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Case Report Article

Stabilizing periodontally compromised teeth with glass fiber-reinforced composite resin – case report

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Abstract

Introduction: The tooth mobility due to periodontal bone loss can cause masticatory discomfort, mainly in protrusive movements in the region of the mandibular anterior teeth. Thus, the splinting is a viable alternative to keep them in function satisfactorily. **Objective:** This study aimed to demonstrate, through a clinical case with medium-term following-up, the clinical application of splinting with glass fiber-reinforced composite resin. **Case report:** Female patient, 73 years old, complained about masticatory discomfort related to the right mandibular lateral incisor. Clinical and radiographic evaluation showed grade 2 dental mobility, bone loss and increased periodontal ligament space. The proposed treatment was splinting with glass fiber-reinforced composite resin from the right mandibular canine to left mandibular canine. **Results:** Four-year follow-up showed favorable clinical and radiographic results with respect to periodontal health and maintenance of functional aspects. **Conclusion:** The splinting with glass fiber-reinforced composite resin is a viable technique and stable over time for the treatment of tooth mobility.

Introduction

The bone loss caused by periodontitis progression may lead to tooth mobility, causing discomfort during mastication, difficult in oral hygiene (because the patient fears of performing tooth brushing), perpetuating the infectious-

inflammatory process and consequently evolving to tooth loss. This tooth mobility is caused by the change of the rotation fulcrum of the teeth to a more apical position [2] and may be aggravated by traumatic occlusal forces, mainly in teeth with reduced periodontium [14].

In these cases, the splinting of teeth with mobility to the stable adjacent teeth is a viable alternative with clinical application in contemporary Dentistry. Splinting can be achieved with orthodontic wires associated with resin composite, orthodontic brackets and passive orthodontic wires, or resin composite alone. Until now, these aforementioned materials do not show the adequate stability and do not enable obtaining a single unit between the tooth/splinting, which makes difficult to distribute the masticatory forces and the oral hygiene [3, 14].

A very viable and promising alternative is the use of twisted polyethylene fiber ribbons bonded to the tooth surfaces [5, 14]. These fibers are functional, esthetic, and improve the stability of teeth with mobility due to bone loss [4, 12, 13].

The literature reports some cases with splinting by glass fiber-reinforced composite resin, but with short following-up periods [7, 9, 13]. This case report aimed to describe the applicability of glass fiber-reinforced composite resin for stabilizing periodontally compromised teeth at medium-term following-up.

Case report

Patient MKK, female, aged 73 years, was referred to the institutional Dentistry Clinics complained about tooth mobility of the right mandibular lateral incisor and masticatory discomfort. At the intraoral examination, we noted gingival recession and loss of the interdental papilla, but without periodontal pocket (figure 1). Tooth contacts occurred on the incisal surfaces of teeth #31 and #32; teeth #41 and #42 showed weariness on the incisal surfaces (figure 1).



Figure 1 – Frontal clinical view of the mandibular anterior teeth

The teeth were submitted to pulp sensitivity test and showed positive results. The tooth mobility test showed degree 2 mobility in tooth #42, due to bone loss because of previously treated chronic periodontitis associated with a traumatic occlusion (figures 2 and 2a). 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 (figure 3).



Figure 2 – Incisal clinical view of the mandibular anterior teeth



Figure 2a – Incisal clinical view of the mandibular anterior teeth, evidencing the tooth mobility



Figure 3 – Initial periapical radiograph

The proposed treatment was splinting the teeth #43 to #33 with resin composite reinforced by twisted glass fiber. After rubber dam isolation, tooth #42 was placed into position and aligned with the other anterior teeth (figures 4 and 4a).



Figure 4 – Frontal after rubber dam isolation



Figure 4a – Frontal view after rubber dam isolation and tooth alignment

After tooth prophylaxis with pumice and Robson brush (Microdont) at low speed, the enamel surfaces were conditioned with 37% phosphoric acid (FGM) for 30 seconds and washed for 30 seconds, dried, and followed by the application of the adhesive agent (Scotchbond-3M ESPE).

The glass fiber (Interlig, Ângelus) was cut and adapted onto the lingual surfaces, according to the manufacturer's instructions (figure 5). Then, all ribbon was covered by resin composite (Filtek Z250 XT, 3M ESPE). This same material was used to obtain the proximal contact point between teeth #42 and #43 and partially reconstruct the incisal surfaces (figure 6). The patient was instructed to performed oral hygiene with interdental toothbrushing, changed at every three months. After one week, the finishing and polishing procedures were carried out with sandpaper disc (Sof-lex, 3M) and felt discs with polishing paste (Poli Composta, Asfer).



Figure 5 – Frontal view after glass fiber application



Figure 6 – Frontal view after reestablishing of the contact point

After four years, we observed the periodontal health and the complete and functional splinting, maintaining the masticatory comfort (figure 7). Radiographically, no further periodontal insertion loss was noted, but the reduction of the periodontal ligament space and bone deposition on the apical, lateral and alveolar ridge areas (figure 8).



Figure 7 – Frontal view of the mandibular anterior teeth after 4-year following-up period



Figure 8 – Four-year following-up periapical radiograph

Discussion

The tooth degree is directly related to the amount of remaining bone and root length and shape [2, 14]. Single-rooted teeth have more pronounced mobility than do multi-rooted teeth, mainly when the loss of alveolar insertion reaches half of the root [2, 14].

Teeth with mobility were not more susceptible to greater insertion loss over time [6], but these teeth may cause masticatory discomfort, as reported in this clinical case. Thus, the splinting restores the functional occlusion and the masticatory comfort, improves the esthetics, and promotes the psychologic well-being of the patient [12].

Tooth mobility itself is not indicative of tooth splinting, but occlusal adjustment associated to splinting may avoid the progressive loss of tooth insertion [4], because this procedure adjusts the rotation fulcrum of the teeth with mobility on the bone remnant preventing the load excess of masticatory forces [22].

Although the effectiveness of the materials for splinting seems indifferent, the twisted glass fiber has some advantages over the stainless steel wire and resin composite [1, 11, 17]. Bond strength tests of specimens made of glass-fiber reinforced resin composite showed the increasing of the bond strength and the modulus of elasticity compared with the specimens made of resin composite alone [5, 21].

The glass fiber shows long-term success rate due to the esthetic features of the resin composite

associated with the strength of the thin ribbon treated by plasma with chemical and adhesive reinforcement with high modulus of elasticity and effective resistance to the occlusion and masticatory forces [20]. These characteristics are evidenced by this case report.

It is worth noting that splinting makes oral hygiene difficult and special attention is needed to assure long-term success of splinted teeth [15]. In this case report, we avoid to close the diastemas between the incisors which allowed an easier oral hygiene with interdental toothbrushing, because that was a non-esthetic area.

The controlling of the interproximal biofilm is necessary to avoid periodontal disease [10]. The conventional toothbrushing reduces the supragingival biofilm in up to 40%, but it is less effective in the interproximal area [19]. The interdental toothbrushing is as effective as dental floss in removing supragingival biofilm in patients requiring periodontal following-up [10].

Moreover, the interdental toothbrushing is more practical than tooth floss in cases of tooth splinting. The systematic reviews demonstrate that the association of interdental toothbrushing and conventional toothbrushing are more effective in removing biofilm and reducing gingival inflammation than conventional toothbrushing alone or associated with flossing [8, 16, 18].

The splinting of mandibular anterior teeth is a fast, low-cost, conservative procedure [5], with short-term successful outcomes [7, 9, 13]. Notwithstanding, the literature lacks case reports with longer following-up periods [12]. In this context, the present case report demonstrated medium-term successful outcomes.

Conclusion

Taking into consideration the function devolution, health periodontium, the 4-year following-up period, patient's level of satisfaction, and the obtained clinical success, the splinting with glass fiber reinforced resin composite is a reliable technique with excellent clinical and functional outcomes, when the patient is carefully instructed on oral hygiene.

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