



BIOLOGIC RESTORATION: A TREATMENT MODALITY FOR RESTORING PRIMARY TEETH

Dental Science

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ABSTRACT

Primary dentition with altered anatomy due to trauma or caries is a commonly encountered problem in Restorative odontology. Use of dental fragments obtained from extracted teeth (autogenous or homogeneous) for aesthetic and functional recuperation is a promising therapeutic prerogative. Present case study portrays restoration of a primary anterior tooth using biologic restoration as a suitable alternative to conventional treatments resulting in great clinical fruition in function and esthetics.

KEYWORDS

Primary teeth, Endodontics, Natural teeth, Biologic restoration

INTRODUCTION:

Dental caries is one of the most prevalent diseases of mankind especially during early childhood. Restoring primary teeth is a challenge and its premature loss can cause neuromuscular imbalance with decreased masticatory efficacy, speech disturbances, development of parafunctional buccal habits and psychological problems.¹

Extraction of primary teeth was the most expedient treatment in the past that was justified on the basis that the permanent teeth would eventually replace the extracted ones. Despite the fact primary teeth will be replaced, preservation of the integrity of primary dentition until the appropriate exfoliation time as premature loss results in the loss of vertical dimension of occlusion, tongue thrusting and mouth breathing habits, which can be sources of future malocclusion.²

Diverse treatment options are available for rehabilitation of primary teeth include esthetic restorative material, polycarbonate crowns, stainless steel crown, strip crowns, pedo jacket crowns, chengcrowns, dura crowns etc.³ Nevertheless, to date, no restorative material has been more effective than the properties of natural dental structures themselves.^{4,5}

Natural crowns, biological restoration have also been suggested as an option for restoring partially or completely lost dental crowns. Santos and Bianchi 1991 framed the term biological restoration,³ 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.^{3,4}

Since the first published paper in 1964 by Chosak and Eidelman³ that reported the use of fragments of extracted teeth as dental restorative materials, several other reports have discussed this technique's advantages, including but not limited to favourable aesthetics due to enamel's surface smoothness, anatomic contours, shade matching, Functional and masticatory efficacy.

Various clinical and laboratory procedures have utilised natural crowns and roots procured from tooth banks⁶ as a substitute for intracoronary metal post, space maintenance in children, and as a biologic restoration for primary teeth. Tooth banks nowadays have state of the art sterilization and storage equipment because of which tooth and tooth fragments can be stored and used long after they have been extracted.⁷ Tooth fragments and tooth pieces which are extracted

can be used as very valuable restoration if an appropriate contingency plan is formulated. Presented hereby is a clinical case report where in patients dentition was preserved using biological restoration.

Case Report

A 3 year 2 months old female child presented with the chief complaint of broken anterior teeth (Fig.1).



Fig.1: Pre-Operative picture showing broken anterior teeth

Patient's medical history was non significant. Clinical and radiographic evaluations were performed and a treatment plan was established. On examination a complete set of primary dentition was present, but the right maxillary incisor was broken due to trauma. Right maxillary central incisor was pulpally involved and required endodontic treatment. (Fig.2)

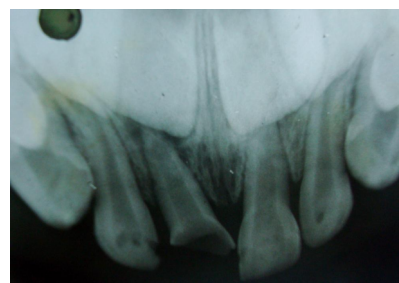


Fig.2: Right maxillary central incisor requiring endodontic treatment.

The child's parents were informed about the treatment plan using natural teeth restoration. A written consent was taken by the parents.

Endodontic treatment was accomplished in pulpally involved maxillary incisors in one appointment. (Fig.3)



Fig.3: Endodontic treatment accomplished in maxillary incisors.

Coronal one third of the canals were prepared to receive intra-canal retainers. At the same time sterilized natural teeth were selected (Fig 4), endodontically treated and the roots were prepared to fit into the prepared root canals.



Fig.4: Natural teeth prepared to be used as a biologic restoration.

An elastomeric impression of the prepared teeth was made to aid in the selection of natural crowns. The prepared biological restoration crown was cemented with dual-cure resin- based cement. The cervical regions of the restoration were polished with rotary instruments and resin composite polishing discs. (Fig.5)



Fig5: Placement of biological restoration.

DISCUSSION

The technique of using bonded tooth fragments as biological restorations is simple allowing preservation of sound tooth structure along with outstanding esthetics compared to composite resins and stainless steel crowns especially regarding translucency.⁸ Lower cost for biological restorations because of elimination of laboratory processing has also been cited as positive feature.⁶

As the natural tooth is prepared previously, clinical chair time for fragment bonding procedures is relatively short, which is highly beneficial especially while dealing with pediatric patients.^{4,9} Resin composite restorations do not present these advantages and can allow staining and plaque formation on their surfaces.

Nevertheless, obtaining teeth for biological restoration with compatible characteristics i.e. colour, shape, dimensions etc poses a major difficulty. This, however could be minimized by using tooth banks- non-profit institutions that store and provide teeth for didactic, clinical and scientific use.¹⁰

Patient compliance for biological restoration is questionable owing to use of fragments obtained from other people.^{4,11} However, these factors are not contraindications for the technique and the procedure can be performed after obtaining an informed consent and rigorous sterilization process completely eliminating any risk of contamination

or disease transmission. Presently, secure methods of sterilization and storage are available to ensure the safety of teeth or tooth fragments coming from tooth banks.⁴ With the advent of novel dental materials in adhesive dentistry, bonding of the dental fragments can be achieved with several materials like composite resins, glass ionomer cements and dual-cure resin cements.⁴

Grewal N et al⁶ also validated biological crown and post restoration for primary teeth in teeth affected with ECC. 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 anteriors.¹²

Advantages of bonded natural teeth or fragments with an autogenous or donated extracted teeth include preservation of tooth structure, superior masticatory function at low cost preventing wear of adjacent structures without any complex material resources. However, long clinical appointments, laborious technique and sterilization difficulty, possible fracture or degradation between the margins of the fragment and the tooth surface are among its disadvantages.¹³

The use of various types of biological restoration is not just limited to primary dentition. It is a well documented method for treatment of Ellis Class II fractures.¹⁴ In autogenous bonding, the fractured fragment of the patient's own tooth is reattached, whereas in homogenous bonding a donated extracted tooth can be used for reattachment procedure.¹⁵

Regular clinical and radiographic assessment of the treated tooth is mandatory. On the basis of our clinical experience and affirmative results in the literature^{5,13,20,22}, we can conclude that the biological restoration technique using tooth fragments is clinically acceptable, viable, cost-effective restorative procedure for severely damaged crowns especially primary teeth.

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