Evidence-based versus experience-based views on occlusion and TMD

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There is an old adage: never discuss divergent views concerning religion and politics with friends; you could lose a friend and create an enemy. Perhaps a variation on this notion applies to certain topics in dentistry and orthodontics. To this end, an acrimonious environment will surely ensue in the dental community when contending views are expressed about such topics as occlusion, temporomandibular disorders (TMDs), condyle position, gnathology, and mounted casts. Particularly sensitive to divergent thoughts on these topics are those who adhere to what is generally described as gnathology. Convinced of their “experience-based” views, they readily excuse away the contrary “evidence-based” (scientific) data. As Greene et al wrote, “Some clinicians are vocal critics of the TMD research community, arguing that clinicians’ anecdotal experiences are more valid than the contradictory research findings.” Even though the evidence points clearly toward occlusion having a secondary role in TMD, they still view occlusion as the primary and perhaps the single cause of TMD. This might be somewhat understandable if one agrees with Vig’s general view concerning some orthodontists: “orthodontists have lain greater emphasis on mastering their art than mastering their science. . . . There are many orthodontic controversies, past and present, that center on whose art is superior.” In a similar manner, Johnston argued: “Those who advocate new therapies seem disinclined to provide the evidence of efficacy (it may be bad for business), and the profession as a whole, perhaps being convinced in dental school of the irrelevance of ‘science,’ seems equally disinclined to demand it.”

The experience-based and evidence-based views are dichotomized and juxtaposed in the Figure. It depicts an extreme, black-and-white comparison; there may be gray areas in between. Also, a practitioner might not hold to the entire experience-based or evidence-based paradigm, he or she might have an evidence-based view on 1 topic and an experience-based view on another.

The evidence-based view on occlusion and TMD does not argue or conclude that occlusion (or condyle position) has no relevance to TMD or that orthodontists should ignore it. What can be derived from the evidence-based paradigm is that occlusion is no longer considered a primary factor in the multifactorial nature of TMD. TMD is now considered a collection of disorders embracing many clinical problems that involve masticatory muscles, joints, and associated structures. Therefore, the gross evaluation and analysis of occlusion is still important in the diagnosis and treatment of TMD: “assessment of occlusion is necessary as part of the initial oral examination to identify and eliminate gross occlusal discrepancies such as those that may inadvertently occur as a result of restorative procedures.”

Parenthetically, studies that had in the 1960s and 1970s placed an inordinate emphasis on occlusion as causing TMD were found to lack control/comparison groups (poor diagnostic specificity).

EVIDENCE-BASED DENTISTRY

Evidence-based dentistry is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of each patient. Turpin stated: “The purpose of using the evidence-based approach is to close the gap between what is known and what is practiced, and to improve patient care based upon informed decision making.” Not all evidence is...
The experience-based view

- Only clinical experience, and years of it, is relevant to the practitioner
- Denies the usefulness of science
- Anecdotal evidence is adequate to make clinical judgments and better than science
- Research journals are biased against the experience-based view
- There are no good clinical studies or clinical researchers
- Believe in finite points, positions, and numbers for "normal/ideal"
- Diagnosis of TMD is based on a detailed analysis of occlusion
- Occlusion is the primary cause of TMD
- Pin-point and minute attention to occlusion
- All occlusal balancing/protrusive posterior contacts are destructive...so concerned with mastication, deglutition, and parafunction (even though these are not recorded or measured)
- Orthodontic treatment causes TMD
- Condyle position other than SAM (superior-anterior-medial) causes TMD
- Over-focus on lateral and protrusive contacts
- No concern with possible relationship of functional occlusion type to chewing pattern shape (vertical vs. horizontal)
- Advocate canine protected occlusion (some tolerance for group function occlusion)
- Anterior guidance (no posterior contacts)
- Concerned with centric contacts in relation to condyle position; MI = CR (tolerance perhaps to 2 mm)
- Favors use of articulators in orthodontics
- When treating TMD, believe they have identified the cause and are treating it
- Believe in phase I and II TMD treatment
- Believe they are "hard tissue plastic surgeons," dental orthopedist, and use anterior guided orthosis

The evidence-based view

- Science and scientific method are relevant to practitioner
- Benefits and usefulness of science have been demonstrated
- Testimonies, case studies, nonobjective experience not adequate to make relevant clinical judgments
- Refereed research journals are not biased
- Clinical research is adequately performed and published
- "Normal/ideal" is a range
- There is no litmus test for diagnosis of TMD; "gold standard" is based on history, clinical exam, and when indicated, TMJ imaging
- Occlusion not primary cause of TMD but perhaps has minor role in etiology...TMD a collection of disorders
- Gross evaluation and attention to occlusion
- Differentiate between occlusal contact vs. interference...concerned mainly with destructive aspects of parafunction
- Orthodontic treatment does not cause TMD
- Condyle position per se not directly associated with TMD
- Functional occlusion type must be superimposed over chewing pattern
- "Biologic concept of functional occlusion"...accept all functional occlusion types, but no interferences (balancing and protrusive posterior contacts tolerated)
- Anterior guidance (posterior contacts tolerated, but not interferences)
- MI does not have to be coincident with CR (tolerance perhaps to 4 mm)
- Articulators not necessary for orthodontics
- Satisfied with symptomatic and palliative TMD treatment
- Favor phase I TMD treatment only
- Use stabilizing splints rather than repositioning splints for treatment

Fig. Evidence-based vs experience-based views on occlusion and TMD.

given the same weight. The double-blind, placebo-controlled experimental design is regarded as the gold standard of research. Evidence-based dentistry has its foundation in science. Science is considered the best approach for acquiring knowledge because it is devoid of personal beliefs, values, attitudes, and emotions. The scientific method also has the means for controlling confounding factors. Objectivity is emphasized in science because the data, the testing procedures, and the investigation's conclusions are open to public and scientific scrutiny. Without science, the health professions would be back to the days of snake oil salesmen.
How can the scientific, evidence-based occlusion/TMD knowledge point so clearly in 1 direction, but dentists and orthodontists ignore this information and practice in a totally different direction? For the experience-based orthodontist, what is accepted as the knowledge of the field is apparently based on some combination of empiricism, authority, rationalism, and tenacity.26 Helmstadler,26 believes these are very poor ways to acquire knowledge, and each has shortcomings when applied to clinical practice.

Empiricism

Empiricism is knowledge acquired through personal experience or perception. “If I have observed something, it must be real and true.” Empiricism is a valid element in science when it refers to the collection of data with the scientific method, not to the personal experience of an event. When people rely totally on their senses to observe, evaluate, and make judgments about nature and the universe, they often find that their perceptions are misleading and wrong. The problem with relying totally on empiricism is that human perception can be affected by such factors as past experience, belief in and expectation for success, predetermined bias, motivation, distortion of memory, the possibility for spontaneous remissions and cures, and the cyclic nature of certain disorders (such as TMD).

An example of empiricism being used in regard to occlusion and TMD is that of a notable restorative dentist who offers as “proof” that occlusal disharmonies cause TMD the observation that, when patients’ occlusions are adjusted, in a matter of minutes, TMD symptoms are reduced or eliminated.27 This “experience-based” dentist wrote: “I’ve seen too many patients who were referred for TMJ pain who had no intracapsular structural disorder, but had severe masticatory muscle pain that was relieved completely, often within minutes, after the occlusion was corrected,” and “the evidence indicating that occlusal disharmonies cause TMD has been too overwhelming to ignore.”

Greene et al contend that experience-based practitioners might believe that their methods are truly effective, having seen so many patients appear to be helped by them.1 However, this is not a correct deduction. Just because symptoms have been eliminated or reduced does not mean that the cause has been identified. Cognitive nonspecific factors that center on placebo effects must be evaluated, and the cyclic nature of TMD should be considered. Some TMD patients who are at the end of the pain cycle would be “cured” irrespective of whether they had therapy or treatment. Furthermore, a study by Goodman et al28 found that mock equilibration (a placebo effect) was effective in eliminating or reducing symptoms in a group of TMD patients.

Authority

Another way knowledge can be acquired is through authority—from perceived experts or highly respected people. The problem with authority is that the information disseminated is not necessarily true or evidence-based. Recall the debate between 2 great authorities of their day, Drs Edward Angle and Calvin Case, over the orthodontic extraction of teeth. Angle was adamantly against extractions of teeth at all costs. Conversely, Case believed in the discriminant use of extractions in orthodontics. Later, Dr Charles Tweed successfully retreated some of Angle’s relapsed, nonextraction patients with extractions.

Or, how about the debate in the 1970s about finishing orthodontic cases to the perceived correct centric relation position of posterior-superior, where $MI = CR$ (maximum intercuspation of the teeth when the condyles are in retruded centric relation)? Ignoring the evidence of the day (particularly the intraoral telemetric studies), many credulous orthodontists followed this notion merely because of a guru’s exhortation. Johnston sarcastically remarked about the absurdity of this past thinking and practice: “it could be argued that the progressive modification of centric relation [from a posterior-superior to anterior-superior position] has done more to eliminate centric slides than 20 years of grudging acquiescence to the precepts of gnathology.”3

Are the experience-based practitioners in the occlusion and TMD debate using authority? It certainly does appear to be the case. In a rebuttal letter in the Angle Orthodontist, the following defense of both the author’s research and his gnathologic view was presented:29 “Traditionally, the best clinicians in the world are those who adhere to the disciplines established years ago by the McCollums, Stuarts, Pankeys, and Roths of the world.”

Rationalism

Rationalism is the acquisition of knowledge based on reason. This left-brain function assumes that if a notion appears logical, it must be true. However, there are many intuitively appealing and logical ideas that, when tested, are proven to be fallacious. Parenthetically, rationalism can correctly be used in the scientific method when developing testable hypotheses and research questions.

An example of the incorrect use of rationalism is the issue of third molars causing orthodontic relapse (crowding). For decades, orthodontists have told pa-
tients that third molars caused interdental pressure and were thus responsible for mandibular relapse (anterior irregularity and crowding) after orthodontic treatment. This seemed rational, particularly from the viewpoint based on the theorized anterior pressure that could be exerted on the mandibular incisors by erupting mesioangular and horizontally impacted mandibular third molars. However, Southard demonstrated that this notion was not correct. How many third molars were extracted solely based on the rationale that they caused orthodontic relapse?

How about the claim in the 1930s that Costen’s syndrome was the cause of TMD and certain ear and hearing problems? Costen, an otolaryngologist, believed that loss of dental vertical dimension and occlusion of the mandible caused intrusional pressure on the external auditory meatus that was in close anatomic proximity to the glenoid fossa/TMJ complex. The result was TMD and ear and hearing problems. Certainly, this notion appeared logical for that day, but it was eventually proven to be false.

Rationalism appears to be alive and well in the experience-based argument over the debate concerning occlusion and TMD. Two experience-based gurus offer comparable dialectics concerning the rationale for the therapeutic use of occlusal splints to treat TMD. Experience-based practitioner A stated, “You are told that occlusion has nothing to do with TMD, but the treatment for TMD is an occlusal splint.” Experience-based practitioner B stated, “Isn’t it interesting that many people who believe that occlusion has nothing to do with TMD use occlusal splints in the treatment of TMD? Indeed, if occlusion has nothing to do with TMD, why don’t they put the splint on the patient’s elbow?”

This kind of “junko logic” ignores all the possible theories on how splints might work. For instance, Clark offers 5 possibilities: occlusal disengagement, restored occlusal vertical dimension, maxillomandibular re-alignment, TMJ repositioning, and cognitive awareness.

Tenacity

Tenacity, another way to acquire knowledge, means holding steadfast to superstitions, information, or traditions that might have been passed down from family to family and generation to generation with little or no concern for validity and accuracy. Tenacity is the substance of folklore and urban legend. For instance, in the 18th century, a toothache was falsely attributed to the “tooth worm,” and a person with tooth pain was lowered face down over a fire to “heat” the worm out of the affected tooth. This act of tenacity went on for decades before the cause of a toothache was discovered.

Greene et al offered the following explanation of why tenacity is used by the experience-based practitioner in the occlusion and TMD debate: “Scientific progress often involves new research findings that contradict long-held beliefs. While both clinicians and researchers will eventually abandon the discredited belief in most instances, this transition is not occurring in the TMD field. . . . Practitioners who use unsubstantiated treatment modalities may feel threatened financially if scientific evidence renders their procedure obsolete.”

**DISCUSSION AND CONCLUSIONS**

The way knowledge is acquired has surely influenced the views and fueled the debate on occlusion and TMD. The evidence-based view on occlusion and TMD is governed by science, but the experience-based view relies on empiricism, authority, rationalism, and tenacity. Even though the experience-based view is based on tenuous ways of acquiring knowledge, it is surprisingly popular.

Most recently, cogent arguments for evidence-based dentistry have received much attention in dental and orthodontic journals. Ackerman stated, “The challenge facing orthodontists in the 21st century is the need to integrate the accrued scientific evidence into clinical orthodontic practice.” Ackerman and Bader discussed the rationale for preferring a systematic (critical) review of the literature to make decisions regarding patient care; they further argued against the experience-based model for clinical decision making based on “its minimal scrutiny of the basis of the master clinician or educator, and the absence of formal and independent mechanisms for considering clinical observations that do not agree with the master educator’s opinion.”

Paquette et al, more than a decade ago, described a nonorthodontic counterculture that made pejorative remarks against scholarly, evidenced-based orthodontics and the direction that the profession was headed. This group made unsubstantiated statements against a mature specialty that has attracted some of our most gifted scholars. Sadly, this counterculture includes some of our own orthodontic brethren who share some of the misconceptions of some general dentists—that orthodontic extractions consistently “dish in” the face and cause dark triangles at the buccal corridors; that extractions expand the maxilla ad libitum even without a posterior crossbite; that functional appliances can significantly (clinically) alter mandibular growth; that occlusion is the primary cause of TMD; and that orthodontic treatment inherently causes TMD. Furthermore, some orthodontists still hold onto a spurious
view of “normal/ideal” static, morphologic occlusion and its relationship to health and disease. Ackerman believes these orthodontists erroneously consider all deviations from an ideal, static occlusion (mesiobuccal cusp of the maxillary first permanent molar into the buccal groove of the mandibular first molar with little overjet and overbite within the framework of acceptable esthetics and reasonable stability) as disease.

Leonardo daVinci said that anyone who falls in love with practice without science is like a sailor on a ship without a compass or a sail; neither knows where he is heading. If dentistry and orthodontics desire a status comparable with medicine, they must rely on the same foundational tenet as medicine: science! The argument of the experience-based practitioners, that anecdotal empirical evidence is equal to and perhaps superior to scientific evidence, is naive and dangerous. The Gies report in the 1920s that petitioned the medical and dental communities to focus on science should be reiterated so that dentistry finally “gets it”! Furthermore, the 1982 ADA conference on TMD called for practitioners to have a scientific basis for their TMD treatment modalities. How do the experience-based occlusion/TMD practitioners expect to comply with this dictum when they generally deny the importance and relevance of science? Unproven TMD tests or devices might pose a risk of false-negative (poor diagnostic sensitivity) or false-positive (poor diagnostic specificity) diagnoses, a detriment to proper TMD treatment.

REFERENCES

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