

Simultaneous Implant Placement in the Posterior Atrophic Mandible Using Combined Techniques: A Case Report

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INTRODUCTION

- Dental implants have proven to be a successful treatment modality in the replacement of missing teeth. However, optimal bone quantity, quality, and location are considered prerequisites for implant application. It is common for dentists to encounter patients with resorbed ridges, where the amount of available bone is deficient. For the purpose of mitigating these ridge defects, a variety of bone augmentation techniques have been developed to facilitate simultaneous or staged implant placement. These techniques have demonstrated predictable outcomes when the biological principles of wound healing are followed.
- The aim of this case report is to demonstrate the use of alveolar ridge split technique, osseodensification, and guided bone regeneration (GBR) with simultaneous implant placement in the severely atrophic posterior mandible.

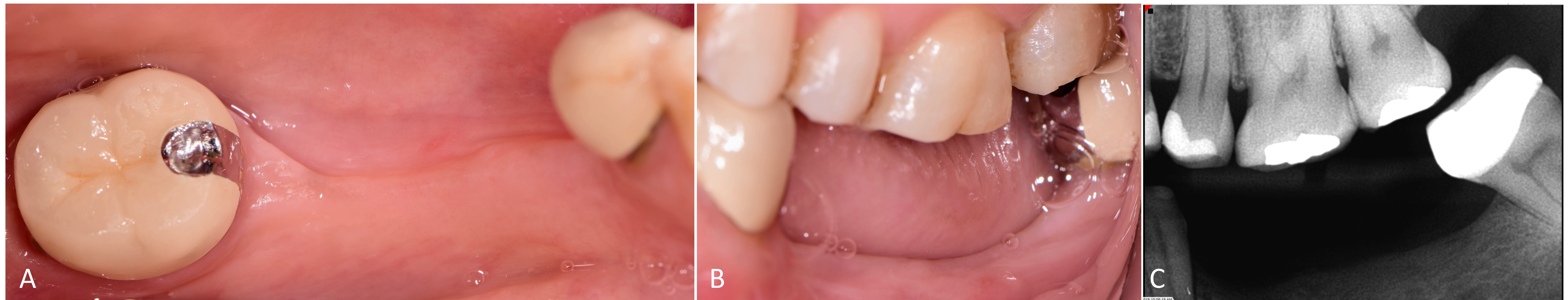


Figure 1. A, Initial presentation- Occlusal View; B, Initial Presentation- Left Buccal View; C, Left Posterior Bite Wing Radiograph

MATERIALS AND METHODS

Clinical Presentation:

A partially edentulous, 36-year-old female presented with the chief complaint (CC) that she wanted “implants to replace her missing lower teeth”. Periodontal evaluation showed pocket depths < 4 mm, no mobility, no recession, a thin gingival phenotype, a narrow band of keratinized gingiva, and adequate oral hygiene. Narrow posterior mandibular ridges, mesially tilted #17, and supra-erupted #14 were also observed.

Radiographic Presentation:

CBCT analysis revealed a posterior mandible with bilaterally reduced vertical height and width, but no apparent pathology. Site #18 had < 3 mm of ridge width, crest approximately 11 mm from the inferior alveolar nerve (IAN), and a lingual concavity. Site #20 had a ridge width of < 3 mm and crest approximately 10 mm from the IAN.

Diagnosis:

A loss of ridge height and bucco-lingual width was determined upon intra-oral examination. Diagnostic casts were prepared in anticipation of the definitive restorations. It was determined that the current ridge volume was inadequate for implant placement and would require bone augmentation. Prosthetic consultation confirmed adequate spacing for appropriate teeth proportions.

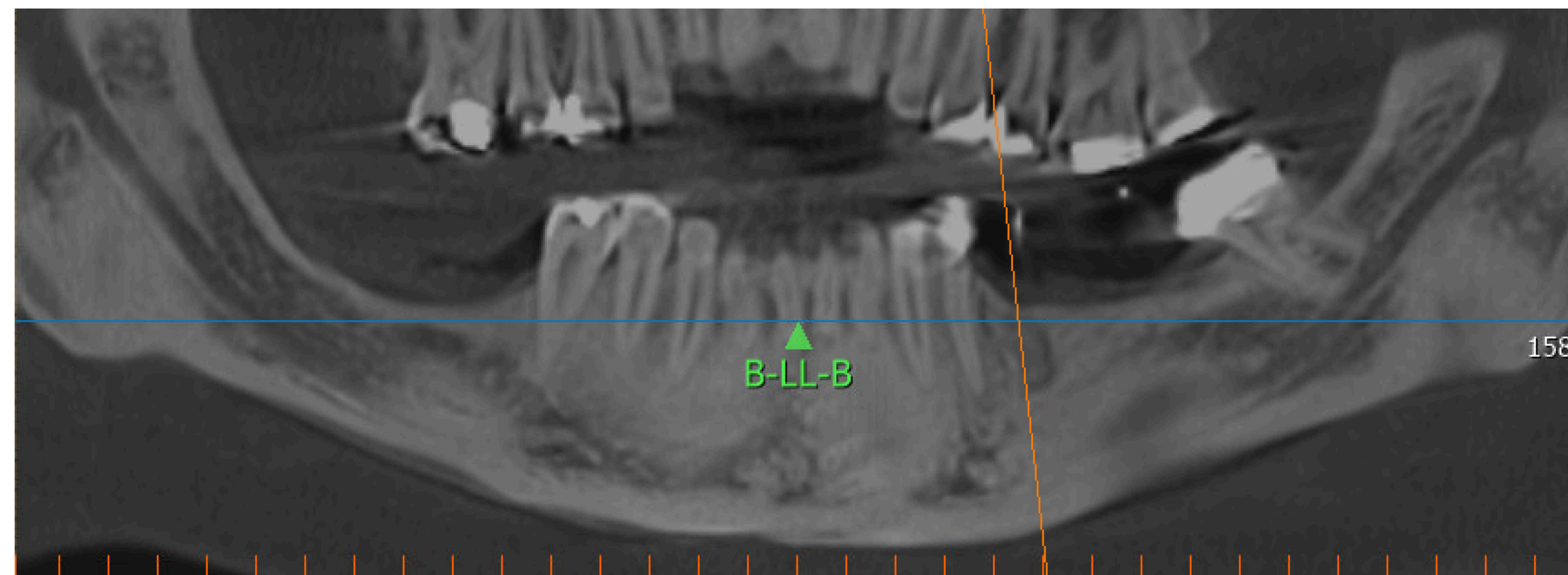


Figure 2. Panoramic view of partially edentulous mandible.

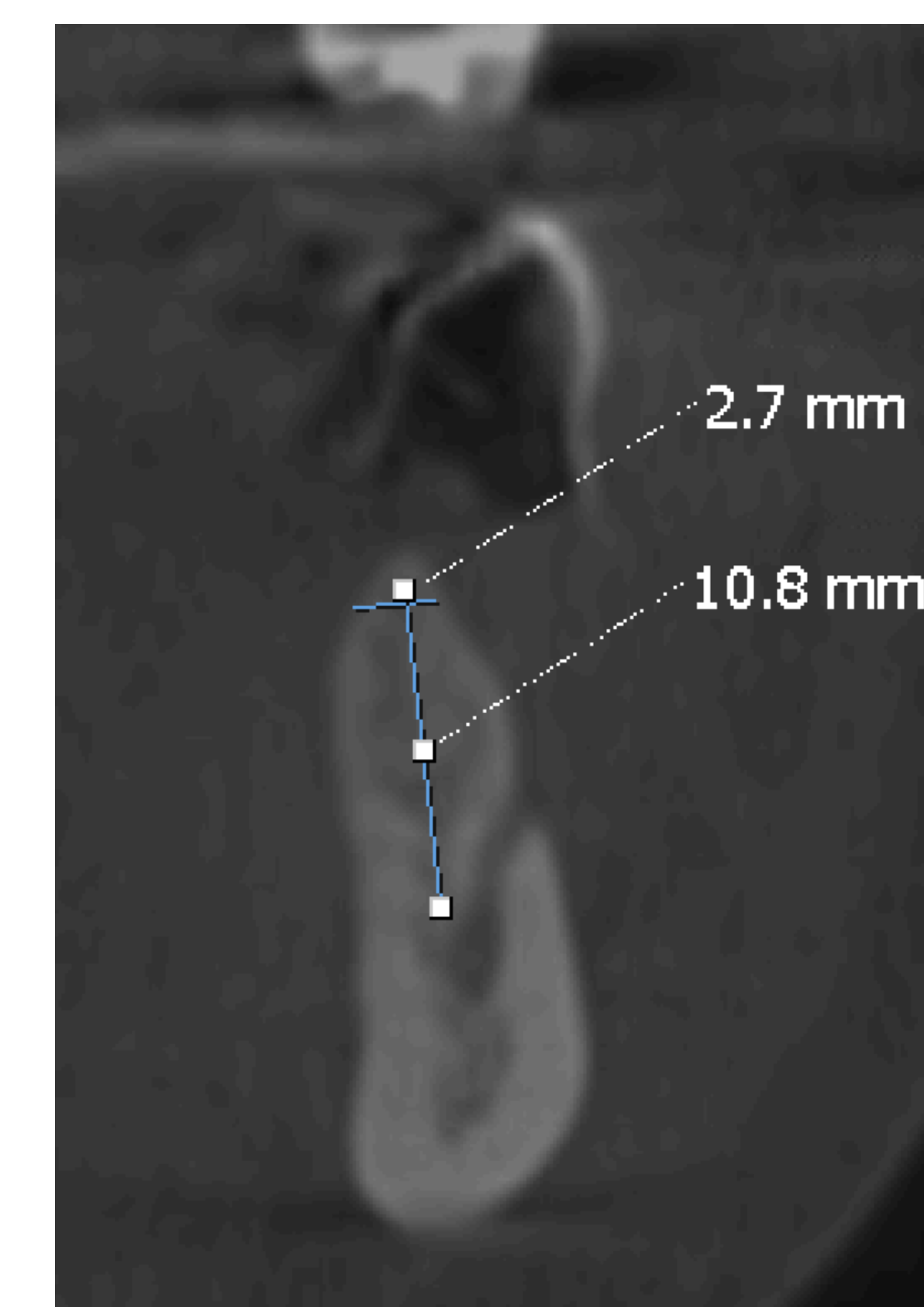


Figure 3. Cross-sectional view of #20 site.

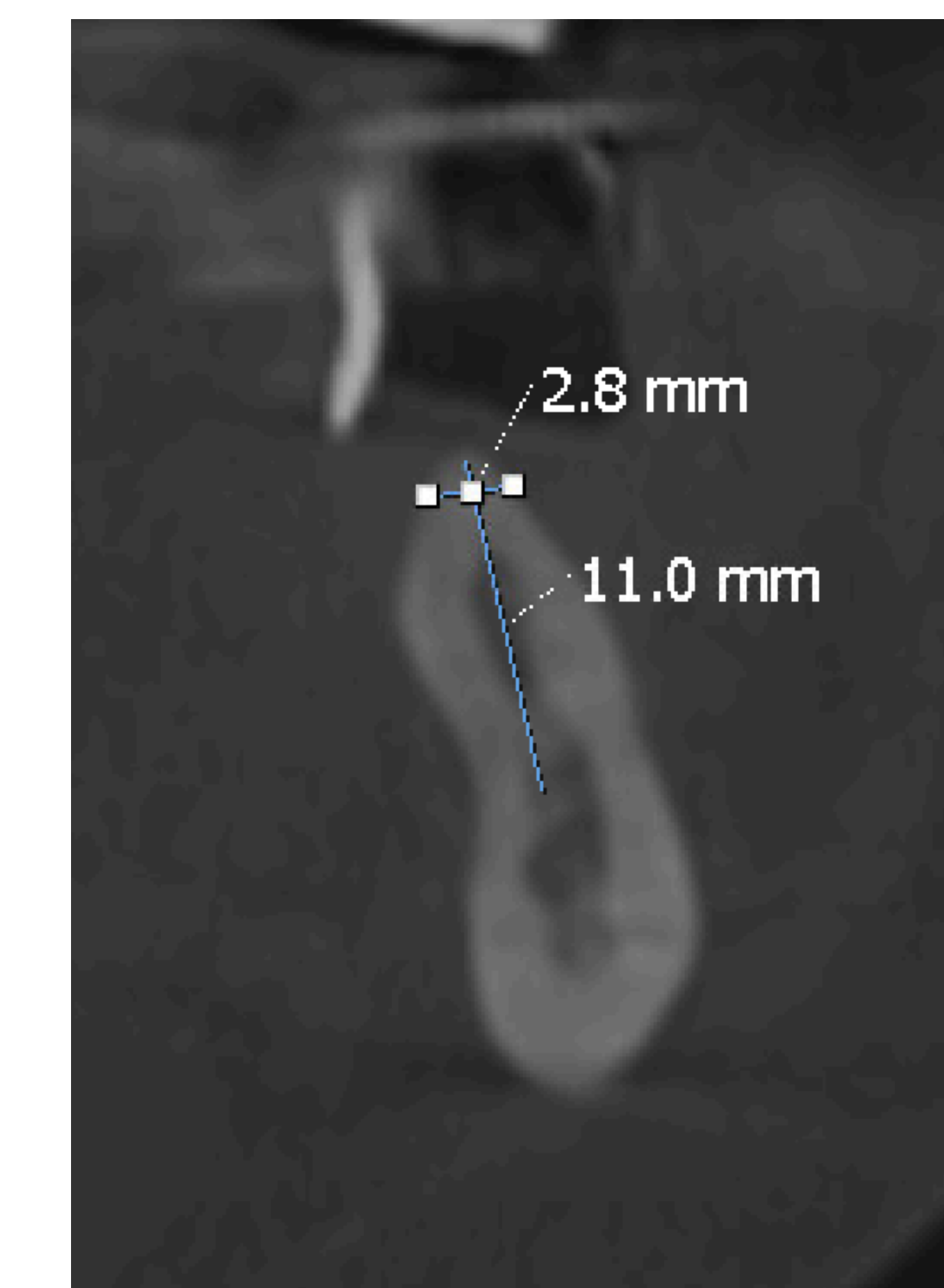


Figure 4. Cross-sectional view of #18 site.

MATERIALS AND METHODS

Surgical Intervention: A mid-crestal incision with sulcular incisions from # 17 and 23 was performed in order to elevate buccal and lingual full-thickness flaps. The mental foramen was located clinically. Piezoelectric instrumentation was then used to initiate a crestal corticotomy after minimal ridge reduction. Horizontal ridge expansion and completion of the osteotomy were subsequently achieved using sequential osteotomes and osseodensification burs. Implants #18 (4.1 x 8 mm) and 20 (3.3 x 8 mm) were placed simultaneously to a torque value of 35 Ncm with good primary stability. Xenograft was then positioned in order to enhance the buccal bone thickness around the implants. Collagen membrane was adapted over the graft material. Cover screws were placed and tension-free primary closure was achieved using 4.0 PTFE sutures and 5.0 chromic gut sutures. The patient was prescribed Amoxicillin 500 mg TID for 7 days, Ibuprofen 600 mg PRN, and Chlorohexidine 0.12% rinse BID for 2 weeks. Healing was uneventful during follow-up visits.

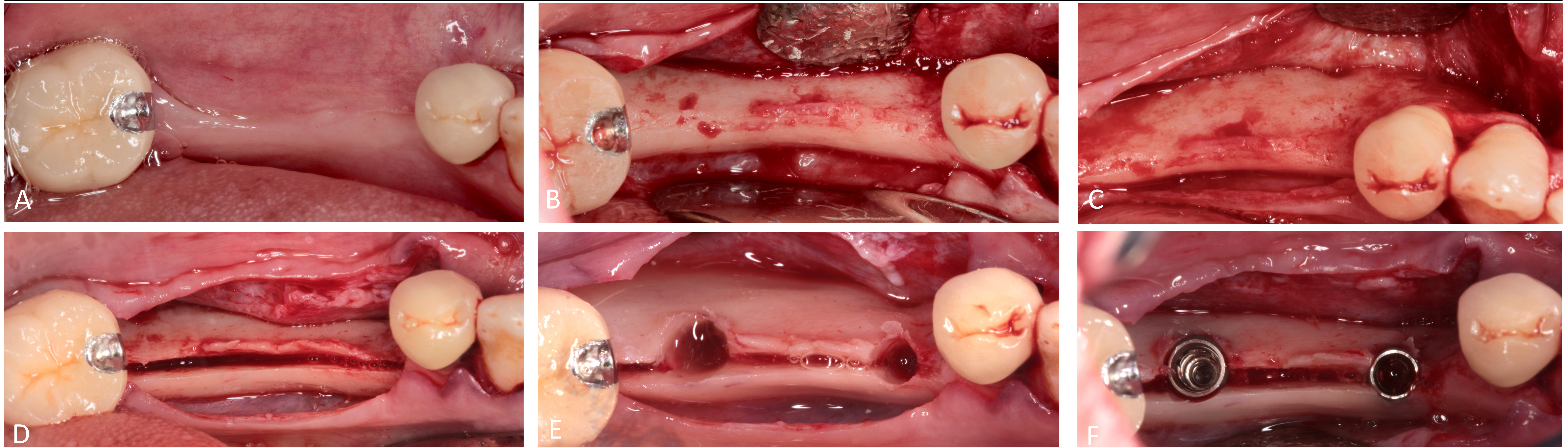


Figure 5. A, Pre-op surgical site; B, Full-thickness flap reflection; C, Visualization of the mental foramen; D, Crestal corticotomy made using piezoelectric unit and ridge expansion initiated using sequential osteotomes; E, Implant site preparation using osseodensification burs ; F, Implant placement #18 and 20

MATERIALS AND METHODS

Surgical Intervention, continued: Second-stage surgery was performed after seven months of healing. Implants #18 and 20 were uncovered and ISQ readings of 86 and 73 were obtained, respectively. Radiographs taken at the second-stage surgery demonstrated stable crestal bone levels. Adequate amounts of keratinized tissue were observed around #18 and 20 implants.

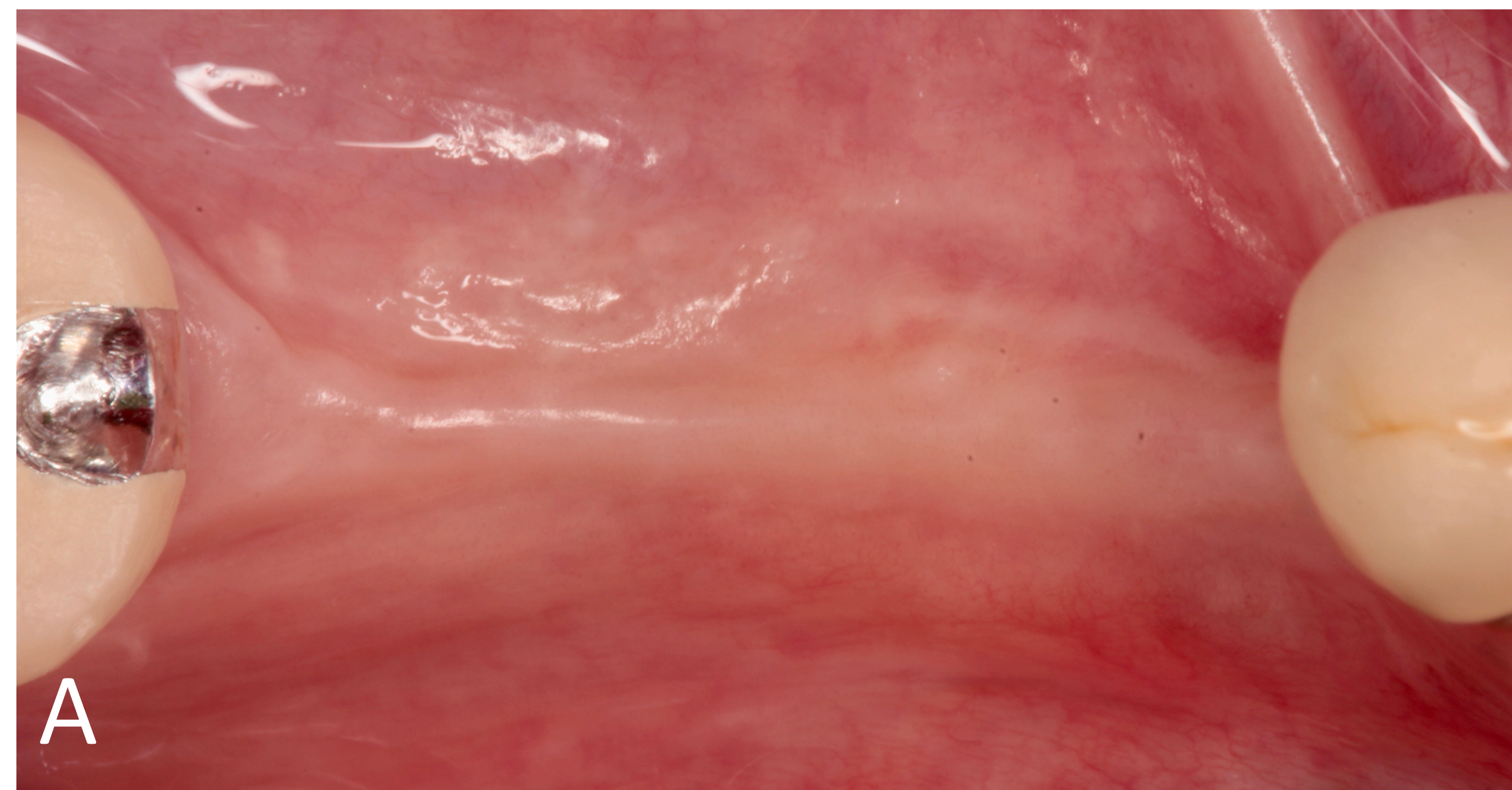
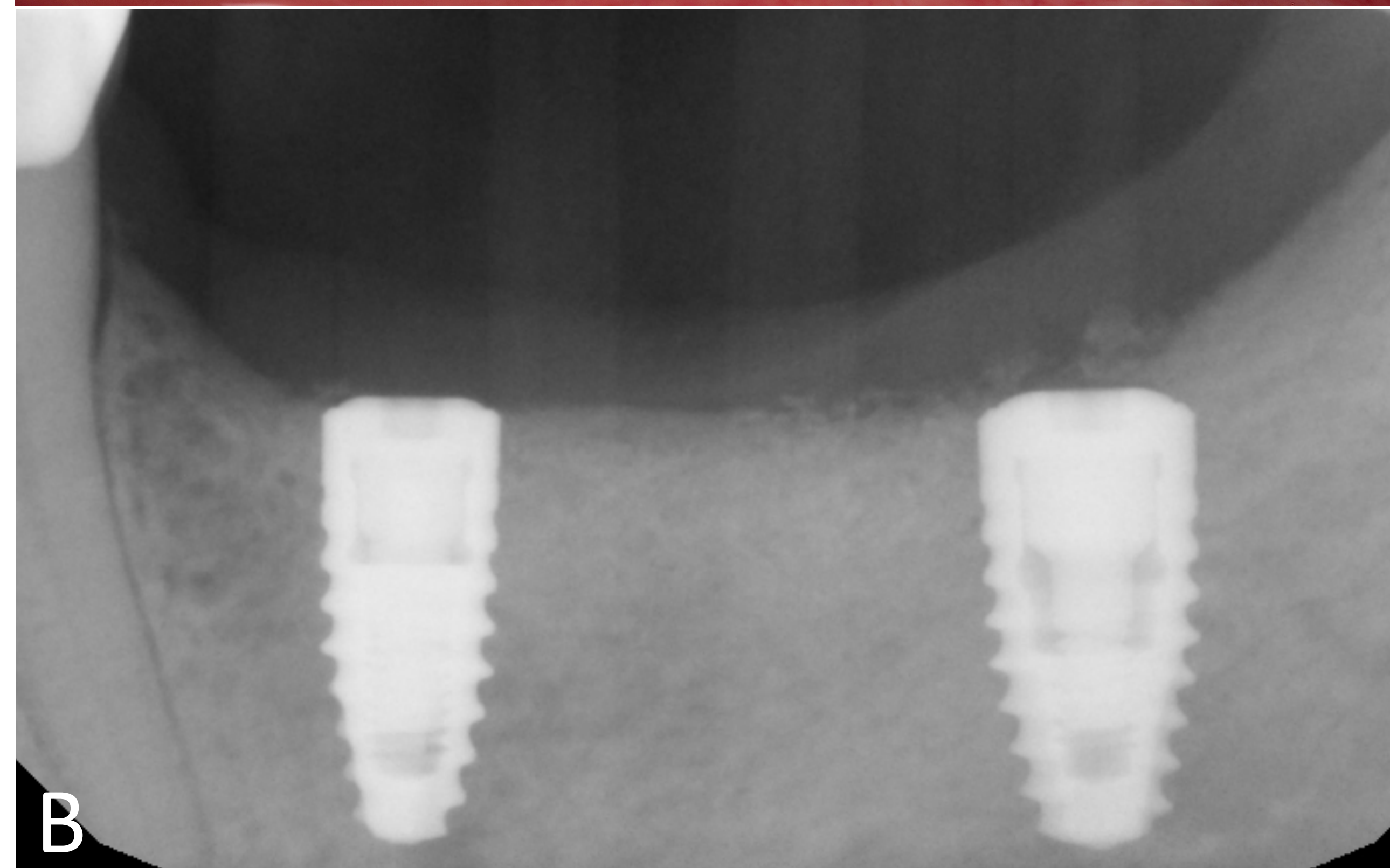
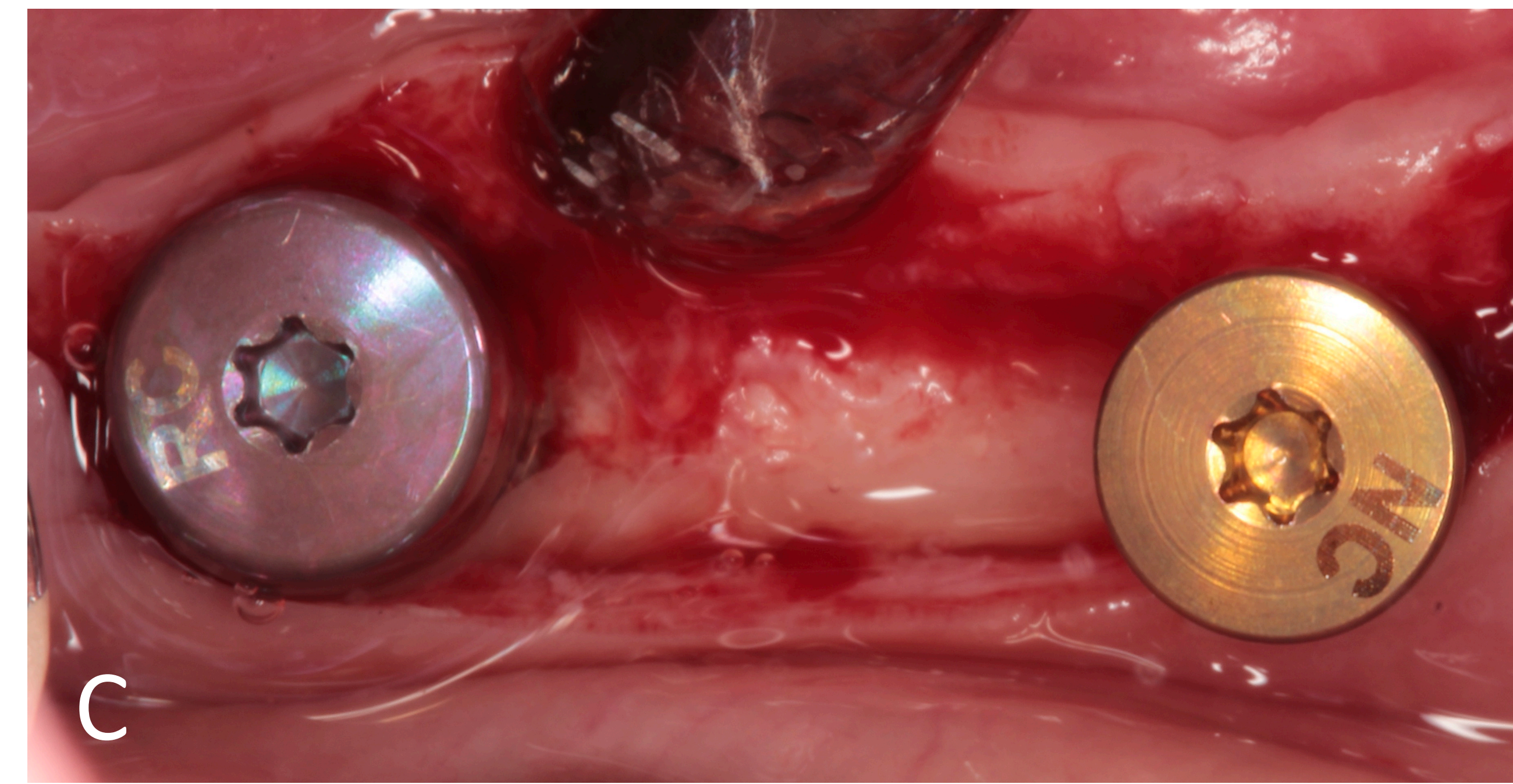
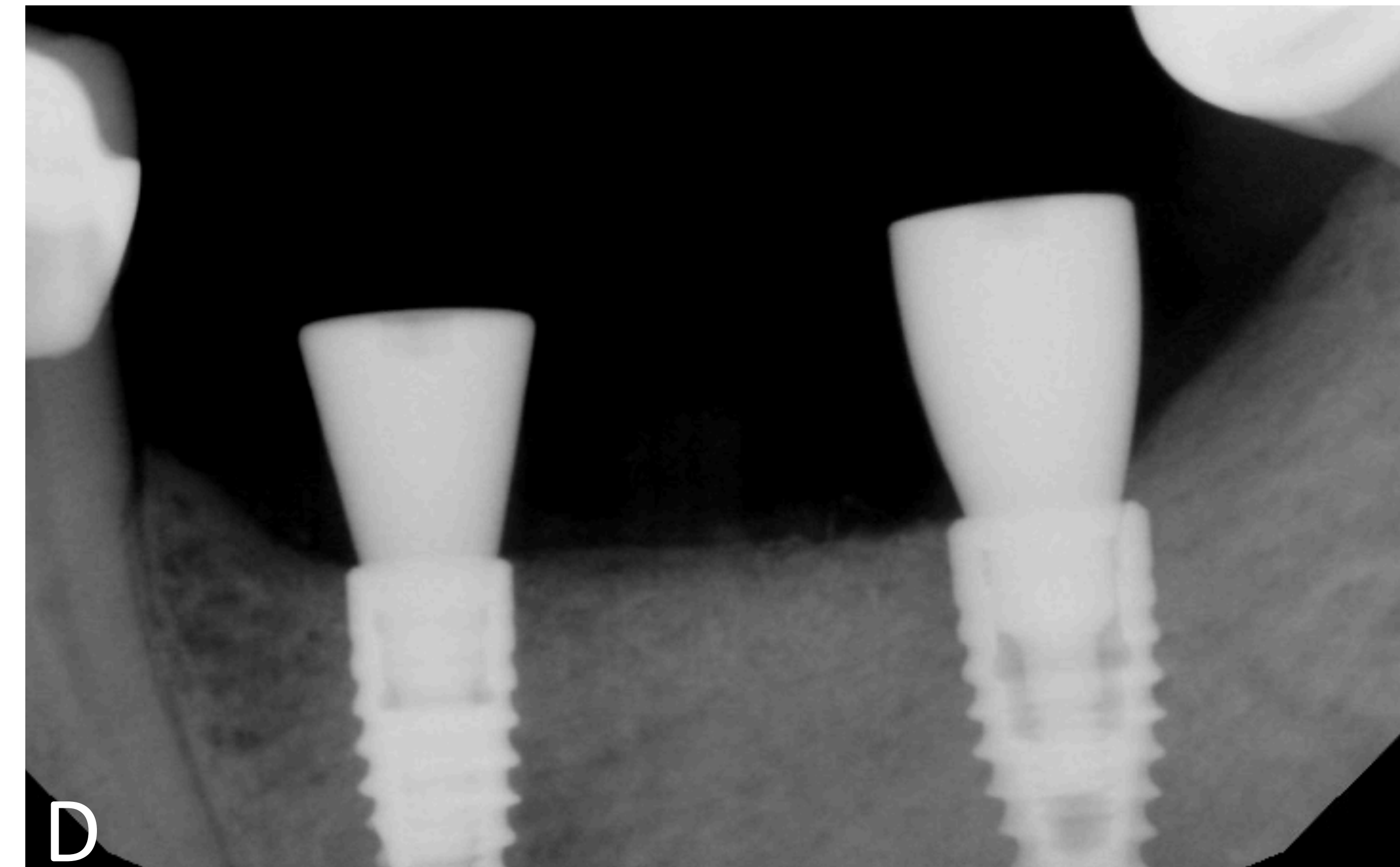
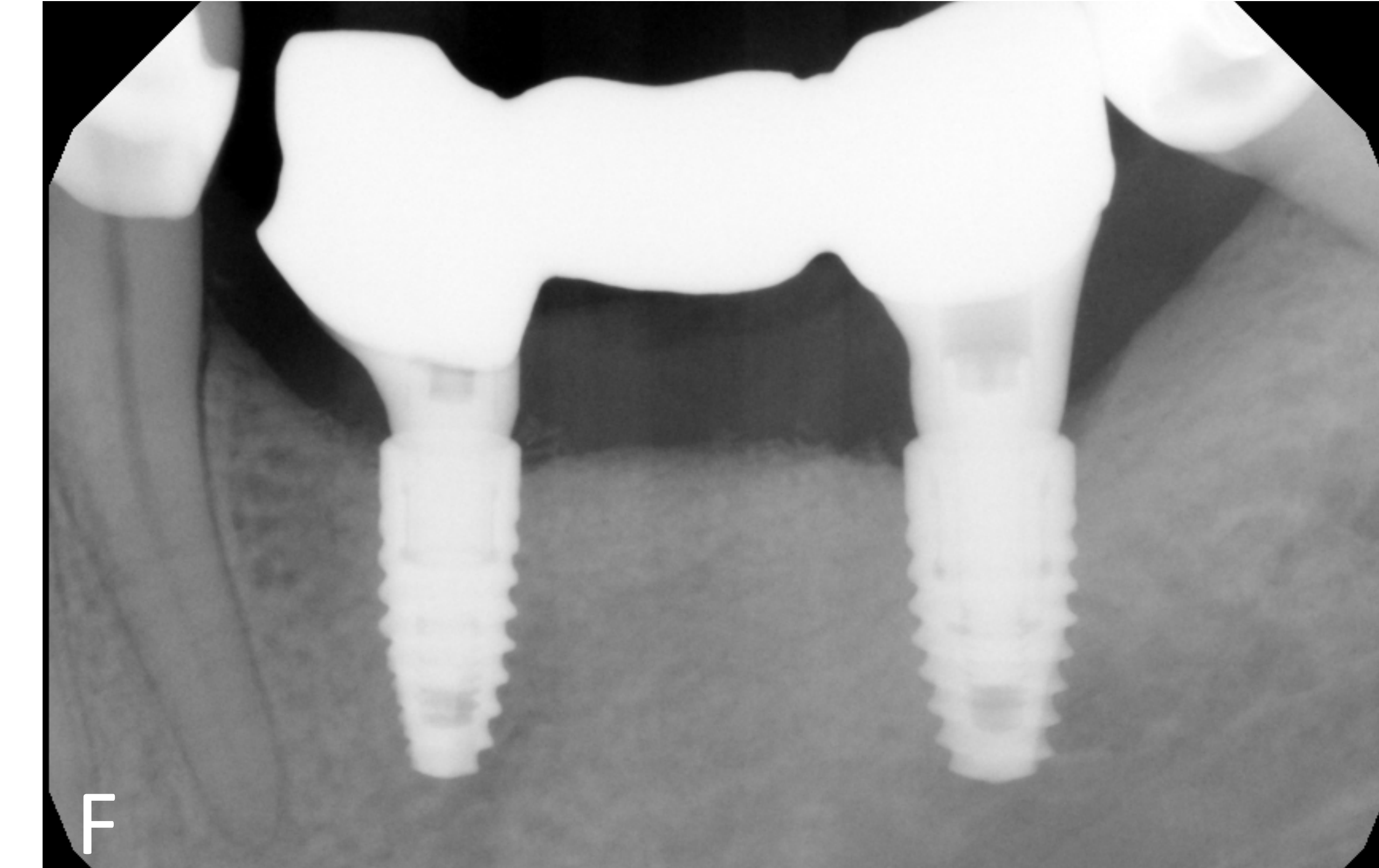
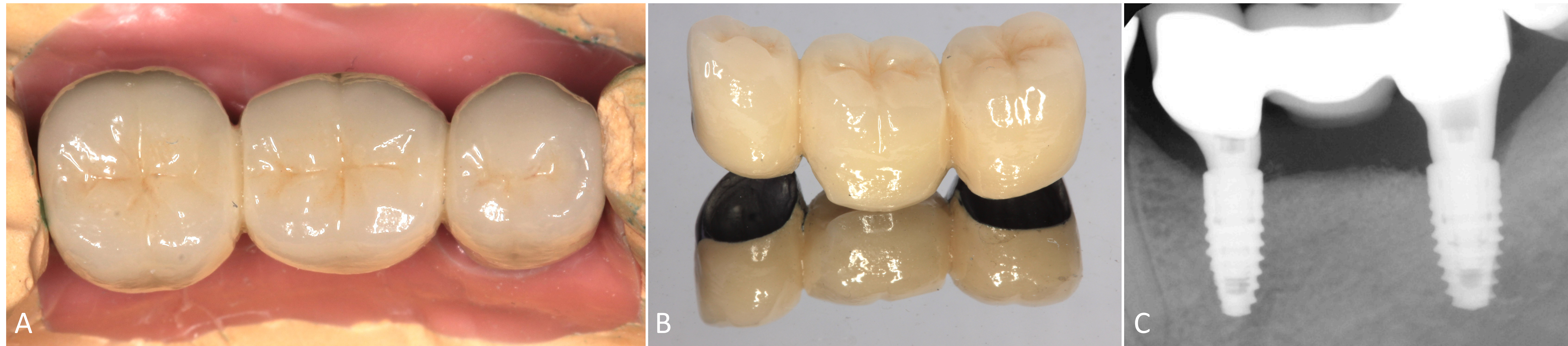


Figure 6. A, Seven-month follow-up; B, PA radiograph - seven-month follow-up; C, Placement of healing abutments on Implants #18, 20; D, Intra-operative radiograph of second-stage surgery; E, Soft tissue profile ten-months post surgery; F, Metal framework try-in radiograph



RESULTS

Patient experienced uneventful healing after the guided bone regeneration with simultaneous implant placement and second-stage implant surgery. After confirming successful implant osseointegration, final impression and metal framework try-in visits took place in the pre-doctoral clinic. The final prosthesis was fabricated and delivered.

Figure 7. A, #18-x-20 definitive fixed prosthesis on the mounted cast; B, #18-x-20 definitive fixed prosthesis; C, #18-x-20 final prosthesis delivery radiograph

CONCLUSION

This case report showed successful use of different surgical techniques to overcome a ridge deficiency and allow simultaneous implant placement with optimal hard and soft tissue contours. Combining ridge split technique using piezoelectric surgery, osteotomes, osseodensification, and GBR can be considered a predictable and effective method when approaching atrophic posterior mandibular sites. Regardless of the technique, understanding the biology of wound healing, proper case selection, and careful treatment planning are critical in managing ridge defects and implant surgery.