Temporomandibular disorder (TMD) represents a multiplicity of conditions expressed in the temporomandibular joints, masticatory muscles, and/or the associated structures. Many of these conditions share common signs and symptoms with a multitude of interacting factors. Therefore, it is important to define the specific subcategory of TMD in order to develop a case-specific plan of care.

In addition, etiologic variables and modifiers associated with perpetuation or recurrence of TMD must be appreciated and determined. Only then will the complete evaluation of each case from historical, clinical presentation and intra/extral physical perspectives must be accomplished. Treatment outcomes can be enhanced by understanding the natural history of the disease and psychological aspects that address all the components involved.

The development of a diagnostic and treatment plan is based on the understanding that the natural course of TMD is to: reduce or eliminate pain; restore a more normal joint function and allow for changes that are favorable for a significant number of patients in terms of function and symptoms.1–3

Involving the patient in the physical and behavioral management of her/his condition is essential in the treatment outcome. The primary goals of treatment of TMD are to: reduce or eliminate pain; restore a more normal function; allow for return to the activities of daily living; reduce long-term health care needs for the patient.4

A multidisciplinary model that includes patient education and self-care, cognitive behavior therapy, physical therapy and orthopedic appliance therapy (intermaxillary elastics) must be considered 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 either exacerbate or result in recurrence.4

Most TMD patients will obtain significant improvement of signs and symptoms with a conservational (non-surgical modality) model. Many studies have supported that most TMD patients have minimal or no need for treatment after conservational therapy.5–7 Still related to these disorders are 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.8–10

Identification of the source(s) of stress and the importance of the patient understanding the associated pain; restore a more normal joint function and stress 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 many patients with TMD. NSAIDs are commonly utilized in the management 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, antidepressants, muscle relaxants, and antipsychotic at very low dosages.11–13

Non-steroidal Anti-inflammatory Drugs

This category is effective for the management of mild to moderate pain and inflammatory conditions, particularly those of muscular 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 NSAID fails, another agent should be considered. Common side effects to be considered include gastric distress, inhibition of platelet aggregation, tinnitus/dizziness, and reduction of bone density. A list of the most commonly utilized NSAIDs is found in Table 1.

Corticosteroids

Corticosteroids are typically utilized in cases of non-infectious inflammation when NSAIDs have proven to be ineffective. Systemic corticosteroids are typically commonly prescribed in the treatment of TMD due to their side effects. They could be considered when in association with the polyarthrides. Corticosteroids are known to be an effective treatment in cases of severe joint pain or in cases of flare ups where conservative therapy has failed.14–16

Muscle Relaxants

Anti-anxiety medication may be utilized as supportive therapy in cases where high levels of emotional stress are associated with pain.17 Sleep medications are commonly utilized in TMD, sleep disturbances to include insomnia, and moving disorders such as bruxism are included in Table 5.

Muscle Relaxants

Central acting muscle relaxants are frequently used in the treatment of temporomandibular disorders.18–20 It is still uncertain whether muscle relaxants, either alone or in combination with other therapy, from this medications is obtained due to the clinical efficacy at low doses. Due to the sedative effect on relieving muscle spasm

Table 1: Non-steroidal anti-inflammatory drugs

<table>
<thead>
<tr>
<th>Category</th>
<th>Generic</th>
<th>Brand</th>
<th>Dose (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salicylates</td>
<td>ASA</td>
<td>Bayer</td>
<td>qtid (500)</td>
</tr>
<tr>
<td>Salicylate</td>
<td>Disuldo</td>
<td>baid, tid</td>
<td>(tid)</td>
</tr>
<tr>
<td>Diflunisal</td>
<td>Disuldo</td>
<td>baid, tid</td>
<td>(tid)</td>
</tr>
<tr>
<td>Naproxen sodium</td>
<td>Naprosyn</td>
<td>qtid (750, (500)</td>
<td></td>
</tr>
<tr>
<td>Acetic Acid</td>
<td>Indomethacin</td>
<td>Indocin</td>
<td>tid (25–50)</td>
</tr>
<tr>
<td>COX 2 Inhibitors</td>
<td>celebrex</td>
<td>Celebrex</td>
<td>tid (6, bid 12–25)</td>
</tr>
</tbody>
</table>

Table 2: Steroids

<table>
<thead>
<tr>
<th>Category</th>
<th>Generic</th>
<th>Brand</th>
<th>Dose (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methocarbamol</td>
<td>Robaxin</td>
<td>500 mg/cc</td>
<td></td>
</tr>
<tr>
<td>Cyclomedrol</td>
<td>Flexeril</td>
<td>10 mg tid</td>
<td></td>
</tr>
<tr>
<td>Diazepam</td>
<td>Valium</td>
<td>2–5 mg tid</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Antidepressant agents

<table>
<thead>
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<th>Category</th>
<th>Generic</th>
<th>Brand</th>
<th>Dose (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antidepressant</td>
<td>Amitryptilin</td>
<td>Elavil</td>
<td>10–75</td>
</tr>
<tr>
<td>Desipramine</td>
<td>Norpramin</td>
<td>10–50</td>
<td></td>
</tr>
<tr>
<td>Mirtatryptin</td>
<td>Famoril</td>
<td>10–75</td>
<td></td>
</tr>
<tr>
<td>Desipramin</td>
<td>Sinequan</td>
<td>10–75</td>
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Table 4: Muscle Relaxants

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<th>Category</th>
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<tr>
<td>Antidepressant</td>
<td>Alprazolam</td>
<td>Xanax</td>
<td>0.5–2 mg tid</td>
</tr>
</tbody>
</table>

Table 5: Antipsychotic agents
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 to help prevent the increased muscle activity associated with TMD.

Flunarizine (cyclobenzaprine hydrochloride), which is similar chemically to tricyclic antidepressants, is the drug of choice for generalized chronic muscle pain. Flunarizine 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 very effective in the treatment of acute TMD. Flunarizine is also used as a muscle relaxant. A list of commonly used muscle relaxants is shown 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.

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 (10 mg) 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 to 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.

**Table 5.** A list of some of the most commonly utilized drugs in the TMD population.

- Lidocaine or carbocaine without a vasoconstrictor
- Prilocaine with a vasoconstrictor
- Bupivacaine with a vasoconstrictor

**Typical indications for opioids in TMD**

- Opioids may be considered in cases of pain refractory to appropriately integrated multidisciplinary care when properly monitored.
- Local anesthetics can be useful in the TMD population as a diagnostic tool and also in selective cases as a therapeutic modality.

**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.

**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

**Antidpressants**

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.

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Tonsillar hyperplasia and
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agressiveness and treatment of tempero-
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