#16 dr.Suzan TMDs Classification

 TMDs are either: **dysfunctional symptoms**occur at 15-30 y/o "young age" present with clicking, muscle tenderness

-Ptns who are older than 40 years have more commonly **degenerative joint disease**

-**Internal derangement** can occur at any age. It is a problem between the condyle, disc, and glenoid fossa.

-Prevalence: male: female = 1:1

TMDs are multifactorial conditions. It could be trauma, stress, genetics, parafunctional habits (50%), deep pain inputs, and occlusion (not really a significant factor).

Events that extend beyond the physiologic tolerance of the pt.

* Pain is the most common cause for the pt to seek treatment.
* Muscle tenderness is frequently detected but rarely reported
* *Joint noises:*
1. Clicking: when the condyle and the disc are not going together).
2. Crepitus: due to a degenerative disease.
3. Locking:
4. Trismus: associated with pain in his muscles and limitation of jaw movements at morning, this is a strong sign of parafunctional habits bruxisim at night.

**Aucisson TMDS Classification**

1. Masticatory muscles disorders.
2. Temperomandibular joint disorders.
3. Mandibular hypomobility.
\*bony( ankylosis)
\*Muscular problem
4. Growth disorders.

**masticatory muscles disorders and its categories**

* Protective cocontraction (muscle splinting): when agonist and antagonist muscles work together as a first response to injurious event.

-if not resolved it will continue to the next category

-Causes: 1. Altered sensory or proprioceptive input.

 2. constant deep pain input.

 3. emotional stress.

-it occur immediately follows an event.

- Clinically : 1. reduced range and velocity of movements ).

 2. no pain at rest

 3. increased pain with function

 4. muscle weakness

-If muscle co-contraction didn’t resolve it continue as muscle soreness.

* Muscle soreness: Causes: 1. protracted muscle cocontraction

 2. trauma

 3. emotional stress

 4. local enjury

Clinically: Pain began several hours to few days following the event

1. Structural derangement
2. Minimum pain at rest
3. Increased pain with function
4. muscle weakness
5. Local muscle tenderness

Myofacial pain (trigger point myalgia): heterotopic pain and is both centrally and peripherally mediated.

Causes: 1. Protracted local muscle soreness

 2. deep pain

 3. increased stress

 4. sleep disturbances

 5. local factors: habits, improper postures, strain, ….

 6. systemic factors: hypovitaminosis, fatigue, viral infection.

Clinically: 1. Structural dysfunction

 2. pain at rest

 3. increased pain with function

 4. presence of trigger point

* Myospasm: involuntary CNS induced chronic muscle contraction (in rest and function). Either due to local factors (fatigue, electrolyte imbalance in the muscles) or systemic factor like musculoskeletal disorder that affects masticatory muscles.
* Can be triggered by continued deep pain input and stress

History: 1. sudden onset of pain

 2. tightness

 3. restriction in the jaw movements & muscles rigidity.

Clinically: 1. Structural dysfunction (marked restriction in the range of jaw movements).

 2. acute malocclusion

 3. pain at rest

 4. pain at function

 5. local muscle tenderness

 6. muscle tightness

* Centrally mediated myalgia (chronic myositis): affects peripherally the muscles. producing neurogenic inflammation

History: long history of consistency of pain.

Clinically: 1. structural dysfunction

 2. pain at rest

 3. pain at function

 4. local tenderness, muscle tightness and muscle contraction

* Fibromyalgia: It’s a systemic disorder , 3 quadrants of the body out of 4 are affected or 11 muscles out of 18 predetermined sites for three months or longer.
* clinically : poor quality sleep, structural dysfunction, pain at rest, pain at function and trigger points.
* Tender points don’t produce heterotopic pain when palpated.

**Temporomandibular joint disorders**

loss of normal disc movement due to elongation of ligaments ,Trauma , Para functional habits, muscle hyperactivity, orthopedic instability , disc dislocation or displacement. ,inflammation

**Derangement of the condyler-disc complex:** where the relation between the condyle and the disc changes . Usually the disc is located more anteriorly by the superior pterygoid muscle.Displacement occurs anteriorly since there is no space posteriorly.. When it gets more serious, it will cause disc dislocation with reduction at the first stage or without reduction at the second stage.

The cause of displacement is thinning of the posterior part of the disc and elongation of the associated fibers , result in a clicking sound.
 we hear two clicking sounds one at the start of the opening and the second should be at the end of closing right before maximum intercuspation occurs.

* Clinically: 1. Joint sound 2. Normal range of jaw movement at centric and eccentric.
* *Dislocation with reduction*: condyle completely dislocated anteriorly. The
* ptn can’t manipulate the jaw to reposition the condyle on the posterior border of the disc and the disc is said to be reduced.& causes clicking sound,
* Dislocation with reduction >> the condyle will return to its position under the disc (recapturing it).
* History: long history of clicking, and joint catching with/without pain.
* Clinically: limited range of movement… opening then click then **deviation** and then a normal range because after the click both the condyle and the disc returned back to their right place).
* *Dislocation without reduction* resulted from excessive elongation and the disc is forced further more anterio-medially by the condyle, and the disc can’t be reduced to get back to normal position while opening so no clocking sound. **Deflection** take place (Opening- deflection- limited range of movement of 25mm while the normal should be 40mm).

\*\*\*These videos were shown in the lecture and are very helpful understanding the concept above:
- <https://www.youtube.com/watch?v=9h2CXfUjuvA>
- <https://www.youtube.com/watch?v=QTihztWMv4k>
- <https://www.youtube.com/watch?v=fyHGOOhxHGs>
* History: 1.ptn report that the jaw was locked.
* 2.Previous history of clicking

**Dislocation** without reduction >> the condyle will never return to its proper position under the disc and separation between them occurs. (the disc in front and the condyle is behind)

* Clinically : 1. Range of movement is limited

 2. mandibular deflection to the involved joint

 3. lateral movement is normal on **ipsilateral** side

 4. bilateral loading is painful

 Structural incompatibility of the articular surfaces :

1. In the form / morphology of the condyle or disc or glenoid fossa..
2. Adhesions and adherence: due to chronic inflammation of the joint.
* Causes are: prolonged static loading of the joint, loss off lubrication, and secondary to hypoxia.
* Adherence: temporary sticking , adhesion (formation of fibrous tissue and its more chronic).both not associated with pain
* Clinically for both: the ptn feels sticking in the joint at certain moment during movement but continues the movement normally.
* There is superior joint adhesion and inferior joint adhesion.
* superior joint adhesion: adhesion space between the disc and glenoid fossa. At early stages, only rotation occurs leading to limited mouth opening but at later stages due to long standing adhesion the condyle translates forward leaving the disc dislocated behind posteriorly , there is a difficulty upon closure and turning back into occlusion). It’s the only case where you will see the disc posteriorly dislocated or displaced.
* inferior space adhesion: happens between the disc and the condyle ,No rotation is allowed but translation is normal .

 Hypermobility (or called **subluxation**): it is just an anatomic variation in ptns have short and steep posterior slopes of the eminence .

* History : ptn reports locking when the mouth is widely opened.
* Clinically : a depression in the face behind the condyle , and no pain is observed.

Spontaneous dislocation : occurs upon opening, the condyle-disc forced beyond the eminence and become locked there. He can’t close his mouth again unless you helped him to do so. So, its hyper extension of the TMJ resulting in fixation of the joint in an open position preventing any translation.

* Causes: anatomic predisposition, yawning, muscle fatigue, sudden contraction of inferior pterygoide muscle.
* Clinically: sudden locking of the jaw with upper and lower anterior teeth separating and posterior teeth are closed. And it’s painful.
* Inflammatory problems

They can be in any component …
* Causes: trauma and infections.
* Clinically : 1. pain in the perioricular area

 2. Pain on function

 3. Limited range of movements

 4. Cripitation sound

**Chronic mandibular hypomobility**

Includes:

 1. Ankylosis

2. Muscle contraction

3. Coronoid impedance

Clinically: restricted range of movements, deflection and NO pain.

#17 stomatognathic system

Examination of the articulatory system What are the signs and symptoms of TMDs?

-Joint pain -sounds -dysfunction or limitation of movement -muscle tenderness –headache.

 What is the Articulatory system? -Neuro-muscular system (muscles)and ligament -the TMJ and - occlusion.

Examination consists of: -Range of movements -TMJ tenderness, TMJ locking, TMJ sounds -Radiographs sometimes although they are not very conclusive -Muscle tenderness (palpating muscles) -signs of parafunction) -Headache in the morning Causes of limitation of the range of movement are either: - muscular (pain ) - articular (physical obstruction).

Range of movement: is the only measurable character mouth opening range, direction, notice any deviation or deflection and lateral movements. examine the midline.

 Types of openings:

 -Diagonal: when the patient opens ,his mandible goes toward one side, Sometimes the movement would be diagonal from the beginning, means that one of the condyles is not moving in, this is due to adhesion ``adherence: it’s a sticky movement initially, then I can open and adapt to it. While adhesion is more permenant (ankylosis).

Deflection: Once you open, there is a straight line, then you go to one side, usually it is associated with disc displacement without reduction. ``in ipsilateral direction, the condyle is not moving there.``

 -Deviation: is vertical then lateral movement in the middle, then it returns to the vertical path, happens with disc displacement with reduction."interference during the condyle movement Range of motion"

 The normal range of opening is 35-40 mm. or 3 fingers of the pt not ur fingers.

 Technique for lateral movement is measuring from the midline to the midline. the lower limit is 7-8mm.

 TMJ tenderness/TMJ sounds:

 Pain is the most common cause for patient to seek treatment , Acute trauma results from injury or v. high restoration.

 While chronic trauma, results from parafunctional overloads on TMJ.

 palpate the retro-discal tissues with your index finger inside or infront of the external auditory meatus. or the lateral tissues and ligaments of the condyle, and the posterior aspect (capsule). hear TMJ sounds better by collaborating palpating with ur fingers to the sound, you can also use stethoscope.

 The most important ligament is the lateral TMJ ligament, it limits the lateral movement of the TMJ.

 Types of clicks are: : (it could be reversible) Popping sound is usually due to dislocation or when the condyle recaptures the disc, it could be .. Single or multiple . Early or late. Soft or loud. Painful or painless. Simple or reciprocal (in opening and closing).

 Crepitus happens with degenerative diseases , TMJ locking refers to two clinical presentations: the patient can open to a limited degree,

pt describes sticking sensation and its painless, usually due to anterio-medial disc displacement, and its dislocation without reduction, mandible opens and locks temporarily , the patient is unable to open or close any further, this is call **spontaneous dislocation**, It sometimes happen due , perforation in the disc.

 Correct diagnosis depend on good examination, Radiographic,

 Muscle examination

 Muscle tenderness: palpated from the muscles origin to its insertion, . If u cant examine then do a functional examination. -Masseter And Temporalis examination:: Palpate /Lateral pterygoid: functional examination, opening and lateral movements against resistance. -Medial pterygoid: We do not palpate it, so it’s also functional.

Trigger points palpation: hypersensitive bands of Ms. trigger points in masseter the pain can be sensed in the maxillary molars, over the angle of the mandible or in the supra-orbital region.

 in the temporalis, the pain will be in the upper molars or the upper anterior teeth and the supra-orbital region. -Lateral pterygoid: referred pain to the ear or infra-orbital regions.

 Bruxism: - attrition -sensitivity - fractures -scalloping of the tongue -headache – abfraction

 Occlusal examination (static and dynamic): -

**Static,** angles classification, the centric occlusion ',centric relation, check for premature contacts ,freedom in centric. Which interference is the most harmful? The lateral slide, And the bigger the slide, the more risk you will have.

 If less than 2mm slide, then it is ok, but if u have for example 6mm slide, then it would be an ortho instability.

90% of people have slide, only 10% CR=CO."MIC" CR?

 We Guide the pt to get the CR, in different cases, you can put a cotton roll and ask the pt to bite on it until he feels tired.

 Retruded contact position: it’s the position of the mandible to the maxilla where there’s just the first contact upon closure, when the condyle is in the centric relation, then a slide occurs due to this contact, and we go to the maximum intercuspation. we don’t notice the slide everytime we close, Because we close in MIC directly, due to brain adaptation, (habitual bite)

**Dynamic occlusion examination**, check for incisal (anterior) guidance, working and non-working side interferances. In anterior guidance you look for how much of the lower teeth in contact with the upper teeth during protrusion, should be simultaneous contact, and equal in density, then you have a nice harmonized anterior guidance.( this is applied to lateral movement also). If only a lower central incisor is in contact, instability, occlusal trauma and pain would result. The most important function of anterior guidance is to disocclude the posterior teeth, to be in a pain free motion. .

Tempromandibular Disorder management:

Treatment of TMD Treatment should be based on an accurate diagnosis and understanding of the disorder .

Orofacial pain is very complex ,many structures in the head and neck can produce complaints that mimic TMD .

 it’s very difficult to diagnose TMDs because muscles pain, TMJ pain, and head and neck pain they mimic each other . Challenges that we face : patient’s symptoms do not fit into one classification.

 The patient may be suffering from one or more than one disorder (myospasm and internal derangement).

 One disorder may contribute to another (so you need to know the primary disorder). Exp. Muscle disorders can lead to disc derangement.

 Etiological factors that contribute to TMDs are difficult to control and eliminate. Some etiological factors are not yet identified.

Pain from musculoskeletal system varies greatly. **Trauma** is one of the most common etiological factors either it’s a macro-trauma (blow to the face) or micro-trauma (occlusion or parafunction) and it could lead to any of the four disorder ,, emotional stress or deep pain input.

 Treatment can be : Definitive treatment (eliminate the TMD cause )

 Supportive treatment (relief the TMD symptoms): analgesic , massage, ultrasound

To do definitive treatment you should know the etiological factor (Occlusal factor, emotional stress) Patient awareness Restrictive use (to decrease or restrict the use of the mandibular movement to its full limit and use small movement)

 Voluntary avoidance (to avoid tooth contact ) , Relaxation therapy

Treatment modalities

 Pharmacological therapy : depends on the severity of the disorder Analgesic NSAIDs Corticosteroid Anxiolytics Muscle relaxants Antidepressants

 Physical therapy modalities : Thermotherapy: hot packs (better blood flow and it changes the sensory input to reduce the pain ) Coolant therapy (reduce swelling) (High and low temperatures are very useful ) Ultrasound Acupuncture Laser

 Manual techniques Massage (by the dentist or you educate the patient how to do massage )

Joint mobilization or distraction (patient should open and relax used in cases of adhesions or myospasm

and you need the patient to relax, Passive muscle stretching (in front of the mirror do a few exercises like opening and closing repeatedly)

Splint therapy

 Surgery (the last option to choose from the treatment modalities)

 Masticatory muscle pain is a common symptom of TMDs

 **treatment** of Protective co-contraction Eliminate the cause Restrict mandiblular movement to painless limit , Soft diet , Short term NSAIDs (for a week)

Local muscle soreness:

 Eliminate the cause , Educate the patient of self managment like exercise, Restrict mandiblular movement to painless limit, Soft diet, Splint ( if the soreness persists for along time ) Minor analgesic , Muscle relaxant

Muscle myospasm Effectively treated by reducing the pain of the patient by Massage ,stretching of the whole Ms, Cold or thermotherapy Eliminate the deep pain source , Allow the muscles to rest, **No need** for Muscle relaxant Trigger points myalgia Eliminate the cause at certain point, vitamins , Reduce the systemic involvement in the myofacial pain ,Treat sleep disturbance (as sleep disturbances might cause trigger points), Pressure and massage

 (if you find the trigger point) Spray or Inject (local anesthesia ) and stretch the muscle , Ultrasound .

Chronic myositis Restrict mandibular movement , Soft diet, Avoid exercises and dental appointments , Disengage the teeth , Anti-inflammatory NSAIDs (at least regularly for 2 weeks)

 Fibromyalgia If diagnosed then refer to medical society and they will use pharmacological treatment like NSAIDs, antidepressants and physical therapy and regular exercise.

TMJ disorders Derangements of Disc-Condyle assembly

 Disc displacement and disc dislocation with reduction.. Characteristics : Restriction is associated with pain most population have clicking and they don’t evolve into something serious and in most population it’s intermittent (it will come and resolve )

If the patient have pain or some restriction of movement treatment will be: Reduce the pain and reposition of the condyle back on the disc to recapture it if possible . it’s difficult to recapture the disc and if it’s not recaptured most pt will function normally without pain So if the patient only have clicking without pain there’s no need to interfere .

Definitive treatment: Reduce the pain, Not to recapture the disc.



Splint therapy : hard acrylic device that sets between the teeth in a certain relationship.

 We can use stabilization splint or anterior repositioning .

the splint Stabilization splint AKA: Centric splint, Michigan splint, and many other names Constructed in Centric relation

Anterior repositioning splint Puts the mandible in a more forward position to try to recapture the disc .

 We use the splint at night and we gradually reduce their use, sometimes they are worn for 8 weeks and sometimes for months .

If after we remove the splint , the symptoms is back then the duration of use is not enough or the patient didn’t wear the splint enough or might have a really serious occlusal instability in this case the occlusion is not allowing proper disc condyle relationship and it’s the only situation where orthodontic treatment or full mouth rehab is allowed for the treatment of TMDs.

cause of TMDs: patients with sleep disorders, breathing disorders, or emotional stress, treatment depend on the patient education to Restrict the movement ,Soft diet, Medications, Moist heat or cold packs ,PSR (physical self regulation) , to educate him to relax, do exercises at home , and to sleep in a more relaxed forms.

Anterior repositioning splint: To put the mandible in a more forward position but to what extent ? It’s the minimal forward movement that eliminate the patient’s clicking

 Time of use: at night and gradually reduce the use

Duration: depend on the severity of the case, age, general health of the patient, the extent of trauma , in older patients the adaptive changes are slower. after the withdrawal of its use the symptoms will disappear ; the condyle-disc relationship will get back to normal or the retrodiscal tissues which was causing the pain will become fibrotic and healing starts and there will be some sort of adaptation. so not all the times you can recapture the disc using the splint .

joint sounds are common and not related to serious disorder or pain or restriction Or clinical disorder.

-even after treatment reoccurrence is common.

the choice of splint the safest and most effective one which is the stabilization splint. Anterior repositioning splint : not commonly used because the success rate is not high And it cause posterior open bite ,but it reduces pain in 75% of cases .

Disc dislocation without reduction Anterior repositioning splint is **contraindicated** where the condyle will never be under the disc so pressing the disc more forward is very painful and harmful. We use in this case stabilization splint.

 But if we have acute case that happened just 2 days ago for example we could recapture the disc by manipulation to relax the muscles, first inject local anesthesia in the lateral ptyregoid muscle and manipulate the muscle to relax and recapture the disc manually and once you achieved that then Anterior repositioning splint is worn for 2 days at night and then we will change it to stabilization splint, this the only case where we use Anterior repositioning splint in Disc dislocation without reduction .

Most pt response well to conservative methods of treatment and if it didn’t work and the patient is still having pain and restriction of normal movement then surgery is the option left for treating the disorder .

 Surgical treatment like : arthroscopy, arthocentesis, arthrotomy, discetomy Supportive therapy , Patient education Self regulatory Anti-inflammatory Soft diet , decrease the load on joint Small mouth opening and gentle exercises



Structural incompatibility :- Deviation in form ..Treatment : surgery

 Adhesions and adherences Treatment : stretching Exercises Stabilization splint PSR ,

Subluxation (the condyle is moving beyond the eminence) Treatment : eminectomy or reduce the slope of the eminence

 Spontaneous dislocation Treatment: inject local anesthesia to relax the muscle and manually manipulate the condyle into its normal position.

 Inflammatory disorders it can be treated by : NSAIDs Ultrasound Soft diet Small bites

 Occlusal appliance Can be definitive or supportive treatment Non-invasive method of treating TMDs they alter the occlusal forces , prevent wear of teeth, reduce bruxism, treat masticatory pain, change the relationship between maxilla an mandible or the condyle to glenoid fossa.

 Theories of how occlusal appliances work : Occlusal disengagement (separate the teeth), Maxillo-mandibular realignment (more physiologic and stable position), Increase vertical dimension "decrease contraction in the muscle" , TMJ repositioning ,

Cognitive awareness theory remained the pt about the disorder . .

 Type of splints:

 Soft guard, bite Localized occlusal interferences splint , Stabilization splint, Anterior repositioning splint, Anterior bite plane

Soft bite guard : which is known as night guard , it’s used in emergencies with severe pain and it shouldn’t be used for a long time because it’s soft the patient will continue to chew on it so it exacerbate rather than alleviate the problem it is given for one week and then replaced with hard appliance, it’s used by athletes during sport for short time.

 Localized occlusal interferences splint It’s like balls the patient bite on it to increase the proprioception on 4 teeth to aware the patient about the parafunction and he will avoid it , it overloads certain teeth and it’s not used for long time worn for short time few months(2-3)

 only Stabilization splint we talked about it is called Centric , tanner, fox, Michigan, muscle relaxation splint It’s used in parafunction Aims to temporarily give the patient ideal occlusion because he will bite in centric and the forces are equilateral and he have proper anterior guidance without interferences and you are putting the condyle in a musculoskeletal stable position Safe to apply

 Duration of use : according to the severity / How it’s made: Take the centric relationship with a soft material and it’s constructed to have flat surface never indentated the splint in order not to cause interferences while moving and to have proper anterior guidance without posterior interferences.

 it’s a common mistake that after the removal of splint that we should do a full mouth rehab and try to achieve ideal occlusion .

 Anterior bite plate Same as stabilization splint but only anterior part only it’s used for short time because it will cause posterior open bite and it can be easily swallowed .

--Permanent occlusal adjustments are rarely indicated.