Restoring anterior teeth with thin veneers

New materials like IPS e.max Press Impulse provide improved aesthetics

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With the advent of new materials such as lithium disilicate, very thin veneers can now be fabricated that require only minimal removal of natural tooth structure. The IPS e.max all-ceramic system from Ivoclar Vivadent covers all the current all-ceramic indications and is suitable for use with the CAD/CAM and press techniques.

The wide assortment of IPS e.max Press products comprises ingots in four levels of translucency (HT, LT, MO and HO) and Impulse ingots in three different values (Value 1, 2, 5) and two opal shades (Opal 1 and 2). These materials are particularly useful for fabricating single-tooth restorations when dental enamel has been damaged or stained. An example for this is described in detail in the following case report.

Clinical case
A 39-year-old patient consulted our clinic for improving the appearance of her anterior teeth (Fig. 1). Apart from slight periodontal problems, we diagnosed proximal caries in the first incisors, as well as Class III dental and skeletal malocclusion with an open bite (Fig. 2). A radiographic examination confirmed the fundamental periodontal problem and showed periapical infections surrounding teeth 51 and 52.

Based on these findings, a two-stage treatment plan was suggested, starting with the elimination of dental caries and the infection. Also, periodontal curettage and planing of root surfaces were performed to control the underlying disease. The existing malocclusion was corrected with orthodontic treatment.

The second stage focused on aesthetics and started with a clinical, radiological and photographic analysis (Figs. 3 & 4). An impression was taken and the maxillomandibular relationship was recorded by means of an arbitrary facebow. The gum line was adjusted with the help of connective-tissue transplants. The mandibular tooth arch was bleached. Finally, the ultra-thin veneers (<0.5 mm) made of IPS e.max Press Impulse Opal 2 were placed.

After the teeth had been thoroughly analysed, a wax-up was fabricated, which was subsequently used to create a mock-up. A 2 mm thick perforated tray (Fig. 5) and two silicone matrices were produced. The first silicone matrix was used for checking the vertical dimension of occlusion during preparation (Fig. 6), while the second one was used to fabricate the chairside temporary.

Preparation
For proper reduction of the vestibular tooth surface, a depth marker was used. This bur cut orientation grooves with a depth of 0.5 mm. The incisal edge was reduced with a diamond bur (0.6 mm). In addition, the instrument was used to remove the ridges between the grooves and completely level out the surface. The proximal and gingival areas were prepared with the same diamond.

A retraction cord was placed along the gingival margin to protect the gingiva during the preparation procedure. The marginal and proximal areas were prepared and then polished. The entire preparation surface was completely smoothed with a polishing disc and a medium-grit polishing paste. All grooves and edges were eliminated. The silicone matrix was inserted to check the correct dimensions of the prepared teeth (Fig. 7). Then, the retraction cords were removed.

Impression
The heavy/light dual-phase impression was taken with a customised tray, which was coated with an adhesive to increase the adhesion of the impression material to the tray. Using the double-cord retraction technique, the first retraction cord (size 000) was individually packed into the sulcus of each prepared tooth. A second continuous retraction cord (size 00) was then placed on top. With this method, the gingiva is completely displaced from the prepared dental hard tissue, blood and saliva, which could affect the precision of the impression adversely. The heavy/light dual-phase impression technique makes use of impression materials of different viscosities. Accordingly, a heavy-body material was loaded into the tray, while a light-body material was syringed around the prepared teeth (Fig. 8).

The precision of the impression was checked and temporary restorations were produced chairside. For this purpose, a two-component composite resin was mixed and syringed into the previously fabricated silicone matrix. Once the composite resin had an ideal consistency, the matrix was placed in the patient’s mouth. Then, the provisional material was cured and the matrix was removed. Excess composite was trimmed away with rotary instruments. Subsequently, the temporary restorations were characterised with staining and glazing materials.

Laboratory work
The dental laboratory technician made a cast from the dissected impression using Class IV plaster. After the models had hardened, the preparation margins were defined (Fig. 9). The veneers were waxed up and then removed from the die and invested. Subsequently, they were reproduced with IPS e.max using the press technique. The veneers were divested (Fig. 10), finished and individually characterised (Fig. 11a).

Try-in and cementation
In the second clinical phase, the veneers were tried in and cemented in place. At first, the temporary restorations were removed and the prepared teeth were cleaned. Each veneer was tried in individually to ensure correct fit. Next, the proximal fit was checked by positioning one veneer correctly and then...
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The adhesive cementation procedure was divided into three stages: pretreatment of the veneers, conditioning of the prepared teeth, and placement and finishing of the veneers. A rubber dam was placed with a retentive clasp for each preparation. The veneers were tried in with the Variolink Try-In pastes. Subsequently, they were rinsed with a water jet and dried with oil-free air. For optimal cleaning results, Ivoclean (Ivoclar Vivadent) was applied shortly before the veneers were placed. The adhesive was applied thickly and oil-free, uncontaminated air. ExciTE F adhesive (Ivoclar Vivadent) was applied shortly before the veneers were placed. The adhesive was applied thickly and oil-free, uncontaminated air. The ceramic surface, which had to be kept free from contamination for the rest of the procedure, was treated with 5% hydrofluoric acid (IPS Ceramic Etching Gel, Ivoclar Vivadent) for 20 seconds. The restorations were cleaned with a water jet and immersed in an ultrasonic bath for 5 minutes. Next, the veneers were dried and conditioned with the silane coupling agent Monobond Plus (Ivoclar Vivadent) for 60 seconds. The excess was dispersed with a strong stream of air. The prepared teeth were then cleaned with brushes and fluoride-free prophylaxis paste. The enamel was etched with the 57% orthophosphoric acid Total Etch (Ivoclar Vivadent) for 30 seconds and then cleansed with a water jet and oil-free, uncontaminated air.

ExciTE F adhesive (Ivoclar Vivadent) was applied shortly before the veneers were placed. The adhesive was applied thickly on enamel and dentine, and carefully scrubbed in for at least 10 seconds. The excess was dispersed to a thin layer with a weak stream of air. Pooling had to be avoided in the process.

A shiny surface showed that the tooth was completely sealed. The adhesive was cured for 30 seconds with a light intensity of above 500 mW/cm². Variolink Veneer was then directly applied to the preparation. In the final luting phase, the veneers were placed on the prepared teeth with the application of consistent pressure and then polymerized for 2 seconds (Fig. 12). At this stage, the luting material was not yet completely cured. As a result, it was easy to remove the excess with a probe. The margins were isolated with Liquid Strip glycerine gel (Ivoclar Vivadent), which is supposed to prevent the formation of an oxygen-inhibited layer during polymerization. It also enables the luting material to cure properly. Subsequently, the restorations were cured for 90 seconds from all sides.

The excess was removed with the help of a scalpel. Fine-grit burs and silicone polishers were used at the palatal margin. Finally, the rubber dam was removed and the occlusion was inspected (Fig. 11). After the treatment was finished, the patient received instructions on how to maintain her restorations. She was scheduled for a recall examination one month after treatment (Figs. 14a & b).

Conclusion

The topic of aesthetics continues to gain importance in dentistry. The development of innovative materials such as IPS e.max Press Impulse allows clinicians to use new techniques for non-invasive preparation of the teeth. Furthermore, they offer aesthetic benefits and eliminate the previous quality difference between the press-on and the layering techniques.

Specialist knowledge of the adhesive cementation of lithium disilicate restorations gives dentists the professional edge needed to address the challenges associated with this type of treatment. The treatment protocol is widely established today. However, it is of utmost importance for dentists and dental technicians to perform their work with great precision. In order to jointly have a positive impact on the results, both parties must be familiar with the entire procedure. Teamwork and a meticulous approach during the individual treatment phases are required to achieve better aesthetic outcomes.

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A list of references is available from the publisher.