TM Disorders: Treatment & Management Considerations

(Part 3 of 3)[i]

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Temporomandibular disorder (TMD) represents a multiplicity of conditions expressed in the masticatory system affecting the temporomandibular joints, masticatory muscles, and/or the associated structures. Many of these conditions share common signs and symptoms, yet require differing treatment/management approaches. Therefore, it is important to identify the specific subcategory of TMD in order to develop a case-specific plan of care.

In addition, etiologic variables and factors associated with perpetuation or recurrence of TMD must be appreciated and determined on each patient. A complete evaluation of each case from historical, clinical presentation and physical/psychological perspectives must be accomplished. Treatment outcomes can be enhanced by the identification of and management strategies that address all the components involved.

The development of a diagnosis-specific plan with a prioritized problem list is necessary to enhance our treatment prognosis. The primary goals of treatment of TMD are to: reduce or eliminate pain; restore a more normal function; allow return to the activies of daily living; reduce long-term health care needs for the problem.

A multi- disciplinary model that includes patient education and self care, cognitive behavioral intervention, pharmacotherapy, physical therapy and orthopedic appliance therapy (interocclusal splints) is favored for the management of the vast majority of TMD patients. It is important to understand that the natural course of TMD does not reflect a progressive disease process, but rather TMD appears to be a complex disorder that is affected by a multitude of interacting factors serving to maintain the disorder or result in recurrence.[1–5]

Most TMD patients will obtain significant improvement of signs and symptoms with a conservative model (non-surgical modalities). Many studies have supported that most TMD patients have minimal or no symptoms after treatment with conservative therapy .[6–8] Studies related to intracapsular disorders have demonstrated that in patients with disc displacement (with or without reduction), the natural progression of the disease can allow for changes that are favorable for a significant number of patients in terms of function and symptoms.[9–11]

Involving the patient in the physical and behavioral management of his/her condition is essential in the treatment outcome. As clinicians in the development of an individualized plan of management, we must determine if intervention is necessary, if the condition is acute or chronic and what would be the prognosis of the condition with and without treatment. If intervention is in the patient's best interest, then we must determine to what degree should we intervene (reversible versus irreversible treatment) and decide between a monodisciplinary versus a multidisciplinary approach.

Patient education and self-care is based on the patients' knowledge of their pain concern. The aim of a self-care program is to prevent further injury to the musculoskeletal system and to allow for a period of healing to take place. The success of self-care depends on patient motivation, cooperation and compliance.[1] The most important aspect of self-care is ongoing encouragement and reinforcement by the clinician.

Self-directed care typically includes: limitation of mandibular function, habit awareness and modification, a home exercise program and stress management. Promoting rest for the injured tissues promotes healing. Voluntary limitation of mandibular function, maintaining a soft diet, avoidance of foods that require a great deal of chewing, opening wide, yawning or other activities that promote excessive mandibular function should be avoided.

Clenching, bruxism, maladaptive tongue position habits and other habitual behaviors must be identified. Correction or behavior modification may require clinical assistance.[12,13] An individualized home exercise program with a detailed description of the program will not only enhance the doctor-patient relationship, but will also assure the patient's compliance, thus making treatment more effective and resulting in a faster rehabilitation.

A program of moist heat and/or ice to the affected areas, massage of the affected muscles, and controlled mandibular movement can enhance joint lubrication and nutrition by encouraging the production of physiological quality and quantity of synovial fluid and minimizing the accumulation of metabolic by-products and pain mediating substances.

Identification of the source(s) of stress and the importance of the patient understanding the association and adverse influence of stress and the course of TMD are also vital. Clinical and health psychologist participation in your multidisciplinary approach may be required to enhance your treatment outcome.

Pharmacotherapy

Rational utilization of pharmacological agents can be a valuable adjunct in the treatment of TMD. Drugs must be considered on a case-specific basis. A clinician must remember that the treatment of TMD cannot rely on a single drug for all cases. Understanding the variety of drugs utilized in the treatment of musculoskeletal conditions, their potential drug interactions and their side effects can result in a useful tool in our armamentarium.

The most effective pharmacological agents for the management of TMD include analgesics, non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids, anxiolytics, muscle relaxants, and antidepressant at very low dosages.[14,15]

Non-steroidal Anti-inflammatory Drugs

This category is effective for the management of mild to moderate pain and inflammatory conditions, particularly those of muscle origin. Relief of symptoms is typically achieved prior to the anti-inflammatory effect. In order to obtain anti-inflammatory effects, these medications should be taken for a minimum of two weeks following the recommended schedule. NSAIDs differ in formulation, efficacy and toxicity. It is suggested that if one NSAIDs fails, another agent should be considered. Common side effects to be considered include gastric distress, inhibition of platelet aggregation, tinnitus/dizziness, and renal/liver toxicity. A list of the most commonly NSAIDs utilized is found in Table 1.

Steroids

Corticosteroids are typically indicated in cases of non-infectious inflammation when NSAIDs have proven to be ineffective. Systemic corticosteroids are not commonly prescribed in the treatment of TMD due to their side effects. They could be considered when in association with the polyarthrides. Intra-articular temporomandibular injection of corticosteroids has been recommended on a selective and limited basis in cases of severe joint pain or in cases of flare ups where conservative therapy has failed.[16,17]

Category	Generic	Brand	Dose (mg)
Salycilates	ASA	Bayer	q4h (300)
	Salsalate	Disalcid	bid, tid (500)
	Diflunisal	Dolobid	bid, tid (500)
Proprionic Acid	Ibuprofen	Motrin	tid, qid (600–800)
	Naproxen sodium	Naprosyn	qid 375, bid (500)
Acetic Acid	Indomethacin	Indocin	tid (25–50)
COX 2 Inhibitors	celecoxib	Celebrex	Qd, bid (12.5–25)

Table 1: Non-steroidal anti-inflammatory drugs

(methylprednisolone) Medrol Dosepack	4 mg tablets
(betamethasone) Celestone	6 mg/cc
(Dexamethasone) Decadron	4 mg/cc

Table 2: Steroids

Generic	Brand	Dose (mg)
Diazepam	Valium	2–5 mg tid
Clonazepam	Klonopin	.05–1 mg tid
Lorazepam	Ativan	0.5–1mg tid
Temazepam	Restoril	15–30mg qhs

Table 3: Antianxiety agents

Generic	Brand	Dose (mg)
carisoprodol	Soma	350 mg tid
methocarbinol	Robaxin	750 mg tid
Cyclobenzaprine	Flexeril	10 mg tid
Diazepam	Valium	2–5 mg tid

Table 4: Muscle Relaxants

Generic	Brand	Dose (mg)
Amitriptyline	Elavil	10–75
Desipramine	Norpramin	10–50
nortriptyline	Pamelor	10–75
Doxepin	Sinequan	10–75

Table 5: Antidepressant agents

We must recognize that multiple injections… ? These medications are also effective in the treatment of inflammatory conditions such as tendonitis or tendomyositis where, due to the decreased blood flow to the areas, oral medications will provide less than desirable results. Side effects include decrease resistance to infection, fluid retention weight gain, painless myopathy, suppression of the hypothalamic-pituitary-adrenal (HPA) axis, osteoporosis and mood alteration with only short term use. Steroidal medications commonly used are listed in Table 2.

Anxiolytics

Anti-anxiety medication may be utilized as supportive therapy in cases where high levels of emotional stress are associated with TMD. Diazepam can be prescribed for acute exacerbation of masticatory muscle pain,[3] sleep disturbances and moving disorders such as bruxism.[14,18] Due to the significant potential for dependency and/or addiction, these medications should only be use on a short term basis. No more than a 10-day consecutive period when utilized multiple times a day, and no more than three weeks when utilized at bedtime.

Klonapin has shown to have a significant effect in patients with Myofascial pain.[19] Side effects include drowsiness and nausea. Benzodiazepines are contraindicated in patients with narrow-angle glaucoma, and can increase CNS depression. A list of anxiolytic agents typically utilized in TMD, sleep disturbances to include insomnia, and moving disorders such as bruxism are included in Table 3.

Muscle Relaxants

Centrally acting muscle relaxants are frequently used in the treatment of temporomandibular disorders.[20] Still uncertain the mechanism in which the benefit from this medications is obtained due to the clinically efficacy at low doses. Either due to their selective effect on relieving muscle spasm

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or due to their action as a sedative they play an important role in the treatment of TMD. Primary indications are for muscle spasm, acute muscle pain and to help prevent the increased muscle activity associated with TMD.

Flexeril (cyclobenzaprine hydrochloride), which is similar chemically to tricyclic antidepressants, is the drug of choice for generalized chronic muscle pain. Flexeril has been shown to provide significant relief of muscle pain, and enhance the quality and quantity of sleep. Its combination with an NSAID can be a very effective tool in the treatment of acute TMD. Diazepam, a benzodiazepine is also used as a muscle relaxant. A list of commonly used muscle relaxants included in Table 4.

Antidepressants

These medications are helpful with chronic diffuse pain due to Myofascial pain, especially when it has been recognized that sleep disturbance is a contributing factor. The analgesic properties of the tricyclic antidepressants are independent of the antidepressant effect. They have shown pain modification properties at therapeutic dosages much lower than those prescribed for antidepressant effect.

The therapeutic effect of the drugs is thought to be related to their ability to increase the availability of the neurotransmitters serotonin and norepinephrine at the synaptic junction in the central nervous system. Studies have demonstrated their use also in the treatment of sleep related bruxism, tension type headache, migraine headache prophylaxis, fibromyalgia and various neuropathic conditions.[21,22]

Side effects are mainly related to the anticholinergic activity that induces xerostomia, constipation, fluid retention and weight gain. Patients occasionally complain of sedation upon awakening. Contra-indications include cardiac arrhythmias, seizure disorders and patients suffering from panic attacks. Dosages should begin at the lowest level (10mg) at bedtime and be increased each week only if needed and tolerated by the patient. Table 5 shows a list of some of the most commonly utilized drugs in this class.

Opioids

Typical indications for opioids in the TMD population include exacerbation of pain, postoperatively and in cases of overt trauma. These medications are best indicated for moderate to severe pain over a short period of time. Most common side effects are nausea, respiratory depression and physical dependence. Opioids may be considered in cases of pain refractory for appropriately integrated multidisciplinary care when properly monitored.

Local Anesthetics

Local anesthetics can be useful in the TMD population as a diagnostic tool and also in selective cases as a therapeutic modality. Indications are as a diagnostic block and in the management of myofascial trigger points. Injections into skeletal muscle with local anesthetics that contain a vasoconstrictor can increase the toxicity of the solution.

Typically, lidocaine or carbocaine without a vasoconstrictor is recommended, especially when injected into muscle (to minimized myotoxic effects). Diagnostic anesthesia may be as simple as the usage of a topical agent, somatic blocks (infiltration, field blocks and division blocks), trigger points injections, temporomandibular joint injections and/or a sympathetic neural blockade.

Physical Therapy/ Physical Medicine

The goal is to relieve musculoskeletal pain, restore normal function, reduce inflammation, coordinate and strengthen muscle activity and promote repair and regeneration of tissues. Rehabilitation of the compromised masticatory system may require various physical techniques.[5] Close cooperation with a physical therapist/physical medicine practitioner who is well trained in the management of musculoskeletal disorders of the head and neck is essential.[22,23,24,25]

Massage

Massage over the painful areas is thought to produce an alteration in the sensory input that exerts an inhibitory influence on pain. It is used to reduce edema and to increase blood flow to the area.

Joint Mobilization

The goal is to passively restore joint motion and to improve joint function by repeated digital manipulation of the jaws by the physiotherapist. Mobilization techniques are indicated for decreased range of motion and pain due to muscle contracture, disc displacement without reduction and fibrous adhesions of the joint. A combination of heat, cold, ultrasound and electrical stimulation is often utilized. Local anesthetic

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injections are often used to improve the outcome.

Jaw Exercises

There are three types of exercises designed to achieve a different purpose. Muscle strength is addressed by isometric exercises. Isotonic exercises are used to increase range of motion. Coordination of muscle function is achieved by repetitive rhythmic exercises. Exercises should be constantly modified as symptoms changed. A maintenance program is recommended with instructions on how to avoid activities that can re-injure the involved tissues to ensure long-term resolution of symptoms.

Physical Modalities

The most common modalities used for the treatment of TMD are superficial heat and cold, ultrasound, short wave diathermy, transcutaneous electrical nerve stimulation (TENS), iontophoresis, anesthetic agents and acupuncture. The use of heat can help relax the muscle and increase blood flow to the compromised muscle. Electrotherapy devices produce thermal, histochemical and physiological changes in the muscle and joints.

Short-wave diathermy provides heat to superficial tissues whereas ultrasound can transmit heat through tissues to a depth of 5cm.[26] The purpose of these modalities is to decrease pain, hyperactivity, increase tissue distensibility and may be neuromuscular re-education.[23,26] Iontophoresis uses an electrical gradient to drive an ionic form of the medication into the tender or swollen tissues.[27] Acupuncture has also been used for the treatment of chronic musculoskeletal pain.[28]

Postural Re-education

Maladaptive posture (head/neck or mandibular) may be a contributing factor in the TMD patient. The relationship between the trigeminal nerve and the upper cervical region is well recognized. Postural re-education throughout exercises and behavior modification should be considered. The participation and guidance of a physiotherapist is required for long-term stabilization of the masticatory system.

Behavioral/Psychotherapy

The TMD patient's cognitive, emotional and behavioral responses to pain are key issues in the overall evaluation and treatment. The patient's perception to pain may be maladaptive in the nature of somatization, catastrophizing and mood and subconscious habitual behavior. Failure to identify and address these factors will likely compromise the treatment outcome.

Cognitive-behavioral strategies such as behavior modification, life style counseling, progressive relaxation, guided imagery, hypnosis and biofeedback may be beneficial.[29,30] This care is typically provided by a clinical health psychologist. Occasionally, TMD may be related to an underlying psychosocial or psychiatric disorder such as depression or conversion disorder. In these cases, a psychiatric or clinical health psychologist referral is indicated.

Occlusal Appliance Therapy

Occlusal orthosis therapy is the most common form of treatment. They are commonly referred to as interocclusal splints, orthotic, orthosis, bite guards, bite planes, night guards and bruxism appliances. An occlusal appliance is a removable device, usually made of hard acrylic, that is custom made to fit over the occlusal surfaces of the teeth on either arch. There are generally two types of appliances: the flat plane (stabilization) appliance and the anterior reposition appliance.

The effects of appliance therapy include: prevention/reduction in abrasion to the dentition, alteration of the motor pattern of the masticatory musculature by altering periodontal ligament proprioception, alteration of muscle length, enhance awareness of parafunctional activity, and alteration of the number, direction and quality of tooth contacts.

The major functions of non-directive, flat plane appliance therapy are muscle relaxation, dispersal of forces, enhancement of TMJ stability and the protection of teeth. Most patients are advised to utilize the appliance while sleeping or when their activity prohibits conscious awareness of daytime parafunction. Anterior repositioning appliances are used less often because repositioning of the mandible over a period of time can result in irreversible changes to the occlusion.

The purpose of these appliances is to alter the structural condyle-disc-fossa relationship in an effort to decrease adverse joint loading.[1,31,32] Complications associated with occlusal appliance therapy arise from poor design/construction and/or excessive or incorrect use of the appliance.

Treatment of occlusion should be considered on an individual basis. Many dental conditions require treatment of the occlusion due to a lack of intra-inter-arch tooth stability, fremitus, tooth mobility, fracture teeth/restoration, and compromised function that requires redistribution of forces to minimize the effects of adverse loading.

Although dental treatment may be necessary for patients with TMD, it is believed to be very seldom necessary for the purpose of treating TMD.[1,33] If occlusal therapy is necessary to complete treatment, it should only be initiated after the patient has regained his/her range of motion, symptoms, neuromuscular activity and when the psychosocial status is as stable as possible.

Surgery

Temporomandibular joint surgery plays a small but important role in the management of patients with TMD. The literature shows that about 5% of the patients who undergo treatment for TMD require surgical intervention. The surgical success is dependent on a total treatment plan that involves non-surgical and surgical treatment.

Arthrocentesis is the simplest and least invasive procedure that is performed in the temporomandibular joint (TMJ). It consists of TMJ lavage placement of medications into the joint. Arthrocentesis is usually performed as an office-based procedure under local anesthesia assisted with conscious intravenous sedation. It has been suggested to be as effective as arthroscopy in the treatment of joint restriction in conditions as internal derangement without reduction.

Surgical intervention includes arthroscopy, condylotomy, and open joint procedures, such as disk reposition and diskectomy. Arthroscopy is a minimally invasive technique that is usually performed under general anesthesia. It is primarily performed in the upper joint space, and it's useful for minor debridement and lavage, incision of minor adhesions and biopsies.

Indications for surgery of the TMJ may be divided into relative and absolute. Absolute indications are reserved for conditions such as tumors, growth abnormalities and ankylosis of the TMJ. The general indications for TMJ surgery for the most common disorders, internal derangement and osteoarthrosis, are significant TMJ pain and dysfunction that are refractory to nonsurgical treatment, and there is imaging evidence of disease. It has been suggested that arthrocentesis and arthroscopy be used for TMJ pain and limited opening, and open TMJ surgery should be reserve for advance cases of TMJ derangement and osteoarthrosis.[34]

Based on our current understanding of TMD, successful management is dependent upon recognizing the complexity of this condition in terms of the multifactorial nature and the need in most cases of a multidisciplinary approach. Recognizing that on many occasions these musculoskeletal conditions may have a co-existing psychosocial component that may need to be address in order to enhance the treatment outcome is also important. A complete and accurate diagnosis on a case-specific basis will provide the development of the most efficacious individualized approach to care. DT

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