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## The Scope of Bite Plane on the Prospective Of TMJ Disorders: Case Reports

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### ABSTRACT

In order to treat temporomandibular joint (TMJ) dysfunction-pain syndrome it is necessary to understand etiology and to establish a systematic procedure for differential diagnosis. Stabilization occlusal splints are commonly used in the treatment of functional disturbances of the masticatory system. When properly adjusted, they provide a good method of eliminating occlusal interferences, reducing neuromuscular activity, and obtaining stable occlusal relationships with uniform tooth contacts throughout the dental arch. Clinical success has been reported in the treatment of temporomandibular joint (TMJ) symptoms by non-surgical method, which included the use of occlusal splints.

**Keywords:** Bite plane, Splints, Temporomandibular joint.

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## INTRODUCTION

Temporomandibular disorders (TMD) are recognized as the most common chronic oro-facial pain conditions that confront dentists and other healthcare providers. It embraces the masticatory musculature, temporomandibular (TM) joints and associated structures [1]. The various clinical conditions are characterized by pain in the preauricular area, TM joint or muscles of mastication, limitation or deviation in mandibular range of motion and TM joint sounds (clicking, popping, crepitation) during mandibular function.

In 1934 Costen first described a syndrome that included facial, head pain and temporomandibular joint dysfunction, which has become known as temporomandibular joint pain-dysfunction syndrome (TMJPDS). The condition is commonly described as myofascial pain-dysfunction syndrome. Since its first description, an understanding has developed that the etiology of the syndrome has not only a physical explanation but also psychological and sociologic variables [2-4].

The MDO classification [5] scheme includes myofascial pain (M), internal derangement of the temporomandibular joint (TMI) (D), and osteoarthritis (AO) change of the TMJ (O).M0: No myofascial pain, MI: Presence of myofascial pain.DO: No evidence of disk displacement, D1: Disk displacement with reduction, D2: Disk displacement without reduction.OO: No radiologic evidence of OA, O1: Radiologic evidence of OA.

The majority of TMD patients achieved good relief of symptoms with a conservative treatment [6-11]. Splint therapy is an art and science of establishing neuromuscular harmony in the masticatory system and creating a mechanical disadvantage for parafunctional forces with removable appliances. A properly constructed splint supports a harmonious relation among the muscles of mastication, disk assemblies, joints, ligaments, bones, teeth, and tendons [12].

The amount of occlusal opening required to produce the desired relief of symptoms has not been specifically defined. It has been suggested that the occlusal splint opening should not exceed the postural or rest position of the mandible [13]. Temporomandibular disorders are similar to other musculoskeletal and rheumatologic disorders because little is known about the natural course of TMD or which signs and symptoms will progress to more serious conditions, a special effort should be made to avoid aggressive, irreversible therapy [14-15].

Conservative treatment is recommended as a basic principle in the management of temporomandibular disorders (TMDs), and the full-coverage occlusal splint has often been suggested as an effective and integral component of the treatment [16-28]. This article described the various kinds of TMJ pain patients successfully managed with different treatment modalities.

### Case report: 1

18 yrs old female reported to the Dept of Prosthodontics, Govt Dental College, Chennai with a complaint of pain in the TMJ.On examination there is no premature contact, wear facets and deep bite.OPG also didn't show any radiological changes in the TMJ. Impacted third molars were extracted 6 months back. Initially she was treated with muscle relaxant for a week and acupuncture treatment (Pre-auricular, scalp and radial points) was given for once in 15days for 6 months. **(Figure: 1)**The patient was relieved from TMJ pain and satisfied with the treatment.

### Case report: 2

22 yrs old male reported to the department with a complaint of clicking on both sides of the TMJ.On examination he had deep bite, deviation of the mandible towards left side while opening and he had opening click on left side. OPG didn't show any radiolucency in both TMJs. The occlusal prematurities were identified with articulating paper and they were removed. While measuring the posterior dental height, it was less than the ramus height in cephalogram. Hence the deep bite was corrected with anterior bite plane. **(Figure: 2)** The patient was evaluated after 6 months there was no clicking and deviation.

**Case report: 3**

35 yrs old male reported to the Department with a complaint of clicking on both sides of the TMJ and restricted mouth opening. On examination closing click and crepitation was seen. OPG shows translucency in the posterior most portion of the condyle( **Figure :3** )His posterior dental height is also less than the ramus height in the cephalogram. The vertical dimension was increased as 0.5,1, 1.5 and 2 m.m with posterior bite plane in 1yr. After a year, full mouth rehabilitation was done. Now the patient was relieved with pain and clicking. (**Figure: 4**)

**Case report: 4**

35 ys old male reported to the Dept with complaints of sensitivity in the posterior teeth with pain radiating from TMJ upto the cheek . On examinations spontaneous preauricular facial pain, moderate to severe tenderness to palpation of the elevator muscles, changes in mandibular movement evidenced by mandibular deviation, clicking sounds in the TMJ and bruxing or clenching of the teeth. OPG didn't show any radiographic changes in TMJ. A soft splint was given and evaluated at 24, 72 hours, 1 week and 3, 6 months. (**Figure:5**) Severity of pain reduced and absence of tenderness in the TMJ.

**DISCUSSION**

In the study of treatment for TMDs, careful description of the patient population is necessary to understand the treatment response of specific TMD diagnoses to specific treatments. A multidisciplinary model that includes patient education and self-care, cognitive behavioral intervention, pharmacotherapy, physical therapy, and orthopedic appliance therapy (interocclusal splints) is endorsed for the management of nearly all TMD patients.

Physical therapy techniques, including the use of heat or cold therapies and lifestyle and diet changes are used also. These physical methods comprise the initial treatment plan for many patients. Anti-inflammatory medications, such as ibuprofen, naproxen is also of value and can substitute for aspirin. Also more effective are muscle relaxants such as cyclobenzaprine and chlorzoxazone, for limited periods of time, anti-anxiety medications such as alprazolam and lorazepam can be beneficial. Psychological care is needed occasionally in the basic treatment protocol. Stress can induce maladaptive behaviors for which counseling can also be useful.

The specific treatment objectives that are desired from an optimum structural and functional reestablishment standpoint for all patients [29 including TMD patients, are as follows: (1) maximum symmetrical distribution of inter-cuspal contacts in the predetermined jaw relationship; (2) axial or near axial loading of the teeth; (3) an acceptable occlusal plane; (4) guidance contacts that allow freedom during closing, incursive and excursive gliding mandibular movements without deflection of the mandible or teeth; and (5) an acceptable vertical dimension of occlusion and interocclusal resting range.

The effectiveness of stabilization of occlusal splints has been questioned [1]. However, there is enough evidence to indicate that the use of a splint will lead to a reduction in the hyperactivity of the elevator muscles, with a decrease in muscle tone and disappearance of muscle spasms [30-32]. A suggested protocol would include adjustments at 24 hours, 72 hours, 7 days, 2 weeks, and 1 month after seating. A significant reduction of the nocturnal activity of the masseter muscle has been reported while using the splint in patients with bruxism."

Posselt and Wolff [33] found out that high percentage of patients were cured or showed improvement when a hard acrylic resin splint was used. Splints cannot do 3 basic things: unload the joint, prevent bruxism, or "heal" the patient. Some authors and lecturers have stated that splints function to unload the joints and therefore take pressure off the disk. This theory has been disproved by Kuboki et al [34] and cannot be explained anatomically or physiologically. The elevator muscles are located behind the most posterior tooth and therefore ensure that the joint will always be loaded when the elevators contract. Such splints open the vertical dimension and minimally decompress the condylar head when not loaded to reduce superior tissue pressures.



Figure 1: Orthopantomogram

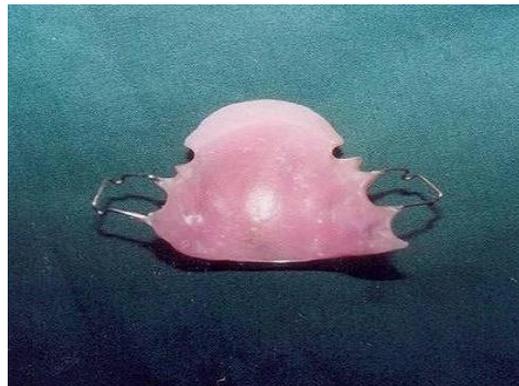


Figure 2: Anterior bite plane



Figure 3: Orthopantomogram



Figure 4: Posterior bite plane



**Figure 5: Soft splint**

They also may increase temporomandibular joint loading [35] that results from greater maximum muscle efficiency. Splints do not prevent bruxism; they balance the force distribution to the entire masticatory system. They can decrease the frequency but not the intensity of bruxing episodes. Occlusal splints create neuromuscular balance by eliminating occlusal interferences and producing a change in the degree of tactile afferent impulses from the periodontal proprioceptive fibers [5, 36, 37]. It is believed that an occlusal appliance should be used to reduce forces to the retrodiscal tissues in the patients with permanent disk dislocation. On the other hand, few patients experienced remission with their disk remaining in a persistently displaced position [38].

Occlusal splints are also believed to improve maxillomandibular relationships and thus alter the relationship of the condyle to the fossa. Furthermore, occlusal splints encourage muscular relaxation, which reduces muscle spasm, as evidenced by a decrease in EMG activity of the mandibular muscles [39-43]. Usually it is wise to maintain the functional equilibrium established by the TMD management program, especially when the intercuspal position (ICP) and the vertical dimension of the occlusion (VDO) are acceptable. The occlusal scheme must be integrated with and conform to the remaining tissues of the masticatory system at the time of treatment.

When a reduced mandibular position is achieved and maintained on an orthotic, it can be held for a period of time to stabilize the joint more fully. This procedure also allows the patient to experience a period of comfort. Usually 3 months is adequate. If the disk cannot be maintained in its reduced position as the mandible is retruded in the superior repositioning splint, a reevaluation is done. If appropriate, further anterior repositioning is pursued and later a walk back is again attempted. Decisions are made at this time to determine whether the occlusion should be restored at a slightly more forward mandibular position. This decision is directed by the pain problem and by the need to maintain the mandibular condyle within the confines of the fossa without excessive anterior loading of the articular eminence.

A mandibular position that is slightly more forward than centric relation may be needed especially in the completely or partially edentulous patient. For these patients, an increase in the vertical dimension of occlusion within physiological limits can be useful especially in those who may have presented originally with a reduced vertical dimension. Elimination of the reciprocal click is not always necessary for the establishment of satisfactory levels of comfort. Continuing care with the disk out of place often possible and needed.

Disk displacements with reduction, but which are not recapturable, are treated also with the disk out of place. Basic splint therapy may be needed and can provide a slightly more anterior mandibular position. This position may serve to unload inflamed posterior capsular tissue and can be useful in treatment of TMJ inflammation. Anti-inflammatory medications are also helpful in these situations. The muscular etiology of mandibular dysfunction is differentiated from non-muscular causes by the examination at the first visit. The problem seems to be a result of protective jaw muscle activity, and the effect of treatment on the limitation of mandibular movement is probably mediated through changes in muscle activity as suggested in several studies.

MRI is the confirmatory diagnostic aid for all TMJ disorders. Because of the financial status, the patients were unable to do the MRI and also not willing for any invasive treatment.

Temporomandibular surgery is the indicated treatment for a very small percentage of TMD patients and only those with specific TMD articular disorders. Surgical management may vary from closed surgical procedures (arthrocentesis and arthroscopy) or open surgical procedures (arthrotomy) to subcondylar osteotomies (condylotomy).

### CONCLUSION

Both pain and dysfunction symptoms will benefit from the occlusal splint therapy. The pain response will be significantly better than the dysfunction response when the patient is treated with an occlusal splint.

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