

Minimally invasive anterior restorations with non-prep veneers

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Fig. 1

Fig. 1_ The patient disliked the gaps in her dentition and wished for the appearance of her teeth to be improved.



Fig. 2

_How many people would like their teeth to look more beautiful? And how many of them avoid dental treatment merely because they fear that they have to sacrifice healthy tooth structure to achieve an aesthetic improvement?

These questions cannot be answered, of course. However, dentists who have found it difficult to convince their patients of the advantages of corrective dental treatment because they are scared of having their teeth cut can now offer a conservative alternative in the form of minimally invasive restorations.

Misaligned teeth and gaps between teeth are unpleasant. Nobody likes to see large gaps between their teeth, particularly not in the anterior region. These were exactly the concerns of this 17-year-old female

patient, who presented to our practice with a wish to improve the aesthetics of her anterior teeth (Fig. 1). At the same time, she insisted on preserving the healthy tooth structure of her anterior teeth, and required relatively inexpensive treatment. Mandibular teeth #35 and 44 were congenitally absent. In addition, the patient lost tooth #36 due to endodontic complications.

First, the patient underwent long-term orthodontic treatment to close the existing gaps. The missing teeth #35 and 36 were replaced with implants, onto which temporary restorations were placed. In order to increase their stability, brackets were bonded to these restorations and to the entire natural dentition.

_Precise planning, accurate outcome

The patient's aesthetic appearance was also impaired by an excessive display of gum tissue (gummy smile). When she smiled, the asymmetrical contours of her gingival tissues became visible. The high dynamics and slanted contour of her lips could not be influenced therapeutically (Fig. 2). Moreover, the teeth appeared barrel-shaped.

Correcting such a situation is unforgiving of mistakes. The treatment has to be planned and performed with absolute accuracy. For this purpose, gum contouring was carried out upon completion of the

Fig. 3_ The gingival contour was corrected in the area between teeth #11 and 21 with a soft-tissue laser.



Fig. 3



Fig. 4

Fig. 4_ The mirror image shows the healed tissue one week after the treatment.



Fig. 5

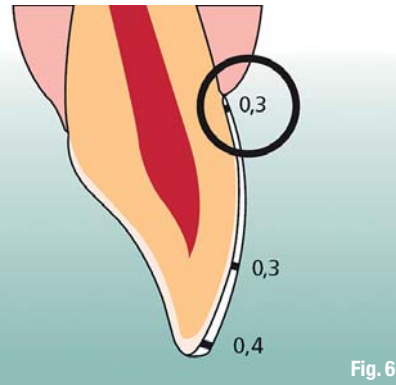


Fig. 6

orthodontic treatment and successful stabilisation of the dentition. Excess gum was trimmed away with a soft-tissue laser and the gingival contours of the two central incisors were harmonised with each other (Fig. 3). The advantage of laser contouring is that the laser naturally seals the wounds and treatment can be continued soon after contouring. The mirror image shows the situation after one week with a palatal view of the anterior teeth (Fig. 4).

Thin and yet stable

At the next stage, the dental technician in charge determined the final tooth shade with the help of a shade guide and shade samples, taking into account the initial tooth shade, which plays a major role particularly in very thin translucent restorations. An impression was taken to create a model with detachable segments. A wax-up was designed on the model to plan and determine the position of the incisal edges. In the process, particular care was taken to extend the incisal edges only minimally. Otherwise, the completed restoration *in situ* would have given an optical impression of being too long.

Please note that the dental technician should apply no more than two thin coatings of die spacer to the dies. The spacer should be applied only up to 1 mm from the preparation margin in order to avoid hollow restoration margins in the oral cavity.

Thin veneers, as presented in this case, are fabricated by creating a fully anatomical wax-up, which is pressed and then characterised with stains. IPS e.max Press (Ivoclar Vivadent) is ideally suited for this purpose. This material is composed of lithium disilicate glass-ceramic and is 2.5 to 3 times stronger than other glass-ceramic materials. Having a flexural strength of almost 400 MPa, IPS e.max Press offers exceptional stability (Fig. 5). These characteristics convey sufficient strength to veneers, inlays, crowns and similar restorations to withstand comparatively high loads. Furthermore, restorations made of IPS e.max Press look impressively beautiful. The product range includes special press ingots, which offer an increased

level of opacity for cases in which the underlying tooth structure is discoloured. These ingots effectively mask dark areas and provide a natural-looking aesthetic result, even if the teeth are discoloured.

Precisely to prescription

In the case presented here, teeth #13 to 23 were restored with non-prep veneers. The highly translucent IPS e.max Press HT ingots are particularly suited for this type of minimally invasive thin restoration. First, the dental technician creates an anatomical wax-up of the veneer using organic wax that burns out without leaving residue. In this respect, the final occlusal relief must be taken into consideration as early as during the wax-up. The subsequent application of stain and glaze materials results in a slight increase in the vertical dimensions of the restorations.

The technician should strictly adhere to the minimum thicknesses stipulated for the relevant lithium disilicate glass-ceramic. According to the manufacturer's directions, the minimum thickness of IPS e.max Press is 0.3 mm in the cervical and labial area, and 0.4 mm at the incisal edge (Fig. 6).

The wax margins are tapered towards the end. The transitions between restoration and tooth structure should be contoured particularly carefully. In this way, the need for later corrections can be pre-empted. It is well known that inexperienced technicians often find it difficult to create such a thin wax-up and thus tend to create thicker wax-ups. However, it is unnecessary to over-contour the margins as a precaution, as the technician may then have to rework the restorations after they have been pressed and divested. This takes time. Thus, it is best to contour as suggested by the manufacturer right from the start.

Everything under control

The veneers are pressed in a Programat EP 5000 ceramic press furnace at 920 °C. Upon completion of the press cycle, they are carefully divested—adjustments are kept to a minimum. The sprues are separated with

Fig. 5 Veneers are best contoured in a fully anatomical shape and pressed.

Fig. 6 Thin veneers should have a thickness of at least 0.3 mm in the cervical area and 0.4 mm in the incisal.



Fig. 7_ The pressed veneers are individualised with IPS e.max Ceram Shades.
Fig. 8_ The smile of the patient at the try-in demonstrated her satisfaction with the result.

thin diamond disks, whilst the objects are kept moist and cool. The attachment points are smoothed out using light pressure and low speed. Next, the restorations are tried in on the dies of the model, and the contact points, occlusion and articulation are checked. If necessary, the surface texture may be adjusted.

After these steps have been completed, the veneers are carefully blasted using aluminium oxide at minimum pressure and cleaned with steam before they are matched to the tooth shade with IPS e.max Ceram Glaze and Stains and IPS e.max Ceram Shades, individualised and glazed (Fig. 7). They are best tried in with Variolink Veneer Try-In pastes. The translucency and shade of these glycerine pastes are identical to those of the polymerised Variolink Veneer luting composite and therefore the composite shade, which provides the least perceptible final result, can already be determined and tested before the veneers are cemented in place. This try-in is performed to check the aesthetics of the veneers only; the occlusion is not checked at this point. After the try-in, the water-soluble paste is removed from the veneers in an ultrasonic bath and then the veneers are thoroughly dried.

Incorporation

The patient was impressed with the veneers already at the first try-in. Her smile, as seen in Figure 8, was an expression of her happiness and the practice team was pleased. The veneers fitted at the first go. The proximal contact points did not require any adjustments. Consequently, the restorations were incorporated immediately.

As a basic principle, ceramic veneers are inserted using an adhesive technique. In preparing them, the inner surfaces were cleaned with water, dried and etched with 5% hydrofluoric acid (for example IPS Ceramic Etching Gel) for 20 seconds and then carefully rinsed and dried. Next, Monobond Plus was applied and allowed to react for 60 seconds in order to achieve the necessary silanisation of the lithium-disilicate veneers.

The patient's enamel was etched with 37 % phosphoric acid for 30 seconds, rinsed with water and then

lightly dried. Next, the oral cavity was isolated with a rubber dam.

The veneers were cemented in place using light-curing Variolink Veneer. This translucent luting composite is suited for anterior restorations with a thickness of less than 2 mm. The restorations have to be sufficiently translucent for the luting composite to be effectively light-cured through them. Variolink Veneer is available in a range of value shades, which cause the restoration *in situ* to appear brighter or darker. This luting composite ensures a strong bond and high resistance to wear.

We selected Variolink Veneer in the shade Medium Value 0 for the present case. This shade is neutral and does not have any effect on the brightness of the restoration. An appropriate amount of luting composite was applied to the bonding surfaces of the restoration and the restoration was placed *in situ* using light pressure. After the surplus material had been removed, each veneer was light-cured for five seconds using a bluephase 20i curing light.

Offering a reliable, high light intensity of 2,000 to 2,200 mW/cm², the Turbo programme eliminates the risk of insufficient polymerisation. The built-in fan ensures a consistently high light intensity. Excess composite material was removed from the margins of the restorations and then the cement joint was polished with a soft silicone polisher.

Without a doubt, the thinner and more delicate the veneers are, the more difficult it is for the clinician to place them. As delicate and fragile the non-prep veneers presented in this report may appear when they are first delivered, they are highly stable and durable once they have been inserted. The adhesive bond with the enamel ensures a long-lasting high stability and optimal adhesive bond of the restoration *in situ*.

Looking beautiful

In terms of aesthetics, the treatment of this patient is a complete success. The margins of the restorations are tapered very thinly and are not discernible from the



Fig. 9



Fig. 10

tooth structure even when examined from different angles (Fig. 9). The lower dental arch has been reshaped as a result of the orthodontic treatment and no longer contains gaps. The upper marginal gingival contour has been corrected to follow a 'high-low-high' pattern, which has a decisive effect on the pink-white aesthetics. According to this pattern, the gingival margins are located higher on the upper central incisors than on the adjacent lateral ones, while the margins on the lateral incisors are located lower than on the canines. If details such as this pattern are not observed, the aesthetic result looks only half as good as it should even if an otherwise excellent restoration is placed.

The restorations reflect the typical characteristics of the natural teeth. Figure 10 shows the beautiful design of the surface texture of the veneers, including their shiny marginal contours. The light is optimally transmitted through the veneers and scattered. The resulting reflections and optical effects impart a natural-looking vibrant appearance to the ceramic veneers. The translucent effect of the lithium disilicate glass-ceramic creates a pleasant chameleon effect; the contact points correlate to one another and the incisal triangles are shaped in a slightly open curve. The gingiva does not show any signs of irritation and it features a healthy stippled surface texture.

These veneers offer a decisive advantage when placing restorations with margins in the visible area. In younger patients in particular, the gum line may recede with increasing age. However, receding gum lines do not present a disadvantage in terms of quality or aesthetics with these restorations, as their margins are invisible.

Conclusion

In the present case, the patient's expectations in terms of shape, size and shade were optimally met. Her appearance was favourably altered without sacrificing any dental hard tissue. From the current vantage point, non-prep veneers are thus indicated in cases in which misaligned teeth or differences in tooth length negatively affect the appearance of anterior teeth, and preparation is not a necessity.

Compared with conventional veneers or crowns, non-prep veneers represent not only a highly aesthetic, but also a minimally invasive treatment option.

Non-prep veneers expand the range of dental treatment options and provide a viable route to meet the patient's desire for aesthetic improvement, which previously could not be carried out because the resulting loss of tooth structure would have been unacceptable to both the patient and clinician. Hence, this treatment option, which has been used in North America successfully for quite some time and is becoming increasingly popular, is also of interest to young and young-at-heart patients in Europe.

Although the dentist does not need to grind the teeth to place non-prep veneers, the desired result has to be accurately planned and the procedure perfectly prepared. Insertion without guide grooves in particular requires a maximum measure of concentration and sure instinct. Selecting an appropriate material is equally essential. With its exceptional strength, the IPS e.max Press lithium disilicate glass-ceramic is a material suited for this purpose. Once the delicate and fragile-looking ceramic veneers have been adhesively placed *in situ*, they are durable and stable.

Fig. 9 A beautiful result: the margin of the restoration tapers to invisible and there are no gaps in the dental arch.

Fig. 10 The surface texture scatters the light. The reflections impart a natural vibrancy.

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dentistry



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