

Review

SPLINTING: PERIODONTIUM STABLIZATION A REVIEW

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Abstract

Splinting is a procedure by which a tooth resistance to an applied force, is increased by joining it, to a neighboring tooth or teeth, is a well-accepted clinical treatment used to control irreversible tooth mobility through mechanical stabilization. It has the advantage of stabilizing mobile teeth by forming a firm unit, minimizing tooth mobility, and greatly improving the occlusal function of the teeth. Splinting is considered an important component of a periodontal treatment plan because of its ability to provide coaptive stability to the teeth and greatly improve the outcome and prognosis of teeth affected by periodontal disease. Splinting is regarded as an integral part of periodontal therapy because it is used to maintain periodontally migrated teeth that have been repositioned and also used before periodontal surgery to stabilize mobile teeth during postsurgical healing as such stabilization creates a more favorable environment for periodontal repair.

Key Words: Splinting; Occlusion; Periodontal Health

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INTRODUCTION

Dawson defines splinting as the joining together of two or more teeth for the purpose of stabilization.^{1,2} The active term of splinting in dentistry is defined as the joining of two or more teeth into a rigid unit by means of fixed or removable restorations or devices.^{3,4} Splinting is valuable in ensuring the retention of periodontally compromised tooth and positively affecting the longevity.⁵ Vályi et al reported that the stabilization of mobile teeth with splint allow the same healing like a nonmobile teeth. Splinting has also been shown to promote healing following periodontal surgery in localized aggressive periodontitis with resultant significant bone gain.⁶

The rationale for splinting

The rationale for splinting which are mainly

for protection of tissue, restoration of physiologic occlusion, distribution of force, ensuring functional comfort during mastication are listed below.⁷

To protect the investing structures of the teeth

To protect the pulp

To control forces and stress

To establish physiologic occlusion

To serve as an evaluating procedure

To serve as anchorage and stabilizer in cases requiring minor tooth movement

executed simultaneously or required immobilization or to maintain periodontal result.

To establish the prognosis of questionable teeth as it affects the final treatment plan To enhance stabilization in postacute trauma

To prevent drifting in normal dentition during occlusal therapy

To provide functional comfort by preventing mobility in dentition

Indications for splinting

The main purposes of splinting are to provide rest where wound healing is in process and permits function where the tissues alone cannot perform adequately. Indications for splinting include.⁸⁻¹⁰ To maintain periodontally migrated teeth that has been repositioned. It is usually required in addition to occlusal adjustment in moderate to severe periodontitis when trauma from occlusion is progressive. Moderate to advanced tooth mobility that cannot be reduced by other means and which has not responded to occlusal adjustment and periodontal therapy and when there is interference with normal function and patient comfort. In cases where nonsurgical and surgical periodontal procedures are difficult in the absence of tooth stabilization. It facilitates treatment of extremely mobile teeth by splinting them before periodontal instrumentation and occlusal adjustment procedures. Splinting is used to eliminate movements in the healing area after periodontal surgery since micromovement of the surgical site may inhibit repair to take place in the healing area. Tooth splinting may be indicated for individual mobile teeth as well as for an entire dentition in cases where extraction and implant therapy is not a viable alternative. Prevention of teeth drifting after orthodontic treatment or when a tooth is missing. Prevention of mobility after acute trauma as in subluxation and avulsion. von Arx stated that splinting of traumatized teeth is an important step in the treatment of periodontally injured teeth and a precondition of healing of the periodontal tissues and also listed medicolegal reasons, patient comfort and avoidance of additional trauma during periodontal healing as other reasons for

splinting in such situations.^{9,10}

Contraindications for splinting

When the treatment of inflammatory periodontal disease has not been addressed. When occlusal adjustment to reduce trauma and/or interferences has not been previously addressed. When the sole objective of splinting is to reduce tooth mobility whose etiology could be ascertained.¹¹

Disadvantages of splinting

The primary disadvantage of splinting is that it compromises plaque control by making oral hygiene access difficult thus instructing the patient about enhanced measures for oral hygiene after splinting is essential for the improved longevity of the connected teeth.¹² This is based on the fact that plaque accumulation at the splinted margins can lead to gingival irritation and further periodontal breakdown in a patient with already compromised periodontal support.¹³ periodontal and caries risk assessment, periodontal debridement, and preventive interventions during professional follow-up are critical to splint longevity. Other disadvantages of splinting include loose or fractured crown, splint interference with phonetics, normal interproximal wear, and mesial drift. Splinting is known to cause further deterioration in periodontal health if incorrectly performed. The following requirements have been outlined to overcome such potential negative consequences and achieve maximal positive outcome.¹⁴

Ideal splinting requirements

Splints will achieve the indicated purpose for the fabrication and application when the ideal requirements listed below are given due consideration.¹⁵ It should incorporate as many firm teeth as is necessary to reduce the extra load on individual teeth to a minimum. It should hold the teeth rigid and not impose torsional stresses on any incorporated teeth. It should extend around the arch so that anteroposterior forces and faciolingual forces are counteracted. It should not interfere with

the occlusion. If possible, gross tooth disharmonies should be eliminated before the application of the splint. It should not irritate the pulp. It should not irritate the soft tissues, gingiva, cheeks, lips, or tongue. It should be designed to be comfortable and easy to keep clean for the patient. Interdental embrasure spaces should not be blocked by the splint. It should be readily available, relatively inexpensive, and medically acceptable. Ease of fabrication and maintenance. Capable of removal, insertion and esthetically acceptable.¹⁵

Classification of splints

There are many techniques for splinting teeth. They can be classified based on their purpose and duration of use, the location of the splinted teeth in the jaw and the way of fabrication.¹⁶ Splints are classified as metallic, nonmetallic, and combination of metallic and nonmetallic type on the basis of material. Metallic types are usually made of stainless steel, chrome cobalt, and cast metals, whereas nonmetallic types are made of acrylic and composites. Splints are classified as fixed and removable on the basis of way of fabrication. Splints are classified as extra coronal and intracoronal on the basis of the location of the splinted teeth in the jaw.¹⁷

Extracoronal splints

Here, stabilizing wire, fiber-reinforced ribbon, or similar stabilization device is bonded to the outside of the teeth like a fixed orthodontic retainer. Other examples include tooth-bonded plastic, night guard, and welded bands.

Intracoronal splints

Here, a slot is milled into the affected teeth, and the stabilizing device is inserted into the slot and bonded in place. This makes this type of splint less visible with esthetic superiority. Examples include inlays and nylon wire. Splints are classified as temporary, provisional, or permanent on the basis of duration and purpose.¹⁸

Temporary splints

Temporary splints are those which are used less than 6 months during periodontal treatment and may or may not lead to other types of splinting. It is used to reduce unfavorable occlusal forces for a limited time in postacute trauma, in supportive measure in the treatment of advanced periodontal disease, and for anchorage in orthodontic therapy. Temporary splints can be removable, fixed external, and fixed internal types. Examples of removable temporary splint are cast metal splint of Elbrecht, the acrylic Hawley or other types of orthodontic appliance, the bite guards or night guards. Examples of fixed external types are

- (1) Annealed 0.010 or 0.012 inches stainless steel ligature wire, single or double, bonded to the teeth facially, lingually, and sometimes incisally.
- (2) The splint of wire combined with acrylic.
- (3) Orthodontic bands welded together
- (4) cast splints of gold or chrome nickel alloy cemented to the teeth and the facial and lingual parts tied together with ligature wire.
- (5) The most popular temporary splint is the one made with acid etch, self-polymerizing resin, and composite material.
- (6) Acrylic reinforced with the orthodontic grid material or cast metal framework

Example of fixed internal type metal wires with acrylic reinforced placed in interproximal box preparation with mark retention to hold the teeth together Provisional splints: Provisional splints may be used from several months to years for diagnostic purposes, and usually lead to more permanent types of stabilization.¹⁹ Amsterdam M, Fox defined provisional splinting as the phase of restorative therapy utilizing a biomechanical combination of tooth dressing coverages and stabilization of teeth on an immediate basis. They are used in borderline cases in which the final result of the periodontal treatment cannot be predicted with certainty during the initial treatment planning. They provide information as to whether

splinting will offer benefits before planning comprehensive treatment. Examples include ligature wires, nightguards, and interim fixed prosthesis, composite resin splints with or without wire and fiber support.

Permanent splints

Permanent splints are worn indefinitely and could be fixed or removable. They are intended to increase functional stability and improve esthetics on a long-term basis. They are usually placed only after completion of periodontal therapy and achievement of occlusal stability. Examples include Pin ledge type of abutment, clasped supported partial denture.²⁰

CONCLUSION

It is crucial to raise clinician's awareness in the appropriate way of managing tooth mobility. In the cases reported, the causes were chronic periodontitis and aggressive periodontitis. It is important to properly diagnose the cause of a particular patient's tooth mobility so as to know how to manage the patient. History taking is necessary for proper diagnosis; however, incomplete history given by the patient may misguide an unsuspecting dentist, especially in cases of trauma. Dental examination and intraoral radiography are usually helpful in confirming the cause. In this report, nonsurgical periodontal treatment and occlusal adjustment before splinting resulted in a good clinical outcome. The bone deposition may be due resolution of the inflammation, passive eruption following occlusal adjustment and improved healing from the splinting.

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