Review Article

# OCCLUSAL SPLINT THERAPY

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**Abstract**

Splint therapy may be defined as the art and science of establishing neuomascular harmony in the masticatory system and creating a mechanical disadvantage for para-functional forces with removable appliances. This paper is a systematic review of the splint occlusal therapy, its advantages and considerations and applications with case reports. A medline indexed search was conducted along with a manual search for articles on occlusal splint therapy and the articles were selected.

**Key words** – Occlusal Splint, Para-functional Forces, Splint Therapy.

## Introduction

Splint therapy may be defined as the art and science of establishing neuromuscular harmony in the masticatory system and creating a mechanical disadvantage for para-functional 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.[10]

Occlusal splint therapy is chosen for the treatment of dysfunctions in the orofacial region for several reasons. It is a proven modality for alleviating the pain of many types of temporomandibular disorders and bruxism. It is relatively simple, reversible and non-invasive; it has a low cost as compared with other treatments.

## Occlusal Splint Characteristics [1]

The characteristics of a successful splint should include. Stability, Balance in centric relation, Equal intensity stops on all teeth, Immediate posterior disclusion, Smooth transitions in lateral, protrusive and extended lateral excursions (crossover), Comfort during wear, Reasonable esthetics and Patient compliance

## FUNCTION OF OCCLUSAL SPLINT [2]

Properly fabricated splints should have following functions:
1. To relax the muscles,
2. To allow the condyle to seat in centric relation,
3. To provide diagnostic information,
4. To protect teeth and associated structures from bruxism,
5. To mitigate periodontal ligament proprioception and
6. Cognitive Awareness

## APPLICATIONS OF ORAL SPLINTS [3]

1. Temporomandibular disorders
   - Myofascial pain
   - Disc displacement disorders
   - Arthritis of the temporomandibular joints
2. Other pain disorders
   - Headaches/migraine
3. Motor and sleep disorders
   - Sleep bruxism
   - Sleep apnea
   - Parkinson's disease
   - Oral tardive dyskinesia
4. Occlusal rehabilitation
   - Orthodontics
   - Periodontics
   - Prosthodontics
   - Phantom bite
5. Others (Prevention of tissue trauma, habits)
   - Diurnal bruxism
   - Sports
   - Cheek or fingernail biting
   - Electroconvulsive therapy
   - Lip commissure burn
   - Esophageal reflux
   - Sinusitis

## SPLINT TYPES [4]

Many splints are used in the treatment of temporomandibular joint disorders. The two most common are the centric relation and the anterior repositioning splint. Others include the anterior bite plane, posterior bite plane, pivoting splint and soft or resilient splint.

## STABILIZATION SPLINT [5]

Stabilization splint is an inter-occlusal appliance that provides an occlusal relationship in the masticatory system that is considered optimal. When it is in place, the condyles are in their most musculo-skeletally stable position, at the same time the teeth are contacting evenly and simultaneously. Canine disclusion of the posterior teeth during eccentric movement is also provided.

The treatment goal of the splint is to eliminate the malocclusion that contributes to the presence of the temporomandibular joint disorder. In many patients reduction of the occlusal factor will lower the overall effect of malocclusion and emotional stress to a level below the patients' physiologic tolerance, thus reducing parafunctional activity and the symptoms.

*Indications* [6]*: -*

- Treatment for masticatory dysfunction signs and symptoms such as muscular pain, TMJ pain, clicking, crepitus, limitation of motion and in-coordination of movements.
- To treat muscle hyperactivity.
- Patients with myospasms and myositis.

- Helpful in reducing symptoms from Para functional habits.

**ANTERIOR REPOSITIONING SPLINT [7]**

The anterior repositioning splint is an inter-occlusal appliance that encourages the mandible to assume a more anterior position to centric occlusion. This position is an attempt to provide a more favourable condyle-disc relationship in the fossa so that normal function can be established. The goal is to eliminate the signs and symptoms associated with disc-interference disorders.

The aim of providing an anterior repositioning splint is to maintain the mandible in a temporary therapeutic position in which click is eliminated and thereby allowing the disc to reposition. Once the function is again optimal, treatment consists of gradually eliminating the splint and returning the patient to pre-existent normal condition.

*Indications: -*

- To treat disc-interference disorders.
- Patients with joint sounds such as single or reciprocal clicks.
- Intermediate or chronic locking of the joint.
- Inflammatory disorders

**ANTERIOR BITE PLANE [8]**

The anterior bite plane is hard acrylic appliance worn over the maxillary teeth providing contact with only the mandibular anterior teeth. It is primarily intended to disengage the posterior teeth and thus eliminate their influence in the function or dysfunction of the masticatory system.

*Indications: -*

- Treatment of muscle disorders, especially myospasms, that originates from an occlusal condition.
- Parafunctional activity associated with unfavourable posterior tooth contacts.

**POSTERIOR BITE PLANE [9]**

The posterior bite plane is usually fabricated for the mandibular teeth and consists of areas of hard acrylic located over the posterior teeth and connected by a cast metal lingual bar. The treatment goals of the posterior bite plane are to achieve major alterations in vertical dimension and mandibular repositioning.

*Indications: -*

- Severe loss of vertical dimension or
- When there is a need to make major changes in anterior repositioning of the mandible. At present, however, there is lack of scientific evidence to support this theory.

**PIVOTING SPLINT [10]**

The pivoting splint is a hard acrylic appliance that covers one arch and usually provides a single posterior contact in each quadrant. This contact is usually established as far posteriorly as possible. When superior force is applied under the chin, the tendency is to push the anterior teeth close together and pivot the condyles downward around the posterior pivoting point.

The pivoting splint was originally developed with the idea that it would create a decrease in inter-articular pressure, thus unloading the articular surface of the joint. This was thought to occur when the anterior teeth moved closer together, creating a fulcrum around the second molar and pivoting the condyle downward away from the fossa.

However, this can occur only if the forces that close the mandible are located anterior to the pivot. Unfortunately, the forces of the elevator muscles are located primarily posterior to the pivot, which therefore does not allow any pivoting action. It was originally suggested that the therapy was helpful in treating joint sounds. It now appears, however, that the anterior repositioning splint is more suitable for this purpose since it provides more controlled re-positional changes. In fact, the pivoting appliance has been advocated for the treatment of symptoms related to degenerative joint diseases of the temporomandibular joint. It has even been suggested that the splint be inserted and elastic bandages be wrapped from the chin to the top of the head to decrease forces in the joint.

*Indications: -*

- To unload the articular surface of the joint caused by decrease in inter-articular pressure.
- Treating joint sounds.
- For the treatment of symptoms related to degenerative joint diseases.

**SOFT OR RESILIENT SPLINT [11]**

The soft splint is an appliance fabricated from resilient material and usually adapted to the maxillary teeth. Treatment goals are to achieve even and simultaneous contact with the opposing teeth. It is quick to fabricate and can be provided as 'emergency treatment' for a patient who presents with an acute TMD. The only record needed is an upper alginate impression. These appliances are generally worn at only at night and if they are successful, will produce symptomatic relief within 6 weeks. They should be replaced after 4 – 6 months as they lose their resilience with the passage of time.

The appliance is generally made out of 2 - 4 mm polyvinyl sheet. If a thinner splint is required, laboratory can be instructed to overheat the material before vacuum forming and if a thicker appliance is required (for patient with an anterior open bite), then layers can be added in certain areas (i.e. anteriorly) to ensure even occlusal contact.

*Indications: -*

- In relieving symptoms of Craniomandibular disorders (joint dysfunction and myalgia)
- Protection from trauma as an athletic splint
- To prevent bruxism and clenching.
- Extremely sensitive posterior teeth due to chronic sinusitis

*Advantages of Soft Occlusal splint: -*

- They are less likely to cause significant occlusal changes that are sometimes noted with hard occlusal splint[32]
- They have low density and amorphous structure, therefore they are compressed or worn before the masticatory muscles are stretched or stressed beyond their physiologic limits.
- They have placebo effect.

*Disadvantages of occlusal splint: -*

- Feeling of queasiness
- Feeling of tightness from appliance
- Tenderness in teeth
- Mouth dryness
- Difficult to adjust and polish

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