

The challenge of testing dental materials

David L. Turpin, DDS, MSD

Although bracket failures continue to interrupt the progress of treatment in my practice, I am impressed with the number of researchers trying to solve the problem. In an attempt to understand as well as evaluate the validity of their studies, I asked James Miller, senior fellow in the Department of Dental Public Health Sciences at the University of Washington, to write a commentary on the design of clinical studies that measure bracket failure. His comments are followed by five papers reporting on variables that may affect bond strength, ranging from the use of chlorhexidine, lasers, and light for curing, to differing ceramic bracket base designs and the popular use of resin-reinforced glass ionomer cements.

Continuing on with the topic of dental materials, you will want to read every word of a paper titled "A review of contemporary archwires: Their properties and characteristics," by Robert Kusy of the University of North Carolina. As he uses the terms *strength*, *stiffness*, *range*, *formability*, and *weldability* to describe materials tested, keep your eye on the future he envisions: "As esthetic composite archwires are introduced, metallic wires will likely be replaced for most orthodontic applications in the same way that metals have been replaced by composites in the aerospace industry." A two-page glossary of terms is included and should serve as an excellent reference for years to come.

With the publication of this review by Kusy, I am reminded of a proposal made recently by

Drummond Rennie, president of the World Association of Medical Editors, during the annual meeting of the American Academy of Sciences in Seattle. With the increased availability of online publications, he advocates setting tough journalistic standards requiring the author(s) of a broad-based scientific review to keep it up-to-date. Rennie calls it "requiring aftercare of the subject." He envisions mandating an ongoing effort to add new studies as they are completed to keep the previously reviewed material current. Criticisms and letters to the editor could even be included following peer review of the material. In other words, everyone involved in publishing a review would have the responsibility of maintaining an electronically published state of the art position paper in their area of special interest for the benefit of clinical practitioners as well as other researchers.

This is similar to an approach taken by a group in medicine known as the Cochrane Collaboration. This international organization prepares, maintains, and disseminates systematic reviews of health care topics. To help provide evidence-based health care, this rapidly growing group of health care providers, consumers, and scientists have come together to engage in the collaborative enterprise of updating specialty reviews of all relevant randomized controlled trials in health care. Although I didn't charge Bob Kusy with this obligation, I can believe that with 25 years of research experience in dental materials under his belt, he would be up to the challenge.