

Temporomandibular Dysfunction: Stress or Structural?



by Dr. Brock Rondeau

For many years, medical and dental clinicians have been debating the causes and treatment for TM (temporomandibular) dysfunction. Dr. Hans Selye, MD, of the International Institute of Stress, University of Montreal, Canada, wrote numerous articles and textbooks starting in 1936 about the negative effects of stress on patients' health. This had a profound effect on the medical profession's view of this disorder and many patients have told me that their family doctors told them their headaches and other symptoms were mainly psychological in origin. One of the other reasons attributing to that conclusion is the fact that many of these chronic pain patients suffer from depression. The medical profession responds with prescribing anti depressants, pain medication, muscle relaxants and anti-inflammatory drugs for their patients. They are treating the symptoms but not the cause of the problem.

The dental profession holds the key and indeed the responsibility to treat these patients. TM dysfunction is not caused by stress: it is a structural problem. The mandible is not in the correct relationship to the maxilla: transversely, antero-posteriorly or vertically. The condyle is not in the correct position in the glenoid fossa. The disc is not related properly to the head of the condyle. This is a structural problem.

Unless this problem is rectified, patients will continue to have chronic pain and suffer needlessly. Once the structural problem has been rectified, the chronic pain, headaches and other symptoms, including depression, disappear and the patient no longer requires medication.

Dr. A. C. Fonder, a dentist who wrote two excellent books, *The Dental Physician* and *The Dental Distress Syndrome*, convinced Dr. Selye later on in his career, that TM dysfunction was not caused by stress, but rather by an incorrect condyle-disc-fossa relationship, many times as a result of a malocclusion. Dr. Fonder stressed the importance of proper vertical dimension and showed numerous cases where he changed head postures, reduced scoliosis and eliminated symptoms of TM dysfunction by establishing the correct vertical dimension for his patients.

Clinicians who treat TM dysfunction know that a patient who is overclosed vertically (short lower face height) routinely has the condyles posteriorly displaced and the discs anteriorly displaced (internal derangement). This results in compression of the nerves and blood vessels in the bilaminar zone distal to the condyle with resultant headaches and ear symptoms such as stuffiness, itchiness or ringing in the ears (tinnitus). Clinically, the patient will click upon opening and closing in centric occlusion. These vibrations can be picked up and analyzed by a device called the Joint Vibration Analysis (JVA). There are basically five stages of internal derangement (disc displacement) and the JVA can identify for the clinician whether each TM joint is normal or what stage of pathology exists in each joint prior to treatment.

In my opinion, the standard of care for the dental profession will be to not only diagnose caries and periodontal disease prior to treatment, but also to examine and assess the health of the TM joints. The dental profession must subscribe to the principle that clinicians need to establish a healthy TMJ (temporomandibular joint) prior to any restorative, prosthetic or orthodontic treatment.

The orthodontic profession seems divided on the subject of the relationship between orthodontics and TMJ. Many orthodontic practitioners take the position that there is no relationship between orthodontics and TMJ. This statement cannot be correct. When orthodontic clinicians change the position of the mandible by advancing the

Second opinions are common in health care; whether a doctor is sorting out a difficult case or a patient is not sure what to do next. In the context of our magazine, the first opinion will always belong to the reader. This feature will allow fellow dentists to share their opinions on various topics, providing you with a "Second Opinion." Perhaps some of these dentists' observations will change your mind; while others will solidify your position. In the end, our goal is to create discussion and debate to enrich our profession.

— Thomas Giacobbi, DDS, FAGD
Dentaltown Editorial Director

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MARA Appliance
Arm in front of elbow



MARA Appliance
Advance mandible 5 mm



Class II Skeletal
Retrognathic profile



MARA Appliance 7 months
Class I skeletal
Straight profile

mandible with functional appliances such as the Twin Block, MARA or Herbst Appliances, the position of the condyle in the fossa certainly changes.

There is also an ongoing debate in the orthodontic profession regarding extraction vs. non-extraction. I want to state at the outset that I agree with extraction of the bicuspid in certain cases of severe crowding and bimaxillary protrusion cases if the patient does not present with TM dysfunction. The situation that must be addressed is the treatment of Class II skeletal malocclusions where the maxilla is properly positioned and the mandible is retrognathic with minimal crowding of the dentition. The patient presents with a moderate to large overjet and almost routinely with TM dysfunction. The JVA reveals an internal derangement which proves that the condyle is posteriorly displaced and the disc anteriorly displaced. The patient's profile shows a deficient lower jaw. The tomogram X-rays reveal that the condyle is posteriorly displaced. The TMJ Health Questionnaire reveals the patient has several signs or symptoms of TM dysfunction. Most orthodontic practitioners agree that there are three options for treatment:

1. Reposition the mandible forward with a functional appliance such as a Twin Block, MARA or Herbst Appliance to eliminate the overjet. Erupt the lower posterior teeth to correct the overbite by increasing the posterior vertical dimension.
2. Extract the upper first bicuspid and retract the six anterior teeth to correct the overjet.
3. Surgically advance the mandible at age 17, after growth has been completed to solve the overjet problem.

Thirty years ago, when I started my orthodontic career, I was encouraged by an orthodontist, Dr. Jack Donovan, to extract bicuspid and use cervical facebow headgear to correct Class II skeletal malocclusions. After four years, I abandoned this technique for the following reasons:

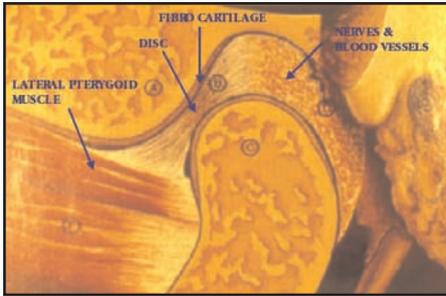
- The patient's profile did not improve. The mandible was still retrognathic at the end of treatment.
- The patient's upper lip flattened since the maxillary incisors were retracted.
- This retractive technique did not eliminate the signs and symptoms of TM dysfunction and, as I learned later on, often increased as the patient grew older (particularly the female patient).
- Patients had a narrow smile due to the constriction of the upper arch following the extractions.

Fifteen years ago, when I purchased a transcranial X-ray machine to take X-rays of the TMJ, as well as a JVA device, I also realized that:

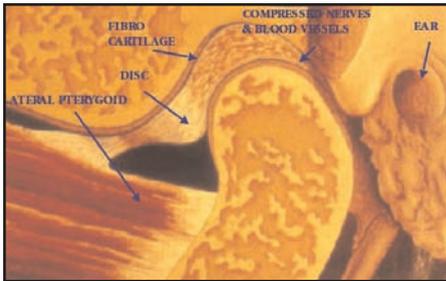
- The position of the condyle does not change in the fossa with the retractive-extraction technique. This posteriorly displaced condyle remained posteriorly displaced.
- The JVA diagnostic device revealed, when I examined some of my patients, that an internal derangement existed after the treatment. I believe that it is the clinician's responsibility to diagnose the presence of an internal derangement prior to treatment and then to correct the problem during treatment.

When I applied the same standards to my Class II skeletal patients treated with functional appliances to advance the mandible, I observed the following:

- The patient's profile improved significantly when the lower jaw was brought forward.
- The patient had a full upper lip.
- This technique routinely eliminated the signs and symptoms of TM dysfunction.
- The condyles routinely ended up in an ideal position, downward and forward.
- In the majority of cases, it was not necessary to extract any teeth to correct the overjet.
- The JVA confirmed that this technique routinely resulted in a recapturing of the anteriorly displaced disc and corrected the internal derangement and reduced the vibrations in the TM joints.
- The patients ended up with a much broader smile compared to those who had their upper bicuspid extracted. The reason is that most Class II skeletal patients require expansion of the upper arch prior to the advancement of the mandible with the functional appliances.



Normal TMJ



Posteriorly displaced condyle;
Anteriorly displaced disc
Internal derangement

Regarding the surgical approach, I was alarmed to read the article by Dr. Sabine Ruf and Dr. Hans Pancherz, two world renowned orthodontists, titled, "Orthognathic Surgery and Dentofacial Orthopedics in Adult Class II Div 1 Treatment – Mandibular Sagittal Splint Osteotomy vs. Herbst Appliances." They treated 69 patients, some with orthognathic surgery and some with the functional jaw repositioning Herbst Appliance. Their conclusion was that in patients with pre-existing TM dysfunction (internal derangement) the Herbst Appliance not only corrected the Class II malocclusion but also eliminated most of the TMD symptoms. Conversely, they reported that while the surgical approach corrected the Class II malocclusion, the TMD symptoms worsened. The authors reported that 50 percent of patients treated with orthognathic surgery to advance the mandible suffered neurosensory disturbances of the lower lip (numb lower lip). Other complications included non union or mal union of the bony fragments and condylar resorption. Based on this study and also listening to patients who have had orthognathic surgery to advance their mandibles, it would seem that the use of functional appliances to advance the mandible non surgically would be the preferred technique.

If a patient presents with TM dysfunction, I believe the standard of care should be to first diagnose the problem and then ensure that the patient receives treatment to stabilize the TMJ prior to any dental procedure.

TM dysfunction is a serious problem in our society that, for the most part, has been neglected by the medical and dental schools. The American Dental Association (ADA) estimates that 34 percent of the population has some signs and symptoms of TM dysfunction. The ADA also stated that dentists have the prime responsibility in the diagnosis and treatment of TM dysfunction to the limit of their ability. The problem is that most North American dental schools do not offer courses to dental students that would give them enough information to either diagnose or treat patients with TM dysfunction.

There are several ways to diagnose TM dysfunction:

1. TMJ Health Questionnaire

Patients should be given a TMJ Health Questionnaire prior to any dental procedure to determine whether the TMJ is normal or if an internal derangement exists (pathological condition). Patients should be asked if they have any of the more familiar signs and symptoms which include headaches, neck pain or stiffness, earaches, congestion or ringing in the ears, clicking, popping or grating noises when opening or closing the mouth, dizziness or fainting, difficulty in swallowing, pain behind the eyes, limited mouth opening, discomfort on opening, numbness in the hands, and shoulder or back pain.

2. Range of Motion

Patients could have intracapsular problems (anteriorly displaced discs) or extra capsular problems (outside the TM joints) due to parafunctional habits such as clenching and bruxing. Patients with healthy jaw joints should be able to open to 50mm, lateral movement 10-12mm, protrusive 8mm, and there should be no deviation or deflection of the mandible upon opening. All patients should be evaluated regarding range of motion prior to the initiation of any dental procedure.

3. Joint Vibration Analysis (JVA)

This is a diagnostic device, which has been available for the past 22 years and is rapidly becoming an important tool to help diagnose TM dysfunction. The JVA measures vibrations. A normal joint is noiseless and painless. A pathological joint has different patterns of vibrations. When the disc is anteriorly displaced, vibrations are created when the patient opens and closes (photo at left).

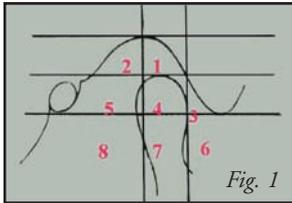
The JVA allows the clinician to not only diagnose what stage of internal derangement exists in each joint, but also allows the clinician to determine if his treatment has been successful in eliminating the vibrations within the TM joints.

4. Tomogram X-rays

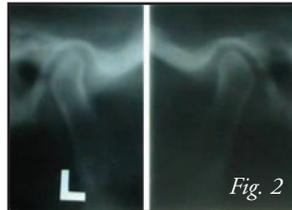
It is extremely beneficial to have tomogram X-rays taken prior to treatment to determine the position of the condyle in the fossa. This helps to determine if there is indeed



Staff taking JVA



Dr. Gelb's 4/7 position



Original tomograms
(condyles posteriorly displaced)



Tomograms with splint
(condyles centered in fossa)

a structural problem within the TM joint. Once the new position has been obtained either using a functional appliance or a repositioning splint, then another tomogram X-ray should be taken to confirm the position of the condyle in the fossa. It has been my clinical experience that patients whose condyles are posteriorly displaced have several signs and symptoms of TM dysfunction (structural problems). The good news is that the dental profession can help these patients by repositioning the condyle downward and forward as discussed above. Most clinicians who treat TM dysfunction agree that the ideal position of the condyle in the fossa is Dr. Harold Gelb's 4/7 position (Figure 1).

I think that it is important for all orthodontic clinicians, including general dentists and orthodontists, to consider this information carefully before deciding what treatment plan is best for the patient. The important fact is where the condyle is located in the fossa prior to treatment and where the condyle is located at the end of treatment. If extraction or surgery is performed and the condyle-disc-fossa relationship is normal at the end of treatment, then I see no problem (Figures 2 & 3).

If we do not address the health of the TM joints, our patients will suffer from headaches, neck pain or stiffness, earaches, congestion or ringing in the ears, limited mouth opening or jaw locking, dizziness, fainting, difficulty in swallowing, pain behind the eyes, numbness in the hands, and shoulder and back pain. This is indeed a sad commentary on the dental profession when practitioners are more concerned with giving the patient straight teeth rather than showing concern about the patient's overall health.

Class II skeletal patients with normally positioned maxillas and deficient mandibles are particularly susceptible to snoring and obstructive sleep apnea. Their mandibles are too far back and their tongues are often distally positioned and consequently block the airway. If the tongue partially blocks the airway, the patient snores. If it completely blocks the airway for 10 seconds or more, seven times per hour, this causes sleep apnea. Snoring itself is not dangerous to your health but detrimental to your relationship with your spouse. However, obstructive sleep apnea (OSA) is extremely dangerous for your health. There is a direct relationship between OSA and cardiovascular disease including high blood pressure, heart attacks, strokes, hypercapnia (increase in carbon dioxide), cardiac arrhythmias, etc. OSA has also been linked to type 2 diabetes and gastroesophageal reflux.

It is estimated that 90 million people in North America experience insomnia, snoring or sleep apnea. I believe that OSA is one of the most undiagnosed serious conditions in our society.

When bicuspids are extracted in Class II skeletal patients and the maxillary teeth are subsequently retracted, this can have a negative effect on the health of the patient in that it may predispose that patient to snoring and sleep apnea later on in life. Prior to treatment, the mandible was in a retruded position. It is my opinion that if the lower jaw was brought forward with a functional jaw repositioning appliance, as discussed previously, obstructive sleep apnea may be prevented or at least reduced.

I think general dentists and orthodontists have a tremendous opportunity and responsibility to not only make patients look better through orthodontics and cosmetic dentistry, but also to help improve the health of our patients. We in the dental profession have oral appliances, fixed and removable, to help these patients. I think it is time to incorporate these principles so we can improve the lives of many of our patients. Patients do not want to take medications for the rest of their lives for their TM dysfunction. Patients do not want to wear the continuous positive airway pressure (CPAP) devices over their noses all night when they sleep. Patients prefer to wear intra oral appliances which move the lower jaw forward, increase posterior vertical dimension effectively eliminating the signs and symptoms of TM dysfunction, and open up the airway, which significantly impacts patients' lives in a positive manner. ■

Author's Bio

Brock Rondeau, DDS, IBO, DABCP
Dr. Rondeau is one of North America's most sought after clinicians who lectures more than 140 days per year. He is the past president and senior certified instructor for the International Association for Orthodontics. More than 18,000 dentists have attended his courses and study clubs in the United States, Canada, China, Australia, England and Poland. He has an extremely busy practice, which is limited to the treatment of patients with orthodontic, orthopedic, TMD, and craniofacial pain problems. Dr. Rondeau is a Diplomate of the International Board of Orthodontics and has his Fellowship and Diplomate in the American Academy of Craniofacial Pain. He has published more than 28 articles in orthodontic and dental journals and has produced a series of DVDs on all phases of orthodontics.