
8. Lang LA, Teich ST. A critical appraisal of the systematic review process: Systematic reviews of zirconia single crowns. *J Prosthet Dent* 2014;111:476–484.