The challenge of replacing adjacent incisors

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Replacing missing adjacent maxillary incisors is a very challenging procedure since aesthetic play a crucial role in this area. Gingival tissue preservation is a major factor, especially in young patients, where the maxillary lip line is usually higher and the gingiva is more apparent. Achieving an excellent papilla between the adjacent missing teeth when using implants is not easy. In addition, achieving ideal gingival margin levels may be a problem as well, depending upon the amount of bone loss that occurred when the teeth were lost.

Case report

A 26-year old female patient visited the clinic because she was dissatisfied with the tooth-supported PFM-bridge in the maxillary zone. The narrow space between the two abutment teeth was closed by one pontic causing an apparent asymmetry in the smile (Figs. 1-3).

Fig. 1: preoperative extraoral view

Fig. 2: preoperative intraoral view

Fig. 3: preoperative view from the top

After clinical and radiographic assessment, the digital smile design was created. Two treatment options were evaluated, keeping in mind the minimum distance between two adjacent implant shoulders to preserve the crestal bone in between (Figs. 4-5):

1) Replacing the three-unit bridge by a four-unit bridge on two implants
   - With this option, it was not possible to obtain a good ratio of the crowns.
2) Replacing the three-unit bridge by two single restorations of the central incisors with reshaping of the canines and premolars.
   - This option gave the best crown ratios to achieve a harmonious result.

Fig. 4: Digital smile design (DSD) of two treatment options.

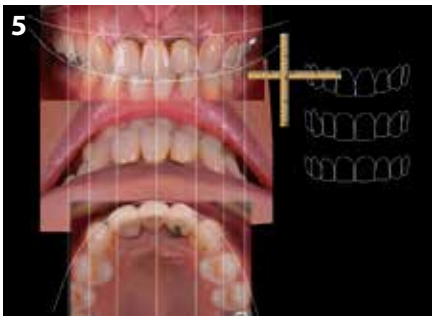


Fig. 5: Final DSD with frontal, top and occlusal view

Fig. 6: Wax-up, frontal view

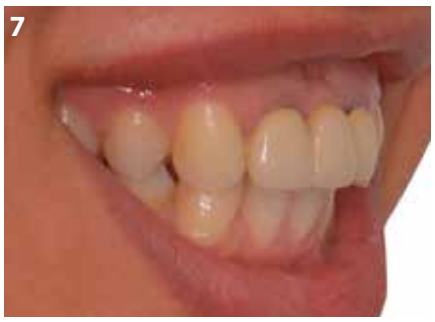
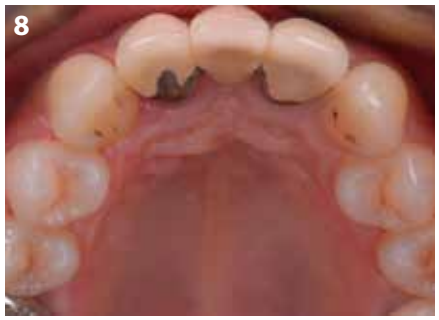


Fig. 7: Wax-up, side view

The second treatment option evaluated with the digital smile design served as a base for the wax-up (Figs. 6-8). The maxillary incisors were abraded and the shape of both canines and first premolars was altered to achieve a symmetrical design while respecting the tooth ratios. The design was evaluated together with the patient by means of an intraoral mock-up (Figs. 9-11).



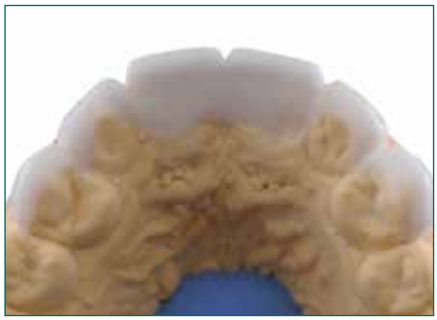
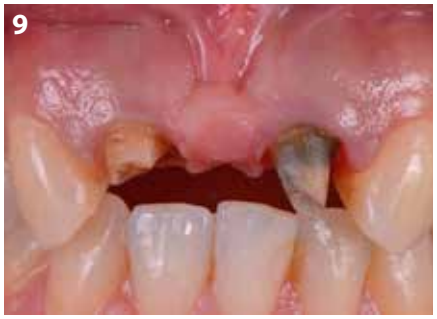


Fig. 8: Wax-up, occlusal view



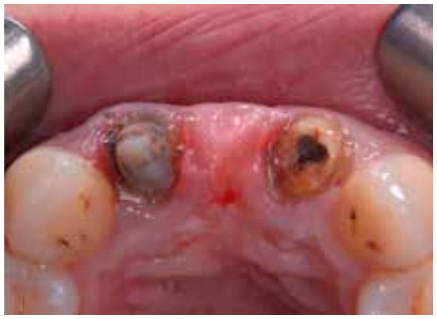


Fig. 9: Intraoral view after removal of the deprecated PFM restoration.

Fig. 10: Preparation of intraoral mock-up using a silicone key.

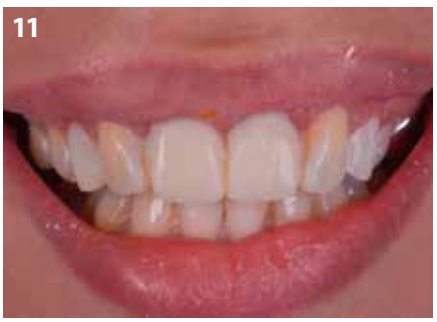


Fig. 11: Intraoral mock-up.

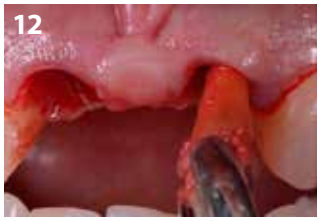


Fig. 12: Atraumatic removal of the radices.

Fig. 13: Supracrestal incision, slightly towards the palatal side.

The roots were extracted atraumatically under local anaesthesia (Fig 12). A crestal incision was made that was located slightly more towards palatal (Fig. 13)

Space was created up to the appropriate depth i.e. 12 mm with the pilot drill (Fig. 14). Proper alignment of the implant space was checked with regard to the adjacent and opposing teeth. The socket was then prepared by a sequence of drills with gradually increasing diameter, never exceeding 50 Ncm torque. An Standard Aadva implant, regular, 4 mm diameter, GC Tech, Breckerfeld, Germany was placed at a speed of 25 rpm in accordance with the manufacturer's instructions (Figs. 15-16) and the primary stability was checked.

A subepithelial connective tissue graft was augmented to achieve an inter-implant papilla (Fig. 17). Two healing screws were placed (Fig. 18).

Fig. 14: Pilot drill

Fig. 15: Implant placement

Fig. 16: Occlusal view on the implants after placement.

Fig. 17: Soft tissue Graft to increase the papilla between the central incisors

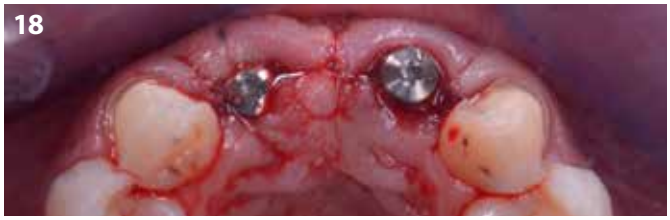
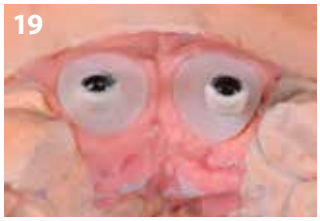


Fig. 18: After placement of the healing screws



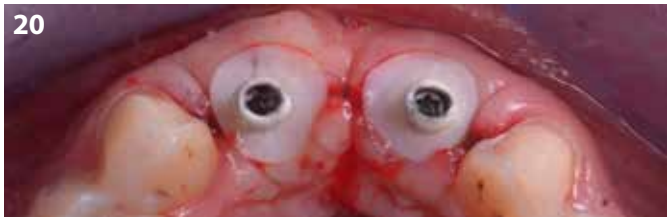


Fig. 19-20: Creation of the temporary abutments with a natural emergence profile to support the gingiva

Temporary customised abutments and acrylic provisionals was prepared in the lab (Figs. 19-20). Care was taken to prepare a subgingival emergency profile that gave a smooth transition from the implant platform to a natural tooth shape at the gingival level, supporting and shaping the gingiva around the implant (Figs. 21-23).

Fig. 21-23: Temporary restorations screwed onto the implants

After a period of 6 months, soft tissues were healed and adapting to the provisional crowns (Figs. 24-26).

Fig. 24: View on the temporary abutment after a healing period of 6 months.

Fig. 25-26: After removal of the temporary abutments. The gingival tissue is shaped.


Fig. 27: Impression on implant level (pick-up technique)


Fig. 28: customisation of impression copings to copy the emergency profile.

An impression post was individualised with acrylic resin to copy the emergency profile shaped in the period of temporisation and the final impression was made with a pick-up technique (Figs. 27-28).


Fig. 29: GC Hybrid abutments (Zr suprastructure on Ti base)

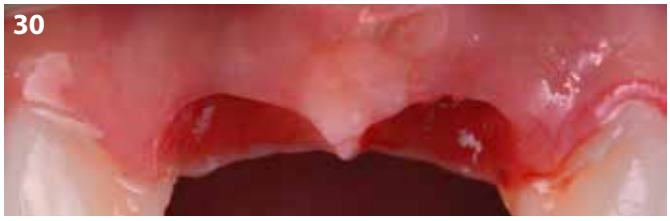


Fig. 30: Frontal view before inserting the custom abutments

Two customised CAD-CAM abutments (GC Tech Milling Centre, Leuven Belgium) from a zirconia suprastructure on a titanium base (GC Hybrid Abutment, GC Tech) were prepared and screwed onto the implants with 20 Ncm torque (Figs. 29-32). The ceramic crowns were then cemented onto the abutments (Figs. 33-34). The final result showed a symmetric smile with preservation of the papillae between both implants and between the implants and adjacent teeth.


Fig. 31: The custom Zr abutments were screwed on the implant

Fig. 32: The custom Zr abutments after proper seating.



Fig. 33-34: Final result

Conclusion

Implant placement is restoratively driven, but the surgical step is key in determining the aesthetic potential. Understanding the biological concepts and maintaining a strict surgical and prosthetic protocol are therefore crucial.

References

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