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RESEARCH ARTICLE

BIOLOGICAL RESTORATION: REBIRTH OF A PRIMARY TOOTH

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ABSTRACT

Background: Changes in primary dentition morphology due to trauma or caries is a commonly encountered problem, and restoration is crucial part from esthetic, functional and psychological aspects. Several treatment modalities such as acrylic resin, composite restoration, strip crowns are available for restoration. Biological restoration is an alternative method for restoration. **Objective:** The purpose of this in vitro study is to present three different ways to use natural tooth material in an attempt for aesthetic rehabilitation. **Methods:** Freshly extracted primary teeth were used for this in vitro study. Samples were thoroughly scaled, polished and then stored in distilled water. Sample tooth was then mounted on wax block. Three different types of biological restorations as an alternative to conventional methods were made. **Conclusion:** Present in vitro study portrays restoration of primary anteriors using biological restoration.

INTRODUCTION

Dental caries is the most prevalent disease in during early childhood. It is an alarming problem because this disease is so common and widespread. A study on dental caries prevalence among preschool children revealed that caries prevalence is 54.1 and 23% of children had caries in anterior teeth (1). The restoration of such an extensive carious lesion needs to be done properly to reestablish their masticatory, phonetic, esthetic and space-maintainer functions in the dental arches. The loss of esthetically essential anterior teeth may affect the child's confidence and its normal personality development. Also, it may cause abnormal habits and speech difficulties (2). Many conventional methods are available for restoration of primary teeth that includes restoration with materials such as GIC and composite, or other esthetic tooth-colored materials. Other treatment options available for rehabilitation of primary teeth include polycarbonate crowns, stainless steel crown, strip crowns, pedo jacket crowns, 3 chengcrowns, dura crowns etc. (3). Biological restorations/ Natural crowns have also been suggested as a treatment option to restore esthetics of tooth, considered to be a conservative and economical option for restoring primary dentition. Thee first paper was published in 1964 by Chosak and Eidelman that reported the use of fragments of extracted teeth as dental restorative materials (3). Santos and Bianchi 1991 framed the term biological restoration, emphasizing a procedure that consists of bonding sterile dental fragments to teeth with large coronal destruction with fragments obtained either from the patient or

from a tooth bank restoring dental anatomy and function with excellent biomechanical properties (4). Various clinics have utilized natural tooth from tooth banks as a substitute for biological restoration. The homogenous bonding, a situation in which the dental fragment can be bonded to the remaining tooth, consists in a simple and fast technique, with excellent cosmetic results (5, 6). Biological restorative system has advantage of shorter treatment time without involvement of laboratory procedures, low treatment cost, preservation of healthy tooth structure (7). The current in vitro report focusses on the effort for esthetic and functional rehabilitation of grossly decayed and damaged central incisors teeth using homogenous biological fragment obtained from extracted natural teeth.

Techniques

MATERIALS AND METHODS

- Freshly extracted maxillary central incisor with no associated fractures or cracks
- Freshly extracted maxillary lateral incisor with no associated fractures or cracks
- Freshly extracted maxillary canine with no associated fractures or cracks
- 3% aqueous buffers solution of formaldehydes

- Freshly extracted primary teeth were used for this in vitro study. Samples were placed in 3% aqueous buffers solution of formaldehydes. Samples were thoroughly scaled, polished and then stored in distilled water. Sample tooth was then mounted on wax block. Three different types of biological restorations done in this in vitro study includes:

Biopins in dentine: Freshly extracted human lateral incisors, without fractures or cracks, were selected to construct biopins for anterior fragment reattachment. Using diamond disk, coronal portion of crown was separated replicating broken tooth with fragment. Thereafter, in another tooth root was sectioned mesiodistally and using diamond abrasives it was modified in such a way that biopins were created. These biopins were made to fit the preparations done in tooth (in which broken fragment was meant to be attached) as well as in the fragment to be re-attached. Prepared dentine was checked time to time to get a proper fit of prepared biopins. After satisfactory adaption of pins to the preparations, cementation was done with dual cure resin cement.

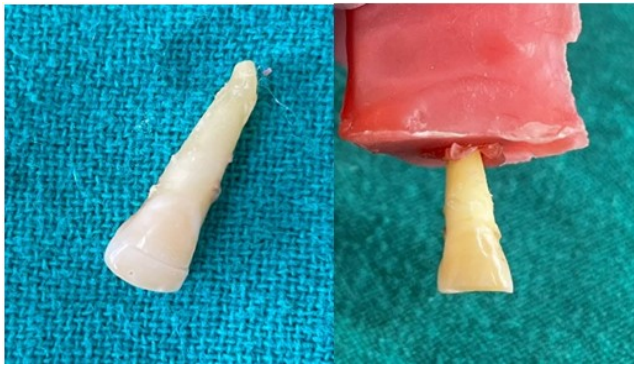


Fig 1.1. Broken Fragment



Fig1.2. Preparations in dentin of fragments to be reattached



Fig 1.3 prepared dentine posts luted



Fig 1.4. Final result

Restoration of primary anterior root stump with fabricated small post attached to crown: Freshly extracted human central incisors, without fractures or cracks, were selected to construct the biological posts attached to core. Using diamond disk, the crown portion were separated from root portion replicating root stump (Fig 2.1). Thereafter, in another tooth root was sectioned mesiodistally [Fig 2.2] along the long axis of the tooth leaving 2-3 mm of root portion cervically to be modified for future post. Using diamond abrasive points, each part of the root was cut in such a way to form biological post core. Prepared dentine post core was checked time to time to get a snug fit of prepared post space (Fig 2.3). Coronal portion was prepared up to the height of 2.5 mm and measurements were made using a caliper gauges. After satisfactory clinical adaption of post to prepared canal, the cementation was done (Fig 2.4). Conditioning was done with 37% phosphoric acid for 15 s, adhesive was applied, and polymerized in canal wall and post. Dual cure resin cement was applied to inner portion of canal space and biological post part was inserted in canal space with pressure until polymerization was completed.



Figure 2.1. Prepared root



Figure 2.2. Post attached to crown



Figure 2.3. Checking the fit

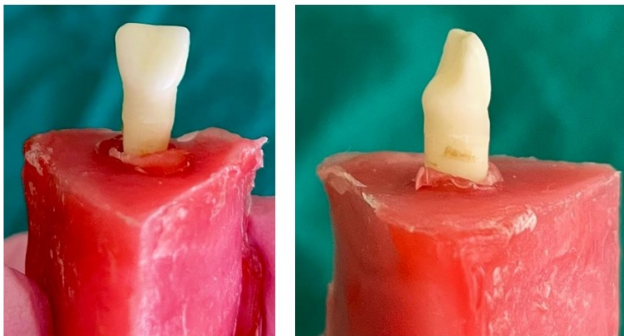


Figure 2.4. Final Result

Restoration of primary anterior root stump with fabricated post and a biological crown: Freshly extracted human maxillary canines without fractures or cracks, were selected to construct the biological post and biological crown. Using diamond disk, the crown portion were separated from root portion replicating root stump (Fig 3.1). Thereafter, roots were sectioned mesiodistally [Fig 3.2] along the long axis of the tooth and reduced using diamond abrasive points in such a way that posts were constructed and prepared posts were checked time to time to get a snug fit. After satisfactory fit, post was luted in canal portion using dual cure resin material. Then biological crown was prepared by cutting coronal portion of sterilized tooth at the level of proximal CEJ using ceramic disk. Pulp tissue was removed and crown portion was prepared by hallowing internally leaving approximately 1 mm dentine with the enamel, using various round and chamfered diamond points (Fig 3.3). Proper fitting of crown was checked and inner portion was reduced until it snugly fits. Etching was done in coronal portion of prepared tooth and inner portion of prepared crown using 37% of phosphoric acid for 15s, then washed and dried followed by application of adhesive system and light curing. Excess extruded cement was removed and the crown was adjusted after clinical evaluation (Figure 3.4).



Figure 3.1 prepared root

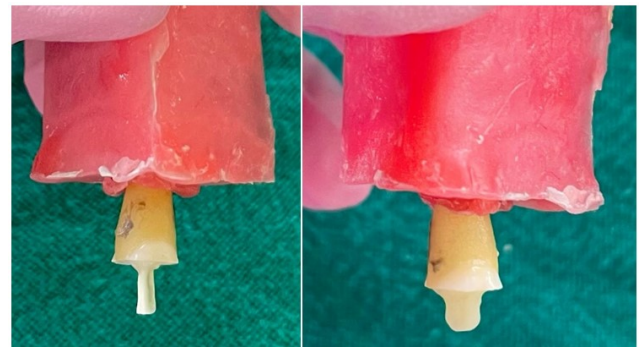


Figure 3.2. Post attached to root



Figure 3.3. Crown prepared

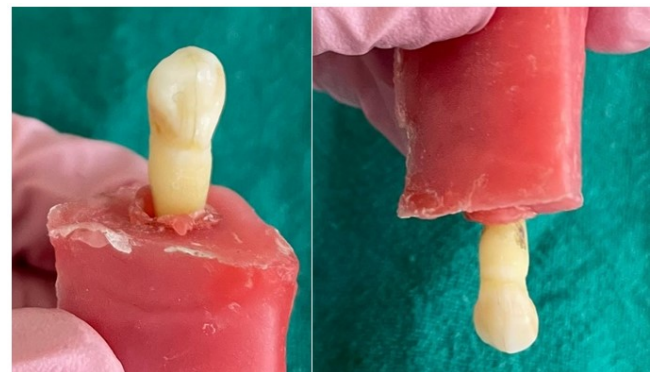


Figure 3.4. Final Result

Advantages

- Better esthetics
- Simple technique
- Preservation of sound tooth structure
- Cost effective
- Less chairside time

Disadvantages

- Despite being simple needs professional expertise
- Difficulty in color matching
- Difficulty in obtaining required dimensions
- Availability of tooth from tooth bank (8).
- Also, having fragments from other people's teeth in their mouth is not a pleasant idea for some patients and many of them refuse to receive this treatment (4).

CONCLUSION

There is no standardized procedure for restoring broken primary tooth. Biological restoration can be an alternative, esthetic and economical procedure.

Duhan H et al concluded that biological restorations are highly favorable and esthetically pleasing due to their color compatibility having a great potential to be used as a restorative option in primary anterior (9). But there is a need for long term clinical studies to assess its longevity and success rate.

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