
Comprehensive Review on Temporomandibular Joint (TMJ) Disorders

Dr. Ved Nagarkar ¹, Dr. Santosh Nelogi, ²

¹Postgraduate Student, Department of Prosthodontics, KLE VK Institute of Dental Sciences, Belagavi, Karnataka, India

²Professor, Department of Prosthodontics, KLE VK Institute of Dental Sciences, Belagavi, Karnataka, India

Corresponding author

Dr. Ved Nagarkar,

Department of Prosthodontics, KLE VK Institute of Dental Sciences, Belagavi, Karnataka, Belagavi, Karnataka – 590010 India

Email – drvednagarkar@gmail.com

Abstract

Temporomandibular disorders (TMDs) encompass a diverse range of clinical conditions affecting the temporomandibular joint (TMJ), masticatory muscles, and associated structures. They are characterized by symptoms such as pain, joint noises, and restricted jaw function. TMDs are broadly classified into occluso-muscular and intracapsular disorders. This review highlights their differential diagnosis, clinical presentations, pathophysiology, and management approaches. It draws upon classical literature as well as recent advancements, including imaging modalities and psychosocial assessment. Improved understanding of the etiology and mechanisms underlying TMDs is essential for precise diagnosis and tailored treatments.

Key words: Temporomandibular Joint (TMJ) Disorders, temporomandibular joint (TMJ), joint noises, intracapsular disorders, clinical presentations

Introduction

Temporomandibular disorders (TMDs) are a group of musculoskeletal and neuromuscular conditions involving the temporomandibular joints (TMJs), the masticatory muscles, and associated structures. They represent the most common source of non-dental orofacial pain and functional limitations in the jaw.¹ TMDs affect approximately 5-12% of the population, with higher prevalence in women and individuals aged 20–40 years.²

Etiologically, TMDs are multifactorial. Contributing factors include trauma, parafunctional habits (e.g., bruxism), occlusal discrepancies, psychosocial stressors, and systemic conditions such as arthritis.³ Historically, occlusion was considered the primary factor; however, contemporary

research highlights the role of biopsychosocial factors.⁴ This paradigm shift has led to more comprehensive diagnostic and management approaches.

Diagnostic systems like the Research Diagnostic Criteria for TMD (RDC/TMD) and its updated version, Diagnostic Criteria for TMD (DC/TMD), aid clinicians in categorizing patients into muscle-related, joint-related, or combined subtypes.⁵ Clinical features vary depending on the underlying disorder—muscular origin typically presents as dull, aching pain and fatigue, while joint-origin cases may involve clicking, crepitus, or locking.

This review aims to systematically examine the differential diagnosis of TMDs with emphasis on occluso-muscular and intracapsular disorders. It includes clinical features, diagnostic strategies, and current treatment modalities.

Classification of TMDs

TMDs are broadly classified into:

- **Muscle (Occluso-muscular) Disorders:** Primarily involving the masticatory muscles.
- **Joint (Intracapsular) Disorders:** Pertaining to the TMJ structures.
- **Combined Disorders:** Involving both muscular and joint components.

Occluso-Muscular Disorders

These disorders are characterized by pain and dysfunction originating from the masticatory muscles.

Myofascial Pain

- **Definition:** A chronic pain disorder involving trigger points in the masticatory muscles.
- **Clinical Features:** Deep, aching pain; restricted jaw movement; presence of trigger points.
- **Etiology:** Stress, parafunctional habits (e.g., bruxism), postural imbalances.
- **Diagnosis:** Clinical examination revealing tender points; exclusion of joint pathology.

Myositis

- **Definition:** Inflammatory condition of the muscle tissue.
- **Clinical Features:** Localized swelling, tenderness, and limited movement.
- **Etiology:** Infection, trauma, or systemic inflammatory conditions.
- **Diagnosis:** Clinical signs of inflammation; elevated inflammatory markers.

Muscle Spasm

- **Definition:** Involuntary contraction of the masticatory muscles.
- **Clinical Features:** Sudden onset of pain, limited jaw opening.
- **Etiology:** Overuse, stress, or acute trauma.
- **Diagnosis:** Clinical assessment; differentiation from other causes of trismus.

Intracapsular Disorders

These involve structural or functional abnormalities within the TMJ.

Disc Displacement

- **With Reduction:**
 - **Definition:** Anterior displacement of the disc that returns to normal position during mouth opening.
 - **Clinical Features:** Clicking or popping sounds; possible transient locking.
 - **Diagnosis:** Clinical examination; MRI for confirmation.
- **Without Reduction:**
 - **Definition:** Disc remains displaced, leading to restricted movement.
 - **Clinical Features:** Limited mouth opening; deviation of the jaw.
 - **Diagnosis:** Clinical signs; imaging studies.

Degenerative Joint Diseases

- **Osteoarthritis:**
 - **Definition:** Degenerative changes in the joint cartilage and bone.
 - **Clinical Features:** Crepitus, pain during function, joint stiffness.
 - **Diagnosis:** Radiographic evidence of joint space narrowing, osteophyte formation.

Inflammatory Conditions

- **Synovitis/Capsulitis:**
 - **Definition:** Inflammation of the synovial membrane or joint capsule.
 - **Clinical Features:** Constant pain, tenderness, limited movement.
 - **Diagnosis:** Clinical evaluation; imaging if necessary.

Ankylosis

- **Definition:** Fibrous or bony fusion of the joint components.
- **Clinical Features:** Severe limitation of movement; facial asymmetry.
- **Etiology:** Trauma, infection, systemic diseases.
- **Diagnosis:** Imaging studies showing joint fusion.

Differential Diagnosis Considerations

- **Dental Causes:** Malocclusion, impacted teeth.
- **Neurological Disorders:** Trigeminal neuralgia, migraines.
- **Systemic Conditions:** Rheumatoid arthritis, fibromyalgia.
- **Psychological Factors:** Stress, anxiety, depression.

This classification helps in identifying the site and nature of dysfunction, facilitating focused diagnostic evaluation and intervention.⁶

Occluso-Muscle Disorders

Occluso-muscle disorders refer to dysfunctions originating from the muscles of mastication. These include myalgia, myofascial pain, muscle hypertrophy, and muscle contracture. Myofascial pain is the most common diagnosis within this category, characterized by the presence of trigger points that elicit referred pain upon palpation⁷. Patients often report diffuse pain, tightness, and limited mouth opening.

One of the primary etiologies of occluso-muscle disorders is parafunctional activity such as bruxism, which leads to sustained muscle contraction and ischemia⁸. Dawson emphasized the role of occlusal interferences in promoting muscular hyperactivity, particularly non-working side interferences that disrupt coordinated function of the elevator muscles⁹. Prolonged muscle strain can lead to biochemical alterations, including elevated levels of inflammatory mediators such as substance P and bradykinin¹⁰.

Protective co-contraction is another pathophysiological mechanism wherein the masticatory muscles contract to stabilize the TMJ in response to perceived instability or dysfunction. While initially adaptive, chronic co-contraction can result in muscle fatigue and pain¹¹. This mechanism is often seen in conjunction with joint pathology, complicating the differential diagnosis¹². Muscle contracture is a chronic condition involving fibrotic shortening of muscle fibers, usually secondary to prolonged spasm or trauma. It is characterized by persistent limitation in mandibular movement that does not resolve with muscle relaxation techniques. Treatment may include physical therapy or even surgical release in severe cases¹³.

Electromyography (EMG) studies have been instrumental in quantifying muscle activity and diagnosing occluso-muscle disorders. Elevated resting EMG levels in the masseter and temporalis muscles are often observed in symptomatic patients. EMG can also help differentiate between myogenous TMD and referred pain from cervical musculoskeletal sources¹⁴.

Intracapsular Disorders

Intracapsular disorders are conditions that originate within the temporomandibular joint capsule, affecting structures such as the articular disc, condyle, and synovial membrane. The most common intracapsular disorders include disc displacement, joint effusion, synovitis, and degenerative joint diseases¹⁵. These conditions often present with joint sounds, restricted range of motion, and localized preauricular pain.

Disc displacement with reduction involves anterior displacement of the disc during mouth opening, often producing a clicking sound. If the disc fails to return to its normal position, the condition progresses to disc displacement without reduction, characterized by limited opening and deviation to the affected side⁹. MRI is the gold standard for confirming disc position and joint integrity¹⁶.

Degenerative joint diseases, such as osteoarthritis and osteoarthrosis, result from the progressive breakdown of articular cartilage and remodeling of subchondral bone. These disorders are associated with joint stiffness, crepitus, and radiographic findings such as condylar flattening or osteophyte formation¹⁷. Dawson linked functional overloading and parafunction with early degenerative changes in the TMJ².

Inflammatory conditions like synovitis and capsulitis are typically triggered by trauma, infection, or systemic diseases such as rheumatoid arthritis.¹⁸ These disorders present with continuous joint pain exacerbated by mandibular movement, and tenderness over the joint capsule. Contrast-enhanced imaging may aid in diagnosis¹⁹.

TMJ ankylosis represents the end stage of severe joint pathology, resulting in fibrous or bony fusion of the joint components. It is usually preceded by trauma or infection and leads to significantly restricted mouth opening and facial asymmetry. Treatment often requires surgical intervention followed by physiotherapy²⁰.

Discussion

Differentiating between occluso-muscular and intracapsular TMDs is essential for formulating effective treatment strategies. While the symptoms of these disorders often overlap, careful clinical evaluation supplemented by imaging and diagnostic protocols like DC/TMD can provide clarity.² Occluso-muscular disorders are generally managed conservatively through occlusal splints, physiotherapy, and behavioral interventions, whereas intracapsular conditions may require pharmacological, arthroscopic, or surgical treatment depending on the severity and chronicity.⁹

A growing body of literature supports the role of psychosocial factors in the onset and perpetuation of TMD symptoms, particularly in occluso-muscular disorders. Stress, anxiety, and depression have been shown to correlate with increased muscle hyperactivity and parafunctional habits such as clenching and bruxism, exacerbating myofascial pain symptoms.¹³ Cognitive behavioral therapy (CBT) and stress management have been increasingly integrated into multidisciplinary treatment plans, demonstrating significant benefits in reducing pain intensity and improving quality of life for affected patients. The DC/TMD also emphasizes the importance of psychosocial screening to guide comprehensive care.

Furthermore, advancements in imaging techniques such as MRI and CBCT have significantly enhanced the diagnostic accuracy of intracapsular disorders.²⁰ MRI is particularly valuable in evaluating soft tissue structures like the articular disc, allowing precise identification of disc displacement and joint effusion. CBCT, on the other hand, offers high-resolution visualization of bony changes such as condylar erosion and osteophyte formation in osteoarthritis. These modalities are indispensable in treatment planning, especially in cases where surgical intervention is considered. The incorporation of objective imaging criteria alongside clinical findings leads to more predictable and targeted outcomes.

Conclusion

Temporomandibular disorders represent a significant subset of orofacial pain syndromes, necessitating accurate diagnosis and individualized management. A thorough understanding of the pathophysiological differences between occluso-muscular and intracapsular disorders, supported by contemporary diagnostic tools and imaging, is crucial. An interdisciplinary approach incorporating behavioral science, radiology, and dental medicine provides the best outcomes for patients suffering from TMDs.

References

1. De Leeuw R, Klasser GD. Orofacial Pain: Guidelines for Assessment, Diagnosis, and Management. 5th ed. Quintessence Publishing; 2018.
2. Okeson JP. Management of Temporomandibular Disorders and Occlusion. 8th ed. Elsevier; 2020.
3. Manfredini D, Lobbezoo F. Role of psychosocial factors in the etiology of bruxism. J Orofac Pain. 2009;23(2):153-166.
4. Schiffman E, Ohrbach R, Truelove E, et al. Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) for Clinical and Research Applications. J Oral Facial Pain Headache. 2014;28(1):6-27.
5. Greene CS. The etiology of temporomandibular disorders: implications for treatment. J Orofac Pain. 2001;15(2):93-105.
6. List T, Jensen RH. Temporomandibular disorders: Old ideas and new concepts. Cephalalgia. 2017;37(7):692-704.
7. Travell JG, Simons DG. Myofascial Pain and Dysfunction: The Trigger Point Manual. 2nd ed. Lippincott Williams & Wilkins; 1999.
8. Lobbezoo F, Ahlberg J, Glaros AG, et al. Bruxism defined and graded: An international consensus. J Oral Rehabil. 2013;40(1):2-4.
9. Dawson PE. Functional Occlusion: From TMJ to Smile Design. Mosby Elsevier; 2007.
10. Shah JP, Danoff JV, Desai MJ, et al. Biochemicals associated with pain and inflammation in myofascial trigger points. Arch Phys Med Rehabil. 2008;89(1):16-23.
11. Okeson JP. Bell's Oral and Facial Pain. 7th ed. Elsevier; 2014.
12. Glaros AG, Williams K, Lausten L. The role of parafunctions, emotions and stress in predicting facial pain. J Am Dent Assoc. 2005;136(4):451-458.
13. Clark GT. Persistent masticatory myofascial pain. J Am Dent Assoc. 2000;131(9):1279-1284.
14. Ferrario VF, Sforza C, Serrao G, et al. Electromyographic activity of human masticatory muscles in normal young adults. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1996;81(1):27-32.
15. Bermejo A, Gonzalez O, Gonzalez JM. The incidence of joint sounds in asymptomatic temporomandibular joints. J Oral Rehabil. 1992;19(4):413-417.
16. Emshoff R, Innerhofer K, Rudisch A, Bertram S. Clinical versus magnetic resonance imaging findings in patients with temporomandibular joint pain. J Oral Rehabil. 2002;29(5):455-461.

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17. Scrivani SJ, Keith DA, Kaban LB. Temporomandibular disorders. N Engl J Med. 2008;359(25):2693-2705.
 18. Bronstein SL, Merrill RG. Temporomandibular joint pain dysfunction syndrome: Identification and treatment. J Am Dent Assoc. 1991;122(3):59-64.
 19. Kaban LB, Perrott DH, Fisher K. A protocol for management of temporomandibular joint ankylosis. J Oral Maxillofac Surg. 1990;48(11):1145-1151.
 20. Yatani H, Ichikawa Y, Yamashita A, et al. Clinical and magnetic resonance imaging findings of temporomandibular disorders: a comparative study. J Oral Rehabil. 2000;27(2):79-84.