Polyethylene fiber tape used as a post and core in decayed primary anterior teeth: a treatment option

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The early loss of the anterior primary teeth can cause problems in phonation, development of the maxilla and is related to deleterious habits. This case presents the clinical sequence of rehabilitation of upper anterior primary teeth, where endodontic treatments were done. This was followed by the construction of root post using polyethylene ribbon fibers and the fabrication of crowns composed of resin.
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INTRODUCTION

Dental caries is an etiological factor responsible for the destruction of many primary teeth.

The early loss of upper primary anterior teeth can be related to esthetic-functional problems, such as space loss, masticatory deficiency, phonetic changes, lack of pre-maxillary development and resulting malocclusion, development of para-functional habits and, mainly, psychological problems that interfere in the personality and the behavior of the child.[4]

For a long time, extraction was indicated as choice treatment for primary teeth with great coronal destruction. This was associated with a posterior prosthetic rehabilitation. With the progress of several techniques for root retention of primary teeth, the improvement of the dental materials and the diversity of options of restoring techniques; it became easier for the specialist to recover the aesthetic-functional characteristics of the dental elements. This resulted in a return to oral health of the child in a very efficient way.[12]

In cases where the primary teeth with great coronal destruction that are endodonticly treated, the reconstruction should have a good retention to resist the masticatory forces. This can be obtained through the use of root posts.

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The polyethylene ribbon fibers are being used with plenty of success as root retention in permanent teeth reconstruction. Recent research found that ribbons provide good retention and stability to the resin crowns because of the ability to fill the prepared root canal. The aesthetics of ribbons are quite favorable. The technique is practical. It can be accomplished in only one session and without a laboratory phase. Thus, the cost is reasonable for most patients (parents).[7]

This present article describes a case report showing an alternative technique for the reconstruction of completely destroyed upper incisors with polyethylene ribbons for retention and stability for the resin crowns.

CASE REPORT

A four year old boy accompanied by his mother arrived at the Pediatric Dentistry Clinic, where he presented the upper incisors with completely destroyed coronal portion, due to progressive decay (Figure 1). After taking periapical radiographs, the favorable conditions of the roots were verified for endodontic treatment and for the use of posts as a retention form.

Initially, the endodontic treatment of the elements that would be restored was accomplished. We opted for doing relative isolation, since the remaining tooth structure did not allow for absolute isolation. File – K were used in the working length (12mm) of the canals. Disinfection was done with irrigation with Dakin. Next the canals were washed with cleanser and properly dried with paper points. Followed by obturation of the canals with a paste containing calcium hydroxide, zinc oxide and propyleugenlicol. A final radiograph was made showing the quality of the obturation (Figure 2). Later a 3 to 4mm space in the obturated canals was made for the post.

The etching was done with 37% phosphoric acid in the internal walls of the canal and the remaining tooth structure for 15 seconds. It was washed for 30 seconds to remove the acid. Dried lightly with air jet. A layer of the

Figure 1. A view of the patient before the reconstruction of the upper anterior primary teeth is seen.

primer was applied. It dried for 30 seconds. Then a layer of the bonding agent (Scotch Bond Multi–Purpose–3M) was applied to the remaining dental surface and in the root canal with brushes (microbrush, KG Sorensen). The light polymerization was done for 40 seconds (Figure 3).

Polyethylene ribbon was chosen to fit the diameter of the canal (GlasSpan medium diameter). The same bonding agent was placed on the piece of GlasSpan for 10 seconds of light polymerization. This was done to facilitate cutting of the 6mm piece of ribbon (Figure 4).

The piece of ribbon was inserted in the canal with an instrument, condensing it well for the interior of the canal. There after an increment of composite was inserted (Z-100, 3M Dental Products Division) using a Centrix syringe. It was placed on all the walls of the root canal, followed by light polymerization.

The coronal part of the ribbon was covered with the same composite, making a core, followed by light polymerization. The reconstruction of the crown was made through an incremental technique of using composite (microhybrid resin Z-100) shade A3.5 to substitute for dentin. The same composite was used in the B2 shade to replace enamel, using a previously selected celluloid form. A small hole was placed in the lingual surface to allow excess composite to flow out of the form. Later the excess composite was removed. The final light polymerization was done for 40 seconds. The restorations were given a final contour and occlusion was adjusted.

The finish and definitive polish were made after 48 hours (Figure 5), following an accompaniment of the case for approximately 1 year (Figure 6).

Figure 2. View of the remaining tooth structure after endodontic treatment.

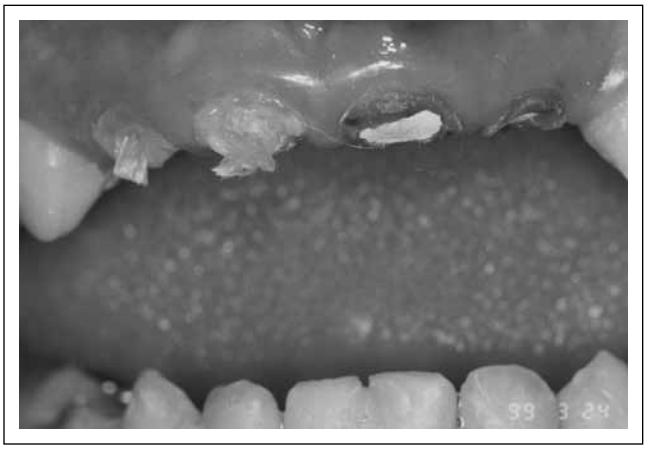

Figure 3. Polyethylene ribbons after condensation inside the canals 51 and 52.

DISCUSSION

The goal of available restorative techniques in pediatric dentistry is to return masticatory function, phonetics and aesthetics to the patient when destruction of the upper anterior primary teeth occurs. When there is severe loss of the coronal tooth structure, the use of posts or cores placed inside the canal after endodontic treatment will get retention and provide stability to the reconstructed crown.[11]

There are a variety of root posts used in pediatric dentistry. They are of different natures: the pre–manufactured, FKG type, treated or not made with orthodontic thread in alpha or gamma forms,[9] the metallic posts with macro retention,[4] short posts made with composite resin,[22] and the biological posts, made starting from roots of natural primary teeth.[12,16]

Independent of the employed post type, the primary teeth should be treated endodonticly and root retention should fill about 1/3 of the root length.[4,11]

The coronal rehabilitation can be made of composite resin, aided by celluloid crowns.[5,12,21] Polycarbonate

Figure 4. Final aspect after the reconstruction of all the upper anterior primary teeth is seen.

Figure 5. A view of the patient after reconstruction is seen.

Figure 6. Clinical aspect after approximately 1 year is seen.

crowns can also be used.[4,18] Also, a heterogeneous bonding of natural primary teeth can be done.[16]

In spite of all those root posts presented for a viable use in pediatric dentistry, some of them present particularities that should be considered. The FKG type posts and those made with orthodontic thread, for example, do not get an adequate adaptation to the canal, since they do not copy its form faithfully. This may lead to radicular fracture with excessive masticatory forces. Besides, the color interferes in the aesthetic result, and opaquers must be used to improve the final result.[4]

The metallic posts with macro retention are indicated to reinforce primary teeth that present with wide canals and little remaining dentine. They were developed by Dentistry University of São Paulo, Brazil (Napem – Fousp). They are formed by spheres that form an integral structure with the tooth and the restoration. Through chemical and mechanical adhesion and they seek the dissipation of tension, which tends to result in a satisfactory retention. If they are metallic, they can also interfere in the final aesthetics, needing the use of opacifier solutions.[4]

The posts made with composite resin presents a satisfactory aesthetic result, but they have the risk of losing the retention due to the resin polymerization contraction.[12]

The biological posts are made from natural elements and need the creation of a Teeth Bank. This factor should be considered, since there is the professional need to have a place adapted to house the teeth, besides the maintenance cares and the preparatory phase of the teeth, it could assist in reducing the delays and other onerous problems. Another important factor is that this post type is still subject to new studies with sampling and clinical studies for future conclusions.[12,16]

The use of polyethylene ribbons in reconstruction of extremely destroyed anterior primary teeth as root retention, has been shown in reconstruction of permanent teeth, and getting a great clinical success.[8]

The polyethylene ribbons have a very good adaptation to the composite facilitating the reconstruction of the crowns.[26] Besides, they have a good acceptance of the post/crown technique, because they conform satisfactorily to the root canal walls, providing a good retention and stability to the crown to be reconstructed. The clinical procedure is very simple. It does not need a laboratory phase, which facilitates the professional work and is a less onerous treatment for the patient.[8]

The indication for primary teeth presented in this work as an alternative technique for the reconstruction of endodontic treated anterior teeth.

In the presented clinical case, it was possible to reconstruct all the upper anterior primary teeth using the polyethylene ribbons, checking the success of the use of this material as root retention after approximately 1 year

of the reconstruction of the crowns. Clinical monitoring should be frequent, because it is a technique that still needs additional studies and scientific research.

CONCLUSION

Anterior primary teeth that present with great coronal destruction and need endodontic treatment should be considered for the placement of root posts. These posts promote retention and stability. They should fill the canal evenly. At most, 1/3 of the root length should be used for placement of the post so that there is no interference in the process of eruption of the permanent teeth.

Several root post types have been used for the primary teeth. Some of them are prefabricated, others can be made indirectly.

The reconstruction technique with root posts for early primary teeth used in this work, appears as another alternative restorative dentistry in pediatric dentistry. With the use of the polyethylene ribbons as root retention, the retention, stability and aesthetics was observed without a laboratory phase, in the accomplished clinical case and monitored for approximately 1 year period.

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