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Stabilizing periodontally compromised teeth with braided glass fiber splint: A Case Report

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Abstract:

Background: Plaque is a significant factor that leads to periodontal disease. One of the most common areas for plaque accumulation is the lower anterior region.Accumulation of plaque leads to periodontal disease progressionthatfurther leads to pathological tooth mobility which can result from acute periodontal inflammation and bone loss .Increased mobility can cause inconveniences for the patient. The new classification of periodontal disease states that teeth with progressive mobility may require splinting therapy to improve patient comfort and additional improvement for the Oral Health-related Quality of Life.**Objective:** To describe the correction of tooth mobility with Extracoronal fiber splint to improve function and comfort.**Case report:** The 39-year-old male patient presented with a chief complaint of mobile lower anterior teeth. At the intraoral examination, we noted gingival recession and loss of the interdental papilla, but without periodontal pocket. The tooth mobility test showed grade 2 mobility in 31,32, 41 and 42. The treatment plans of periodontal therapy begins with the initial phase, followed by the correction and the maintenance phases. In the initial phase, SRP(Scaling and Root planning) was done followed by extracoronal fiber splint placement to stabilize the mobile teeth.**Conclusion:** The splint does the redistribution of forces on the affected teeth, and also it minimizes the impact of the loss of support.

Introduction

The inflammatory condition known as periodontitis is brought on by bacterial biofilms that builds up in the gingival margin.[1,2] It is characterized by bleeding gums, increasing periodontal pocket depth, loss of alveolar bone and connective tissue attachment, and gingival inflammation.

A healthy periodontium can be achieved by removing calculus, plaque, deep periodontal pockets, and making occlusaladjustments. Increased tooth mobility may come from the ongoing loss of supporting tissues brought on by the advancement of periodontal disease if treatment is not received.

As periodontitis progresses, bone loss can result in tooth mobility, which can make mastication uncomfortable, leading to difficulty in oral hygienemaintainence ,prolong the infectiousinflammatory process, and ultimately lead to tooth loss.The shift in the rotational fulcrum is what causes this tooth movement.In modern dentistry, splinting mobile teeth to stable neighboring teeth is a practical solution that can be used in certain situations. "A device that maintains hard and/or soft tissue in a predetermined position" is what a splint is defined as. There are several purposes for which teeth are

splinted: to restore lost teeth, to preserve orthodontically repositioned teeth, to stabilize traumatized teeth, and to stabilize mobile, periodontally involved teeth.[3]

Orthodontic wires used in conjunction with resin composite, brackets and passive orthodontic wires, or resin composite by itself can all be used to produce splinting. Up until now, the aforementioned materials have not demonstrated sufficient stability or the capacity to form a single unit between the tooth and the splint, making it challenging to distribute the masticatory pressures and maintain dental cleanliness.[4]

The use of twisted polyethylene fiber ribbons bonded to the tooth surfaces is a very practical and promising substitute. These fibers serve a practical and aesthetic purpose while also strengthening teeth that are mobile as a result of bone loss. Fiber reinforced composite (FRC) is a combination of fiber and resin matrix. The fiber is the reinforcing part, providing stability and stiffness, while the resin matrix is the protecting part, assuring the reinforcement and the possibility to work with the material.[5]

This case report aims to describe the applicability of braided glass fiber splint impregnated with light-composite resin for stabilizing periodontally compromised teeth.

Case presentation:

The 39-year-old male patient presented with a chief complaint of mobile lower anterior teeth. At the intraoral examination, we noted gingival recession and loss of the interdental papilla, but without periodontal pocket. The tooth mobility test showed grade 2 mobility in 31,32,41 and 42. The initial periapical radiograph diagnosed the increase in the space of the periodontal ligament, horizontal bone loss compromising half of the root surface, and bone resorption on the alveolar ridge. The treatment plan of periodontal therapy begins with the initial phase, followed by the correction and the maintenance phases. In the initial phase, SRP (Scaling and Root planning) was done followed by extracoronal fiber splint placement to stabilize the mobile teeth.

Method :

First step :

After oral prophylaxis the lingual surfaces of the teeth to be splinted are etched using the etchant gel for 30 seconds and then dentin bonding agent is applied.

Second step:

The glass fiber (Interlig) was cut and adapted onto the lingual surfaces, according to the length of the teeth to be splinted. All ribbons of the fiber are covered by resin composite.

Third step :

A thin layer of flowable composite was applied on the work area and the fiber was placed on the work area and is adapted until it adheres well and then it is cured with Light cure for 20 seconds .

Follow up was conducted 1 month after the procedure. The patient was prescribed 0.2% chlorhexidine mouthwash 2 times a day for 1 week and instructed to brush his teeth 2 times a day to keep oral hygiene well maintained. The second recall was carried out at 8 weeks after the procedure and was

instructed to perform oral hygiene with interdental toothbrushing, changed at every three months.(Figure 1-7)

Result:

Results showed decreased mobility after 2 months follow up. The patient maintained the oral hygiene and was satisfied with the treatment.

Discussion:

Improving patient comfort, the prognosis of mobile teeth, and better occlusion management in the case of mobile anterior teeth are the most frequent reasons for periodontal splinting. After periodontal therapy, stability is achieved with periodontal splints that shift functional and parafunctional pressures. The literature has documented a wide variety of splints, including wire-composite, fiber-reinforced composite resin, composite resin-based splints used in conjunction with adhesive systems, and orthodontic wire.[6]

The twisted glass fiber has some advantages over the stainless steel wire and resin composite .[7] Bond strength tests of specimens made of glass-fiber reinforced resin composite showed increasing the bond strength and modulus of elasticity as compared to the specimens made of resin composite alone.Because of the aesthetic qualities ,strength,high modulus of elasticity and effective resistance to occlusion and masticatory forces, glass fiber exhibits a long-term success rate.This case study provides proof of these qualities.

It is important to remember that splinting makes maintaining good oral hygiene more challenging and extra care is required to ensure the long-term success. In this case study, we chose not to seal the spaces between the incisors, making interdental brushing easier for maintaining good oral hygiene.

In order to prevent periodontal disease, the interproximal biofilm must be controlled. Conventional tooth brushing is less effective in the interproximal area, but it can reduce the supragingival biofilm by up to 40%. For individuals who need periodontal follow-up, interdental brushing is just as effective as dental floss at eradicating supragingival biofilm.

Moreover, the interdental tooth brushing is better than flossing in cases of tooth splinting. The systematic reviews demonstrate that the association of interdental tooth brushing and conventional tooth brushing are more effective in removing biofilm and reducing gingival inflammation than conventional tooth brushing alone or associated with flossing.[8]

The splinting of mandibular anterior teeth is a fast, economical, conservative procedure, with short-term successful outcomes.

Conclusion:

In the case of bone loss, treatment consists of a combination of periodontal therapy, occlusal adjustments and tooth stabilization. Stability is achieved through periodontal splinting, which redistributes functional and parafunctional forces. This supports the tissue reorganization process of the gingiva, periodontal fibers and alveolar bones, and maintains patient comfort. When used prior to surgical periodontal therapy, the periodontal splint promotes tooth stabilization and tissue healing by

reducing inflammation. Various techniques have been used to manufacture periodontal splints, such as: fiber reinforced composite in combination with composite resin. Finally patient compliance also plays a very important role in the success of treatment.

Figure 1: Pre – operative radiograph showing bone loss irt 31,32,41,42

Figure 2: Gingival recession with no pockets on clinical examination

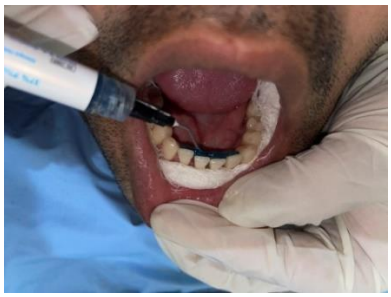

Figure 3: Application of etchant gel

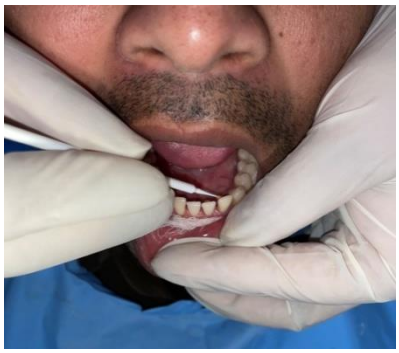

Figure 4: Application of bonding agent and flowable composite in work areas and fiber.

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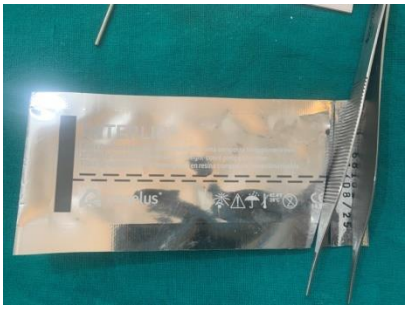

Figure 5:Braided glass fiber splint

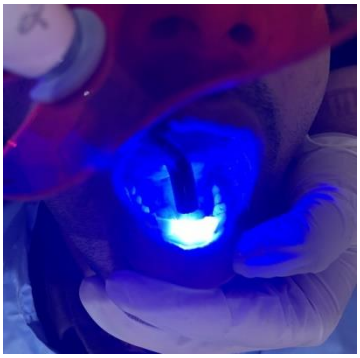

Figure 6: Illuminated work area with light cure for 20 seconds.

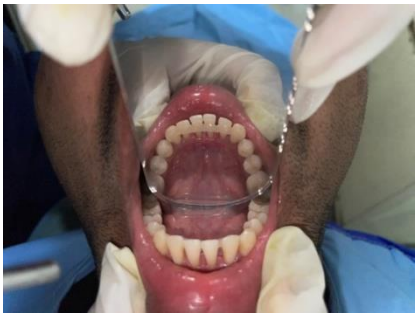

Figure 7:Post – operative view.

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