Endodontic treatment, retreatment and permanent cementation of full ceramic CAD/CAM crown in one visit

Clinical case

By MUDc. Marek Šupler, MPH

Introduction

One-visit dentistry is becoming more and more popular among patients nowadays. The reasons behind are various – lack of time due to work, unwillingness to come several times, parking issues, and many others. A rising demand for treatment that includes as few steps as possible is becoming a strong trend among patients. In some cases, all that needs to be done is acquire more knowledge on endodontic treatments, a suitable rinse protocol and usage of FRC pins. As far as the prosthetic work is concerned, modern chairside CAD/CAM systems allow to achieve a very efficient and rapid post-endodontic treatment completion and reinforcement of the tooth.

This study reports how one visit treatment can cover endodontic, endodontic retreatment, through usage of FRC pin, and permanent cementation of full ceramic crown, using MyCrown.

Patient first contact

52 years old woman came to our dental clinic with broken tooth no. 14 and asked for emergency treatment as the tooth is in the smile area and the patient stated she felt deficient and uncomfortable when working and speaking with people. (Fig. 1, Fig. 2) After taking an introral X-ray and status analysis, we suggested RCRT (root canal endodontic retreatment), followed by treatment with FRC (fiberglass-reinforced composite) post and reconstruction with ceramic crown, made by CAD/CAM system MyCrown.

Endodontic treatment

During the treatment with Zeiss Openi Pico microscope, it was found, that the palatal root canal was not treated at all. Subsequently, the vestibular root canal retreatment and palatal root canal treatment were performed using a standard rinse protocol using 5% NaOCl 2% CHX and EDTA. To fill the root canals M-Two system ISO 25/06% - gutta-percha and Base-Fill system were used. (Fig. 3)

Immediately after the endodontic treatment, the palatal part of the gingiva was removed by electrotome. The FRC ENA post was placed in the palatal root canal. After removing a portion of gutta-percha from the filled root canal, 6mm deep, the dentin was etched with orthophosphoric acid for 90 seconds and then rinsed with water from syringe for 30 seconds. The ENA bond was mixed with the polymerization activator in a 1:1 ratio and applied to the dentin with microbrush and also to the pre-islanised pin. Subsequently, ENA CEM - dual curing resin cement was applied to the duct and FRC post was introduced. Enlightenment with cutting light 30 seconds. The crown part of the tooth was rebuilt by the same ENA CEM - dual curing cement. Thus, the tooth was ready for shoul der preparation before the digital impression. (Fig. 4)

Cingiva management

After shoulder preparation and preservation of all parameters for the next restoration, the tooth was prepared for digital impression. Firstly, it is most important to make the edge of the preparation as clear as possible. This is the most important thing in defining the future restoration. This has resulted in proper gingival management. In this case, a two-cord technique was used. (Fig. 5) A thinner fibre was first put into sulcus with haemostasis solution. Subsequently, a fibre with thickness 3, impregnated with aluminum chloride, was put for faster and better haemostasis and retraction. After 5 minutes, the thicker fibre is drawn, the thinner one is left and the edge of the preparation is clearly visible.

Treatment with MyCrown

The scanning area must be dry before every digital impression. For better access to the oral cavity we use OptraCure. By using DryTips, the saliva of gl. parotida is stopped. Lingual fixation fixes the tongue while removing saliva with suction from the sublingual gland. (Fig. 6)

After drying the area of interest and applying sufficient amount of HD PONA spray, scanning can begin. First, the area of restoration is scanned, then the opposite jaw, and finally a buccal scan to register the occlusion. After completing the
Aesthetic rehabilitation and tissue preservation in the anterior region

By Dr Jan-Frederik Güth & Hans-Jürgen Stecher, Germany

While there are often several adequate prosthetic treatment options to choose from for one single case, there are some cases where none of the proven solutions seems to be perfectly suitable. The prosthodontist and his team have to balance the pros and cons for each available option – they have to decide which treatment is best suited to fulfill the needs of the specific patient. This fact significantly limited the prosthetic options and had a negative effect on the prognosis of this tooth. The developmental stage of the cervical vertebrae assessed by the orthodontist using lateral cephalometric radiographs revealed that only minimal transversal and horizontal growth was still to be expected for this patient. Due to this fact and the unfavourable prosthetic value of the abutment teeth, the prosthodontic team – in consultation with the patient – decided to place an all-ceramic adhesive bridge with two wings bonded to teeth 12 and 22. The aim of this treatment was to postpone the placement of implants as long as possible in order to ensure that the patient was fully grown when this intervention was carried out. By use of a fixed restoration, the team strived for the best possible support and preservation of the surrounding soft and hard tissues.

First steps
After removal of the fixed orthodontic appliances, the direct restorations of the maxillary lateral incisors were replaced by new composite restorations. Tooth preparation had already been carried out on these teeth to place the former metal-ceramic bridge. Hence, it was not necessary to remove large amounts of additional tooth structure; however, the existing palatal preparations required refinement. Subsequently, gingiva management was carried out with retraction pastes. An impression was taken with the µTrue Definition Scanner and uploaded to the 3M Connection Center. The patient received a removable interim prosthesis.

Laboratory procedure
In the dental laboratory, the digital impression file was downloaded, a physical model ordered and the data set imported into the Ziko CAD-Software for the design of the adhesive bridge framework.

The bridge was designed in full contour. The recommended parameters (minimum wall thickness, connector strength etc.) for the selected material – µM Lava Plus High-Translucency Zirconia – were entered into the software. Then, the bridge was automatically reduced to the framework (Fig. 6). This procedure is beneficial in that it provides for a uniform strength and optimal support of the veneering porcelain. The framework was rolled, thinned out at the margins using a fine diamond rubber polisher, individualized with dyeing liquids, and sintered. The precise fit of the wings to the palatal tooth surfaces was confirmed on the model before the porcelain layering was performed (Fig. 7). Figure 8 shows the situation at the buccal bake try-in. Finally, the adhesive bridge was finished and glazed. On the model, a highly accurate fit was obtained (Fig. 9), and the restoration showed a natural appearance (Fig. 10). This is in part due to the high translucency of the framework material (Fig. 11).

Conclusion
This clinical example demonstrates that, if we have sufficient knowledge of latest dental trends and suitable equipment, we can help the patient in one session, even in more complicated cases that would otherwise require multiple appointments.

MyCrown allowed to create a perfectly fitting restoration within one visit. The initial software proposal of the crown design was approved allowing to place the restoration into the patient mouth within minutes of its completion.

We should always consider every patient different and should be treated with a unique approach, based on the indication. MyCrown illustrated the benefit of being able to offer restorative treatment in a single visit.

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