Direct anterior restoration placed with a modern composite

Lifelike aesthetics achieved with minimally invasive methods

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The possibilities of restoring teeth have grown immensely over the past few decades owing to the development of innovative dental composites. In the past, dentists had to rely on indirect veneers to produce highly aesthetic results, but today advanced materials are available that offer a suitable alternative in many cases. Composite resins have undergone considerable changes in recent times. The dental research community and 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 (Ivoclar Vivadent), anterior restorations can be efficiently layered to produce highly aesthetic results that are virtually indiscernible from the natural tooth structure. Consequently, dental practitioners can benefit from the convenient handling properties of composites without having to make any compromises in terms of aesthetics. In our opinion, IPS Empress Direct is the best material of its kind available for satisfying exceptionally high aesthetic requirements. Owing 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 of composites is more significant 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 fulfills all of these major requirements. The monomers contained in the composite determine its reactivity, strength, shrinkage and handling. The monomer matrix incorporates fillers that determine the wear resistance, strength, polishability, surface gloss, radiopacity and translucency of the material. A coarse barium glass filler imparts 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.

The composite system comprises 32 shades and five translucency levels. The properties of fluorescence, translucency and opalescence are decisive for the aesthetic appearance of the restoration. IPS Empress Direct obtains its lifelike fluorescence from special pigments and owes its exceptional optical characteristics to its composition. The Dentin shades exhibit a higher opacity and colour saturation than the Enamel materials. Therefore, the aesthetic effect is enhanced from within the restoration. The translucency of the Enamel shades allows the Dentin materials to scatter light in a manner similar to natural tooth structure. Furthermore, the Trans Opal shade gives the restoration a true-to-nature opalescence. In reflected light, it appears 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 aesthetic result. Skill and expertise are required on the part of the dental practitioner who has to impeccably 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.

Fig. 1: Initial situation with tooth #22 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 in white.—Fig. 4: The tooth is completely coated with a layer of IPS Empress Direct in A2 Dentin.—Fig. 5: Internal play of colours: IPS Empress Direct Color in blue in the incisal area and IPS Empress Direct Color in honey yellow in the cervical area to match the neighbouring teeth.—Fig. 6: Contouring of the composite with an OptraSculpt Pad instrument.

Fig. 7: After final shaping of the restoration and polymerisation.—Fig. 8: Finished and polished restoration on tooth #22.—Fig. 9: Two months after treatment: the result is stable.—Fig. 10: Examination of the functional situation two months after treatment.
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Case study

A 28-year-old patient was referred to our practice. He was dissatisfied with the colour and position of the maxillary left lateral incisor (Fig. 1). The examination showed that tooth #22 had been endodontically treated, which explained its substantial discoloration. 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 suboptimal 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 aesthetic result that could be achieved in one appointment. This was the ideal indication for IPS Empress Direct.

We suggested that the patient consider having the tooth restored with a direct composite. This type of restoration would involve minimally invasive preparation and could be placed in a single 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 the process, as 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 was concealed with IPS Empress Direct Color in white. The material was applied to the tooth surface in such a way that the restoration would not appear completely opaque (Fig. 3). The tooth surface was then entirely covered with IPS Empress Direct in A2 Dentin (Fig. 4).

In order to impart a lifelike appearance to the incisal part of the tooth, we applied IPS Empress Direct in A2 Enamel in layers and imitated the enamel areas of the adjacent teeth. The natural incisious exhibited several dark incisal areas as a result of their relatively high translucency. These areas were imitated with IPS Empress Direct Color in blue. Owing to the thin enamel layer, the cervical areas of the natural teeth had a yellowish tinge. This feature was recreated in tooth #22 using IPS Empress Direct Color in honey yellow (Fig. 5).

The patient was thrilled with the new appearance of his anterior teeth (Fig. 8). The shape and shade of tooth #22 blended in smoothly with the existing teeth. The optical characteristics of the restoration were comparable 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 & 10).

Conclusion

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

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