Lifelike esthetics achieved with minimally invasive methods
Direct anterior restoration placed with IPS Empress Direct

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Tooth-conserving treatment is a major priority in modern dentistry. This includes minimally invasive strategies for repairing lesions and/or conserving discoloured tooth structure in the anterior dentition.

The possibilities of restoring teeth have grown immensely over the past few decades due to the development of innovative dental composites. In the past, indirect veneers were needed to produce highly esthetic results; today, advanced dental composites are available which offer a suitable alternative in many cases. Composite resins have undergone considerable changes in recent times. The dental research community and the dental industry have reacted to the emerging demand among practitioners and patients for these materials, and as a result composite resins are now at a level where they are regarded as state-of-the-art. With modern materials such as IPS Empress Direct, anterior restorations can be efficiently layered to produce highly esthetic results which are virtually indiscernible from the natural tooth structure. Consecutively, dental practitioners can benefit from the convenient handling properties of composites, without having to make any compromises in terms of esthetics.

Physical properties
In our opinion IPS Empress Direct is the best material available of its kind for satisfying exceptionally high esthetic requirements. Due to the material’s lifelike opacity, fluorescence and opalescence, true-to-nature restorations can be fabricated using a very efficient method. Generally, the filler composition used in composites plays a more significant role in anterior than in universal materials. A composite resin has to meet special physical property requirements with regard to volume shrinkage, surface hardness, flexural strength, polishability and wear resistance. Furthermore, the optical characteristics have to be carefully balanced. IPS Empress Direct from Ivoclar Vivadent fulfills all these major requirements. The monomers contained in the composite determine its reactivity, strength, shrinkage and handling. The matrix monomer incorporates fillers which determine the wear resistance, strength, polishability, surface gloss, radioopacity and translucency of the material. A coated barium glass filler impacts the Dentin shades with high strength, while the finer barium glass filler contained in the Enamel shades ensures excellent polishability, high gloss and low susceptibility to wear.

Optical properties
The composite system comprises 32 shades and five translucency levels. The properties of fluorescence, translucency and opalescence are decisive for the esthetic appearance of the restoration. IPS Empress Direct obtains its lifelike fluorescence from special pigments. The material owes its exceptional optical characteristics to its composition.

The Denin shades of the IPS Empress Direct assortment exhibit a higher opacity and colour saturation than the Enamel materials. Therefore, the esthetic effect is enhanced from within the restoration. The translucency of the Enamel shades allows the Dentin materials to scatter light like natural tooth structure. Furthermore, the Trans Opal shade gives the restoration a true-to-nature opalescence: in reflected light, it looks bluish and in transmitted light reddish-orange, which corresponds to the appearance of natural tooth structure.

Nevertheless, ideal physical and optical properties alone are not enough to ensure an esthetic result. Skill and expertise are required on the part of the dentist who has to impressively layer and shape the restoration as well as faithfully reproduce the shade and optical characteristics of the tooth. For this purpose, a composite should be convenient to handle. IPS Empress Direct is applied according to an intuitive method.

Case study
A 28-year-old patient was referred to our practice. He was dissatisfied with the colour and position of the left lateral incisor (Fig. 1). The examination showed that tooth 22 had been endodontically treated, which explained its substantial discolouration. The shade of the existing composite restoration considerably deviated from that of the natural tooth structure. In addition, the position of tooth 22 contributed to the subgum overall appearance of the dentition. It was inclined towards the palatal aspect and therefore looked very small compared with the adjacent teeth. The patient desired an esthetic result, which could be achieved in one appointment. This was the ideal indication for IPS Empress Direct.

Layering
We suggested that the patient considered having the tooth restored with a direct composite. This type of restoration would involve minimally invasive preparation and could be placed in one appointment. The patient accepted this proposal and we proceeded to prepare tooth 22 for a modified veneer and to remove any discoloured dental tissue. In this process, little as possible of the healthy tooth structure was ground. Since minimally invasive criteria were being followed, the existing composite restoration was not completely removed (Fig. 2).

The tooth was conditioned and a bonding agent was applied. Next, the discoloured dentine tissue was concealed with IPS Empress Direct Color white. The material was applied on the tooth surface in such a way that the restoration would not appear completely opaque (Fig. 3). Then the tooth surface was entirely covered with IPS Empress Direct A2 Dentin (Fig. 4). In order to impart a lifelike appearance to the cervical part of the tooth, we applied IPS Empress Direct A2 Enamel in layers and imitated the enamel anatomy of the adjacent teeth. The natural incisors exhibited a dark incisal areas as a result of their relatively high brilliance. These areas were imitated with IPS Empress Direct Color blue. Due to the thickness of the layer, the cervical areas of the natural teeth had a yellowish tinge. This feature was recreated in tooth 22 using IPS Empress Direct Color honey yellow (Fig. 5). The enamel layer was completed with IPS Empress Direct A2 Enamel. This layer was shaped with the help of an ingenious contouring instrument called OptraSculp® Pad (Figs 6 and 7). This instrument is used to form the final contours of the restoration. The foam pad attachments allow composites to be shaped quickly and without sticking. This instrument has become an indispensable tool in our day-to-day work. Finally, a thin layer of IPS Empress Direct Trans Opal was applied and the restoration was shaped again with OptraSculp Pad. The Trans Opal material allowed us to successfully imitate the natural optical properties of the tooth surface. Subsequently, the restoration was polished according to the recommendations of the manufacturer.

Finishing
The excess material was removed with finishers and fine grit diamond burs. The contouring and function of the restoration were checked. Then the restoration was polished to a high-gloss finish with silicone polishers and polishing discs in a few easy steps. The patient was thrilled with the new appearance of his anterior teeth (Fig. 8). The shape of the restoration agreed smoothly with the existing teeth. The optical characteristics of the restoration were similar to those of the natural dentition. Two months after the treatment, the patient returned to the practice for a recall appointment. On this occasion, the restoration showed excellent integration. Its shape and shade completely fulfilled our expectations (Figs 9 and 10).

Conclusion
IPS Empress Direct is a nano-hybrid composite for direct restorative procedures. It features lifelike opacity, fluorescence and opalescence. Esthetic anterior restorations can be skillfully created with the material in a very short time. Given the appropriate conditions, this material can be used to offer patients an adequate alternative to lab-fabricated ceramic veneers.

Fig. 1: Initial situation: Tooth 22 is discoloured as a result of endodontic treatment.

Fig. 2: Minimally invasive preparation of tooth 22 for the placement of a composite restoration.

Fig. 3: The prepared tooth surface is covered with IPS Empress Direct Color white.

Fig. 4: The tooth is completely coated with a layer of IPS Empress Direct A2 Dentin.

Fig. 5: The shade of tooth 22 blended in with the new appearance of his incisors.

Fig. 6: Contouring of the composite with an OptraSculp® Pad instrument.

Fig. 7: After final shaping of the restoration and polymerization.

Fig. 8: Flushed and polished restoration on tooth 22.

Fig. 9: Two months after the treatment: The result is stable.

Fig. 10: Examination of the functional situation two months after the treatment.

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