

REVIEW ARTICLE**MANAGEMENT OF TEMPOROMANDIBULAR DISORDER: A REVIEW**Ridam Jain¹, Ashish Yadav², Saurabh Rastogi³, Shrikant Patel⁴¹Department of Orthodontics, Darshan Dental College and Hospital, Udaipur, Rajasthan, India²Department of Prosthodontics, Government Medical College, Azamgarh, Uttar Pradesh, India³Department of Orthodontics, Azamgarh Dental College & Hospital, Uttar Pradesh, India⁴Department of Oral Pathology, Pacific Dental College & Hospital, Debari, Udaipur, Rajasthan, India**ABSTRACT:**

Temporomandibular disorder (TMD) is one of the most common disorders in the maxillofacial region which usually presents with pain, unusual sounds, discomfort in chewing and locking of the jaw. TMD patients comprise a considerable proportion of patients seeking treatment; early diagnosis is important because it is proven that acute TMD responds well to treatment in contrast to chronic TMD. True diagnosis and treatment of TMD can be difficult, as these patients often suffer from some other disorder at the same time. In these cases, a successful treatment is due to true diagnosis of all initiating factors, predisposing and perpetuating factors and treatment of other established disorders. Most TMJ symptoms resolve over time, but a significant percentage requires a year or more to do so. The seriousness of the symptoms also varies greatly. On the other hand, the pathology tends to be progressive and can result in loss of condylar bone and development of facial deformity. Thus, when reviewing treatment options, the time course for resolution of symptoms, their seriousness, and the progressive nature of the disease should all be considered. Treatment efforts are directed toward: 1) reduction of pain, 2) improvement of dysfunction, 3) slowing the progression of diseases. Although few current treatment options appear to affect progression of diseases favorably, this goal gains importance with accumulating evidence suggesting that progression to late-stage disease has a deleterious effect on pain resolution and plays a role in the development of facial deformity.

Keyword: Disorders, Temporomandibular Joint, Management

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INTRODUCTION
Temperomandibular joint is a complex craniomandibular articulation formed between the condyle of the mandible and the glenoid fossa. A joint is a junction between 2 or more bones. The area where craniomandibular articulation occurs is called the Temperomandibular joint. It is formed by the mandibular condyle fitting into the mandibular fossa of the temporal bone. TMJ development takes place mostly between the 7th and 20th week of intrauterine life and a particularly sensitive period is morphogenesis between the

7th and 11th week.¹ Structures involved in formation and functions of the TMJ are:

- Mandibular condyle
- Temporomandibular fossa
- Articulating disk.
- Synovial membrane.
- Ligament of Joint.

The temporomandibular joint is different from the body's other joints. The combination of hinge and sliding motions makes this joint among the most complicated in the body. Also, the tissues that make up the temporomandibular joint

differ from other loadbearing joints, like the knee or hip. Because of its complex movement and unique makeup, the jaw joint and its controlling muscles can pose a tremendous challenge to both patients and health care providers when problems arise.²

Temporomandibular joint and muscle disorders, commonly called "TMJ," are a group of conditions that cause pain and dysfunction in the jaw joint and the muscles that control jaw movement. The condition appears to be more common in women than men. For most people, pain in the area of the jaw joint or muscles does not signal a serious problem. Generally, discomfort from these conditions is occasional and temporary, often occurring in cycles. The pain eventually goes away with little or no treatment. Some people, however, develop significant, long-term symptoms.³

Classification of TMJ Disorders:

Disorders of the jaw joint and chewing muscles—and how people respond to them—vary widely. Researchers generally agree that the conditions fall into three main categories:⁴

1. Myofascial pain involves discomfort or pain in the muscles that control jaw function.
2. Internal derangement of the joint involves a displaced disc, dislocated jaw, or injury to the condyle.
3. Arthritis refers to a group of degenerative/inflammatory joint disorders that can affect the temporomandibular joint.

A person may have one or more of these conditions at the same time. Some people have other health problems that co-exist with TMJ disorders, such as chronic fatigue syndrome, sleep disturbances or fibromyalgia, a painful condition that affects muscles and other soft tissues throughout the body. These disorders share some common symptoms, which suggest that they may share similar underlying mechanisms of disease. However, it is not known whether they have a common cause.⁵

Prevalence of temporomandibular disorder (TMD):

In the same US population, recurrent or persistent orofacial pain (not including 'toothache') has been estimated to occur in 6-12% of people, with a similar figure of 5% of the population in the Netherlands.⁶ TMD is characterized by a complex of signs and symptoms, with orofacial pain as a main symptom. TMD is the most common orofacial pain disorder but its prevalence varies between studies, due likely to age-related differences in the groups analyzed. One survey reported the prevalence of TMD symptoms or signs to occur in 70-80% of young adults. TMD is usually associated with a predilection for females in the 18-35 year age group. In this group, TMD is usually of limited duration (days to weeks) and it is often recurrent because 'stress' is a prime causal factor. Nearly 2% of the population seeks treatment for their symptoms. However, it

should be noted that Vickers et al. have shown that TMD occurs in another targeted age group (45-60 years); patients referred to a medical multidisciplinary pain center reported chronic 'persistent' pain, in contrast to 'recurrent' pain. No definitive reason has been established for 'persistent' pain, although there is compelling evidence to indicate that one cause is muscle spasm secondary to neuropathic orofacial pain, and thus, the consequent development of a TMD.⁷

Etiology of TMJ disorders:

Failure to find disc displacement or Osteoarthritis in infants and very young children strongly suggests that the condition is not congenital, but is acquired. Joint overloads play a central role in the development of Osteoarthritis in the TMJ.⁷ Joint overloads may also have a role in the development of disc displacement. In addition to overloads, blunt force to the face or flexion-extension (whiplash) neck injuries may cause or aggravate TMJ disorders. The repetitive loading of clenching and bruxism possibly are etiologic factors, but a clear relationship has not been established. Genetic and metabolic factors may contribute by lowering the threshold for tissue damage from overloads (relative) or trauma and therefore may also be an important factor in the development of TMJ disorders.⁸

Not all causes are known. Some possible causes are injuries to the jaw area, various forms of arthritis, some dental treatments, your genes and/or hormones, an infection, and auto-immune diseases. Research has shown that TMJ patients can also be hypersensitive to pain, which may explain why they may also have other chronic pain conditions. The cause is now considered multifactorial, with biologic, behavioral, environmental, social, emotional, and cognitive factors, alone or in combination, contributing to the development of signs and symptoms of temporomandibular disorders.⁹

Symptoms of TMJ disorders:

Pain is the most common symptom of TMJ Disorders. TMJ pain is often described as a dull ache in the jaw joint and nearby areas, including the ear. Some people report no pain but have jaw dysfunction. Other symptoms can include:¹⁰

- 1) pain in the neck and shoulders
- 2) migraine and/or chronic headache
- 3) jaw muscle stiffness
- 4) limited movement or locking of the jaw
- 5) painful clicking, popping or grating in the jaw joint when opening or closing the mouth
- 6) a bite that feels "off"
- 7) ear pain, pressure and/or ringing in the ears
- 8) diminished hearing
- 9) dizziness and vision problems

Keep in mind that occasional discomfort in the jaw joint or chewing muscles is common and is not a cause for concern. Many people with TMJ problems get better without treatment. Often the problem goes away on its own in several weeks to months. Recent research suggests that

some patients with jaw problems also experience other painful conditions such as fibromyalgia, chronic fatigue syndrome, cardiovascular disorders, hearing problems, such as tinnitus, digestive and gastrointestinal disorders, vulvodynia, endometriosis, and sleep disorders.¹¹

Diagnosis of TMJ Disorders:

Diagnosis of TMD is made by obtaining a detailed pain history, report of his/her symptomatology, radiographs / CT / MRI, and a clinical examination. A simple screening examination for assessing TMD includes: (i) measurement of the pain-free and maximal range of mandibular opening and lateral excursions, (ii) palpation of the TMJ for tenderness, (iii) obvious TMJ clicking or crepitus, (iv) palpation of masseter and temporalis muscles for tenderness, (v) presence of excessive occlusal wear, chipped teeth, fractured dental restorations, and (vi) measurable differences in facial / jaw asymmetry. In addition, the close association of anxiety / stress assessment is also done.¹²

Common Clinical Disorder & Treatment:

The ideal candidate for TMD treatment presents at least one symptom of the disorder and is committed to maintaining an ongoing treatment regimen. Additionally, candidates may suffer mental or psychological stress stemming from their condition, which, in turn, may only exacerbate their symptoms. Finally, patients who suffer from systemic conditions related to their TMJ disorder may also benefit from treatment.¹³

Effective TMJ treatment relies on a multifaceted approach that often involves more than one practitioner. There is not one tool that can be used to treat all cases, and practitioners need to be able to work as a team to achieve a high success rate. Dental practitioners should work with physiotherapist, chiropractors and massage therapists to optimally treat cases of Temporomandibular Disorders. Within a dental practice, there are different tools that can be utilized.

Myofascial Pain Disorder: Myofascial pain disorder of the masticatory muscle system is the most common of all temporomandibular disorders. Imaging studies of the TMJ usually show no evidence of anatomic pathology. Patients with myofascial pain disorder generally respond to the simple, noninvasive treatments described below.¹⁴

Reassurance and Counseling: It is important for the patient to receive counseling on the natural history and course of temporomandibular disorders. Likewise, it is important for the patient to hear from a health care professional that both the physical suffering and the emotional suffering associated with temporomandibular disorders are understood.¹⁵

Rest: Although it is not prudent to immobilize the mandible, the patient should be instructed to avoid extremes

of mechanical movements (e.g., yawning, laughing, and jaw clenching). Certain habits that may affect jaw function, such as chewing gum and biting fingernails or pencils, should be eliminated.

Heat: The application of heat to the sides of the face with a heating pad, hot towel, or hot-water bottle will be comforting and will help to relieve muscle pain. More vigorous treatment may be achieved with ultrasound or short-wave diathermy heat treatments, which are widely available in physical therapy offices.⁹

Medications: Nonsteroidal antiinflammatory agents are often of value in the acute stage. Initial treatment is usually administered for 10 to 14 days, at which time the patient should be reevaluated. Muscle relaxants are frequently used for episodes of acute pain but have not been proven efficacious in chronic conditions.

Jaw Appliances: Many types of intraoral occlusal orthotic appliances exist for the treatment of temporomandibular disorders, and their multiplicity suggests that the optimal design has yet to be discovered. These devices are worn on the teeth like a retainer or a removable denture and are usually made of processed, hard acrylic. The most common appliance is one that is custom-made of hard acrylic and fits over all the teeth in the dental arch (upper or lower). The patient's dentist should be able to construct and supervise the use of such an appliance.

Behavioral Approaches: Counseling, relaxation techniques, stress management, work pacing, guided imaging, biofeedback, cognitive therapy and other behavioral approaches to treatment have all been reported as helpful.⁹

Physical Medicine: Manual manipulation, massage, ultrasonography, and iontophoresis are helpful in reconditioning and retraining the masticatory and the other craniocervical muscles that are usually involved in temporomandibular disorders. Several commercial passive motion devices for the jaw (similar to those used for the knee) are currently in use for temporomandibular disorders.¹⁶

Intra-articular Disk Derangement Disorder: Disk derangement disorder is defined as a temporomandibular disorder resulting from displacement of the TMJ disk from its normal position or from deformation of the disk. This may lead to synovitis, pain, and limitation of motion. The diagnosis is confirmed by history, clinical examination, and MRI scan in the open- and closed-mouth positions. Diagnostic or therapeutic arthroscopy may also be helpful in confirming the diagnosis and providing minimally invasive surgical manipulation, if necessary.¹⁷

Often, patients have no pain with this condition. In such cases, the signs and symptoms of degenerative joint disease may also be present. Initial treatment for internal derangement consists of the same noninvasive therapies used in treating myofascial pain dysfunction syndrome: behavioral medicine, occlusal appliances, heat, muscle relaxants, nonsteroidal anti-inflammatory agents, physical therapy, and so forth.⁹ These strategies are often successful in patients with an anteriorly displaced disk with reduction (intermittent locking). In contrast, patients with a closed lock, especially one that is long-standing, will most often require interventions such as intra-articular injection with steroids, arthrocentesis, or arthroscopy.

Osteoarthritis: Osteoarthritis of the TMJ may result from trauma (acute or chronic), infection, metabolic disturbances, and previous joint surgery.¹⁸ The patient reports pain on moving the mandible, limited motion, and deviation of the jaw to the affected side. There may be acute tenderness to palpation of the joint. There is a strong predilection for the disease among women in their third or fourth decade. Only a few patients have generalized osteoarthritis.¹⁹

The natural course of the disease suggests that the pain and limitation may “burn themselves out” after as little as several months in some patients. The majority can be kept comfortable with the use of noninvasive techniques until remission. In the acute phase, patients may require intra-articular injection of a long-acting corticosteroid such as beclomethasone or hyaluronic acid. Neither corticosteroids nor hyaluronic acid are recommended for long-term use, and the data on their effectiveness remains equivocal.²⁰ These injection treatments are generally reserved for older patients and are limited to two or three injections separated by 4 to 6 weeks. When these techniques are not effective, surgery may be indicated to remove the loose fragments of bone (so-called joint mice) and reshape the condyle.

Rheumatoid Arthritis: There may be involvement of the TMJ in adults and children with rheumatoid arthritis. In adults with long-standing rheumatoid arthritis, symptoms may develop in the TMJ late in the course of the disease, and these patients may report discomfort only when they have marked limitation of jaw motion. Medical management, along with altering the biomechanics of the TMJ with the approaches mentioned earlier (physical medicine, jaw appliance, and biobehavioral therapy), may be helpful initially. If medical management is not effective, surgical treatment may be necessary, as it is for other joints in the body.²¹

Non-surgical Treatment²²

Non-surgical treatment should be considered for all symptomatic patients with TMJ disorders. For mild or moderate pain and dysfunction, this treatment alone often suffices. One or more of the following non-surgical

treatment modalities may be utilized.

1. *Diet:* Load reduction in the TMJ is achieved by modifying the patient's diet to reduce joint loading from forces of mastication. This is achieved primarily by a non chewing diet such as liquid or pureed food. As the joint pain improves, the diet may be advanced.
2. *Pharmacologic Agents:* The nonsteroidal anti-inflammatory drugs (NSAID) are the mainstays in the pharmacological treatment of musculoskeletal disorders where pain and inflammation are prominent features. Low dose tricyclics are effective in controlling pain from nighttime bruxism, when doses are adjusted to provide improved sleep. Narcotic pain medications are commonly used for a short period after surgery. If needed for extended periods of time, it is recommended that a pain management specialist be consulted.
3. *Maxillomandibular Appliances:* Maxillomandibular appliances (occlusal splints, orthotics, night guards, bite guards) are widely used for bruxism control. Prolonged use of repositioning appliances for TMJ disorders can cause undesirable and irreversible changes in dental occlusion, skeletal structure, and muscle dynamics.
4. *Physical Therapy (PT):* PT in conjunction with other methods of treatment is used to relieve musculoskeletal pain and improve range of motion. Range of motion exercises, whether guided by a physical therapist or the surgeon, is a valuable adjunct after joint surgery.
5. *Injections:* Injections of tender muscles, trigger areas, and/or joint spaces with local anesthetic solution is used for diagnosis and relief of symptoms. Corticosteroid injection can be effective in reducing capsulitis.
6. *Behavior Modification:* Behavior modification is intended to help patients understand and avoid stress-related lifestyle habits, such as clenching, bruxism, and excessive gum chewing. Psychological consultation may be indicated for stress management.²³

Surgical Treatment²⁴

Surgery for treatment has the twin advantages of effectiveness and a rapid response. Surgical consultation should be offered within 2-3 weeks to patients with documented and in whom severe pain and dysfunction persists after a trial of non-surgical therapy.

The following surgical procedures are accepted and effective methods for treatment of joints:

1. *Arthrocentesis:* Arthrocentesis involves placing a suitable needle into the superior joint space and aspiration for histopathology examinations, and then a large amount of lactated Ringer's solution is injected into the superior joint space to debride the superior joint space.
2. *Arthroscopy:* Use of arthroscopy in diagnosing, treating and surgery of TMJ disorders is very popular. In comparison with open surgery and direct cutting of local tissues, arthroscopy is more comfortable with less adverse effects. Laser fibers can also be used to eliminate adhesions and inflamed tissue and cutting adhesions. A variety of

TMJ disorders, including internal disorders, hypomobility as a result of fibrotic adhesions, DJD, hypermobility or excessive movements of joint can be treated by arthroscopy.

3. *Condylotomy*: In this method, a subcondylar osteotomy in the ramus is used which starts from the sigmoid notch and ends inferiorly to the condylar neck. It is suggested in some disorders such as recurrent anterior disc displacement and in degenerative joint disease.

4. *Arthrotomy*: Alloplastic implants are not generally indicated for initial surgical treatment of TMJ. Prosthetic joint replacement may be indicated in selected patients with severe joint degeneration, destruction, or ankylosis. These devices should be considered for use only when their safety and efficacy has been recognized by the FDA.

Recent Advances in Management of TMJ disorders:

Botox therapy: The use of Botox to eliminate muscle spasm and reduce strength of contraction, while retaining voluntary control, has allowed this drug to be used in a variety of clinical conditions involving muscle hyperactivity. Although its therapeutic use was first reported 20 years ago, its application for clenching and bruxism is recent. It appears to be an effective method for treating severe bruxism when traditional methods fail. It also appears to be an effective method for treatment of masseteric hypertrophy.²⁴

TMJ Implants: Surgical replacement of jaw joints with artificial implants may cause severe pain and permanent jaw damage. Some of these devices may fail to function properly or may break apart in the jaw over time. If you have already had temporomandibular joint surgery, be very cautious about considering additional operations. Persons undergoing multiple surgeries on the jaw joint generally have a poor outlook for normal, pain-free joint function. Before undergoing any surgery on the jaw joint, it is extremely important to get other independent opinions and to fully understand the risks.²⁵

Low Level Laser Therapy²⁶: Low Level Laser Therapy (LLLT) uses light energy from Low Level Lasers or Superluminous Diodes (SLDs) to reduce pain, modulate the immune response and stimulate healing. There are also a number of secondary effects from LLLT, including stimulation of β -endorphins, fibroblasts for soft tissue repair and osteoblasts for the repair of bone. LLLT has been demonstrated both clinically and in research to be effective for post-surgical pain and swelling, better integration of implants, healing of soft tissue lesions, and nerve regeneration. LLLT is an effective tool in the treatment of TMJ disorders. Studies have shown that LLLT can decrease pain, muscle trismus and swelling. There has also been some evidence to show that LLLT can help stimulate fibroblasts to form a pseudo disc in cases of disc

degeneration. LLLT is most effective for acute conditions and often can be used as the sole treatment tool. In acute cases, the patient should be treated 3-4 times for one week and then left for two weeks before being reassessed. Chronic conditions often require a combination of LLLT, splints and other physical therapy. Patient should generally be treated 2-3 times per week for 3 weeks before being reassessed. It's important to note that if the patient doesn't experience any improvement the condition should be reassessed.

Postoperative Care

Good care after an operation is essential for obtaining an optimal outcome. Patient instructions immediately after surgery should include the following: wound care, thermal applications (ice, heat), non-chew diet regimen, medications, occlusal management, bruxism control as needed, joint motion plans, and any special instructions related to the specific operation. Active or passive joint exercise to increase range of motion is a key component of management after surgery. Long-term follow-up is recommended.

CONCLUSION

Many dental practitioners find TMJ disorders too complicated to treat and refer treatments to specialists. However, if a dentist understands the anatomy of the joint and takes a good history, then many cases of Temporomandibular Joint Disorders can easily be treated. Substantial improvements have been made in our diagnostic and imaging capabilities, and some treatment advances have been helpful in the long-term management of these common disorders. Future efforts in the fields of genetics, pain research, and arthritis offer the possibility of better defining this heterogeneous group of disorders and providing more focused and effective treatment strategies.

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