

Splinting with Composite and Wire: Cheap, Flexible Option for Stabilizing Traumatized Teeth

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ABSTRACT

Trauma to teeth is one of the most serious dental injuries, and it requires correct and timely management for the favorable prognosis. Splinting of teeth is considered best practice to maintain the repositioned tooth in the correct position, provide patient comfort and improve function. Amongst several methods, splinting with composite and wire is an economical, maintainable and flexible option for stabilizing traumatized mobile teeth. This case report shows splinting of teeth with composite and wire of traumatized teeth in a 24-year-old-male with two years follow up.

Keywords: Composite and wire; dental injuries; splinting.

INTRODUCTION

Dental trauma is a common problem we encounter in our day to day dental practice. A splint has been defined as 'an apparatus used to support, protect or immobilize teeth that have been loosened, replanted, fractured or subjected to certain endodontic surgical procedures.¹ Splinting has been recommended for repositioning the tooth/teeth to stabilize the tooth/teeth and to enhance healing outcomes for the pulp and/or the periodontal ligament.² Amongst many methods of splinting of teeth, composite and wire splint is probably most common, economic and easily available. An animal model experiment shows a lower incidence of ankylosis when flexible splint used while teeth were subjected to masticatory forces.³ The flexible splint has a wire diameter of no greater than 0.3–0.4 mm (up to 0.016" or 0.4 mm) and allows functional movement.¹ International Association of Dental Traumatology (IADT) guidelines recommend splinting types that are flexible rather than rigid and employed for a shorter duration.⁴ According to B Kahler et al. 2016, the splint should allow periodontal ligament reattachment,

stabilized teeth, maintenance of hygiene, preferably fulfill aesthetic appearance and provide patients comfort.⁵

CASE REPORT

A 24-year-old male reported to the Department of Periodontology and Oral Implantology, College of Dental Surgery, BPKIHS, Dharan, Nepal with a chief complaint of mobility of upper front teeth following fall injury. Medical history was non-contributory. He was conscious and well oriented with time, place and person during examination. Clinically, there was lateral luxation lingually and intrusion of 12 & 22 and lateral luxation buccally and intrusion of 13, 11 & 21 with traumatized buccal and palatal gingiva and separation of interdental gingiva. The affected teeth were tender and mobile (Figure 1a and 1b). Radiographic



Figure 1a: Preoperative view shows lateral luxation lingually and intrusion of 13, 12 & 22 and lateral luxation buccally and intrusion of 11 & 21 with traumatized buccal and palatal gingiva and separation of interdental gingiva.

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Figure 1b: After scaling and debridement.



Figure 1c: After repositioning of teeth and suturing.

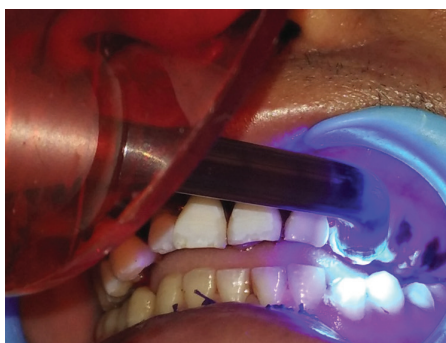


Figure 1d: After light curing of composite resin over teeth.



Figure 1e: After splinting teeth with composite and wire.

examination revealed widening of periodontal ligament space of 13, 12, 11, 21 & 22 and bone was fractured of 12, 11, 21 & 22.

Written informed consent was taken after explaining about his condition, different treatment options, the nature of the procedure, the prognosis of teeth and the required follow up. Treatment began with non-surgical phase. Proper extraoral asepsis with 2% povidone-iodine was followed by intraoral preprocedural 0.2% chlorhexidine rinses and then adequate infraorbital block local anesthesia (Xylocaine HCL 2% with Adrenaline 1:100000) was administered. After scaling and debridement of area, teeth were repositioned manually after explaining the complications related to it and interdental gingiva was secured with 3-0 interrupted suture (Figure 1c). The composite wire-splint was constructed using a ligature stainless steel round wire. The wire was cut to the desired

length and three strands of ligature wire were tightly held with one needle holder at one end and other end held with another needle holder which was moved clockwise multiple time until desired twisted intertwined multistrand structure obtained and then placed on the labial surfaces without bending, so as to provide neutrality. Labial aspects of the teeth were spot etched using 37% phosphoric acid gel for 30 seconds (VISTA VIS-502115 Best-Etch Dentsply), rinsed off with air-water spray for 10 seconds and then air-dried. A thin layer of bonding agent (Prime & Bond NT Dentsply) was applied on the etched surfaces as per the manufacturer's instructions. The splint was secured with light curing resin composite (Spectrum Dentsply) with 30 seconds of photopolymerization (Figure 1d and 1e). Once the splinting with composite and wire was performed, the patient was counselled and an intraoral periapical radiograph was taken

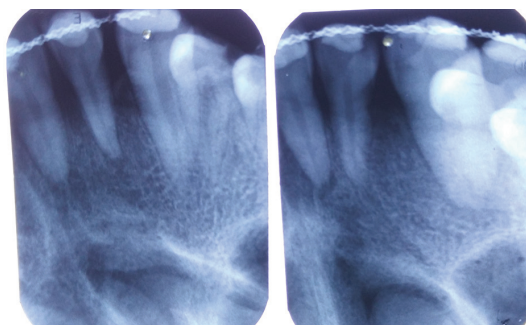


Figure 1f: IOPAR immediately after splinting.



Figure 2a: After one week follow up.



Figure 2b: After suture removal buccal aspect.



Figure 2c: After suture removal palatal aspect.



Figure 3: After splint removal from teeth.

to evaluate the tooth repositioning (Figure 1f). The splint was evaluated for its stability, mobility, premature contact and comfort to the patient. The patient was given antibiotics (Amoxicillin 500 mg for every eight hours a day for seven days and Metronidazole 400 mg for every eight hours a day for seven days) to prevent infection as separation of interdental gingiva which was contaminated and fracture of crestal bone in maxillary anterior region as chance of spread of infection due to higher vascularization. The analgesics (Ibuprofen 400 mg every eight hours a day for three days) was given to reduce pain and decrease inflammation for improving healing with 0.2% chlorhexidine gluconate rinse every 12 hours for 14 days as an antiplaque mouth rinse. Postoperative written instructions for the consumption of a soft diet, maintenance of regular oral hygiene, avoidance of direct trauma by mastication, oral habits and immature

contact were given. The patient was recalled after one week and examined for the stability of the splint and at the same time, sutures were removed after careful 0.2% chlorhexidine rinse as healing was satisfactory (Figure 2a, 2b & 2c). Splint was placed for four weeks with weekly evaluation. At end of four weeks, splint was removed (Figure 3) with diamond bur. After one year of continuous three months follow up, the patient referred in the Endodontics department of BPKIHS, Dharan for evaluation of vital status of teeth and required treatment as teeth respond delayed on electric pulp test of 13, 12, 11, 21 & 22. In the same department after careful evaluation, root canal treatment was done (Figure 4a & 4b) and was kept in regular follow up. At two years of follow up, color, contour, position of gingiva was excellent, well maintained alveolar bone height (Figure 5) & the patient was completely satisfied with result obtained.

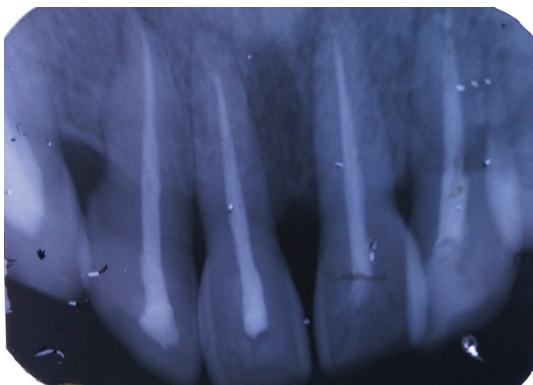


Figure 4a: IOPAR after endodontic treatment.



Figure 4b: Clinical frontal view after endodontic treatment.

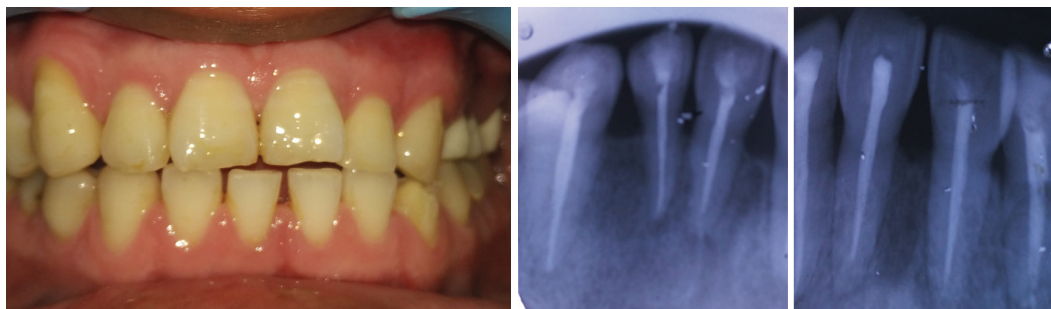


Figure 5: After two years of follow up, shows normal color, contour and position of gingiva and well-maintained alveolar bone height in all four incisors.

Table 1: Current International Association of Dental Traumatology (IADT) recommendations for splinting.⁵

Type of injuries	Splinting type	Splinting time
Subluxation	Flexible splint	Two weeks
Extrusive Luxation	Flexible splint	Two weeks
Lateral luxation	Flexible splint	Four weeks
Intrusive luxation	Flexible splint	Four weeks
Root fracture	Flexible splint	Four weeks
Root fracture (cervical third)	Flexible splint	Four months
Avulsion	Flexible splint	Two weeks
Avulsion (Extra oral dry time >60 minutes)	Flexible splint	Four weeks
Alveolar fracture	No recommendation	Four weeks

DISCUSSION

The IADT guidelines recommend a flexible splint for all injury classifications except for alveolar fracture where no recommendation is given either to use flexible or rigid (Table 1).⁶ In this case report, splinting time was four weeks similar to ideal requirement of splint for intrusive luxation according to International Association of Dental Traumatology (IADT) guidelines. The teeth were repositioned manually for faster restoration of discrepancy in occlusion and chewing habits despite being chance of damaging vital periodontal tissue than slow self or orthodontic eruption. All five teeth required endodontic treatment may be either due to previous traumatic injury or manual manipulation. The wire used in our case were round stainless-steel ligature wire, used in orthodontics

and were of diameter 0.33 mm which is considered flexible. Slight modification in wire was done in our case by using three strands twisted intertwined multistrand ligature wire to provide slight rigidity because all four incisors are mobile and alveolar crest bone fracture.⁶ Splinting with this method shows favorable and excellent patient perspective results in crestal bone fracture. In the context of our country like Nepal, the composite and multistrand ligature wire splints may also act as alternative treatment approach than arch bar in dental traumatic injury with crestal alveolar bone fracture as it is an easy, economical, provides optimal result and seems one of the best options.

Conflict of Interest: None.

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