

PERIODONTAL SPLINTING A REVIEW

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Abstract : *The ultimate goal in successful management of mobile teeth is to restore function and comfort by establishing a stable occlusion that promotes tooth retention and the maintenance of periodontal health. The clinical management of mobile teeth can be a perplexing problem, especially if the underlying causes for mobility have not been properly diagnosed. In some cases, mobile teeth are retained because patients decline multidisciplinary treatment that might otherwise also include strategic extractions. Some mobile teeth can be treated through occlusal equilibration alone whereas mobile teeth with a compromised periodontium can be stabilized with the aid of provisional and/or definitive splinting. Tooth splinting have been accomplished since ancient civilizations to decrease tooth mobility, to replace missing teeth & to improve form, function, and esthetics. Still splinting remains one of the poorly understood & controversial areas of dental therapy. This article discusses splinting...its, rationale, basic principles, indications, contraindications, limitations and classifications.*

Keywords: *Splints, Stabilization, Occlusal forces.*

1. INTRODUCTION

Periodontal diseases are characterized by subgingival plaque formation, gingival inflammation, loss of connective tissue attachment and loss of alveolar bone. As a result of the progressive loss of attachment tissue, the teeth involved in the disease process eventually exhibit increased tooth mobility. Thus, the reduction of mobility is an important objective of periodontal therapy. Root planning, curettage, oral hygiene and surgery may cause teeth to tighten as inflammation is resolved. However, a transient increase in mobility may occur immediately after surgery. Occlusal adjustment, periodontal orthodontics and restorative dentistry may alter occlusal relationships and redirect forces, thereby reducing traumatism. This may result in the teeth becoming firmer. Increasing the support of loose teeth may also increase their firmness; the device used for such treatment is the "SPLINT". Splint may be used to maintain periodontally migrated teeth that have been repositioned.

DEFINITION

Splint is defined as an any apparatus, appliance device employed to prevent motion or displacement of fractured or movable parts (Francis G. Serio).⁽¹⁾

Grant defined splint is an any appliance that joins two or more teeth to provide support.

According to Macphee and Cowley – Splint is a rigid flexible appliance used to stabilize and protect an injured part.⁽²⁾

HISTORY

Splinting began way back in the 400BC's As a Phoenician mandible from 500BC and, another Phoenician prosthetic appliance was found from 400 BC in modern day Lebanon that is comprised of two carved ivory teeth attached to four natural teeth by gold wire.⁽³⁾ Archaeological excavations of the Etruscan society (Eighth century BC to the first century AD) have found evidence of their use of wire ligation and gold bands to stabilize teeth. In early 1700s Fauchard attempted tooth ligation. In the 1900s several authors described splinting techniques that dated back to the 1800s. Hirschfeld (1950) was one of the first modern periodontal authors to advocate ligation of periodontally diseased teeth using either stainless steel wire or silk. His technique was extra coronal and involved only the anterior teeth. In the last 50 years, scientific principles evolved to treat patients with compromised dentitions.⁽⁴⁾

PRINCIPLES OF SPLINTING:

The main objective of splinting is to decrease movement three dimensionally. This objective often can be met with the proper placement of a cross-arch splint. Conversely, unilateral splints that do not cross the midline tend to permit the affected teeth to rotate in a faciolingual direction about a mesio-distal linear axis.⁽⁵⁾

INDICATIONS FOR SPLINTING:

- Splinting is indicated when moderate to advanced motilities (2 degrees or more) are present and cannot be treated by any other means.
- Splinting should only be used with other necessary measures such as oral hygiene instructions, root planning, pocket elimination, and occlusal adjustment.
- When pre-prosthetic surgery or orthodontic measures are called for they should be completed before splinting whenever possible.
- One obvious indication for splinting is when a patient presents with multiple teeth that have become mobile as a direct result of gradual alveolar bone loss, a reduced periodontium.
- Splinting is indicated when the patient presents with increased tooth mobility accompanied by pain or discomfort in the affected teeth.
- Splinting may be a way to gain stability, reduce or eliminate the mobility, and relieve the pain and discomfort.
- Following loosening of teeth by accidental (or) surgical trauma.
- To immobilize excessively mobile teeth so that the patient can chew more comfortably.

-To avoid dislodging teeth prior to and during re-constructive procedures (Occlusal reconstruction).⁽⁶⁾

CONTRAINDICATIONS FOR SPLINTING

- Splinting teeth is not recommended if occlusal stability and optimal periodontal conditions cannot be obtained.
- Any tooth mobility present before treatment must be reduced by means of occlusal equilibration combined with periodontal therapy.
- Otherwise if the tooth involved does not respond, it must be extracted prior to proceeding from provisional restorations to definitive treatment.
- Insufficient number of firm / sufficiently firm teeth to stabilize mobile teeth.⁽⁷⁾

THE IDEAL QUALITIES OF A SPLINT

- It should be simple, economic, stable and efficient
- Non-irritating, not interfere with treatment,
- Esthetically acceptable, Biologically compatible
- Should not provoke iatrogenic disease
- Should not cause entrapment of food
- Should not impair phonetics(speech)
- Protect the gingiva from food impaction
- Rigid and durable

OBJECTIVES OF SPLINTING:

- Rest is created for the supporting tissues giving them a favourable climate for repair of trauma.
- Reduction of mobility immediately and hopefully permanently. In particular, jiggling movements are reduced or eliminated.
- Redirection of forces - redirected in a more axial direction over all the teeth included in the splint.
- Redistribution of forces - ensures that forces do not exceed the adaptive capacity. Forces/received by one tooth are distributed to a number of teeth.
- Restoration of functional stability - functional occlusion stabilizes mobile abutment teeth.⁽⁸⁾

- To preserve arch integrity - restores proximal contacts, reducing food impaction & consequent break down.
- To stabilize mobile teeth during surgical, especially during regenerative periodontal therapy.
- To prevent migration and over eruption.
- Psychologic wellbeing - gives the patient comfort from mobile teeth a sense of wellbeing.
- Masticatory function is improved.
- Discomfort and pain are eliminated.

TYPES OF SPLINTS

Splints, like bridges may be fixed, removable, or a combination of both.

They may be temporary, provisional, or permanent, according to the type of material and duration of use.

They may be internal or external, depending on whether tooth preparation is required or not.

Permanent splinting of teeth that have been treated periodontally is also referred to as periodontal prosthesis.

CLASSIFICATION ⁽⁹⁾

Goldman, Cohen and Chacker Classification:

Temporary splints

A. Extra coronal type

Wire ligation, Orthodontic bands, Removable acrylic appliances, Removable cast appliances, Ultraviolet-light-polymerizing bonding materials

B. Intracoronal type

Wire and acrylic, Wire and amalgam, Wire, amalgam, and acrylic, Cast chrome-cobalt alloy bars with acrylic, or both. Provisional splints All acrylic Adapted metal band and acrylic

Ross, Weisgold and Wright Classification:

A. Temporary stabilization

Removable extra coronal splints, Fixed extra coronal splints, Intracoronal splints, Etched metal resin-bonded splints

B. Provisional stabilization

Acrylic splints, Metal-band-and-acrylic splints

C. Long-term stabilization

Removable splints, Fixed splints, Combination removable and fixed splints

DISADVANTAGES OF SPLINT

They may be grouped under: ⁽¹⁰⁾

-Hygienic, Mechanical, Biological.

Hygienic:

All splint hamper the patient self-care. Accumulation of plaque at the splinted margins can lead to further periodontal breakdown in a patient with already compromised periodontal support.

It is also difficult to achieve proper contour of a splint at the gingival margin, especially in the interproximal areas.

(If the roots of the teeth to be splinted are very close together, it may be impossible to achieve periodontal health in the interproximal areas after the splinting).

Biological:

Development of caries is an unavoidable risk.

It requires excellent maintenance by the patient.

Splints, especially full coverage splints, may allow the development of extensive caries under loose abutments, without symptoms.

It is very important that splints be inspected regularly and that the patient be examined for the development of caries.

Splints should never be used as a “shotgun” substitute for accuracy and precision in occlusal therapy of the individual teeth.

2. CONCLUSION

The single observation of tooth mobility is not unto itself sufficient justification to splint teeth. Tooth mobility alone does not necessarily indicate the existence of an underlying pathologic condition. Splinting teeth to each other allows weakened teeth to gain support from neighbouring ones. Splinting is best viewed as a preventive treatment measure for teeth that have minimal or no bone loss, yet are clinically mobile. However, splinting makes oral hygiene procedures difficult. Therefore, to ensure the longevity of the connected teeth, special attention must be given to instructing the patient about enhanced measures for oral hygiene after placement of the prosthesis.

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