**BIOLOGICAL RESTORATIONS: AN EMERGING TREND IN DENTISTRY**

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**ABSTRACT**  
In the present scenario, several researchers have provided extensive solutions in the field of restorative odontology but the search for an ideal material is still on. In order to restore a carious or a fractured, primary or permanent tooth various restorative materials and crowns have been successfully established. But there have been certain limitations in each one of them. Currently, the focus has shifted from synthetic materials to the use of naturally available tooth fragments from fractured or exfoliated/extracted human teeth. This is known as Biological Restoration. The major advantages of this technique are better aesthetics and it is inexpensive.

**KEYWORDS:** Biological Restoration; Primary teeth; Natural teeth; Tooth bank; Pediatric Dentistry.

**INTRODUCTION**  
Conventional restorative procedures for severely damaged teeth require a combination of metallic and aesthetic restorations for anterior and posterior teeth. In today’s world, children even as young as 3 years are becoming conscious of their appearance. The loss of aesthetically essential anterior teeth may affect the child’s confidence and its normal personality development. Also it may cause abnormal habits and speech difficulties. Satisfactory restoration of these teeth, improving aesthetics along with the management of space and function has been a challenge for pediatric dentist. In an attempt to widen the treatment options to rehabilitate severely destroyed tooth, as biologically and conservatively as possible, several authors have suggested the use of tooth structure available from tooth bank as restorative material.[1] This article describes a brief outline about the history, techniques available and advantages of biological restorations.

**HISTORY**  
Santos and Bianchi 1991 framed the term biological restoration, emphasising 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. The first paper on the use of fragments of extracted teeth as dental restorative materials was published in 1964 by Chosak and Eidelman. Tavares in 1992 first described the technique of biological restoration in primary dentition.[2] Ramires-Romito et al used teeth from the human tooth bank of Sao Paulo University Dental School to be used as natural posts and crowns to fit into the roots and replace the crowns as well. Thereafter, several other reports have demonstrated the advantages of this technique, such as favourable aesthetics, resulting from enamel’s natural surface smoothness, anatomic contouring and colour match, functional and masticatory effectiveness, preservation of sound tooth structure, prevention of physiological wear, and no need of complex material resources.[3]

**TECHNIQUE**  
The technique consists of bonding sterile dental fragments teeth with large coronal destruction. Adhesive materials retain the tooth fragment in the non-retentive cavity which is present as a result of extensive loss of tooth structure. Fragments obtained either from the patient or from a tooth bank may be used as a safe and reliable alternative to restore dental anatomy and function with excellent biomechanical properties. Various techniques have been considered based on the extent of destruction of the tooth. In case of a smaller destruction, tooth fragments obtained from tooth bank or the patient can be prepared and attached to the patient’s tooth with the help of GIC or composite material. In case of larger destruction, a biological post and core technique can be employed.
The collected samples of extracted teeth must be thoroughly scaled, polished, freed of soft tissues, and periodontal remnants. The pulp must then be removed from the root canal and teeth stored in Hank’s Balanced Salt Solution. A tooth which best fitted the mesio-distal, cervico-occlusal and bucco-lingual dimension of the tooth to be restored can be selected from the storage medium. The extracted tooth's shade should also be matched with the patient's tooth. Selected tooth should be decoronated and autoclaved at 120°C and 15 lbs for 30 min.\(^8\)

**Biological Restoration**

Tooth to be restored must be minimally prepared on all the surfaces using crown preparation kit and non-retentive preparations should be made, ending in chamfer shoulder-type margin with rounded corners. The coronal fragment of the extracted tooth can be tried for fit, and adjustments can be done until it fits to the prepared tooth. The tooth fragment is then cemented to the prepared tooth structure with Glass Ionomer Luting Cement or flowable composite and cervical regions of the restorations must be polished with both rotary instruments and resin composite polishing disks.\(^3\)

Nogueira et al in 2015 described the use of biopins prepared with the help of tooth fragments as a method for attachment of tooth fragment from tooth bank to fractured anterior teeth. In this technique, they reported that retentive holes can be prepared in both the patient’s fractured tooth and in the tooth fragment obtained from tooth bank. Biopins (pin shaped tooth fragment) can be inserted in these holes to support the tooth fragment as metallic pins are used for secondary retention in amalgam restorations.\(^6\)

**Biological Post and Core**

In cases, where the loss of tooth structure is large, attachment of a tooth fragment directly to the tooth structure is not a feasible option. In such cases, it is better to go for a post and core procedure. Biological post and crown are the emerging answer to this problem. The patient’s tooth in consideration is obturated and a post space is prepared with the help of paeso-reamers. A suitable tooth is selected from the tooth bank and after following the necessary sterilization protocols, the root of the selected tooth is prepared in such a manner that it can act as a post. The crown portion is also prepared in accordance with the anatomy of adjacent teeth. The prepared post is then cemented with the help of GIC or composite material into the canal of patient’s tooth along with the crown. Finishing and polishing is done thereafter.\(^7\)

**Biological Crown**

In case of primary teeth, crown is considered as a semi-permanent restoration. Biological crowns are the natural and most aesthetic crowns as well as inexpensive. These can be prepared by using the crown portion of the tooth from tooth bank. These are prepared by removing the dentin layer from the inside. The patient’s tooth is prepared by reducing the enamel from labial, lingual, occlusal and proximal surfaces. The crown is then tried and adjusted and finally cemented on the tooth. Final finishing and polishing is done to ensure smooth margins.\(^8\)

**DISCUSSION**

This method of using biological crown and post restoration for primary and permanent teeth affected by caries and trauma has shown promising results. The cost of these restorations when compared with conventional methods of using intra-canal reinforced composite resin restorations was six to seven times lesser. Hence it proved to be a cost effective alternative making it possible to recycle precious biological tissue which has been discarded as bio-waste. However, patient acceptance of a biological restoration is an important issue and donor selection from siblings could be a more acceptable alternative.\(^9\)

In 2003, Mandroli PS et al and Barcelos R et al have reported successful outcomes with the use of biological crowns in terms of retention, aesthetics and clinical satisfaction. In 2008, Grewal N and Reeshu S concluded that biological restoration is a successful, cost effective alternative aesthetic treatment for restoration of severely mutilated primary anterior teeth.\(^10\)

**REFERENCES**


