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# 3M℠ Health Care Academy

# Increased efficiency in post-endodontic restorative treatment.

by Dr Walter Devoto and Dr Daniele Rondoni, Italy.

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**Restorative procedures following endodontic treatment are usually highly complex and time-consuming. Often, a post is needed to stabilise the remaining tooth structure and this post needs to be cemented properly, which is not always easy given the lack of space in the root canals. Afterwards, the tooth needs to be built up layer by layer with composite. In this context, the establishing of a long-lasting bond between the resin cement, the tooth structure and the build-up material is a decisive factor. Finally, a crown needs to be produced and placed, and this crown should fulfil high demands regarding function and aesthetics.**

With so many steps in the process, the use of feasible treatment techniques and innovative materials that enable the user in the dental practice and laboratory to streamline the procedures is particularly beneficial. They can be implemented easily, increase the work efficiency by reducing the number of potentially error-prone work steps and lead to predictable results. An example of a streamlined treatment approach in the context of an endodontic revision is described using this case example.

Figure 1: Clinical situation after endodontic retreatment of the mandibular second premolar which had originally been restored with a metal screw post. The tooth is ready for the restorative procedure.

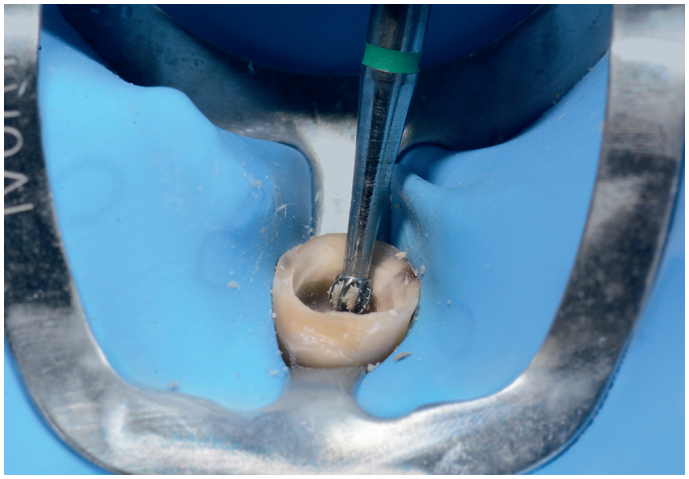

Figure 2: Removal of the gutta-percha filling with rotating instruments. Apically, 4 mm of the root filling should remain in place.

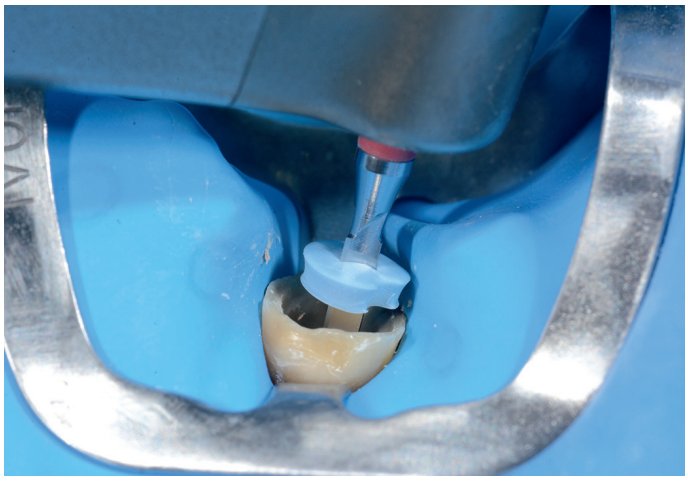

Figure 3: Preparation of the root canal for the placement of a 3M™ RelyX™ Fiber Post 3D Glass Fiber Post. The RelyX Fiber Post system includes drills that match the post diameters. Afterwards, the canal needs to be carefully rinsed with water.

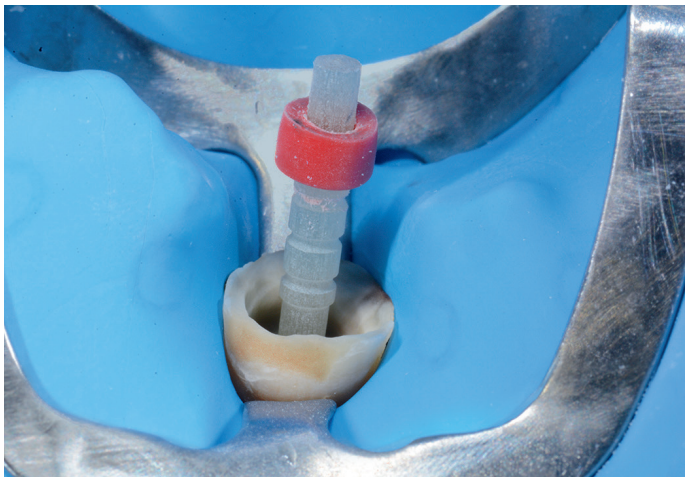

Figure 4: Try-in of a 3M™ RelyX™ Fiber Post 3D Glass Fiber Post size 2 (1.6 mm diameter), which should fit exactly and still needs to be easily removable, and marking of the desired final length of the post.

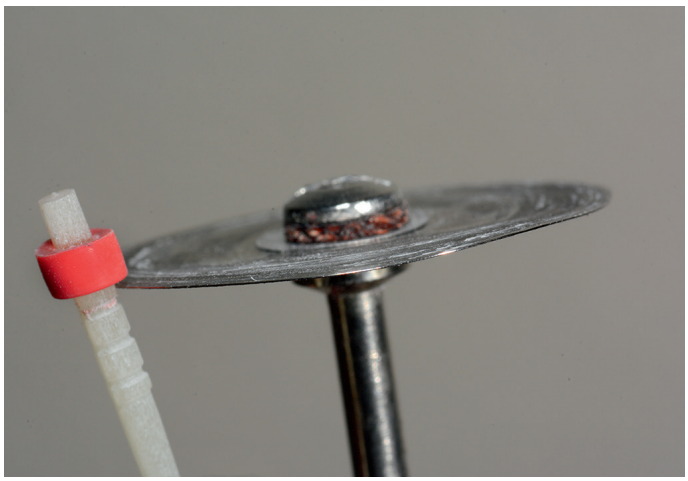

Figure 5: Shortening of the fibre post with a diamond disc. It is necessary to use a suction system and to wear a mask.

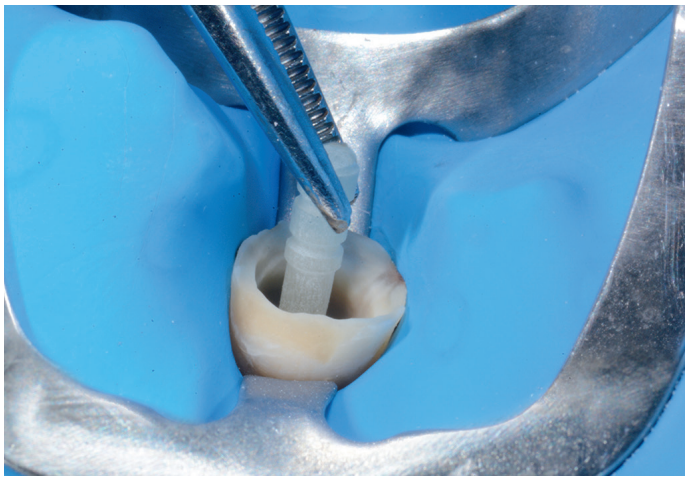

Figure 6: Checking of the obtained post length in the root canal.

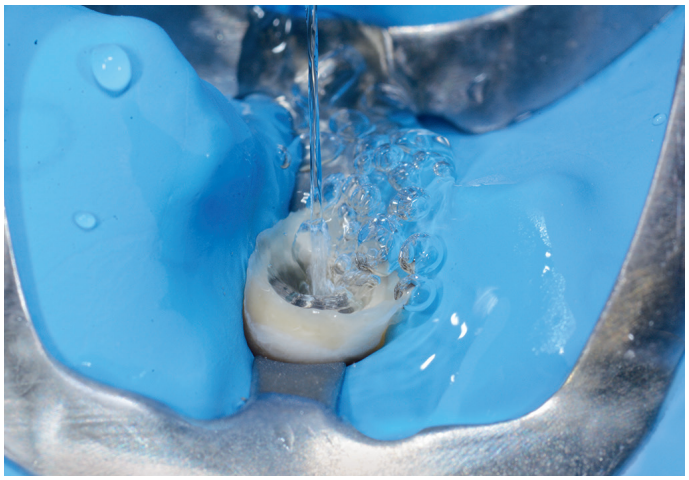

Figure 7: Thorough rinsing of the root canal with water after disinfection with a sodium hypochlorite solution (NaOCl).

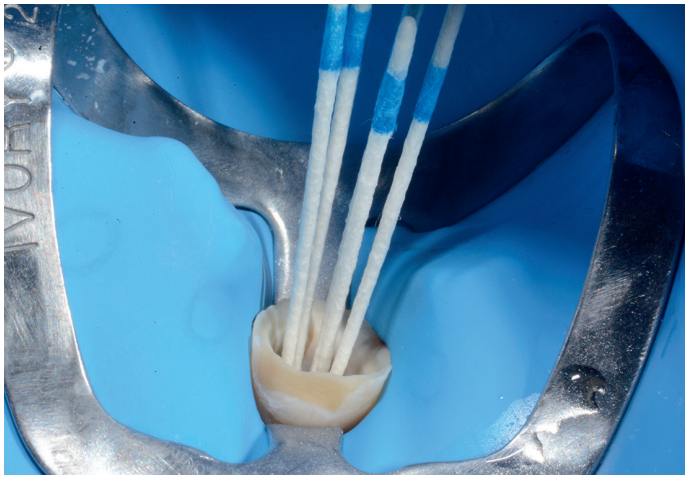

Figure 8: Careful drying of the disinfected root canal with paper tips.


Figure 9: Application of 3M™ RelyX™ Unicem 2 Automix Self-Adhesive Resin Cement into the root canal with an endo tip.

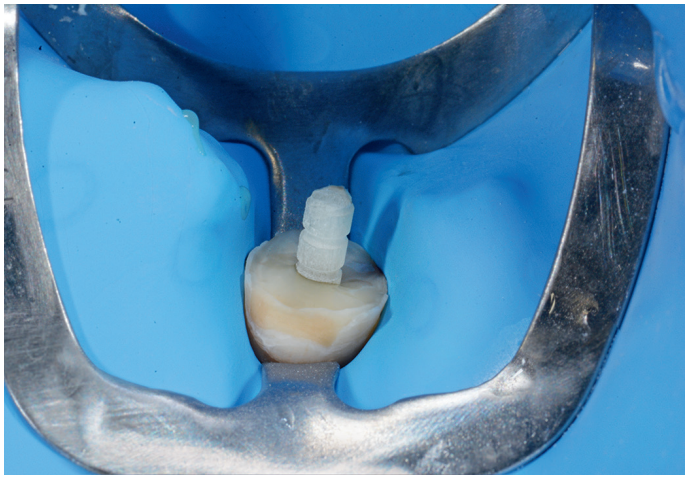

Figure 10: Situation after insertion of the fibre post into the root canal and excess removal. The post has been shortened extraorally with a diamond disk and cleaned with alcohol.

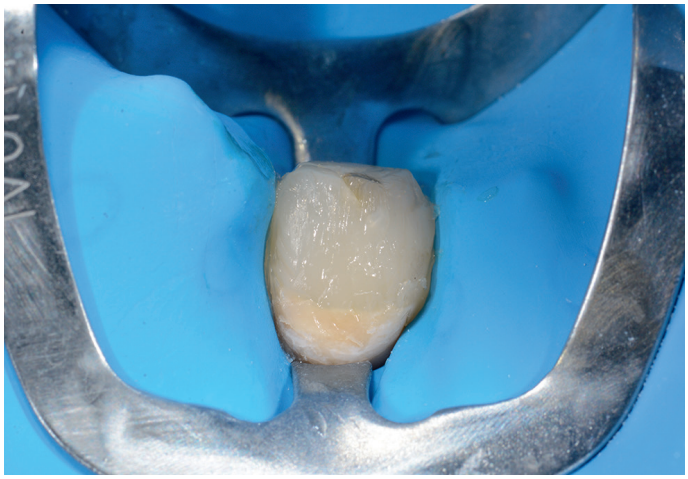

Figure 11: Tooth build-up using 3M™ Scotchbond™ Universal Adhesive and 3M™ Filtek™ One Bulk Fill Restorative.

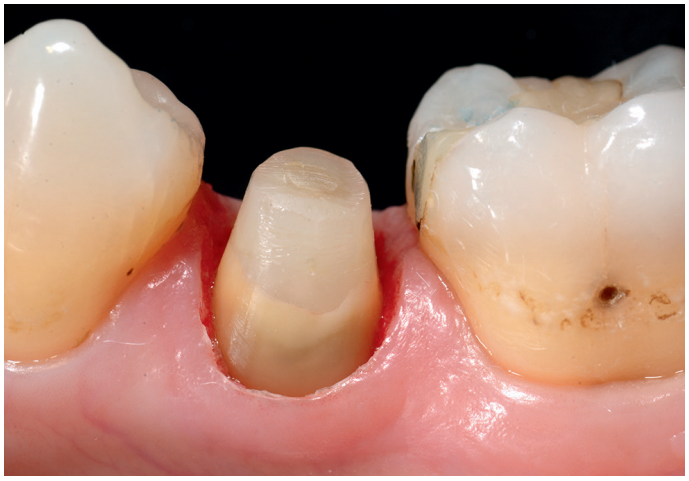

Figure 12: Tooth stump after build-up and preparation. As the preparation margin is in a subgingival position, soft tissue management is particularly important.

Figure 13: Situation after soft tissue management with the 3M™ Astringent Retraction Paste which was used according to the manufacturer's instructions for use. The precision impression was taken with polyether impression material.

Figure 14: Temporary restoration in place. At the same appointment, the adjacent molar has received a new direct restoration made of 3M™ Filtek™ One Bulk Fill Restorative. This material offers a tooth-like opacity and may be placed in layers of up to 5 mm height (provided that a specific light-curing protocol is respected).

Figure 15: Computer-aided full-contour design of the crown to be produced using 3M™ Lava™ Esthetic Fluorescent Full-Contour Zirconia. The transparent view of the planned restoration enables the technician to visually check the wall thickness. In addition, virtual tools are used to ensure the required material thickness (0.8 mm in this case) as well as a suitable crown shape and ideal occlusal contacts.

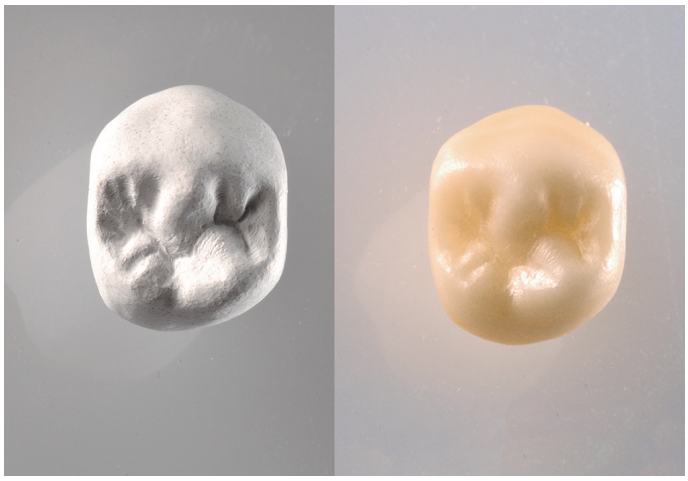

Figure 16: Crown after milling, removal from the blank and optimisation of the restoration surface with finishing instruments (left). It is possible to elaborate the morphological details including fissures prior to sintering. The crown on the right shows the result after sintering.

Figure 17: Sintered crown made of 3M™ Lava™ Esthetic Fluorescent Full-Contour Zirconia on the model. It fits precisely and has a natural surface texture and colour thanks to gradient shading technology.

Figure 18: Crown after the application of low-temperature (< 900 °C) firing stains used to increase the chroma in the cervical body area and in the non-functional areas of the occlusal surface, glazing and glaze firing.

Figure 19: Sandblasting of the crown's inner surface with 40 µm aluminum oxide. This procedure was followed by cleaning with alcohol and air-drying.

Figure 20: Cleaning of the roughened stump surface with ethanol before it is air-dried as well.

Figure 21: Application of 3M™ RelyX™ Unicem 2 Automix Self-Adhesive Resin Cement into the restoration.

Figure 22: Crown placement with excess cement visible at the margin.

Figure 23: Removal of the excess material with a spatula after brief light-curing for 2 seconds. It is easy to remove the cement in this gel state.

Figure 24: Buccal view of the treatment outcome immediately after cementation of the monolithic crown, light curing of each restoration surface for 20 seconds and a final checking of the occlusal contacts.

Figure 25: Occlusal view of the final clinical situation with the crown in place next to the new direct restoration on the first molar.

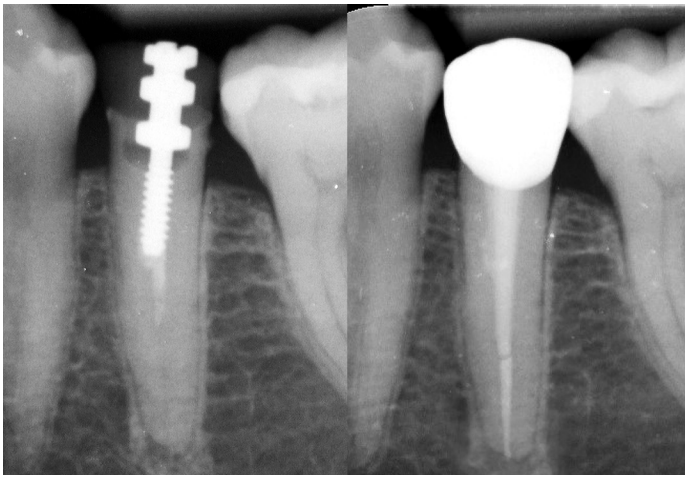

Figure 26: Radiographs of the initial and the final situation.

## Dr Walter Devoto

Dr Walter Devoto graduated with honours in Dentistry and Dental Prosthesis in 1991 at the University of Genoa, Italy. He is particularly interested in the fields of Conservative Dentistry and Aesthetic Dentistry and runs his own private practices in Sestri Levante and Portofino. In addition, he is collaborating with diverse restigious dental offices throughout Europe that specialise in Aesthetic Dentistry. He has worked as a teacher and demonstrator at the University of Genoa and as a lecturer at the universities of Siena and Madrid. At the moment, he is lecturer at the International University of Catalonia, Barcelona, and visiting professor at the Universitè de la Mediterranee, Marseille.

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## Dr Daniele Rondoni

Dr Daniele Rondoni obtained his degree as a Dental Technician in 1979 at “P. Gaslini” Professional Institute in Genoa. Upon request, he helped establishing the first Savona-based School for Dental Technicians in 1981 and has worked in the field of professional training as a teacher and counsellor ever since. In 1982, he opened his own dental laboratory (Daniele Rondoni Dental Lab) in Savona. His career features numerous international professional experiences in Italy, Switzerland, Germany and Japan. Particularly devoted to the study of morphology and dental aesthetics, he is actively involved in the development of aesthetic restorative materials.

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