



## Review Article

# Occlusal appliance therapy: A review

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### ABSTRACT

Occlusal splint therapy is being employed for treatment of various systematic disorders. Less availability of scientific literature on devices is major hurdle behind its effective utilization for treatment planning and care.

Therefore, appliance selection with accurate information is critical for proper use and quality of care.

Treatment of patient with occlusal appliances is prominently reversible and responsible for proper care and symptoms management.

Selection of appliance design for a particular patient depends on multitude of factors and proper understanding of physiologic and therapeutic effects is crux behind successful treatment planning and management.

This review article briefly explains various occlusal appliances with their utilization and limitations along with working principle of appliances.

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## 1. Introduction

Temporomandibular Joint (TMJ) is articulation between the squamous part of the temporal bone and the head of the mandibular condyle.

Temporomandibular Disorders, commonly called TMD are a group of conditions that are associated with persistent pain and dysfunction in the jaw joint and the muscles that control jaw movement.

Anderson et al. highlighted that around 75% of the population was facing with problem of joint dysfunction.<sup>1</sup>

Occlusal Appliance is mainly a removable device and fabricated with hard acrylic substance.

Occlusal appliance precisely accommodates the occlusal and incisal surfaces of the teeth in one arch.

It is generally classified into occlusal splint, bite guard, night guard, interocclusal appliance, or even orthopedic device. (other arch is in occlusal contact)

Occlusal appliances are not only used for treatment of TMJ disorders but also are effectively used for occlusal stabilization as well as prevention of wear of dentition.<sup>2,3</sup>

Treatment of TMD is done through occlusal splint therapy, drug therapy, occlusal adjustment, biofeedback and short-wave diathermy laser.

## 2. Discussion

### 2.1. Uses of occlusal appliances

1. With occlusal appliance condyles occupies stable joint position.
2. Helps in stress distribution and protect supporting teeth structure.

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3. Helps in achieving stable occlusal condition and improve muscle pain disorder.

## 2.2. Types of occlusal appliance therapy

### 2.2.1. Flat plane stabilization appliance

This appliance is usually used for the maxillary arch.

This appliance is rarely used for mandibular arch.

Turp et al. assessed that appliance does not reduce symptoms in both maxilla and mandible arch position.<sup>4</sup>

According to American Academy of Orofacial Pain, the purpose of stabilization appliance is:

1. Occlusal force redistribution,
2. Joint stabilization,
3. Protection of tooth
4. Relaxation of muscles.

Canine protected occlusion is generally suggested for disocclusion of posterior teeth in case of eccentric movement.

This concept is essentially utilized in asymptomatic patients to reduce muscle activity and joint inflammation.

### 2.2.2. Anterior repositioning appliance

Anterior Repositioning Appliance is employed to alter maxillomandibular relationship in order to get more anterior position in mandibular arch position.

Patients with anterior disk displacement depend on this appliance for treatment and care.

Anterior Repositioning Appliance is short term solution for relieving of internal derangements pain.<sup>4,5</sup>

### 2.2.3. Muscle deprogrammer

This appliance helps in removing deviating tooth inclines from contact areas and helps in unlocking the occlusion.

In Muscle deprogrammer condyles assume their correct position in centric relation.

### 2.2.4. Directive splints

Directive splints is particularly used for alignment of the condyle-disk assemblies.

Directive splints guide the mandible in forward direction and prevent full seating of joints.

Used in Severe trauma with retro-discal edema and chronic, painful disc displacement disorders.

### 2.2.5. Superior repositioning splint

This is used for providing short term and removable ideal occlusion.

This appliance is also known as Tanner appliance, the Fox appliance, the Michigan splint, superior positioning appliance or the stabilization appliance.

Used mainly in maxillary position to provide stability and retention.

When Superior repositioning splint is used, the condyles assume stable position in the glenoid fossa.

### 2.2.6. Anterior bite plane

Anterior Bite Plane is mainly used for occlusal disengagement.

It is a hard acrylic appliance designed so that only the anterior teeth contact to disocclude the posteriors to eliminate any influence the posterior teeth have on the occlusion.

Ideal anterior guidance helps in relaxing masticatory musculature.

### 2.2.7. Hydrostatic appliance

Lerman was the person behind the development of this appliance.<sup>6</sup>

The working of Hydrostatic appliance is based on premise that mandible occupies its ideal position automatically.

Further, appliance does not direct the position of jaw.

### 2.2.8. Pivoting splint

This appliance is used for the mandibular teeth with only one occlusal contact on each side.

This is given as far posteriorly as possible.

The ultimate purpose is to cause contact on the posteriors contact point when the anterior are brought together to induce the condyles to pivot downward over the posterior pivoting-points.

This appliance should be used for short duration as in longer term this will cause intrusion of the second molar on which the pivot has been constructed.<sup>7,8</sup>

### 2.2.9. The soft bite guard

This appliance is fabricated by employing vacuum forming technique onto either an upper or lower model.

The need of occlusal registration is essential.

This appliance fabrication is quick, easy and economical.

Specific property includes such as uniform thickness and no attempt is made to balance it on the opposing teeth.

### 2.2.10. Anterior midline point stop

The AMPS can be used with other appliances with specific modifications to prevent temporalis contraction intensity and thereby in treatment and preventive therapies

### 2.2.11. Mandibular orthopaedic repositioning appliance

This appliance includes a lingual bar connecting the posterior segments of the splint.

This is known as Gelb splint and fabricated on hard acrylic material.

### 2.2.12. Posterior bite plane

Posterior bite plane is mainly employed for the mandibular teeth.

Hard acrylic area is stationed over the posterior teeth.

Further, the hard acrylic zone is connected with metal lingual bar.

Posterior bite plane is used to correct vertical dimension and helps in the repositioning of mandible.

### 2.3. Principles of working of a splint:<sup>9</sup>

1. The occlusal disengagement theory suggests that providing an ideal occlusion by the use of splint therapy reduces abnormal muscle activity.
2. The same is true of the maxillomandibular realignment theory, which aims to produce 'neuromuscular balance'.
3. The resorted vertical dimension theory is based on the concept that the patient has lost vertical height.
4. The TMJ repositioning theory implies that the condyle should be repositioned within the glenoid fossa. It has been suggested that the most desirable condylar position can be attained by the use of radiographs.
5. Finally, the cognitive awareness theory could be applied to all splints

### 3. Conclusion

Different types of occlusal appliances come with different design setting, indication and precautions so clinician should be adept and experienced enough to apply it in effective and proper manner.

Clinicians are strongly advised to thoroughly understand the masticatory system dynamics and perform a comprehensive examination to the TMJ and its related structures to be able to choose correct appliance perfectly with fewer complications.

Correct application of appliance is crucial for success of prosthesis and this depends upon the correct understanding of masticatory system.

Further, clinicians should depend on clinical examination of TMJ as well as their experience so that correct appliance can be employed for treatment and care of patients.

### 4. Clinical Significance

Appliances, irrespective of their design and intended use, create the following effects:<sup>10</sup>

1. They temporarily alter the existing occlusal condition
2. They alter the condyle to a more Musculoskeletal stable position or more structural and functional position.
3. They cause an increase in the vertical dimension
4. They bring about cognitive awareness in the patient regarding their parafunctional activity and help to control them.

5. Placebo effect to the confident and calm method in which the clinician deals with the patient, reducing his anxiety levels and bringing about beneficial effects.

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### 6. Conflict of Interest

The authors declare that they have no conflict of interest.

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