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The strengths of composite resin

Esthetics, strength and minimal invasiveness

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For many patients, unsightly anterior teeth present a major problem. Straightforward, minimally invasive restorative procedures may be an appropriate treatment option in such cases because of the advantages they offer.

When patients present with fractured teeth, dentists usually suggest restoring them with ceramic crowns or veneers. Very frequently, however, patients are deterred by the considerable time, cost and loss of healthy tooth structure involved and ask for a minimally invasive alternative to solve their esthetic problem. In general, patients are not aware of the possibilities offered by composite resin in these cases. Nano-hybrid composites have gained in popularity among experts lately – a fact that should be more thoroughly communicated to patients and made allowance for by using them more frequently in daily practice. When used in conjunction with a suitable layering technique, state-of-the-art composites allow optimum restorative results to be achieved and thus represent a convincing option to patients.

Case presentation

A 14-year-old girl with a fractured left central incisor was referred to our clinic (Fig 1). The fracture was due to a bicycle accident which had occurred three years previously. As the parents of the patient refused to have the tooth invasively restored with a crown, we looked for a viable alternative. We suggested a composite resin restoration – a minimally invasive procedure that was instantly accepted by the patient and her parents. An esthetically oriented restorative approach was chosen, which involved the imitation of the natural tooth layers using different shades of composite (dentin, enamel, translucent shades etc).

In the case presented, we used the nano-hybrid composite Tetric® N-Ceram. The following shades were selected: Tetric N-Ceram A2, B2 Dentin as well as a translucent shade. Several different regions were used as a reference in the selection of the shades. The dentin shade was selected based on the cervical portion of the canine, while the undamaged adjacent tooth 11 served to determine the enamel shade. The only invasive measure consisted in placing an undulated bevel on the fractured edges of tooth 21. This was done to improve adhesion and attain a more esthetic result (Fig 2). In order to achieve reliable adhesion in the enamel portion, the total-etch technique was used. For this purpose, 37% phosphoric acid was applied to

Fig 1 A 14-year-old patient presented with a fractured left central incisor.

Fig 2 In order to achieve optimum adhesion, an undulated bevel was placed along the fractured edge.

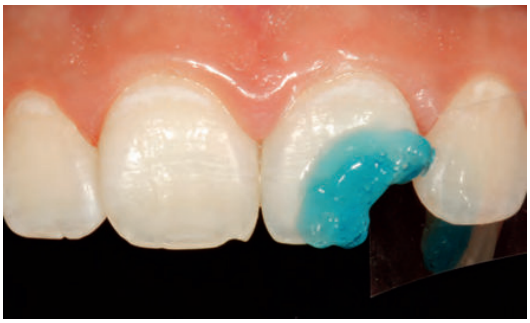

Fig 3 A plastic matrix was placed between the lateral and central incisor and 37% phosphoric acid gel was applied.

Fig 4 Tetric N-Ceram A2 was applied to a plastic strip which was then used to create the first portion of the palatal wall.

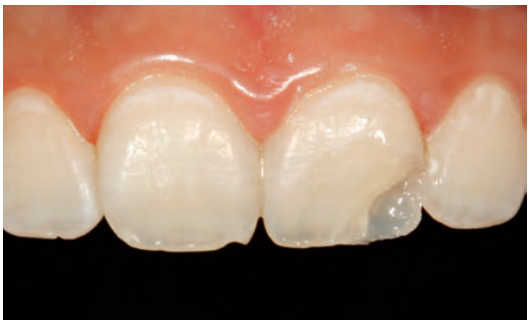

Fig 5 Tetric N-Ceram T was used for the translucent incisal portion of the palatal wall.

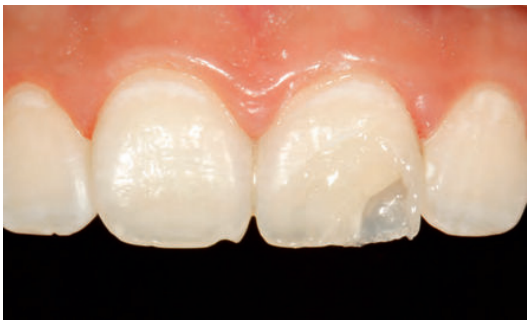

Fig 6 Contouring of the palatal wall …

Fig 7 … and creation of the mamelons using an opaque dentin material

Fig 8 In order to achieve the required translucency in the incisal area, Tetric N-Ceram T was placed between the mamelons.

the dentin and enamel surfaces beyond the beveled areas. A plastic matrix was placed between the lateral and central incisor to prevent the adjacent tooth from being etched (Fig 3). The etching gel was left to react 30 seconds on the enamel and 10 seconds on the dentin. Subsequently, the tooth was rinsed with water spray for 30 seconds and dried with an air gun. Care was taken not to overdry the etched surfaces. Then a bonding agent (Tetric® N-Bond) was applied to the etched surfaces, slightly dispersed with air and cured with the bluephase® curing light for 10 seconds using the Low Power mode.

To create the palatal wall, Tetric N-Ceram A2 composite was applied and cured for 15 seconds with the bluephase light using the Soft Start mode (Fig 4). This curing mode was also used for the intermediate curing of all the other composite layers applied. The translucent

Fig 9 To mimic the enamel layer, a coat of Tetric N-Ceram A2 was applied to the dentin build-up. Finally, the entire restoration was coated with a thin layer of Tetric N-Ceram T.

Fig 10 After finishing and polishing, the restoration had a natural-looking appearance. High-gloss polishing was performed with OptraPol NG and Astrobrush.

Figs 11 and 12 The patient's smile – before and after the treatment

Tetric N-Ceram T shade proved to be ideal for the reproduction of the translucent incisal portion of the palatal wall (Fig 5). To facilitate the build-up of the proximal wall, Tetric N-Ceram A2 was applied to a plastic strip (Fig 6), while the mamelons were created with Tetric N-Ceram B2 Dentin. The opaque dentin material prevented the darkness of the oral cavity from shining through the restoration (Fig 7). The right central incisor served as a reference in the creation of the mamelons and helped ensure a lifelike appearance. To achieve the required translucency in the incisal portion, the translucent material (Tetric N-Ceram T) used earlier on was placed between the mamelons (Fig 8). Subsequently, the dentin build-up was coated with a layer of enamel material (Tetric N-Ceram A2). This was followed by the application of a thin layer of Tetric N-Ceram T (Fig 9).

After finishing and polishing, the restoration showed a natural appearance and was symmetric with respect to tooth 11 (Fig 10). The restoration was imparted with the desired high lustre by using OptraPol® NG polishers and Astrobrush®. Finally, all the restoration surfaces were light-cured again with the bluephase curing light using the High Power mode.

Conclusion

High-quality composite resins, when used in conjunction with an appropriate placement technique, allow successful tooth restorations to be achieved which represent a conservative alternative to ceramic crowns or veneers (Figs 11 and 12). ❑

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