Aesthetic posterior restoration with IPS e.max Press

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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 demonstrate impeccable aesthetic properties. In this report, Horst Polster, 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 Ivoclar Vivadent introduced IPS Empress in 1989, nobody suspected that this glass ceramic, made of silicon dioxide, aluminium oxide and zirconia oxide with leucite as the crystal phase, would become so strongly associated with each other that they are almost inseparable. Having impeccable teeth is vital for many people. Against this background, a growing 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 ingots offer an excellent degree of strength. They are indicated if the preparation margin is located less than 6.5 mm from the cusp tips or if severely undermined enamel is present and 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 rounded out at an angle of 20° to 50° is necessary for this type of restoration. The width of the shoulder should approximately measure 1 mm. Hint: Material-oriented preparation and an accurate impression for skilled reconstruction are the basic requirements for a successful all-ceramic restoration.

From the stone die to the framework

A working model with removable segments is created as usual. After finishing the model, the clearly visible preparation margins are defined (Fig. 1). Next, the margins are marked. A sealer is then applied to harden the surface and protect the stone die. Thereafter, the die is sealed with a coating of spacer, to ensure that the frameworks can be pressed with such a high degree of accuracy that they provide an excellent fit without requiring extensive adjustment by grinding. The spacer is applied in two consecutive up to maximally 1 mm from the preparation margin. The thickness of the spacer should be 9 to 11 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 without leaving residual 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 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 wax pattern should not exceed 15 to 16 mm. The attachment points should be rounded 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. 3). Neither the ingot nor the Alox Plunger should be precoated. Before inserting them, the cold IPS e.max Alum Plunger is coated with separator to prevent it from sticking to the press ingot (Fig. 4). 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. 5). If necessary, a plaster knife may be used to complete this step.

As a general rule, the press dies are always divested using polishing beads only; rough divestment is carried out at 4 bar pressure and fine divestment at 2 bar.

The pressed objects demonstrate an exceptionally homogenous surface immediately after having been divested. Next, the restorations are checked for accuracy of fit in the usual proven manner using Okkaido 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 surfaces are marked. A sealer is then applied to harden the surface and protect the stone die. Thereafter, the die is sealed with a coating of spacer, to ensure that the frameworks can be pressed with such a high degree of accuracy that they provide an excellent fit without requiring extensive adjustment by grinding. The spacer is applied in two consecutive up to maximally 1 mm from the preparation margin. The thickness of the spacer should be 9 to 11 mm per coating and should be coordinated with the expansion of the investment material.

Fig. 1 After the working model has been completed, the clearly visible margins are defined. – Fig. 2: It is essential to avoid contamination of the wax and to observe the required minimum thickness when contouring the restorations, to ensure an impeccable press result. – Fig. 3: The sprues are attached at the thickest part of the restoration. The wax wire should be 5 to maximally 8 mm long and the total height should not exceed 15 to 16 mm. – Fig. 4: The IPS e.max Press HT ingot was oriented for the press procedure. – Fig. 5: The sprues are attached at the thickest part of the restoration. The wax wire should be 5 to maximally 8 mm long and the total height should not exceed 15 to 16 mm. – Fig. 6: The IPS e.max Press HT ingot is best used in conjunction with the staining technique. – Fig. 7: Neither the ingot nor the Alox Plunger should be precoated. – Fig. 8: Before starting the press procedure, the Alox Plunger is dipped into IPS e.max Separator to prevent the plunger and ingot from sticking together during pressing. – Fig. 9: The IPS e.max Press impresses with its dynamic optical properties. – Fig. 10: The opalescent effect is particularly noticeable in transmitted light. – Fig. 11: Almost a piece of magic: the fluorescence of the material is particularly noticeable. – Fig. 12: The natural effect of this material is simply beautiful.
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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 ceramist 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.

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**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 teeth to be restored.—**Fig. 16:** The reconstruction seamlessly blends into its natural surroundings.

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