models with the software, the edge of preparation is drawn (Fig. 7) and after defining the insertion axis, the crown is designed. MyCrown Design software calculates the first proposal based on the surrounding teeth and gives a patient-specific and aesthetic restoration proposal. A quick adjustment was required due to a small improvement of contact points with neighbouring teeth. (Fig. 8)

After crown modelling, contact points as well as occlusal contact points satisfaction, we went to the next step - Manufacture (Milling process). Once the milling was over, we polished the tooth and sat it on the preparation. After checking the points of contact and occlusion, the crown could be cemented. Cerrnenta was done by VarioLink by Tucker due to its great cementation shade/opacity control and adhesive attrib-
ute.

Aesthetic rehabilitation and tissue preservation in the anterior region

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

While there are often several ad-
equate 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 was the case with a 16-year-old female patient who presented at the Department of Prosthodontics of the Ludwig Maximilians University of Munich, Germany in 2015. An ort-
odontic treatment had just been completed and a further prosthetic rehabilitation was required.

Background

At the age of 10, the patient had suffered an anterior tooth trauma with avulsion and replantation of the maxillary central incisors (teeth 11 and 21, FDI notation). Despite all efforts, it had not been possible to preserve tooth 22. The former den-
tist had replaced it with a four-unit metal-ceramic adhesive bridge (Mar-
yland bridge) (Figs 1 & 2).

Unfortunately, the distal prognosis for tooth 11 was confirmed in the course of treatment it had to be ex-
tacted during orthodontic therapy. In order to replace both central inci-
sors for the duration of this therapy, a provisional bridge with artificial gingiva was manufactured and at-
tached to the fixed orthodontic app-
licants (Fig. 3).

Prosthetic treatment plant

At the patient’s first visit in the pri-
vate dental office of the LMU Munich, the lateral incisors had large composite restorations not only on the vestibular surfaces, but also due to the previous rehabilitation with an adhesive bridge – also on the palatal surfaces (Fig. 4).

Tooth 22 had received an endodon-
tic treatment. 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 as-
sessed by the orthodontist using lateral cephalometric radiographs revealed that only minimal transverse and horizontal growth was still to be expected for this patient. Due to this fact and the unfavourable pros-
thetic value of the abutment teeth, the prosthodontic team – in consul-
tation with the patient – decided to place an all-ceramic adhesive bridge with two wings bonded to teeth 11 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 resto-
ration, the team strived for the best possible support and preservation of the surrounding soft and hard tis-

First steps

After removal of the fixed orthodontic appli-
cances, the direct restorations of the maxillary lateral incisors were replaced by new composite restora-
tions. 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 exist-
ing palatal preparations required refinement. Subsequently, gingiva management was carried out with retraction paste. An impression was taken with the 3M True Defination Scanner and uploaded to the 3M Connection Center. The patient re-
cieved a removable interim prosthesis (Fig. 5).

Laboratory procedure

In the dental laboratory, the digital impression file was downloaded, a physical model ordered and the data-
set imported into the 3M CAD-Soft-
ware for the design of the adhesive bridge framework. The bridge was designed in full con-
tour. The recommended parameters (minimum wall thickness, connector strength etc.) for the selected materi-
als – 3M Lava Plus High-Translucancy Zirconia – were entered into the soft-
ware. Then, the bridge was automati-
cally reduced to the framework (Fig. 6).

This procedure is beneficial in that it provides for a uniform strength and optimal support of the veneer-
ing porcelain. The framework was rolled, thinned out at the margins using a fine diamond rubber pol-
isher, individualized with dyeing liquids, and sintered. The precise fit of the wings to the palatal tooth sur-
faces was confirmed on the model before the porcelain layering was performed (Fig. 7). Figure 8 shows the situation at the biscuit bake try-in. Finally, the adhesive bridge was finished and glued. 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 materials (Fig. 11).
Clinical procedure

With the use of a GC Fit Checker Advanced Blue (GC Europe), the precise fit observed on the model was confirmed intraorally (Fig. 12).

As the patient was also satisfied with the aesthetic result, the adhesive bridge could be placed immediately. For this purpose, the working field was isolated with rubber dam and a 37% phosphoric acid etching gel applied to the palatal enamel surfaces and to the dentine surfaces for 15 seconds before being rinsed off.

The inner surfaces of the wings were conditioned to increase the surface roughness. After thorough cleaning of the surfaces, an adhesive (3M Scotchbond Universal Adhesive) was applied, rubbed in, air-dried and light-cured according to the manufacturer’s instructions. Then, 3M RelyX Ultimate Adhesive Resin Cement was applied and the bridge placed. The excess cement was removed immediately with a sponge pellet.

To prevent a reaction of the uncured cement with oxygen and lay the foundation for a good marginal integrity, the exposed margins were covered with glycerine gel.

Fig. 10: Final restoration on the model: A natural colour gradient is obtained.

Fig. 11: Light transmission through the translucent framework material.

Fig. 12: Use of fit checker to verify the precise fit of the restoration.

Fig. 13: Interfaces between tooth and restoration covered with glycerine gel.

Fig. 14: Margins immediately after curing of the cement.

Fig. 15: Aesthetically satisfying situation after eight weeks. Further recovery of the gingival tissues needs more time.

Fig. 16: A natural look is obtained.

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With regard to the restoration that was produced, the invasive preparation was surely a matter of debate. However, the existing preparation for the metal-ceramic bridge and the large composite restorations limited the amount of sound tooth structure that needed to be sacrificed at this point of the treatment to a minimum, so that the plan became acceptable. In general, the maximum preservation of tooth structure should always be given highest priority when a dental restoration is planned. Important criteria guiding the amount of hard tissue removal are the available intermaxillary space and the minimum wall thickness of the selected material.

Due to the material selection in the present case, it is not necessary to remove the restoration as long as it serves its purpose. Thus, the planned long-term temporary might even become a definitive restoration over time. This, of course, is only possible with continuous monitoring and good compliance of the patient.