BUILD-UP OF ENDODONTICALLY TREATED TEETH

NEW ROUTES WITH FIBRE-REINFORCED POSTS

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Root canal posts offer the only means of creating a durable and strong core build-up if inadequate coronal tooth structure is available. This is still the case in the era of adhesive bonding. The following article illustrates new treatment techniques using the fibre-reinforced composite post FRC Postec Plus(r). The permanent restoration was fabricated with the IPS e.max(r) all-ceramic system.

In the past few years, the corrosion and biomechanical behaviour of root posts has been the subject of much discussion. Furthermore, the optical requirements of metal-free restorations have changed. As a consequence, root posts made of fibre-reinforced composite have gained in popularity. In contrast to metal and ceramic posts, these posts possess mechanical properties that are similar to those of natural dentin. They have the added advantage of being removable should this become necessary.

Clinical procedure

In order to assess the thickness of the remaining dentin more accurately, the operator should begin with circular crown preparation. The strength of teeth with post-and-core build-ups has been shown to increase by preparing a two-millimetre wide band around the circumference of the dentin (ferrule design shown in Figure 4). The tooth should be prepared for the post by evenly reducing the canal walls and fully removing the root canal filler in the prepared region. The length of the preparation must at least correspond to the planned crown length. At least four millimetres of root canal filler should be maintained for the apical seal.

Direct posts and core build-ups seated with the adhesive technique offer an efficient and gentle procedure (Figs 1 to 6). Adhesively bonded mouldable composite materials can be used to reinforce thinly tapering dentin walls and undercut areas are suitable as retentive surfaces. This produces an anatomic anti-rotation, which makes the preparation of an auxiliary cavity superfluous. Around the coronal part of the post, enough room

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FRC Postec Plus -Visible on X-rays, invisible when the patient smiles

The glass-fibre-reinforced root post FRC Postec Plus isdesigned for the direct build-up of endodontically treatedteeth. Innovative glass fibres in combination with a spe-cial composite matrix ensure lifelike transmission of light.Therefore, the build-up is virtually invisible in the mouth.However, the radiopacity of FRC Postec Plus of 510 %Al iscomparable to that of metal posts. Consequently, theposts are easy to distinguish from dentin on X-rays.

Figure 1: Endodontically treated premolar 14, which demonstrated an extremely high degree of destruction.

Figure 2: Situation after the adhesive cementation of two root canal posts made of glass-fibre reinforced composite with high radiopacity (FRC Postec Plus).

Figure 3: With the help of a transparent matrix, a direct adhesive build-up was fabricated using a dual-curing flowable composite (MultiCore Flow).

Figure 4: Situation after having prepared the tooth for an all-ceramic crown.

Figure 5: Adhesive placement (Excite DSC/ Variolink II) of the crown made of high-strength glass-ceramic (IPS e.max Press, veneered with IPS e.max Ceram). An oxygen-inhibited layer was prevented by using glycerine gel (Liquid Strip).

Figure 6: The restoration after several weeks of clinical use.

should be provided to allow the post to be covered by the build-up material on all sides. Modern adhesive composites are more suitable for this purpose than amalgam or glass ionomers because of their superior mechanical and optical properties, which are similar to those of dentin.

As indirect core build-ups do not allow the preparation of undercuts, more tooth structure has to be sacrificed than in direct build-ups (Figs 7 to 12). A broad horizontal contact to the surface of the core build-up has to be created to ensure that axial forces are effectively transferred to the tooth. At the same time, it will ensure a tight seal. The residual dentin should measure at least one millimetre in width on all sides. This can be achieved by shortening the dentin walls if necessary. To protect the tooth from torsional forces and define the build-up position, a box-shaped auxiliary cavity (canal inlay) should be prepared at the entrance to the root canal.

Conclusion

Modern metal-free restoratives together with improved adhesive cementation procedures have considerably enhanced the techniques for building up endodontically treated teeth in the past few years. A definitive statement about the long-term results of the described new techniques can only be supplied once positive results from the prospective clinical studies, which are currently in progress at various centres, are available.

Figure 7: Defective composite jacket crown on the endodontically treated tooth 11, which was first internally bleached.

Figure 8: A customized build-up made of glass-ceramic (IPS e.max Press) was fabricated for the prefabricated root post made of fibre reinforced composite (FRC Postec Plus). Both components were adhesively bonded during placement.

Figure 9: Palatal view of the indirect core build-up after adhesive cementation with Variolink II and Syntac. The post was reduced to the required length only after the bonding composite had set intraorally.

Figure 10: Labial view of the core build-up following the preparation for an all-ceramic crown.

Figure 11: Situation after the adhesive placement of the glass-ceramic crown made of IPS e.max Press/ IPS e.max Ceram. The optical characteristics are exactly adjusted to those of the adjacent teeth.

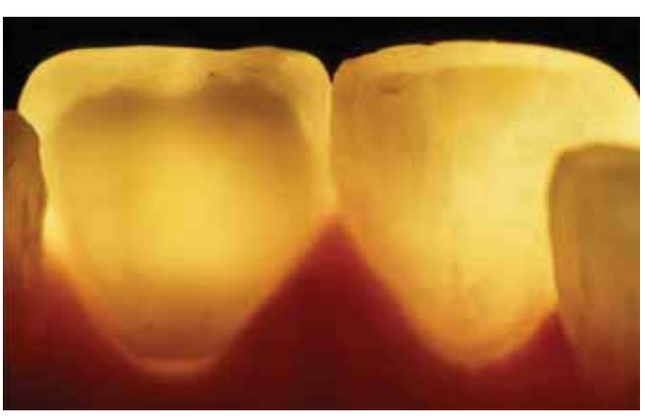

Figure 12: Picture of restoration 11 (tooth on left) taken from the palatal aspect by transmitted light. The light transmission of the restoration closely matches that of the adjacent natural teeth.

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