

CONSERVATIVE TREATMENT OF TEMPOROMANDIBULAR DISORDER USING PHYSICAL THERAPY

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Review Article

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ABSTRACT

Temporomandibular disorders (TMDs) refer to a number of disease entities responsible for impaired function of temporomandibular system. They represent a various group of musculoskeletal and neuromuscular disorders involving temporomandibular joint (TMJ) and surrounding tissues. Common symptoms include pain and jaw dysfunction. Excluding the possibility of headache or sinus pathology, the diagnostic hypothesis is oriented towards TMDs, especially if the pain associates joints noises and limitation in jaw movements. Up to 70% of the general population experience at least one sign of TMDs, but few seek treatment. The etiology of TMDs is not known, but is generally agreed that a variety of conditions may influence the functionality of masticatory system, including biological, psychological, social and cognitive factors. First-line treatment involves noninvasive therapies, including physical therapy, pharmacotherapy, occlusal devices and most patients show improvement. This article reviews the clinical features of TMDs and the possibilities of treatment, focusing on physical therapy.

Key words: temporomandibular disorder, conservative treatments, physical therapy.

INTRODUCTION

The practitioners in oral health field, dentists, orthodontist, oral and maxillofacial surgeons are aware that temporomandibular disorders (TMDs) are still a controversial topic and all the assumptions regarding the etiology and the treatment principles are constantly the subject of debates and generate various opinions. There is no formally endorsed specialty group or guidelines of care for TMDs management, as a result the clinical approach of these pathologies varies according to the professional background of the practitioners¹. For a proper treatment of TMDs, practitioners must have a good understanding of their clinical presentation, etiology, evolution, complications and associated risks. The absence of unanimously

accepted practice guidelines may expose TMD patients to either conservative and simple procedures or to invasive and irreversible treatments, both for the same clinical presentation. None of the different therapeutic approaches for TMD has demonstrated scientific superiority, consequently practitioners must be guided by the particularity of each case, following the clinical and biological logic². Considering these circumstances and for ethical reason, it is recommended to start the treatment with conservative methods when the etiology is uncertain and the risks of invasive treatment are considerable³.

DEFINITION

Temporomandibular disorder (TMD)

refers to a collective term used to describe a number of pathologies affecting the temporomandibular joints and all associated structures, which have common symptoms such as pain, joint noises, and restricted jaw function. The American Association for Dental Research define TMD as a “group of musculoskeletal and neuromuscular conditions that involve the temporomandibular joints (TMJs), the masticatory muscles and all associated tissues”⁴. This condition has been described since the 1934, when James Bray Costen reported a detailed approach of temporomandibular joint pathology, its relationship with masticatory muscles, teeth and jaws, and introduced the treatment of this disease, which is still known as “Costen’s syndrome”. Since then, these conditions have been given various names: temporomandibular joint pain-dysfunction syndrome, functional disorder of the masticatory system, mandibular dysfunction, myofascial pain dysfunction, oromandibular dysfunction or craniomandibular dysfunction⁵. According to Kirveskary, TMD represent a cluster of dysfunctional conditions affecting the masticatory muscles and/or the TMJ. They represent an important cause of nondental pain in orofacial territory and are considered a subclass of musculoskeletal disorders⁶.

EPIDEMIOLOGY

The literature provide a great variability in the prevalence of TMDs symptoms and signs, from 6% to 93%, for self-reported symptoms and from 0% to 93% for clinically assessed conditions, mainly as a result of different conceptualization and other methodological factors, but about one-third of these persons are seeking treatment^{5,7,8,9}. TMDs may occur at any age, but the incidence peaks from 20 to 40 years, primarily in women^{10,11}. According to Al-Jundi et al., although women are the majority of patients in clinical treatment centers, the differences

between genders are smaller in general population than in clinical trials¹².

ETIOLOGY

The etiology of TMDs is not known with certainty, but is agreed that multiple factors and conditions may reduce the adaptive capacity of masticatory system and conduct to TMDs⁴. Most authors support a multidimensional model of TMD’s etiology including structural, functional, psychosocial and neuroendocrine components that can be classified as “pre-disposing”, “triggering” and “perpetuating” factors of this disease. “Pre-disposing” factors include alteration in occlusion, hyperlaxity, parafunctional habits (chewing gum, nail biting, the habit of forced mandibular movements of lateralization or protrusion without occlusal contact), bruxism and psychological factors (stress, anxiety, depression). “Triggering” factors involve stress or emotional shock supporting parafuncions, rapid occlusal changes following orthodontic or prosthetic treatments, behavioral changes in parafunctional habits, acute trauma. “Perpetuating” factors are represented by secondary tooth migrations, alveolar remodeling, hypersensitivity to pain, emotional lability¹³. The involvement of genetic factors is not well proven. According to Michalovicz and al., following a study conducted to a group of 494 monozygotic and dizygotic twins, the genetic factors and the family environment have no significant influence upon the prevalence of TMD’s clinical presentation¹⁴.

CLINICAL FEATURES

There are three major features of TMDs: orofacial pain, articular sounds and anomalies of mandibular movement and function. Pain is the most common symptom¹⁵ and the most difficult problem to evaluate. Anomalies of mandibular movement refer to a restriction of movement of the mandible or inability to perform mandibular translation

and rotary movement. Articular sounds are represented by clicking and crepitus and the clinical relevance is insignificant in the absence of pain. Pain occurs in various aspects, either spontaneously or triggered by mastication or palpation. The site of pain can be easily specified, as a localized pain or referred to a distant region. The pain may be acute which occurs before initiating of jaw movements, suggesting an articular malfunction or associated with fatigue when mobilizing the mandible, localized in the masseter muscle and surrounding areas, suggesting a muscular malfunction. The pain is frequently associated with the surrounding tissues and muscles more than the TMJ itself. Some non-specific symptoms, such as headaches, tinnitus, earaches, shoulder pain, ocular disturbance, cephalic discomfort, and neurovegetative manifestation of edema, rhinorrhea and excessive lacrimation are also reported¹³.

CLASIFICATION

Considering the diversity of opinions regarding diagnostic criteria and etiology, the classification of TMDs remains a challenge. There is an agreement on the existence of two major categories depending on the affected structures, respectively intra-articular (within the joint) or extra-articular (involving the surrounding musculature)¹⁶. The first category refers to muscle pathology, including hyperactivity, spasm, trismus, inflammation, trauma, atrophy and hypertrophy, myofascial pain and fibromyalgia. The second category includes a great variety of arthrogenic disorders: disc displacement, dislocation and subluxation, hypomobility of the disc, arthritis, infections, capsulitis and synovitis, ankylosis, metabolic diseases affecting bone structures, condylar hyperplasia, hypoplasia or aplasia, fractures and neoplasms⁴. The most common cause of TMDs are in the first category, accounting for at least 50% of

¹⁷ cases¹⁸. From the second category, the most frequent is articular disc displacement involving the condyle-disc relationship.

DIAGNOSTIC

The diagnostic algorithm of TMD is largely based on history and physical examination findings and must take into account the multifactorial etiology of this disease. The main symptoms may include orofacial pain, often in the preauricular, masseter, or temple region, articular sounds, restricted mouth opening or a combination of these. Another source of orofacial pain should be suspected if pain is not affected by jaw movement¹⁵. A large retrospective study, conducted over 25 years, reported that the most common clinical presentations of TMDs were facial pain (96%), ear discomfort (82%), headache (79%), and jaw discomfort or dysfunction (75%)¹⁸. Physical examination results that support the diagnosis of TMD may include abnormal or restricted mandibular movement, tenderness of masticatory, neck or shoulder muscles, joint sounds, signs of bruxism. Myofascial pain frequently presents with cyclic and diffuse pain which is often more intense in the morning and associates a history of stress and sleeping difficulties¹⁵. The role of occlusion as an etiologic factor of TMDs is also a controversial topic. Some authors found a strong correlation between symptoms and signs of TMDs and malocclusion¹⁹, others reports a partial association²⁰ and there are also results that attribute to occlusion a secondary role in the etiology of these diseases²¹. Although some authors argue that masticatory system is capable to adapt to occlusal discrepancies, within tolerable limits, without causing specific clinical manifestation of TMDs, the tolerance limit of each patient cannot be predicted²². Articular sounds as clicking,

crepitus, or locking of the TMJ may inform about joint pathology. A single click produced at the opening of the mouth may be representative for an anterior disk displacement. Crepitus or grating sounds reflects damage to joint surfaces, which often occurs in osteoarthritis²³. Tenderness to TMJ palpation inform about an intra-articular pathology, while tenderness of the surrounding muscles may distinguish myalgia, myofascial trigger points, or referred pain syndrome¹⁶.

Imaging can assist in the diagnosis of TMD especially to exclude the hypothesis of other pathologies that may mimic TMDs clinical presentation. The most accessible investigation are plain radiography of the TMJ (transcranial and transmaxillary views) or panoramic radiography providing useful information regarding degenerative or traumatic pathology of bone structures. Additional information of subtle bony morphology can be obtained using computed tomography. The optimal modality for joint evaluation is magnetic resonance imaging, indicated for cases with persistent signs and symptoms, refractory to conservative treatments.

TREATMENT

The peculiarity of TMD is represented by the multifactorial etiology and the involvement of multiple factors in the maintenance of symptoms. The main objectives of treatment are to reduce or eliminate pain or articular sounds and to restore the functionality of mandible. As this pathology frequently associates psychogenic diseases, it is necessary from the beginning of the treatment to establish the organic or psychogenic origin. Treatment options include both conservative methods and surgical methods. The effectiveness of a particular method of treatment has not been unanimously accepted, so the option for a particular approach is dictated by the doctor's experience and the particularity of the case,

however, non-surgical treatment remains the most effective approach over 80% of patients¹⁵.

Regardless of the therapeutic approach, **patient education and self-care** is an important component of treatment. A daily self-care routine should aim the following: avoiding exposure to stressful and anxious situation, an adequate program of rest and relaxation, habit awareness and the motivation to change them, limitation of mandibular movements, a home exercise program¹⁵. Patients should be advised toward an increased awareness of all the mandibular movements, to carefully plan meals, avoiding hard foods that require a significant chewing force or extreme movements of the mandible and also acknowledging different vicious patterns, as laterality of chewing or grinding²⁵ of teeth, trying to eliminate the habit²⁴. Patients with hypermobility may require education to avoid wide mouth opening. A useful technique is to explain patients not to lower their mandible further than the position that allow the tip of the tongue to maintain contact with the hard palate just posterior to

the upper incisors²⁴. In some patients, the deconditioning of harmful habits is difficult, and their persistence maintains or exacerbate the symptoms. These cases may benefit from **behavioral therapy** procedures, using relaxation therapy, counseling on lifestyle and hypnosis.

PSYSICAL THERAPY

Physical Therapy, also known as **kinesitherapy**, **kinesitherapy**, **kinesiology**, **physiotherapy**, **physical exercise**, the therapeutic treatment of disease by passive and active muscular movements, address muscle reeducation, being the first line treatment in patients with severely asymmetries and symptoms and the only²⁶ proper approach of treatment²⁶. Successful results in muscle restoration are also noticed

after trauma and injuries. Adequate training is necessary as the exercises must be performed moderately, with a well-dosed intensity and adjusted during the treatment, in such condition ensuring a success rate of 70%. This treatment aims to avoid stress related pain from the masticatory muscles and reduce this symptoms using therapeutic exercises, self-massage and relaxation. These exercises also target the posture of head, neck, shoulders, mandible and tongue, opening movement of the mandible, focusing on translation and rotation, progressive relaxation of masticatory muscles, education on avoiding excessive mouth opening and vicious habits, restoration of joint mobility^{29,30,34}.

Exercises aimed at muscle reeducation and restoring symmetry between the left and right sides and it is recommended to be performed in front of the mirror opening the mouth in a straight line, in sets of 15 to 20 repetitions, 2 to 3 times a day, providing significant improvement after 6 weeks²⁷.

Limited mobility, deviation of the mandible and pain in masticatory muscles could be improved by using a combination of alternative activation and relaxation exercises. One exercise recommends placing the tongue in contact with the anterior part of the palate and followed by light force to the tip of the tongue so it doesn't touch the teeth, having the patient maintain this position as long as possible (3 times over a period of 4 weeks, 10 minutes each time)²⁸.

Joint hyperlaxity, associating mandible deviation during opening has a lower benefit from physical therapy. The exercises aim opening the mouth while the tip of the tongue is placed in the anterior palate, in front of a mirror, along the straight line, 15 to 20 repetitions, 2 to 3 times a day²⁷.

Manual therapy aims to alleviate the signs and symptoms of TDM addressing the “trigger points” by using **joint and soft tissues mobilization and muscle energy technique**. The **joint mobilization** method involves

successive traction or sliding movements at a slow speed and increasing amplitude, in various amount of mouth opening. The movements are performed perpendicularly or parallel to the plain of targeted articulation, repeated 8 to 10 times in 3 sets. Tractions follows three successive effects: relaxation, tension and stretching, increasing mobility in the joint area. This method is successfully used in disc displacement pathologies³³.

Soft tissue mobilization especially addresses to myogenous forms of TMD. It is based on finger(s) pressure to contact a myofascial trigger point or the general masticatory muscles bellies, using multiple methods, as friction massage or tissues techniques, resulting in an increase of tissues strength and

myofascial pain alleviation²⁴. **The muscle energy technique** is indicated in cases of limitation of mandibular movements that are caused by soft tissues disorders. The exercises take place in three successive stages that are repeated up to the limit of individual tolerance. Initially, the patients perform as much movement as the affected tissues allow, then they perform a slight tightening of the muscles, against the resistance created by the therapist for about 10 seconds and finally they

relax their muscles³⁵. These procedures are frequently associated with **massage therapy**.

The main massage technique used in TMD's therapy are: *kneading/effleurage*, performed by soothing and circular movements, aiming to increase blood flow and warming up the muscles, *friction*, which uses pressure of fingertips in trigger points, working toward local tissues remodeling and *stretching* (“*petrissage*”), conducted by rolling the muscles, intending to alleviate the pain and to increase the range of movement³⁶.

The presence of malocclusions, the association of somatic symptoms or the severe damage of joint components may benefit from additional treatment modalities such as **oral**

splints therapy, pharmacotherapy, minimally invasive and surgical procedures. **Oral splints therapy** use different types of artificial occlusal surfaces for therapy of various conditions affecting the relationships between jaws. These are removable devices, fitting over the dental arches are mainly used for occlusal stabilization or for the prevention of teeth

wearing³¹. They are effective in reducing symptoms and muscular activity, but the effect is insufficiently strong to treat sleep

bruxism³². **Drug treatment** represent a complementary therapy rather than an independently one, prescribed for patients with TMD who associate a range of somatic symptoms as chronic pain, inflammatory diseases, neuropathies, myalgias and sleep

disorders²⁵. The mainly medications are myorelaxants, nonsteroidal anti-inflammatory drugs, analgesics, benzodiazepines and corticosteroids²⁵. Botulinum toxin injections have shown successful results in various conditions of TMD such as bruxism, trismus, masseter and temporalis hypertrophy, headaches by decreasing the intensity,

frequency, and duration of painful episodes³⁷. **Surgical procedures** mainly use the arthrocentesis, indicated in inflammatory pathologies, the *intr-articular injections of platelet-rich plasma (PRP)*, especially in chronic pain associated with important articulation dysfunction and the *implants* that replace the severely damaged joint.

CONCLUSIONS

Temporomandibular disorders represent a heterogeneous musculoskeletal and neuromuscular diseases that affect the stomatognathic system, presenting a multifactorial etiology, insufficiently elucidated, whose diagnostic and classification criteria are still a controversial topic. Consequently, multiple therapeutic approaches have been developed, without resulting in the elaboration of a unanimously accepted practice guideline. Considering these premises and for ethical reason, it is recommended to start the treatment with conservative methods because of their low risk of side effects. Physical therapy holds a central place among conservative treatment methods, offering a wide range of procedures, with a high success rate in treating various conditions of temporomandibular diseases.

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