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 in a few cases to achieve a small improvement of contact points with neighbouring teeth (Fig. 8).

After crown modelling, contact points and 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. Cementation was done by VarioLink by 3M Espe due to its great cementation shade/opacity control and adhesive attributes.

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 fulfil the needs of the specific patient. 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 J-M true Definition Scanner and uploaded to the 3M Connection Center. The patient received a removable interim prosthesis (Fig. 3).

Prosthetic treatment plant

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

Tooth 22 had received an endodontic 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 vertebra assessed by the orthodontist using lateral cephalometric radiographs revealed that only minimal transversal and horizontal growth was still to be expected for this tooth. 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.

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Laboratory procedure

In the dental laboratory, the digital impression file was downloaded, a physical model ordered and the data set imported into the Zfx 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 – J-M Lady Plas 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 biscuit 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).
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 of both lateral incisors for 30 seconds 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. After eight weeks, further recovery of the gingival tissues needs more time. This, of course, is only possible if this design would have offered sufficient stability to ensure the desired result.

With regard to the restoration that was produced, the invasive preparation on the maxillary lateral incisor seems questionable if this design would have been possible to place a removable partial denture or two-unit adhesive bridges with one wing each. The former, however, is regarded as functionally less effective and not capable of supporting the preservation of soft and hard tissues. The two-unit adhesive bridges would have required stabilisation with a retainer. The main reason to opt against this alternative was the compromised value of the abutment tooth 22. As the root surfaces of the maxillary lateral incisors are small, it also seems questionable if this design would have offered sufficient stability to ensure the desired result.

Discussion
As an alternative to the selected treatment option, it would have been possible to place a removable partial denture or two two-unit adhesive bridges with one wing each. The former, however, is regarded as functionally less effective and not capable of supporting the preservation of soft and hard tissues. The two-unit adhesive bridges would have required stabilisation with a retainer. The main reason to opt against this alternative was the compromised value of the abutment tooth 22. As the root surfaces of the maxillary lateral incisors are small, it also seems questionable if this design would have offered sufficient stability to ensure the desired result.

The aesthetic appearance was already satisfactory, although the harmony was impaired by black triangles between the teeth. Due to the favourable characteristics of the ceramic, however, the soft tissue recovered quickly and closed the gaps.

Figures 15 and 16 show the results 8 weeks after the restorative procedure.

Result
The aesthetic appearance was already satisfactory, although the harmony was impaired by black triangles between the teeth. Due to the favourable characteristics of the ceramic, however, the soft tissue recovered quickly and closed the gaps.

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