

# Splinting with Fibre-Reinforced Composite: A Case Report

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## ABSTRACT

Splinting is widely used in periodontics to stabilise mobile teeth. There are different splints available based on the types of materials and duration of use. This case report presents splinting in a 41-year old female patient who had the chief complaint of loosened teeth in the lower front teeth region and discomfort during chewing for four months. The fibre-reinforced composite was used and the patient reported comfort during mastication with reduced mobility of the associated teeth.

**Keywords:** Fibre-reinforced composite; splint; tooth mobility.

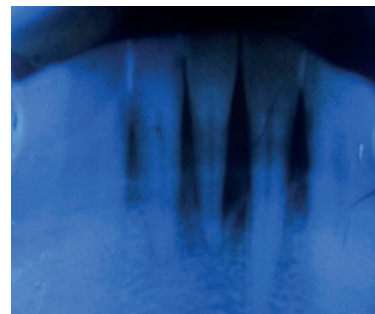
## INTRODUCTION

Periodontitis is a chronic inflammatory disease, which has multifactorial aetiology and is associated with dysbiotic plaque biofilms typically characterised by progressive destruction of tooth-supporting apparatus.<sup>1</sup> The progression of disease eventually results in increased mobility of teeth, which compromises periodontal health, aesthetics, function, and comfort of the patient.<sup>2</sup> In such cases, splinting helps in redistribution of the forces and stabilisation of the teeth. Splinting is defined as joining of two or more teeth into a rigid unit by means of fixed or removable restorations or devices.<sup>3</sup> This case report describes the splinting of periodontally compromised mandibular anteriors with fibre-reinforced composite material.

## CASE REPORT

A 41-year female patient reported to the Periodontology and Oral Implantology Unit, Department of Dental Surgery, Bir Hospital with the chief complaint of loosened teeth in the lower front teeth region and discomfort during chewing for four months. The medical history and the personal history reported were not significant. On clinical examination, there was presence of

moderate deposits of plaque and calculus with generalised periodontal pocket. Secondary trauma from occlusion and Grade II mobility was noted in relation to 31, 41 (according to two-digit teeth numbering system). Intraoral periapical radiograph showed bone loss in relation to 31, 41, 42 (Figure 1). A diagnosis of generalised chronic periodontitis was made.



**Figure 1: Intraoral periapical radiograph in relation to 31 and 41.**

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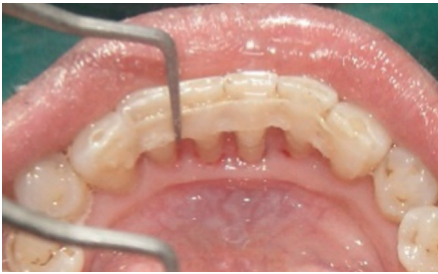
**Figure 2: Clinical picture after scaling and root planing.**



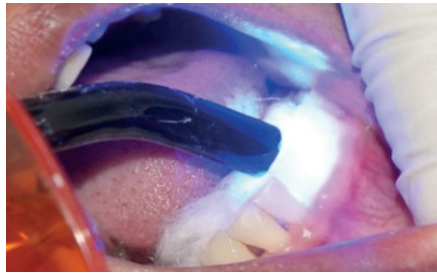
**Figure 3: Lingual view after scaling and planing.**



**Figure 4: Cleaning with non-fluoridated pumice paste.**



**Figure 5: Fibre splint adapted over the cingulum.**



**Figure 6: Curing of composite restorative material.**



**Figure 7: Finishing and polishing.**



**Figure 8: Splint in final position.**

Thorough scaling and root planing was done (Figure 2, 3) and occlusal adjustments were done in relation to 31 and 41 to remove the excessive forces so that bone apposition would occur to the pretrauma level and the periodontal ligament would regain its normal width stabilising the teeth. Splinting was planned in relation to 31 and 41 with fibre-reinforced composite (Ribbond-ultra, US). First, a tin foil was taken and placed along the lingual surface of the lower incisors and canines to measure the required length of the fibre splint. The fibre was cut and was dipped in dentin bonding agent and blotted to remove the excess material. The teeth were cleaned using prophylaxis cup with a non-fluoridated pumice paste (Figure 4), which was rinsed with water and dried. Then the lingual surface was etched with 30% phosphoric acid for 30 seconds, rinsed with an air-water spray for 10 seconds and gently dried. Dentin bonding agent was applied followed by the application of a thin

layer of composite and the fibre splint was adapted above the cingulum (Figure 5). A layer of light cure composite was added and cured for 60 seconds per tooth (Figure 6). Finishing and polishing was done (Figure 7) to gain a smooth and polished surface to prevent the entrapment of plaque. Occlusion was checked. The patient was discharged after proper oral hygiene instructions and advised to use interproximal aid (Figure 8).

On the recall visit, the patient reported comfort during mastication with reduced mobility.

## **DISCUSSION**

Splinting is widely used to provide functional comfort by preventing mobility, as a prevention of tooth drifting during occlusal therapy, create adequate occlusal stability when replacing missing teeth and in cases of post-acute trauma. The rationale of splinting is redirection of stresses, redistribution

of forces, stabilization, and strengthening of abutments, prevention of supraeruption, prevention of migration, and stabilisation of tipped teeth.<sup>4</sup>

The ideal characteristics of a splint are they should be simple and hygienic, economic, not interfere with treatment, aesthetically acceptable, non-irritating, stable, and efficient. Over the years, many types of splints have been used. The use of orthodontic stainless steel wire or ligature wire with composite is a cost-effective option. But, bonding of metal to composite or tooth surface does not occur. The mechanical locking creates shear planes and stress concentrations that would lead to fracture of the composite and premature failure.<sup>5</sup>

In comparison to metals, adhesive resins offer many other advantages including non-corrosiveness, translucency, and good bonding properties.<sup>5</sup> The use of composite resin as a sole agent results in early failure at contact points due to its brittle nature.

Fibre-reinforced composite splint, on the other hand, makes use of the chemical adhesion and aesthetic characteristic of composite resin coupled with strength enhancement of the reinforcing ribbon, but their inherent thickness after being incorporated in the composite creates a problem.<sup>6</sup> Thus, a lock stitched cross-linked weave of thinner strands of polyethylene fibres was introduced. This material does not unravel when cut unlike braided fibre weaves.<sup>6</sup>

Fibres of woven ribbon have no memory which enhances their adaptability along the varied surface topography of teeth. It imparts multidirectional reinforcements to polymeric restorative resins, improves flexural strength as well as flexural modulus of composite resin and stops crack from propagating. The material has highly favourable mechanical properties, is chemically inert and biologically compatible.

The advantages of fibre-reinforced composite material for periodontal splinting include the need of minimal tooth preparation, easy application, cost-effectiveness in comparison to fixed prostheses, easy removal, easy repair in case of failure by re-bonding and re-application of material and more convenient oral hygiene practice for the patient.<sup>7</sup>

Splints form an integral part of nonsurgical periodontal therapy, whether it be temporary, provisional or permanent. However, they cannot be applied in all scenarios. The contraindications of splinting are poor oral hygiene, high caries activity, presence of occlusal interference, overall poor prognosis, if occlusal stability and optimal periodontal conditions cannot be obtained, insufficient number of non-mobile teeth to adequately stabilise mobile teeth and crowding or malaligned teeth that may compromise utility of splint.

Splints, not only reduces tooth mobility but also improves periodontal prognosis<sup>8</sup> and helps in faster healing and regeneration.<sup>9</sup> Greater predictability of regenerative procedures using membranes and bone graft has been reported when tooth mobility is eliminated.<sup>10</sup> Thus, splinting provides an excellent adjunct to the periodontal therapy, provided that the cause-related therapy has been completed. The patient should be put under strict maintenance phase as achieving adequate oral hygiene is difficult post splinting. Among different types of splints, fibre-reinforced composite splint shows superior result owing to its aesthetics, chemical bonding, adaptability, repairability, and level of comfort reported by the patient.

**Conflict of interest:** None.



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