Aesthetic posterior restoration with IPS e.max Press

Horst Podelter
A Dr. Gerhard Müller
Germany

Today’s dental manufacturers produce a substantial range of materials and, consequently, offer virtually limitless possibilities to use individual and case-specific working techniques. All-ceramic systems enable users to create restorations that closely resemble their natural counterparts and impart impeccable aesthetic properties. In this report, Horst Podelter, MDT, describes the procedure of fabricating a posterior restoration with IPS e.max Press.

It has been claimed that the dental market is short-lived. However, this is not true for all areas. For instance, when Dr. Gerhard Vivadent introduced IPS Empress in 1989, nobody suspected that this glass ceramic, made of silicon dioxide, aluminium oxide and potassium oxide with leucite as the crystal phase, would be copied by numerous manufacturers over the years. With the trailblazer development of IPS Empress, Ivoclar Vivadent may be regarded as the progenitor of a presently available glass-ceramic material currently available on the market for the fabrication of crowns, inlays and small bridges.

Almost 20 years have passed since the introduction of IPS Empress. Yet, this material continues to be in successful use. This example shows that a dental product may have a longer lifespan than expected if it stands the test of time. A renowned manufacturer who decides to launch another press ceramic product with a successful ceramic system as IPS Empress must have absolute confidence in the new material’s ability to perform well. For this reason, the market launch of IPS e.max Press inevitably aroused curiosity.

A new press ceramic is expected to satisfy many different requirements. It has to meet the demands of modern technology and enable the fabrication of cost-efficient ceramic restorations. In addition, it has to combine high aesthetics with reliability. As health and good looks have become so strongly associated with each other that they are almost inseparable, having impeccable teeth is vital for many people. Against this background, increasing pressure is placed on dental technology to meet the exacting requirements of patients.

Material-oriented preparation

In the present case, teeth 45, 46 and 47 had to be restored with partial crowns and inlays. As it was the patient’s wish to receive aesthetic restorations, the dentist opted for treatment with all-ceramic partial crowns made of the IPS e.max Press lithium disilicate ceramic.

Having a flexural strength of 400 MPa, these press inlays offer an optimum degree of strength. They are indicated if the preparation margin is located less than 6.5 mm from the cusps and if it is severely undermined. If a minimum space requirement of 1.5 mm in the area of the cusps can be provided. A circular shoulder preparation with internal edges without an angle of 20° to 50° is necessary for this type of restoration. The width of the shoulder should be approximately measure 1 mm. Hint: A material-oriented preparation and an accurate accuracy that they provide an excellent fit without requiring extensive adjustment by grinding. The spacer is applied in two settings up to maximally 1 mm from the preparation margin. The thickness of the spacer should be at least 1 mm per coating and should be coordinated with the expansion of the investment material.

After the dies have been prepared, a wax-up is fabricated using organic wax, which burns out with no risk of leaving residue and fits into the range of materials used by this system. Pressed restorations made of IPS e.max Press can be either stained or layered with IPS e.max Ceram. As the staining technique was used in the present case, a fully anatomical and functional wax pattern was created. Care should be taken to ensure that the wax pattern is free of contamination and demonstrates the stipulated minimum thickness so that an impeccable press result can be attained (Fig. 2).

Exact contouring in the area of the preparation margins is particularly vital. The preparation margins should not be over-contoured, as this would entail time-consuming and risky fitting procedures after pressing. Hint: The subsequent application and firing of the stains and glaze materials results in a slight increase in vertical dimension. Hence, only light occlusal contacts should be created when contouring the restoration.

Investment as you like it: conventional or rapid

It is advisable to closely follow the manufacturer’s directions when preparing the restorations. Deviations from directions may result in failures (Fig. 5). The sprues are attached at the thickest part of the wax-up, using a 5 to maximally 8 mm-long wax wire. The total height of the wax wire and the wax pattern should not exceed 150 mm. The attachment points should be round and slightly tapered. A distance of at least 5 mm between the individual objects and 10 mm to the silicone ring should be observed.

It is a matter of personal preference whether a conventional or speed investment material is used. The highly translucent IPS e.max Press HT ingot is best used in conjunction with the staining technique (Fig. 4). Neither the input nor the Alum Plunger should be preheated before inserting them. Shortly before the preheating cycle of the investment ring has been completed, the cold IPS e.max Alum Plunger is coated with separator to prevent it from sticking to the press ingot (Fig. 5). Next, the cold ingot and the part of the cold IPS e.max Alum Plunger that has been coated with separator are inserted into the hot investment ring and the press programme is started. Preferably, an investment ring is broken into two at the predetermined breaking point (Fig. 6). If necessary, a plaster knife may be used to complete this step.

As a general rule, the prepared dies are always divested using polished heads only; rough divestment is carried out at 4 bar pressure and fine divestment at 2 bar. The pressed objects demonstrate an exceptionally homogeneous surface immediately after having been divested. Next, the impressions are checked for accuracy of fit in the usual proves manner using Okkia Spray to render possible premature contacts visible. Attention: Pressed IPS e.max restorations should only be minimally adjusted. Furthermore, tungsten carbide burs are unsuitable for use with glass-ceramic materials.

The sprues are cut with fine diamond discs under cooling with water spray. Proximal contacts and premature contacts on the occlusal surface are marked. A sealer is then applied to ensure that the frameworks can be sprued (Fig. 7). The investment ring is separated using a large separating disc (Fig. 7). Next, the...
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surface are best adjusted using the ceramic polishers No. 9690/9691 from KOMET Brasseler according to Ivoclar Vivadent’s recommendations on the use of polishing instruments for glass-ceramic materials. The more homogeneous the surface is before glaze firing is performed, the better the result.

The press ceramic displays its dynamic optical characteristics when fitted on a model. A pressed sample carrier impressively shows the opalescent properties and dynamic shade behaviour of the material in transmitted light (Figs. 9 & 10). In addition, the material demonstrates excellent fluorescence (Figs. 11 & 12).

Accurately characterised restorations

The inlays are characterised with shades or stains. Several staining procedures and firing cycles can be conducted until the desired shade intensity and degree of lustre is achieved. However, the staining materials should always be applied in thin layers only.

After completion of glaze firing, the restorations are polished mechanically. Felt polishers and diamond-powder polishing pastes are particularly suitable for this purpose. Upon completion, the restoration is inspected on an untreated model (Fig. 15). If necessary, the contact points are adjusted. The true-to-nature effect of the material results in excellent restorations (Fig. 14).

The teeth onto which these fine pieces of craftsmanship are placed are isolated with a rubber dam (Fig. 15) to make sure that the patient does not ingest or choke on the restorations.

Conclusion

New innovative routes can only be followed if a team pursues the same objectives in terms of quality and aesthetics. Only if the dentist and dental technician work hand in glove at all stages of the restoration process, ensuring a flawless preparation design, accurate impression-taking and appropriate final finishing, is it possible to accomplish aesthetic restorations that meet the exacting requirements of discerning patients (Fig. 16).

We are impressed by the new IPS e.max Press HT ceramic from Ivoclar Vivadent. This ceramic system has all the components required by the dental ceramicist to work efficiently. IPS e.max Press provides a fast and reliable route to creating highly aesthetic ceramic restorations that blend seamlessly into their natural surroundings.

Fig. 13: The restoration is polished with felt discs and diamond pastes and inspected on an untreated model.—Fig. 14: The true-to-nature effect of this material results in masterpieces of craftsmanship.—Fig. 15: A rubber dam is used to isolate the tooth to be restored.—Fig. 16: The reconstruction seamlessly blends into its natural surroundings.

Dr Horst Polleter has his own dental laboratory in Reichenbach in Germany.

Dr Gerhard Müller currently runs a dental practice in Nuremberg in Germany.

For More Information:
Greater New York Dental Meeting™
570 Seventh Avenue - Suite 800
New York, NY 10018 USA
Tel: +1 (212) 398-6922
Fax: +1 (212) 398-6934
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