

Review Article

Examination of the Temporomandibular Joint- A Review

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ABSTRACT

A correlation is present between irregular occlusal contacts leading to temporo-mandibular joint (TMJ) problems. Diagnosis of functional disturbances of masticatory system is a complex procedure and should have a thorough understanding of its working and more importantly the normal working of TMJ. Auscultatory examination of TMJ helps in detection of clicking and crepitus. By evaluating the type of clicking one can differentiate Temporo-mandibular dysfunctions. Tenderness, synchrony of action, and co-ordination of relative position in the fossae can be checked by palpating the condyles. Palpation of associated musculature (muscles of mastication) also is an important part of examination. Functional evaluation of TMJ is done by checking for hypermobility and oral habits causing neuromuscular imbalance. Dental parameters like tooth mobility, pulpitis and tooth wear should also be examined for heavy occlusal force after ruling out obvious causative factors. Radiographic examination of TMJ is done to check anatomy of joint, but radiographically significant changes are seen only in few cases. A significant correlation is found between curve of spee and temporo-mandibular Joint Disorders. Therefore examination of TMJ should become an integral part of routine check up in a dentist's office.

Introduction

Masticatory system is a functional unit of the body primarily responsible for mastication, swallowing, and speaking. TMJ is an important part of this system and is composed of glenoid fossa, articular disc and mandibular condyle. It is a ginglymo arthrodiar joint. Muscles of mastication play an important role in movement of TMJ.¹ Clark GT et al have shown a correlation between irregular occlusal contacts leading to TMJ problems.² The prevalence of Temporomandibular disorders was studied by Solberg et al and concluded that 50% of his subjects had subclinical signs and 10% had symptoms, who were eager to seek treatment.³ Diagnosis of functional disturbances of masticatory system is a complex procedure and should have a thorough understanding of its working and more importantly the normal working of TMJ.⁴ A dentist always comes across pain

associated with masticatory system which may have multiple causes like improperly occluding crown, hypermobility, bruxism or any systemic causes like arthritis. Adverse oral habits are known to alter the oral facial imbalance which could have effect on the TMJ working.^{1,4} So there is need to create awareness regarding the importance of examination of TMJ during routine dental checkup.

EXAMINATION OF TMJ

The aspect of functional examination is to assess whether incipient symptoms of TMJ dysfunction are present. These symptoms are important for two reasons:

1. Through the early elimination of functional disturbances, some incipient TMJ problems can be prevented or eliminated. This is an indication for early orthodontic treatment.

2. During functional therapy the condyle is displaced or dislocated to achieve a remodeling of the TMJ structures and a change in muscle function. If the temporomandibular structures are abnormal at the start and hypersensitivity is a problem, the possibility of exacerbating the symptoms exist (**Table 1**).

Early symptoms of TMJ problems include the following :

- Clicking and crepitus
- Sensitivity in the condylar region and masticatory muscles
- Functional disturbances (eg : hypermobility, limitation of movement , deviation)
- Radiographic evidence of morphologic and positional abnormalities

Clicking is commonly noted at the initial examination.

A. AUSCULTATION: is carried out with a stethoscope,clicking and crepitus in the joint may be diagnosed during anteroposterior and eccentric movements of the mandible. The examination is performed by having the patient open and close the jaw into full occlusion , if clicking or crepitus is note the patient is instructed to bite forward into incision and then repeat the opening and closing movements most often sounds disappear in protruded position (**Figure 1**).

JOINT CLICKING IS DIFFERENTIATED AS FOLLOWS:

1. *Initial* Clicking: is a sign of retruded condyle in relation to the disc.
2. *Intermediate* Clicking: is a sign of unevenness of the condylar surfaces and of the articular disc, which slide over one another during movements.

3. *Terminal* Clicking: occurs most commonly and is an effect of condyle being moved too far anteriorly, in relation to the disc, on maximum jaw opening.It is a sign of peripheral irregularity of the articular disk or unevenness of the condylar surface .

4. *Reciprocal* Clicking: occurs during opening and closing and expresses an incoordination between displacement of the condyle and disc. Seen in pseudoanterior cross bite patients and anterior functional displacement.

Crepitation during chewing is occasionally seen , especially in children with deep overbites.

B. PALPATION

I.PALPATION OF THE TEMPORO MANDIBULAR JOINT

The condyle and fossa are palpated with the index finger during opening and closing maneuvers. The posterior surface can be palpated by inserting the little finger in the external auditory meatus. The condyles are thus be checked for tenderness , synchrony of action, and co-ordination of relative position in the fossae.(**Figure 2&3**)⁴

II. PALPATION OF THE ASSOCIATED MUSCULATURE

Palpation of the associated musculature is an important part of the examination. In TMJ patients, palpation of the muscles of the face, head and neck is essential.

a. *Lateral Pterygoid Muscle* - Research has shown that children with incipient TMJ symptoms almost always demonstrate some tenderness in the Lateral Pterygoid Muscle. Palpation of this muscle is

Auscultation	Palpation	Functional Analysis	Radiographic Examination
Object			
<ul style="list-style-type: none"> • TMJ 	<ul style="list-style-type: none"> • TMJ • Musculature 	<ul style="list-style-type: none"> • TMJ • Mandibular excursion • Occlusion • Rest position • Premature contacts • Dysfunctions 	<ul style="list-style-type: none"> • TMJ
Symptoms			
<ul style="list-style-type: none"> • Crepitus • Clicking 	<ul style="list-style-type: none"> • Palpatory pain 	<ul style="list-style-type: none"> • Dislocation • Hypermobility • Limitation • Deviation • Orofacial dysfunction 	<ul style="list-style-type: none"> • Dislocation • Changes in shape and structure.

difficult but can be approximated by placing the forefinger behind the maxillary tuberosity, right above the occlusal plane, with the palmer surface of the finger directed medially toward the pterygoid hamulus. In patients with early TMJ symptoms, unilateral tenderness commonly occurs. If hypersensitivity or pain is present on both sides, the condition is more protracted and palpation of other associated muscles is indicated. Tenderness in the superior head of the LPM is an important diagnostic clue because it may indicate abnormal functional loading of the joint (**Figure 4**).

b.Temporalis muscle- The temporalis muscle is palpated bilaterally and extraorally. The anterior, medial and posterior portions of the muscle are examined separately. The palpation is carried out while the muscle is contracted isometrically. The temporal tendinous attachment on the coronoid process, in the

posterolateral region of the upper vestibule is palpated. The patient's mouth should be half open for the examination (**Figure 5**).

c.Masseter muscle - The superficial masseter muscle is palpated beneath the eye, inferior to the zygomatic arch. The deep portion is palpated on the same level, approximately 2 finger widths in front of the tragus. During maximum isometric contractions the width of the superficial masseter and its direction of pull can be registered around the gonial angle. This muscle attachment should be examined for pain on pressure. Occasional trigger spots may occur which can be quite painful (**Figure 6**).⁵

C. FUNCTIONAL ANALYSIS

Recording of the maximum inter incisal distance:

Maximum jaw opening – distance between incisal edges of the upper and lower central incisors are measured with *Boley* gauge. It is usually 40-45mm in children of 6- 8 yrs of age and 49mm in adults beyond which it is considered as hypermobility. In over bite cases this amount is added to the obtained value whereas in open bite it is subtracted. In cases with TMJ dysfunction, hypermobility is often registered in the initial stages and limitation in the later stages.^{1,4}

Rule of thumb – diagnosis of incipient TMD can be made if two of the following three signs are present :

- a. Perioral neuromuscular abnormalities
- b. Crepitus
- c. Tenderness of the LPM.

Measures to prevent functional TMDs-

1. Early care of deciduous teeth for caries and interferences.
2. Elimination of tooth guidance crossbites and an unwanted translator condylar movement in the deciduous dentition.
3. Elimination of neuromuscular dysfunctions and habits that force the mouth open.⁴

D.DENTAL EXAMINATION

Two conditions should be evaluated. First the most important feature to evaluate is the orthopaedic stability between ICP (maximum intercuspatation) and TMJ positions. Second is the evaluation of the dental structures for any breakdown that might suggest the presence of a functional disturbance. A 2mm shift of mandible from centric relation to ICP is considered to

be normal. Dental examination should accompany other diagnostic tests for conformation.⁶⁻⁸

- 1.**MOBILITY-** Tooth mobility can result from 2 factors:
 - a. Loss of bone support (periodontal disease)
 - b.unusually heavy occlusal forces (traumatic occlusion)

Differentiation between primary and secondary traumatic occlusion should be done. The former results when unusually heavy occlusal forces exceed the resistance of the healthy periodontium and the latter results when light to normal forces exceed the resistance of a weakened periodontium.¹

2.**PULPITIS-** An extremely common complain of persons who come to the dental office is tooth sensitivity or pulpitis. When all other obvious causative factors have been ruled out , the clinician must consider heavy occlusal loading.⁹ Toothache of non dental origin can come from muscular, neural or sinus sources. The most common cause is muscular. Trigger points that develop in certain muscles can create excitatory effects that refer pain to the teeth. Three muscles show this potential

(a) the temporalis, (b) the masseter and (c) the anterior belly of diagestric .

Temporalis refers pain to maxillary teeth (anterior or posterior), the masseter refers pain only to posterior (maxillary or mandibular) and anterior belly of digastric refers pain to the mandibular anterior teeth only. The key to identifying referred tooth pain is that local provocation of the painful tooth does not increase the symptoms.

Local anesthetic blocking of the tooth will help in locating trigger point and eliminating tooth pain.¹⁰

3. **TOOTH WEAR**- It is probably seen more often than any other functional disturbance in the masticatory system. Majority of this wear is related to parafunctional activity. To differentiate between functional and parafunctional activity, the position of wear facets on teeth should be examined. Functional wear should occur near fossa areas and cusp tips of tooth. These facets are found on the inclines that guide the mandible in the final stages of mastication. Wear found during eccentric movements is almost always caused by parafunctional activity. To identify this type of wear, it is necessary to have the patient close on the opposing wear facets and visualize the mandibular position. If the mandibular position is close to the maximum intercuspation, it is likely to be close to the functional wear. If an eccentric position is assumed, the cause is more often parafunctional activity. Patient's history is taken regarding parafunctional (bruxism) habit. Patient with diurnal habit will be acknowledge this but the nocturnal bruxism will get unnoticed.¹¹

E. RADIOGRAPHIC EXAMINATION

Only in limited cases radiographic examinations indicated for patients with functional disturbances of the temporomandibular joint. Radiographic examination is used as an adjunct to other tests to gain additional information but should never be used to establish a diagnosis.

When analyzing the radiographs following findings are registered:

1. Position of the condyle in relation to the fossa.
2. Width of the joint space
3. Changes in shape and structure of the condyle head or the mandibular fossa.

Adolescents with class II, Div. 1 malocclusion and lip dysfunction (lip sucking or sucking) are most frequently affected by TMJ disorders.⁵

Curve of spee and Temporomandibular joint disorders- A flatter curve of spee is in coordination with a more posteriorly positioned condyle, and a steeper curve of spee is found in people with more anteriorly positioned condyles. It has been reported that a more posterior relative position of the condyle in the mandibular fossa could be one of the reasons for anterior displacement of the articular disc which frequently results in TMJ sounds.¹²

EMOTIONAL STRESS

Emotional stress can play a significant role in functional disturbances of the masticatory system. While taking the history the clinician should attempt to assess the level of emotional stress experienced by the patient. Symptoms can be helpful if patients show a correlation between symptoms and high levels of stress. A positive finding should motivate clinician to enquire about other psychophysiologic disorders (gastritis, hypertension, colitis). The presence of this types of disorders suggests that emotional stress is a causative factor in TMJDs.^{1,13}

CONCLUSION

- The prevalence of TMDs is very high, so every patient who comes to the dental office should be screened for these problems, regardless of the apparent need or lack of need for treatment.
- The purpose of examination is to identify patients with subclinical signs and symptoms of TMDs that are commonly associated with

functional disturbance of the masticatory system.

- Examination of TMJ should become an integral part of routine check up in a dentist's office.

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Figure 1

Figure 2

Figure 3



Figure 4



Figure 5



Figure 6