

Occlusion: The Standard of Care

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"A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up familiar with it."

— Max Planck (German physicist 1858-1947)

As a group, dentists are the specialists of occlusion. We are responsible for the physiological harmony of the temporomandibular joints, masticatory musculature and teeth. Nobody can seriously debate that occlusion does not have an intimate relationship with the joints and muscles.¹ Occlusion is within the adaptive capacity of the joints and muscles to accommodate, or it is not. When it is not, physiological distress results, which inevitably leads to pain and dysfunction.²

Are we doing our best to ensure that our specialty, occlusion, is providing physiologic harmony amongst teeth, muscle and bone? The short answer is no. Optimistically speaking, however, the standard of care is rising. Subgroups of our profession — the International Association of Orthodontists, the American Association of Functional Orthodontists and the International College of Cranio-Mandibular Orthopedics — are at the forefront of this progress. The ramifications of this science are not limited to orthodontics.

Facts support the view that the method taught to find "centric relation" was wrong. The retruded, uppermost position of the condyles impinges on the delicate retrodiscal tissues, encourages the meniscus to subluxate and is not in its most effective position for load stress against the powerful muscles of mastication. Healthy joints function in a "down and forward" position known as the Gelb 4/7 position.³ On radiograph, patients having temporomandibular dysfunction (TMD) most often have condyles displaced up and back, compressing neural and vascular tissues and thus activating nociceptors. It is the occlusion that "locks" the mandible in a retruded position as the proprioceptive afferent stimuli from periodontal ligaments affect muscle posture.⁴ Muscle soreness and trigger point formation with referral pain patterns result.⁵

Until recently, we have not even been able to locate the true resting position of the mandible devoid of muscle posturing interference. As specialists in occlusion, we should be able to. Surface electromyography (myotronics, bio research) clearly

shows the elevated muscle activity that results from malocclusion-directed nociception. It also clearly shows normal resting levels after surface transcutaneous electrical nerve stimulation (TENS). Computerized sagittal mandibular kinesiology graphically demonstrates habitual centric occlusal position, the true mandibular rest position and the myotrajectory for a peaceful neuromuscular occlusal position.⁶ In this position, the condyles move down and forward, decompressing non-loadbearing retrocondylar tissues and allowing for physiological muscle function. Utilizing the neuromuscular occlusal position ensures us of an effective relationship between the bones, muscles and teeth. This is our responsibility.

This objective, science-based approach with bioinstrumentation, practised by many, enjoys wonderful results. The applications are extensive. Patients seen for orthodontics, fixed and removable prosthetics, periodontics, TMD, trauma and many other reasons are benefactors. Therapy designed to prevent TMD is rewarding to all parties. There is no question that TMD can be multifactorial and that one treatment approach will not help everyone, but the days of arbitrarily putting in a splint, equilibrating and prescribing analgesics and muscle relaxants are giving away to objective, science-based medicine. Once we have firmly established physiologic harmony with this approach, our ability and scope of practice increase dramatically. Complex fixed prosthetic cases can be finished with confidence. Currently, there is a lack of support for Phase 2 treatment as statistical research has not kept pace with this technology. This "window" of bioinstrumentation clearly shows what is wrong and how to fix it. Certainly, establish your patient on a reversible orthotic first. But when the pain and dysfunction have resolved for months, are you going to make the patient endure the rest of his or her life on a large piece of odiferous temporary plastic or treat the patient with prosthetics or orthodontics? What would you want if you were the patient? Suffice it to say that when you have objectively established healthy function, Phase 2 is often in the best interest of the patient.

Reversible Phase 1 treatment, combined with therapies from allied health professionals when indicated, dramatically improves the quality of life of our patients. Why is there resistance to objectively locating neuromuscular occlusal position? In the past, ignorance has been an acceptable excuse. Today,

the disagreement revolves around politics rather than science. At the very core of this disagreement is the issue of money.⁷ Insurance companies have successfully shunned their responsibility, as if TMD is not a reality. Similarly, the academics have their agenda — obtaining research grants, seeking specialty status and defending the outdated methods they are still teaching — but this agenda will not stand in the way of objective scientific progress. This bioinstrumentation has been given the “seal of approval” by the American Dental Association. Is the CDA lagging behind? If we intend to perpetuate the myth of centric relation vs. neuromuscular occlusal position, there will be fallout. Reasonable people serving as jurors in court will

ultimately decide. If we are to be the leaders in oral health in our country, we need to look at the scientific evidence and move forward by promoting functional jaw orthopedics and neuromuscular occlusion. Given that a “causal relationship can be demonstrated such that successful occlusal management of certain myogenous problems results in repeatable improvement of relevant parameters and symptoms,”⁷ unsuccessful occlusal management can have a causal relationship of certain myogenous disorders. Unsuccessful occlusal treatment is often the result of distalizing forces acting on the mandible and the loss of posterior vertical dimension.

Occlusion: The “Science-Based” Approach

• James P. Lund, BDS, PhD •

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Dr. Dale makes many statements in his short article and cites the opinions of people with whom he agrees. He is pushing dentists to buy a set of electronic instruments with which they can recognize “physiologic harmony” of joint muscles and teeth, and then correct any disharmony they uncover using the same instruments. He repeats many of the claims that the manufacturers and their allies have made during the last decades of the 20th century:

- that elevated muscle activity “results from malocclusion-directed nociception” and that this can be detected with surface electromyography (EMG);
- that computerized mandibular kinesiography can be used to locate the “true mandibular rest position”;
- that electrical stimulation of the skin over the mandibular notch can be used to uncover “the myotrajectory for a peaceful neuromuscular occlusal position.”

He calls these methods an “objective, science-based approach,” but cites no scientific studies to back up the claim. He also decries the fact that academics have not embraced these instruments, and accuses us of having “an agenda” that is non-scientific. However, if he were to read just some of the articles that academics like me have written, he would find that our objections to the use of these methods are clearly based on science, and on a desire to prevent harm to patients. Consider the following.

- There is a great deal of evidence from well-controlled studies that EMG activity is not higher than normal in people who have pain in the masticatory muscle and joints.^{1,2} Therefore, there is no reason to try to lower EMG levels to find the so-called “true mandibular rest position.”
- Computerized mandibular kinesiographs have been shown to be inaccurate and very difficult to calibrate in a dental office.^{3,4}

- Electrical stimulators used in the dental office activate the fibres of the superficial masseter muscle, not the masseter nerve.⁵ The so-called “neuromuscular occlusal position” is really a superficial masseter occlusal position.

None of the papers that are critical of this methodology are ever cited by the proponents of this instrumentation, except in letters which are sent to people like myself, and to deans and university presidents, ordering us not to publicize our findings. Dr. Dale uses the same approach when he implies that those who do not embrace the faith will be dragged into court. However, if the scientific evidence for and against the ideas that he has acquired were ever placed on the scales of justice, he would be surprised by the height to which his weighing pan would rise. ♦

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The views expressed are those of the author and do not necessarily reflect the opinion or official policies of the Canadian Dental Association.

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Beware, the standard of care is rising. Joint vibratology, advanced imaging techniques, electromyography, jaw tracking and TENS allow us to follow our treatment with objective precision. Currently, the most progressive dental schools are involved with this technology. We need to accept this science and start applying it for the benefit of all. Do not be defensive about it. Embrace it as a new therapeutic tool that gives you the confidence to expand your scope of practice. ♦

Dr. Dale is now in private practice in Keller, Texas.

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