

United we stand - periodontal splints : a brief insight

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ABSTRACT

Splinting is one of the oldest forms of aids to periodontal therapy. By redistribution of forces on the affected teeth the splint minimizes the effects caused by loss of support. This article aims to review the rationale, techniques, advantages and ill effects of stabilization of teeth by splinting as an aid to periodontal therapy. With the acceptance and clinical predictability of adhesive procedures, the use of conservative bonding techniques to splint teeth offers a useful alternative to more invasive restorative procedures. It also describes the technique for splinting with any of the fiber reinforced ribbon materials used in conjunction with light cured composite resin.

Introduction

When the teeth are seriously loosened by acute trauma or periodontal disturbances, stabilization by splinting can become a valuable adjunct before, during and after corrective therapy. The prime objective of splinting is to rest the affected structures by redistributing functional and parafunctional forces, reducing especially those forces that act in a horizontal direction. Because an axially inclined force is the least traumatic, splinting provides for this type of force by controlling excessive mobility. Thus it aids in the prevention of further breakdown of a seriously weakened periodontium, of tooth migration and of subsequent bite collapse.

Definitions

The Glossary of Prosthodontic terms[1] defines a splint as "a rigid or flexible device that maintains in position a displaced or movable part; also used to keep in place and protect an injured part.

Biologic Rationale of Splinting

- 1) Rest
- 2) Redistribution of forces
- 3) Redirection of forces
- 4) Preservation of Arch Integrity
- 5) Restoration of functional stability
- 6) Psychologic Well-Being

Stabilization by splinting not only improves function but it also can restore a sense of a solid feeling dentition as well as comfort and good looks. The attainment of comfort and esthetics as a basis for splinting cannot be disregarded, however, splinting must not be misused as cosmetic procedure.

Classification of stabilization by Splinting

Teeth can be splinted by several methods. The classification

formulated by Ross et al (1968)[2] is as follows:-

- A) Temporary stabilization
 - I. Removable extra coronal splints
 - II. Fixed extra coronal splints
 - III. Intracoronar splints
 - IV. Etched metal resin bonded splints.
- B) Provisional stabilization
 - I. Acrylic splints
 - II. Metal bond and acrylic splints.
- C) Long term stabilization
 - I. Removable splints
 - II. Fixed splints
 - III. Combination removable and fixed splints.

Indications

- 1) Control of forces of parafunction or bruxing removable acrylic biteguard or Hawley appliances with anterior bite plane.
- 2) Stabilization of mobile teeth for masticatory comfort - temporary provisional or permanent splints.
- 3) Stabilization of mobile teeth during surgical especially regenerative therapy - Temporary, provisional or permanent splints that may be removable or fixed.[3]
- 4) Cross-arch stabilization of an intact natural dentition (or preservation of arch integrity).
- 5) Stabilization of a severely periodontally compromised tooth when more definitive treatment is not possible, a reinforced ribbon and resin or intracoronar wire and resin splint is indicated.
- 6) Restoration of the vertical dimension of occlusion in a case of posterior bite collapse.
- 7) Prevention of the eruption of an unopposed tooth - "A splint", bite guard or restoration of the missing opposing tooth.
- 8) Post orthodontic retention.
- 9) Redistribution of forces along the long axis of teeth.
- 10) Stabilization of loose teeth to restore the patients psychological

and physical well being splinting may restore occlusal stability; restore a sense of a solid occlusion and improved esthetics.

Contraindications for Splinting

- 1) Splinting should not be done without elimination of causative factors.
- 2) When there is moderate to severe tooth mobility in the presence of periodontal inflammation or primary trauma from occlusion.
- 3) It should not be done without elimination of occlusal interferences.
- 4) If the number of non-mobile teeth insufficient to adequately stabilize the mobile teeth.
- 5) If oral hygiene is inadequate.

Temporary Stabilization : Indications

A temporary splint is used when

- 1) Splint is to be used until stabilization is no longer necessary. e.g. In cases of mobility caused by orthodontics repositioning, trauma or occlusal traumatism, all of reversible nature.[4]
- 2) As a phase of therapy being undertaken to determine whether hypermobility can be resolved by conservative methods or whether mobility is caused by loss of support sufficient to create permanent hypermobility.[5]
- 3) When permanent fixation is needed but cannot be done due to economic reasons because prognosis for all remaining teeth is doubtful. Poor health seriously affects the longevity of the dentition because the patient cannot accept the lengthy procedures of permanent fixation.

New Generation Bonded Reinforcing Materials for Anterior Periodontal Tooth Stabilization and Splinting.

For many years, the optional choice for splinting teeth was the use of full-coverage cast restorations. But a significant drawback was the amount of tooth structure that had to be removed.

With the acceptance and clinical predictability of adhesive procedures, the use of conservative bonding techniques to splint teeth offers a useful alternative to more invasive restorative procedures.[6]

Periodontal Splinting with Direct Composite

Resin Polyethylene Woven Ribbon

The interproximal surfaces are cleaned and prepared with a medium grit diamond finishing strip in a handle. In some cases, mandibular lingual splints with the presence of tooth rotations and misalignment can require a definite preparation to a minimal depth of 0.5 mm but not greater than 1.0 mm.

For maxillary anterior splints, placing the preparation on the facial surface affords the benefit of maintaining the occlusal stops on sound tooth structure. If the splints were placed on the lingual surface of the maxillary arch, the composite resin would be susceptible to wear through to the fibre resin.

After measuring the length of fibre ribbon needed for splinting, the extremely tough fiber ribbon is cut with special treated scissors that are part of the product kit. Once cut to size,

the Connect or Ribbond is saturated with a few drops of adhesive resin from any dentine and enamel bonding system.

The resin flows over and completely wets the surface of the ribbon. The wetted ribbon should be blotted to remove any excess resin and kept aside and covered to keep light off it.

The teeth to be splinted are etched for 30 seconds, then rinsed and dried.

The etched enamel can be verified by its frosty appearance. A resin adhesive is applied to etched enamel and root Surfaces using a brush. Wooden wedges are kept interproximally passively to limit the flow of composite resin into the gingival embrasure.

A medium viscosity hybrid composite resin is dispensed onto the facial surfaces of all interproximal areas of the teeth and light cured for 40 seconds. The composite resin is then syringed onto the lingual surfaces. The lingual surfaces are light cured for 60 seconds for each tooth. The composite resin is shaped finished and polished to remove excess bulk and achieve an esthetic result.

Splinting Natural Teeth & Implants

Incorporating an implant and a natural tooth becomes a desirable treatment option in unilateral posterior edentulous areas when only one implant can be placed. But problems have been reported with this combination.

The different complications encountered are :

- 1) Tooth intrusion
- 2) Abutment or prosthesis fracture.

Generally, at this time, most authors recommend avoiding the combination of natural teeth and implants.

Limitations of Splinting

- 1) Difficulty in performing the Extensive Restorative procedure
- 2) Cost
- 3) Technical Difficulty
- 4) Repair and Maintenance
- 5) Additional Tooth Reduction.
- 6) Plaque Removal

Interdental brushes and wooden tooth picks are better suited to these patients because they are the only adjunctive plaque control aids that can effectively remove plaque from the proximal surfaces of tooth when many concavities exist.

To facilitate adequate access for cleansing, a splint must be placed with open gingival embrasures and be properly contoured with no overhanging margins all surfaces must be smooth to minimize plaque retention.

Conclusion

Tooth stabilization and splinting have been done since ancient civilization to decrease tooth mobility, to replace missing teeth, and to improve form, function and esthetics. In recent years, the use of conservative bonding techniques to splint teeth offers a useful alternative to more invasive restorative procedures. Splinting without adequate diagnostic techniques can result in misapplication of these procedures and unnecessary mutilation of teeth.

Effective personal plaque control, professional caries risk assessment and periodontal maintenance are crucial to the longevity

of the splint and health of the splinted teeth.

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