Temporomandibular Joint Dysfunction: Overview, assessment and treatment

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Introduction

For the purposes of this paper the phrase "Temporomandibular Pain Disorder Syndrome" (TMPDS) replaces the more commonly used term "Temporomandibular Joint (TMJ) Syndrome." TMPDS is defined by a triad of primary symptoms:

1. *Pain and tenderness of the muscles of mastication.*
2. *Joint sounds with jaw opening.*
3. *Limited mandibular movement.*

Secondary characteristics include referred pain to other areas of the head causing headaches, and retro-orbital, bitemporal, and occipital pain.

This paper is will present an overview of TMPDS, offer instruction on how to identify it in your clients, and offer several treatment approaches and techniques that effectively reduce clients' complaints. The case will also be presented for taking a detailed case history and performing an adequate physical examination.

There are a number of considerations that must be addressed before attempting to render aid to a suffering pain client of any type. Is the work that you are considering doing going to be done within the context of a traditional Structural Integration series or will it be stand alone work? Will you be working with this client as a solo practitioner or as part of a treatment team? Is the client's complaint based on trauma or is it cryptogenic? Another serious consideration is whether this person is a pre- or a post-surgical case. I will address these issues briefly in this paper, but I believe that each case will present other aspects of the individual that must be closely examined.

The language I use is from the allopathic perspective Most of the TMPDS clients we see are referrals from allopaths or have extensive history in the allopathic system. The allopathic language format is the one the client is most familiar with. With improved communication comes efficacy in treatment, and a common language is the first step towards better communication.

The TMJ Client

We have all seen them in our office. Four out of five of these clients are women. They are usually young: 15-45 years of age[1]. Their complaints are common; they have pain in the TMJ region that is exacerbated by movement of most any type, from talking to eating. Headaches are also very common as is "clicking," and in some cases the jaw actually locks. Many complain of waking up with sore or tired jaws.

They describe their pain as on one or both sides of their face around the ear, in the cheek, or temple. Generally characterized as a dull, continuous, poorly localized ache of moderated intensity with a boring or gnawing quality, it may vary in the degree of discomfort through the course of the day.

They have tried over the counter medications, dental equilibration and plastic devices to go inside the mouth when they sleep. Many, especially in the last 20 years, have tried multiple surgeries. Most of the clients that I see have found that these remedies have been to little or no avail.

It is not uncommon for the cryptogenic TMJ client to suffer from deviations from their ideal posture. For example, the forward head syndrome, with its typical distortions in function of the transitional units of the spinal column, and a multiplicity of other associated structural/functional issues throughout the body, is a common contributor to TMPDS. In general, remember that craniofacial pain of a musculoskeletal origin may arise in the head/neck region from muscles of mastication, the TMJ, or structures of the neck, but the entire body must be assessed for contributory factors.

Client History

Identifying TMPDS is usually achieved based on the client's history and clinical findings. In general, extensive radiographic evaluation is not necessary. Yawning, chewing or moving the mandible will often result in stabbing or severe pain, precipitating cramping or locking

of the jaw. Long-term pain may also include cyclical periods of remission. Be aware also that chronic TMPDS clients will often present psychological characteristics that include anxiety, stress, depression, anger and frustration. The majority of idiopathic TMPDS clients are women in their childbearing years of age.

Taking a detailed case history and performing a competent physical examination are critical to the successful treatment of any condition by any physician. Specifically, you will need to know how and when this complaint was first noticed. What were the events surrounding inception of the complaint? Is this complaint idiopathic or trauma based?

What type of trauma precipitated the onset of the complaint? Was it a direct blow to the chin, or was it a lateral blow, such as the head hitting the side window in a side impact motor vehicle collision? Knowing the details of the initial insult that the client suffered will better help you understand how the biomechanics of the region you are working with have changed from their prior given structure and arrangement. With this information you will be better able to bridge/integrate what you understand of body mechanics with the altered anatomy before you. Frankel[2] found that 37.5% of whiplash patients had symptoms of TMJ trauma. Did they have time to react before the event happened? If so, the musculature that was contracted at the time of impact will have to be addressed before the damaged joint and immediate tissue can be manipulated[3].

Is this client pre-surgical? If there has been no surgical intervention, then you have the advantage of having a clean anatomical theater in which to work. Your anatomical atlas will be a valid map for the presentation. If the client has a TMJ surgical history you need to be aware of the types of invasive procedures that TMPDS patient's commonly undergo; whether they have had a discectomy, a tissue implant and/or hard appliance implantation. Implant devices will be discussed later in this article.

If you take a complete case history, and you understand the possible surgical and trauma induced influences on your client's structure, then you will better serve your client and increase the possibility of reducing your client's suffering.

Physical Examination

ANATOMY

Now what are we looking at here when we examine the TMJ? One of five joints in the body that functions with an intra-articular meniscus, it is considered by many to be one of the most overused and abused joints in the entire body.

When the TMJ is subjected to such abuse it can progress through the same pathological changes we see in other meniscal joints: deviation of form, disc displacement, disc dislocation, osteoarthritis and/or disc deterioration. As with any other meniscal joint, pain and dysfunction of the TMJ can be medically treated by prescribing pain killers, administering cortisone injections, performing surgery, and/or prescribing physical therapy exercises; or as SI practitioners, we can assess what local myofascial structures are shortened and/or are contributing to dysfunctional TMJ movement, we can assess what alignment issues and dysfunctional movement patterns throughout the body may be contributing to local joint dysfunction, and we can lengthen, open, and differentiate those limiting tissues while retraining the neuromuscular system with integrative movement. Let's look more closely at the local structure.

The TMJ is a universal joint operating about an incongruous joint structure with a shifting axis of rotation. The surface of the condyle is ovoid and the fossa surface is sellar. Movement occurs as a combination gliding motion rather than an all-arch rotation. Opening the jaw is really a two-stage event: first the mandible rotates with the radius at the joint itself for about 25 degrees or so, then the condyle slides/glides anteriorly on the glenoid fossa cartilage for the rest of the opening action[4]. Basically, the surfaces of the joint don't neatly fit together because movement at the joint is complex. Necessarily then, the articular surfaces are cushioned by a soft and pliable fibrocartilage disc. The lateral pterygoid muscle holds and elongates this disc as the jaw articulates, thus functioning to protect the disc of the TMJ from being deformed every time the jaw opens or closes. Other muscles and fibrous structures affecting TMJ articulation are named in the sections on function, palpation and treatment.

FUNCTION

Your examination will reveal the functional status of the mandible. First check the range of motion of the mandible. The client's first three fingers will serve as a general rule of thumb for this assessment. You will often find a limited mouth opening of less than three fingers.

Next, check the line of tracking of the mandible in motion. Does it deflect to one side? This will generally be the result of muscle splinting or spasm. Does it deviate in the middle of its range and then correct back to midline? This is often the result of a meniscal displacement where there is a failure of the condylar head to capture the meniscus appropriately during opening of the jaw. This can be because of a damaged or distorted disc.

Check for lateral deviation by asking the client to slightly open their jaw and move their chin right and left. This active movement will address issues related to contractile tissue. Next move the client's jaw in the same directions without the client's help to assess the ligamentous, osseous and cartilage structures.

Audible soft clicks and pops are not considered significant, but hard clicking consistently occurring late in opening coupled with periodic closed locking may indicate pathologic changes in the meniscus or joint[6]. Assessment and treatment for clicking is discussed further in the treatment section of this paper.

Notice any differences in the outward appearance of the joint itself. Look for swelling, heat, redness, any significant alternation from what you would consider normal in your daily practice. Click your thumb and middle fingernail close to the external meatus for a gross hearing test. Palpate the muscles of mastication: temporalis, masseter, buccinator and pterygoids. Note the bony landmarks of affected structures. This would, at the least, include the atlantooccipital joint, the atlantoaxial joint and the cervicothoracic joint. Note also the relationship of the greater angle of the mandible and its relationship to the styloid process and the transverse processes of the atlas.

You will be more successful in your efforts if you complete your examination with a structural and functional assessment of the client *in toto,* and assess how the TMJ region and its issues fit in with the whole person as they present before you.

Palpation and Treatment

APPROACH

In a process often termed "the self teaching" cycle, a practitioner assesses through palpation and at the same time treats. During this process, practitioner observations, the client's felt experience and direct feedback, and further palpation all inform and direct the work, helping the practitioner modify and refine treatment strategy. This is a classic Structural Integration approach.

SPECIFICS

In the cryptogenic cases of TMPDS, the client's complaints are really about symptoms. Most failures in allopathic treatment of this disorder come from focusing on joint dysfunction as the problem. This approach rarely brings about a permanent resolution to the issue for the client.

It is important to understand the tissue's response to injury. Generally, intracapuslar inflammation stimulates the sensory innervation of the capsule. This sensory innervation and the motor innervation that brings about movement of the joint originate from the same neural branch. Stimulation of the sensory nerve triggers stimulation of the motor nerves. As a result, the musculature goes into spasm, which in effect splints the joint[7]. In turn, pain and trismus is produced which are cardinal signs of TMPDS.

Usually the problem stems from one or two issues: A disruption of the integrity of the atlantooccipital joint (AOJ) and/or an imbalance in the tone of the pterygoids. The AOJ disruption, more often than not, involves a rotational displacement of the occiput on the atlas or a rotation of the atlas itself. When this occurs, very often the anterior transverse process of the atlas will be much closer to the posterior aspect of the ramus of the mandible and the angle of the mandible. When this occurs, pain will increase with palpation in this region. It appears that when these two osseous bodies become affixed, connecting tissue webbing forms and seems to lock these bodies into their intimate positioning. Any time the body suffers pain, it attempts to lock down the area and keep it from moving/hurting any more than it already is.

The atlas and occiput are anatomically coupled and designed to rotate on the axis. This functional unit becomes bound onto the ramus

of the mandible, but only on one side. Binding of a rotational component (the transverse process of the atlas) to a component that swings in an arc and translates anteriorly/posteriorly (the mandible) results in a torquing of the mandible when it moves in any direction. What you find in palpation, you will not find drawn by Netter. It will most often feel like a tight band or a stringy mass of connective tissue between and attaching to the transverse process of the atlas and the angle of the mandible. Sometimes it will appear to be a thickening of the platysma; don't be misled. It is on the next layer down and has horizontality to its fibers. Acknowledge and BE VERY CAREFUL OF THE STYLOID PROCESS of the temporal bone. Do not confuse this with the transverse process of the atlas. If you do, you could wind up with a nasty case of Bell's palsy as well as a TMJ problem on your table. Your goal here is to free the mandible from the spine, nothing short.

To create the appropriate relationship between the atlas and the occiput, release the fascial adhesions in the atlantooccipital and atlantomandibular proximities. Your hallmarks will be an occiput that moves independently of the atlas and one that is in the appropriate anatomical relationship with the atlas. Create space and movement according to the joint's design. Utilize myofascial release techniques as well as joint mobilization. One procedure will not achieve your goal.

To attain this goal you will have to appreciate the subocciptal musculature. This includes the trapezius, splenii, and semispinalis capitis and cervicis, as well as the multifidi and rotators. These bilateral pairs of muscles must be addressed for overall tone, right/left balance, and length. Traditional myofascial release techniques are usually sufficient to bring about the appropriate relationships and facilitate the appropriate positioning of the atlas in relation to the occiput. Assess carefully and if you have not attained your goal, refer the client to another team member and get the appropriate osseous work.

Anterior to the subocciptital musculature is the floor of the mouth. The hyoid group must be addressed for anterior/posterior balance with the suboccipitals. This is not just a metaphorical relationship, it is a literal one. Palpate and understand this relationship. See how the anterior/posterior articulation of the atlantooccipital joint is balanced with these two sets of muscles once the extrinsics have been balanced.

Remember that earlier I said the problem of TMJ pain stemmed from the dysfunction of the AOJ and/or an imbalance of tone of the pterygoids. To get to the pterygoids we must first address the other muscles of mastication. In many cases the temporalis, masseter and buccinator are secondary or compensatory muscles to the pterygoids.

After a traditional approach to releasing tension and balancing the tone of these muscles of mastication is completed, look at the tone of the pterygoids, lateral and medial. The medial pterygoid is addressed first from an extraoral approach looking first from the angle of the mandible posterior and superior. Look for balance in tone right/left. If absent, create it. I use my ring finger; it is more sensitive and less powerful. Ask for the jaw to open and close gently and slightly and release the contractures in the medial pterygoid as well as all of the affected hyoids. Ask for anterior/posterior translation of the mandible and repeat process until balance is attained.

The intraoral medial pterygoid work follows the muscle from the angle of the ramus to the belly of the muscle. This is accomplished by placing the pad of your gloved index finger on the same side medial aspect of the client's mandible and working from the greater angle medially up the belly of the pterygoid toward the palatine.

Next, use same side forefinger, with jaw opened moderately, and place the distal phalanx posterior to the last molars and ask the client to close their jaw and squeeze your finger out of that space between their gums. This will cause more discomfort to the client than you will experience from being clamped down upon, and you will facilitate the work by sliding your finger out, but not too quickly. Encourage slow and gentle complete closure. The work needs to be done.

What is "the work?" Your finger will serve as a fulcrum and the TMJ will be leveraged open with very little movement. This action opens the capsular joint space in the most effective manner that I have found to date. Clients report that there is more space in the joint itself and a significant reduction in perceived pain. Do this work on yourself on both sides several times to

practice. You will learn quite a bit about this technique that you won't by working on others.

The masseter, temporalis and buccinator groups have a balanced action in that they are stretched and flexed as they go through their normal TMJ range of motion. The lateral pterygoids, especially the upper fibers, do not benefit from this action. The upper fibers contract to translate the disc back and forth in conjunction with pressure from the mandibular condyle. The disc changes shape to serve function with assistance from the pterygoid, then in the closing phase of the TMJ cycle it releases its tension. Posterior to the disc is a highly innervated fibrovascular zone full of blood vessels, lymphatics and dense connective tissue fibers. The disc has an elastic attachment that is affixed to the temporal bone and a non-elastic attachment that affixes to the superior and posterior aspect of the mandibular rami inferior to the condyle, according to Gorman[8].

The lateral pterygoid has a limited range of motion. External manipulation is mandatory The practitioner will find many TMPDS clients with masseters that are painful to palpate, but I will venture to say that they will find ALL lateral pterygoids painful to palpate[9]. Release this tension and balance the tone and you will reduce the client's subjective complaint. You will not get these results by manipulation of the masseter, temporalis and buccinator alone.

Manipulation of aspects of the lateral pterygoid can be achieved from both extra and intraoral approaches. From outside, open the jaw wide and you will find the posterior aspects medial to the masseter. With your fingertip, the intention of work is directly medial. This is tender material, approach compassionately Here you are working perpendicular to the plane of the surface of the molars with the pad of your finger on the mandibular notch, the dorsum of the digit under the posterior maxillary arch and the tip of your finger on the surface of the lateral pterygoid.

From inside the mouth, open the jaw only slightly to allow work on the inferior division of this muscle. It has a broad origin, as any strong muscle does, and a focused insertion. The only aspect that you can touch effectively is the lower aspect of the inferior division coming from the lateral pterygoid lamina of the sphenoid. Run your contralateral index finger superior and posterior until you can go no further; your index finger will be on the muscle in question, posterior to the last molar. Wisdom teeth make this manipulation more difficult, needless to say. Once touching the muscle your intention will be medial[10,11]. Have compassion, but get the work done; re-establish balance and function.

Understand that the pterygoids are the muscles of TMPDS. Given that the soft tissue holds bones in any particular arrangement, what I have found is that the contralateral lateral pterygoid is most often at the base of etiology of common TMPDS. That is to say, if the left TMJ is the affected joint then look for the right pterygoids to be more contracted than the left. Both pterygoids originate from the sphenoid. When hyper tonicity exists bilaterally the tendency is for the sphenoid to rotate on its horizontal axis. If one side is hypo and the other hyper toned, then there is a torque on the mandible and the sphenoid as well. There are many negative and far reaching consequences to any displacement of the sphenoid beyond the scope of this paper, but take note: this is not a good thing. Take a moment here and survey the tone of the pterygoids and psoas. You will be surprised, but that is another paper.

Travell shows the posterior attachment of the superior division of the lateral pterygoid attaching to the capsular ligament and the articular disc as well as the upper one-third of the front of the neck of the condyle[10]. This component of the pterygoids is directly responsible for the placement of the disc in the TMJ. If you study the dynamics of this disc and the nature of its task you will be amazed that it lasts as long as it does in the average structure. Joe Breck, my illustrious colleague of the last decade, pointed out the fact that this disc must be made of very unusual material to last as long as it does while undergoing the radical structural and physiological changes that occur every time the jaw is opened.

CARTILAGE AND DISC FUNCTION

After treatment of the cervical structures and the muscles of mastication, then reassess the functional status and condition of the disc. Is there clicking? Without locking? Is there lateral deviation upon opening/closing of the jaw? From this you can easily ascertain the status of the disc. Is it being captured properly? Has its structure been compromised and lost function? These issues have their origins in disc damage. Assessing major disc damage is not difficult for

trained eyes. If you have gotten this far in your reading, more than likely, you have trained eyes.

The disc and the articular cartilage play a predominant role in normal joint motion and also in TMPDS. Glenoid fossa cartilage and the material covering the condyle are both fibrocartilaginous. This composite is different from the condylar surfaces and menisci of other synovial joints in the body. Physiologically, these tissues deform in all directions of TMJ movement. Most significant deformation is seen in flexion, extension, protrusion, retraction, lateral motion and circumduction[12].

In the knee joint the meniscus moves with the femur in rotation and with the tibia in flexion-extension[13]. The TMJ disc actually changes its shape during all movement of the jaw and then returns to its original shape at the end of the movement. The posterior aspect of the disc is directly affixed to the mandibular condyle. With this understanding, the physician can see how the joint "locks" only when the disc doesn't go through the deformation and reformation phases that define its function. By definition, the disc must change shape and return to the original state to be optimally functional.

By unloading the TMJ through an ordered process such as a Structural Integration series, the surrounding structure is balanced in tone and the components of the joint move towards order. Over time, the cartilage may reshape and function closer to its original state. This is the ideal response of joint cartilage to integrative manipulation of the surrounding fascial structures, but it is especially true of the TMJ disc.

Differential Assessment of Temporomandibular Joint Pain

Generally, there are two types of problems that define TMJ arthralgia: intracapsular and extracapsular. Intracapsular arthralgia issues include a fixed or locked jaw, degenerative joint changes, subluxation, and/or a displaced disc creating clicking. Extracapsular issues include dysfunction of lateral and medial pterygoids, masseters, and temporalis muscles.

There are two basic types of joint or intracapsular injuries: those that permanently deform the disc and essentially render it dysfunctional, and those injuries that only temporarily alter shape and/or function of this disc.

When there have been repeated disc dislocations, the cartilage of the glenoid fossa as well as the mandibular condyle wind up being damaged to the point of being classified as degenerative arthritis. This often leads to extracapsular arthralgia where the soft tissue reacts to the pain in the joint and the client often presents with multiple myofascial contracture patterns in the muscles of mastication shortly after the initial insult[14].

INTEGRATIVE MOVEMENT

Working to correct mandible movement will support a return to healthier cartilage shape and function. Now that you have made an attempt to balance and decompress the joint area, you have a chance at training the mandible by tracking it manually through its range of motion. With your client standing, back against the wall, stand directly in front of them, with your eight fingertips pointing medially with moderate force on the masseters and thumbs on the chin, and call for motion. The fingers bring balance to the superficial and some of the deeper jaw muscles while the thumbs, with help from the fingers, keep the jaw tracking in a more ideal anatomical plane. This work is usually done at the end of the treatment. It helps "ground" them as well as significantly improve their mandibular tracking.

OVERALL TREATMENT CONSIDERATIONS

Idiopathic or cryptogenic-based TMPDS more often than not will necessitate a longer time in treatment. This is due to the fact that over time clients unconsciously compensate for pain and dysfunction, and the trauma in the primary tissues becomes more deep-seated. Results are often found in the form of scar tissue, adhesions, lesions, fixations and anatomical distortions. Trauma-based TMPDS, depending on the type and severity, can often times be resolved within a much shorter time frame especially when promptly addressed.

Are you seeing this client in the context of a traditional series or doing only what I call manual medicine? Are you working alone or are you part of a team? I strongly suggest teamwork. The chronic pain client, research has shown clearly, will only respond to a multi-disciplinary team approach when a long-term solution is being sought. Psychologists, sex therapists, chiropractors, osteopaths, dentists, oromaxillary facial surgeons, and general practitioners should

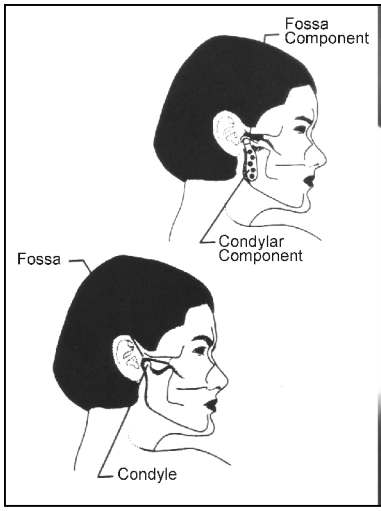

Figure 1: Schematic of Typical Total TMJ Implant

Figure 2: Total Christensen Device Implant: Fossa and Condylar Components, Right Lateral View

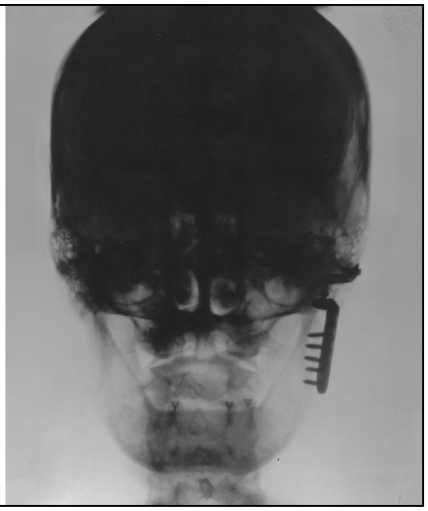

Figure 3: Total Christensen Device Implant: Fossa and Condylar Components, Anterior View

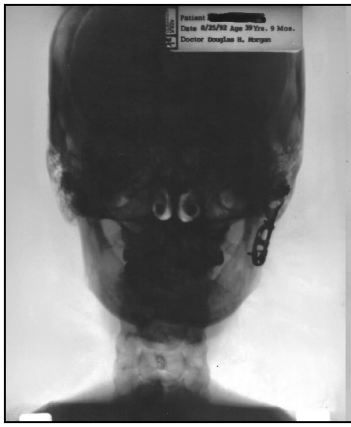

Figure 4: Total Morgan Device (Box Type) Implant: Fossa and Condylar Components, Anterior View

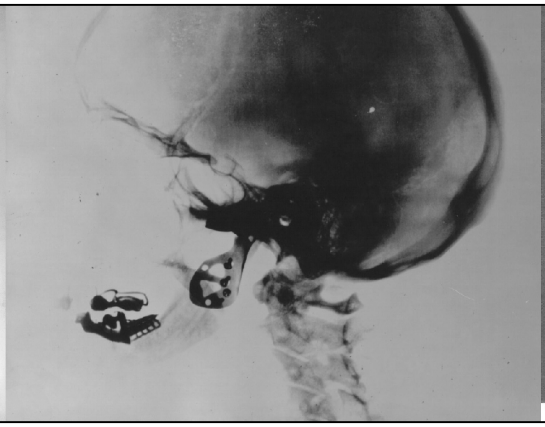

Figure 5: Total Morgan Device (Box Type) Implant: Fossa and Condylar Components, Left Lateral View

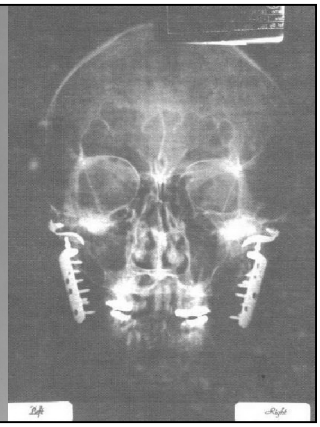

Figure 6: Bilateral Total Christensen Device Implant: Fossa and Condylar Components, Anterior View

be strongly considered when dealing with chronic TMPDS clients. Without a team, you are only putting band-aids on a bad situation.

Brief Summary of Current TMJ Implant Devices

Since 1934 various materials have been used to replace failed components of the TMJ. Autogenous graft surgeries utilizing the patient's own tissues such as ear cartilage were performed as late as the 1990s[15]. Ear cartilage has some of the consistency of the disc if you don't look too closely. The trouble with it was that it did not have the physiologic property of being able to change shape and form, and then return to its original state over and over again, without disintegrating. Then they started pulling down strands of the tendons of the temporalis to use as disc material.The temporalis tendons at least had a blood supply to them and had a remote chance of living until the patient's first bowl of hospital gruel. It is difficult for the writer to understand how the FDA approved these two procedures even on an experimental basis.

The hard appliances (Fig. 1) became available soon after these repeated failures started rolling in. The Morgan (Figs. 4 and 5) and the Christensen (Figs. 2,3 and 6) devices are the most common types used in the last two decades. Due to a combination of politics, failed appliance history (81% in the case of the Christensen device[15]), litigation, and poor (IMHO) medical case management, both of these devices have been removed from the AMA-

approved list of devices. I do not believe that you will see many other types of devices in your practice for some time to come.

The only device that is approved for use at the time of this writing is the ANSPACH device. This device utilizes a titanium mesh fossa component that is designed to encourage bone growth around and through it. The condylar component is made of polyethylene. Very few medical doctors have been trained and certified to perform this implantation.

The recipients of these fossa devices will present a surgical site anterior to the articular capsule and inferior to the maxillary arch. An incision is made along the greater angle of mandible, the patient's condyle is removed and the device is screwed in place onto the upper portion of the ramus.

Obviously the musculature of mastication will be disturbed as a result of these procedures. The temporal and mandibular branches of the trigeminal nerve will be disturbed as well. One of my clients presents with Bell's palsy due to damage sustained to the trigeminal nerve during a fossa device implantation. In the case of the condylar implant it is necessary to remove the patient's natural condyle and fix the appliance with multiple screws. Christensen devices are typically affixed with short screws that go only through the outer lamina. The Morgan devices used longer screws that went through both laminae somehow. Be careful on inner mouth work. You can imagine what the tips of these little sharp screws feel like when they are drilled into the lateral aspect of the pterygoid attachments on the rami of the mandible.

Early screws were stainless steel and patients complained a lot with changes in the weather. They also had a tendency to back out frequently. Because of the frequency of the screws backing out and the resulting screw heads no longer sitting flush with the condylar appliance, they continually tear into the masseter. In some cases these screws back completely out of the lamina and create a total implant failure. Later procedures utilized titanium screws with fewer problems of this type.

According to The TMJ Association, Ldt.[15], a company called VITEK bought a substance called "Proplast" from Dow Corning in the 70's and 80's in an attempt to avoid some of the previous failures. VITEK marketed this material to be used to form the fossa component in TMJ surgeries figuring that it could conform to the natural condylar surface that was different with each patient.

There is a long story, but in short, Proplast implantations have largely failed in joint repair. Failure in most patients, including two of mine, involved primarily the splintering of the Proplast material. The natural fossa region of the skull is very thin. In both of my client's cases splinters of Proplast material were driven into the cranial cavity and in one case into the brain itself, as well as dropping down into the musculature of mastication. Dow Corning's position was that what VITEK was doing with their product was VITEK's business and not Dow Corning's. They both filed for bankruptcy when one of my clients took them to court.

Not all patients who received Proplast implants had them removed. You need to know the history of your client. If your client was a recipient of Proplast and it is still in place, you need to operate with caution in the TMJ region as well as in the muscles of mastication. There may be foreign body splinters in these regions. The myofascial contracture pattern in these patients may be secondary to Proplast splintering.

One of my clients, after ten or more surgical failures, wound up having a five-inch section of her fifth rib incised on both sides. These bones were attached to the rami, bilaterally, with the sternocostal aspect being used as the condylar component in a titanium fossa. At 30+ years of age no one expected the ribs to begin growing again, but they did. Since this procedure in 1987, the ribs were removed from the mandible and replaced with total "Christiansen" devices. She has completed three residential treatment stays, works full time as a local business owner dealing with the public, takes 12-16 Vicodin daily and drives to work.

Conclusion

This paper has presented the readers with an overview of the issues and problems related to a very complicated and painful syndrome. It has also contained some basic tools to add to your repertoire in the treatment of craniomandibular pain conditions.

There are many issues related to TMPDS that have not been addressed in this particular paper including: re-balancing the involved musculature through specific exercises, dietary changes, postural corrections, client education, and lifestyle changes. People with TMPDS are

chronic pain suffers. They will certainly benefit from a Structural Integration series, as all of their systems are strongly affected, and yet a team approach is the only intelligent way to provide these folks with any significant, long-term relief. Establish a network that includes dentists, oral surgeons that specialize in TMJ reconstruction, biofeedback practitioners, psychologists, and the whole host of physicians out there who know how and want to help people who have suffered for a long time.[16]

Finally, although a team approach may be necessary to address severe cases of TMPDS, prevention is still the most helpful tactic. As Structural Integrators, when we are working toward the biomechanical hallmarks of our profession, namely improved structural support, balance, and function, we are often averting or correcting conditions that can give rise to the pain and damage associated with TMPDS. Understanding these conditions and the specific treatment methods used both within our discipline and within other disciplines to treat TMPDS helps us to make preventative corrections more effectively. We all have a responsibility to make sure that we do our best to prevent TMPDS. We will do it by assisting others in their efforts to bring order to what Dr. Rolf[17] called "randomness."

Endnotes

(1) Burchiel, K. and Burgess, J. "Differential Diagnosis of Orofacial Pain." *Handbook of Chronic Pain Management*, ed. Tollison, C., Williams & Wilkins, Baltimore, Maryland 1989. p.282.

(2) Frankel, VH. "Temporomandibular joint pain syndrome following deceleration injury to the cervical spine." *Bull.Hosp. Joint Dis.*, 1969; 26:47-51

(3) Cox, C. *Soft Tissue Management of Acute Physical Trauma.* Private Publication, 1988. p.13.

(4) Mennell, JMcM. *The Musculoskeletal System: Differential Diagnosis from Symptoms and Physical Signs.* Aspen Publishers, Gathersberg, Maryland, 1992. p.138.

(5) Cailliet, Rene. *Head and Face Pain Syndromes.* F.A. Davis, Philadelphia, 1992. p.145; fig.10-2.

(6) Cox, C. *Four Chronic Pain Syndromes and The Basic Rolfing Series.* Private Publication, 1989. p.26.

(7) Hilton, J. In Jacobson WHA (ed): *Rest and Pain.* Ed 2., William Wood & Co, New York , 1979. p.96.

(8) Gorman, D. *The Body Movable.* Ampersand Press, Ontario, Canada, 1981. p.194.

(9) Travell, J. *Myofascial Pain and Dysfunction: The Trigger Point Manual.* Waverly Press, Baltimore, Maryland, 1983. p.264.

(10) Ibid, p.261.

(11) Ibid, p.266 fig. 11.3.

(12) Cailliet, R. *Head and Face Pain Syndromes.* F.A. Davis, Philadelphia, 1992. p.148.

(13) Sheikoleslam, A., Holmgren, K., and Riise, C. "A clinical and electromyographic study of the long-term effects of an occlusal splint on the temporal and masseter muscles in patients with functional disorders and nocturnal bruxism." *J Oral Rehabil.* 1986. 13:137-145.

(14) Cailliet, R. *Head and Face Pain Syndromes.* F.A. Davis, Philadelphia, 1992. p.153.

(15) The TMJ Association, Ltd. "Temporomandibular Joint Implants." *The TMJ Association Newsletter.* Spring/Summer 1994. p.5.

(16) A good resource to start with if you are interested in working with these folks is: The TMJ Association, P.O. Box 26770, Milwaukee, WI 53226. www.tmjassociation.com, fax: 414-259-8112, email: info@tmj.org.

(17) Rolf, I.P. *Rolfing.* Dennis-Landman, Santa Monica, CA, 1977. p.69.