Letters

Centric relation treatment

Dr. Frank E. Cordray's opinion article, published earlier this year in the Angle Orthodontist (Centric relation treatment and articulator mountings in orthodontics. 1996;66(2):153-158) seems to exemplify the mindset of our professional leadership in embracing ideals and objectives of diagnosis and treatment that have universal professional appeal. Unfortunately, with all due respect for intention, the suggested methods for attainment of said objectives are equivalent to the objectives of playing horseshoes or hand grenades.

To advocate methods of diagnosis and treatment determination because they are less accurate than hand held models seems persuasively empty. I cannot justify assaulting my patients with 19th Century-based geometric approximations.

To my knowledge and in my practice, "the polycentric hinge joint occlusal system" is the only accurate method for reproduction of individualized chewing strokes from which we are able to make a diagnosis, determine treatment options, and construct physiologically appropriate prostheses. It will take more than Dr. Cordray's well intentioned article to convince me to change.

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Orthodontists owe a debt to their colleagues who have mandated the treatment goal of establishing maximal intercuspation (CO) at or near centric relation jaw position (CR). I would hope that all orthodontists subscribe to Frank Cordray's mandate that "The discrepancy/slide between CR and MIC/CO needs to be identified and eliminated when reorganizing the occlusion, which is required: (1) when restoring posterior occlusal stability by occlusal adjustment or tooth restoration; (2) when treating mandibular dysfunction; (3) prior to multi-unit restoration; (4) prior to complete denture prosthetics; (5) when treating a patient orthodontically; or (6) when positioning the condyle during orthognathic surgery."

Dr. Cordray states that identification of such a slide in centric is "best done with diagnostic study models mounted in centric relation," and other orthodontists contend that "it is not an optional step to be taken on some patients, but a necessary step to be taken on all patients." The rationale for mounting all cases is that "Bite disharmonies cannot be studied (or even detected in most cases) in the functioning mouth because the muscles and nerve reflexes protect the teeth by overriding the joint's guidance."

As a student of Dr. Sigurd Ramjord, I learned how to diagnose slides in centric in the mouth. As long as the patient's musculature allowed me to freely manipulate the mandible, I was convinced that I could (and still can) detect a centric slide in the mouth. Dr. Ronald Roth has been a strong advocate for the need to mount all cases to detect occlusal discrepancies. I readily acknowledge that there are cases in which CR cannot be recorded in the mouth. But before accepting the need to mount all cases, I would like to know how many consecutive patients presenting for orthodontic treatment have a significant slide (>2 mm) that cannot be detected in the mouth. The study design is simple: Mount the case with a bite taken prior to splint wear and again after splint wear. Such a study is being carried out by Dr. Jorge Ayala in Santiago, Chile, and I eagerly await the results. Until I see this data and its corroboration by other investigators, I will not be convinced that all cases need mounting.

As a physiologist, I am uncomfortable with the contention that "reflexes protect the teeth by overriding the joint guidance." Under certain circumstances, occlusal interferences do indeed generate avoidance reflexes; under other circumstances, they do not. This was documented many years ago by Schaerer, Stallard, and Zander (J Prosth Dent, 1967;17:38-449), who demonstrated that balancing interferences were eight times more likely to generate avoidance reflexes than working slide interferences. Many factors determine whether reflex avoidance will occur. These include magnitude and direction of the occlusal force, the threshold of re-

ceptors surrounding the teeth, frequency and duration of occlusal contacts, crown-to-root ratio, jaw position at occlusal contact, and the segment of the arch in which the contacts occur. Since occlusal interferences do not evoke protective reflexes in all instances, they do not prevent manual determination of CR in the mouth in every patient.

At issue in mounting all cases is the principle Dr. Cordray cites using Lombardi's football philosophy: You play for 100% success. Is mounting all cases necessary to detect the 15% that, according to Dr. Roth, have a sufficient CR-CO discrepancy to alter the treatment plan? Clearly it is imperative to identify these cases. I would like to see data on how many of these cases would be missed by use of CR jaw registration techniques in patients who do not fight jaw manipulation.

At a time when justification for the use of diagnostic tests both in medicine and dentistry is being asked, can the cost-benefit of mounting all cases in a typical orthodontic practice be justified? Is it not possible to screen for the 15% of patients that require mounting? I am always suspicious of mandates to always or never follow a particular practice; mandates to always take TMJ radiographs or never extract come to mind. I am hopeful that some enterprising orthodontic study group will tackle this cost-benefit challenge. Clinicians and patients would benefit from an objective appraisal and critical assessment of the current mandate.

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Among the steps Dr. Cordray promotes "if we are to succeed as a specialty" is the use of a repositioning splint "to eliminate MPD symptoms and attain a comfortable, stable, centric relation jaw position."

Dr. Cordray claims this is state-of-the-art orthodontic treatment. I respectfully disagree. New information, gleaned from an orthopedic surgeon's arthroscopic view of live temporomandibular joints during surgery, directly contradicts this 1895-based philosophy. Ask 100 prosthodontists to define "centric relation" and you'll have a hard time getting only 10 definitions, let alone one. Dr. Cordray proposes treatment to a position that the dental profession has no uniform agreement on. Lack of uniform agreement indicates lack of consistent scientific proof.

In the medical textbook *Operative Arthroscopy*, the TM joints are described as partially loaded polycentric hinge joints. In all of vertebrate anatomy, including man, there is not one joint operating as a single centric hinge that can be manipulated into a centric relation position. The human temporomandibular joints consist of cylindrical condyles suspended by capsules and ligaments in cylindrical fossae. While locked in bony congruity, the condyles and fossae are asymmetrically positioned at differing angles and distances from each other and from the true midline. Each condyle rotates loosely on its angulated axis. Yet both condyles (set at individual varying angles) must also rotate and move along the separate axis of movement of the mandible. The resultant polycentric movement consists of an initial vertical drop of the lateral pole while the medial pole scribes a differing arc of movement.

Another method of describing human temporomandibular movement is continuous rotation of each condylar hinge axis along nonlinear lines, i.e., no straight line movement. In all of vertebrate anatomy, including man, there is not one joint that produces straight line movement.

Here again, the author suggests that state-of-the-art orthodontics demands "mounting diagnostic study models in centric relation on a semi-adjustable articulator." All of the articulator models the author names are single centric hinge joint models that produce straight line movement. This knowledge and technology was developed in 1895.

Previously, our concepts of temporomandibular joint polycentricity were rejected by referees for publication and presentation in dental journals and at AAO and ADA meetings. In contradistinction, the medical profession has chosen to include our findings, knowledge, and technology in a medical textbook that has been described as the "Gold Standard" and the "Bible" and that is used as a reference in all medical schools in the United States.

As one of the few orthodontists to assist in over 200 TMJ arthroscopic surgical procedures, I have manipulated the mandible (for the surgeon) and looked directly into the TMJ capsule attempting differing tooth and jaw positions. Without the benefit of actually peering into the TMJ capsule, any manipulation or repositioning by the orthodontist is blind and potentially inaccurate. No doctor is smart enough to know where a joint will function most comfortably. Only the patient's neuro-skeletal-muscular morphology can accurately determine proper joint positioning. Again, this is common 1990s orthopedic surgical knowledge.

Blind manipulation or repositioning of two polycentric hinge joints set at asymmetric angles and distances and lined with fibrocartilage that lacks the percentage of proteoglycans to permit loading could result in iatrogenic damage.

Personally, I am pleased that this opinion article was published. Each day, orthodontists reposition teeth to improve occlusion. The key question is where the maxillary and mandibular teeth should be positioned at what correct condylar position.

There are two different thought processes: (1) single centric hinge relationship position, and (2) individual patient selected centric relation position based on TMJ polycentricity.

Since the resolution of this difference affects every patient we treat, it would appear prudent for the Angle Society to make this debate the central theme for an annual meeting. Let us bring together science, not religion or dogma. My entire team of several orthodontists, an orthopedic surgeon, and a general dentist stand ready to present a 10-year study clearly documenting the scientific accuracy of our statements.

Michael C. Alpern
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via Electronic Study Club

Author's response

Dr. Alpern's suggestion of an open debate on these topics is an excellent idea. It should have been started years ago and revisited regularly.

Regarding the controversy over the definition of centric relation and various descriptive terms used for this position, such as "polycentric" or "physiologic centric," I stand by my assertion that it is paramount to treat to a stable, comfortable, repeatable jaw position when undergoing comprehensive dental correction. This includes fixed prosthodontics, removable prosthodontics, complete prosthetics, orthognathic surgery, and orthodontics. This position must be definable, verifiable, quantifiable, and repeatable. We must have a treatment goal for condylar position. Otherwise, how do we know where we are starting from and how do we know where we are treating to?

The point of my article is that traditional orthodontic records and diagnosis presuppose that the condyle is in the correct position to start with. This is an unspoken assumption and, often, an incorrect one. Traditional orthodontic records (handheld models, lateral ceph taken in CO/MIC do not give any indication of condylar position. If you don't know where the mandible is positioned pretreatment or where it belongs posttreatment, then how can you accurately quantify the discrepancy (for example, is it a 3 mm or 5 mm Class II buccal segment relationship) or accurately determine how much Class II correction is required.

The time is running out when we can treat every patient using habitual occlusion as our only base of reference.

Finally, although we may differ in definitions, the interest in condylar position shown by some of the orthodontic community is encouraging.

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Home pages

I have visited the Angle Orthodontist home page on the web and found it a very interesting and exciting way to see what research is going to be published. We subscribe to the journal but it takes a couple of weeks to arrive.

Do any other orthodontic journals—or for that matter perio, prostho, or MFOS journals—have a similar service. If they do, I would like to get hold of their URLs.

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Editor's note

We've found several interesting sites—too many, in fact, to list them all. To reach The Angle Orthodontist home page, type our address into your web browser. There are no extra spaces between words or symbols, no period at the end, and be sure to note the unusual spelling of "dentstry." http://weber.u.washington.edu/~dentstry/angle-orthodontist.htm. The AJO/DO has a home page at www.uic.edu/depts/dort/journal.html. The European Journal of Orthodontics can be reached at http://www.oup.co.uk/jnls/list/eortho/scope/t. ACTA Dept. of Orthodontics can be reached at www.acta.nl/orthodontics/homepage/html. Or take a look at Giorgio Fiorelli's home page "Biomechanics in Orthodontics" at www.ats.it/fiorelli/home.html. It includes convenient links to dozens of related sites.

Correction

As they say, "there is many a slip between the cup and the lip." Or more to the point, between the final copy and the printed edition.

Figures 8G and 8H which appear on page 107 of the last issue, were reversed, although they were correct in the final proof. This could result in some confusion by readers of the article.

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