# Appliance Therapy in Temporomandibular Disorders: A Review

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## Abstract

The prosthetic rehabilitation in temporomandibular disorders is a challenging task, This article reviews about the present condition and provides the data regarding the treatment needs of the TMD patients and what approach should be followed the practitioner. There has been tremendous development in Evaluating through MRI, it was inferred that the splint therapy through various means reduced the risk of the temporomandibular disorders by eliminating the etiological factor. Furthermore it allowed the patient to cope with the disease such as disk displacement with greater tolerance rate. Moreover, after treatment the patients are likely to cope with disc displacements with larger or smaller tolerance.

***Keywords:*** *Temporomandibular Joint, Pain, Muscles of Mastication, Stabilization Appliance.*

## Introduction

Temporomandibular disorders (TMD) is a vast term that deals with various clinical conditions and their pathology comprising of the masticatory muscles and/or temporomandibular (TM) joints and associated soft and hard tissue[1]. The Temporo-mandibular joint is a load bearing joint which entails the condyle, mandibular bone and the fossa eminence of the temporal bone separated by a fibrocartilaginous disc. The clinical conditions associated with the temporomandibular joint diseases were characterized by preauricular pain, pain the Temporomandibular joint area or soreness of muscles of mastication; limitation or deviation in mandibular movement and TMJ sounds[2] (clicking, popping, and crepitus) upon various activities . Symptoms most often found in the patients includes head ache, neck ache, face ache and ear ache .In clinical scenario the TMD are the most intractable problems. The primary approach in the TMD management is controlling the pain.[3,4] The clinicians should be cautious while diagnosing TMD in patients.

The diagnosis of TMD is based upon the chief complaint, past history that patient gives, thorough clinical intra and extra oral examination and the physical examination this helps in formulation of a diagnosis for the disease[5]. Most common findings that the patient present with are faulty mandibular movement,pain of masticatory muscles, pain on loading, signs of bruxism, and neck or shoulder muscle tenderness[6,7]. If there is presence of any certain type of malocclusion then the practitioner should address the problem. Crepitus, clicking, locking of the TMJ is accompanied with the joint dysfunction . Such as, if a single click Is heard during mouth opening, it can be associated with the anterior disk displacement[8,9]. But if there is a second click upon closing of mouth, then it is associated with disk displacement with reduction[10] with the progression of the disc displacement,the patient is not able to open the mouth (closed lock. The crepitus most often associated with the articular surface disruption that occurs in patient with osteoarthritis.[11,12]

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Radiographic evaluation and Imaging can help in the diagnosis of TMD when we don't get much information form the physical examination and the history of the patient[13] . Plain radiograph such as an lateral cephalogram or orthopantograph can be used assess the joint area. CTscans are more superior which used for the evaluation of subtle bony morphology.[14,15] False positive findings occur in 20% to 34 %of asymptomatic patient . MRI is mostly done for patients with continous symptoms, those in whom conservative treatment approach was not effective, or in patients with internal disk derangement[16,17] when the MRI is not available, then the Ultrasonography can be used which is anon invasive procedure and is cost effective to diagnose the internal derangement of the TMJ[18].

**Types of Oral appliance for Treatment of TMD:**

**Stabilization Appliance:** It is a rigid appliance usually fabricated using acrylic and generally fabricated in the maxiilaryarch. It is fabricated in the centic relation so when the appliance is placed the jaws are separaed by 2 to 3 mm and the condyle is brought in centric relation. It eliminates any instability and other causative factors for TMD and improves the condyle fossa relationships[19].

**Indications:** It is used in the treatment of muscle pain disorders .Wearing it decreases the parafunctional activity. In cases of muscle hyperactivity such as bruxism, local muscle soreness, myalgia, retrodiscitis a stabilization appliance is considered.[20]. This appliance minimizes forces that damage tissues, thus efficiently improves the healing.[19]

**Simplified Fabrication Technique:**

**Fabricating the Appliance:** A clear sheet of resin is adapted to the maxillary cast . The lingual extension is about 10 to 12 mm from the gingival border runs throughout the lingual portion of the arch. Thelabialy it is extends upto the junction between the incisal and middle thirds of the anterior teeth. A small anterior stop is fabricated in the anterior region and the patient is made to bite on it in Centic relation. This procedure is repeated till the centic relation is obtained and the area is grooved using a round bur. Self cure acrylic resin is mixed and placed over the appliance except in the anterior stop area and the patient is made to bite in centric relation .After the acrylic sets it is removed and is polished.[21]

**Anterior Positioning Appliance:** It that encourages the mandible to be positioned anteriorly.. It is useful for the treating disc derangement disorders . It alters the position of mandible for short duration and thus It provides a better condyle-disc relationship and provides time for tissue repair and adaptation of retrodiscal tissues. After the tissue are adaptated, the usage of appliance is eliminated.[22]

**Indications:** It is used mainly in the treatment of disc displacement with reduction, joint sounds, Intermittent or chronic locking of the joint and few inflammatory disorders.

**Simplified Fabrication Technique:** It is also a hard acrylic device similar to stabilization appliance, that can be used in either arch. As a maxillary guiding ramp, helps in positioning the mandible, it is usually preferred over the mandibular arch.[22]

**Fabricating and Fitting the Appliance:** The initial steps inthe fabrication of a maxillary anterior positioning appliance are similar to that of fabrication of a stabilization appliance. A anterior stop is fabricated on maxillary central incisiors. The patient is asked to open the mouth widely and asked to close the mouth in forwarded position and the joints are evaluated for the symptoms. This step can be repeated and verified. Once the forwarded position is confirmed a groove is made in this position.[21] This groove helps in positioning of the mandibular incisiors . The appliance is placed in the mouth to the mouth with self cure acrylic resin on it except in the areas of anterior stop and the patient is made to close the mouth in the setting acrylic in the determined position

Adjusting the Occlusion. Excess of acrylic is removed, smoothened and polished using hard rubber wheel. A well fabricated appliance allows even and smooth contact of all the teeth in the desired position.[20] Flat occlusal contacts are developed for the posterior teeth, The appliance is returned to the mouth, and the patient closes in the forward position. Sound contact is checked using red articulating paper that should be visible on all cusp tips.

**Anterior Bite Plane:** It is a hard acrylic aplliance with contact is provided in the anterior region only without any contact in the posterior region[22].

**Indications**: It is used in the conditions of orthopedic instability causing muscle disorders or in cases of an acute change in the occlusal condition . Parafunctional activity is also treatablefor short

duration. Main disadvantage of this appliance is, if it is used for long time, it may cause supraeruption of posterior teeth leading to anterior open bite. It must be carefully observed during the treatment procedure and should be used only for short periods. similar results can be obtained using stbilizationappliance. More recently a device has been designed with similar cocepts of anterior bite plane to reduce the incidence of heeadache. It was marketed in the name of by its inventor the Nociceptive Trigeminal Inhibition Tension Suppression System (NTI TSS) or NTI[23]. It allows contact in the central incisiors. The initial studies showed that the NTI was only slightly more effective when compared to standard appliance therapy in reducing the headache

**Posterior Bite Plane:** It is a hard acrylic constructed usally in the lower arch in the posterior region connected by lingual bar.

Indications :They have been used in the cases of severe loss of vertical dimension or when severe changes are desired in the forwared positioning of the mandible It is also used as a protective appliance by athelets in few cases .However there is no scientific evidence for this . It helps in supra eruption of unapposed teeth or intrusion of apposed tooth. it is used in some cases of disc derangement however not much studies are present to support the fact[24].

**PIVOTING APPLIANCE** It is a hard acrylic device that provides contact usually in the second molar region which act as a fulcrum and pivot the condyle in downward and backward position away from the fossa.

Indications . It was thought that it unloads the joint and provides time for tissue repair., It was used in the treatment for joint sounds. It is possible only if forces are located anterior to the pivot. As elevator muscles are present posterior to the pivot it does not allow pivotingaction. Anterior positioning appliances much more capable of as it provides better control in positioning the mandible[22].

However there are very few scientific studies that supports the success of treatment using this pivot appliance .In fact anterior positioning appliance has much more therapeutic value compared to the pivoting aplliance and is usually not used for the treatment clinically.

**Soft or Resilient Appliance:** It is usually made up of Resilient material that is adapted to the maxillary archto achieve even and simultaneous contact.[24]

**Indications:** It is usually indicated in athletic sports person to protect the teeth and tissues from damage due to trauma . But less studies are available regarding this. It is usually recommended in patients exhibiting clenching and bruxism. However soft appliances have not been shown to decreasebruxing activity. It is also recommended for patients suffering from repeated or chronic sinusitis resulting in sensitive posterior teeth due to heavy occlusal forces[24].

## Conclusion

This paper is designed to give the dental practitioner an overview of splint treatment in the management of temporomandibular disorders. It is impossible to be definitive or prescriptive unless the TMD diagnosis has been made and it is not the remit of this paper to cover such diagnosis[24]. The overall benefits of splint therapy should not be underestimated a major benefit is that if splint therapy is beneficial if proper diagnosis is made and proper fabrication and regular follow-up done.

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