

Six-year case report

Fully guided immediate implant restoration in the aesthetic zone

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Dental implants have become a reliable option for replacing missing teeth due to their high clinical success rate. Over the years, advancements in implant technology and surgical techniques have significantly improved patient outcomes.¹ One of the notable advancements is immediate implant placement, developed to address the traditionally lengthy treatment times associated with conventional implant protocols.² Immediate implant placement offers the advantage of reducing overall treatment duration and minimising the number of surgical interventions required.

Rehabilitating missing anterior teeth with dental implants in the maxillary aesthetic zone presents particular restorative challenges due to the high aesthetic demands of this region. The aesthetic zone is highly visible when a person smiles or speaks, and any imperfections can significantly affect a patient's appearance and self-confidence. Achieving a harmonious integration of the implant-supported restoration with the surrounding natural dentition is crucial for patient satisfaction. However, the variability in aesthetic outcomes can be influenced by several factors, including the patient's biotype, the quality and quantity of the surrounding soft and hard tissues, and the skill and experience of the clinician.³

Immediate implant placement in the aesthetic zone requires precise planning and execution to achieve optimal aesthetic and functional results.⁴ This approach often involves a multidisciplinary team, including restorative dentists, oral surgeons, and dental technicians, to ensure a comprehensive treatment plan tailored to the individual patient's needs. The use of advanced digital technology, such as computer-aided design & computer-aided manufacturing (CAD/CAM), and guided surgery has disrupted the planning and placement of dental implants. These technologies enhance the accuracy of implant placement, allowing for a more predictable outcome and reducing the risk of complications.⁵

In the following case report, we present a fully guided immediate implant restoration in the aesthetic zone, with a six-year follow-up. This case highlights the importance of meticulous planning, the use of advanced technology for guided surgery, and the long-term stability of the aesthetic and functional outcomes. The patient presented with a hopeless maxillary central incisor and strongly desired a rapid and aesthetically appealing solution. Through detailed preoperative assessment and guided implant surgery, we achieved immediate implant placement and restoration, providing the patient with a seamless transition from a failing tooth to a functional and aesthetically pleasing implant-supported restoration.



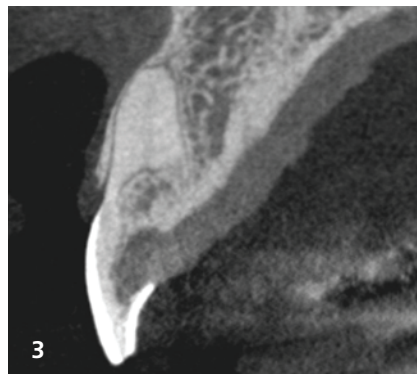
Fig. 1: Initial intra-oral examination showing external root resorption on the palatal surface of tooth #11. – **Fig. 2:** Tooth #11 appears darker and slightly intruded compared to its contralateral tooth.

The six-year follow-up period offers valuable data on the stability of the treatment, underscoring the importance of a correct diagnosis and treatment planning.

Initial situation

A 45-year-old woman, in good health (ASA I), a non-smoker, and with no medications or allergies, visited our clinic due to concerns about one of her central incisors. She reported, "I have a front tooth that has changed colour and was told it needed to be extracted. I would like it to be restored quickly because it's the first thing you see when talking and smiling." She desired a minimally invasive aesthetic solution for her upper right central incisor.

The extra-oral examination showed a high smile line. The intra-oral examination of tooth #11 revealed signs of external root resorption on the palatal surface (Fig. 1). The tooth appeared darker and slightly intruded compared to its contralateral tooth (Fig. 2), raising suspicion of ankylosis. The tooth was non-sensitive to percussion, and the CO₂ test was negative. No signs of local infection, occlusal trauma, or periodontal inflammation were observed.



The CBCT scan confirmed the extent of the root resorption with no loss of alveolar height detected (Fig. 3).

Based on the SAC classification, the patient's surgical case was categorised as complex, and her prosthodontic case was evaluated as advanced (Fig. 4).

Treatment planning

Following an extensive discussion of the treatment options, immediate implant placement was selected, considering the favourable clinical conditions and the patient's desire. Tooth #11 was atraumatically extracted with the intention of preserving the residual alveolar bone. A

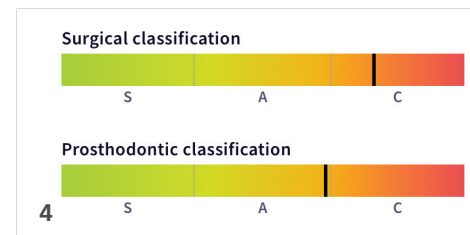


Fig. 3: CBCT scan confirming the extent of root resorption. – **Fig. 4:** SAC classification categorising the patient's surgical case as complex and prosthodontic case as advanced.

temporary screw-retained crown was placed on the same day.

The treatment workflow included:

1. Digital planning to establish a prosthetically-driven implant position.
2. Atraumatic extraction of tooth #11.
3. Guided surgery for a Straumann® Bone Level Tapered 3.3 mm SLActive® 12 mm implant placement in a prosthetically driven position.
4. Connective tissue graft on the buccal side.
5. Temporary screw-retained crown delivery after surgery.
6. After healing, final screw-retained crown delivery.

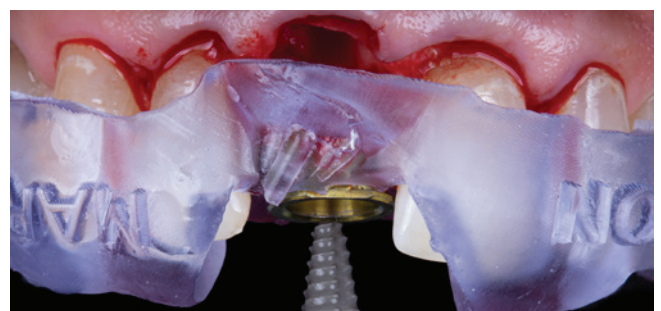
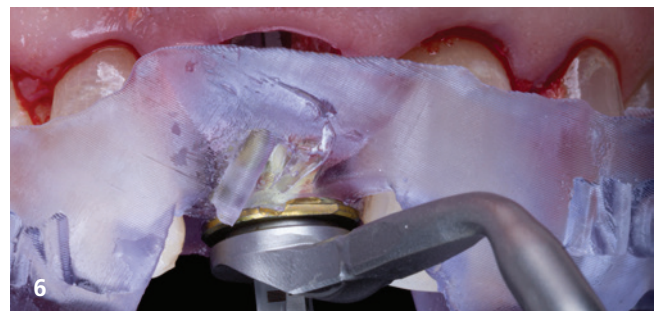


Fig. 5: Evaluation of tooth #11 showing absence of increased probing depth. – **Fig. 6:** Implant bed preparation following the extraction of tooth #11. – **Fig. 7:** Confirming complete preparation depth and correct orientation of the implant axis. – **Fig. 8:** Insertion of Straumann® Bone Level Tapered SLActive® implant using the surgical guide.

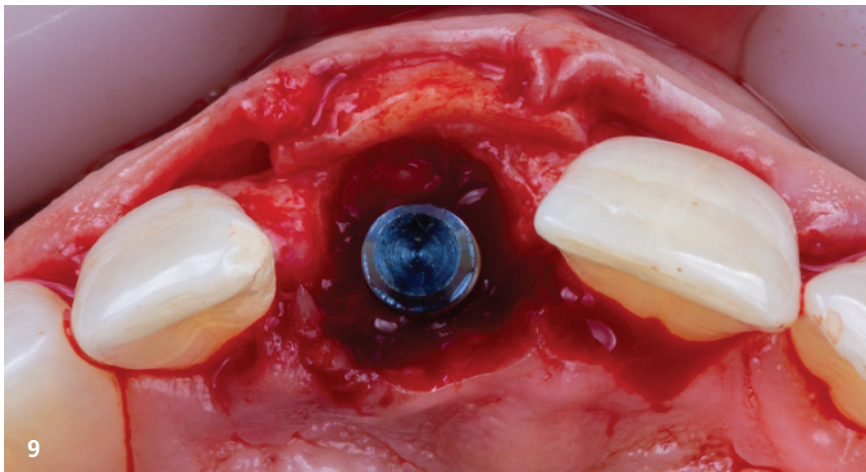


Fig. 9: Soft-tissue augmentation in the buccal zone with a connective tissue graft.

Surgical procedure

We initiated the evaluation of the tooth, noting the absence of dental plaque, bleeding on probing, or increased probing depth (Fig. 5). Local anaesthesia with 4% articaine and 1:100,000 epinephrine was administered, and tooth #11 was extracted atraumatically.

The sterile surgical guide was verified and positioned for implant-site preparation following the extraction. The implant bed was prepared according to the manufacturer's guidelines (Fig. 6). The Straumann® depth gauge was utilised to confirm the complete preparation depth and the correct orientation of the implant axis (Fig. 7).

The Straumann® Bone Level Tapered 3.3 mm SLActive® 12 mm implant was inserted using the surgical guide with the

aid of the handpiece in a clockwise direction at a speed of 15rpm torqued to 35Ncm (Fig. 8). Soft-tissue augmentation was performed in the buccal zone with a connective tissue graft (Fig. 9).

A tension-free closure of the soft tissue was achieved, and a provisional abutment was placed (Fig. 10). A radiograph was taken to confirm the precise positioning of implant #11 in relation to teeth #21 and #12, as well as the placement of the abutment. Subsequently, the abutment was torqued to 35Ncm using a torque wrench, followed by the placement of an immediate temporary crown (Fig. 11). Proximal contacts and occlusion were verified, and all occlusal contacts were adjusted to eliminate interference during lateral and excursive movements. The patient received instructions on care and hygiene.

The site demonstrated good healing at the time of suture removal ten days later and at subsequent follow-up appointments.

Prosthetic procedure

Four months after the implant had healed and osseointegration was confirmed, the temporary crown was removed. The gingiva was examined for healing, showing sufficient interdental papilla and buccal contours similar to those of the adjacent teeth (Figs. 12+13).

A digital impression was taken using a Virtuo Vivo™ IOS, and the final crown was placed, ensuring proper occlusion and aesthetics. A radiographic intra-oral examination confirmed the absence of any pathological findings (Fig. 14). Access holes were sealed with Teflon and composite restoration. The patient was highly satisfied with the treatment's aesthetic and functional results. Oral hygiene instructions were given, and follow-up appointments were scheduled.

Clinical and radiographic evaluations were performed yearly. During these follow-up assessments, at two (Fig. 15) and six years (Figs. 16+17), the clinical examinations showed well-maintained gingival tissues and gingival margin around the implant. The prosthesis was deemed satisfactory in terms of aesthetics, and patient satisfaction. At six years, the radiographic evaluation confirmed the preservation of peri-implant bone tissue (Fig. 18).

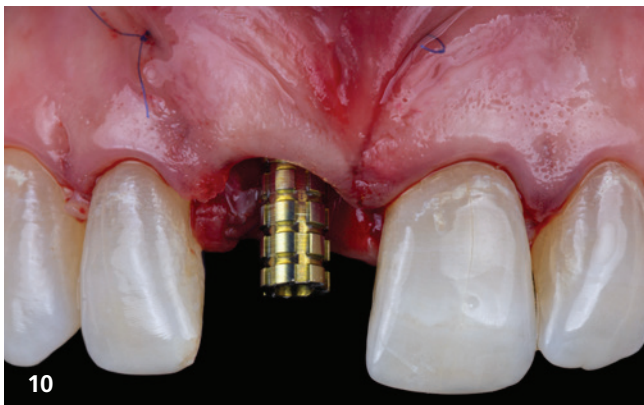
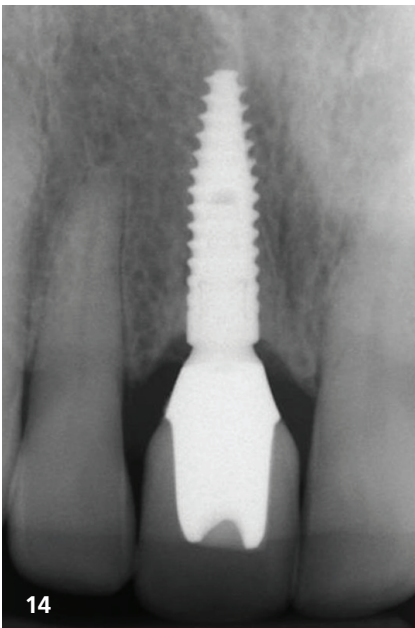
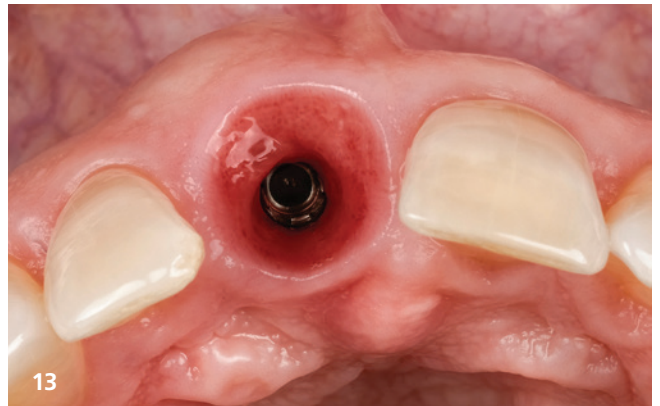


Fig. 10: Placement of the provisional abutment. – **Fig. 11:** Immediate temporary crown.



Figs. 12+13: Four months after the surgery, presence of sufficient interdental papilla and buccal contours similar to those of the adjacent teeth. – **Fig. 14:** Radiographic examination of the final crown. – **Fig. 15:** Two-year follow-up showing well-maintained gingival tissues. – **Figs. 16+17:** Six-year follow-up showing stable gingival margin around the implant. – **Fig. 18:** Six-year follow-up radiographic evaluation.

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Treatment outcomes

The final outcome demonstrated exceptional health in both the hard and soft tissues. The gingival tissue surrounding the implants has remained stable with no recession for six years following final crown placement. The patient expressed gratitude, stating, "I am very pleased with the treatment results, especially having had a provisional prosthesis from the outset. The new crown looks natural and blends perfectly with my other teeth—I love it."

Conclusion

The key to successful implant therapy in the anterior aesthetic zone is the optimal management of the relationship between hard and soft tissues. Implants that are adequately stabilised can be successfully loaded without occlusal contact at the time of implant placement. They can later be definitively loaded with occlusal contact, without compromising function or aesthetics.



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References



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