



Temporomandibular Joint Disorders

Dr. Rakhshunda Manzoor, Dr. Maroofa Hafiz, Dr. Marikinda Manzoor, Dr. Mansha Hassan, Dr. Krishna Popat

Post Graduate Student, Department of Pediatric and Preventive Dentistry, Jaipur Dental College, Jaipur, Rajasthan, India

Post Graduate Student, Department of Oral and Maxillofacial Surgery, Jaipur Dental College, Jaipur, Rajasthan, India

Post Graduate Student, Department of Conservative Dentistry and Endodontics, Jaipur Dental College, Jaipur, Rajasthan, India

Post Graduate Student, Department of Oral and Maxillofacial Surgery, Jaipur Dental College, Jaipur, Rajasthan, India

Post Graduate Student, Department of Conservative Dentistry and Endodontics, Jaipur Dental College, Jaipur, Rajasthan, India

Submitted: 10-11-2021

Revised: 25-11-2021

Accepted: 28-11-2021

ABSTRACT : Temporomandibular joint disorders are of different types that can include ankylosis or subluxation or degenerative disorders, that could be managed by the different treatment approaches. Here in this paper, we are going to discuss briefly about the types, features, classification of the TMJ disorders along with the anatomy of the TMJ.

KEYWORDS : TMJ, mouth opening, clicking sound in TMJ, arthroscopy

I. INTRODUCTION :

Temporomandibular joint disorders are the problems related to the joint of jaw & their associated muscles and other surrounding tissues of the joint resulting in reduced mouth opening or pain associated with mouth opening usually with clicking sounds. The etiology and the types of TMJ disorders varies but before explaining those, let us briefly describe about the anatomy of the joint.

ANATOMY OF TMJ: TMJ joint is located just in front of the ear, and it joins mandible to the skull near to temple region or we can say that the joint is between the mandible & temporal bone on each side, allowing the movements of lower jaw, thus helps in mastication and speech. Although, TM joints are the bilateral but considered as components of a single craniomandibular articulation/joint because the movement cannot take place at one temporomandibular joint without a concomitant movement occurring at the joint on the opposite side. TMJ consisting of three articulating surfaces i.e., (a) mandibular fossa, (b) head of the condyle and (c) articular tubercle from the squamous part of the temporal bone; out of which (a) & (c) contributes to the upper articular surface of TMJ with concavo-convex surface from

behind forwards, whereas condylar head of mandible contributes to lower articular surface of TMJ which is elliptical in shape (1). There are three extracapsular ligaments to TMJ that provide stability to the joint. These are-

The temporomandibular ligament/ lateral ligament

The stylomandibular ligament

The sphenomandibular ligament.

Also, the joint is separated by the articular disc into two compartments that are named as superior & inferior compartments where, superior compartment is having the superior border - mandibular fossa of the temporal bone and inferior border is the articular disc itself and this contains 1.2 mL of synovial fluid and is responsible for the translational movements of the joint i.e., gliding movements, protrusion, retraction, and chewing. And, in the inferior compartment superior border is formed by the articular disc whereas, inferior border is formed by the condyle of the mandible. Inferior border is slightly smaller in volume and size. This compartment contains synovial fluid with volume of 0.9 mL and it allows rotational movements i.e., (2). These movements of TMJ are produced by the muscles of mastication (temporalis, pterygoid muscles, masseter) and hyoid muscles (geniohyoid, mylohyoid). The arteries supplying to the joint are branches of the external carotid artery mainly superficial temporal branch, and other arteries that contribute are deep auricular, ascending pharyngeal and maxillary arteries (3). The innervation of the joint is by auriculotemporal and masseteric branches of the mandibular nerve that is the 3rd division of trigeminal nerve.

CLASSIFICATION OF TMJ DISORDERS

1. Myofascial pain and dysfunction (MPD)



2. Internal Derangements
3. Degenerative Joint Disease like Arthrosis, Osteoarthritis
4. Systemic Arthritic Conditions
5. Chronic Recurrent Dislocation also known as subluxation
6. Ankylosis of TMJ
7. Neoplasia& infections

MPD :MPD is the most common cause of masticatory pain and limited function for which patients seek dental consultation and treatment, this condition consists of group of symptoms arising from temporomandibular joints and their associated masticatory muscles. Clinical features include are –

- Diffuse facial pain due to spasm of masseter muscle
- Headache usually in bi-temporal area due to spasm of temporalis muscle.
- Jaw pain, due to spasm of lateral pterygoid.
- Joint noises—grating, clicking.
- Deviation of the Jaw to the Affected Side During the Normal Opening Motion (7)

Examination of the patient reveals diffuse tenderness of the masticatory muscles, range of mandibular movement in patients with MPD may be decreased (4). Other associated symptoms are tinnitus, ear pain, dizziness, fatigue, dry mouth, twitches, blurred vision, etc (5). Psychological factors including anxiety with sleep disturbances, occlusion imbalance specially missing teeth in posterior regions and para-functional habits are mentioned as its most important underlying causes

(6), beside these other causes include muscular hyperfunction physical disorders, injuries to the tissues, nutritional problems. Diagnosis of MPD include the proper history taking from patient in which he will describe about the clinical symptoms, intraoral examination including dental as well as extraoral examination, radiographic examination like IOPA for dental evaluation & OPG, TMJ arthrography, CT scan, muscle examination of the patient and psychological status of the patient is also important. Management of the conditions involves pharmacological non-invasive like NSAIDs, muscle relaxants, anti-depressants as well as invasive include intra-articular injection of hydrocortisone with 2% lignocaine, physiotherapy like heat therapy, TENS, ultrasound waves, dental approach like occlusal splints or replacement of the missing teeth or management of the decayed tooth.

INTERNAL DERANGEMENT I.E., DISC DISPLACEMENT :Disc displacement is the common TMJ arthropathy. The patients with TMJ pain and dysfunction have an abnormal relationship among the condyle, the disk, and the fossa. Disc displacement generates a popping sound when the disc is first forced out of alignment as the mouth opens up and then again as the disc is forced back into place as the mouth is closed. Clinically, this is an initial symptom of the temporomandibularjoint internal derangement. Wilkes developed staging classifications for internal derangement, and these stages were based on clinical or radiological findings, or on the anatomic pathology of the jaw; given below in the table 1 {source (8)}.

Stage	Clinical Findings	Radiologic Findings	Surgical Findings
I	Painless clicking No locking No restricted motion	Slight anterior disk displacement that reduces on opening Normal osseous contours	Normal disk form Slight anterior disk displacement
II	Occasional painful clicking Intermittent locking Headaches	Slight anterior disk displacement that reduces on opening Early disk deformity Normal osseous contours	Thickened disk Anterior disk displacement
III	Frequent pain Joint tenderness Headaches Locking Restricted motion	Anterior disk displacement that does not reduce on opening Moderate disk deformity Normal osseous contours	Disk deformed and displaced Variable adhesions No bone changes
IV	Chronic pain Headaches Restricted motion with crepitus	Anterior disk displacement that does not recapture on opening Marked disk deformity Degenerative osseous changes	Disk perforation, displacement, and adhesions Degenerative changes in condyle and/or fossa
V	Variable pain Joint crepitus	Anterior disk displacement that does not recapture on opening Marked disk deformity Degenerative osseous changes	Disk perforation, displacement, and adhesions Degenerative changes in condyle and/or fossa

Table 1 - Wilkes Staging Classification for Internal Derangement of the TMJ.

If the displaced disc returns to its original position when the mouth is opened, accompanied by a popping sound, it is referred to as disc displacement with reduction, but in case, if the

displaced disc does not return to the normal position and acts as an obstacle during attempted mouth opening, the joint appears as locked then the



condition is known as disc displacement without reduction (9).

Factors for the disorder include – malocclusion, crossbites (unilateral posterior leading to mandibular dysfunction), habitual posture of body during sleep, direct injury, arthritis, parafunctional activities like bruxism, nutritional, missing teeth, systemic degenerative changes, structural changes, genetic factors, etc.

Diagnosis of involves the patient history & examination, lab tests like RF for arthritis, ESR, imaging studies for the joint pathology like OPG, arthrography, CT & MRI.

Management of disc displacement includes –

a. Patient education - After educating the patient about their pathological conditions, the patients can actively take part in their own improvement like reduction in the habitual habits, dietary habits modifications.

b. Medication –NSAIDs like aspirin, ibuprofen, naproxen etc; muscles relaxants like diazepam, baclofen; antidepressants in bruxism may be helpful. Corticosteroids either systemically or intraarticular injection of hydrocortisone are helpful in the reduction of inflammation.

c. Physiotherapy – The aim of physiotherapy is to restore normal mandibular function by a number of physical techniques that serve to relieve musculoskeletal pain and promote healing of tissues (10).

d. Surgery – Surgery can play an important role in the management of TMJ disorders, these including arthrocentesis, arthroscopy, discectomy, and joint replacement. Conditions that are always treated surgically involve problems of overdevelopment or underdevelopment of the mandible resulting from alterations of condylar growth (9).

SUBLUXATION :Subluxation of the jaw is a fairly common injury and also known as habitual chronic recurrent dislocation. In hypermobility the condyles are positioned over the articular eminence resulting in a skip of the condyle complex during the terminal opening of the mouth (11). Subluxation of the jaw occurs when TMJ is subjected to forces that exceed the strength of the ligaments in joint and these excess forces over time are enough to weak the ligaments, and thus frequency of such injuries will continue to increase. And, then this condition can occur after – Subluxation occurs after or commonly seen in such cases:

External influences on the lower jaw,
Chewing too large or hard pieces of food,
Wide mouth opening like yawning, laughing, opera singers, etc,

Diseases causing seizures like epilepsy,
Tooth extraction that occurs due to violation of the density of the dentition and jaw structure,

It is found in people who have a common frustration in the activity of the joints.

Clinical features include mouth difficult to open and close, pain and discomfort in the joints and masticatory muscles may be or may not be present (and in some of the patients the pain is sudden sharp and severe during wide mouth opening) and, the problem is of such magnitude, that the patient becomes reluctant to masticate

food. On clinical examination, palpation of the joints and measurements of the mouth opening can be assessed with additional assessment of the involvement of the disc in condyle mobility derangement and its relation to the disc with its articular surfaces using specific methods of joint examination. Thus, diagnosis include patient history, clinical examination of the TMJ and usually came to clinics with opened mouth most of the time, since patients are unable to close their mouth. Other diagnostic investigations include OPG, CT scan & CBCT, MRI. The management of the subluxation involves different treatment approaches like (5,11) –

- Intermaxillary fixation or limiting the oral opening by giving elastics for 3 – 4 weeks to give rest to the joint,
- Use of sclerosing solution injections into the joint space like injection of sodium tetradecyl sulfate (sterol) brings about fibrosis in the capsular region, but the results are short lived.
- Physiotherapy, particularly kinesiotherapy by Schulte, affects the musculature and joint kinetics, and regular, but not excessive exercise affects the coordination of maximal movements of TMJs.
- Intramuscular injection of Botulinum toxin type A was also tried, but it has also the same outcomes that results are not of long term.
- Surgery - In 1976, Miller and Murphy divided surgical procedures to correct recurrent condylar dislocation into five categories:
 1. Capsule tightening procedure.
 2. Creation of a mechanical obstacle or block.
 3. Direct restraint of the condyle.
 4. Creation of a new muscle balance.
 5. Removal of mechanical obstacle.

TMJ ANKYLOSIS:It is the condition where the condylar head of mandible gets fused to the fossa



either by bony or fibrotic tissues. The American Academy of Orofacial Pain (AAOP) defines ankylosis of the TMJ as a restriction of movements caused by intracapsular fibrous adhesions, fibrous changes in capsular ligaments (fibrous-ankylosis), and osseous mass formation resulting in the fusion of the articular components (osseous-ankylosis) (12). Also, it can be classified into –
TMJ ankylosis can be classified into various types (13):

- a. True or false
- b. Extraauricular or intraauricular
- c. Fibrous or fibro osseous or bony
- d. Unilateral or bilateral
- e. Partial or complete.

Causes of TMJ ankylosis include:

Trauma,
Arthritis,
Infection,
Previous TMJ surgery,
Congenital deformities,
Birth injuries,
Congenital defects,
IU developmental problems,
Inflammation of joints,
Idiopathic factors and
Iatrogenic causes

The most common cause of ankylosis is followed by the infection. The clinical problems that arise due to the ankylosis of TMJ are interference with mastication, speech problems, poor oral hygiene due to limited mouth opening, and interference with normal life activities, and it could be potentially life threatening when struggling to acquire airway in an emergency due to ankylosed joint. Also, chin is underdeveloped and with overjet due to maxillary anterior teeth is seen as mandibular growth is less, thus due to reduced growth of mandible bird face is seen; this can also result in emotional & psychological effects. Diagnosis of TMJ is usually made by the history taking & clinical examination, imaging like OPG, CT scan, MRI (14). Management of TMJ ankylosis given by Kaban include:

Resection of the fibrous or bony tissue
Coronoidectomy on affected side i.e., unilateral ankylosis
Contralateral coronoidectomy with intraoral approach if it is less than 35mm
Reconstruction of ramus with a costochondral graft
The lining of the TMJ with temporalis fascia
Early mobilization & physiotherapy
Rigid fixation (15).

NEOPLASIA OF TMJ: Although, neoplasia of TMJ is rare, but tumors within TMJ can result in restricted opening of the mouth and pain in TMJ area due to abnormal relationship between the condyle and fossa.

II. CONCLUSION :

TMJ disorders can be an annoying for any age group either be old or young or children due to the restricted opening or closing of the mouth, deviation of the jaw, inability to speak in restricted conditions, etc. Besides the physical suffering to the patient as like pain or clicking sounds, it could also result in psychological changes specially in case of children or old age groups. The physical therapy and pharmacological, dental (occlusal splints, replacement of the missing teeth, restoration of decayed teeth, orthodontics) management is the reversible treatment phases for the reduction of pain, inflammation, anxiety or in cases of initial staging pathology of TMJ disorders but the overall long-term treatment plan in advance cases of TMJ disorders can only be provided by the surgical management.

REFERENCES

1. Vishram Singh; Textbook of Anatomy: Head, Neck, and Brain
2. <https://www.kenhub.com/en/library/anatomy/the-temporomandibular-joint>
3. The arterial blood supply of the temporomandibular joint: an anatomical study and clinical implications; Imaging Science in Dentistry 2013
4. Chapter – Management of Temporomandibular Disorders; Contemporary oral and maxillofacial surgery, 7thed, Elsevier
5. Textbook of oral & maxillofacial surgery by Neelima, 4th ed.
6. Effects of Low-level Laser in the Treatment of Myofascial Pain Dysfunction Syndrome; J dent res dent clin dent prospectus
7. Garg, et al.: Myofascial Pain Dysfunction Syndrome: An Overview, Heal talk; 2013.
8. https://pocketdentistry.com/wp-content/uploads/285/B9780323171267000108_t0010.png
9. Temporomandibular Joint: Disorders, Treatments, and Biomechanics; Annals of Biomedical Engineering
10. Management of temporomandibular joint disorders: A surgeon's perspective; Australian dent. J
11. Subluxation of temporomandibular joint- A clinical view; Journal of Dental Problems and Solutions



12. Gundlach KK. Ankylosis of the temporomandibular joint. J Craniomaxillofac Surg 2010
13. Malik NA. Textbook of Oral and Maxillofacial Surgery. 1st ed.
14. Management of Temporomandibular Joint Ankylosis; Oral Maxillofacial Surg Clin N
15. Juniordentist.com