

## Temporomandibular joint disorders - Part I

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### Abstract

The terminology “temporomandibular disorder” (TMD) covers a group of conditions. A lot of attempts have been made to categorize TMD, but all have shortfalls. Some classify by frequency of presentation, some by etiology, and some by anatomy. However, there is substantial overlap in classification system as they are not clinically suitable. Therefore, not even one system persuades all the criteria. TMD is a wide-ranging collection of clinical problems that involve the muscle of mastication, the temporomandibular joint, surrounding bone and soft tissue components, or at times combinations of all of them. Any factor that affects one part of the system is likely to have impact on the other parts also, so it is essential to avoid blind side when we have to consider likely signs and symptoms of a TMD. About 20–30% of the adult populations are affected to some degree; it is predominately a condition of young and middle-aged adults, rather than of children or the elderly, and is approximately twice as common in women as in men. TMD is the second most common non-dental origin orofacial pain, but at the same time, the recurrence of other symptoms such as earache, headache, neuralgia, and tooth pain, which can be related to the TMD or be present as secondary findings to be assessed in the differential diagnosis process.

### Introduction

Temporomandibular joint (TMJ) disorders are any disorder that affects or affected by deformity, disease, misalignment, or dysfunction of the temporomandibular articulation. This includes occlusal deflection of the TMJ and the associated responses in the musculature.

Research diagnostic criteria (RDC) defined temporomandibular Disorders (TMD) as - A collective term describing a group of condition affecting the TMJ, the masticatory musculature, or both.

The definition for TMD that was presented by the National Institute of Health Technology Assessment Conference on Management of TMD (1996) illustrates the terminology problem that must be corrected:

Depending on the practitioner and the diagnostic methodology, the term TMD has been used to characterize a wide range of conditions diversely presented as pain in the face or the jaw joint area, limited mouth opening, closed or open lock of the TMJ, abnormal occlusal wear, clicking or popping sounds in the jaw joints, and other complaints.”<sup>[1]</sup>

### Terminology

- Functional disturbances of the masticatory system have been known by a variety of terminology. In 1934, James Costen

described a group of symptoms centering on the ear and TMJ. Due to his work, the term Costen syndrome developed.

- In 1959, Shore introduced the term TMJ dysfunction syndrome.
- Functional TMJ disturbances coined by Ramfjord and Ash.
- Certain terms described etiologic factors such as occlusomandibular disturbance and myoarthropathy of the TMJ.
- Stressed pain, such as pain-dysfunction syndrome, myofascial pain-dysfunction syndrome, and TM pain-dysfunction syndrome.
- Bell suggested the term TM disorders.
- American Dental Association adopted the term temporomandibular disorders or TMD.<sup>[2]</sup>

### Epidemiology

Patients who have temporomandibular problems are in a broad age range with a peak occurrence between 20 and 40 years of age. TMD symptoms are more prevalent in women as compared to men; women tend to develop TMD during their premenopausal years. TMD occurrence is not clear entirely; however, few have suggested the influence of hormone, high levels of estrogen have been found in patients.<sup>[3]</sup>

## Etiology

- Parafunctional habits
- Emotional distress
- Trauma due to blows or impacts which can be acute
- Trauma caused by hyperextension
- Occlusal factors
- Deep pain input.

### Parafunctional habits

#### Diurnal

- Clenching
- Grinding
- Cheek and tongue biting
- Occupational habits.

#### Nocturnal

- Clenching
- Bruxism.

### Emotional distress

Emotional stress activates the hypothalamus and reticular system as a result of which there is increase in gamma efferent activity due to which there is contraction of intrafusal fibers that cause reflex contraction and increase in tonicity in muscle.

### Trauma

#### Microtrauma

Small forces constantly applied to structure over an extended course of time.

For example, bruxism/clenching.

#### Macrotrauma

Sudden traumatic or forceful blow that causes structural alteration.

e.g.: Blow on the face.

#### Direct trauma

- Intubation procedures
- Third molar surgeries
- Long dental appointments
- Yawning.

#### Indirect trauma

- Injuries that may occur to TMJ secondary to sudden force
- Cervical flexion-extension injuries (Whiplash injuries).

### Deep pain input

There is Central excitement of the brainstem which produces muscle response known as protective co- contraction (body's response to injury or threat of injury). There is a functional disorder of masticatory system; two symptoms are seen: Pain and dysfunction.

For example, toothache, earache, and cervical pain.

## Classifications

### Diagnostic classification of TMDs (Burket's 12<sup>th</sup> edition)<sup>[4]</sup>

#### Cranial bones (including the mandible)

1. Congenital and developmental disorders
  - Aplasia
  - Hypoplasia
  - Hyperplasia
  - Dysplasia.
2. Acquired disorders
  - Neoplasia
  - Fracture.

#### TMJ disorders

- Deviation in form
- Disk displacement
- Dislocation
- Inflammatory conditions (synovitis, capsulitis)
- Arthritides (osteoarthritis, polyarthritis)
- Ankylosis (fibrous, bony).

#### Masticatory muscles disorder

- Myofascial pain disorders
- Myositis
- Spasm
- Protective splinting
- Contracture.

### Classification System for Diagnosing TMDs (Okeson 7<sup>th</sup> Edition)<sup>[2]</sup>

#### Masticatory muscle disorder

- Protective cocontraction
- Local muscle soreness
- Myofascial pain
- Myospasm
- Centrally mediated myalgia.

#### Chronic mandibular hypomobility

- A. Ankylosis
  - Fibrous
  - Bony.
- B. Muscle contracture
  - Myostatic
  - Myofibrotic.
- C. Coronoid impendance.

#### TMJ disorders

##### Derangement of the condyle-disc complex

- Disc displacements
- Disc dislocation with reduction
- Disc dislocation without reduction.

*Structural incompatibility of the articular surfaces*

1. Deviation in form
  - Disc
  - Condyle
  - Fossa.
2. Adhesions
  - Disc to condyle
  - Disc to fossa.
3. Subluxation (hypermobility)
4. Spontaneous dislocation.

**Inflammatory disorders of the TMJ**

1. Synovitis/capsulitis
2. Retrodiscitis
3. Arthritides
  - Osteoarthritis
  - Osteoarthrosis
  - Polyarthritides.
4. Inflammatory disorders of associated structures
  - Temporal tendonitis
  - Stylomandibular ligament inflammation.

**Dr. Mark Piper's classification**

1. Normal
2. Ligaments or cartilage damage
3. Partial disc subluxation, with reduction
4. Partial disc subluxation, non-reducing
5. Complete disc dislocation, with reduction
6. Complete disc dislocation, non-reducing
7. No disc, bone to bone - Adapting
8. No disc, bone to bone - Adapted.

**Examination of TMD<sup>(1)</sup>**

- I. The chief complaint (there may be more than one)
  - A. Location of the pain
  - B. Onset of the pain
    - Associated with other factors
    - Progression.
  - C. Characteristics of the pain
    1. Quality of the pain
    2. Behavior of the pain
      - Temporal
      - Duration
      - Localization.
    3. Intensity of the pain
    4. Flow of the pain
  - D. Aggravating and elevating factors
    1. Function and parafunction
    2. Physical modalities
    3. Medications
    4. Emotional stress
    5. Sleep disturbances.

- E. Past consultations and/or treatments
- F. Relationship to other pain complaints

## II. Medical history

## III. Review of systems

## IV. Psychological assessment

**Diagnosis**

TMD is categorized into articular and non-articular disorders, which is known as extracapsular and intracapsular conditions. Majority non-articular disorders are present as myofascial pain related to the masticatory muscles. Indeed, >50% of TMJ disorder is myofascial pain. Chronic conditions such as fibromyalgia, muscle strain, and myopathies come under non-articular disorders. A focused history and physical examination are needed for diagnosis of TMJ disorder. Pain and restricted range of movement are common symptoms of TMJ disorder. Radiographic studies can also be used as adscititious diagnostic tools. Dental problems due to referred pain can be ruled out using periapical radiographs. Detailed imaging of bony structures of the joint can be obtained from cone-beam computed tomography scans and panoramic radiographs. Examination of the disk position and morphology is done using magnetic resonance imaging (MRI) which is a gold standard modality; it may also show degenerative bony changes. Along with MRI findings, we should combine patient's clinical presentation, signs and symptoms along with TMJ imaging at the time of a treatment planning.<sup>[3,5]</sup>

**Myofunctional Pain of Masticatory Muscles**

Also known as masticatory myalgia syndrome, TMJ pain dysfunction syndrome. Myofascial pain and dysfunction is theorized to begin from muscle spasm caused by over extension of muscle, muscular over contraction and muscle fatigue, chronic oral habits like clenching, bruxism or other parafunctional habits. The result is strain in muscles of mastication, pain, spasm, and limitation in functions. Emotional stress also predisposes to clenching and bruxism that causes myofascial pain.

Symptoms consist of chronic pain in muscles of mastication, pain in the ears, neck, and head which radiates tenderness in the muscle, clicking noise in TMJ, and limitation of movements in the jaw which deviates on opening.<sup>[4,6]</sup>

**Treatment**

- Drugs - aspirin, ibuprofen, and amitriptyline
- Occlusal splint
- Physiotherapeutic modalities - heat application, cryotherapy, and transcutaneous electrical nerve stimulation.<sup>[6]</sup>

**Ankylosis**

It is a Greek terminology meaning "stiff joint: Hypomobility to immobility of the joint can lead to inability to open the

mouth from partial to complete. The definite cause of ankylosis of TMJ is unknown. Two main factors predisposing to the ankylosis are trauma and infection in or around the region. In 1968, Topazian reported that 26–75% of cases of TMJ ankylosis are seen following trauma, while 44–68% are seen due to infection.<sup>[7]</sup>

### Etiology

- Abnormal I/U development
- Birth injury
- Trauma to the chin
- Malunion of condylar fracture
- Injuries associated to malar-zygomatic compound
- Congenital syphilis
- Primary inflammation of the joint
- Metastatic malignancies
- Inflammation secondary to radiation.

### Types of ankylosis

1. False ankylosis
  - Extra-articular
  - Fibrous
  - Bilateral
  - Partial.
2. True ankylosis
  - Intra-articular
  - Bony
  - Unilateral
  - Complete.

### Unilateral ankylosis

- Chin deviates toward the affected side
- Affected side is foreshortened
- Lack of contour is seen on the affected side
- Ramus and body in the ankylosed side is underdeveloped
- Presence of antegonial notch
- Malocclusion and tilting of lower incisor and posterior crossbite.

### Bilateral ankylosis

- Inability to open mouth
- Failure of development of the lower jaw
- Antegonial notch well defined
- Mandible is symmetrical but micrognathic. Patient develops typical “bird face” deformity with receding chin
- Severe malocclusion.

### Management of TMJ ankylosis

Treatment of TMJ ankylosis is always surgical.

Objective: The objective of this study was to -

- Establish movements in the joints and functions of the jaw.
- Prevent relapse.
- Restore occlusion and appearances.

The number of techniques has been advocated by different surgeons. Critical analysis of all filters only to three basic methods:

- Condylectomy
- Gap arthroplasty
- Interpositional arthroplasty.<sup>[7]</sup>

### Traumatic Disturbances

This includes luxation and subluxation, ankylosis, and fracture of condyle. Luxation and subluxation are when dislocation occurs when condylar head moves anteriorly into such a position that it cannot come back voluntarily to its normal position. The etiological factor is traumatic injuries or yawning or opening the mouth too wide which will cause sudden locking and immobilization of jaws when mouth is opened. Sometimes, mouth cannot be closed. It can be treated by relaxation of muscles and moving the mandible to its position by exerting inferior and posterior pressure of thumbs in the mandibular molar region.<sup>[2,6]</sup>

### Developmental Disturbances

This includes aplasia, hypoplasia, and hyperplasia of mandibular condyle.

Aplasia occurs when mandibular condyle fails to develop, it can be unilateral or bilateral which results in facial asymmetry, occlusion and mastication are altered, mandible shifts toward the affected side, whereas in bilateral cases, mandibular shift is not present. It can be treated by osteoplasty; malocclusion is corrected by orthodontic appliances and cosmetic surgery for facial deformity.

Hypoplasia is underdeveloped or defective formation of condyle. It may be congenital or acquired causing facial asymmetry in unilateral cases, in mild disturbance, there is slight mandibular shifting from midline. It can be treated by cartilage or bone transplants preceded by unilateral or bilateral sliding osteotomy.

Hyperplasia generally occurs after puberty and is completed by 18–25 years of age, it is unilateral enlargement of condyle caused by mild chronic inflammation as a result of which here is unilateral slowly progressive elongation of the face and deviation of the chin away from affected side, severe malocclusion is seen. This can be treated by resection of the condyle.<sup>[2,6]</sup>

### Conclusion

A patient suffering from TMD can have symptoms, in any combination, which may consist of alteration and restriction in mandibular movement, pain in facial, preauricular muscle which may worsen with function, crepitation or clicking of the joint, unexplained tooth pain, and chronic daily headache. The basic necessity for successful occlusal treatment is stable

and comfortable TMJ. This understanding of the TMJ is the foundation to diagnosis and treatment of almost everything a dentist does.

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