

A Conservative And Biological Approach For Rehabilitation Of Anterior Edentulous Space Using Natural Tooth Pontic (Ntp) And Fibre Reinforced Composite – A Case Report

Abstract

Background : Among the various dental traumatic injuries avulsion accounts for 0.5 – 16% of all traumatic injuries and is most commonly observed in young adolescents . The important factors to be considered while management of avulsed teeth are conservation, preservation, minimal invasion, patient acceptance and cost. Fibre reinforced composite fixed prosthesis is an innovative alternative to the conventional metal ceramic restorations. Here, a clinical technique for immediate interim tooth replacement is being presented, utilizing the clinical crown to assist the clinician in providing an aesthetically acceptable treatment option .

Materials & Methods : Fibre Reinforced Composite(Interlig) has virtually no memory, adapts well to the tooth contours of arch, has patented lock stitch leno weave design which effectively transfers forces without transferring them back to the resin and thus serving a key to success. Avulsed teeth can be bonded directly to adjacent teeth utilizing a prefabricated composite resin framework reinforced with polyethylene fibre as a non invasive long-term provisional tooth replacement. This immediate provisional restoration allows for exact repositioning of the coronal part of the extracted tooth in its original intraoral three-dimensional position and thus relieves the apprehension of the patient caused by the sudden loss of an anterior tooth.

Results : Acceptable aesthetics were obtained and the result was satisfactory for the patient.

Conclusion : The technique is practical, economically feasible, requires limited laboratory support and materials, and can be accomplished in a single appointment. Using the natural tooth as a pontic offers the benefits of being the right size, shape, and color. This particular design allows for exact repositioning of the coronal part of the extracted tooth in its original intraoral three-dimensional position.

Key Words

Avulsion, Fibre Reinforced Composite, Natural Tooth Pontic

Introduction

Sudden loss of an anterior tooth is a catastrophic event for a patient. Such an incident has a far reaching impact on an individual's psychology as well as personality. The aesthetic zone of the anterior region can be affected either due to trauma, periodontal disease or endodontic failure^[1]. The anterior teeth are the most vulnerable teeth to get injured during any trauma. Among the various dental traumatic injuries avulsion accounts for 0.5 – 16% of all traumatic injuries and is most commonly observed in young adolescents^[2]. Although the re-implantation of the avulsed tooth is the preferred treatment of choice but its success rate is very low and also this immediate treatment is mostly not given, that could be either due to lack of dental facilities or deficient awareness regarding immediate dental preventive measures^[3]. The important factors to be considered while management of avulsed teeth are conservation, preservation,

minimal invasion, patient acceptance and cost^[4]. Whether the tooth is removed surgically or lost due to trauma the dentist should consider an immediate means to satisfy the patient's cosmetic requirements. In today's era various materials have been introduced that serve as excellent tooth pontic but nothing replaces natural tooth pontic. It offers the benefits of using the right size, shape and color^[5]. These pontics can be stabilized with various Fibre reinforced composite fixed prosthesis, an innovative alternative technique to the conventional fixed restorations^[6]. This procedure offers a restorative alternative that produces minimally invasive, aesthetic, time saving, easy and cost-effective metal-free tooth replacement^[7]. This case report describes a successful immediate replacement of avulsed tooth in an adolescent using preimpregnated fibre-reinforced composite (INTERLIG) with a follow up of 6 months.

¹ Meenakshi Bodh

² Ritu Namdev

³ Mitali Jain

⁴ Samir Dutta

¹ PG Student , Dept. Of Pedodontics

² Associate Professor

³ PG Student

⁴ Senior Professor And Head

Dept. Of Pediatric And Preventive Dentistry

P.G.I.D.S Rohtak

Address For Correspondence:

Dr. Meenakshi Bodh (P.G. Student)

Deptt.of Pedodontics and Preventive Dentistry

PGIDS ROHTAK, HARYANA Pin -124001

Mobile no:8813871638

Email Id : mbodh10@gmail.com

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Case Report

A nine year old boy reported to the Department of Pedodontics and Preventive Dentistry, PGIDS Rohtak with the history of fall from cycle 3 days back resulting in loss of upper anterior tooth . In the local clinic he was given medication for pain relief and booster dose of Tetanus toxoid. No other necessary dental management could be done due to lack of any dental facility in that peripheral area. Patient's father was carrying the avulsed tooth in a bottle filled with water; he was concerned about the appearance of his son and wanted some immediate replacement to be done. Health and family history were not significant.

Clinical examination revealed bilaterally symmetrical face with lacerations on the chin. Mouth opening was normal and there was no pain on examination of the temporomandibular joints. Intraoral examination revealed mixed dentition with missing left maxillary permanent central incisor (**Fig 1**). Occlusion was normal with bilateral Class I molar relationship . Intraoral periapical radiograph was taken to confirm the



Fig 1: Preoperative Photograph Showing Loss Of Upper Left Central Incisor

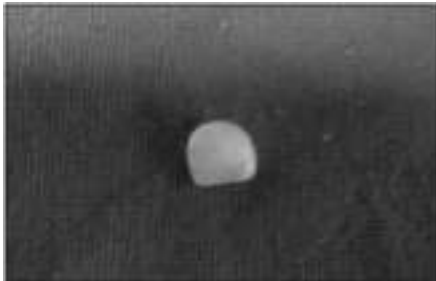


Fig 2: Natural Tooth Pontic Made From The Avulsed Tooth

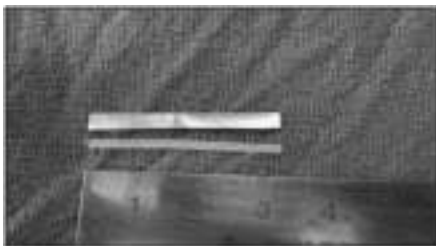


Fig 3: Template Used To Measure The Length Of The Interlig Required



Fig 4: The Interlig Adapted To The Palatal Aspect Of The Pontic And Adjacent Teeth



Fig 5: Postoperative Photograph Showing Rehabilitation With Natural Tooth Pontic

integrity of alveolar bone. Re-implantation of avulsed tooth was ruled out considering the extra oral dry time. Because of the time constraint and patients parents desire for immediate aesthetics it was decided to use patients own teeth as pontic and splint it to adjacent teeth using fibre reinforced

composite (interlig). The avulsed tooth was cleaned and stored in sterile distilled water to avoid dehydration. Impression and photographs were recorded. Length of the natural pontic as needed was determined on the study model using incisal edge of adjacent teeth and gingival margin as reference point. The root was cut from the crown with a carbide bur and then shaped with a flame shaped finishing bur. The coronal pulp chamber was filled with a bonded composite resin and the gingival aspect of the tooth was smoothed and shaped into an ovate pontic design (Fig 2). It was then checked in the edentulous space for proper position and proximal contacts. The patient was satisfied with the trial appearance.

Next the lingual surfaces of the abutment teeth were scaled, polished, rinsed and dried. Mesiodistal horizontal grooves were prepared 3mm wide and 0.5mm deep in the enamel of the pontic and the adjacent teeth to accommodate the width and thickness of fibre reinforced composite interlig. The required length of fibre ribbon was measured by placing a template on the lingual surfaces of the teeth, extending from the adjacent left lateral incisor to the right lateral incisor (since the child was in mixed dentition stage the canines were not included for stabilization as they were slightly mobile). A piece of 3mm wide Interlig was taken from its packet using the cotton pliers and cut to an equal length as that of template with the scissors (Fig 3). The natural tooth pontic was first placed in the desired position and stabilized with composite and stainless steel wire onto the adjacent teeth labially. After stabilizing it the grooves of the lingual aspect of the natural tooth pontic and the adjacent teeth were etched with a phosphoric acid etchant (37%) for 15-20 seconds, rinsed with water and dried for 10 sec. A resin adhesive (Single Bond) was applied to the etched enamel surfaces, the tooth preparations, using a disposable brush. Using plastic filling instruments and burnisher, the interlig was embedded into the composite resin starting at the left lateral incisor and moving around the arch to the right lateral incisor (Fig 4). Using a gloved finger wetted with adhesive resin, the ribbon was further pushed into the composite resin so it is covered with composite. It is important that the ribbon be as closely adapted to the lingual

surfaces of the teeth as possible. Excess composite resin was removed before light curing. The lingual surfaces were then light cured for 20 seconds. The composite resin was shaped, finished, and polished to remove any excess restorative material and achieve an aesthetic result. This was accomplished with finishing diamonds on a high speed hand piece. The composite resin was further finished using aluminium oxide impregnated silicone composite resin polishing points. After complete finishing the splint was checked for occlusion and aesthetic appearance. The final outcome of the procedure left patient highly satisfied with the result (Fig 5). The patient was asked to maintain proper oral hygiene and the limitations of the restoration were informed to him. The patient has been on follow up since 6 months with no problems except for some dietary restrictions.

Discussion

Loss of permanent anterior teeth is an uneventful traumatic experience not only for the child but also for the parents. It compromises mastication, speech and esthetics^[8]. It also causes a huge psychological trauma to the child. At present there is no standardized treatment protocol for management of avulsed permanent anterior tooth in cases that occur before cessation of growth^[9]. Interim removable partial dentures have been one of the treatment modality but the patients compliance to wear the appliance, its maintenance, subject to fracture, irritation to palatal mucosa and also the psychological setback to the patient does not fulfil our goal of restoring the patients health and overall well being^[10]. This clinical report describes a simple, conservative, economical and easy method of replacing a single tooth using Fibre Reinforced Composite and patients own tooth as natural pontic. This type of prosthesis has been referred to as "resin bonded fibre reinforced composite fixed partial denture". This can be done using two approaches: one is the conventional tooth preparation and laboratory based procedures while the other is based on using the fibres in minimally invasive restorations by direct or indirect fabrication. Direct techniques are conservative, cost effective and does not jeopardise the periodontal health of adjacent teeth^[11]. This particular design allows for exact repositioning of the

coronal part of the extracted tooth in its original intraoral three-dimensional position. This chair side technique does not require laboratory involvement, is non-invasive and reversible, so that all traditional treatment options for single tooth replacement remain open.^[12]

With the introduction of bondable poly ethylene and glass woven fibres, many of the problems with older types of reinforcement were solved^[13] and splinting teeth with reinforcement fibres that can be embedded in composites has gained popularity. Procedures can often be completed in a single appointment. It also has an acceptable strength because of good integration of fibres with the composite resin resulting in clinical longevity. In addition, the appliance can easily be repaired in case of fracture due to wear and tear. Moreover, it meets the patient's aesthetic expectations.^[14]

Conclusion

In recent years the desire expressed by many patients for cosmetic and metal free restoration has lead to the development of better performance and truly aesthetic composite resin. Though this technique has excellent aesthetics, preservation of tooth structure and reduced patient cost, Long-term follow-up of preimpregnated fibre-reinforced composite will be required to prove their success. Further laboratory and long-term clinical evaluations are necessary to determine how durable these restorations will prove to be over longer periods of time.

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