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To splint or not to splint - A review

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Abstract

The various stages of periodontitis may require individual treatment for periodontal tooth mobility, ranging from simple occlusal therapy through splinting and non-surgical phase therapy to surgical phase therapy. The treatment of the periodontitis normally includes nonsurgical and careful periodontal medicines. However, at times might be restricted to just the nonsurgical periodontal treatment. Splinting serves two purposes: first, it stabilizes the teeth so that they can be treated with surgery in the future. Chalifoux expressed that supporting recoveries a critical number of versatile teeth however requires a serious level of clinical ability and demonstrative skill. Indications, contraindications, classification , merits, demerits and various splinting materials are all covered in this article. [1]

Keywords: Stabilisation, tooth mobility, appliance, splinting, periodontium.

Introduction

Splinting is required in cases with traumatically displaced teeth, transplanted teeth, and fractured roots, as well as in cases where support has been diminished or destroyed as a result of apicectomy, external resorption, or periodontal damage. [1] A dental splint is defined as “a rigid or flexible device or compound used to support, position, or immobilize teeth that have been loosened, replanted, fractured, or subjected to certain endodontic surgical procedures” by the American Association of periodontics. Dental splinting has two purposes: [11]

- It protects the attachment apparatus so that the periodontal fibres can renew.
- It stabilises the tooth for as long as necessary to prevent additional damage.

Figure 1: Ligature Splint

Figure 2: Fibre Split

Figure 3: Extra Coronal Splint

Indication

- Stabilize moderate to advanced tooth mobility that cannot be treated by other means
- Stabilize teeth with increased tooth mobility interfering with normal masticatory function
- Secondary occlusal trauma
- Prevent tipping or drifting of teeth
- Prevent extrusion of unopposed teeth
- Stabilization of mobile teeth during surgical especially regenerative therapy (Serio 1999)

- Stabilize teeth following acute trauma • Stabilize teeth following orthodontic movement [11]

Contraindication

- When there is moderate to severe tooth mobility in the presence of periodontal inflammation or primary trauma (Nyman and Lang, 1994)
- Insufficient number of non-mobile teeth to adequately stabilize mobile teeth
- Poor oral hygiene
- High caries activity
- Crowding and mal-aligned teeth that may compromise the utility of splint. [11]

Classification

Temporary splint: A splint which exist only for a limited period of time-not a permanent splint.[2][5]

Provisional splint: A provisional splint can be fabricated for the present situation which can be changed later may or may not to a permanent splint. [10][6]

Goldman, Cohen & Checker Classification Temporary splints

1. Extra-coronal type

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

2. Intra coronal type

- Wire & acrylic
- Wire & amalgam
- Wire, amalgam & acrylic
- Cast chrome- cobalt alloy bars with acrylic, or both

Provisional splint

- All acrylic
- Adapted metal band and acrylic

Ross, Weisgold and Wright Classification

1. Temporary stabilization

- Removable extra coronal splints
- Fixed extra coronal splints
- Intra-coronal splints
- Etched metal resin-bonded splints

2. Provisional stabilization

- Acrylic splints

- Metal-band-and-acrylic splints

3. Long term stabilization

- Removable splints
- Fixed splints
- Combination removable and fixed splints Grant, **Stem and Listgarten Classification**

1. Removable (external)

- Swing-lock devices
- Over dentures (full or partial)
- Continuous clasp devices

2. Fixed (internal)

a. Posts in root canals

b. Horizontal pin splints

c. Full coverage, three-fourths coverage and inlays

3. Cast metal resin bonded fixed partial denture (Maryland splints)

4. Combined

a. Partial dentures and splinted abutments.

b. Removable fixed splints

c. Full or partial dentures on splinted roots

- Fixed bridges incorporated in partial dentures seated onposts or copings Others
- Arch bar splint
- Orthodontic wire and bracket splint

Stages Involved In Splinting

Tooth splinting in dentistry is a procedure used to stabilize loose teeth, usually due to trauma or periodontal disease. The process generally involves several stages: [11][10][2]

Diagnosis and Planning

Examination: The dentist assesses the extent of tooth mobility, underlying causes, and overall oral health.

Treatment Plan: A tailored plan is created based on the diagnosis, which might include the type of splinting material to use and the duration of the splint.

Preparation

Cleaning: Teeth and surrounding areas are cleaned to remove plaque, tartar, and any debris.

Tooth Preparation: Sometimes, minor adjustments or treatments are done to the teeth that will be splinted to ensure proper fit and function.

Splint Placement

Material Selection: Various materials can be used for splinting, including dental bonding materials, metal wires, or composite resins.

Application: The chosen splinting material is applied to stabilize the loose teeth. This may involve bonding the teeth together or using a splint to connect them.

Post-Placement Care

Instructions: Patients receive instructions on how to care for their splinted teeth, including oral hygiene practices and dietary recommendations.

Follow-Up: Regular follow-up appointments are scheduled to monitor the stability of the teeth and adjust the splint if necessary.

Monitoring and Adjustment

Assessment: The dentist monitors the teeth and gums to ensure healing and stability.

Adjustments: If needed, the splint may be adjusted or replaced based on the patient's response and progress.

Removal (if applicable)

Evaluation: Once the underlying issue has resolved and the teeth are stable, the splint is removed.

Final Assessment: The dentist checks for any residual issues and provides further treatment or maintenance recommendations as needed.

The goal of tooth splinting is to support the healing process, protect the teeth, and restore function and appearance.

Duration of Splinting

The duration of tooth splinting can vary based on the grade of tooth mobility:

Grade 1 Mobility: This is a slight mobility where the tooth is slightly loose but not excessively. Splinting is often done for a short period, typically 2 to 4 weeks, to allow the periodontal tissues to stabilize.

Grade 2 Mobility: This indicates moderate mobility where the tooth moves more than in Grade 1. Splinting usually lasts around 4 to 6 weeks, as the tooth needs more time for the supporting structures to heal and stabilize.

Grade 3 Mobility: This is severe mobility where the tooth is very loose and may even be in danger of being lost. Splinting for Grade 3 mobility may extend from 6 weeks to several months, depending on the healing process and the tooth's response to treatment.

The exact duration will be tailored by the dentist based on individual patient needs and the specific circumstances of the dental injury or condition. Regular follow-ups are important to adjust the splinting duration as necessary. [10]

Methods Other Than Splinting for Treating A Mobile Tooth

Instead of tooth splinting, there are several other methods and treatments depending on the nature of the dental issue: [3]

Root Canal Treatment: For a tooth with severe pulp damage or infection, a root canal might be needed to remove the damaged tissue and restore the tooth.

Periodontal Therapy: For mobility due to gum disease, periodontal treatments such as scaling and root planning, along with improved oral hygiene, can help stabilize the tooth.

Dental Implants: If a tooth is too damaged or loose and splinting is not effective, extraction followed by dental implant placement might be considered.

Bone Grafting: If there is significant bone loss around the tooth, bone grafting might be used to restore bone support, often in conjunction with other treatments.

Orthodontic Treatment: In cases where the mobility is due to misalignment or occlusion issues, orthodontic adjustments can help stabilize the teeth.

Provisional Crowns or Bridges: For teeth with structural issues or damage, temporary crowns or bridges might be used to provide support while the underlying problem is addressed. Each alternative method is selected based on the specific diagnosis and overall treatment goals. [9]

Advantages

- Reconstruction of the alveolar bone and periodontal ligament in the alveoli for orthodontically moved teeth.
- Assists in the repair of supporting structures.
- Patient comfort and fine stability will be provided.
- Maintains the tooth in a fixed position, making surgical procedures easier.
- Spreads occlusal forces out over a large area.[8]

Disadvantages

- Plaque buildup can necessitate additional periodontal care.
- Excellent OHI maintenance is required.
- Assuming one tooth in the brace is in horrible impediment, it can
- The periodontium of all other teeth in the splint may be damaged if one tooth in the splint is in traumatic occlusion.[8]
- Caries development is a risk that can be tolerated.

Conclusion

In advanced periodontal disease, tissue destruction is so severe that one or more teeth must be extracted. The main goal of periodontal treatment is to stabilize hypermobile teeth and replace missing teeth in a crowd of mobile teeth by immobilizing the remaining teeth that are available for treatment.

From a straightforward composite splint to a removable cast partial prosthesis, there are numerous options for splints. The permanent splint, such as a metal bridge or PFM bridge, may be included at a later review if there is no increase in the mobility of the previously assigned provisional bridge or abutment teeth. Periodontal splinting and other types of traumatic splinting or orthodontic splinting may have different retention times. Therefore, collective knowledge of the biomechanics of splinting in relation to the patient's existing periodontal condition is required when selecting a splint, the duration of the splint, and the material of the splint. [10]

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