

SECURELY ANCHORED IN THE ROOT CANAL: ADHESIVE CORE BUILD-UP WITH INDIVIDUAL GLASS-FIBRE POSTS

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The success of a restoration in endodontically treated teeth is dependent upon many factors. These include the occlusal and approximal contact points, the position of the tooth in the dental arch, treatment with an artificial crown, the condition of the apex and the periodontium as well as the condition and size of the remaining natural crown or root.

Endodontically treated teeth often lack sufficient substance in the crown region, rendering a post and core build-up necessary for sufficient retention of the definitive restoration. In addition to prophylactic treatment against bacterial recolonisation of the root canal system, the aim is to reproduce aesthetic and biomechanical characteristics comparable to those of a healthy tooth. In such cases, the amount of remaining dental hard tissue, the type of material used for the root post and the coronal build-up, the type of composite-based cement, the extent of the preparation and the occlusion must all be taken into consideration.

The aim of this article is to discuss current concepts for the cementing of glass-fibre posts and the reconstruction of the crown.

A sound understanding of the biomechanical factors which influence the properties of the root post and/or core build-up with regard to retention of the crown and protection of the remaining dental hard tissue is fundamental to the long-term success of the restoration (Sillas Duarte et al.). Cementing a post or core build-up into the root canal alters the biomechanics of the tooth considerably.

For example, the material from which the post is made (glass fibre, quartz fibre, zirconia, gold or titanium) determines the distribution of stress and has a significant influence on the concentration of forces during mastication (Fig. 1).

CASE REPORT

The following clinical case describes the use of a new type of material for adhesive reconstruction of endodontically treated teeth using individual glass-fibre posts.

A 23-year-old patient presented with a request for dental treatment to improve aesthetics following trauma to tooth 11 (upper right central incisor) (Fig. 2-3). After clinical and radiographic examinations of the tooth in question, the decision was taken to leave the existing root-canal filling in situ and replace the metal post with individual glass-fibre posts (Fig. 4-7). The system chosen was Rebilda Post GT (VOCO, Cuxhaven, Germany).

Rebilda Post GT comprises bundled glass-fibre posts, and is available in four versions, each containing a different number of individual, thin posts per bundle (Fig. 8-10). According to the particular clinical situation, the necessary number of posts can be introduced, thus eliminating the need to adapt the shape of conventional posts, as in cases of expanded root canals. Following removal of the metal post construction, the posts were inserted with a composite-based cement, the dual-curing core build-up Rebilda DC (VOCO) and the universal adhesive Futurabond U (VOCO) (Fig. 8-10).

The crown was prepared with the aid of the diagnostic wax-up, which made it possible to visually distinguish between the dentine, composite and glass-fibre posts (Fig. 11-13). The restoration was concluded with cementing of a crown comprising a zirconia coping (Zirkonzahn CAD/CAM) layered with CZR porcelain (Kuraray Noritake, Japan). Although this case was complex and posed a challenge, it proved possible to achieve a good outcome (Fig. 14-16).

Another advantage worth highlighting is that the root canal is sealed and the crown region reconstructed immediately after conclusion of the endodontic treatment, which reduces the risk of contamination of the root canal system and fracture of the hollow cusp. A sound understanding of the materials, including their indications and limitations, is of fundamental importance in all treatment approaches nowadays.

CONCLUSION

The use of conventional glass-fibre posts cemented in place using composite-based materials is an advantageous and viable option in comparison with metal or ceramic post and core build-ups. At the same time, there is a possibility that the dentist may make clinical errors when placing such a restoration due to the multitude of treatment steps associated with the technique and the wide range of cementing materials available on the market. The use of a complete system such as the Rebuilda Post GT system is helpful in minimising this risk, as the materials employed are all optimally coordinated.

IMAGES

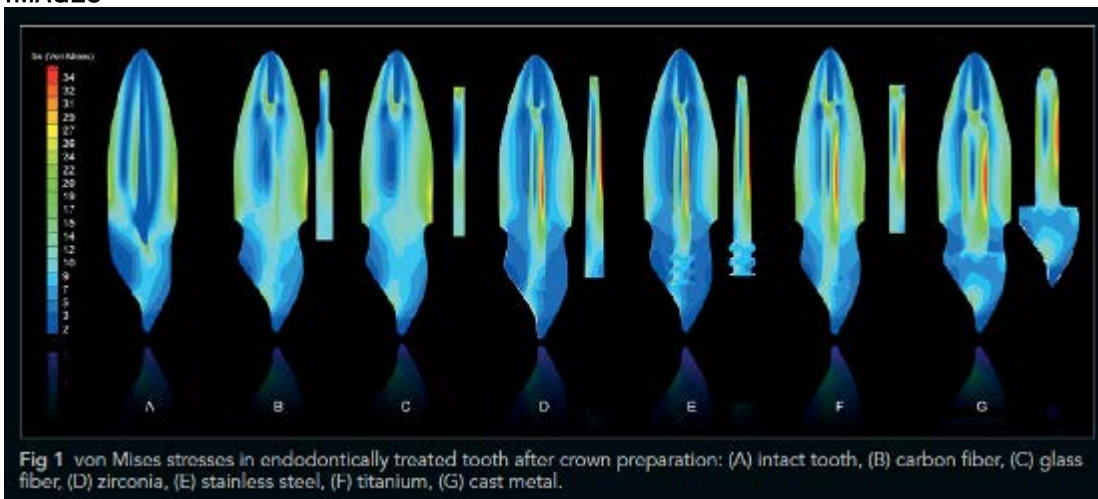


Figure 1: The material from which the post is made (glass fibre, quartz fibre, zirconia, gold or titanium) determines the distribution of stress and has a significant influence on the concentration of forces during mastication.

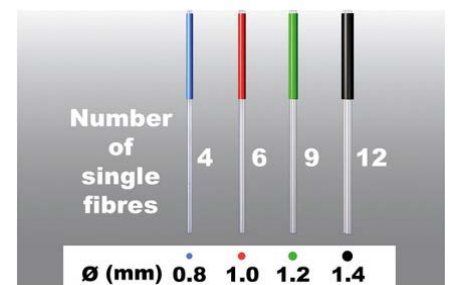


Figures 2 and 3: Following earlier trauma, endodontic treatment and subsequent dark discolouration of tooth 11, the patient was unhappy with the aesthetics of her smile and requested dental treatment.



Figures 4, 5, 6 and 7:

The root canal treatment was assessed as being clinically sound with an intact periodontal seal and no periapical lesion, but it included a metal post, which was removed together with the existing composite restoration.



Figures 8, 9 and 10: The glass-fibre post is selected according to the diameter of the root canal. Consequently, the system is available in different sizes to suit the specific requirements. Once the post has been placed, the sleeve which bundles the glass fibres is removed, allowing the fibres to fan out inside the canal. The post bundle is then fixed in position by means of light polymerisation.



Figures 11, 12 and 13: The view of the tooth following preparation performed with the aid of the wax-up also reveals the differences between the dentine, the composite-based cement and the glass-fibre bundles.



Figures 14, 15: View of the ceramic crown following cementation, and a before-and-after comparison of this complex case involving a single central incisor, showing the satisfactory outcome.

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