Biological Restoration As Treatment Partial Denture For Esthetic Rehabilitation

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Introduction

Traumatic dental injuries are frequent, with high incidence in the age group of 3-4 years and 10-12 years with twice occurrence in boys as compared to girls. These injuries usually affect the anterior teeth, most commonly central incisors because of their vulnerable position in the dental arch.Traumatic injuries cause a significant impact on the quality of life of children in terms of physical and psychological discomfort and have the potential to negatively affect social relationships.

Various treatment options for esthetic and functional replacement of traumatically lost anterior tooth can be broadly classified into removable and fixed options such as removable partial dentures, fixed partial dentures and implants. When the patient's own tooth is not available, an artificial tooth or an extracted tooth from a different donor can be utilised for fabrication of prosthesis.

This case reports discusses fabrication of treatment partial denture in a 13 year old boy with history of avulsion of permanent lateral incisor using a previously extracted incisor from another patient.

Case Report

A 13 year old boy reported to Department of Pedodontics & Preventive Dentistry, Sudha Rustagi College of Dental Sciences & Research, Faridabad, with history of trauma to his anterior teeth following a bike accident 6 days back. Clinical examination revealed Ellis Class 2 fracture with 11 and avulsed 12. Grade 2 mobility was observed in 11,21. Splinting of 11 and 21 was planned along with root canal treatment of 11. Patient was advised both removable and fixed options for replacement of missing tooth.

1) Preparatory phase:

a. Root canal treatment and composite restoration of 11 was done
b. Canine to canine bonded ligature wire splinting was done on the same visit.
c. Removable partial denture was fabricated and delivered initially as the patient wanted immediate replacement as he had to attend a wedding. (Figure 2)
d. Composite build up was done with fractured 11. (Figure 3)

After few days, the patient reported back for a permanent replacement.

2) Selection of natural tooth:

a. Extracted intact right maxillary central incisor was selected after shape and color matchingwith 11. (Firgure 4)
b. The tooth was stored in 10% formalin until it was used.
c. The tooth was properly cleaned, stored & sterilized by autoclaving at 121 degree Celsius for 15 minutes ensuring all bio security standards.

3) Preparation& Trial Fit of Selected Tooth:

a. Tooth was decoronated using diamond disc under copious irrigation to avoid cracks/fracture. (Figure 5)
b. Tooth was cut to appropriate shape to match the opposing lateral incisor. (Figure 6)
c. Pulp was extirpated from the pulp chamber using barbed broach, irrigated with saline and sealed with Glass Ionomer Cement (Fuji IX). (Figure 7 & 8)

4) Preparation Prior to Cementation

a. Palatal grooving was done along the middle third of 11, 13 and the prepared donor tooth. (Figure 9)
b. A 21 gauge SS wire was selected, cut into desired length and adapted to fit into the grooves.

5) Final Cementation

a. Acid etching was done using 37% ortho-phosphoric acid on the palatal surface of 11, 13 and extracted tooth.
b. Bonding agent was applied and cured for 40 seconds.
c. The SS wire was inserted in the groove and stabilized with composite material on each tooth which was then light cured for 60 seconds each. (Figure 10)
d. Final finishing and polishing was done on the same visit.

Patient was pleased with the final outcome. (Figure 11& 12) The tooth was stable and esthetics preserved at 1 month, 3 months and 6 months follow up.

Dicsussion

Biological restorations are of special importance in pediatric dentistry, as they are less expensive. Removing the cost of laboratory and assistant also can do a lot of help in reducing chairside time, which makes this practice a feasible option within schools of dentistry that attend mostly to people of a lower economic

Figure 1: Preoperative

Figure 2 :Removable Partial Denture

Figure 3:Composite Build up of 11

Figure 4: Color Matching of Extracted Tooth

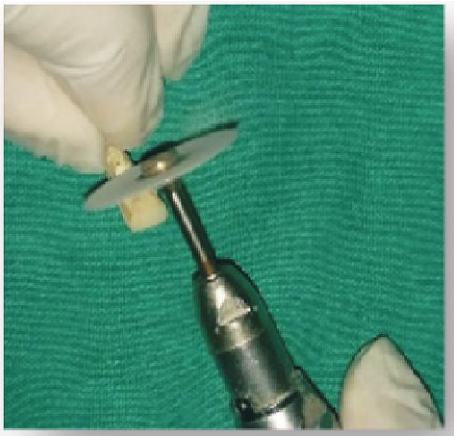

Figure 5 :Decoronation of Extracted Tooth

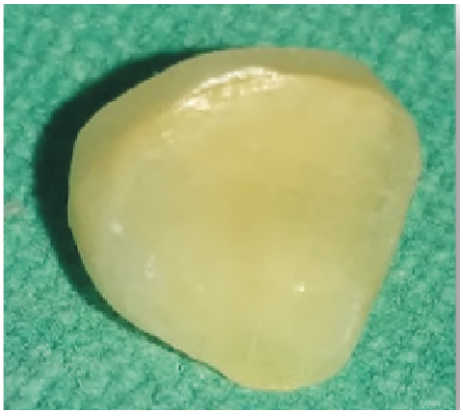

Figure 6: Shape Matching With 22

Figure : 7 Pulp Extirpation of Extracted Tooth

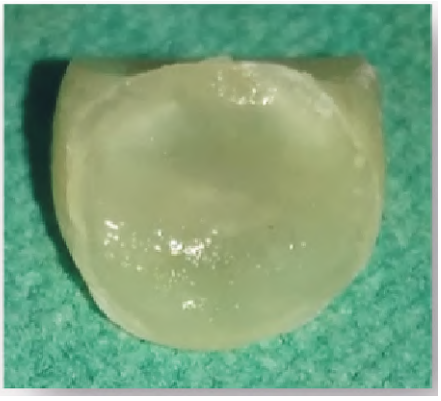

Figure 8: Sealing of Extracted Tooth With GIC

Figure 9: Palatal Grooving of 11, 13

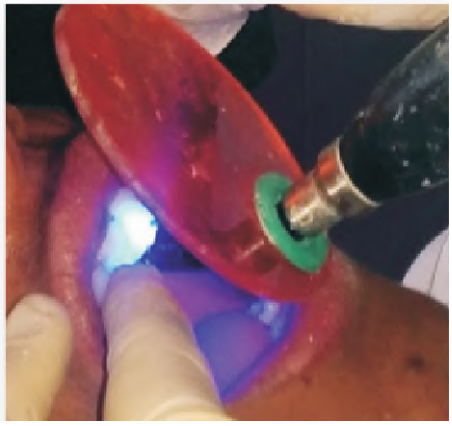

Figure 10: Light Curing of Composite to Stabilize SS wire and Extracted Tooth

Figure 11: Pre operative and Post Operative

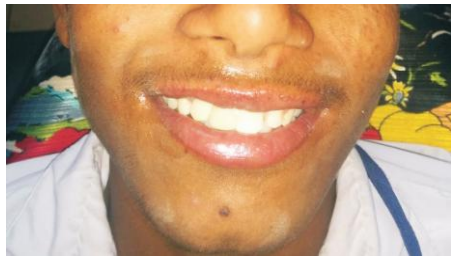

Figure 12: Post Operative

level. Our patient belonged to weaker section of society and was not willing to pay for a crown. Hence this case was selected for biological restoration.

Possibility of fracturing the selected extracted tooth during its sectioning for the obtainment ofthe crown is another frequently encountered limitation. In order to minimize such risks, theteeth used in biological restorations should be kept hydrated throughout all procedures. Thus the extracted tooth after selection was stored in formalin till required. Also use of a diamond disc for cutting tooth structure is more efficient than using carbide burs which often lead to micro cracks and fracture of the enamel structure.

Major problem with the adaptation of fragment from an extracted tooth is the possibility of cross-sectional infection. The teeth used in biological restoration procedures can be obtained from human teeth banks which store the teeth under adequate sterilization. The tooth in our case report was properly cleaned, stored & sterilized by autoclaving at 121 degree Celsius for 15 minutes ensuring all bio security standards.

Studies have shown that, in completely obliterated pulp chamber, opening the pulpspace with necrotic pulp tissue present (that is undetected by radiographs), without successful root canal treatment, would lead this pulp tissue to infection. Hence after decoronation of the extracted tooth, immediate pulp extirpation was done and canal sealed with glass ionomer cement.

Palatal groove was made on the adjacent teeth in this case to provide enough anchorage and support to the extracted tooth. Stainless steel wire offers good stability, stiffness and resilience. Therefore, the wire was adapted into the grooves and stabilized using composite resin.

Composite resins were used for final stabilization since theyare insoluble, aesthetic, insensitive to dehydration, easy to manipulate and reasonably inexpensive. Also, these materials bond to the toothand eliminate the need to create retentive features.

However, the low number of human teeth banks and the limited knowledge of the technique make this an uncommon routine in dental practice, especially in India adding to the difficulty of finding teeth with a similar color and shape as that of the destroyed element. Also, it is necessary to clarify to the patient and/or the parents/guardians that the crown is made from duly donated and properly sterilized extracted teeth, thus preventing biosecurity risks. However, a tooth fragment obtained from another patient may be rejected by the individual, which is a disadvantage of this technique. However due consent was first obtained from our patient and his parents prior to fabrication of the biological restoration.

Conclusion

As observed in the present case, biological replacements, both autogenous andhomogeneous, can beconsidered as alternatives to artificial replacement, as they offer superior esthetics and are cost effective. However, further studies are needed to assess adhesion, fractureresistance, and the long-termbehavior of these replacements, to better understand the advantages of the technique and make it amore acceptable amongdentists and patients.