Replacing a failing tooth with an implant-supported crown – strategies for ensuring an esthetic treatment result

The restorative team will often be exposed to significant challenges in trying to replace a failing tooth in the esthetic zone. Different treatment alternatives exist but the least invasive method in regard to neighboring teeth would most certainly consist of the utilization of implant-supported prosthodontics. Implant site development, surgical approach, prosthodontic handling with utilization of appropriate components and materials are vital issues to consider in the therapy.

In this case report, a young individual presented with circumstances which may have resulted in a less appealing treatment result with a more conventional approach. Difficulties were anticipated and different approaches as well as expected results were discussed with the patient who decided to go with the following treatment.

1. View from initial consultation. The tooth 11 is mobile with a deep buccal gingival pocket and exhibits a soft tissue swelling marginally.

2. X-ray reveals a root fracture and the buccally positioned gutta-percha point confirms communication with the fracture.

3. In the CBCT section (Planmeca Promax 3D Conebeam) one can see insufficient vertical height of the alveolar process. This could be further reduced after a surgical extraction of the apical part of the root which would lead to a hopeless situation.

4. The coronal part of the tooth is removed. Upon inspection one can see that the buccal bone plate is resorbed to the inferior of the fracture line.

5. After achieving haemostasis, an orthodontic elastic is attached to the remaining root fragment.

6. A provisional tooth which has been bonded to neighboring teeth is hollowed out palatally and the elastic is attached to it and stretched in order to force the remaining root to erupt.
7. Four months later the root has erupted significantly and the supporting tissues have followed, resulting in a vertical augmentation of both soft and hard tissues.

8. X-ray indicates bone apposition even superior of the marginal ridge.

9. There seems to be enough space for an implant on the CBCT scan in respect to both vertical and horizontal dimensions.

10. The remaining root tip is carefully extracted without lacerating the soft tissues using a periotome and appropriate forceps.

11. The cervical contour of tooth 21 is delineated on the X-ray.

12. The orthodontic extraction has resulted in a dense bone quality, a frequent finding. This will allow for an immediate flapless implant installation followed by immediate temporization aiming for maximum “pink” esthetics.

13. The preparation for the implant will have to be considered thoroughly since this is performed according to a “flapless” protocol.

14. The excess of soft tissues will have to be considered during implant installation and the soft tissue profile is here manipulated to a symmetric level.

15. In order to be able to manipulate soft tissues and allow enough space for the prosthodontic components, the implant has to be positioned 3 mm below gingival zenith and in this case it means below the marginal bone level to allow for symmetry.


17. Implant in position, it resists a torque of 35 Ncm indicating good primary stability.

18. A temporary abutment (Astra Tech Implant System) and a 3M ESPE Ion shell crown are used to fabricate an individually shaped temporary crown. The temporary abutment has to be cut for proper length.
19. Temporary crown finished and ready for seating.

20. The situation clinically just after seating of the temporary crown. Mild, but not undue, ischemia can be noticed since it exerts some pressure towards the soft tissues. This is where the shaping of the "emergence profile" starts.

21. Three weeks after implant installation.

22. The temporary crown is trimmed a few months later to shape the soft tissues further and this is the situation after almost 6 months.

23. The soft tissues have matured and are now stable. Final prosthodontic treatment can be initiated.

24. Impression coping on implant level is modified with a light cured acrylic (block-out resin e.g. Ultradent) to be able to replicate the soft tissue profile created.

25. A customized impression tray is used for obtaining an impression together with Polyether material.

26. Working model with a detachable soft tissue mask and implant replica.

27. The model is scanned in the 3M ESPE Lava scanner and the files are sent to the Dentsply Sirona Implants production facility where an individually designed Atlantis Abutment will be manufactured.

28. In the Virtual Atlantis Design (VAD) software, an abutment is individually designed according to the soft tissue anatomy, selected emergence width option and the shape of the final crown.

29. The finished Atlantis Abutment in zirconia is delivered to the dental laboratory. Margins are ideally placed for easy removal of excess cement.

30. The abutment is tried in and checked clinically with light finger force of the abutment screw before proceeding with the construction of a crown restoration.
31. A 3M ESPE Lava zirconia coping is produced, after scanning the abutment, and a final crown is fabricated. The ceramic crown and the Atlantis Abutment are ready for delivery to the clinic.

32. An insertion guide produced in the dental laboratory will facilitate seating of the abutment into proper position. Otherwise, excessive undue forces can be applied when the abutment screw is tightened.

33. An X-ray will verify positioning before tightening the abutment screw with appropriate torque.

34. The crown is cemented with 3M ESPE Rely X “Unicem”. The excess material is “frozen” by a short exposure with the curing unit and can then be removed before chemical setting starts. Notice the translucency.

35. Final result.

36. X-ray at the 6 month recall. Seating and removal of excess cement is visualized in this X-ray.

37. At the 6 months recall, the soft tissues have stabilized and the symmetry is even better. Note that a transition from smoking to snuff has resulted in gingival recessions on tooth 22 and 23.

38. X-ray at the near to five years recall. Note that patient has gained bone around the implant.

39. At the near to five years recall, the soft tissue shows excellent soft tissue stability around the restoration. Significant wear can especially be noted on tooth 21 but also on tooth 11 (crown) and 12, due to parafunctions.