the implants. A pick up impression is then taken as before. Case study 3 shows the technique where both teeth and implants are restored with crowns in the same arch (Figs. 24–26).

**Conclusions**

Whilst this technique of duralay bionets requires two lots of impressions (two stages) and appears to increase the clinician’s time, the benefits of having excellent fit, occlusion etc. far outweigh the extra time taken.

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- Dr Ibrahim Hussain, BDS, M.Adm.

By Dr Yao Lv, China

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

**Challenge**

A natural tooth is composed of different layers of tissue. This plays a particularly important role in the restoration of anterior teeth.

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.

**Solution**

IPS Empress Direct is a well-designed composite system consisting of 32 shades, five levels of translucency and seven characterization shades. With its versatile range of shades, IPS Empress Direct meets all conceivable requirements that could be placed on an esthetic composite. Additionally, the material is characterized by an exceptionally low sensitivity to ambient light, allowing dentists sufficient time to layer the composite and mould the restoration to give it a natural shape.

The case presented below provides an example of how an optimal restoration can be achieved with IPS Empress Direct.

**Clinical case presentation**

A 7-year-old female patient presented with fractured maxillary central incisors. Approximately one third of the incisal area was fractured on both teeth. The patient requested a fast and minimally invasive restoration of the broken teeth. She did not want healthy tooth structure to be cut, which meant that crown restorations were not an option.

A detailed clinical examination showed that the pulp of tooth 21 was exposed but the periodontal tissues were undamaged (Fig. 1). After informing the patient of the treatment choices, we decided to perform endodontic treatment on tooth 21 and then reconstruct tooth 11 and 21 using a composite layering technique (IPS Empress Direct). A lingual suture key would help in establishing the correct tooth shape.

A polarization filter assisted in evaluating the internal and external colour distribution of the natural teeth (Fig. 2). On the basis of the values measured and the natural tooth colour, we selected the appropriate shades for the restoration, including A2 and A3 for the dentin, A2 for the enamel as well as Trans 30, Trans Opal and suitable characterization shades.

To reconstruct the translucent enamel area, Trans 30 was mainly applied, while Trans Opal was mostly applied to imitate the structural features of the incisal ridge. To ensure a high bond strength, I applied the total-etch technique using Tetric N-Bond®. In addition, I recommend using the OptrACLinc® modelling instruments. Fillings can be shaped more easily – the OptrACLinc Pad is particularly handy when contouring anterior restorations. A rubber dam was applied to provide absolute isolation and adequately expose the tooth surfaces to be restored.

**Step by step**

With a minimally invasive technique, wave-shaped bevels were prepared on the teeth. This procedure design generally results in an increase in bond strength and enhances the intrinsic vibrancy of the restoration (Fig. 3). Once the teeth were prepared, 37% phosphoric acid was applied. The bonding surfaces were etched for 20 seconds (Fig. 4). The adjacent teeth were covered with Teflon tape to prevent the phosphoric acid from coming in contact with them during the etching procedure. Subsequently, Tetric N Bond was applied to the enamel surface and allowed to react for 10 seconds.

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As a result, the adhesive was able to evenly penetrate the enamel. Excess adhesive was then dispersed with compressed air. The resulting thin adhesive film was light-cured for 10 seconds using the High Power mode of the curing light (1,200 mW/cm², Bluephase N).

The layering procedure was begun by building up the lingual contours with the help of the silicone key. First, I applied IPS Empress Direct Enamel A3, followed by Tetric N-Flow (Fig. 5). It should be noted that Tetric N-Flow is particularly suitable for reconstructing the lingual anatomy. Once the lingual walls were rebuilt, the dentin and enamel areas were layered. IPS Empress Direct Dentin A3, Enamel A2, Trans 30 and Trans Opal were used for this part.

It is advisable to work from inside out – from the dentin towards the enamel – 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. As a result, the restorations demonstrated a lifelike and vibrant appearance and faithfully reflected the optical properties of the natural teeth (Figs 6 to 8).

Finally, I polished the restoration to a natural looking gloss using the Astropol® and Astrobrush® polishing sets (Fig. 9). Two weeks later, tooth 21 showed an undesirable change in shape. We therefore decided to remodify the restoration. The retreatment resulted in a restoration that met the expectations of both the patient and my own (Fig. 10).

Result
A lifelike and functional restoration was achieved in the case presented above with the help of the IPS Empress Direct composite system, combined with solid dental skills. Six months after the placement, no imperfections or changes in shade or shape were noted – neither from the frontal nor from the lateral view (Figs 11 to 13). Even when evaluated with a polarization filter, the restoration met all the requirements (Fig. 14).

Conclusion
The case described above shows that healthy tooth structure can be protected and preserved by using minimally invasive technology, satisfying both the preferences of the patient and the requirements of the dentist. On balance, superior restorative outcomes can be accomplished.

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