

Guided immediate implant placement in the anterior zone

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Implant surgery with post-extraction positioning and immediate loading represents a reliable and desirable treatment in relation to comfort and a reduction of the number of surgical procedures.



Fig. 1: Initial situation. **Fig. 2:** Situation after prosthesis removal—vestibular view. **Fig. 3:** Situation after prosthesis removal—occlusal view.

On the other hand, the possibility of maintaining dental elements is always preferred, especially in younger patients and in patients with a poor systemic clinical condition. In some cases the evaluation of the cost-benefit ratio, the prognosis and the clinical condition of the patient allows a multidisciplinary approach (e.g. orthodontic-surgical)¹ which can guarantee a significant improvement in the prognosis of the prosthetic treatment by giving new life to dental elements partially compromised.

In other cases, a careful assessment of the patient's clinical and functional condition, combined with their wishes, can push the clinician and the patient to prefer this type of implant rehabilitation in total safety.

The use of guided surgery in the aesthetic sector reduces the margin of error in implant placement and allows the clinician to focus more on the reconstructive procedures that are often associated with this type of treatment.²

Patient history

A non-smoker and systemically healthy 72-year-old female came to our clinic complaining of pain and swelling in correspondence with the tooth #12 and mobility of the four-unit bridge 12–22 (Fig. 1).

After removing the prosthesis, a pathological condition of the three roots appeared, with caries and coronal fractures (#12 and #21). Site 11 was edentulous and volumetrically resorbed (Figs. 2 & 3).

Treatment plan

After performing periapical radiographs and a cone beam CT (Fig. 4), two treatment hypotheses were formulated. The first involved the maintenance of the three roots through a multidisciplinary orthodontic and surgical approach, aiming to obtain a conservative restoration.

The second treatment plan involved the extraction of the three roots and post-extraction guided implant insertion with immediate loading to support a new four-unit bridge.

After considering the orthodontist's opinion and evaluating all aspects, especially with regard to prognosis, the patient chose the immediate implant treatment.

Surgical procedures

The surgery performed under local anaesthesia began with the atraumatic avul-

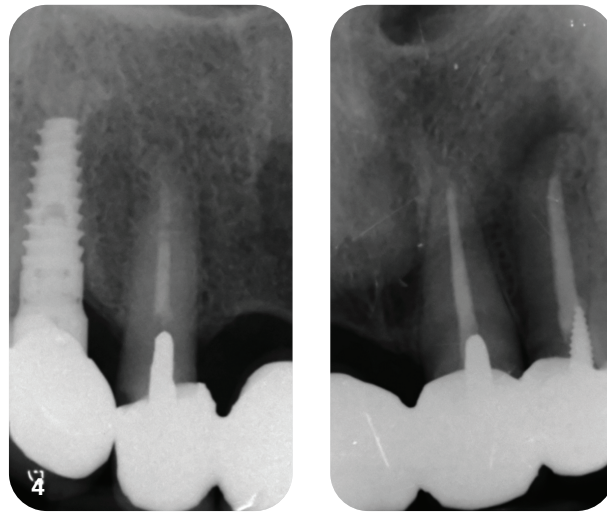


Fig. 4: Preoperative periapical X-ray.

sion of the three incisors (Fig. 5) and the application of the dental-supported surgical guide (Fig. 7; INTEGRAL, Anthogyr). The planned positions were #12 (post-extraction), #11 (healed and resorbed bone crest) and #21 (post-extraction; Fig. 6).

It was decided not to place the implant in position #22 as it was not necessary for the prognosis and for the presence of an endodontic lesion that made the alveolus even deeper: the possibility of obtaining a sufficient implant stability was doubtful.

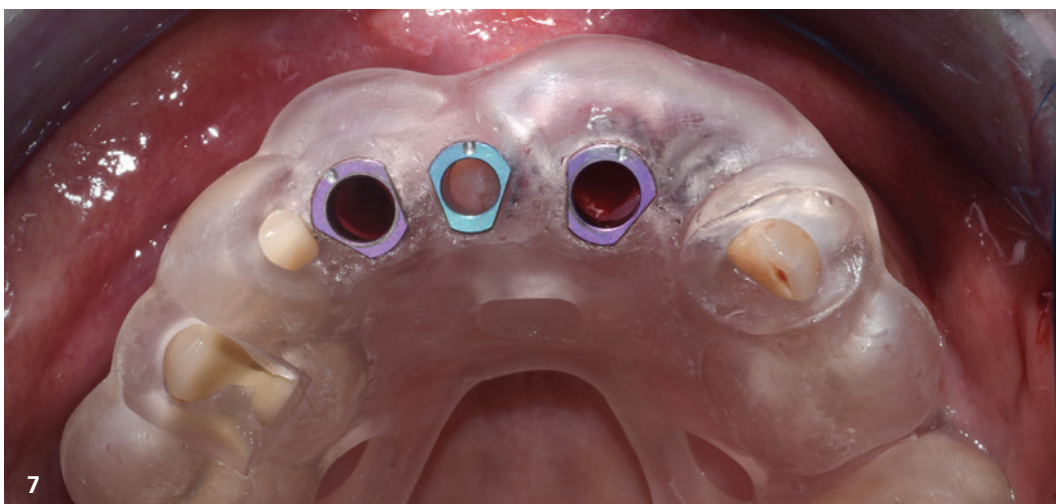
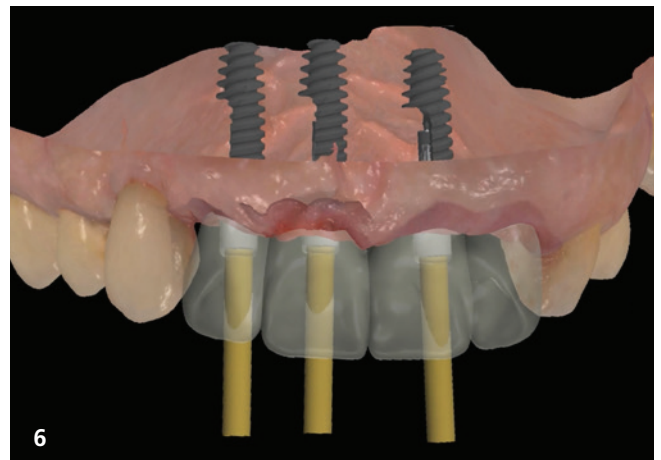
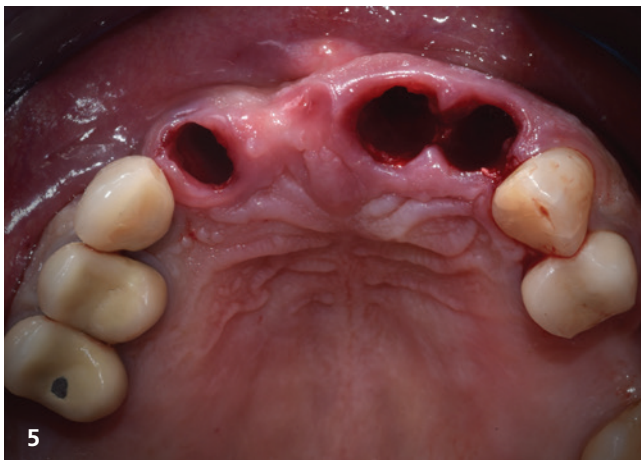


Fig. 5: Occlusal view of the extraction sockets.

Fig. 6: Implants planification.

Fig. 7: Integral guide, occlusal view.

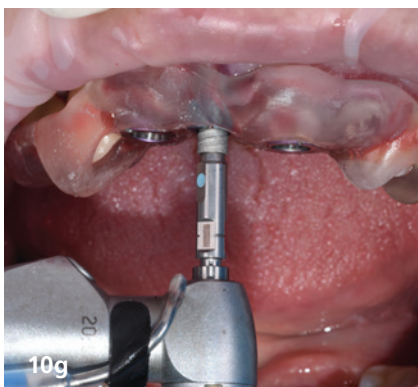
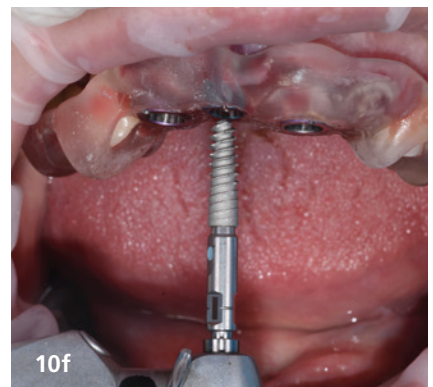
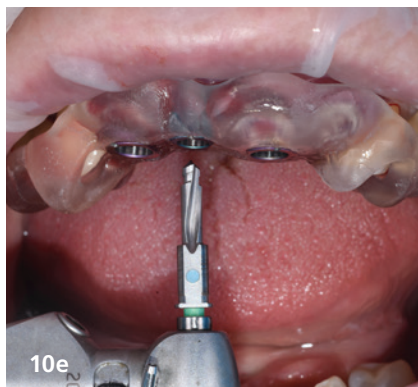
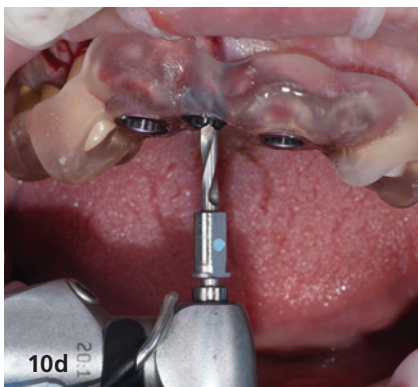
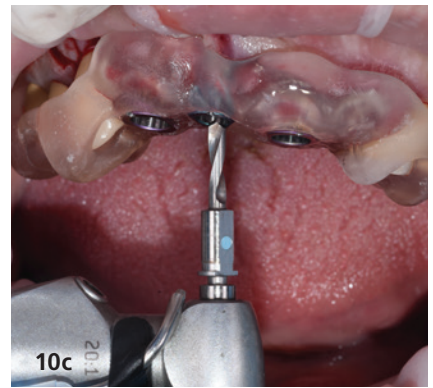
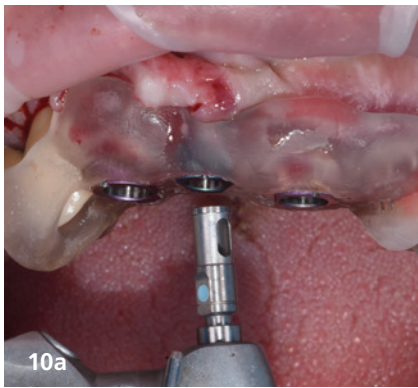
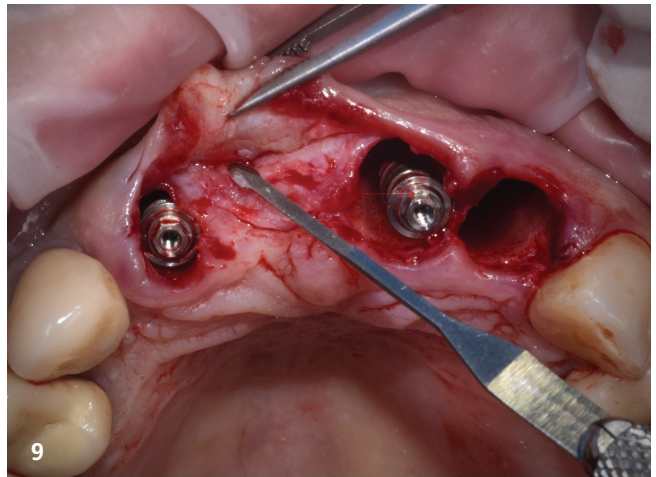
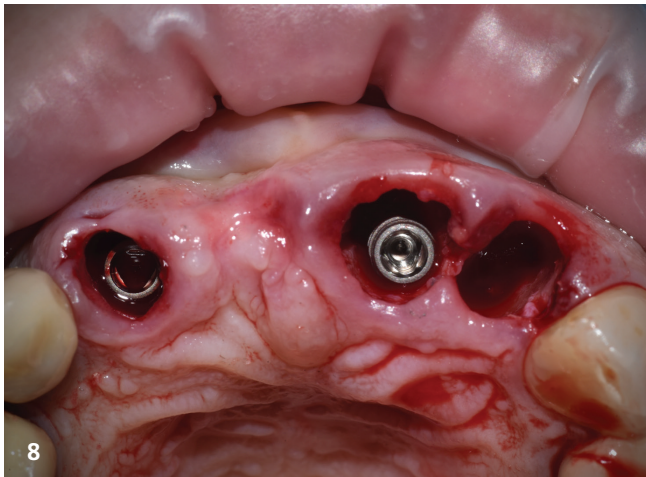
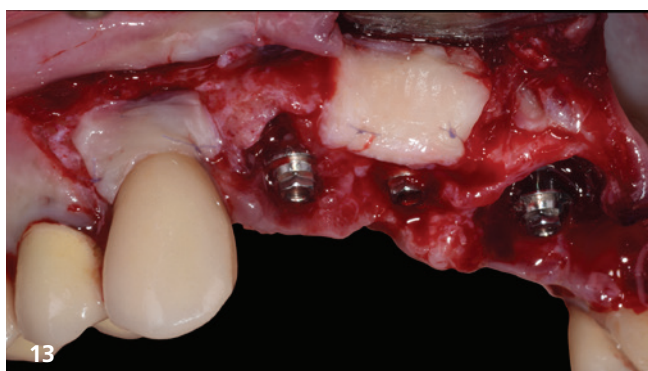


Fig. 8: Occlusal view of the two 4 x 14 mm implants in sites. **Fig. 9:** Flap elevation. **Figs. 10a–g:** Integral drilling protocol for a 3.4 mm diameter implant: (a) Tissue punch, (b) bone mill, (c) initial drill, (d, e) step drills, (f, g) implant placement. **Fig. 11:** Easy handling of the multi-unit abutment with its specific holder. **Fig. 12:** Tightening of the multi-unit abutments.



The chosen implant was Axiom X3®, a bone-level implant with conical connection, and self-tapping (Fig. 10f). The osteotomies of the two post-extraction sites (#12 and #21) were performed in a flapless approach; two implants with diameter 4 and length 14 were inserted into two purple sleeves. The bone density in the two sites, diagnosed by the cone beam CT and perceived during the osteotomies, was D4 for site #12 and D3/D2 for site #21.

According to the Axiom X3® insertion protocol, an undersized osteotomy was adopted: the last drill used for site #12 was the 2–2.4 mm (green) and for site #21 the 2.4–3 mm (red), respectively obtaining a torque of insertion of 45 Ncm and 52 Ncm (Fig. 8).

A half-thickness flap from #13 to #21 was then elevated (Fig. 9): the surgical guide was reapplied, an implant with diameter 3.4 and length 12 was inserted in site #11 into a blue sleeve (Ø 3.6 mm). The perceived bone density was D3/D2 and the last drill used was therefore the 2–2.4 mm (green); the torque obtained was 55 Ncm (Figs. 10a–g). The INTEGRAL guided surgery system is very comfortable to use, as no spoon or wrench are necessary to guide

Fig. 13: Connective tissue grafts sutured to the buccal periosteum.

Fig. 14: Digital impression. **Fig. 15:** Provisional prosthesis delivered in 24h. **Fig. 16:** First provisional prosthesis in mouth. **Fig. 17:** Emergence profiles four months after surgery.

Fig. 18: Optimised provisional prosthesis *in situ*. **Fig. 19:** Optimised provisional prosthesis on the model.

the drills and it allows single-handed procedures.

Once connected, the multi-unit abutments (0°, platform diameter 4 mm) were tightened to 25 Ncm using the Anthogyr dynamometrical wrench to obtain the conical coupling (Figs. 11 & 12).

We then proceeded with the grafting of the jumping distance of sites 12 and 21 and of socket #22: hemocollagen (Septodont) apically and Xenograft (Straumann) coronally (Fig.13). Thanks to a bilaminar grafting technique by palatal removal of de-epithelialised epithelial-connective tissue, the volume deficit was then corrected in the vestibular #11 and apical to the prosthetic crown #13 (pre-existing implant)^{3,4} finally the flap was advanced coronally.

After the surgery was completed, an intra-oral scan (3Shape) was performed for the construction of a provisional which was delivered to the patient within 24 hours (Figs. 14–16).

After four months, the emergence profiles were optimised with small additions of flowable composite (Fig. 17) and at five months the optimised provisional (Figs. 18 & 19) was screwed onto the initial working model, once the false gingiva was removed and scanned to duplicate the shape and emergence profiles. A four-unit bridge screwed in zirconia was then created (vestibular ceramic veneering, cemented on stock abutment for MUA; Figs. 20–24).

Conclusion

The treatment plan performed was carried out without any surgical or prosthetic complications.

The accuracy of implant placement⁴ and the achievement of an adequate stability in the absence of excessive stress on the bone tissue are two very important factors for this type of treatment: the guided surgery system used (INTEGRAL, Anthogyr) associated with an implant with a modern and performing design (Axiom X3®, Anthogyr) facilitated the achievement of a satisfactory result for the team and for the patient.

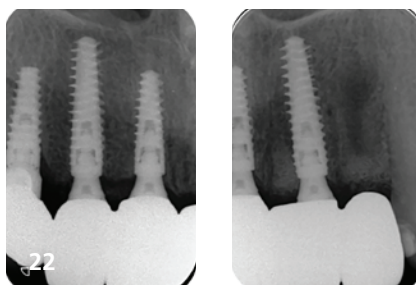


Fig. 20: Final zirconia restoration. **Fig. 21:** Final zirconia restoration *in situ*. **Fig. 22:** Periapical X-rays five months after surgery. **Fig. 23:** Final smile. **Fig. 24:** Before/after situation.

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References



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