Case Report

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Application of hollow posts for prosthetic provisionalisation and pre-endodontic build-up of severely destructed teeth

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Abstract

The following article presents the utilization of hollow posts as a treatment alternative for teeth with severe hard tissue loss that need an endodontic therapy and therefore a reliable pre-endodontic build-up and prosthetic provisionalisation. Often dentists confront a clinical situation where teeth with not enough ferrule are to be endodontically treated before crown lengthening procedure or orthodontic extrusion and in consequence they have to have a sound build-up preventing leakage. The application of hollow posts offers predictable treatment results and in some cases it might be the only procedure possible preventing tooth extraction.

Keywords: hollow posts, pre-endodontic build-up, severely destructed teeth, provisionalisation

Background

The use of hollow posts has been advocated for years in cases where no sufficient residual dentinal tissues were present in cases where an endodontic treatment needs to be completed first. Several methods have been recommended such as temporary crowns with hollow or removable posts, forth wall build-up, copper or orthodontic bands, use of amalgam pins etc. (1) .
Case description

The patient visited our clinic for a check-up. X-ray examination revealed an apical periodontitis on tooth 22 (Fig. 1). The tooth had a PFM crown, metallic post and an underfilled root canal. After discussing the problem with the patient a decision was taken to remove the old crown, perform a root canal retreatment and place an interim crown during the healing process and after that to make a definitive crown.

Fig. 1 Initial X-ray (OPG 20/07/2014)

After the removal of the PFM crown an additional problem was discovered. The tooth lacked the necessary ferrule possessing only 0,5-1mm of sound dentin height (Fig. 2). The normal values for the ferrule are 2-3mm (2).

Fig. 2 Occlusal appearance of tooth 22 after crown removal

The stability of the pre-endodontic build-up in this case is questionable since the build-up will be supported by adhesion on a very narrow band of dentin. The existing techniques for provisionalisation had an increased probability of fracture during insertion and removal of provisional crown or in case a palatally opened hollow post was chosen - a risk of bacterial infiltration existed. Moreover an apical patency was not obtained during the first visit and a stable provisional solution was needed. To resolve this problem we modified the prefabricated root canal post which we regularly used in our dental praxis (Mani EG Post). The posts were longitudinally perforated using two different technologies. Erosive

devices (AGI - Swiss) were applied in order to perforate the post using spark erosion. An alternative technology using carbide microdrills on precise drilling machine (MICRON - Swiss) was utilized. The latter can also be combined with spark erosion in order to remove the oxide layer formed at the contact areas and to achieve fine cylindrical shape of the canal.

The diameters of the openings were 0,5 and 0,8 accordingly and were chosen in order to allow a 30 K-file to reach the root canal apex (Fig. 3). The sealing procedure was performed according to a protocol for a metal post cementation using glass ionomer cement with the single difference of holding a canal file (Fig. 4) at the maximal accessible canal length to avoid blockage of the root canal patency by the cement.

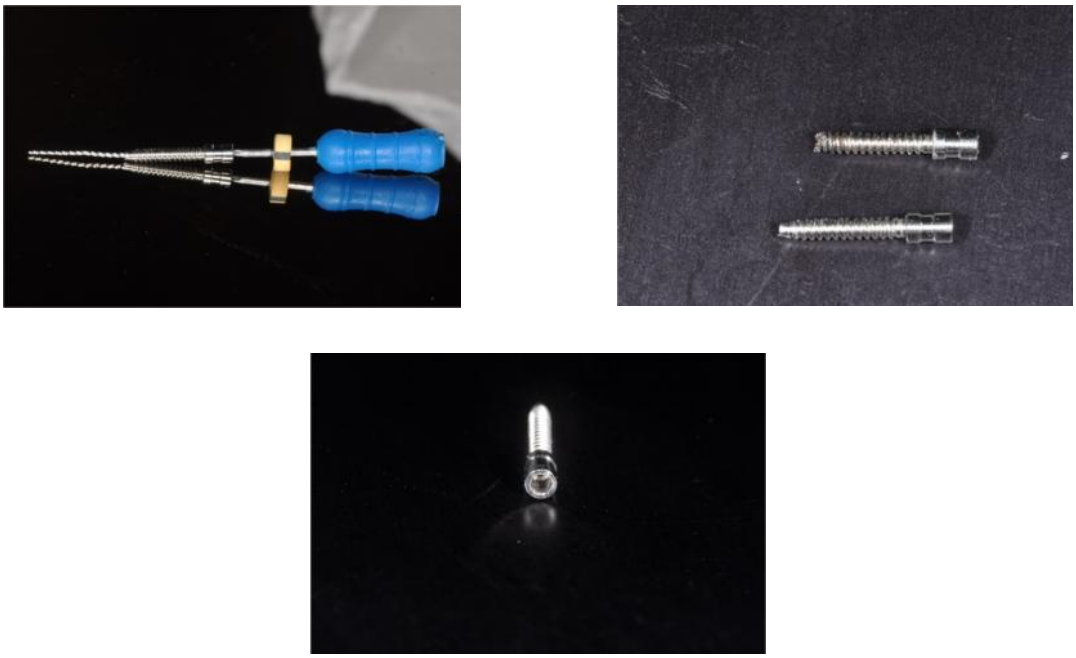

Fig. 3 The hollow posts

Fig. 4 Sealing of the hollow post

After post-cementation a composite core build-up (Fig. 5) was made preserving the post opening and an acrylic interim crown was made and provisionally sealed allowing a stable long term provisionalisation. On each visit the crown and provisional remedy were easily removed and the root canal therapy was performed through the post.

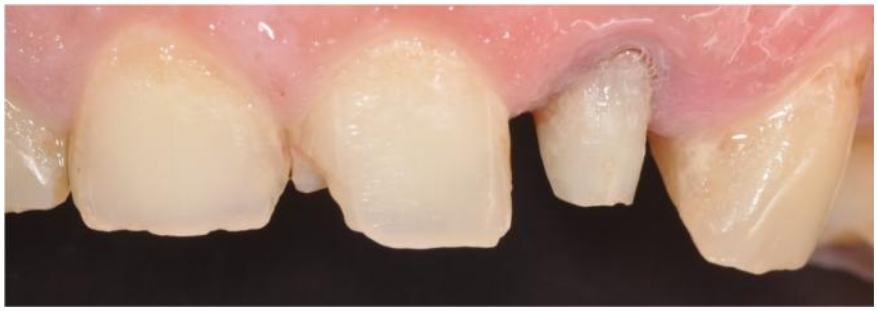

Fig. 5 Pre-endodontic build-up

Several appointments later, when an apical patency was obtained and the root canal was considered ready to be filled, the provisional build-up was removed and the root canal was obturated (Fig. 6). A subsequent definitive build-up was performed and the crown was relined.

Fig. 6 The obturated root canal

Discussion

Different applications of hollow root canal posts can be found in the literature (1). Orthodontic tubing is also suggested as a treatment possibility (3) for largely destroyed teeth that need endodontic retreatment but in the authors' opinion orthodontic tubing is too large, requires drilling of too much sound dentinal tissues and doesn't fit properly the root canal anatomy. The technique presented in this article, however, possesses several advantages that will be discussed further. It provides a stable long-term provisionalisation option in case a reduced ferrule height is present. The posts allow an easy access for as many visits as necessary while at the same time the opening is protected by a provisional crown in-between two appointments, therefore bacterial leakage is unlikely to occur. This is considered to be a substantial advantage compared to the palatally opened hollow post technique where the post opening is in direct contact with the oral environment and leakage is much more likely to happen.Patents exist (Valeria Chiarini, Imola (IT), Pub. No.: US2005/0074724A1, Pub.Date: Apr. 7, 2005) (4) regarding the production of hollow root canal posts and the product is commercially available (EDS AccessPost™). But the present technique allows the practitioner to modify and work with the post system that he or she is familiar with thus avoiding all the inconveniences and risks regarding the introduction of new and unfamiliar drills and post diameters. The technique allows usage of any type of prefabricated posts. Out of the two technologies for post perforation, spark erosion tends to create an oxide layer at the contact surface and to damage the post at the tip and all the areas where the remaining metal is too thin. That is the reason why we prefer mechanical drilling which unfortunately is very time consuming, and machine and operator demanding.

For the obturation in this particular case we preferred to remove the hollow post and the provisional build-up, but according to our experience, root canal obturation could be made through the post as well. The only disadvantage in this case would be the impossibility to use a lateral condensation technique, because of the limited clearance of the longitudinal perforation and the necessity to use a single cone root canal obturation technique. Further research is needed in order to compare the mechanical properties of the perforated, non-perforated metallic and an alternative fibrocomposite or carbon post.

In case that treatment plan requires the full healing of the periapical lesions to occur before the final restoration is produced, then the above described provisional restoration might be used as a long-term provisional together with the interim crown. Another advantage that might be cited is the reduction of microleakage resulting from the post opening positioned just under the occlusal surface where bacteria are least likely to appear. The presence of materials that are electric insulators, such as dentin or composite, around the metallic post facilitate the application of an apex locator and the top platform of the post might be used as a reliable reference point throughout the endodontic treatment.

Conclusion

The hollow posts technique allows dentists to treat properly largely destructed teeth and to save teeth that otherwise would be considered with bad prognosis and therefore extracted. The hollow posts facilitate reliable pre-endodontic build-up and short-term as well as long-term provisionalization, prevent bacterial contamination and give dentists a possibility to perform endodontic therapy lege artis.

References

1. Castellucci A. Endodontics Volume 1 Publisher: IL Tridente

2. Fradeani M., Barducci G. Esthetic Rehabilitation in Fixed Prosthodontics Volume 2 Publisher: Quintessence Publishing Co, Inc.

3. Grundy JR, Glyn Jones J. A Colour Atlas of Clinical Operative Dentistry Crowns&Bridges Second Edition Publisher: Mosby 1992.

4. United States Patent Application Publication Chiarini, Pub. No.: US2005/0074724A1, Pub.Date: Apr. 7, 2005.

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