Immediate implant placement in the aesthetic zone

Strategies for counteracting tissue deficiencies following implant placement

Introduction

Implants have evolved to become an important treatment strategy for replacing missing or failing teeth. According to the Third International Team for Implantology (ITI) Consensus Conference, dental implants can be placed into the extraction socket immediately; in a delayed fashion following soft tissue healing (4–8 weeks); in an early-delayed fashion following substantial hard tissue healing (12–16 weeks); or late on after complete socket healing. Among these different options, immediate implant placement is often described as being particularly suitable for the aesthetic zone, due to the opportunities it provides for tissue preservation. On the other hand, it is also documented that immediate implant placement might be associated with certain risks, in particular buccal soft tissue dehiscences. A review by Hämmerle et al. stated that ‘immediate implant placement is primarily indicated in premolar sites with low aesthetic risk’. The aim of this case report is to demonstrate measures that can be taken to potentially counteract tissue deficiencies following immediate implant placement.

Basic considerations

Multiple experimental and clinical studies have shown that tooth extraction is followed by substantial alterations of the ridge dimension. A meta-analysis by Tan et al. reports that bucco-lingual shrinkage after tooth extraction is $3.79 \pm 0.23 \text{ mm}$. It has also been demonstrated that immediate implant placement cannot counteract the resorptive processes that follow tooth extraction. However, recent scientific evidence clearly shows that these alterations are dependent on many variables, in particular the periodontal biotype of the patient and the thickness of the bone plate. Hence proper case selection may be associated with less atrophy following tooth extraction. Lee et al. report that following tooth extraction and immediate implant placement (presumably in cases where a proper case selection was performed) a bucco-lingual shrinkage of 1.07mm on the buccal and 0.78mm on the lingual can be expected. This is clearly significantly less than reported previously.

As well as appropriate case selection (intact buccal bone plate; thick periodontal biotype), several surgical and technical factors may contribute to successful results when placing implants immediately. Among these, a one-stage procedure could potentially limit the resorptive process. De Rouck et al. demonstrated that immediately provisionalised implants reveal 2–3.5 fold less tissue shrinkage when compared with a provisional phase after tissue healing. Additionally, immediate sealing of the implant-abutment junction using a platform-switched design could also be an important factor in reducing buccal dehiscences following implant placement. Canullo et al. revealed that immediate implants with a platform-switched design are associated with only minute buccal shrinkage, thus leading to soft tissue stability on the buccal and interproximal aspect.

When proper case selection is performed and certain surgical and technical measures are taken, immediate implant placement can lead to aesthetically pleasing and successful restorations. However, the long-term prognosis of this procedure is still currently rather unclear.

Case report

A 65-year-old patient presented with a hopeless left lateral incisor. The affected tooth had a history of root resection, was mobile grade 2, and...
decementation of the crown frequently occurred (Figures 1–3). Due to several predisposing factors (intact alveolar housing, thick periodontal biotype, compliant patient) an immediate implant with immediate provisionalisation was planned and executed.

Tooth No. 22 was carefully extracted without elevation of a mucoperiosteal flap (Figure 4). Following proper intra-surgical diagnosis with respect to the buccal bone plate, the implant osteotomy was performed on the lingual aspect of the alveolar housing. The implant (T3 implant, BIOMET 3i) was then inserted in a subcrestal position, as a certain degree of remodelling of the buccal bone plate had to be expected (Figure 5). The remaining gap between the implant and the buccal bone plate was grafted with a xenogenous bone substitute (BioOss, Geistlich Biomaterials) to support the adjacent tissue (Figure 6). A provisional crown had been manufactured prior to surgery and was adjusted to the individual situation. Care was taken to mimic the submergence profile of the extracted root, in order to avoid any tissue pressure or undercontouring. The provisional crown was screw-retained, torqued at 20 Ncm, and the patient was instructed to maintain a soft diet for 6–8 weeks. Static and dynamic occlusal contacts were meticulously removed to avoid any lateral loading on the implant fixture (Figures 7–8).

Three months following implant placement, the patient presented with a successfully osseointegrated implant with minimal loss of surrounding soft tissue (Figure 9). An individual impression coping was prepared based on the existing submergence profile to maintain the established contour (Figure 10). A full-ceramic crown was inserted and torqued at 20 Ncm. Only small horizontal and vertical changes occurred after implant installation (Figures 11–13).

Summary

Proper case selection is required when immediate implants are placed in the aesthetic zone. Surgical factors such as grafting of the gap and flapless implant placement also play a significant role in a successful outcome. Technical factors such as a tight platform switched seal of the fixture can potentially help avoid tissue shrinkage after implant installation.

References