



Classification of Tempromandibular Disorders



Defined as any disorder that affects or that is affected by deformity, disease, misalignment, or dysfunction of the tempromandibular articulation. This includes the occlusal deflection of the TMJs and associated responses in the musculature.

A wide range of conditions diversely presented as pain in the face or jaw joint area, limited mouth opening, closed or open lock. Clicking or propping sounds and other complaints.

- Until fairly recent years there exists a tremendous amount of confusion about many of the symptoms that are related to the area of the tempromandibular joint
- Because of the failure to differentially diagnose the problem and determine its cause, patients are routinely subjected to imperical treatments that are often more harmful than the symptoms themselves

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- Many patients are forced to lead their lives under unnecessary medication or under the care of psychiatrist to “learn to live with pain” that can be frequently eliminated by a knowledgeable dentist within a matter of minutes.
 - A large percentage of TMDs are actually caused by a dentist who doesn't understand the cause and effect relationship involved with the syndrome.



Dentists should be taught to

- Recognize the symptoms of temporomandibular joint and related syndromes
- Diagnose the cause
- Treat the problem in the most conservative way that is practical.

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- In 1959 Shore introduced the term temporomandibular joint dysfunction syndrome, later ramfjord and Ash suggested term temporomandibular joint disturbances.
 - Since the symptoms are not always isolated to the TMJ some authors believe that the term craniomandibular disorders is a more appropriate term.

Epidemiology of TMD

- **Prevalence of** temporomandibular joint disorders **among students of the university of jordan**
- This study aimed to investigate the prevalence of temporomandibular disorder (TMD) among students of the University of Jordan
- Information about the symptoms of TMD and the possible risk factors were collected
- **RESULTS:**
- The results showed that pain in or about the ears or cheeks was the most prevalent symptom whereas locking of the temporomandibular joint (TMJ) was the least prevalent. Nearly one-third of the investigated sample (31.4%, 346/1103) had no symptoms of TMD whereas 68.6% (757/1103) had at least one symptom. Students of health science studies had significantly the highest risk in developing TMJ clicking compared to students studying pure science or humanitarian studies.

- ◉ **CONCLUSIONS:**

- ◉ TMD is of a high prevalence among students of the University of Jordan, particularly among students of health and science studies, which signify the role of stress in the development and/or progression of TMD. The findings of this study are alarming and entailing further investigations to identify risk factors associated with TMD in order to establish measures for prevention and treatment.
- ◉ Subclinical?

Types of TMD

- Each structure of the masticatory system can tolerate only a certain amount of increased force created by muscle hyperactivity
- When these applied forces are increased beyond the critical level, breakdown of the tissues begins.
- The initial breakdown is seen in the tissue with the lowest structural tolerance (the weakest link of the chain, whether it's the muscles, the TMJ, the teeth or their supporting structures), that's why this varies from one patient to another.



Symptoms of TMD might be one of the following

- If the weakest link is the TMJ
 - Limited jaw movement
 - Joint tenderness and pain
 - Sounds such as clicking or grating
- Teeth showing mobility
- Wear of teeth
- Pain and tenderness in muscles



Analysis of orofacial pain

- For any treatment approach to be effective it must identify each specific disorder and isolate the factors that either cause the disorder or contribute to its intensity or duration.
- First we should make a diagnosis, what is the source of pain...
- A logical diagnostic procedure requires a structure by structure analysis to determine which tissue are the source of pain



Analysis of structural deformation

- Pain is a common symptom of structural deformation.
- Signs usually precede symptoms because some type of structural disorder is almost always responsible to activate awareness of pain or discomfort. (periodic disease)
- A clinician can learn a lot by listening to the symptoms but will miss much if careful observation and attention to signs is not given the attention it deserves.

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- The point that should not be missed is that the masticatory system disorders are rarely ever confined to a single structure. There will always be collateral effects from disorders in the joints, muscles, or teeth.
 - It is usually found that a chain of cause and effect reactions as one disorder leads to another.



Classification of TMD

- The most logical approach is to recognise that the most likely sources of TMD pain or dysfunction can be separated into three broad categories
 1. Masticatory muscle disorders
 2. Structural intracapsular disorders
 3. Conditions that mimic TMD

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- Combinations of two of the three can and do occur
 - One type of problem can cause or be caused by another.

Disc derangement might be accompanied by muscle response and it should be known if muscle incoordination activated the disc derangement or vice versa.



Categories of TMD

1. Occluso-muscle disorder with no intra-capsular defects
1. Intracapsular disorders that are directly related to occlusal disharmony and are reversible in reestablishing comfortable function if the occlusion is corrected
2. Intracapsular disorders that are irreversible, but because of adaptive changes can function comfortably if occluso-muscle harmony is re-established
3. Non-adaptive intra-capsular disorders that may be either primary or secondary to occlusal disharmony or may be unrelated



Dr Bell's classification of Tempromandibular disorders

- Acute muscle disorders
- Disc interference disorders
- Joint inflammatory disorders
- Chronic hypomobility disorders
- Growth disorders



Occluso-muscle disorders

- ◉ Most common
- ◉ Most correctable
- ◉ Most prevalent cause of orofacial pain
- ◉ Most common findings
- ◉ Most misunderstood and most ignored
- ◉ Mostly originate directly from para functional disorders

Symptoms

- Pain usually aggravated by manual palpation or functional manipulation of the muscles.
- Pain in other structures due to masticatory muscle incoordination and hyperactivity.

Premature or overloaded tooth contacts can cause severe pain in teeth intensify pain of sinusitis, activate tension headaches especially in the temporal muscle, simulate ear pain, affect the alignment of the disk on the condyle, or cause painful displacement of the TMJ, alter the TMJ rest position leading to change in occlusion of the patient, restricted jaw movement.

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- Occluso muscle pain might occur as a separate entity or in combination with intra-capsular disorders or other pain sources.
 - Evaluation of occluso-muscle pain must be a separate step in diagnosis.
 - Because occluso-muscle pain always involves the relation between the TMJ and occlusal contacts it is necessary to relate occlusal contacts to the completely seated position of the condyle, so the starting point is to determine if the condyles are healthy and capable of complete seating into centric relation or adaptive centric position

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- Before the occlusion can be evaluated the TMJ should be evaluated to make sure it is healthy and the condyle disk alignment and position are ok.
 - The condyles must be free to go to and from centric relation freely and without discomfort.
 - Any problem with the TMJ must be resolved before occlusal problems can be resolved as all occlusal relationships are also related to the TMJs.
 - Harmonizing the occlusion to a misaligned joint makes a disharmony.

Ways to verify TMJs are healthy

- History key questions to be asked

Muscles:

- Do you have frequent headache if yes where and how often
- Do you have soreness in your muscles, where, when, what causes it and what relieves it

joints

- Have you ever been injured, details
- Do you have joint noises, pain or discomfort, locks, other joint concerns

Bite/teeth



Acute muscle disorders might be divided into

- Muscle splinting
- Muscle spasm
- Muscle inflammation (myositis)



Masticatory muscle splinting

- The first reaction to altered proprioception and sensory input
- It may result from alteration of sensory input from the dentition and the surrounding structures, which could be caused by dental treatment, gingival pain like denture base irritation, administration of local anesthesia, parafunctional activity.

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- It is normally of short duration and it disappears when the etiologic factor is resolved.
 - There is usually no restriction of jaw movement except to avoid pain.
 - No signs of disc condyle interference in the joint, no acute muscle induced malocclusion.



Masticatory muscle spasm (myofascial pain dysfunction syndrome)

- The continued presence of muscle splinting might lead to muscle spasm
- May be caused by central excitatory effects of deep pain in the surrounding areas.
- General or physical fatigue, exhaustion and systemic illness.
- Might lead to disc-condyle interferences during movement
- Might cause acute malocclusion, spasm in the lateral pterygoid affects the rest positional leading to a change in the occlusion.



Muscles involved

- Elevator muscles
- Inferior lateral pterygoid
- Superior lateral pterygoid



Clinical characteristics of elevator muscle spasm

1. Pain with biting or chewing as well as wide opening
2. Biting on a separator between posterior teeth does not change this pain
3. Some restriction of mandibular opening may be present arising from painful muscles
4. No disc interferences
5. No alteration in mandibular position

Inferior lateral pterygoid spasm

1. Can be identified by pain during contraction or stretching

When the mandible protrudes against resistance

When teeth are clinched in centric occlusion

When a separator is placed between posterior teeth stretching of the inferior lateral pterygoid is reduced and pain is also reduced

Rarely causes any restriction of mandibular movement

Can cause acute malocclusion which is usually noticed as absence of posterior teeth contact on the ipsilateral side with premature contact on anterior teeth on the contralateral side



Superior lateral pterygoid spasm

- Increased by clenching with or without separator
- Does not increase when the mandible is opened or protrudes against resistance
- It can influence disc function (can create disc interference disorders)
- The symptoms usually disappear when the spasm is resolved



Elevator and superior lateral pterygoid spasm

- When all the three muscle groups are in spasm a combination of the previous symptoms are found
- Pain is present in all muscle groups
- Pain present during clenching is only partially reduced by biting on a separator
- Restriction of mandibular movement is extracapsular and occurs only during mouth opening
- Acute malocclusion malocclusion may result

Masticator muscle inflammation

- As myospasm continues inflammation may arise in the muscle
- It might result from the same etiologic factors contributing to spasm or from local injury and subsequent infection of the muscle tissues or from direct extension from inflammation in nearby structures
- Prolonged inflammation might lead to muscle contracture



Clinical characteristics

- Pain occurs when the muscle is at rest or in function
- Soreness
- Pain is increased when the teeth are clenched since the elevator muscles are mainly affected
- Pain is not reduced with biting on a separator
- Restriction of mandibular opening is common



Disc interference disorders

1. Joint tightness, clicking, crepitation, and locking.
2. Pain is usually related to strain or injury to the discal or other collateral ligaments.

Symptoms associated with these disorders often are caused by micro or macro-trauma, muscle hyperactivity that might increase intracapsular pressure and alter disc position leading to disc interference during movement

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- Disc interference disorders are divided into 5 categories.
 1. Class I occurs before translation begins.
 2. Class II as translation begins characterized by a distinct click within the first 8-10 mm of opening after maximum intercuspatation or an extended period of inactivity.
 3. Class III during translation
 4. Class IV when translation is extended to normal limits
 5. Class V (spontaneous anterior dislocation) when the condyle moves beyond normal limits of translation



Class III interference

- Caused by excessive motion between the articular disc and the condyle that results in catching or striking altering or restricting mandibular excursions. The steepness of the articular eminence can be a contributing factor
- Three factors can create class III interference
 - Incompatibility of the articular structures and/or surfaces
 - Impaired condyle disc function
 - Increase in the passive intra-articular pressure

Structural incompatibility of the articular surfaces

- May result from developmental anomalies or alterations of normal growth patterns
- Create repeatable and consistent alterations in mandibular movement
- Normally consistent with certain movements thus the patient often learns a movement pattern that will avoid or minimize the interference so deviation from the midline and back is often seen.



Impaired condyle disc function

Factors that impair condyle disc function

1. **Adhesion between the condyle and the disc**
(action of the condyle is rough, irregular and noisy)
2. **Damage to the articular disc** (continuous grating noise)
3. **Dysfunction of the discal ligament**, leading to functional displacement leading to a click or dislocation of the disc which can occur by heavy opening, heavy external trauma, or significant changes to the disc.
4. **Dysfunction of the superior retro-discal lamina**
the patient will have the signs of closed lock

Anterior functional dislocation

- Occurs when there has been sufficient thinning of the posterior part of the disc
- The disc is pulled forward by the superior lateral pterygoid muscle
- Mechanism
 - Click
 - Reciprocal click
 - Closed lock can open between 25-30mm with deflection of the midline to the ipsilateral side. Normal lateral movement to the ipsilateral side and restricted movement to the contralateral side



Posterior functional dislocation

- Occurs when anterior thinning of the disc occurs
- Mechanism
- The patient can open normal interincisal distance but on closing has difficulty getting the teeth directly back into intercuspal position often a deviation to one side is necessary before final closure
- Much less common than anterior dislocation.



Class IV interference

- Occurs when the condyle and disc are forced anteriorly to the limits of translation because of excessive opening of the mouth during yawning or dental procedures. Or because of the steep articular eminence.
- It is referred to as subluxation or hypermobility.



class V :Spontaneous anterior dislocation of the disc

- Occurs at the full extent of translatory movement due to premature activity of the superior lateral pterygoid.
- Patients report a history of excessive mouth opening
- Pain which might result from excessive muscle spasm or from stretching the inferior retro-discal lamina when force is applied to close the mouth before properly reducing the disc

Inflammatory Disorders of the Joint

- Common symptoms
 - Continuous deep pain
 - Might create secondary central excitatory effects like referred pain, excessive sensitivity to touch,
 - Increased muscle spasm
- Classified according to the structure involved into
 1. Synovitis or capsulitis
 2. Retrodiscitis
 3. Inflammatory arthritis

Synovitis

- Clinical characteristics

1. Joint area is tender to palpation
2. Swelling
3. Changes in the joint fluid that may affect the movement
4. Dis-occlusion at the posterior teeth on the same side

The inflammation may be a result of trauma, wide opening, abusive movement, spread of inflammation from the adjacent tissue



Retrodiscitis

- Trauma is the most common cause
- May be accompanied by swelling
- Can follow a chronic anteriorly dislocated disc

Inflammatory arthritis

- Extensive inflammation involving the articulating surfaces
- Destruction of the articulating surfaces and subarticular osseous structures of the joint.

- Clinical characteristics

Constant pain in the joint

Tender to palpation

Acute malocclusion



Can be sub classified into

1. Traumatic arthritis
2. Degenerative joint disease
3. Infectious arthritis
4. Rheumatoid arthritis
5. hyperuricemia



Chronic mandibular hypomobility

- Long term painless restriction of movement
- Can be divided into
 1. Contracture of the elevator muscles
 2. Capsular fibrosis
 3. ankylosis



Contracture of the elevator muscles

- Clinical procedure of reducing the resting length of a muscle without interfering in its ability to contract further.

- Clinical characteristics

History of long term of restricted mandibular movement during opening

No pain or malocclusion are associated

Lateral movement is not limited

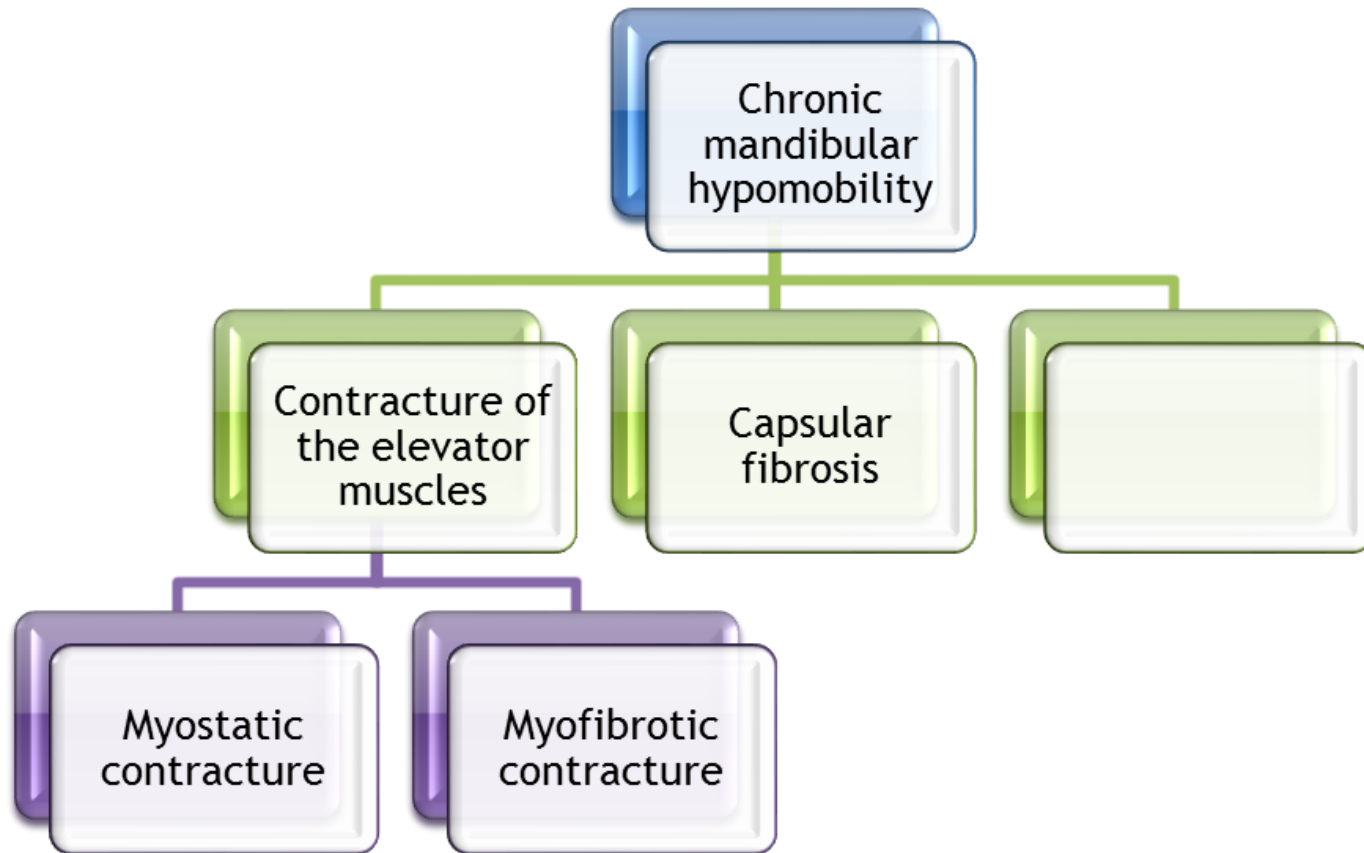
X-rays reveal limited movement of the condyle



Capsular fibrosis

- Capsular ligament becomes fibrotic secondary to trauma or inflammation
- Restricted movement during opening lateral and protrusive
- If it is unilateral the midline will deflect to the ipsilateral side during opening

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- **Contracture of the elevator muscles refers to reducing the resting length of the muscle without affecting its ability to contract. Limiting mouth opening.**
 - **The two subtypes of elevator muscle contracture can't be differentiated easily clinically.**
 - **Mysotatic contracture results when a muscle is restricted from full relaxation (stretching) for a prolonged time.**
 - **Myofibrotic contracture results due to excess tissue adhesions within the muscle or its sheath. Usually follows myositis.**
 - **Capsular fibrosis associated with a history of trauma or inflammation. Results when capsular ligaments become fibrotic. It limits all mandibular movements. Mandible will deflect to the ipsilateral side upon opening.**
 - **Ankylosis can be fibrotic due to a previous hemarthrosis from trauma, or osseous due to a history of infection. It limits all mandibular movements. Mandible will deflect to the ipsilateral side upon opening.**



Growth disorders

- ◉ Hypoplasia
- ◉ Hyperplasia
- ◉ Neoplasia
- ◉ Asymmetry may be noticed in such cases.
- ◉ Radiographs and bone scans are extremely beneficial for the diagnosis.



Refernces

- Evaluation diagnosis and treatment of occlusal problems. Peter Dawson chapter 3
- Fundementals of occlusion and tempromandibular disorders. Jeffrey Okeson chapter 7, 10
- Functional occlusion from tmj to smile. Peter Dawson ch 23,24
- **Prevalence of temporomandibular joint disorders among students of the university of jordan.** Ryalat S, Baqain ZH, Amin WM, Sawair F, Samara O, Badran DH. J Clin Med Res. 2009 Aug;1(3):158-64. Epub 2009 Jul 3.