

Intermittent Loops Wire Splint: A Novel Technique

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ABSTRACT

Tooth splinting has been used to stabilize traumatically displaced, transplanted and root fractured teeth or teeth where support has been lost due to periodontal injury or external resorption. Here, we are presenting a novel technique for splinting luxated or subluxated teeth with an easy chair side modified wire adaptation technique (Intermittent Loops Wire Splint) in a case report with a review of various splinting techniques. Proposed advantages are easy chair side working, better support for loose teeth, larger surface area for composite bonding and good patient compliance

KEYWORDS: Intermittent loops, Splint, Composite, Avulsion, Dentoalveolar

INTRODUCTION

Splinting has been defined as to join two or more teeth into a rigid unit by means of removable or fixed devices or restorations, according to The Glossary of Prosthodontic Terms.¹ Tooth splinting is a needed and an important method to stabilize traumatically luxated, subluxated, transplanted or root fractured teeth. It can also be used on teeth which have lost their support either due to periodontal problems, external resorption or sometimes due to endodontic surgery^{2,3}. Various methods have been described in the literature to stabilize periodontally compromised teeth with pros and cons of each technique. Here we are summarizing various splinting techniques and describing a modification of conventional wire-composite splint technique (Intermittent Loops Wire Splint) in a case report.

Classification of splints:

A. Splints can be broadly classified as:

1. Extracoronary Splints
2. Intracoronary Splints.

B. They may also be categorized as:

1. Permanent,
2. Provisional,
3. Temporary.

Initially splinting was carried out by cast restorations or joint crowns. These procedures used to result in the abundant loss of tooth material. Recently, conservative single visit techniques like metal wires covered with resin, metal and nylon mesh embedded into resin⁴ or in the posterior teeth, channels prepared on the occlusal and posterior surfaces connected with thick wires or cast bars filled with resin⁵ has been used.

CASE REPORT

Here we are presenting a case report of 28-year-old male patient who sustained the injury to lower jaw region due to fall from a bicycle Patient presented with the chief complaint of mobile lower front teeth and gingival contusions and lower lip, chin lacerations (fig 1). On arrival of the patient, primary care was done by wound debridement and suturing of chin laceration.



Fig-1: Clinical presentation of the case

On clinical examination, there was mobility (Grade II) in 31,32,41,42 teeth with no evidence of clinical crown fracture. On radiographic examination, no bony fracture was noted and only lower anterior teeth deviation and slight periodontal widening were noted, (fig 2, 3). On the basis of clinical and radiographic evidence, diagnosis of dentoalveolar fracture of the lower anterior segment was made, and composite splinting was planned for treatment of the same.

As per previous experience for such kind of cases, it was noticed that single wire splint doesn't provide enough strength and twisted wire doesn't provide good space for composite application, hence a new technique was

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planned for wire splinting called as “Intermittent Loop Wire Splint.” It contains two (22 gauge) wires twisted intermittently (fig 4, 5) to provide loops for application of composite at loop areas (fig 6).



Fig-2,3: Radiographic presentation of the case

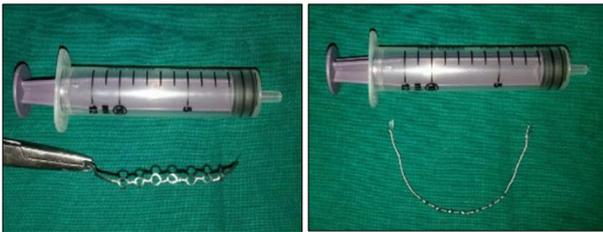


Fig-4,5: Intermittent loops wiring technique



Fig-6: Application of splint

Theoretically, it provides better strength than conventional single or twisted wire technique and better areas to apply composite over indicated teeth with little increase in chair side timing for wire bending work. We used ideal lower dental stone cast for adapting the curvature of the arch and spacing between loops (fig 7),



Fig-7: Adaptation of splint over ideal cast

although custom made casts can be used for better adaptation but again it will increase the operating time of

splint application. Good adaptability and rigidity of mobile lower anterior segment was achieved with this splinting technique with good patient compliance. Follow-up showed decrease in mobility over three week’s period and after that splint was removed.

DISCUSSION

In literature, various methods of splinting traumatized teeth⁶ are as follows (Table 1):

Reported techniques for splinting traumatized teeth
Stabilization to teeth
- wire-composite splint
- Kevlar, Fibreglas splint
- bracket splint
- porcelain veneer splint
- arch bar
- interdental ligature wiring
Stabilization to gingiva/mucosa
- suture fixation
- vacuum-formed stent
Stabilization to bone
- fixation to bone screw/plate
- fixation to bone wire

Table 1

Various methods like arch bar splinting, TTS (Titanium Trauma Splint), Bracket splint, Resin splints are costly methods for patient and need availability of material. Easy chair side splinting method is wire-composite splint which has been used since three decades for mobile teeth with clinically acceptable results worldwide.

The wire-composite splint was introduced in 1982 by O’Riordan et al., who used the acid-etching technique and placed composite materials only on the labial surfaces of the teeth, fixing them together with a wire bent along the dental arch⁷. This type of splinting was, however, originally developed by Neaverth and Goerig in 1980⁸, who used a rectangular wire, and was adapted by Oikarinen in 1987⁹, who used a thin flexible wire and light-cured composite tightening the wire by means of a palatal loop during polymerization.

The wire-composite splint meets most of the demands of modern tooth fixation. Its flexibility has been tested on a model and mobility tests performed in clinical situations with the Periotest device. The advantages of flexible splinting have not been investigated experimentally, but it can be concluded from various animal studies that normal masticatory stimulus prevents and eliminates small resorption areas^{10, 11} and promotes pulpal healing¹². Splinting with a flexible wire-composite splint focuses the occlusal forces on the teeth in an almost normal manner. Consequently, splinting times are not as critical in terms of late complications and can be extended for as long as is needed for the clinical healing of the soft tissues or supporting bone. The wide range of indications shows that the wire-composite splint is useful in most tooth trauma cases. The splint can be changed into a rigid one when needed e.g. for root fractured teeth which are assumed to heal with hard tissue formation in between the

fracture lines. The splinting times for root fractures were the longest in this tooth trauma group. It has been shown in humans and animals that up to 3 months is needed to ensure hard tissue healing³.

Our novel technique i.e. “Intermittent Loop Wire Splint” adds the advantage of the wire-composite splint with better strength than conventional single or twisted wire technique and better areas to apply composite over indicated teeth with little increase in chair side timing for wire bending work. Some shortcomings noted while application of this splint is as followed:

- Difficult adaptation of splint in initial cases as compared to single wire technique.
- The need of custom made cast for better adaptation.
- Need thinner wires for better flexibility.
- Oral hygiene maintenance if poorer as compared to conventional technique.
- Bulkier than conventional single/ twisted wire splint.

This being a preliminary approach modifying the conventional technique for better results further studies are needed with larger sample size to compare with conventional techniques for the betterment of the patients.

CONCLUSION

This preliminary case report provides a modification of conventional wire- composite splinting technique with proposed advantages as easy chair side working, better support for loose teeth, larger surface area for composite bonding and good patient compliance. Although there are few shortcomings as described in discussion part, we would like to conclude that this novel “Intermittent Loops Wire Splint” technique might be helpful for better patient outcome in future if performed for larger sample size.

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