

TMJ: Diagnosis and Management of Temporomandibular Joint Disorders

2.0 Contact Hours

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TMJ Diagnosis and Management of Temporomandibular Joint Disorders

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Objectives

Upon completing this course, the learner will be able to:

1. Define temporomandibular joint dysfunctions (TMDs) and the basic etiology of the dysfunction.
2. List and define the three categories of TMDs.
3. Discuss the anatomy and physiology of the temporomandibular joint (TMJ).
4. Discuss the progression of symptoms as the TMD becomes more unstable.
5. Explain what is included in the physical examination of the TMJ.

Introduction

Temporomandibular joint disorders, or TMDs, comprise a broad subgroup of musculoskeletal disorders that affect the temporomandibular joint (TMJ), the muscles of mastication and/or their associated structures.¹ TMJ sounds are often an indication of mechanical interferences with the joint.² TMDs occur when the muscles used in chewing and the joints of the jaw fail to work in combination with each other. TMD may have any number of causes; a few among them are habits such as clenching or grinding of the teeth (bruxism), malocclusion that puts the muscles under stress, diseases such as arthritis, and trauma that causes damage to the bones of the face and jaw.³ Symptoms can range from barely noticeable to severely debilitating. The etiology of TMD has been considered to be one of the most controversial issues in clinical dentistry. Currently, TMD is not considered a single entity, but a group of several diseases of varying etiology and pathology, and controversy on its management still exists because of the limited knowledge regarding its etiology and natural history.

Epidemiology

According to the American Academy of Orofacial Pain, temporomandibular disorders are defined as “a collective term embracing a number of clinical problems that involve the masticatory muscles, the TMJ and associated structures, or both.”¹ Symptomatic TMJ dysfunction occurs in 10-24% of the adult population, with a smaller percentage experiencing

severe impairment.⁴ The peak prevalence occurs in adults 20 to 40 years old⁵, and the lowest among children, adolescents and the elderly.⁶ Women are affected four times more often than are men.⁷ One general population study indicated that 75% of those evaluated exhibited at least one sign, such as joint noise or palpitation tenderness, and 33% of this non-patient population exhibited at least one symptom that potentially would prompt that individual to seek evaluation and care.⁸ Although no specific data exists about the social impact of TMJ disorders, it has been speculated that they have been responsible for the loss of 550 million workdays every year in the United States. Accordingly, analgesics that are directed at these symptoms are among the top selling over-the-counter medications in the society.³

Classification

Currently, TMJ syndrome is divided into three categories:⁹

1. Myofascial pain dysfunction (MPD) syndrome
2. Internal Derangement (ID)
3. Degenerative Joint Disease (DJD)

The MPD syndrome is considered the most common cause of TMJ pain and may have a psychophysiological etiology which involves the muscles of mastication. ID is defined as an abnormal relationship of the articular disc to the mandibular condyle, fossa and articular eminence. DJD, or osteoarthritis, is the organic degeneration of the articular surfaces within the TMJ.³

Anatomy and Physiology of the TMJ

The temporomandibular joint is a complicated joint; it not only has to allow for rotational motion, but it also has to slide anteriorly and posteriorly. The TMJ is a synovial joint in which the condyloid process of the mandible articulates with the mandibular fossa in the temporal bone. The meniscus (disc) separates the condyle and the temporal bone. The meniscus varies in thickness, with the thinner central area separating the thicker areas which are designated the anterior band and the posterior band. The meniscus and its attachments divide the joint into superior and inferior spaces. The superior joint space is bounded on the top by the articular fossa and the articular eminence. The inferior joint space is bounded at the bottom by the condyle. Both joint spaces have small capacities, generally 1 cm³ or less.

When the mouth opens, two distinct motions occur at the joint. The first motion is rotation around a horizontal axis through the condylar heads. The second motion is translation. The condyle and meniscus translate anteriorly beneath the articular eminence. In the closed-mouth position, the thick posterior band of the meniscus lies immediately above the condyle. As the condyle translates forward, the thinner intermediate zone of the meniscus becomes the

articulating surface between the condyle and the articular eminence. When the mouth is fully open, the condyle may lie beneath the anterior band of the meniscus.³

The principal innervation of the TMJ is the auriculotemporal nerve. It is a branch of the posterior trunk of the mandibular nerve which originates from the trigeminal nerve, one of the largest cranial nerves.¹⁰ The trigeminal nerve, as its name implies, is composed of three branches: the ophthalmic, which has a sensory function, the maxillary, also a sensory nerve, and the mandibular, which provides motor and sensory function. The ophthalmic branch provides sensory innervation to the superior orbital fossa and the skin of the forehead. The maxillary branch provides sensory innervation to the inferior orbital fossa, the cheek, upper teeth, soft and hard palate, nasal cavity and pharynx. The sensory part of the mandibular nerve carries sensory information from the mucous membranes of the mouth and cheek, anterior two-thirds of the tongue, the lower teeth, skin of the lower jaw and the side of the head and scalp. It is important to know these sensory distributions to be able to explain why pain can be referred from the TMJ to these areas. Motor fibers of the mandibular nerve supply the masseters, the tensor veli palatini (which assists in chewing) and the tensor tympani muscles. Irritation of this nerve can cause ear pain and irritating and painful spasms of the facial muscles.³

Clinical presentation

A patient with TMD can present with a plethora of symptoms, many of which would appear to be unrelated to the TMJ. Common complaints associated with pain referred from the TMJ include headache, earache, tinnitus, burning tongue and decreased hearing.³ The patient may describe a jaw that locks on occasion; the patient may have to wiggle the jaw to unlock it. Behavioral changes may include the avoidance of opening wide, such as to bite into an apple, starting to cut food into smaller-than-usual pieces, and changing to food of a softer texture. There also appears to be a large psychosocial component to this disease.¹¹ It is believed that increased stress levels result in bruxism, teeth clenching, and excessive gum chewing. These lead to muscular overuse, fatigue, spasm and subsequently pain.³

Following is a list of symptoms which may not appear to relate to the TMJ:¹²

- **Headache:** Eighty percent of patients with a TMJ disorder complain of headache, and 40 percent report facial pain. Pain is often made worse while opening and closing the jaw. Cold-weather exposure or air conditioning may increase muscle contraction and facial pain.
- **Ear Pain:** Fifty percent of patients with a TMD notice ear pain but do not have evidence of an ear infection. The pain is usually described as being in front of or below the pinna. Patients are often treated numerous times for an ear infection when no infection exists.
- **Sounds:** Crunching, grinding, clicking and popping noises (crepitus) are common in patients with a TMD. These sounds may or may not be accompanied by pain.
- **Dizziness:** Forty percent of patients with a TMD report vertigo. The cause of the vertigo in TMD is not well understood.

- Ear fullness: Thirty-three percent of patients with a TMJ disorder report muffled, clogged or full ears. These types of symptoms may be due to Eustachian tube dysfunction (ETD). It is hypothesized that spasms of the muscles which regulate the opening and closing of the Eustachian tubes are causing these symptoms.
- Tinnitus: For unknown reasons, thirty-three percent of patients with a TMD report tinnitus. Of those patients, one-half will have a resolution of their tinnitus after successful treatment of the TMJ symptoms.

Clinical signs of the MPD syndrome include limitation of jaw opening (normal range is at least 40 mm as measured from lower to upper anterior teeth), palpable spasm of facial muscles, clicking or popping in the TMJ with range of motion, tenderness on palpation of the TMJ, crepitus over joint, and lateral deviation of the mandible. The ID syndrome is often associated with joint pain and is characterized by disc displacement. The patient will describe that a popping or clicking is felt and a clicking sound is heard on opening or closing of the jaw. This is usually associated with pain. The popping is due to the noise the condyle makes as it moves under the displaced disc. The greatest difficulty facing the clinician is distinguishing these disorders from those involving the muscles because the presentations are often similar. Sometimes, the chief complaint is not a pop, but an occlusal instability associated with locking.³

There seems to be a progression of symptoms as the TMD becomes more unstable. Donlon and Jacobson¹³ have classified the derangements based on the findings of the history and physical examination. The patient often gives a history of having passed through each stage of the derangement:³

- Type IA: Derangement is found with a popping noise over the TMJ, but there is no associated pain. This type is seen in more than fifty percent of patients.
- Type IB: Pain is associated with the popping of the joint.
- Type II: This is similar to Type IB derangement, but there is a history of locking of the jaw. There are two types of jaw locking. The closed lock is due to the inability of the condyle to slide under the anteriorly displaced disc. The open lock is due to the inability of the condyle to slide back over the disc into its normal position.
- Type III: This is a persistent lock, usually closed; therefore, there is no associated click or pop on physical examination.

Traumatic injuries to the condyle, such as whiplash or a punch in the jaw, are common.^{13,14} The diagnosis of a condylar fracture is usually made easily by physical examination and radiographic studies. A unilateral condylar or subcondylar fracture results in the deviation of the jaw towards the site of fracture with opening.³

Degenerative arthritis of the TMJ can be either primary or secondary. Primary disease is seen in the elderly and is a disease of wear and tear. Patients are usually asymptomatic, and when symptomatic, the complaints are usually mild. Secondary degenerative arthritis occurs secondary to trauma or chronic bruxism. It occurs in younger people and the symptoms are generally more severe.³

Rheumatoid arthritis is usually seen in other joints before the TMJ becomes involved. Bilateral TMJ tenderness and swelling are seen as the disease progresses. In the early stages, there are a few radiographic changes, but as the disease advances the joint space becomes progressively narrower. In end-stage rheumatoid arthritis of the TMJ, this joint space becomes obliterated. In juvenile rheumatoid arthritis with TMJ involvement, end stage disease can result in destruction of the condylar growth plate.¹⁵

History

The patient should be asked if there is any history facial trauma, particularly to the jaw (fistfights, automobile accidents, etc.). Ask if his partner tells him that he grinds his teeth at night. If the patient is a weightlifter or bodybuilder, ask him if he clenches his teeth when lifting. Ask if there are headaches, ear pain, crepitus, pain in the TMJ when chewing or the presence of tinnitus. Determine when the patient had his last dental checkup, and if his TMJ pain began after having dental work performed, because a change in occlusion after dental work can stress the TMJ. A family history of rheumatoid arthritis should also be noted. The patient should be asked if joints other than the TMJ are affected.

Physical examination

The masseter muscles and the temporal and preauricular areas should be palpated. While the examiner's hands are on the preauricular area, the patient should be asked to repeatedly open and close his mouth. It should be noted if any popping or clicking is felt during range-of-motion. The presence of joint sounds should be noted, and if these sounds are associated with joint pain.

Have the patient open his mouth as wide as possible, and measure the distance between the anterior maxillary and anterior mandibular teeth; any distance less than 40 mm is considered a restricted mouth opening.¹ The teeth should be examined for unusual wear patterns which may indicate bruxism. The opening pattern of the jaw should be observed, and the clinician should note whether the pattern is straight, laterally deviated or deviated with correction.³ Take a tongue blade, place one end on each of the molars, and tap the other end with your finger. The patient's reaction if a toothache or tooth abscess is present will be obvious.

Laboratory work

Lab work may include calcium, phosphate or alkaline phosphatase to check for possible bone disease. An elevated erythrocyte sedimentation rate (ESR) and positive Rheumatoid Factor may indicate rheumatoid arthritis. If gout is suspected, a serum uric acid level should be ordered. An elevated serum creatine level may indicate muscle disease.³

Imaging studies

The MRI is the examination of choice whenever ID is suspected because it is the only modality which can directly visualize the disc and other soft tissue components of the TMJ; however, bony components are better visualized using CT imaging.³ Imaging studies may also be considered if a neoplasm or developmental abnormality is present.

Management

TMJ syndrome is a multifactorial issue, and treatment should be viewed on a case-by-case basis. To achieve optimum treatment outcomes, clinicians must address the specific pathophysiology.⁸ Many patients with TMD experience a remission of symptoms over time and can be treated conservatively. If stress factors are suspected, the clinician may consider antianxiety or antidepressant medication and mental-health counseling, as well as nonsteroidal, anti-inflammatory medications, with the possible addition of muscle relaxants. As with any other painful joint, heat or ice applied to the TMJ may be helpful.

If the patient's symptoms persist, the clinician may consider the use of an acrylic splint, also known as a stabilization splint or night guard. This will help the masseter muscles to relax, and will also prevent bruxism; however, the clinician should consult with a dentist before prescribing any intraoral appliance. Though helpful, these appliances may lead to major alteration of the patient's occlusion and, consequently, lead to the possibility of creating other problems.⁵

Prognosis

Most cases of TMD can be successfully treated; in fact, many cases will resolve over time without intervention by the clinician; however, if symptoms persist after all methods of treatment have failed, referral to an otolaryngologist or oral surgeon would be appropriate.

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