

# Occlusal adjustment for treating and preventing temporomandibular disorders

Greg J. Huang, DMD, MSD, MPH

Seattle, Wash

**T**he cornerstone to evidence-based health care is the systematic review, a process that involves identifying, judging, and summarizing evidence on a particular clinical question. An excellent article appeared in the April issue of the *Journal of the American Dental Association*, devoted entirely to describing how systematic reviews are conducted and identifying some systematic reviews that have been performed in dentistry.<sup>1</sup> It is a worthwhile read for every dentist, and it explains why systematic reviews are more useful and valuable than traditional reviews. Some goals of systematic reviews are:

1. To be comprehensive and reproducible by stating the question, the search methods, and the criteria for studies to be included
2. To identify studies that have the least potential for bias
3. To judge the quality of the included articles
4. To summarize the findings in order to answer the stated question or to report that the answer is not clear from the evidence
5. To provide directions for future research

I would like to address occlusal adjustment and its relationship to temporomandibular disorders (TMD), a topic of some interest to orthodontists. Most of us were taught that a good occlusion leads to healthy functioning of the teeth, jaws, and joints. In fact, some orthodontists are passionate about the importance of ideal occlusion. If occlusion is a factor in TMD problems, it seems logical that perfecting the occlusion with equilibration might alleviate or prevent TMD.

Several systematic reviews have addressed occlusion and TMD,<sup>2-5</sup> with 2 specifically evaluating occlusal adjustment. In the first review, published in 1999, Forssell et al<sup>2</sup> found 4 randomized trials that met their

inclusion criteria. Of these, 2 studies reported that occlusal adjustment was comparable with control treatments, 1 reported that occlusal adjustment was inferior to control treatment, and 1 found occlusal adjustment was comparable to passive control. The second systematic review, by Koh and Robinson,<sup>3</sup> was published in 2003 and comes from the Cochrane Database of Systematic Reviews. The authors identified 6 studies that were either randomized controlled trials or quasi-randomized controlled trails. Three of these investigated occlusal adjustment for treating TMD, and 3 investigated prevention. All studies had either placebo, reassurance, or no-treatment control groups. Again, they found no studies indicating that subjects in the occlusal adjustment groups had statistically better outcomes than the control groups with respect to TMD. Thus, the 9 best studies on this topic (1 was shared by the 2 reviews) seem to indicate that occlusal adjustments are not beneficial for managing or preventing TMD.

Believers in occlusion and gnathology will cry foul, that we cannot believe the evidence, and that their patients respond very well to occlusal equilibration. These arguments deserve a response. First, we should consider whether we can always trust our clinical experience. Okeson<sup>6</sup> stated that occlusal appliances might reduce TMD symptoms in 7 ways. Three of these (alteration of the occlusal condition, placebo effect, and regression to the mean) seem applicable to occlusal adjustments. The improvement our patients demonstrate is real. But is it due to alteration of the occlusion, the reassurance that is given to them, or the spontaneous improvement that accompanies cyclical TMD pain? A clinician would find it very difficult to answer this question, because these 3 mechanisms are not easily separated in our daily practices. Additionally, a clinician might use his or her experience in deciding which patients to treat with occlusal adjustment, thereby introducing selection bias. Many years ago when I was a dental student, I remember discussing TMD surgery with an oral surgery faculty member. He was known to have a particularly good record with surgical interventions for TMD, and I asked him what contributed to this

Assistant professor, Department of Orthodontics, University of Washington, Seattle.

Reprint requests to: Dr Greg J. Huang, Department of Orthodontics, University of Washington, HSC Box 357449, Health Sciences D569, Seattle, WA 98195; e-mail, ghuang@u.washington.edu

Am J Orthod Dentofacial Orthop 2004;126:138-9

0889-5406/\$30.00 + 0

Copyright © 2004 by the American Association of Orthodontists.

doi:10.1016/j.ajodo.2004.06.013

success. His answer was that he operated only on patients who had very, very, very favorable prognoses—clever. The insurance companies use the same tactic—they try to insure those with minimal risks.

These problems help explain why randomized controlled trials (RCT) provide the most convincing evidence to clinical questions. In RCTs, random assignment into 2 or more groups protects against selection bias. Blinding the subjects to their treatment status equalizes the placebo effect. Blinding the clinicians prevents differential treatment of the 2 groups, and blinding the examiners ensures objective grading of the results. Collectively, these factors minimize bias and allow us to place much more confidence in the results of an RCT.

Is it possible that occlusal adjustment is beneficial? Certainly, from the hundreds of articles initially identified by Forssell et al<sup>2</sup> and Koh and Robinson<sup>3</sup> in their review processes, some supported the use of occlusal adjustment to prevent or treat TMD. However, no studies in favor of occlusal adjustment were conducted with enough rigor to be included in the final reviews. They both pointed out that the included RCTs were not perfect and, in fact, graded most of them to be of low to fair quality. For this reason, they concluded that there is a lack of evidence that occlusal adjustment is effective for treating or preventing TMD, but a definitive conclusion is not possible at this time.

What are the implications for orthodontists? From our dental school days, we are all familiar with adjusting a restoration that is high or trying to eliminate traumatic occlusion. These are usually very localized issues. During orthodontic treatment, though, we sometimes completely alter the occlusion. What is our obligation with respect to perfecting the occlusion for esthetic and functional reasons? I polled some of my colleagues on their use of occlusal adjustment and their rationale, timing, and fees. Most reported that they do some selective adjustment, with the rationale of improving occlusal relationships. The timing was usually during the final stages of treatment, and usually no additional fees were involved. However, there was considerable variation, with 1 orthodontist performing comprehensive occlusal adjustment 12 months after treatment to prevent TMD problems and charging several thousand dollars.

I asked myself whether my position on occlusal adjustment was consistent with the 2 reviews I have cited. Generally, I use minor occlusal equilibration to normalize unusual conditions, such as unequal cusp heights on premolars or thick marginal ridges on maxillary incisors, that interfere with ideal occlusal

relationships. I consider this type of adjustment simply part of the means to achieve an ideal occlusion—like interproximal reduction for a Bolton discrepancy. Achieving an ideal occlusion (our universal orthodontic goal) usually delivers optimal esthetics, which is a main reason patients seek our care. I do not routinely equilibrate after treatment, because almost all teeth that are not in contact will settle relatively quickly once the appliances are removed. This is supported by a recent study.<sup>7</sup> I also do not offer or recommend occlusal adjustment to treat or prevent TMD. I believe this agrees with the current best evidence.

Having said that, I would like to point out that the Cochrane Reviews are periodically updated; this allows recommendations to change based on new evidence. So for the strong believers in occlusal adjustment to treat or prevent TMD, it is possible to alter the available evidence by conducting high-quality studies that can be included in Koh's systematic review in the future. If occlusal adjustment is as effective as some think, it should not be a huge challenge to design and conduct an RCT that can demonstrate its effectiveness.

Evidence-based treatment is not black or white, absolutely right or absolutely wrong. It is the current position that an intelligent, unbiased person would reach after objectively evaluating the best available information on a given topic. It can, and will, change as new evidence is presented. The degree to which an evidence-based approach is incorporated into a practice is ultimately up to each clinician. Although no one can be forced to use the evidence, the internet already places all of this information at our patients' fingertips.

## REFERENCES

1. Bader JD, Ismail AI. Survey of systematic reviews in dentistry. *J Am Dent Assoc* 2004;135:464-73.
2. Forssell H, Kalso E, Koskela P, Vehmanen R, Puukka P, Alanen P. Occlusal treatments in temporomandibular disorders: a qualitative systematic review of randomized controlled trials. *Pain* 1999;83:549-60.
3. Koh H, Robinson PG. Occlusal adjustment for treating and preventing temporomandibular joint disorders (Cochrane Review). In: *The Cochrane Library, Issue 2, 2004*. Chichester, United Kingdom: John Wiley & Sons.
4. Forssell H, Kalso E. Application of principles of evidence-based medicine to occlusal treatment for temporomandibular disorders: are there lessons to be learned? *J Orofac Pain* 2004;18:9-32.
5. Tsukiyama Y, Baba K, Clark GT. An evidence-based assessment of occlusal adjustment as a treatment for temporomandibular disorders. *J Prosthet Dent* 2001;86:57-66.
6. Okeson JP. *Management of temporomandibular disorders and occlusion*. 4th ed St. Louis: Mosby; 1998.
7. Nett BC, Huang GJ. Long-term posttreatment changes measured by the American Board of Orthodontics objective grading system. *Am J Orthod Dentofacial Orthop* 2004; in press.