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REFURBISHING SMILE BY RESTORING MUTILATED PRIMARY ANTERIORS WITH THE HELP OF FOUR DIFFERENT POSTS SYSTEM: A CASE REPORT

Maxillofacial Surgery

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ABSTRACT

Early childhood caries can cause aesthetically unacceptable dentition with early loss of teeth that can snatch the pretty smile and affect a child developmentally, psychologically and socially. So, several attempts have been made to correct this situation by refurbishing the grossly decayed primary anterior teeth with the use of intra-canal retainers in the form of endodontic posts followed by core systems. Posts can be effectively used in such severely decayed teeth to restore the lost form and function until their replacement by successors. This paper highlights a case of four different posts (Omega loop post, glass fiber post, polyethylene woven fiber post and biological post) in the restoration of grossly decayed primary anteriors.

KEYWORDS

grossly decayed primary teeth, polyethylene fiber post, biological post, glass fiber post, RIBBOND fiber post

INTRODUCTION

Early childhood caries is one of the most common, devastating diseases in childhood. It may be defined according to the American Academy of Pediatric Dentistry "as the presence of one or more decayed, missing (due to caries), or filled tooth surfaces in any primary tooth in a child 71 months of age or younger"1. Clinically this condition is represented as a distinctive pattern, with the involvement of mainly maxillary central incisors, lateral incisors, and the maxillary and mandibular 1st primary molars. The maxillary primary incisors are the most severely affected where in extreme cases, lead to total loss of the crown structure. Previously, the only treatment option for early childhood caries has been extraction, but recently there has been a paradigm shift in the treatment option where parents are more determined to maintain the primary teeth [2,3]

The early loss of primary anterior teeth causes reduction in masticatory functions, loss of vertical dimension, development of parafunctional habits, esthetic concerns, functional problems, and also adverse psychologic effects.4 Pediatric dentists have to face the dual challenge of restoring severely decayed teeth at the same time dealing with the behavior management of younger children.3 Other than that, there are also morphological problems like aprismatic enamel, small amount of the tooth structure for bonding.[5,6]

In cases where teeth are severely decayed, endodontic treatment and placement of intracanal posts or retainers followed by strip crowns, art glass crowns, zirconia crowns etc become necessary for restoration. There are different techniques and both metal, non metal posts are available for primary teeth.[7]

The following paper elaborates the clinical sequence of rehabilitation of severely mutilated maxillary anterior teeth affected with early childhood caries with the help of four different types of posts (Omega loop post, glass fiber post, polyethylene woven fiber post and biological post).

Case Study

A four year old boy reported with the chief complaint of decayed teeth in the upper front region since 1year. The patient had no significant medical history. Patient's mother also gave a history of bottle feeding including night time till 3 years of age. On intraoral examination 51, 52, 61, 62 were found to be grossly decayed, with blackish discolorations, leaving only about 1mm of coronal structure above gingival margin (Figure 1). Periapical radiograpgh showed pulpal involvement of all the above mentioned teeth (Figure 2). Dentinal caries was observed in 63, 64, 74 and interproximally between 71 and 81 showing mild yellowish discoloration (Figure 1). The child's parents were informed and written consent was collected.

Clinical Procedure:

Diet analysis, counseling and oral prophylaxis were performed. 63, 64, 74, 71 and 81 were restored with glass ionomer cement followed by composite resin using sandwitch technique. Then the treatment plan for maxillary incisors were divided into following three phases.

Phase I: Pulpectomy

Labial and palatal infiltration was carried out for 51, 52, 61 and 62. Gross carious lesions were removed with a no. 330 round carbide steel bur. After extirpation of infected necrotic pulp with H file, working length was determined with a no. 10 K-file and IOPA (Figure 3). The root canals were cleaned with subsequently larger K files until no.60, followed by copious irrigation using 0.5% NaOCl and normal saline, and obturation with metapex (figure 4). The teeth were then sealed with GIC (Ketac Molar, 3M, ESPE, Minnesota, USA).

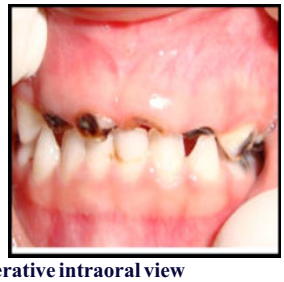

Figure 1: Preoperative intraoral view

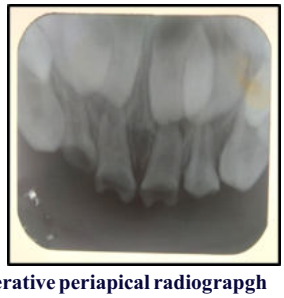

Figure 2: Preoperative periapical radiograpgh

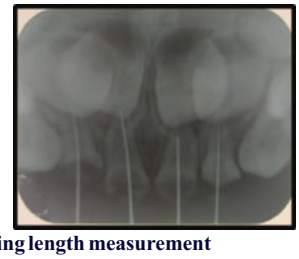

Figure 3: Working length measurement

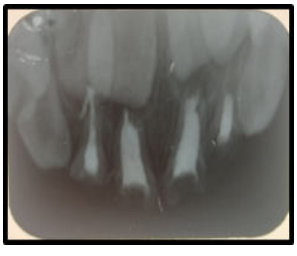

Figure 4: Obturation with metapex

Phase II: Fabrication of posts

After 1 week, post space was prepared by removing 4 mm of metapex using slow moving straight fissure bur. A 1 mm of GIC was placed to isolate the obturation material. The prepared post space was then cleaned with saline, air dried and etched with 37% phosphoric acid (Eco-Etch, Ivoclar Vivadent) for 15 seconds. After rinsing the etchant post space was air dried and bonding agent (Adper Single Bond 2, 3M,

ESPE) was applied on etched surface, then light cured for 20 seconds.

Omega loop posts (made of a 0.6mm stainless steel wire) was placed in 61 with flowable composite resin. (Figure 7a and 7b).

Light cured flowable composite resin was then inserted into the canal chamber after which the snugly fitted GF post was inserted in 62 (Figure 7a and 7b).

The width of Ribbond (Polyethylene woven fiber) was decided based on the root canal space available in 52. A 3mm wide Ribbond fiber was cut to a length double of the working length plus an excess of 2-3 mm. Ribbond fiber was coated with a layer of unfilled resin (Clinpro™ Sealant, 3M, ESPE), the length of the fiber was folded over itself, was inserted in the canal and was light cured for 40 seconds (Figure 5). Ribbond was stabilized using flowable composite (Figure 7a and 7b).

In this case, biological post was prepared from the palatal root of human primary maxillary second molar which was collected from the tooth bank where teeth were stored in HBSS(Hank's Balanced Salt Solution) at 4°C (Figure 6a and 6b).The tooth was then

autoclaved for 30 minutes at 121°C and 15 lbs before cementation. It was cut mesiodistally with a metal disc, washed with saline and was luted with flowable composite in 51 (Figure 7a and 7b).

Phase III: Post placement followed by strip crown

All the posts were cemented using flowable light cure composite (Nexcomp Flow, Meta Biomed, Korea) with a curing cycle of 60 seconds and a coronal extension of 2-3 mm and clearance of at least 1–2 mm from the opposing teeth (Figure 7a and 7b). An IOPA was taken to verify the position of posts (Figure 8). Crown build up was done with properly fitting pedo strip crowns and composite for 51, 52, 61 and 62 (Figure 9a and 9b). At 12 month follow up, intact coronal restoration with no marginal leakage and good retention was found (Figure 10).

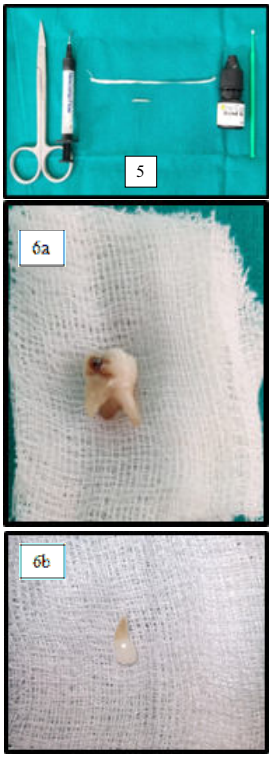

Figure 5: Preparation of RIBBOND post
Figure 6a and 6b: Preparation of biological post

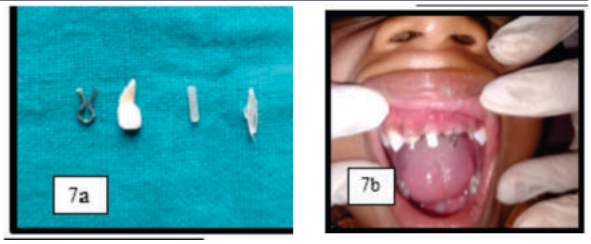

Figure 7a and 7b: Four different types of posts

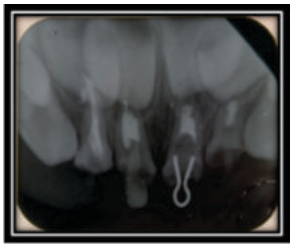

Figure 8: IOPAR after luting of posts

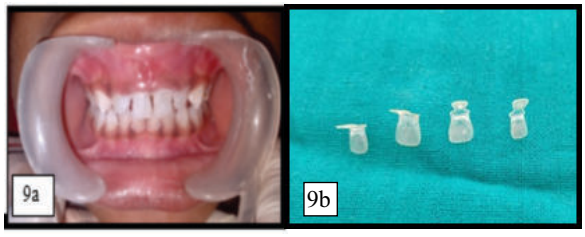

Figure 9a and 9b: Final restoration with composite and strip crowns

Figure 10: Intact esthetic restoration after 12 month follow up

DISCUSSION

Restoration of an endodontically treated primary tooth in a structure similar to natural teeth has always been a great challenge for pediatric dentists; but recently with the innovation of different newer posts and full crowns, this difficult task seems to be achievable.[8] The main reason for using a post is to provide retention, stability, stress distribution and to resist any fracture from masticatory forces.[2] several posts have been used for intracanal reinforcement of anterior teeth, such as metal posts, Ni-Cr coil spring posts, short composite posts, biologic posts, short orthodontic wire posts (omega or gamma loop), glass fiber posts, carbon fiber posts and polyethylene fiber posts/Ribbond.[10]

The use of Omega loop was introduced by Mortada and King as intracanal retainer in the year 2004.[6] The advantages are mainly that the free end has two arms crisscrossing to the opposite side which adapt to the walls of the root providing extra retention and serves with minimal chair side time.[11] But disadvantages include poor adhesion and adaptation between Omega wire and dentinal wall leading to dislodgement of the wire, and radicular fracture from masticatory forces.[9]

The development of the fiber-reinforced composite technology has brought a paradigm shift in esthetic dentistry by adding metal free adhesive material. Different types of fiber such as glass fibers, carbon fibers, Kevlar fibers, vectran fibers, and polyethylene fibers are being used.[2,3] Glass fiber post utilizes the coronal portion of the root, which is the strongest part of the root to transmit any functional stresses and may add to success.[12] Various studies also show that glass fiber posts exhibit better retention and marginal adaptation than omega shaped stainless steel wire.[13,14] As fiber post has modulus of elasticity similar to dentin, so they have advantage of stress distribution over broad surface

area. Disadvantage of this post system are failure to stick to the resinous matrix and interference with resorption if extended beyond 3 mm.[15,16]

In Ribbond, the polyethylene fibers are not arranged longitudinally and are instead woven in alternating patterns. This arrangement results in improved distribution of the internal tension lines and thus provides fracture resistance and being opaque in nature are also very esthetic.[3,17] As their modulus of elasticity and flexural strength are closer to dentin, Ribbond post offer better impact strength for coronal reconstruction. It has been established that the adhesion of the polyethylene fiber post to the composite resin matrix is better when compared to the adhesion of the glass fiber post to composite resin. Biological post is less technique sensitive, has resorbing properties similar to the natural teeth, and also provides good adhesion by creating monobloc effect with luting cement. As these posts are reabsorbable, these can be extended to the middle and apical third of the root, thus increasing retention and resistance of the post to a greater extent.[8] Need of tooth bank, availability and donor & recipient acceptance & cross infection are some of the disadvantages of biological post.[9]

CONCLUSION

This paper presents with the four different types of posts starting from most commonly used omega post to the much debated biological posts. To fulfill esthetic purposes, glass fiber post and polyethylene woven fiber posts have also been discussed in this paper. Thus all the posts along with its advantages and disadvantages have been presented in this paper.

Finally it can be concluded that all the four types of posts showed good clinical efficiency after 12month follow up.

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