On target with more brightness

Benjamin Votteler[1]

The loss of tooth structure may have many causes, such as caries, abrasion or even dental trauma. Restoring the resulting dental defect by means of an adhesively luted ceramic restoration normally offers the best possible solution. Various methods are used to achieve this goal, such as layering over refractory dies and CAD/CAM applications. The press technique (hot pressing) presents an additional option and this method is discussed in detail in this report.

Introduction

The press technique provides an ideal solution for creating veneers: high quality (shade, accuracy) can be achieved using an efficient working method. Whether or not a restoration seamlessly blends into the natural oral environment depends not only on the layering scheme applied by the dental technician. The press ceramic used to create the restoration also has an essential effect on the final outcome. The new IPS e.max® Press Impulse kit features new press ingots, which enable dental technicians to attain impressive results.

Case Report

A 19-year-old female patient presented with a horizontal fracture in the incisal region with enamel splitting, which extended far into the palatal zone. This injury happened when the patient was 14 years old and fell onto the edge of a chair whilst playing.

However, there was good fortune in bad fortune: the two damaged anterior teeth remained vital. The teeth had been restored with temporary composite restorations to bridge the time until the patient reached the end of her growth phase. Now, it was time to provide her with a permanent restoration (Fig 1). As the shade of the anterior teeth was slightly brighter than the A1 shade in the dentin, or the dentin body, selecting appropriate press ingots was no easy task.

In search of the correct material

Normally, I select an ingot that is one colour tone lighter than the actual tooth shade. This was not possible here. The Bleach BL ingots of the IPS e.max® Press LT (Low Translucency) range did not match the requirements of this case. In addition, the saturation of the Bleach ingot is too high to be suitable for veneers on non-discoloured tooth

Fig 1 Initial situation: horizontal fracture with enamel splitting

[1] MDT, Pfullingen/Germany
Correspondence:
Benjamin Votteler, MDT, Dentaltechnik Votteler GmbH & Co. KG, Arbach ob der Straße 10, 72793 Pfullingen, Germany
benni@votteler.eu
www.votteler.eu

Fig 2 Conservative preparation design for 360° veneers

Fig 3 The IPS e.max Press Impulse copings modelled in wax

preparations and prevents the natural colour of the remaining tooth structure to shine through the restoration. Even the excellent light optical properties of the IPS e.max Press® HT (High Translucency) press ingots were not suitable for this patient case.

As luck would have it, however, I attended an in-house continuing education course on all-ceramics held for opinion leaders at Ivoclar Vivadent just a few days before and there I received the first press ingots from the IPS e.max Press Impulse kit and was also able to see these materials in situ in the oral cavity of a patient. The Impulse ingots are available in three Value shades with different degrees of brightness and in two Opal shades with different levels of opacity.

I decided to use an individual layering technique for this patient case. The new Value ingots appeared to be the perfect material for this purpose. The translucency of these ingots is between that of the IPS e.max Press HT and the IPS e.max Press LT ingots.

In addition, they offer a natural fluorescence. The chroma gradation is divided into three degrees (V1, V2, V3).

The following information was essential to produce the restoration: the shade of Value 1 is between HT BL1 and HT BL2 and the shades of Value 2 and Value 3 are between LT A1 and HT BL1. From my viewpoint, these ingots perfectly fill the gap in the range of ingots, providing the levels of brightness that hitherto have been missing. The opalescent characteristics of the ingots are comparable to those of the IPS e.max Press HT materials.

Conservative tooth preparation was carried out on both the labial and palatal side to place 360° veneers (Fig 2). After an impression had been taken and a model created, the frameworks were designed in wax featuring a thickness of 0.4 to 0.5 mm (Fig 3) and pressed with the IPS e.max Press Impulse ingots in Value 1 (Fig 4 and 5). The press temperature of the ingots corresponds to that of the HT ingots. The reaction layer is almost entirely removed when

Fig 4 Copings after pressing of the ingots

Fig 5 The pressed veneers are approx. 0.6 mm thick.

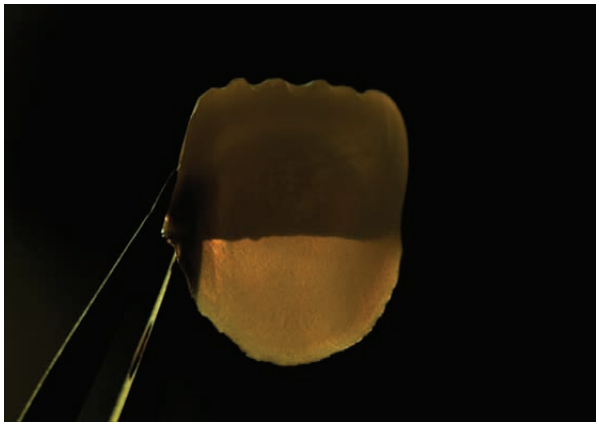

Fig 6. The frameworks show a lifelike opalescence.

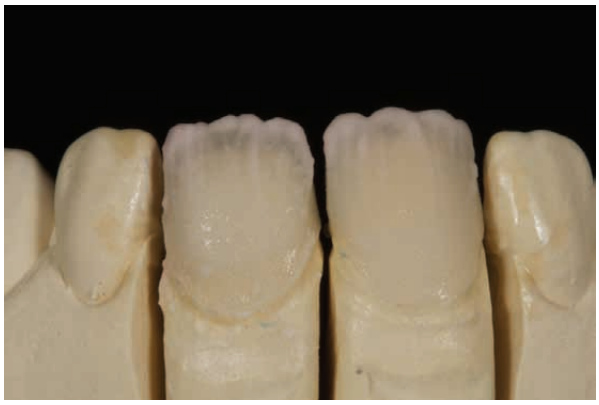

Fig 7 First, IPS e.max Ceram Dentin and Transpa Neutral were applied.

Fig 8 The youthful opalescent properties of the natural teeth can be mimicked in the proximal and incisal areas with Effect materials.

Fig 9 Reconstruction of the mamelons

Fig 10 The mamelons were built up using a mixture of Effect materials which were defined beforehand.

the restoration is divested using glass beads (50 µm) at 2 bar pressure. In my opinion, using an appropriate furnace has a major effect on the outcome – for instance, the Programat® EP 5000 ensures gentle treatment of the material during the press cycle (Fig 6).

Structured layering

After foundation firing, the cervical and proximal areas were characterized with IPS e.max® Ceram stains (Shades and Essences). The dentin body was built up. Transpa Neutral (TN) was applied in the incisal area to reduce the degree of Saturation (Fig 7 and 8). Opal Effect 1 (OE 1) was applied to the proximal and incisal areas to mimic the youthful opalescent effects (Fig 9 and 10).

The structure of the mamelons caught my eye already during the shade selection process. A mixture of IPS e.max Ceram Mamelon materials enabled a lifelike reproduction of the mamelon. A soft transition between the internal

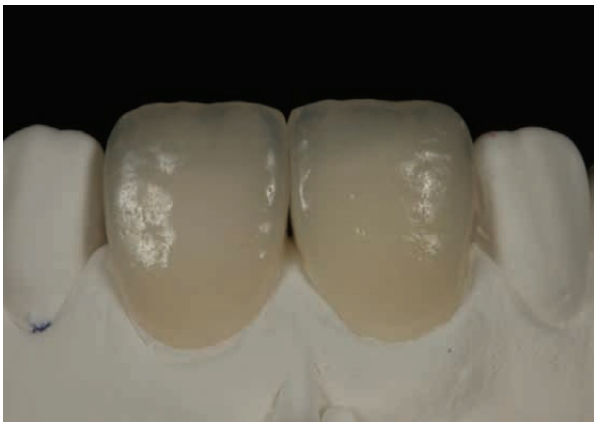

Fig 11 Layered veneers on the model

Fig 12 Try-in in the patient's mouth

Fig 13 Gold powder facilitates the final contouring and shaping of the restorations.

Fig 14 Completed veneers on the model

structures and the body was achieved with Dentin/OE3 and the brightness value was adjusted. Various Enamel and Opal materials were used to complete the tooth shape on the labial side.

To finish off the layering procedure for the main firing cycle, the restoration was framed with a layer of dentin to create a halo. The veneer was slightly over-contoured to compensate for material shrinkage. As a result, correction firing was obsolete (Fig 11).

As this was the first time I used the new Value ingots for a patient case, I was keen to check the esthetic effect in the patient's mouth. The image of the try-in clearly shows that a balanced translucent effect has been achieved in the restoration: no greying and no inappropriately intense masking of the substrate can be seen (Fig 12).

High precision finishing

Finishing the form and functional aspects of the restoration is an essential part of my work. The surface was given its final structure with rotary instruments before glaze firing was conducted – gold powder is of particular use in this respect (Fig 13). After glaze firing, the proximal contacts and the occlusion were checked on the uncut model. To complete the procedure in the dental laboratory, the restoration was manually polished on a polishing unit using a fine pumice/Sidol mixture and a water soaked felt wheel (Fig 14).

Incorporating the restoration – a moment of suspense

The enamel surface of the prepared teeth were etched with 37% orthophosphoric acid for thirty seconds and then rinsed with a water/air spray for sixty seconds. The three-component bonding agent (Syntac® Classic) was applied according to the manufacturer's directions for use. At the same time, the all-ceramic restorations were etched with 9% hydrofluoric acid and after twenty seconds carefully rinsed with water.

Next, the restorations were cleaned with alcohol and subsequently silanated with Monobond Plus. Note: the

Fig 15 and 16 The restorations in situ optimally blend into the natural dentition

Fig 17 The result: harmonious contours of the lips ...

Fig 18 ... veneers with lifelike opalescent and ideal brightness effects and ...

restorations should be protected from light after application of the bonding agent (Heliobond® in this case). To prevent the conditioned surfaces from becoming contaminated, they should be etched and silanated not in the dental laboratory but immediately before they are placed in the oral cavity in the dental practice.

A purely light-curing luting composite (Variolink® Veneer), which is available in various degrees of bright ness, is well suited for the cementation of these veneers.

As an advantage, light-curing composites give users ample time to remove excess material.

After the 360° veneers were conditioned and filled with luting material, they were accurately placed on the tooth preparations and excess material was re - moved.

Dental floss was used to remove surplus material from the interdental spaces, a brush for the margins and a small foam sponge for the palatal areas. Next, the veneers were polymerized to the tooth structure from the palatal and vestibular side for five seconds each side.

Fig 19 ... ultimately a happy patient.

The operator applied Liquid Strip to the cement joints to prevent contact with oxygen (oxygen inhibition layer). If this precaution is not taken, there is a risk that the cement joints may discolour after a fairly short time.

Finally, the restorations were polymerized for sixty seconds from each side and the retraction cords were removed. Checking the sulci for remaining composite luting material is essential at this point. After the static and dynamic occlusion had been inspected, the treatment was completed (Figs 15 to 19).

Conclusion

The new IPS e. max Press Impulse Value ingots feature a translucency that lies between that of the IPS e.max Press HT and IPS e.max Press LT ingots. The fluorescent and opalescent properties of the press material optimally enhance the esthetics of the restoration. Like all the other materials from the IPS e.max Press range, these ingots offer a typical flexural strength of 400 MPa and therefore give the required peace of mind to the treatment team.

Reprinted with permission from Reflect 01/11