Customised abutments made of lithium disilicate glass-ceramic

Improving aesthetics and function of implant-supported restorations

The restoration of dentition with implants has become an established procedure throughout the world. Owing to ongoing research and development in this field, this treatment modality has become increasingly popular. Furthermore, the number of companies that manufacture dental implants and the corresponding prosthetic components has risen commensurate to the speed at which the advancements have been made.

However, the large number of commercially available systems has not helped much to improve aesthetics and function. Clinicians find themselves overwhelmed by the confusing variety of products and have trouble selecting the components that suit the treatment modality best.

Implant-supported crowns are not all the same: each patient has individual needs that have to be taken into consideration. Generally, abutments are divided into two categories: ready-made or customised (titanium, zirconium oxide, etc.). Ready-made abutments are machined components with standardised shapes and dimensions, while custom-made abutments are specially created for each patient.

Customised abutments are considered to be an efficient solution for placing a restoration on an implant. Moreover, this type of abutment offers more control over the aesthetic and functional aspects of the restoration than ready-made abutments do. The benefits of customised abutments include the improvement of aesthetics, excellent accuracy of fit, as well as the thorough and precise removal of excess cement in the luting of crowns.

In combination with a titanium base, lithium disilicate abutments such as the new IPS e.max Press abutment (Ivoclar Vivadent) offer an optimum solution for fabricating functional implant-supported restorations (strength of 400 MPa), as well as satisfying discerning aesthetic demands. In this way, implant-supported restorations can be tailored to the needs of the individual patient. The durable bond between the two components, that is, the titanium base and lithium disilicate, is created with the self-curing luting composite Multilink Implant (Ivoclar Vivadent)—which can also be light cured if desired. The following case report demonstrates the effective combination of an anterior dental implant with an individually created abutment (press technique) and an aesthetic crown produced in the same way.

Case report

A 42-year-old patient consulted the practice owing to a root fracture, which had caused discoloration of tooth 11 (Figs. 1 & 2). After a thorough diagnosis revealed that the tooth could not be preserved, a new restoration was planned. The tooth was extracted (Fig. 3) and a conical NanoTite Certain Implant (diameter 4.1 mm; BIOMET 3i) was inserted. During the healing period of about 90 days, the laboratory-fabricated provisional restoration was seated (Fig. 4). The provisional en-

Fig. 1 & 2: Initial situation with root fracture in tooth 11 and subsequent severe discolouration. – Fig. 3: Healed tissue after the extraction of tooth 11. The implant was inserted at this stage. – Fig. 4: The provisional during the healing phase of the implant. – Fig. 5a–c: Impression taking of the implant and the laboratory-fabricated master cast. – Fig. 6: The IPS e.max Press abutment on the titanium base (coated with titanium nitride) after divestment. – Fig. 7: The two components are prepared for cementation with Multilink Implant. – Fig. 8: The customised abutment after cementation. – Fig. 9: The customised abutment is tried in. – Figs. 10a–d: Fabrication of the crown framework (coping) with lithium disilicate and subsequent layering of the permanent crown with IPS e.max Ceram.

Figs. 1 & 2:
Initial situation with root fracture in tooth 11 and subsequent severe discolouration.

Fig. 3:
Healed tissue after the extraction of tooth 11. The implant was inserted at this stage.

Fig. 4:
The provisional during the healing phase of the implant.

Figs. 5a–c:
Impression taking of the implant and the laboratory-fabricated master cast.

Fig. 6:
The IPS e.max Press abutment on the titanium base (coated with titanium nitride) after divestment.

Fig. 7:
The two components are prepared for cementation with Multilink Implant.

Fig. 8:
The customised abutment after cementation.

Fig. 9:
The customised abutment is tried in.

Figs. 10a–d:
Fabrication of the crown framework (coping) with lithium disilicate and subsequent layering of the permanent crown with IPS e.max Ceram.
Fig. 11: The customised abutment and the completed ceramic crown are ready for permanent placement. – Fig. 12: The abutment and crown are seated without difficulty. – Fig. 13: An X-ray is taken to check the final situation. – Figs. 14 & 15: The shape and surface structure of the tooth look very natural. As a result, the crown blends in well in the oral cavity.


crown shape had already been determined during the wax-up stage, the subsequent working steps were carried out efficiently with the silicone matrix, which was based on the wax-up. The abutment was built up in wax, and its shape and size were checked against the matrix. Then, the built-up abutment was reproduced with IPS e.max Press (lithium disilicate) in the appropriate tooth colour (LT A1). After the coping had been divested and its fit checked, the restoration was cemented with the luting composite (Fig. 8). After the cement residue had been removed, the fit of the abutment and the gingival emergence profile were checked in the patient’s mouth (Fig. 9). Since all the parameters were in order, the laboratory work could proceed.

The ceramic crown was sent to the dental practice together with the hybrid abutment (Fig. 11). The dentist in charge of the case rechecked the fit of the abutment and cemented it to the crown using Multilink cementation (Fig. 12). The ceramic crown was then adjusted to the gingival sit -

even, are very important and it is the dental team’s responsibility to select them properly in order to achieve natural-looking results (Figs. 14 & 15).


crown on the titanium base and was ready for polishing. Next, the abutment and titanium base were prepared for cementation with Multilink Implant (Fig. 7). The manufacturer’s instructions were closely observed in the process. The bonding surfaces were carefully cleaned. The pressed component (lithium disilicate) was etched with 5 % hydrofluoric acid and rinsed with water. Then, the primer (Monobond Plus, Ivoclar Vivadent) was applied to both dried parts. Subsequently, the restoration was cemented with the luting composite (Fig. 8). After the cement residue was removed, the fit of the abutment and the gingival emergence profile were checked in the patient’s mouth (Fig. 9). Since all the parameters were in order, the laboratory work could proceed.

The ceramic crown was sent to the dental practice together with the hybrid abutment (Fig. 11). The dentist in charge of the case rechecked the fit of the abutment and cemented it to the crown using Multilink Implant. Finally, the cement residue was removed meticulously and an X-ray was taken to check the situation (Figs. 12 & 13).

Conclusion

The customised hybrid abutment made of IPS e.max Press offers an excellent solution for highly aesthetic requirements and ensures outstanding inte-