

Anterior Maxillary Defect Reconstruction in a Late-stage Implant Placement. A Case Report

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Introduction:

As a result of the loss of the periodontal ligament and its vascular support, tooth extraction can lead to alveolar bone resorption, which is a physiological process¹. Consequently, deterioration of this vascular support in the anterior maxilla, a region with significant aesthetic significance and thin buccal bone, has important implications².

These changes result in considerable dimensional alterations, often requiring horizontal alveolar ridge augmentation procedures to facilitate successful implant placement³.

Case presentation:

A 54-year-old male patient is referred to the Postgraduate Course in Periodontics and Oral Implantology at ENES UNAM León with missing teeth due to facial trauma 37 years ago. He presents a medium class I defect in the anterior maxillary area, following the classification of deficiency of horizontal, vertical, and combination (HVC) crest by Wang⁴. Preoperative evaluation, including the use of cone beam computed tomography (CBCT), radiographs, and digital scanning, were essential to guide surgical planning.

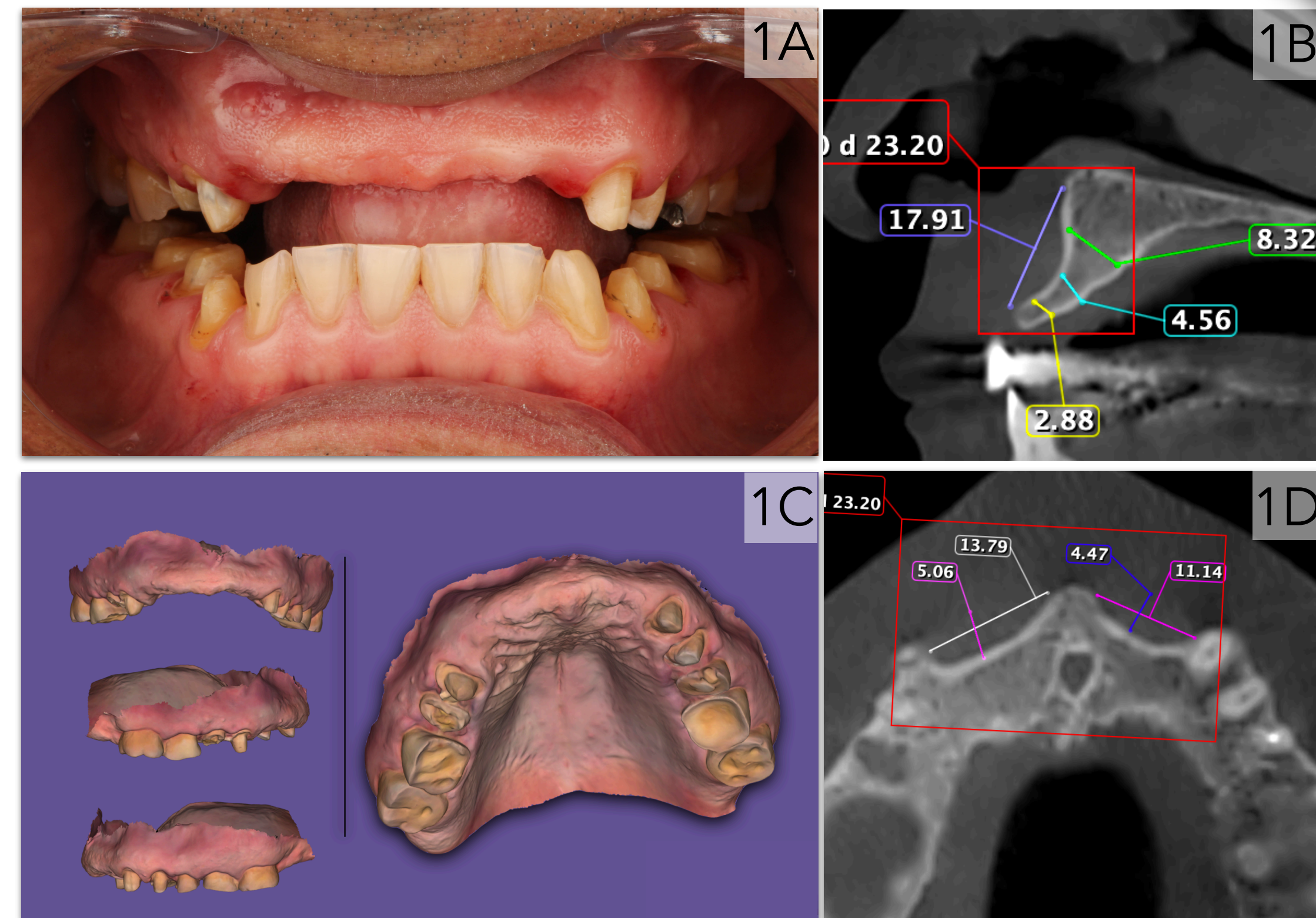


Figure 1. Diagnostic tools and surgical planning for alveolar ridge augmentation in the anterior maxillary area.
 Fig. 1A) Initial clinical photograph. Fig. 1B) Initial sagittal tomographic section with alveolar ridge measurements in the anterior area in the apicocoronal and buccopalatine direction. Fig. 1C) Initial digital scan of the upper maxillary arch. Fig. 1D) Initial axial tomographic section with alveolar ridge measurements in the anterior area in the buccopalatine direction.

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Methods:

In this case, an alveolar ridge augmentation procedure was used, which involved the guided bone regeneration technique, with the use of autogenous graft, xenograft and allograft biomaterials, in combination with a porcine-derived collagen membrane. After a 20-week bone maturation and remodeling process, dental implants were placed in tooth areas 1.3, 1.1 and 2.2 previously augmented through guided surgery. Sequential prosthodontic restoration planning was carried out for the adequate conformation of the peri-implant soft tissues.

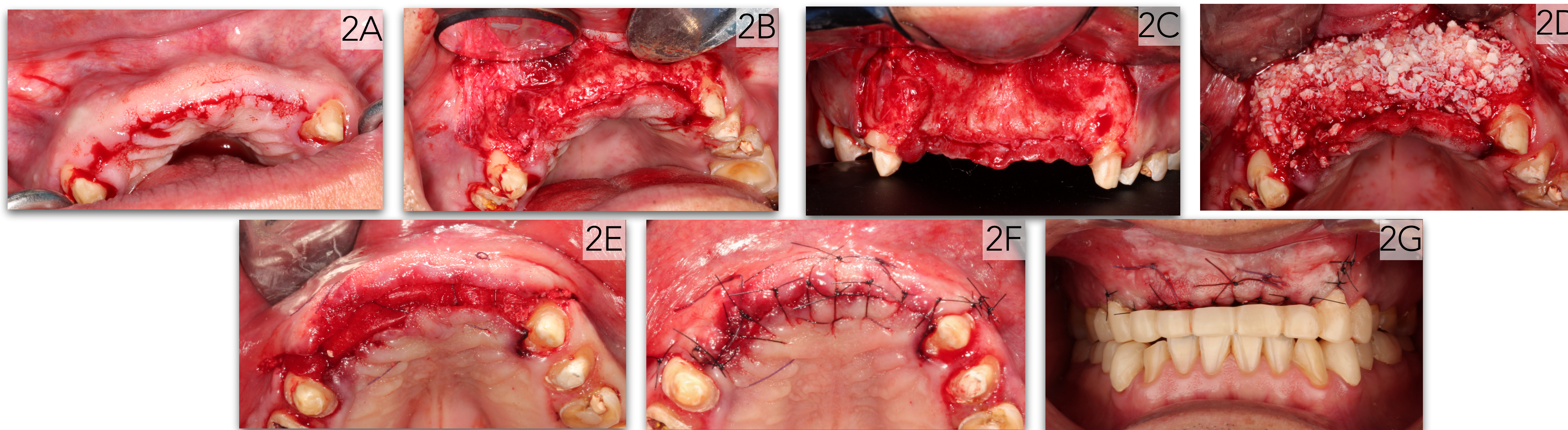


Figure 2. Transsurgical sequence of alveolar ridge augmentation in the anterior maxillary area. Fig. 2A) crestal incision with a 15c scalpel blade with vertical discharges along the longitudinal axis of adjacent teeth. Fig. 2B) mucoperiosteal flap elevation. Fig. 2C) exposure of upper anterior maxillary alveolar ridge bone defect. Fig. 2D) placement of autogenous, xenogeneic and allogeneic bone graft in bone defect. Fig. 2E) Fixation of collagen membrane of porcine origin with 4-0 polyglycolic acid suture. Fig. 2F) primary, tension-free closure with 5-0 nylon suture, with flaps adequately addressed. Fig. 2G) Immediate adaptation of provisionals without putting pressure on the surgical site.

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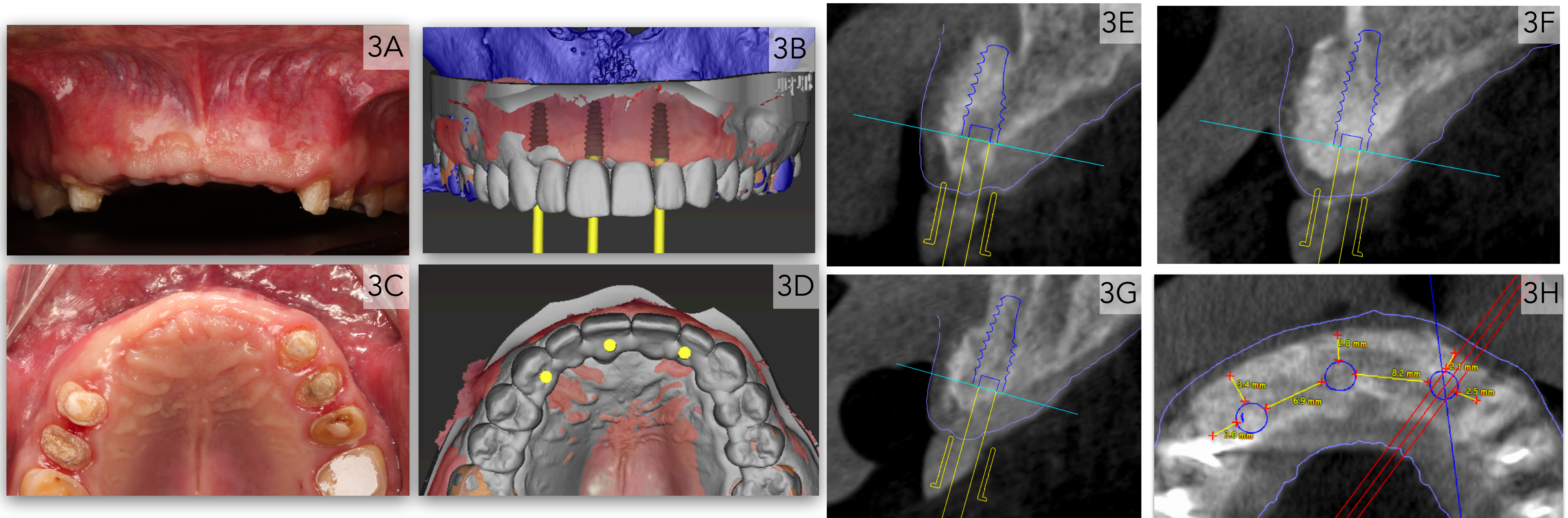


Figure 3. Surgical-prosthetic planning at 20 weeks after surgery. Fig. 3A and 3C) post-surgical clinical photograph of enlarged area. Fig. 3B and 3D) digital planning for the placement of dental implants in tooth areas 1.3, 1.1 and 2.2. Fig. 3E) Sagittal tomographic section of tooth area 2.2. Fig. 3F) Sagittal tomographic section of tooth area 1.3. Fig. 3G) Sagittal tomographic section of tooth area 1.1. Fig. 3H) Axial tomographic section with distances between tooth-implant.

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Results:

Significant volumetric results were obtained in posterior alveolar ridge increase at 20 weeks, with mature bone quality and a vestibular bone wall >2 mm.

This allowed the placement of the dental implants to be carried out successfully, obtaining a primary stability of 40 Ncm and an adequate distance between tooth and implant.

ZONE B-P	INITIAL	FINAL
I.3	2.8 mm	8.0 mm
I.1	6.0 mm	8.8 mm
2.2	4.4 mm	7.9 mm

Figure 4. Volumetric results of alveolar ridge increase 20 weeks after surgery, according to tomographic measurements in the buccopalatine direction.

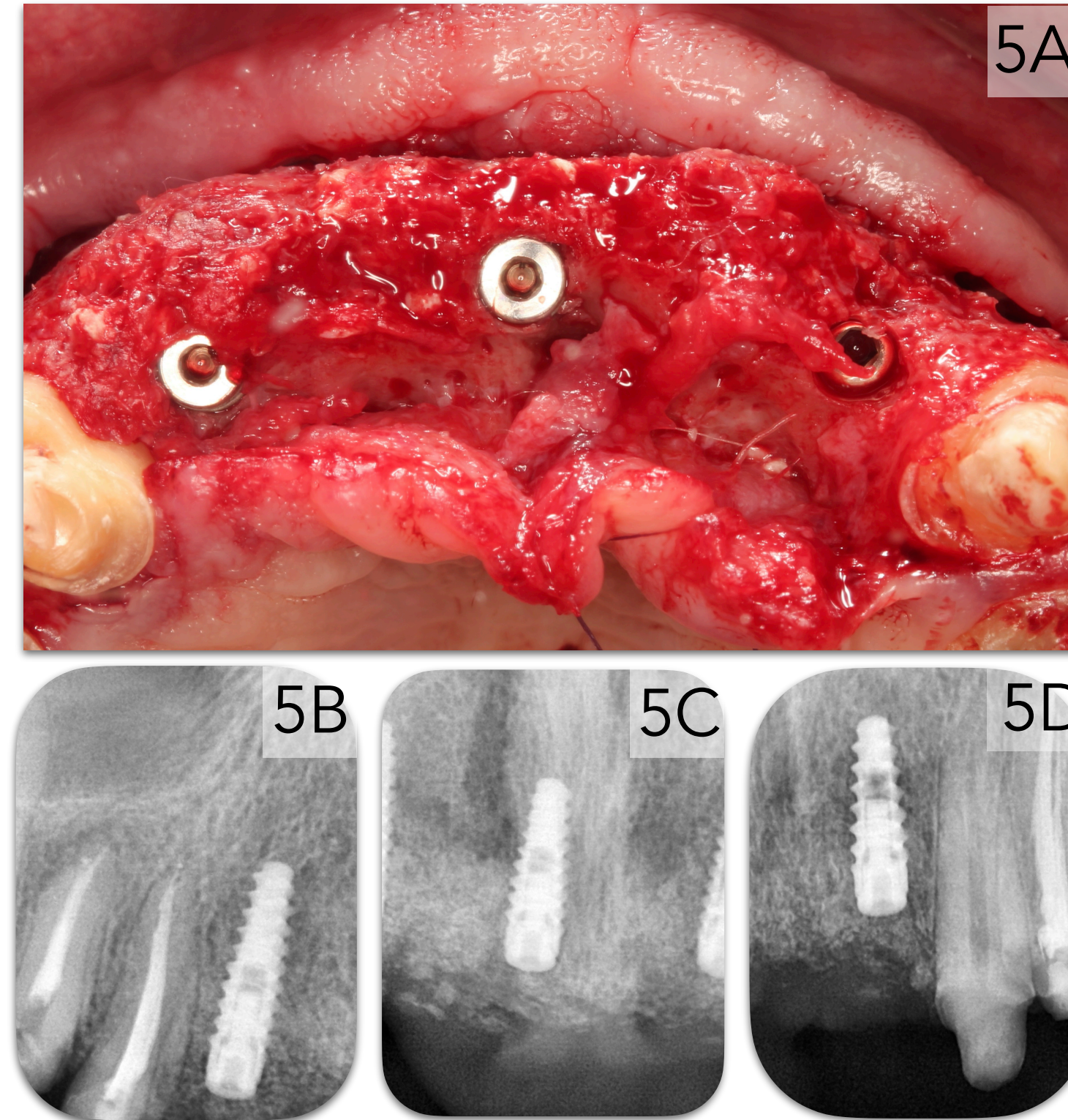


Figure 5. Transoperative photography and radiographs of dental implant placement. Fig. 5A) Transsurgical occlusal photograph with implants properly placed in tooth area I.3, I.1 and 2.2. Fig. 5B) periapical radiograph of 3.8 mm x 12 mm implant placed in tooth area I.3. Fig. 5C) periapical x-ray of 3.8 mm x 10.5 mm implant placed in tooth area I.1 Fig. 5D) periapical x-ray of 3.8 mm x 9 mm implant placed in tooth area 2.2.



Figure 6. Post-surgical photograph of the area after 3 weeks, where adequate healing is observed.

Conclusion:

Considering the morphological changes that are triggered after tooth loss is essential for greater precision and predictability in implant therapy.

For this reason, the alveolar ridge augmentation technique represents a therapeutic alternative, mainly in aesthetically compromised areas, such as the anterior maxillary region, where the placement of prosthetically guided dental implants is not possible at the time of initial planning.

Understanding and addressing the challenges each case presents is critical to long-term success in the field of implantology.



Figure 7. ePoster file and references QR.