Cutting Through the Confusion About TMD

A Syllabus for Dentists and other Health Care Professionals regarding the diagnosis and management of Temporomandibular Disorders and Orofacial Pain

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This 45 page document discusses:

• A brief history of how jaw problems have been managed
• The many challenges associated with understanding the etiology of jaw disorders
• The reasons for the conflicting philosophies in the TMD field
• The ethical lapses among some treating clinicians today
• Dr. Guinn’s 35-year journey though the labyrinth called TMD
• Guidelines for how to diagnose and treat this patient population
The purposes of this paper

- Dispel the myths and misconceptions surrounding TMD.
- Provide the clinician with a sound foundation for evaluating the many divergent opinions expressed by so-called experts in the field.
- Speak for those who cannot speak for themselves. Our patients can go to 5 dentists and get 5 highly conflicting opinions about the cause of their jaw symptoms and the treatment required. They deserve better than this.

What this Syllabus is Not

This is not a typical TMD presentation. It does not include a review of anatomy, physiology, patho-physiology, etiology, occlusion, jaw orthopedics, imaging, diagnostics, or specific treatment modalities. Resources for all of this excluded information are listed on page 38.

Disclaimer: I have no financial interest in any product, book, program, philosophy, drug, treatment modality, professional organization, or other resource, which may be discussed or mentioned in this paper.

Confronting the Confusion

There may be no other condition as misunderstood, misdiagnosed, and mistreated as jaw disorders and associated pain.

As a clinician, this paper may make you uncomfortable. Frankly, it is my opinion that we should all be uncomfortable regarding this topic, because as a profession we have a less than stellar track record in managing it. However, it is not my purpose to criticize any one individual or group. Reasonable people can certainly disagree, especially on this topic.

I have identified 12 different categories of contributing factors responsible for the confusion surrounding TMD. I believe this confusion prevents most clinicians from developing a firm foundation from which they can make appropriate diagnostic and treatment decisions.

The Twelve Areas of Confusion

#1 The multi-factorial nature of the disorder

“A patient with orofacial pain can represent a significant challenge to the clinician, leading to repeated and usually unsuccessful interventions. To further complicate matters, pain is a multidimensional experience involving physical, cognitive and emotional aspects and chronic pain in particular recruits active involvement of these dimensions…The trigeminal nerve innervates anatomically related but functionally diverse organs such as the meninges, the craniofacial vasculature, the eyes, the ears, the teeth, oral soft tissues, muscles and the temporomandibular joint. In the brainstem, the trigeminal sensory nucleus overlaps with upper cervical dermatomes. Taken together, these features account for the complex and extensive pain referral patterns that often make clinical diagnosis so difficult.”

--Barry Sessle, MDS, PhD, DSc, FRSC, FCAHS
Professor and Chair, Craniofacial Pain and Sensorimotor Function
University of Toronto

While everything Barry Sessle said is true, the confusion is not just about the multifactorial nature of the condition. The primary reason for this confusion is us as clinicians and researchers.
The 3 Contributing Factor Categories in TMD

Anatomical / Structural
- Malocclusion
- Internal Derangement
- Degenerative Joint Disease
- Mandibular Posture/Vertical dimension of occlusion
- Skeletal Growth Deformities
- Trauma
- Ligament Damage / Weakness
- Condylar Position
- Orthopedic Complications

Neuromuscular Disorders
- Parafunction
- Cervical Referral
- Myofascial Pain
- Fibromyalgia
- Myofunctional
- Allodynia / Hyperalgesia
- Sympathetically-Maintained Pain
- Tension-Type HA
- Migraine

Psychological Disorders
- Anxiety
- Depression
- Upregulation
- Sensory Perception Disorder
- Central Sensitization
- Insomnia
- Abuse
- Poor Lifestyle Choices
- The Unbalanced Life
- Medication Overuse/Abuse

Almost without exception, every TMD patient will have at least two contributing factors responsible for their symptoms, usually from different categories. The more complex patients will have at least two factors from all 3 categories.

Any clinician who “plays favorites” with one or even some of these factors, and ignores others, will likely mislead himself as well as his patient, resulting in less than optimum treatment results. For more on this, refer to #8 How Doctors Think (page 15).
The contributing factors listed are by no means an exhaustive list. See page 25 for a more complete list of diagnoses and contributing factors. See if you can put each one into one of the 3 categories above.

#2 Clinical Conditions that can masquerade as TMD
  Cervical MFP / Cervicalgia
  Facial Migraine
  Occipital neuralgia
  Odontogenic referral
  ENT problems
    Glossopharyngeal neuralgia
    Sphenopalatine ganglion neuralgias
    Otalgia (sometimes an ear ache is an ear ache)
    Acoustic Neuroma
    Vestibular neuropathy
  Neuropathic pain / Neuroma
  Parotid tumors
  Cardiovascular / Carotidynia
  Neoplasia, i.e. TMJ osteochondroma
  Degenerative joint disease
  Fibromyalgia
  Ankylosing spondylitis
  Gout

Obviously, some of these conditions can have serious medical consequences. It is our obligation to be aware of these conditions and to be able to recognize them if we are evaluating a patient for a potential TMD problem, so an appropriate referral can be made. This is no different than conducting an oral cancer screening.

#3 The Handicap of a Syndrome
From the 1930’s to the present, this disorder has been thought of as a syndrome by too many clinicians. Labeling “TMJ” or “TMD” a syndrome has caused both patients and clinicians to be mislead about the true nature of this condition, as well as impede sound scientific investigation.

To further explain this area of confusion, please refer to the article titled “The Equivocal Results and Misleading Conclusions in Current Research Addressing TMD / Orofacial Pain.” See appendix 1, pg 40.

#4 A lack of training in dental schools
There is currently no mandate for dental schools to include any education in TMD in their curriculum. Most undergraduate students get no more than 2 hours of lecture on this subject.
Therefore, most dentists are provided no foundation for judging which CE programs, courses, or textbooks are appropriate if they want to expand their knowledge. Today, most dental students are taught how to seek scholarly evidence on the Internet. Unfortunately, the results they may find regarding TMD are also likely to be misleading.

#5 The history of how dentists came to treat these problems (How did we get here?)

The “father” of TMD can be considered to be Dr. James Costen (1895-1962), an ENT physician. In 1934, he theorized that ear pain, jaw pain, dizziness, with associated h/a are caused by missing posterior teeth or a collapsed bite. He treated this by fitting blocks of material between the molars. Costen’s occlusion theory (then called Costen Syndrome) opened the door for dentists to attempt various bite-altering therapies.

The early dentists who attempted to help TMD patients through occlusal therapy include the following:

Nathan A. Shore (1914-1984) Spent 40 years focusing on “TMJ Syndrome”, NYC

Gnathologists: Beverly B. McCollum, Charlie Stuart, Victor Lucia, Peter K. Thomas, Bill McHorris, Everett Payne, Frank Celenza

Harold Gelb, NYC, did much to popularize “TMJ” from the 60’s thru the 80’s. He had several controversial methods, including putting condyles in what he called the “4/7 position” and building a “Gelb splint” which did not follow the principles of occlusion.

In the early 70’s several dentists who had been trained in gnathology began eliminating the more esoteric methods (i.e., tripodized occlusion) and making it more user-friendly for clinicians. I call it gnathology-lite. They include: Peter Dawson, Henry Tanner, Niles Guichet, Peter Neff, Bob Lee, and Terry Tanaka. They perpetuated the concept of treating TMD through focusing on the occlusion, although Dr. Tanaka has done much to advance our understanding of the TMJ with excellent anatomical research via cadaver studies.

Barney Jankelson, a Seattle dentist, invented a jaw tracking device in the early 70’s. He incorporated the use of TENS on the jaw muscles, and claimed that this method proved where the jaw “belongs.” He then advocated rebuilding the occlusion to this “scientific” position, which almost always resulted in opening the bite. His mantra was “If you can measure it, it’s a fact; if you can’t, it’s an opinion.” He is considered the father of electrodiagnostics and neuromuscular dentistry.

Dr. George Goodheart, D.C., 1918-2008, Detroit, Michigan. In 1964 Goodheart developed applied kinesiology—a method of “testing” the body in ways that “diagnosed” any physiologic or medical condition the patient may have. For dentists, this technique was popularized by George Eversole, who had studied with Goodheart. Many dentists interested in TMD took weekend courses from Eversole in the 1980’s, after which
Eversole moved to a Caribbean island. Applied Kinesiology is widely used by chiropractors today.

Bill Farrar (pronounced “fair-ah”), Montgomery, AL, 1924-1985. Bill Farrar, along with an oral surgeon, Bill McCarty, “discovered” the internal derangement of the jaw joint. Prior to Farrar, the biomechanical function of the joint was poorly understood. In 1979, Farrar began lecturing on his discoveries, which transformed our understanding of this condition. He introduced (along with others) transcranial x-rays to study condylar position. He introduced disc re-capturing and jaw unlocking techniques. He used a pull-forward appliance on many of his patients to prevent their jaws from locking again.

To Review: The underlying philosophy regarding appropriate condylar/mandibular position for TMD patients divides these experts into two basic camps:

Centric Relation/ Ideal occlusion
   Gnathology,
   Restorative occlusionists

Anterior Condylar Repositioning
   Kinesiologists
   Gelb
   Jankelson
   Farrar

We will revisit when and where to employ condylar repositioning later on. Farrar was erroneously interpreted as saying that you had to hold the condyle forward forever. He never said that. However, he is the one most responsible for “phase II” dentistry on TMD patients. More accurately, Farrar (along with Gelb, Jankelson, kinesiology) is used as an excuse by too many dentists to perform phase II dentistry (ortho and/or extensive crownwork) on TMD patients.

The lite gnathologists, who I will now call the occlusionists, especially Dawson and Guichet, were adamant that Farrar was wrong about what caused jaw clicking and the need for provisional condylar repositioning. They dismissed kinesiology, Gelb, and Jankelson out-of-hand as little more than quacks.

#6 The claims of so-called experts in the field

By the early 1980’s, it became the battle of the gurus with egos, primarily between the occlusionists and Bill Farrar. The occlusionists ganged up on Bill Farrar. He was telling us that attempting to put TMD patients in centric relation was iatrogenic. He was bringing their jaw forward to recapture their disc, or at least reduce joint capsulitis. The occlusionists regarded this as heresy. However, Farrar was unflappable at conferences in which he was attacked. I was privileged to be with him every year until he died in 1985 of emphysema. He was only on the TMD national stage for 6 years, but he made a huge impact on TMD treatment throughout the world.
Over 900 dentists traveled to Farrar’s small Montgomery AL office from 16 foreign countries and 46 states. He taught 79 courses in Montgomery between 1980 and 1985. He published numerous articles in American and European dental journals over a 25 year period. He worked in his office until he died.

“My time is short, I will fight and I am not bitter. I have accomplished much of what I wanted to do. It has been exciting...Criticism on a professional level is actually beneficial, because it stimulates us to re-think and re-test our viewpoints and concepts. **We must not accept old ideas not based on scientific fact.**”

--Bill Farrar

“Dr. Farrar considered his patients his primary teachers. His clinical findings encouraged him, even drove him, to scientific contributions. He possessed a mind that did not allow intermissions and a heart that reached out to his patients.”

--Dr. Jack Haden

In his final days, Farrar was heard to say, “Medical science has not yet been able to attach a prognosis of doom on man’s spirit nor to predict the physical strength it can harness. I ask only to contribute to life as long as I live it.”


For those of us who grew up in gnathological occlusion, we could see the writing on the wall. We realized within a year of Farrar’s 1979 revelations that the days of manipulating patients into centric relation, making splints in that position and subsequently equilibrating them into this position was not the answer for TMD patients. If the disc is dislocated, as it is in the majority of TMD patients, there is no such thing as “centric relation.” The most you can hope to accomplish is identify an “adapted centric position” (Dawson’s term).

Also, by the late 1970’s we had some excellent clinicians who were leading the way in looking at more than just occlusion in evaluating and treating these patients. They include:

- Weldon Bell, Oral Surgeon, Texas
- Parker Mahan, U of Florida, Gainsville
- Bernie Williams and Jack Haden of Kansas City -- The best students of Farrar
- Jeff Okeson, UK/Lexington

In addition, some very good basic science, which explained the physiology and neurochemistry of TMD, started coming out of universities, from individuals such as:

- Ron Dubner, U of Maryland
- Barry Sessle, U of Toronto
The academic contributors to TMD (hereafter called the academics) include the following:
Daniel Laskin, OMS, U of Ill
Charles Green, U of Ill
Joseph Marbach, OMS, NY
Glenn Clark, UCLA
Bill Solberg, UCLA
John Rugh, UCLA, UTSA
Sam Dwarkin, UW
Ed Truelove, UW
Chuck McNeil, UCSF
Norman Mohl, SUNY, Rochester
Don Seligman, UCLA
Andrew Pullinger, UCLA

Electrodiagnostics – Re-Defining Normal
Remember Barnie Jankelson’s mantra: "If you can measure it, it’s a fact; if you can’t measure it, it’s an opinion.” Sounds impressive, but what does it mean?

Electronic devices allow you to measure a lot of things. The question is whether the results of electronic testing are valid or useful. In TMD, these devices include:
Jaw Tracking devices
Surface EMG muscle testing
The use of TENS to establish the optimum rest position of masticatory muscles
Doppler Ultrasound / sonography
Joint vibration analysis
Occlusion scanners
Thermography
Diagnostic imaging

A dose of statistics: Sensitivity and Specificity
In order to determine if these devices are reliable indicators of a patient having a certain problem, we have to make sure they find the problem in patients, without also finding the problem in non-patients.

Sensitivity: The proportion of actual positives that are correctly identified as such.

Specificity: The proportion of those proven to be normal which are correctly identified.

The study: Establish 100 patients who are verified through a gold-standard exam to have a TMD condition, and also 100 patients who are proven to have no evidence of no TMD condition. Then blind the device operator as to which patients are in which group. Test all 200 patients with the same device to be studied, using the same operator and methods.
### Ideal result:

<table>
<thead>
<tr>
<th>Gold-std Exam</th>
<th>Test Pos</th>
<th>Test Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Has Disorder</strong>&lt;br&gt;(Proven Positives)&lt;br&gt;(Sensitivity)</td>
<td>95</td>
<td>5</td>
</tr>
<tr>
<td><strong>Normals</strong>&lt;br&gt;(Control group)&lt;br&gt;(Proven Negatives)&lt;br&gt;(Specificity)</td>
<td>5</td>
<td>95</td>
</tr>
</tbody>
</table>

To be considered a valid testing device, the sensitivity and specificity must be at least 80%. In the example above, both sensitivity and specificity are 95%.

### Typical results for electrodiagnostic devices, excluding diagnostic imaging:

<table>
<thead>
<tr>
<th>Gold-std Exam</th>
<th>Test Pos</th>
<th>Test Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Has Disorder</strong>&lt;br&gt;(Proven Positives)&lt;br&gt;(Sensitivity)</td>
<td>90</td>
<td>10</td>
</tr>
<tr>
<td><strong>Normals</strong>&lt;br&gt;(Control group)&lt;br&gt;(Proven Negatives)&lt;br&gt;(Specificity)</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

In this situation, electronic devices have a high sensitivity of 90% (good), but a specificity of just 20% (way too many false positives).
There are currently no electrodiagnostic devices which have been independently proven to be valid, because of the propensity for the devices to provide false positive results (80% of normal patients are “diagnosed” as abnormal). This convinces the clinician and the patient that there is a problem requiring treatment, which may be erroneous, and also opens the door for these devices to be misused, in “selling” dentistry to normal patients.

The prime example is using TENS and jaw tracking, possibly in conjunction with surface EMG testing, to establish the ideal rest position of the mandible, for the purpose of providing maximum relaxation of the masticatory muscles—commonly known as Neuromuscular Dentistry. Most patients (and normal asymptomatic individuals) undergoing this testing will be shown to be “over-closed” and/or over-retruded, and therefore in need of bite-opening (a good thing if you want to do a lot of dentistry).

Thus, unethical or mis-informed clinicians can easily exploit such devices in order to sell extensive (and expensive) dentistry that the patient may not need.

Ref: Orofacial Pain: Guidelines for Assessment, Diagnosis, and Mgt, 4th Ed, pp36-40

The problem with electrodiagnostic devices is not that they are inherently inaccurate. They are actually quite accurate in what they measure. They often make very useful research tools. The problem is in how they are inappropriately applied in clinical dentistry.

Redefining Normal
Specifically, the problem lies in making false assumptions about what normal parameters are. These false assumptions include the following:

• The vertical dimension of occlusion should be 1 to 1.5 mm from the position of maximum jaw relaxation.
  o Using the principles of neuromuscular dentistry, the average closure from the “relaxed” position to tooth occlusion is 9 mm. This means that the average patient (or normal person) will be found to be “over-closed” 8 mm. This is the reason for the false positive results with jaw tracking & EMG.
• Using a TENS unit is the optimum way to find the maximum jaw relaxation position.
  o TENS was abandoned over 20 years ago by physical therapists as being ineffective. Well-controlled research has also shown this technique to lack efficacy. Those advocating TENS as part of neuromuscular dentistry claim it is somehow “special” because it is low frequency. This claim appears to lack foundation.
• Normal TMJ’s have no joint sounds
  o If 1/3 of the general population has a displaced disc, which has been established by numerous studies. Therefore, “normal” would have to include joint sounds. Most people do not think much of popping in their
knees or ankles, but somehow dentists have made them afraid of the popping in their jaw.

- Surface EMG only measures electrical activity in the muscles it is intended to measure.
- Normal condylar position is concentric or forward from centric
- Normal body surface temperature should be…
- A person with normal occlusion has no inclined-plane contacts

Likewise, diagnostic imaging can be mis-used. For example, if the clinician assumes that the condyle must be concentric in the fossae in the closed-mouth position, they will “diagnose” many patients as having a TMJ problem. However, almost half of certified normal patients have over-retruded condyles. Such a clinician may recommend to the patient that their condyles have to be repositioned forward. This creates a posterior open bite, requiring ortho or restorative dentistry to correct. See below for the long-term sequella to mandibular repositioning.

#7 The Philosophical Turf Battles Among TMD Groups.

There are three main groups representing TMD (there are dozens of fringe groups as well). All are in the US, but all have international representation. I am a member of all 3 organizations.

**American Equilibration Society (AES)**
Organized in 1956, initially focused on occlusion and gnathological principles. Incorporated TMJ disorders by the 1960’s. It is the largest of the TMD organizations. It is the “big tent”, in that it invites all disciplines and philosophies of TMD and occlusion. Equilibration as a procedure has not been emphasized in meetings for over 20 years. The organization name refers to the harmonious equilibrium between the musculoskeletal system and the occlusion.  [www.aes-tmj.org](http://www.aes-tmj.org)

**American Academy of Orofacial Pain (AAOP)**
Emphasizes or supports:
- The psychological component of TMD, along with neurology and pharmacology.
- Evidence-based dentistry.
- The use of reversible treatment modalities
De-emphasizes or opposes:
- The use of electrodiagnostics.
- Phase II dentistry for TMD patients.
- The orthopedic and structural components of TMD.
American Academy of Craniofacial Pain (AACP)
Emphasizes or supports:
- The orthopedic and structural components of TMD.
- An empirical/anecdotal approach to management of these disorders.
- The use of electrodiagnostics.
- Phase II dentistry for TMD patients.
De-emphasizes or opposes:
- Evidence-based dentistry.
- The academic/scientific, psychological and pharmacological approaches to TMD.

All three organizations support the use of splints, although they use them for different purposes and have different beliefs about the mechanism of how a splint works.

Conferences with a Hidden Agenda
1988: ADA Conference on Diagnostic and Treatment Modalities for TMD, Chicago.
Over 600 dentists in attendance. The day before the meeting, members of the AACP obtained a court-restraining order, preventing even the mention of any electrodiagnostic device during the conference. AACP had their attorneys in the conference room, monitoring all proceedings. As a result, it was conservatively estimated that several million dollars were wasted in this meeting, given the cost of travel, lodging, and lost income for the participants.

In addition, the manufacturers of the electrodiagnostic equipment had petitioned the ADA to obtain the ADA Seal of Approval. When this was denied, they sued (or threatened to sue) the ADA. Around 1990, the ADA responded by abandoning its Seal of Approval program. These devices have since been cleared by the FDA, but only for safety; not efficacy or validity.

1996: National Institute of Health TMD Conf, Bethesda, MD.
Over 800 in attendance, including the lay public.
Numerous presenters spoke on various diagnostic and treatment modalities. A panel of “experts”, none of whom had ever treated a TMD patient, and most of whom were not dentists, listened to the presenters. The panel rendered an opinion regarding the current status of research and treatment options for these disorders, supposedly based on the information presented at the meeting. It was later discovered that the opinion of this panel, which was released to the press at the end of the conference, was written before the conference ever started. The conclusions of the panel: “The experts know nothing about TMD.” According to the panel, we don’t even know how to correctly define it, much less how to appropriately treat it. The one clear conclusion of the conference was that occlusion plays no role in TMD, and therefore occlusal treatment is not warranted. This conference opinion was written by members of the AAOP (the academics at university-based TMD programs).
A dentist/U.S. Congressman was in attendance. He stated that “A result like this is always about one of two things: power or money. Follow the money.”

Headline in most U.S. newspapers following this conference: “Treatment for jaw disorder unproven. About $1 billion a year is spent on treatment of TMD patients, yet most treatment is not based on proven science.”

This conference provided all the cover insurance companies needed to avoid paying claims for TMD, because it was labeled “experimental”. This meeting did more to prevent patients from having access to care than any other event before or since.

It also gave dental schools all the cover they needed to deny class time in the undergraduate curriculum for this subject.

**Why did this happen?** Academics make their money through research grants. In order to obtain a grant, you have to prove that 1) there is a large percent of the general population with the condition, and 2) there is not enough research to demonstrate how to adequately diagnose or treat it.

**1998: AAOP (and later AACP) petition the ADA regarding recognized specialty status for TMD.**

Why? Because it is difficult to attract qualified grad students into the (approximately) 10 university-based TMD programs, if the graduates do not have an ADA-recognized certificate at the end of their training. AAOP and AACP re-submitted applications each year (on alternating years) for approximately 6 years before giving up.

Why was specialty recognition not granted by the ADA? Because there is obviously no consensus among the various groups regarding how to treat these patients.

**1998: The TMD Alliance** was formed. It consisted of delegates from approximately 10 organizations having an interest in TMD. The express purpose of this organization was to thwart attempts by AAOP and AACP to obtain specialty status with the ADA. This was done out of fear that if one of the groups were successful, that organization would be able to dictate the “accepted” methods of diagnosis and treatment. They were also afraid that existing practitioners could not be “grandfathered” in as specialists; and that only patients seeing the recognized specialists could obtain insurance benefits. I was a delegate to this organization for several years, but recommended that both organizations I represented withdraw their membership from this group.
#8 How Doctors Think


“We carve out order by leaving the disorderly parts out.” --William James, M.D.

“If you listen to the patient, he is telling you the diagnosis.” --William Osler

“In one study of misdiagnosis that caused serious harm to patients, 80% could be accounted for by a cascade of cognitive errors, such as putting the patient into a narrow frame and ignoring information that contradicted a fixed notion.”

“Another study of 100 incorrect diagnoses found that inadequate knowledge was the reason for error in only 4% of instances. The doctors didn’t stumble because of their ignorance of the clinical facts; rather, they missed diagnoses because they fell into cognitive traps.”

The cognitive traps:
- Attribution errors
- Anchoring errors
- Commission errors
- Outcome bias
- Deductive logic errors
- Availability errors
- Overuse of stereotypes
- Heuristic errors

“Misdiagnosis is a window into the medical mind. It reveals why doctors fail to question their assumptions, why their thinking is sometimes closed or skewed, why they overlook the gaps in their knowledge.”

“Intellect, intuition, careful attention to detail, active listening, and psychological insight all coalesce for the competent clinician.”

--Dr. Jerold Groopman

This book is a must-read for any clinician treating TMD patients. It is well written. Your spouse will love to read it too, especially if they enjoy watching “House.”

The bottom line: Our preconceptions regarding the typical TMD patient prevents us from taking the time to thoroughly investigate the one in our chair today. The one in your chair is unlike all the others. Each person is unique, in so many ways. What worked for your last TMD patient will probably not work for this one.
When it comes to treating TMD patients, there is no substitute for being a thinking dentist. Don’t hesitate to reschedule them to a day when you know you will have more time in your schedule. They deserve it.

#9 Evidence-Based Dentistry

Because of the lack of consensus in the TMD field, one would think that the scientific method, available to us by adapting evidence-based medicine principles, would be welcomed. The reality is that most TMD clinicians do not welcome this scientific approach. There are probably many reasons for this. Many of those reasons are included in this document. However, one of the bigger fears among practitioners is that EBD will force them to practice in a way that is different from the way they KNOW is best. Those treating these problems have a long tradition of relying on the less-than-scientific training they received. It is not unlike the story of the man who asked his wife why she cuts the ends off a ham before putting it in the oven.

As Bill Farrar so eloquently stated, “We must not accept old ideas not based on scientific fact.”

I have spent more than 6 years focused on the principles of Evidence-based dentistry, particularly in how it applies in the TMD arena. I am on an international scientific investigation committee, conducting a systematic review of the literature, in order to eventually write guidelines for TMD treatment (note: guidelines are not mandates). I can tell you that, while EBD promises to one day lead us out of the wilderness of confusion we are in, it is currently not ready for prime time, at least not in the field of TMD (apologies for the mixed metaphors).

Briefly, EBD is based on looking at the best available evidence, and combining/pooling similar trials on the same subject, in order to elicit adequate valid evidence to produce a guideline regarding how to manage a component of TMD. As the graphic below illustrates, the poorest quality (but greatest quantity) of evidence is opinions expressed by experts in the field. Unfortunately, expert opinion is the primary evidence most of us in the field have had to rely on. However, it is the opinion of experts that have left us with such diverse diagnostic and treatment modalities, with the resulting confusion for both clinician and patient alike. Expert opinion is part of the problem, not part of the solution.
Sound science is based on well-controlled, randomized trials. Unfortunately, there is a dearth of true randomized controlled trials (RCT's) available to us for review in the TMD field. There are many trials that claim to be randomized and controlled, but few actually are. There are many reasons for this, not the least of which is the multi-factorial nature of the condition (it is very difficult to control all the variables affecting the outcome during the course of the trial). The bottom line is that analyzing the available data on TMD patients almost always produces equivocal results for any particular treatment modality, including splint therapy. Please refer to appendix 1 (pg 40) regarding the reasons for these equivocal EBD results.

Because of the equivocal results, some academics declare that there is no evidence that any TMD therapy is efficacious. This includes splint therapy, which these same academics routinely use on patients. However, a lack of evidence does not mean that a treatment intervention lacks efficacy. More often than not, it means that the underlying trials were poorly designed and/or poorly conducted.
#10 The Ethical Slide: Using TMD as a sales pitch to sell dentistry

Many of you will recall that in 1997 an article was published in the Reader's Digest by Mr. William Ecenbarger. He is an investigative journalist, who had himself examined by a panel of respected dentists. One of these dentists was John Dodes, a member of the National Council Against Health Fraud. The panel agreed Mr. Ecenbarger needed a crown on #30 and possibly a crown on #18. That’s all.

He then traveled to the offices of 50 dentists in 28 states and D.C. Some dentists told him that he needed no treatment (15 of the 50 missed #30 entirely), and others informed him that he needed a $30,000 full mouth rehab.

While this was not a scientific study, and many dentists criticized the article, I think we ignore it as a profession at our own peril.

If a TMD patient were similarly “prepped” and had the wherewithal to conduct this kind of experiment, I have no doubt that they would have a similar experience with dentists, except today the upper end would be closer to $60,000 (yes, possibly right here in Utah, especially if this “patient” consulted Dr. Google for a “referral” to a TMD expert).

It is easy to exploit TMD patients, because they are desperate to find an answer to their pain and dysfunction.

The Cosmetic-TMJ Dentist

As we all know, dentistry has been pursuing elective cosmetic procedures for more than 20 years. Some dentists have sought out special training at “cosmetic centers” in order to get a leg up on the competition.

The former “director of occlusion” at one of these centers spoke at an AAOP conference a number of years ago. I was shocked at what he said. Specifically, he candidly informed us that when patients came to their center, he examined them and then referred them across town to a chiropractor. Using applied kinesiology (muscle testing, usually of the deltoid muscle) and pieces of paper between the patient’s molars, the chiropractor determined the “proper” vertical dimension of occlusion for the patient. Using this “prescription” from the chiropractor, the director of occlusion then informed the patient that all their teeth needed to be restored in order to treat their over-closed bite, (and cure their TMJ problem, if they had one).

However, this gentleman was the former director of occlusion because the cosmetic dental centers found something even better than kinesiology to “diagnose” the occlusion: Neuromuscular Dentistry, i.e., electrodiagnostic jaw tracking with EMG muscle testing.
To quote from some Cosmetic-TMJ dentists’ web sites:
“Neuromuscular dentistry is used to determine the ideal position for your jaw by focusing on all three dimensions. By discovering the perfect resting position for your jaw and adjusting your jaw to this position, neuromuscular dentistry is able to relieve you of your discomfort. To learn more about neuromuscular dentistry as well as other cosmetic dentistry procedures....”

“Neuromuscular dentistry will help your facial and jaw muscles find their optimal position. Through this, the occlusion or bite of the jaw is improved in order to eliminate the pain you are suffering.”

It was marriage made in heaven (or hell, depending on your perspective). Now the cosmetic-TMJ dentist has a more “scientific” method for convincing the patient their bite is over-closed (and proof of why they have “TMJ”). The added bonus is that dentists who “graduate” from these cosmetic centers are not only going to be experts in cosmetics, they will also be experts in occlusion and “TMJ.” As John Stossell would say, “Give me a break!”

Five years ago, “UDA Action” reprinted an article by Gordon Christensen titled “I Have Had Enough.” In this article, he states:
“Where has the professionalism of my profession gone? I have seen a major degeneration in the ethics of the dental profession over the past several years.”

“Oral over-treatment in the name of esthetic dentistry without total informed consent of patients, primarily for the dentist’s financial gain, is nothing less than overt dishonesty in its worst form. You cannot put tooth structure back after it has been removed... Financial income to the practitioner should be related to the needs and decisions of the informed patient, not the needs of the practice.”

A copy of Gordon’s article is available from the UDA office, via fax.

Besides the cosmetic dentist’s newfound interest in TMD, there are other dental “experts” making highly questionable statements to patients. We have heard these recently, as reported by patients:

“We will start treating your TMJ by taking out all of your silver fillings.”

“Since my bite guard didn’t help you, that means I will have to do braces on you next.”

“I can tell you have TMJ without examining you, because your eyes are bulging out.”

“The doctor doesn’t need to examine you in order for us to know you have TMJ. We can tell from this form you filled out. That will be $4,000 to get started.”

“Your orthodontist caused your jaw symptoms because he doesn’t understand TMJ. Now I will have to re-do your orthodontic treatment and then I will have to crown most of your teeth.”
(From the cosmetic dentist who just completed a patient’s full-mouth rehab): “Well, if your bite is still off you are going to have to get braces next.”

“You can only open 42mm. This proves you’ve got TMJ.” (Normal jaw opening is 40mm or more).

“You have had some teeth root-canal’d. This will lead to systemic health problems. We may have to extract these teeth and place implants”

There are marketing campaigns, masquerading as continuing education, which promise a new income source through the field of TMD. They employ slick dentist-salesmen pretending to be TMD experts, who promise to make you one of the top dentists in America if you simply buy their line of products, treatment methods, and sales tactics.

It is my belief that the vast majority of dentists are honest, ethical, and possess great integrity. But it only takes a handful of dentists to make the rest of us look bad. We all get painted with the same brush, especially in the eyes of the insurance industry. Utah is the worst state in the nation for insurance coverage on TMD. It is my belief, after serving for many years as an insurance consultant on TMD cases, that we can blame the few “bad apples” in our midst for the insurance industry’s skeptical and jaded opinion of TMD treatment.

#11 The Internet

The blind leading the blind

A greater quantity of information doesn’t lead to greater quality
A cornucopia of mis-information and biased advice

Unfortunately, the Internet has resulted in a quantum leap in the “noise” surrounding these disorders, perpetuating the confusion and the abuse of these patients.

The Internet has allowed clinicians to make false and misleading advertising claims that would have never been tolerated a few years ago by the profession or by state regulators.

While the Internet helps us in many ways, advancing sound TMD knowledge is not one of them.
#12 The Belief Window

See the resources section (pg 39) of this paper for more information on this topic.

This topic is different than #8 How Doctors Think. It addresses the group dynamics that help explain the unwillingness of the various camps in the TMD field to even attempt to reach common ground and consensus, based on the “Not Invented Here” mentality of these groups.

Summary

The twelve conditions above help explain the reasons for the confusion surrounding TMD. We will be able to effectively explain the true nature of the TMD patient only if we are mindful of these confusing factors, and their potential to mislead us. Trying to treat every patient complaining of jaw pain and dysfunction with just one diagnosis and one treatment is likely to be as successful as winning at the slot machine with every pull of the handle. Hopefully, we can move past the paradigm of “If all you have is a hammer, then all you see is nails.”

Understanding and acknowledging these confusing factors may appear to make TMD more challenging to the clinician. However, I submit it can actually be quite freeing. Dentists are the doctors of the masticatory system. MD’s want nothing to do with these disorders. However, dentists can only take their rightful place as the doctors of the masticatory system if they pay the price in terms of a sound scientific foundation. Otherwise, we are relegated to being “chiro-dontists”, relying on anecdotal/empirical testimonials and opinion regarding how to diagnose and treat these patients.
Where Do We Go From Here?

My Journey
With this background, let me share my own experience, as I have had to transform my philosophy and my practices over the past 32+ years. I don’t do this to claim that my way is the right way or the only way. It is simply a way to view these problems, and treat them conservatively. For me, it is the way I would want a member of my family treated.

Before starting, let me state that today I rarely recommend “phase II” dentistry to my patients. I hung up my high speed over 20 years ago, and have performed no restorative dentistry since then. The reasons for this are discussed below.

I went through five different CE courses on gnathological occlusion before I graduated from dental school (I finished my graduation requirements a year early). The first thing I bought after graduating was a pantograph (for recording condylar movements) and a fully adjustable articulator (programmed by the pantographic tracings). While I do not use either of these devices today, the education I obtained about the stomatognathic system was invaluable, and continues to serve me today.

I first heard Bill Farrar in 1979. In two days he shook me to the core intellectually, and challenged everything I had learned about jaw function, anatomy, physiology, and TMJ pathology. I was a member of the American Equilibration Society, as well as the Society for Occlusal Studies. Everyone in these organizations was similarly rattled by what Farrar was showing us (as stated above, some of the guru occlusionists attacked him and fought him on every point). I immediately took additional courses from Jack Haden, Bernie Williams, and others. Bernie was kind enough to let me observe in his office. By 1980 I was treating patients much differently than I was originally trained in gnathological occlusion, and getting more predictable results. My success was also much improved by working with some outstanding physical therapists. I have learned it frequently requires a team-approach to successfully manage these patients.

Following the Farrar model, I did condylar repositioning on the patients that were locking or had painful clicks. To be clear, I let the closing click tell me where to position them—just anterior to the closing click. However, I never repositioned them more than 2 mm forward from their relaxed jaw position.

At that time, if I had to do condylar repositioning this meant that I had to recommend phase II dentistry (to correct the resulting posterior open bite). This included:

• Fixed prosthodontics
• Orthodontics (by an orthodontist)
• Functional ortho (by an orthodontist)
• Selected eruption of posterior teeth while cutting off the back of the splint
• A cast metal orthotic the patient could wear full time (in rare cases)

All work was performed only after obtaining mounted study models, using a facebow, along with pre and post-treatment transcranial x-rays to verify condylar position. The fixed prosthodontics had a highly specialized occlusion, including ramps on the distal
marginal ridges of the upper 2nd molars, to resist retrusion of the mandible. This restorative work was performed utilizing a special anterior jig that locked the mandible into the final therapeutic condylar position. In addition, all patients continued to sleep in a disc appliance at night after all phase II dentistry was completed. Patients were recalled every 4 months for a year, then every 6 months.

After 7 years of treating patients in this manner, I decided to recall all the patients I had treated with phase II dentistry at least 5 years earlier. I wanted to verify that they were continuing to be asymptomatic, and that they were maintaining the proper condylar position. By this time I had over 100 cases that had been treated in the manner described above, and that were at least 5 years post-treatment.

I soon learned the first lesson in the difficulty of doing a prospective/longitudinal trials—getting the patients to come back. After begging and pleading, we were able to get 26 of the 100 patients back. All of the ones we contacted said they were doing well, but some said they just didn't want to take time off work to come in, even though we were not charging them. Each of these 5-year recalls underwent a full exam, along with follow-up joint x-rays. The results were both encouraging and discouraging.

The encouraging part was that all of these patients were asymptomatic, while some of them continued to have clicking in their jaws.

The discouraging part was what I saw on the films. Without exception, every patient had regressed to his or her pre-treatment condylar position. This shocked me. I had done my very best to hold them in their final therapeutic condylar position. Most of these patients were still wearing disc appliances every night.

By this time, I had been an instructor for the Society For Occlusal Studies for several years, teaching the TMJ course with Bernie Williams. I had been throughout the US, Canada, Hawaii, and Alaska, teaching dentists how to perform phase II dentistry after Bernie had taught them how to conduct phase I diagnosis and treatment.

In 1987 there was a retreat for the SOS staff in Banff, Alberta, where we were to share nuggets we had learned in the past year. I sheepishly got up before this group, and disclosed to them the findings of my 5-year follow-up study. I fully expected to be ridiculed and expelled as inept. Instead, the response I got was “We are seeing the same thing. Condylar repositioning is not stable.” This caused me to re-examine everything I was doing for these patients.

Since condylar positioning is not stable, that means we should be re-evaluating why we had the idea that patients must be maintained in a certain mandibular posture indefinitely. I began converting “pull-forward” appliances to stabilization appliances after the patient had been in treatment for 3-4 months. I also began experimenting with having them wear the splint just part-time during the day plus at night. Very few of them relapsed. This was very reassuring.
I took my first course from Jeff Okeson at about the same time. Jeff said something that I found intriguing. He said patients do better if you do not have them wear their splint full time. “Growing up” in the world of gnathological occlusion, I had believed that what the (stabilization) splint was doing is providing an (artificial) ideal occlusion. The splint uncoupled them from their malocclusion, thus allowing the muscles of mastication to relax (or so I thought). Jeff explained that actually what splints do is alter muscle engrams temporarily, to reduce muscle activity. However, if they wear the splint full-time, their muscle engrams permanently change, making the splint less effective over time (look up “muscle engrams” in Okeson’s text). This made sense, because I had some patients who told me their splint helped tremendously the first 2 or 3 weeks, but became ineffective after that.

I was reminded of John Rugh’s study in which he had a dental student intentionally place a high crown on another student, and then performed over-night EMG studies on the “patient”. He found that for the first few days, the EMG readings were dramatically lower, then gradually returned to normal or increased above baseline.

I started having patients wear their splint no more than 2 or 3 hours during the day, plus during sleeping hours. This included the patients I was holding forward in disc appliances at night. They did better as well. Since I was not permanently holding them forward, I found less of a need for phase II dentistry.

Because condylar repositioning is not stable long-term, by 1990 I stopped performing restorative treatment on TMD patients (I stopped seeing general patients in 1981). Another amazing thing happened after I did this. I saw fewer and fewer patients who needed permanent alterations in their occlusions, even those who had been previously locked. I did (and still do) perform an occasional occlusal adjustment. However, I have performed no formal equilibrations (with mandibular manipulation) on TMD patients since 1987. Now, I simply free up their occlusion, by removing inclined-plane contacts, especially non-working interferences, or premature anterior tooth contacts.

I now have to say that I was “diagnosing” the need for follow-up restorative work on TMD patients partly because I still used a high speed. Since I hung up my high speed I have never looked back. I now refer less than 5% of my patients back to their dentist for restorative work. Most of the patients I now refer have the need for restorative work because of failed restorations (they needed crowns anyway). Some are referred because of unilateral condylar erosion, resulting in a posterior open bite on the contralateral side. In short, it is amazing how much less you see the need for phase II dentistry if you don’t perform phase II dentistry yourself.

Today, I rarely make a “pull-forward” disc appliance. If I do, it is only to 1) prevent morning locking in their jaw, or 2) to be inserted after the oral surgeon unlocks them under I.V. sedation. I have found that if you effectively relax the lateral pterygoid muscle, so that it is not constantly pulling the disc forward, that a stabilization splint is adequate for most patients with morning locking. Without permanent condylar repositioning, the need for phase II dentistry is greatly diminished.
Today, thanks to extensive marketing and “sponsored” lectures by experts, more and more dentists are buying into the concept of mandibular (and therefore condylar) repositioning and/or bite opening, followed by extensive dentistry.

For those of you who continue to believe that mandibular repositioning/bite opening is justified, my challenge to you is this: Do your own 5-year follow-ups on patients you have held forward with splints and phase II dentistry (or patients you have performed neuromuscular dentistry on). If you based your altered jaw position on a neuromuscular approach, retest them with the electrodiagnostic instrumentation. You may be surprised at what you find 5 years (or even 1 year) later. If you think you recaptured their disc, do an MRI on them at this 5-year follow-up. Just because they can open over 40mm without clicking, pain, or restriction does not mean their disc is still in place. I treat approximately 500 patients a year who come in with a displaced disc. Most of them leave with a displaced disc, but they leave comfortable and without jaw impairment. Given the fact that 1/3 of the general population has a disc dislocation (most of whom are not even aware of it), why do we think it is imperative for us to get the disc back in place on our patients?

In summary, I spend approximately 90 min with a new patient, reviewing their 8-page history, reviewing their CT scan, which was previously obtained by my staff, interviewing them, examining them, formulating a treatment plan, consulting with them, and dictating a 3 or 4 page report. This process involves deciding which of the three categories of contributing factors (page 4) and which individual factors within each category are playing the most significant role for that particular patient. I then make a recommended treatment for each of these etiological factors. I will often be recommending 4 to 7 specific treatment modalities to the patient, along with a list of things they can do to reduce stress on their jaw. For approximately 1/4 of the patients we see, I recommend that all of the treatment be performed outside our office, because what they thought was a jaw problem is really caused by something else.

Our patient’s treatment is typically completed within 4 months, unless we have to wait longer to take a follow-up CT to check for bone loss. Once we have competed the active phase of treatment, for about 70% of them I recommend that they continue wearing their splint at night only—nothing else. On 20%, I recommend a conservative “hands-off” (without mandibular manipulation) occlusal adjustment. 5% will need full or partial ortho, and they are referred to an orthodontist. Up to 5% will need some restorative work. Usually this is only 1 quadrant. None of my patients have needed full-mouth rehab for many years, because I don’t open bites and I don’t try to maintain the condyle in an advanced position.
Frequently Asked Questions

What are your “most common” diagnoses?
If I only looked for the most common, I would be assured of missing the less common. For me, the rewarding challenge of the TMD patient is the diagnostic hunt. We can only diagnose what we know. Here is the list of the 150 I try to keep in my brain. This is not an exhaustive list. I wrote it in about an hour. I see the first 40 of these every week. I have seen all of these in my practice. Obviously, some of them had to be confirmed by other clinicians.

This list includes contributing factors, as well as formal diagnoses.

- Capsulitis
- Masticatory myalgia
  - Lateral pterygoid
  - Masseter
  - Temporalis
  - Medial Pterygoid
  - Digastric
- Cervical myofascial pain
  - SCM
  - Suboccipital
  - Hyoids
  - Trapezius
  - Levator scapuli
- C-1 tendonitis
- Internal derangement
- Closed lock
- Parafunctional clenching
- Bruxism
- Muscle bracing / splinting
- Local muscle soreness
- Muscle hypertrophy
- Genetically weak ligaments
- Trauma-induced ligament damage
- Poor sleep hygiene
- Tension-type headache
- Sensory Perception Disorder
- Parafunctional sleep posture (stomach-sleeping)
- Degenerative joint disease
- Osteoarthritis
- Erosion of condylar head
- Intra-condylar bone cysts
- Loss of cortical bone
- Osteophytes (bone spurs)
• Torn/perforated bilaminar ligament
• Idiopathic resorption of condyle
• Malocclusion
  o Distalizing contacts
  o Striking anterior teeth prematurely
  o Lateral slide
  o Severe class II’s (greater than 3 mm overjet)
  o Collapsed bite
  o Unilateral posterior open bite
  o Anterior open bite
  o Non-working interferences
  o “Division I” (retro-inclined upper anterior teeth)
  o Locked in occlusion
• Occipital neuralgia
• Upregulation
• Depression
• Anxiety
• Traumatic arthropathy
• Arthrosis
• Chronic pain patient
• Subluxation locking
• Joint effusion
• Occlusal trauma
• Migraine w/o aura (common migraine)
• SSRI / SNRI –induced nocturnal bruxism
• Postural distress
• Fremitus
• Neuropathic pain
• Neurogenic inflammation
• Allodynia
• Hyperalgesia
• Coronoid tendonitis
• Tongue thrust
• Abscessed tooth
• Fibrous adhesions
• Post-surgical condylar resorption
• Hemarthrosis
• Hyperemesis-induced permanent ligament damage
• Maxillary sinus mucosal disease
• Sinusitis
• Migraine w/ aura (classic migraine)
• Rebound analgesic headache (medication overuse headache)
• Transformed migraine
• Developmental deformities
• Mandibular asymmetry (often due to childhood trauma)
• Lingual tori
• Scalloped tongue
• GERD
• Obstructive sleep apnea
• Bulimia
• Sexual abuse
• Physical abuse, by spouse, boyfriend, or parent
• Otitis media (confirmed by ENT)
• Hemifacial hyperplasia
• Temporal arteritis
• Chiari Malformation
• Cluster headache
• Acute paroxysmal hemicrania
• Trigeminal neuralgia
• Complex region pain syndrome (formerly called reflex sympathetic dystrophy)
• Sympathetically-maintained pain
• Nerve root impingement
• Frontal sinusitis
• Sphenoid sinusitis
• Muscle trismus secondary to needle trauma
• Muscle atrophy
• Muscle spasm (rare)
• Acute occlusal awareness
• OCD
• Bipolar disorder
• Borderline personality disorder
• Somatiform disorder
• Secondary gain
• Chronic Fatigue Syndrome
• Ehlers-Danlos Syndrome
• Sjogrens Syndrome
• Rheumatoid Arthritis
• Lupus
• Marfans
• Scoliosis
• Torticollis
• Oro-mandibular Dyskinesia / dystonia
• Tardive Dyskinesia, often secondary to phenthiazines
• Accutane-induced myalgia/myofascial pain
• Ankylosis, both fibrous and boney
• Osteochondroma
• Post-herpetic neuralgia
• Trigeminal neuropathy
• Drug dependency
• Munchausen’s (including “by proxy”)
• Carotidynia
• Blocked parotid duct
• Parotid tumor
• Acromegaly
• Apical breathing
• Burning mouth/tongue syndrome
• Capsular fibrosis
• COPD-induced jaw pain
• PFO-induced migraine
• Tinnitus
• Eagle syndrome
• Extension-flexion arthropathy (whiplash)
• Fibrositis
• Glossopharyngeal neuralgia
• Psoriatic arthritis
• Coronoid impingement
• Calcified stylohyoid ligament
• Stylomandibular tendonitis
• Synovitis
• Retrodiscitis
• Fractures
  o Zygoma
  o Subcondylar
  o Maxilla
  o Mandible
  o Orbit
• Mandibular nerve trauma
• Hematoma
• Osteosclerosis
• Paresthesia
• Steroid-induced necrosis (TMJ)
• Gout
• Osteofibroma
• Osteochondritis dessicans
**What are the typical treatment choices to consider after examining a patient?**

There are over 50 types of treatment recommendations I use over the course of a year. Some recommendations include referrals to other clinicians. It can’t emphasize enough that no treatment options should be considered without thoroughly evaluating the patient, and deciding what the various etiologies are for that patient (see the 3 Contributing Factor Categories, pg 4). The treatment has to be tailored to the contributing factors/etiology. As stated above, the typical patient is given 4-7 recommendations. The more challenging may get up to 10 recommendations. Some of the recommendations made to patients include the following:

- Jaw Instructions (see handout)
- Splint (deprogrammer, stabilization, pull-forward, pivot, Tanner, etc)
- P.T. referral, with script including all contributing factors, exacerbating factors, parafunction, treatment goals, precautions, treatment frequency, and treatment length. Only P.T.’s with advanced training and experience will consistently help TMD patients. There is now TMD/Orofacial Pain certification available for P.T.’s
- Jaw school
  - *TMJ Healing Plan*, by Cynthia Peterson, P.T. (see pg 38).
  - TMD CD* (Freedom from TMJ) for progressive relaxation of masticatory muscles
  - Glucosamine, Omega 3 fatty acids, Vitamin D, Calcium, Magnesium (for patients with bone loss). See handout.
  - NSAID, either OTC or script, typically Lodine, 400 mg bid prn pain
  - Muscle relaxant, typically cyclobenzaprine, 2 ½ - 5 mg, 10 hours prior to wakeup time (typically 8pm)
  - Instructions regarding restrictions at work, singing, or contact sports to avoid
  - Therapeutic exercises
  - Laser treatment (class 3b gallium cold laser)
  - Topical transdermal cream (may contain pregabalin, Ketamine, ketoprophen, gabapentin, lidocaine, amitriptyline, others)
  - Flector Patch (diclofenac)
  - Trigger point injection (rarely needed with good P.T. and laser)
  - Unlock joint, either in-office or under I.V. sedation by oral surgeon
  - Neurologist for migraine assessment, Chiari malformation, neuralgia, RSD, or sensory perception disorder (SPD)
  - Chronic pain therapist (primarily for self-hypnosis to block the pain)
  - Counselor for stress management
  - Blood test for 17β-estradiol and Vitamin D (for patients with bone loss)
  - Inject Coronoid ligament (with Celestone) for temporal tendonitis
  - Endodontist
  - Speech pathologist, for tongue thrust
  - Consult with PCP, to substitute for SSRI meds (Prozac, Paxil, Zoloft, Celexa, etc)
  - Primary care physician, for physical, blood screen, hyper/hypotension, thyroid
  - ENT
  - Oral surgeon, for unlocking under i.v. sedation, arthrocentesis (lavage), arthrotomy, Botox, biopsy, clip lingual frenum, or orthognathic surgery
• Gabapentin, with instructions for titrating drug plus guidelines and warnings. Given for trigeminal neuralgia, neuropathic pain, acute capsulitis, migraine preventive, trigeminal nerve trauma, herpes zoster or severe nocturnal bruxism.
• Follow-up CT, to check DJD progress or evaluate airway in sleep appliance.
• Mounted study models, using facebow and semi-adjustable articulator.
• Occlusal adjustment, to reduce grossly high teeth due to DJD or surgery, or for fine-tuning after active jaw treatment.
• Pulse oxymetry over-night study, plus review of study and consult w/ pt.
• Amitriptyline or nortriptyline, used to augment gabapentin in neuropathic pain.
• Klonopin, given for no more than 2 weeks, hs.
• Anterior jig (not NTI), rarely made, used to evaluate if pt would benefit from a splint, not worn more than two weeks, hs.
• Orthodontist, besides std ortho, sometimes for a condylar repositioning device, i.e., Herbst, Jasper Jumpers, or Forcus springs, primarily in young patients.
• Referral to Fibromyalgia / chronic fatigue syndrome specialist.
• General dentist for restorative work to address malocclusion, after resolution of symptoms.
• Prosthodontist, after resolution of symptoms.
• Neuro-otologist, to r/o acoustic neuroma, vestibular neuropathy.
• Reumatologist.
• Sleep physician.
• Sleep appliance.
• Psychiatrist.
• Chronic pain clinic.
• Movement disorder clinic, UofU, for orofacial Dyskinesia, mandibular ataxia.

Notes: For the typical TMD patient, they are referred to 1 or 2 other clinicians. None of the above drugs used are prescribed long-term. I write less than 6 narcotic analgesic scripts per year—typically hydrocodone, apap. Surgery is recommended to less that 4% of our patients. P.T. is recommended to 70%.

**Patient Management**

Stress to the patient that the treatment recommendations you give them are the minimum necessary to insure treatment goals are met. Also emphasize that the recommendations are not a “menu of choices” they can pick and choose from. If patients are not committed to following through with all your recommendations, they should be told they might be wasting their time and money. Also tell them that if they only want to go to a physical therapist who is on their insurance that the treatment will probably not be successful.

Too often, it is the patient who has not followed the instructions and recommendations of myself, and the other clinicians they are referred to, who returns and complains that
they are not getting better. To these patients, I say something like “The good news is there are answers for your problems. The bad news is there are not easy answers.” Review with them again the things they will have to follow through on to get the results they are seeking. Remind them that it often takes 4-6 months to achieve optimum results.

Patients are seen every 2-3 weeks. Review their chief complaints each time, review how they are following through on all recommended treatment, re-examine them, insure they are making progress in range of motion, resolution of joint inflammation and muscle tenderness, and re-balance their splint if necessary. Make other treatment recommendations, as needed. Consult with the other clinicians they have been referred to, to coordinate care and get feedback from them regarding patient compliance.

In the end, it is the patient who has to be a primary member of the team. I tell patients we can only help them if they are fully dedicated to doing everything necessary to resolve their symptoms. If the patients are not committed to helping themselves, no treatment efforts on our part will be successful. Besides the treatment you render, you are there to educate them, coach them, encourage them, reassure them, and coordinate their care.

The goal is to give them a long-term solution, so they are not experiencing symptom recurrences on a regular basis. For most TMD patients, the trigger for symptom exacerbations is stress. Tell them this up front, so it does not sound like an excuse when they come back later wondering why they have symptoms again. Try to give them tools and resources so they can manage exacerbations on their own. Following this approach will greatly reduce the need for frequent recalls or re-treatment.

This is a better approach than just trying a splint first, and if that does not help, to then recommend something else. The patient perceives this approach as the doctor just playing a guessing game.

**In summary**

It takes more than a piece of plastic to effectively manage a TMD patient. However, by tailoring the treatment to the individual patient’s needs, treatment time and expense is greatly reduced, and they can avoid expensive restorative work or ortho in the vast majority of cases.
How should we view the importance of occlusion today?
Let me say first that I continue to have the greatest respect for the occlusion. However, way too much dentistry is being performed on TMD patients (ortho and restorative) in the name of occlusion—in my opinion.

Very few of us have a perfect bite. Most of us live with some degree of instability in our occlusion without awareness and without symptoms. For me, the key is to get the patient to stop clenching and grinding. I hammer patients on the fact that the only time their teeth should touch is when they swallow. Immediately after a swallow their jaw should relax, and their teeth go slightly apart. If they can do this, they can tolerate a less-than-ideal occlusion, especially if they are wearing a night-appliance. It is the patient who has the “orthopedic instability” of a malocclusion, coupled with parafunction, that becomes symptomatic.

I am also concerned that occlusion is being ignored by too many dentists today. I am seeing a huge increase in thermoplastic devices being made with a suck-down technique. They are being called orthodontic retainers, orthodontic appliances, splints or bleach trays. A thermoplastic suck-down device is just another bad bite. Because they have a uniform thickness, most patients only occlude on the molars of these devices (when the molars are 1 mm apart, the anteriors are 3 mm apart). This can intrude the molars, resulting in the molars being out of occlusion when the device is removed. There is no way the principles of occlusion can be maintained with these devices.

In addition, I continue to be concerned that most dentists seat their fixed prosthodontics out of occlusion. I typically see patients when this has been done to them once too often, and they “loose” their bite. The last dentist to do this is the one who gets blamed, but it was probably the patient’s 4th or 5th crown to be seated in hypo-occlusion. Patients say “My bite was fine until I got this crown,” when the truth is they were an accident waiting to happen because of their previous dentistry. Also be cautious about equilibrating teeth that were not part of the crown-seating appointment. Patients get upset if the dentist has to grind on other teeth because the new restorations were too low.

The key things I look for in the occlusion is bilateral simultaneous posterior contact; vector forces down the long axis of the tooth (no lateral vector forces); anterior guidance; and touching the anterior teeth less than the posterior teeth. Look for evidence of occlusal trauma, including fremitus, mobility, and hypersensitivity. Look for the signs of clenching, including scalloped tongue, deep overbite, lingual tori, and abfractions. Do not ask patients if they clench or grind. They have no clue—or if they think they do not clench or grind they are wrong. The parafunction of clenching and grinding is a subconscious habit.
What is the accepted ideal condylar position today?
The gnathologists voted for RUM (rear-most, upper-most, mid-most). The lite gnathologists voted for superior, but this was pre-Farrar. The enlightened view today is that there is a physiologic zone in which the condyle can comfortably function. This may be an over-retruded position, as long as the patient is not experiencing capsulitis. Both the kinesiologists and those using electrodiagnostic devices usually end up with the condyle 2-3mm anterior to the seated condylar position. This means they will be recommending phase II dentistry on their patients. However, as I pointed out, this is NOT a stable position long-term, and often results in a dual bite after ortho or restorative.

How many patients need condylar repositioning and/or bite opening?
Very Few!! Look, repositioning a condyle is a big deal. You are committing a patient to thousands of dollars in dentistry they may not otherwise need. In most cases, condylar repositioning is an irreversible procedure, which obligates the patient to thousands of dollars of dentistry after their jaw is “fixed.” Too often, they are not informed about this contingency at the start of jaw treatment. I get more and more calls from dentists saying something like “I have this patient who seems to have joint capsulitis. Should I build a pull-forward appliance to reduce the joint inflammation?” Condylar repositioning happens in a variety of ways. These include altering the position consciously by evaluating tomographic or CT x-rays, or unconsciously, by relying on devices or techniques such as neuromuscular dentistry or kinesiology to reposition the mandible.

It is generally OK to use a pull-forward appliance for a few weeks to treat a TMJ problem, but no longer. However, there are easier and more direct ways to reduce joint capsulitis, including ultrasound, iontophoresis, stopping the cause (clenching and grinding), topical transdermal creams, laser, etc.

As for bite opening, I only recommend it in severely worn dentitions, in which the only way to restore the anteriors is to open the bite. All of the hype generated about “proper vertical for optimum muscle function and comfort” is the propaganda of neuromuscular dentistry. The big lie works if it is repeated loudly enough and long enough, again and again. It sells a lot of electronic boxes to a lot of dentists who want to do a lot of dentistry. Once they have invested thousands of dollars in these devices, they will find the patient to fit their pet diagnosis.

How many of your patients need phase II dentistry?
See above section for the answer to this question. Short answer: less than 10%.
What is the best type of splint?
It depends on the diagnosis. First of all, all splints should fit passively and be stable without rocking, and without eliciting lateral vector forces on the teeth (otherwise, you have an orthodontic appliance, not a splint). A suck-down appliance is not a splint—it is another bad bite. Soft splints have been shown by EMG sleep studies to actually induce greater muscle activity than baseline. Any splint should incorporate the principles of occlusion: stable posterior contact, anterior guidance, no posterior tooth contact in eccentric movements (immediate posterior disclusion). These principles apply regardless of the type of splint it is. Maxillary splints are easier to adjust, cause less tooth movement, and are generally the only type that can be a deprogrammer. I don’t worry about appearance or altered speech with an upper splint, because I do not have the patient wear them more than 2-3 hours during the day, in 15 min intervals (if they can’t control daytime clenching). I use deprogrammers in clenchers IF they have a deep overbite (more than 50%). Deprogrammers (in which they only occlude on the lower centrals) are much more effective in reducing elevator muscle activity. I then convert the same appliance to a stabilization splint within a few weeks.

How long should patients wear splints?
The only time I have a patient wear a splint full-time is after TMJ surgery or arthrocentesis (joint lavage) for 2 to 6 weeks. I will occasionally make two splints for a patient (one upper, one lower), if they are experiencing daytime locking. There are significant risks in asking a patient to wear a splint full-time. There is a much greater chance the patient will have altered muscle length, permanent changes in muscle engrams, or a psychological dependence on the splint. All of this makes it much harder to wean the patient off the splint. The fact that they do worse when they stop full-time splint wear is not evidence that they need this vertical dimension of occlusion to be comfortable. Full-time wearing of a splint dramatically increases the likelihood that the splint will move the teeth, including intrusion, super-eruption, or lateral movement. I am OK with patients wearing splints indefinitely, as long as it is during sleeping hours only, and as long as it stays in adjustment.

I agree with Gordon Christensen when he says 1/3 of all patients should wear a splint during sleeping hours. Splints are not just for TMJ patients. Patients sometimes get upset when I point out that they have worn through the enamel on many of their teeth. They ask me “Why didn’t my dentist tell me about this?”
What is the take-home message?
There are several.

Message 1:
If you have an interest in treating these patients, spend the time and money to build a sound foundation using the resources listed above (Remember what Yoda said: “A weekend course does not a sound foundation make.”).

• Attend the annual conference of the TMD organizations (web sites of the organizations are listed above). See which one you feel most comfortable with, in terms of the philosophy and treatment approaches being advocated.
• Use the information contained in this paper to assist you in recognizing the hidden agendas and marketing hype of those with something to sell.
• Learn to read between the lines of the research literature that has been published in this field.
• Be the best student you know how to be.

Learning is not attained by chance. It must be sought for with ardor and attended to with diligence.

--Abigail Adams

Message 2:
The old saying is still true: “Patients don’t care how much you know until they know how much you care.” Treating TMD patients is fundamentally different than treating routine dental patients. Too many TMD patients suffer in silence because they don’t want to be a burden to their family, and they don’t want to complain. They will tell you, without realizing it, what the diagnosis is and how to treat them; but only after they are assured that you will take the time to really listen with empathy and understanding, and without preconceived ideas of how you can make them accept one of the treatments you perform. Sometimes the greatest gift you can give them is simply acknowledging the pain and suffering they have been enduring, because they have learned that no one else understands.

Message 3:
Treating TMD patients is highly rewarding. However, if you treat them in the manner I have recommended above you will not get rich. The reward is in knowing that you provided a service that no one else could, because you are a doctor of the masticatory system. It is also rewarding because you recommended the treatment that is best for the patient, not that which is best for your production goals. Sometimes the best treatment for the patient is not to treat them at all, but rather to refer them to someone in a different discipline, who can treat the source of their jaw pain rather than the site of their jaw pain.

Message 4:
Much of the confusion surrounding the TMD field is self-inflicted. As a profession, we have made it confusing because we have failed to reach a consensus on how to
diagnose and treat these problems. This paper is an attempt to enumerate some of the reasons for this lack of consensus.

Thirty-five years ago, when I was immersing myself in this field, I assumed that in twenty years hence we, as a profession, would have worked out our differences, to the great benefit of our patients. Sadly, I have to report that we not only have not resolved our differences, we now disagree in much more sophisticated ways. This helps insure that our patients are not insured for the treatment they require. It also insures that it is the patient making the differential diagnosis, based on whom they choose to go to for help.

Hopefully, the reader of this paper will be much better equipped to see the "lay of the land" in the TMD field, and be able to make more informed choices as they seek to increase their understanding of this condition. You should also be in a better position to counsel your patients about reasonable courses of action.
What Are Good Books, Courses, or DVD Series to Consider?

Books:

Management of Temporomandibular Disorders and Occlusion, Jeff Okeson, 6th Ed, Mosby, 2008

The TMJ Healing Plan: 10 Steps to Relieving Headaches, Neck Pain, and Jaw Disorders, Cynthia Peterson, P.T., HunterHouse pub, 2010

Bell’s Orofacial Pain: The Clinical Management of Orofacial Pain, Edited by Jeff Okeson, 6th Ed, Quintessence Pub, 2005


DVD’s:
Jeff Okeson’s 30 DVD series on TMD, from diagnosis through treatment. $1,700 for full set, or DVD’s can be purchased individually. Very well done, and affords the clinician the opportunity to learn at his/her own pace and review as desired. A great foundation. www.jeffokeson.com

Courses, Training Programs, Study Clubs:
Until recently, I recommended Henry Grimillion’s mini-residency at the University of Florida. However, he is now the dean of LSU dental school.

Closest to Utah is the Arizona Craniomandibular Group, organized by Rich Cohen. Contact his secretary, Ivy @ 602-992-6727 x317. He invites excellent speakers to come in several times each year. They are in Phoenix.
*Misc Resources:


**Patient CD**: *Freedom From TMJ*, by Denise Lynch. Other CD’s are available from this same person, on stress, headaches, insomnia, back pain. 801-232-5193 or 801-347-3595

**The Belief Window**

These concepts originated in the out-of-print book, *Gaining Control*, by Robert Bennett. It was popularized in a lecture series and video tape with the same title, by Hyrum Smith. A man named Kurt Hanks claims to be the originator of these concepts.

Key Concepts of the Belief Window:

Hanging out in front of every person is a large window through which he or she sees the world. It is invisible to all but the trained eye. And written on each window (by its owner) are a series of explanations, guides or principles, which direct the owner’s behavior.

- A proclamation of belief does not show the governing principles that dominate a person’s life; their actions do.
- Beliefs can become principles, which direct our thoughts and our behavior.
- “My way is the right way and I see things absolutely correctly.”
- A belief window limits what we see or don’t see, and therefore what we do or don’t do.
- Our individual needs provide the power, and the principles written on our window direct that power.
- We are constantly scanning our environment through the window for ways to satisfy our needs.
- The things written on the glass include our prejudices.
- We cannot behave inconsistently with our belief window; it controls our decisions.
- We consider what is written on our glass to be absolutely true, with no possible alternative.
Appendix 1

The Equivocal Results and Misleading Conclusions in Current Research addressing TMD / Orofacial Pain.

James L. Guinn, D.M.D.
March 3, 2009

In the forward to the new text “Orofacial Pain & Headache” edited by Sharav and Benoliel, Dr. Barry Sessle states: “A patient with orofacial pain can represent a significant challenge to the clinician, leading to repeated and usually unsuccessful interventions.” He goes on: “To further complicate matters, pain is a multidimensional experience involving physical, cognitive and emotional aspects and chronic pain in particular recruits active involvement of these dimensions…The trigeminal nerve innervates anatomically related but functionally diverse organs such as the meninges, the craniofacial vasculature, the eyes, the ears, the teeth, oral soft tissues, muscles and the temporomandibular joint. In the brainstem, the trigeminal sensory nucleus overlaps with upper cervical dermatomes. Taken together, these features account for the complex and extensive pain referral patterns that often make clinical diagnosis so difficult.”

What is the reason for the “repeated and usually unsuccessful interventions” in this field?
Sessle’s observation that TMD/OFP patient treatment is characterized by “repeated and usually unsuccessful interventions,” goes hand in hand with the results of most clinical trials. Specifically, there has so far been no robust treatment intervention demonstrated in RCT’s or their associated systematic reviews. Given the equivocal results from research on potential treatment interventions in TMD/OFP, one has to ask the question: “Are the intervention results equivocal because the studied treatment lacks efficacy, or because of failure(s) in differential diagnostic methods and the resulting inappropriate inclusion/exclusion criteria employed in the trial?” In other words, are the results of clinical trials on various treatment modalities an indictment against the treatment, or an indication of weak trial design and methodologies?

The Handicap of a Syndrome
A syndrome refers to the apparent association of several clinically recognized features (signs), symptoms, or characteristics that often occur together, so that the presence of one feature alerts the clinician to the presence of the others. These signs or symptoms collectively indicate or characterize a disease or abnormal condition. The term syndrome derives from the Greek, and means literally “runs together.”

The corollary to the term syndrome is the implication that a standard treatment regimen or protocol exists which will resolve the condition(s).
The problem with labeling a collection of signs and symptoms a syndrome is that it can potentially impede sound scientific investigation, as well as mislead and frustrate clinicians and patients alike.

It is generally recognized that the term “TMJ Syndrome” is no longer appropriate. However, the functional working hypothesis of most randomized controlled trials and systematic reviews in this field are, in fact, based on this naive premise. Standard phrases utilized in a description of the “problem” to be studied include the following: “In patients with temporomandibular disorder…”; “In patients with myogenous orofacial pain…”; “In patients with myofascial pain dysfunction syndrome…”. This leads to inclusion criteria such as the following: “80 consecutive patients seen in a university TMD clinic,” “mandibular dysfunction”, “TMJD”, “facial pain”, and “CMD”.

This “misdirection” in clinical trials is summarized in a systematic review authored by Forssell, et al.²: “The actual definitions of the patient samples varied. The study population was described to consist of TMD (or alike) patients, and patients with muscle pain and different types of joint problems were placed into a single group. However, the distinct clinical entities that constitute TMD are likely to exhibit differences in treatment responses. Trials using more detailed case definitions would probably be more sensitive and give more clinically useful information.”

This problem is compounded by some researchers who appear to lack a fundamental understanding of the subject they are studying. One systematic review recently published on myofascial pain³ states: “A diagnosis of myofascial pain can be made if the patient exhibits more than one of the following signs and/or symptoms in any combination: Pain on palpation of the temporomandibular joint; Pain on palpation of associated mandibular muscles; Limitation and/or deviation of mandibular movement; Joint sounds and headache.” Even the reference to mandibular muscles may not apply in this case, because in myofascial pain the site of the pain is not the source of the pain.

Headache is a common co-morbidity in the field of TMD/OFP. It shares many of the same contributing factors and pathophysiology. Like TMD/OFP, headache is a multifactorial condition. Yet headache, in all its forms, has been systematically studied with great success, based on an internationally accepted classification system. This system is published and continually updated by the International Headache Society (IHS), chaired by Dr. Jess Olesen. In this classification system, each component of headache is described and defined with great specificity, using unequivocal terms⁴. Unfortunately, no such system exists for TMD/OFP.

The Answer
The answer to equivocal TMD/OFP interventions for both clinicians and researchers is to abandon the mindset of a syndrome. In the field of TMD/OFP, there is no substitute for making a thorough differential diagnosis, based on the following.
History
A detailed history from the patient, including:
- Family history
- Trauma history (including a history of hyperemesis and childhood injuries), Surgery history (including the total number of intubations)
- Physical/sexual abuse
- The chronicity of the symptoms, including the sequence in which they appeared
- The quality of the pain
- Exacerbating and attenuating features
- Whether use of the jaw exacerbates the symptoms
- Screening instruments to assess psychological factors
- Previous treatment
- Medication history, evidence of medication overuse and dependence
- Sleep quality and quantity, as well as sleep posture
- Diet and exercise history
- Work/home environment

Clinical Exam
Pain on palpation throughout the head, neck, and jaw
- Range of motion measurements, with deviation & deflection noted
- Jaw provocation tests
- Evaluation of potential trigger points in the head, neck, and jaw, with their pain referral patterns
- Objective evidence of:
  - Crepitation
  - Subluxation
  - Capsulitis or joint effusion
  - Parafunction
  - Severe malocclusion (orthopedic instability)
  - Odontogenic etiology for the pain
  - Autonomic features
  - Coronoid tendonitis
  - Cervical myofascial referral to the jaw
  - Carotidynia or temporal arthritis
  - Facial migraine
  - Bulimia or GERD

Radiographic Examination
- Condylar degeneration, resorption, or other morphologic changes
- Developmental deformities
- Previous fracture or orthognathic surgery
- Sinus mucosal inflammation or sinusitis (for CT)
- Coronoid hypertrophy or impingement

Structural contributing factors
- Hypermobility syndrome or damaged joint ligaments
Marfans or Ehlers-Danlos syndrome
Evidence or history of collagen-vascular diseases
Disc displacement with or without locking
Developmental deformities
The use of certain CPAP Masks
Stylo-hyoid calcification
Coronoid adhesions

**Neuromuscular Contributing Factors**
Parafunction (clenching, bruxism, muscle bracing)
   - Adverse events from medications (SSRI’s, SNRI’s, amphetamines)
Obstructive sleep apnea
Tongue thrust

**Neuropathic Contributing Factors**
Static or dynamic allodynia, hyperalgesia
Quality of pain consistent with neuropathy
History of onset with failed dental treatment or nerve damage
Central sensitization or up-regulation
Complex regional pain syndrome

**Psychological Contributing Factors**
Anxiety
Depression
Somatization
Insomnia
OCD
Borderline personality disorder
Poor “coping” mechanisms
Demanding lifestyle (work, school, family)
Malingering
Secondary Gain
PTSD

**Associated Co-Morbidities**
Migraine
TT Headache
Cervicogenic Headache
Fibromyalgia
Cervicalgia
Osteochondritis Dessicans
Orofacial Dyskinesia
Chiari Malformation
Unresolved sinus disease
Ankylosing spondylitis
Systemic Arthritis
Because every patient will present with a different combination of history, clinical findings, contributing factors, and co-morbidities, trying to test the efficacy of any one treatment modality on this entire population is foreordained to equivocal results, whether it is employed in a clinical trial or by a treating clinician. Failure to recognize all of these factors can have unintended consequences for research and for patients undergoing treatment. Furthermore, even if the diverse combinations of contributing factors and co-morbidities are recognized by researchers, attempts to control for all these contributing factors have proven to be very challenging.

It is a disservice to patients and to scientific inquiry to continue to publish equivocal results and to draw conclusions from these results, based on the methods currently employed in trials and systematic reviews addressing TMD/OFP. While such trials may appear to be “evidence-based”, a closer inspection of the subject being investigated, the inclusion and exclusion criteria, the lack of adequate controls, and the overall quality of the trial leads one to the conclusion that the results could have been predicted.

For too many years, clinicians have tried to make their patients fit the limited treatment modalities they are familiar with, often with little thought for the etiology and contributing factors for any particular patient. Current research only perpetuates this application of a particular treatment to broad section of the general population labeled as having “TMJ.” It is inevitable that the result will be the state of futility described so well by Dr. Sessle above.

In his book *How Doctors Think*[^5], Dr. Jerome Groopman states “Misdiagnosis is a window into the medical mind. It reveals why doctors fail to question their assumptions, why their thinking is sometimes closed or skewed, why they overlook gaps in their knowledge. Experts studying misguided care have recently concluded that the majority of errors are due to flaws in physician thinking, not technical mistakes. In one study of misdiagnoses that caused serious harm to patients, some 80 percent could be accounted for by a cascade of cognitive errors, often putting the patient into a narrow frame and ignoring information that contradicted a fixed notion.”

In order to achieve predictable results with any TMD/OFP intervention, it is imperative to identify the key diagnoses, contributing factors, and co-morbidities. Only then can a meaningful intervention be tested on a subset of patients with highly correlated, well-defined features in a clinical trial.

For treatment of individual patients, a multidisciplinary approach is often necessary in order to effectively address that patient’s principle precipitating and perpetuating factors. It should therefore not be surprising that a clinical trial, which lacks such an approach, will produce equivocal results.


References

1. Yair S., Rafael B., eds, Orofacial Pain & Headache, Mosby, 2008


5. Groopman, J., MD, How Doctors Think, Houghton Mifflin, pg 24, 2007