Resolving severe bone atrophy

with the cortical lamina technique and innovative materials

Dr Roberto Rossi, Dr Giovanni Franzone & Stefano Giulini, Italy

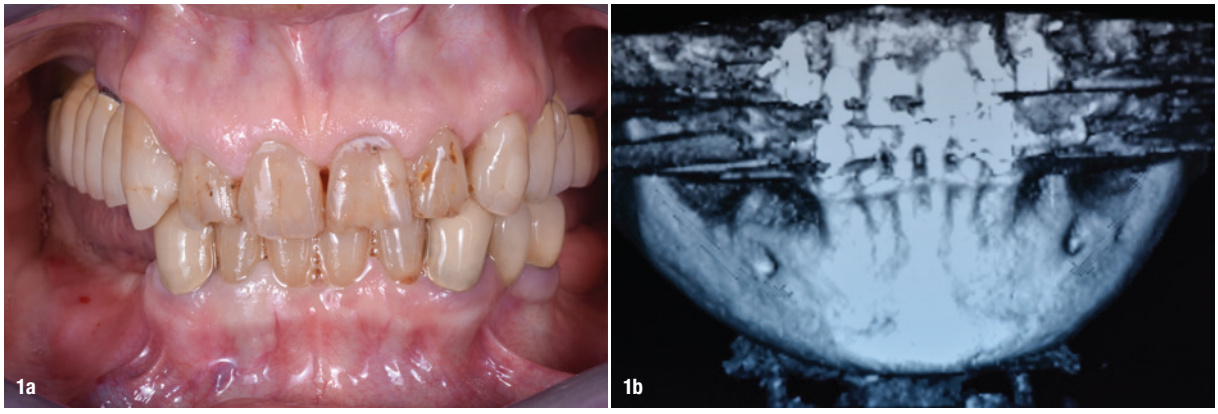


Fig. 1a: Initial situation. **Figs. 1b & c:** Initial CBCT scan.

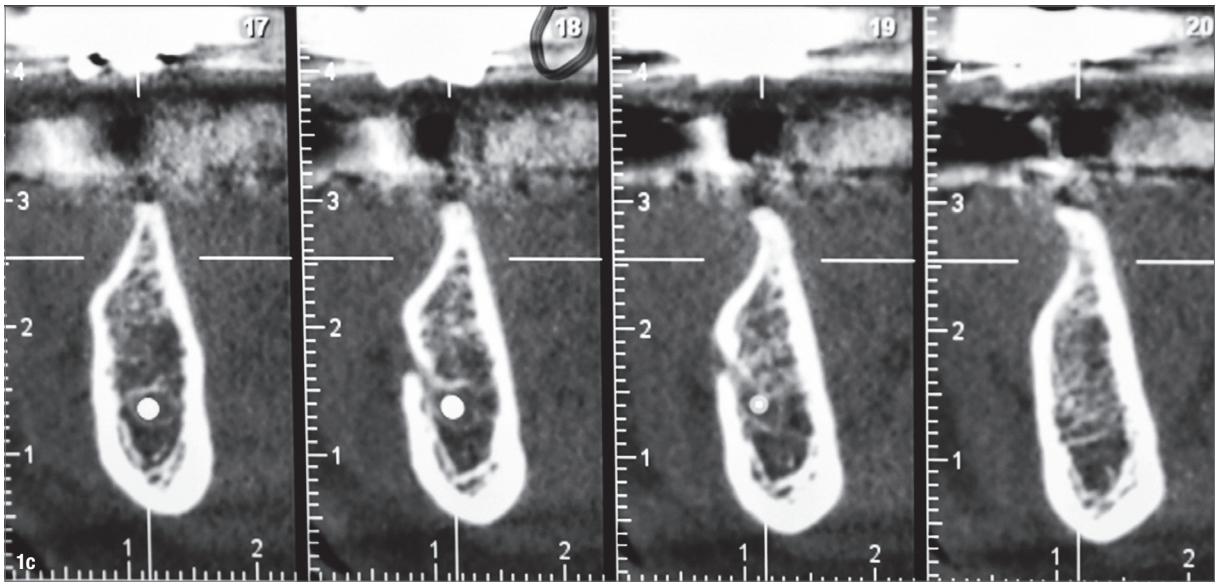
Introduction

The 65-year-old female patient presented for treatment of her bilateral posterior edentulism. She presented with a negative medical history and the loss of her diathoric teeth as a result of fractures after an old prosthesis (Fig. 1a). The CBCT scan of the mandibular dental arch showed a horizontally resorbed edentulous bone ridge with an average thickness not exceeding 3 mm (Figs. 1b & c). After a preventive oral hygiene session, bone regeneration using the cortical plate technique was planned (Fig. 2).

The objectives of the treatment plan designed for this patient included in the first phase the insertion of implants (Neodent, Straumann), two implants in the left of and four in the right of the mandible, with subsequent augmentation of the bone volume and at the uncovering of the implants the increase of the soft tissue, given the small amount of attached gingiva.

Materials and methods

Local anaesthesia with articaine with 1:200,000 adrenaline was administered. An incision with a #12 blade was



Dentsply Sirona

INTRODUCING DS PRIMETAPER™

THE PERFECT UNION OF FORM AND FUNCTION

DS PrimeTaper is a demonstration of science and art in harmony. With immediate function and intuitive digital workflows, these unique implants will complement and enhance your expertise.

- EFFICIENT HANDLING
- LASTING BONE CARE
- ENVIABLE ESTHETICS
- SEAMLESS WORKFLOW INTEGRATION

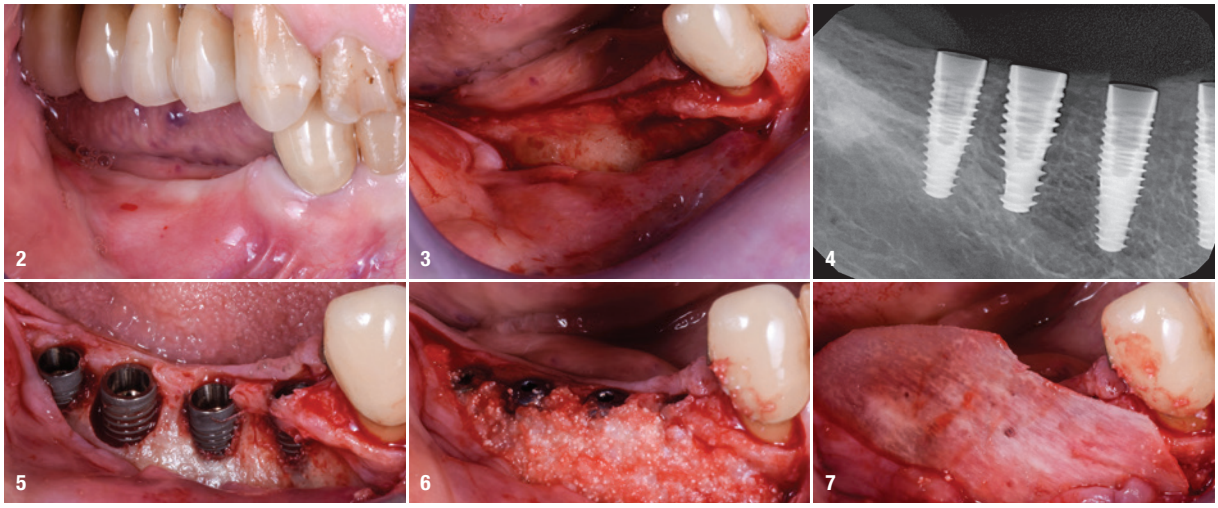


Fig. 2: Close-up of the edentulous area. **Fig. 3:** Exposure of the residual bone ridge. **Fig. 4:** Post-op radiograph. **Fig. 5:** Implants in position. **Fig. 6:** Bone grafting material placed. **Fig. 7:** Lamina inserted.

made on the edentulous ridge, taking care to divide the small amount of keratinised gingiva equally between the vestibular and lingual flaps. The exposed ridge confirmed what had been observed on the CBCT scan: the thickness in the ridge was 3 mm in the area distal to the canine and thinned to 1 mm in the molar area (Fig. 3). Near site #46, there was a residual root, which was removed, and an implant of standard diameter (4 mm) was inserted in the same position, whereas the implants placed in the premolar and second molar sites were of reduced diameter (3.5 mm; Fig. 4).

The postoperative radiograph showed that the implant in site #46 was anchored to the bone only by its apical portion. The clinical image showed an evident vestibular dehiscence affecting all four implants, at least five to six implant threads being exposed outside the crest, and evident volume insufficiency horizontally (Fig. 5).

For this specific clinical situation, a grafting material (GTO, OsteoBiol) with special characteristics was selected. This sticky biomaterial is composed of collagenous porcine bone combined with a thermosensitive gel (TSV Gel, OsteoBiol), allowing it to jellify and become solid on contact with the moisture of the mouth. GTO can be used to create and maintain volume even in an anatomically unfavourable situation. Its properties make it both easy to mould to the defect and stable. Figure 6 shows how this stability makes it possible to apply an adequate amount of material to correct the defect in the ridge and cover the exposed implant threads.

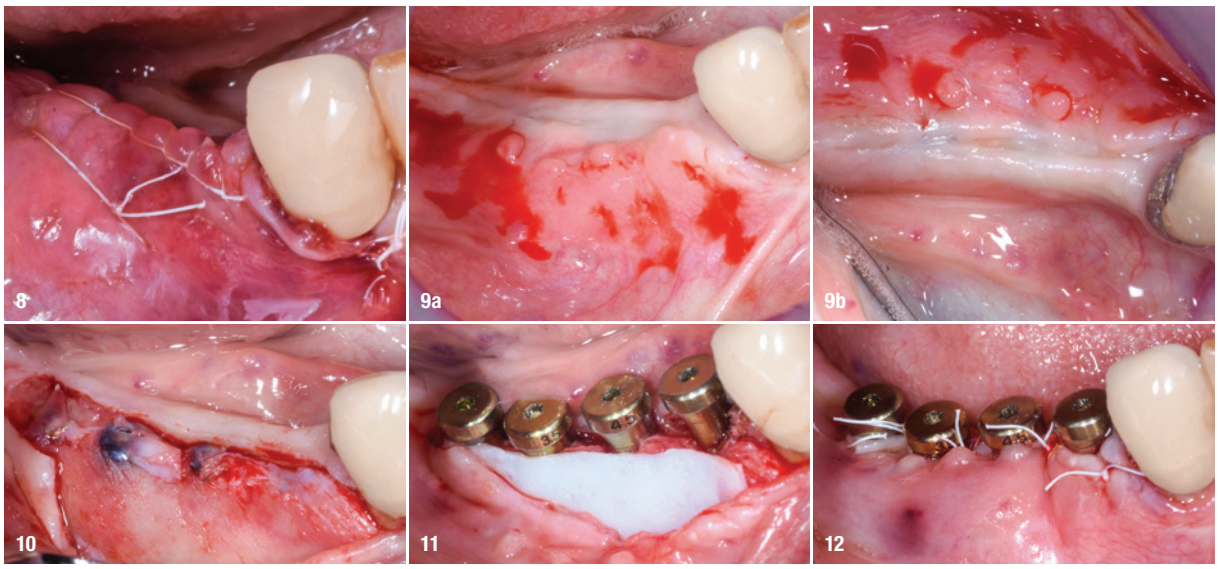


Fig. 8: Sutures. **Figs. 9a & b:** The ridge six months post-op. **Fig. 10:** Reintegration. **Fig. 11:** NovoMatrix (BioHorizons) in position. **Fig. 12:** The sutured flap.

Fig. 13: Occlusal view of the ridge. **Figs. 14a & b:** Fixed crowns in position.

The procedure was completed with the use of a fine cortical lamina (Lamina, OsteoBiol) as a membrane. The lamina was adequately modelled, cut out, hydrated with a clot of blood from the patient and stabilised by the stickiness of the graft, which it covered, helping it adhere to the underlying bone (Fig. 7).

Sutures play a crucial role in this phase. One or two horizontal mattress sutures with a PTFE thread aim to compress the lamina horizontally and to produce coronal tissue positioning. The flaps are then approximated using a continuous blocking suture to guarantee airtight closure of the area (Fig. 8). This type of graft, that is using a membrane made of bone, takes slightly longer to heal. This being a large graft, it was decided to re-explore the area after a six-month period of healing (Figs. 9a & b).

Under local anaesthesia, an incision that left a modest part of the attached gingiva on the lingual side

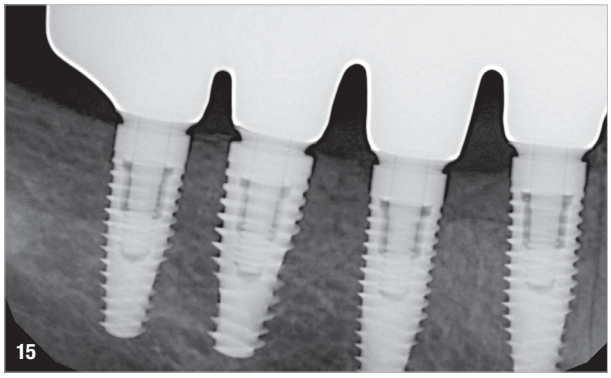


Fig. 15: Radiograph taken at six months after implant insertion. **Fig. 16:** Follow-up at 12 months post-op.

was made and a full-thickness vestibular flap was raised, revealing excellent mineralisation of the lamina and maintenance of the horizontal volume (Fig. 10). It could also be seen how the bone had formed and mineralised even above the screws covering the implants.

To remove the bone layer, it was necessary to use a diamond drill in order to unscrew the covering screws and connect the healing screws. At the same time as the implants were being uncovered, the planned vestibular soft-tissue augmentation of the reconstructed area was performed. Given the size of the area to be augmented and the scarcity and quality of palatal tissue (as well as the difficulty of access in a relatively small mouth), it was decided to use a connective tissue substitute of the same origin as the grafts (NovoMatrix, BioHorizons). This biomaterial has a peculiarity that differentiates it from similar products: it is pre-hydrated and reminiscent of native connective tissue, has a thickness of 0.8 mm and is available in different sizes. In this case, it can be seen that with a 2.5 × 1.5 cm strip the entire previously grafted area was substantially increased (Fig. 11). Given the easy manageability and stability of this new type of graft, it was not necessary to suture it to the underlying tissue or implants, so it was simply inserted under the vestibular flap and repositioned at the neck of the healing screws (Fig. 12).

About eight weeks later, the integration of the grafts (bone and soft tissue) and the significant difference in the vestibular ridge volume could be observed (Fig. 13). Three months after the implants had been uncovered and the tissue had completely healed, impressions were taken and definitive zirconia crowns placed (Figs. 14a & b). The radiograph taken six months after prosthetic completion (Fig. 15) showed the stability of the prosthesis–implant complex and the complete reconstruction of the bone defect surrounding the implants. Compared with Figure 1a, Figure 16 shows how the initially concave edentulous area was restored to a convex shape to protect the prosthetic restoration.

Conclusion

The correct diagnosis and planning of complicated cases are key factors for achieving a sustainable result. A fundamental component is knowledge of new biomaterials and their correct application in complex situations. In the present case, the use of this particular sticky grafting biomaterial in an unfavourable anatomical situation helped to achieve rapid healing without any complications. The decision in favour of a fine lamina rather than a thick, rigid one facilitated the integration and the excellent mineralisation of the lamina itself.

The choice of a conical implant with an aggressive tip facilitated primary stability (especially in the post-extraction site) even where the anatomy was unfavourable. Grafting a biomaterial instead of autologous connective material simplified the procedure and reduced morbidity to zero. For this reason, it is believed that knowledge of the best, new and innovative biomaterials is the way forward to make even complex procedures simple in the future.

about the author

Dr Roberto Rossi graduated in dentistry and dental prosthetics (with honours) from the University of Genoa in Italy and obtained a specialist qualification in periodontics in 1991 and an MSc in dentistry in periodontics from the Boston University Henry M. Goldman School of Dental Medicine in the US in 1992. Since 1993, he has been practising in his practices in Casale Monferrato and Genoa in Italy. He has been a contract professor in several Italian universities and since 2004 has been a contract professor in the master's degree in periodontics programme at the Sapienza University of Rome in Italy.

contact

Dr Roberto Rossi
+39 010 5958853
drrossi@mac.com

Dr Roberto Rossi

Literature

Premium Partner:

straumanngroup Geistlich Biomaterials

51ST INTERNATIONAL ANNUAL CONGRESS OF DGZI

30 September/1 October 2022
Hotel Berlin Central District

SAVE THE DATE!

© Alexandr Bakanov – stock.adobe.com

DOWNLOAD
REGISTRATION FORM

www.dgzi-jahreskongress.de

DGZI
Deutsche Gesellschaft für Zahnärztliche Implantologie e.V.

OEMUS MEDIA AG

Holbeinstraße 29 · 04229 Leipzig · Germany · Phone: +49 341 48474-308 · event@oemus-media.de