Impressive developments of composite materials have been introduced to the market in recent years. Nano-hybrid composites such as IPS Empress Direct (Ivoclar Vivadent) have enabled dentists to offer their patients adhesive restorations that meet the requirements for functional and aesthetic excellence. A well-considered layering technique and accurate shade selection contribute towards an optimal outcome.

A natural tooth is composed of different layers of tissue and reproducing these is important in the restoration of anterior teeth in particular. In order to obtain a natural-looking vibrant restoration, the natural tooth has to be replicated in fine detail. In addition to the anatomy, the optical characteristics of the natural tooth structure should be reflected in each composite layer. These properties include brightness, saturation, hue, translucency, opalescence and fluorescence.

IPS Empress Direct is a well-designed composite system consisting of 32 shades, five levels of translucency and seven characterisation shades. With this versatile range, the product meets all conceivable requirements for an aesthetic composite. Additionally, the material features exceptionally low sensitivity to ambient light, giving the dentist sufficient time to layer the composite and mould the restoration to impart a natural shape.

Clinical case

The case presented here demonstrates how an optimal restoration can be achieved with IPS Empress Direct. A 37-year-old female patient presented to our practice with both maxillary central incisors fractured to approximately one-third of the mesial area. The patient requested fast and minimally invasive restoration of the broken teeth. She did not want healthy tooth structure to be removed, which meant that crown restorations were not an option.

A detailed clinical examination showed that the pulp of tooth #21 was exposed; however, the periodontal tissue was undamaged (Fig. 1). After discussing the treatment choices with the patient, we decided on performing endodontic treatment on the affected teeth and then reconstructing teeth #21 and #11 using a composite layering technique (IPS Empress Direct). A lingual silicone key would help in establishing the correct tooth shape.

A polarising filter assisted in evaluating the internal and external colour distribution of the natural teeth (Fig. 2). Based on the values we measured and the natural tooth colour, we selected the appropriate shades for the restoration, namely A2 and A3 for the dentine, A2 for the enamel, Trans 30, Trans Opal and suitable characterisation shades. In the reconstruction of the translucent enamel area, Trans 30 was mainly applied, and Trans Opal was mostly applied to imitate the structural features of the incisal ridge. In order to achieve a high bond strength, I continued with the total-etch technique using Tetric N-Brond (Ivoclar Vivadent).

I recommend using the Optra-Sculpt modelling instrument
The restorations examined with a polarising filter showed optimal results.

Fig. 3: Prepared teeth with wave-shaped bevels.

Fig. 4: Phosphoric acid was applied to the bonding surface.

Fig. 5: The lingual walls were reconstructed with IPS Empress Direct A3 Dentin and A2 Dentin.

Fig. 6: The dentine was built up with IPS Empress Direct A2 Enamel and Tetric N-Flow.

Fig. 7: Prepared teeth with wave-shaped bevels.

Fig. 8: The adjacent teeth were covered with PTFE tape to prevent the phosphoric acid from coming into contact with them during the etching procedure. Subsequently, Tetric N-Bond was applied to the enamel surface and allowed to react for 10 seconds. As a result, the adhesive was able to penetrate the enamel evenly. Excess adhesive was then dispersed with compressed air. The resulting thin adhesive film was Ivoclar Vivadent).

The layering procedure began by building up the lingual contours with the help of the silicone key. In the first step, IPS Empress Direct A3 Enamel was applied, followed by Tetric N-Flow (Fig. 1). It should be noted that Tetric N-Flow is particularly suitable for reconstructing the lingual anatomy.

Once the lingual walls had been rebuilt, the dentine and enamel areas were layered with IPS Empress Direct A3 Dentin, A2 Dentin, A2 Enamel, Trans 30 and Trans Opal. It is recommended that one work from the inside out (from the dentine towards the enamel) in order to facilitate the layering procedure. After light curing the composite material, I contoured the restorations to give them a natural shape and created a textured enamel surface using a diamond bur.

The resulting restorations demonstrated a lifelike and vibrant appearance and faithfully reflected the optical properties of the natural teeth (Figs. 6–8). Finally polished the restoration to a natural-looking gloss using the Astropol and Astrobrush polishing sets (Ivoclar Vivadent, Fig. 9). Two weeks later, tooth #21 showed an undesirable change in shape.

We therefore decided to modify the restoration. The retreatment resulted in a restoration that met both my own and the patient’s expectations (Fig. 10). Six months after the placement, no imperfections or changes in shade or shape, neither from the frontal nor from the lateral view, were noted (Figs. 11–13). Even when evaluated with a polarising filter, the restoration met all the requirements (Fig. 14).

The case described here shows that healthy tooth structure can be protected and preserved by using minimally invasive techniques and products, satisfying both the preferences of the patient and the requirements of the dentist. In this manner, superior restorative outcomes can be accomplished.