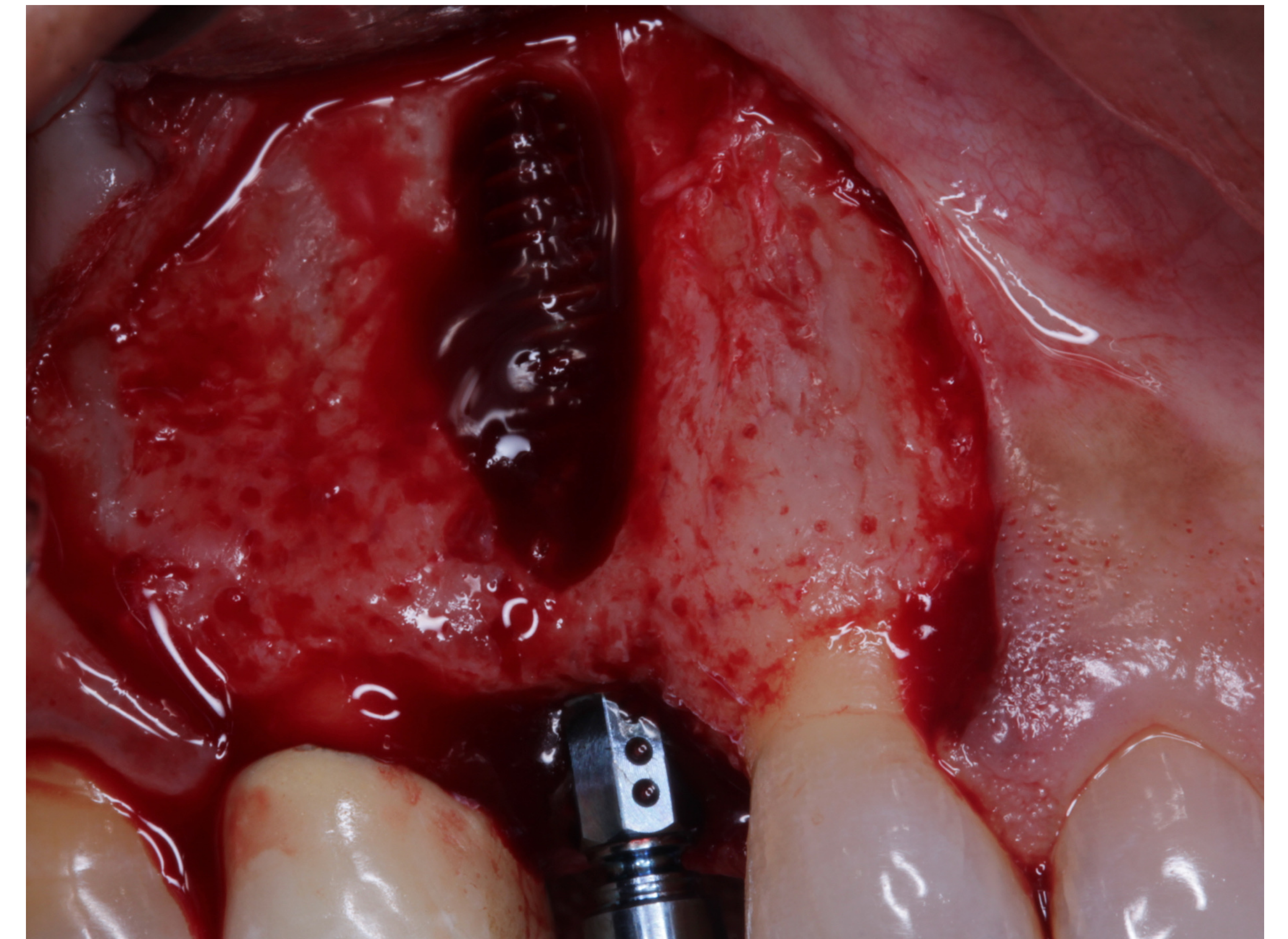


Window Approach for Simultaneous Root Fragments Removal and Implant Placement (WASRIP): A Case Series.

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Introduction

Root fracture during extraction is a common intraoperative complication. The occurrence of root fractures is attributed to several factors: the presence of multiple roots, thin and brittle roots, divergent or dilacerated root shapes, and iatrogenic trauma. Among all the dentitions, maxillary premolars are found to be the most frequently fractured teeth with retained root fragments. Although there is no indication for the removal of RF in asymptomatic cases in general, when RF is present at a site where implant placement is performed, potential complications may be observed. The presence of a retained RF undetected during implant placement has been reported as a potential source of pathogens in the etiology of peri-implantitis and retrograde peri-implantitis. Therefore, prophylactic extraction of RF either before or during implant placement is highly recommended. However, surgical access to RF often necessitates varying degrees of bone reduction around the osteotomy, and subsequently, the mechanical stability of implants may be compromised and patients may experience increased postoperative morbidity and prolonged wound healing.

Case Presentation

The purpose of the case report is to introduce a novel minimally invasive technique of removing a retained RF and predictable simultaneous implant placement: Window Approach for Simultaneous Root Fragments Removal and Implant Placement (WASRIP) (Fig. 1).

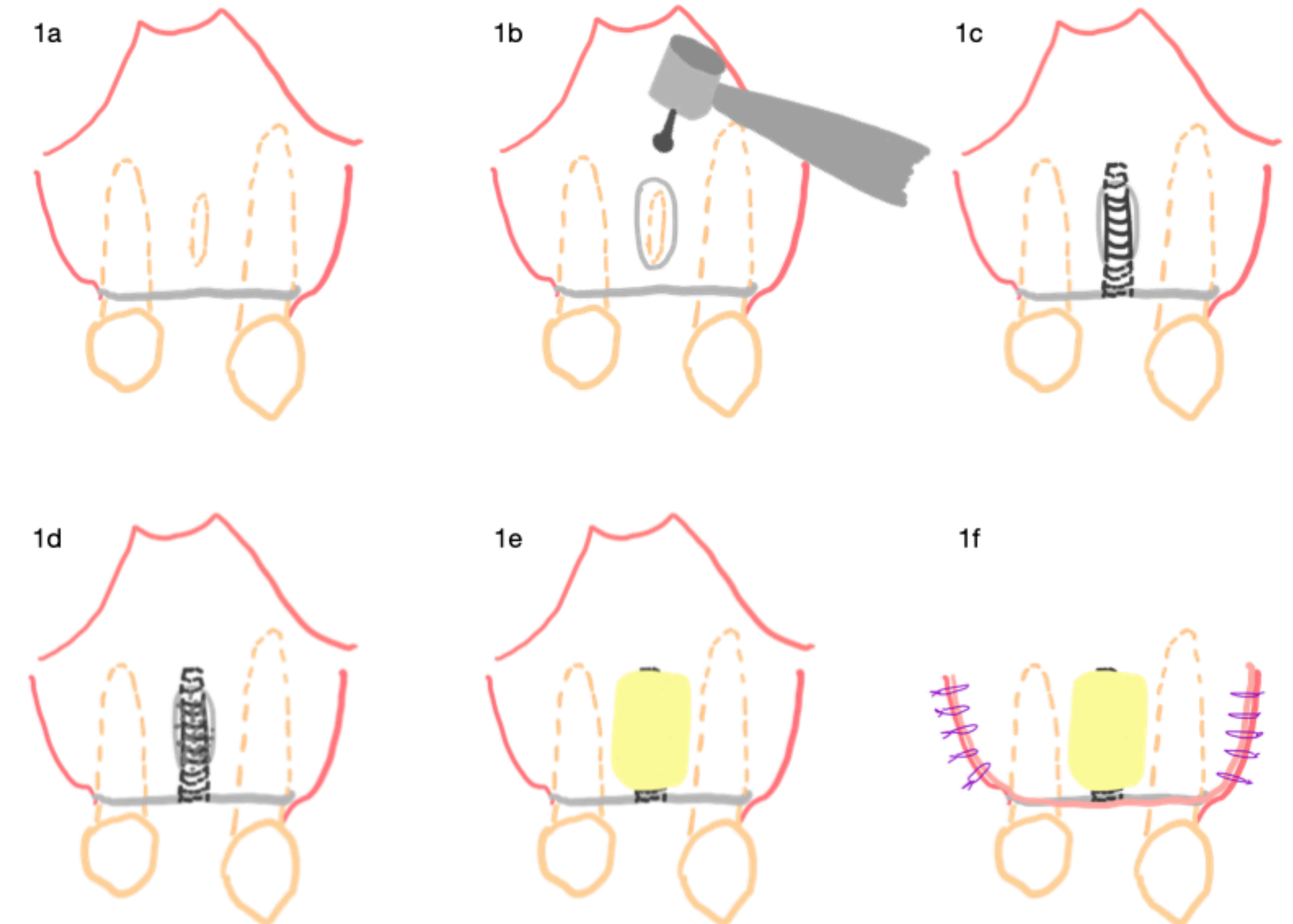


Figure 1. a) Full-thickness flap reflection and root fragment (RF) identification. b) Preparation of window by diamond round bur. c) Implant osteotomy preparation and implant placement upon RF removal and defect degranulation. d) Guided bone regeneration around the defect and implant with particulate graft. e) Resorbable membrane covering the defect and graft. f) Flap closure with simple interrupted configuration.

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Case 1. 35-year-old female patient presented with a missing maxillary right second premolar. Tooth #5 was extracted 1.5 years prior to the initial visit and a concomitant ridge preservation procedure with particulate graft and collagen membrane had been performed. Upon radiographic examination, a radiopacity of 8 x 3 mm (length x width) at the edentulous ridge was noticed and the lesion was suspected to be a residual RF. RF removed and implant placed as per WASRIP protocol (Fig. 2). At a 3-month follow-up, periapical radiographs and second stage surgery revealed stable crestal bone at the implant fixture platform.

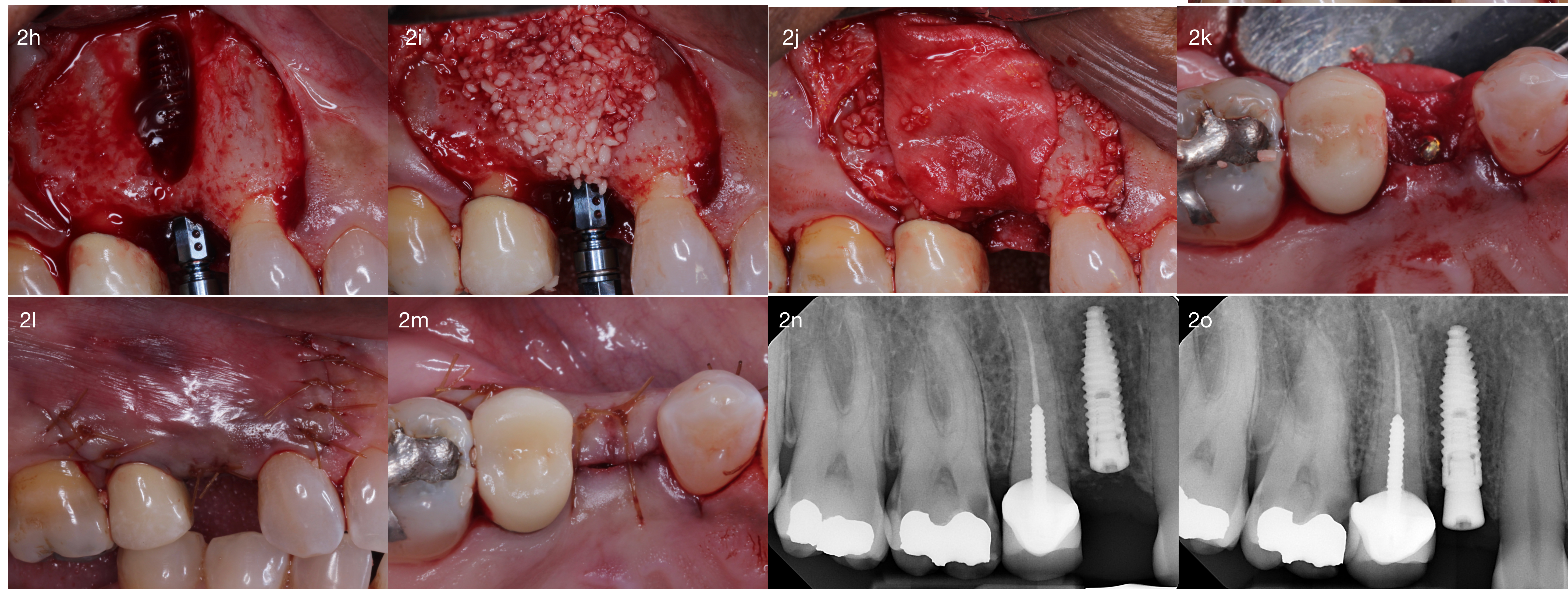
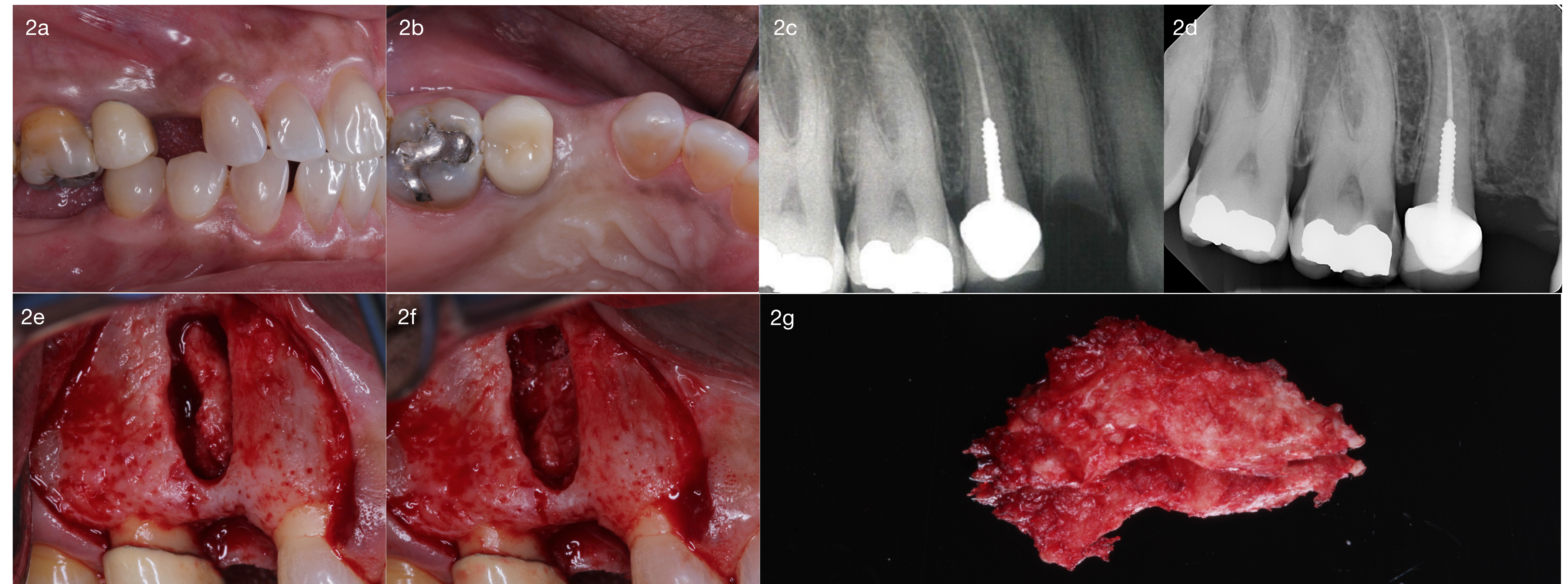


Figure 2. a.b) Buccal and occlusal view of initial presentation. c)Periapical film from general dentist prior to #13 extraction. d)Periapical film at initial presentation. e) Window preparation and RF identification. f) RF removal and degranulation. g) RF removed showing fibrous tissue and remnant of particulates from previous procedure. h) Osteotomy preparation and implant placement. i.j) Guided bone regeneration with particulate particles and resorbable membrane. k) Resorbable membrane secured with cover screw. l.m) Flap closure with simple interrupted configuration. n) periapical film immediately after implant placement. o)3-month follow up and stage 2 surgery.

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Case 2. 32-year-old female patient presented with a chief complaint to replace a missing of maxillary left second premolar with a dental implant. Radiographs showed RF located at the center of the ridge between the sinus floor and alveolar crest. RF removed and implant placed as per WASRIP protocol (Fig. 3). At a 3-month follow-up, a periapical radiograph showed increased mineralization of the grafted particles. With clinical verification of successful osseointegration, second stage surgery was performed at the same visit.

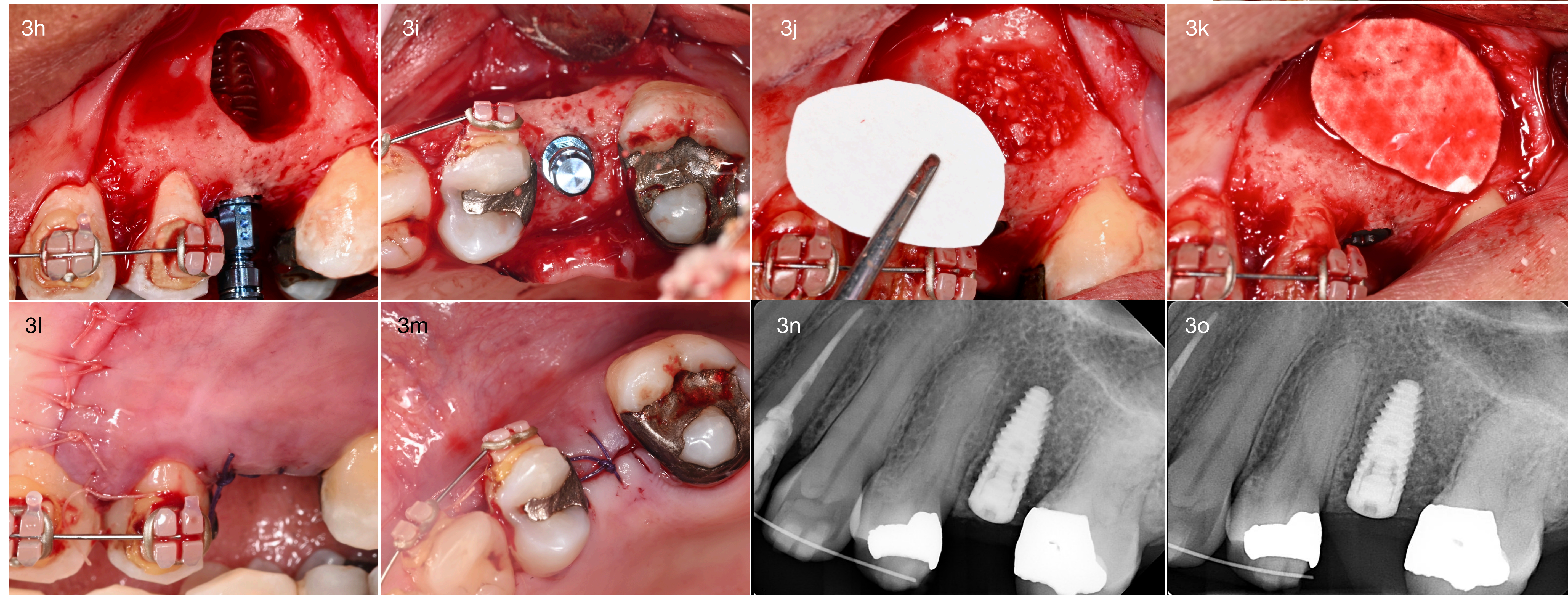
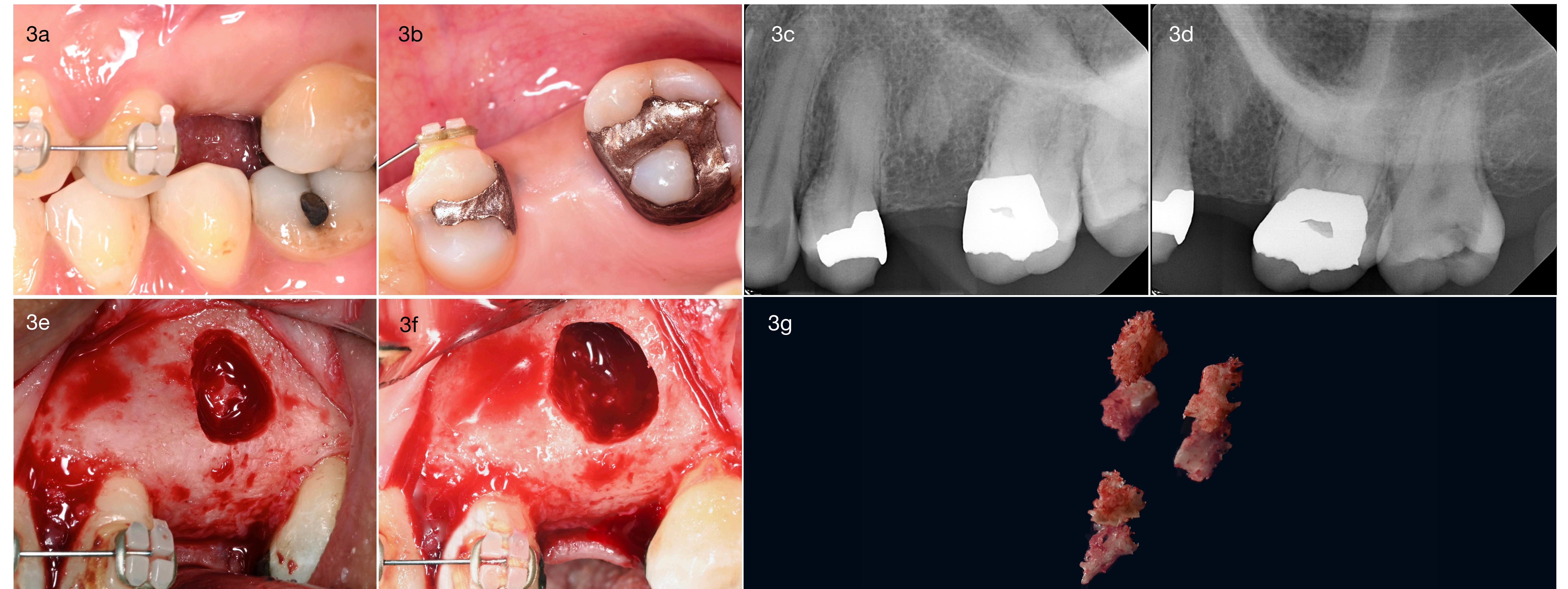


Figure 3. a.b) Buccal and occlusal view of initial presentation. c.d) Periapical radiographs using Same Lingual Opposite Buccal (SLOB) rule to identify the buccopalatal location of the RF in the alveolar ridge. e) Window preparation and RF identification. f) RF removal and degranulation. g) RF removed showing fibrous tissue and remnant of particulates from previous procedure. h.i) Osteotomy preparation and implant placement with preservation of coronal crestal bone from buccal and occlusal view. j.k) Guided bone regeneration with particulate particles and resorbable membrane. l.m) Flap closure with simple interrupted configuration. n) periapical film immediately after implant placement. o) 4-month follow up.



Discussion

In this case series, the Window Approach for Simultaneous RF removal and Implant Placement (WASRIP) technique was used to perform the extraction of residual RF, allowing the preservation of the alveolar bone crest, coronal and apical bone in particular, for simultaneous implant placement. The key question here would be “Is it necessary to remove retained RF?” when it comes to restoring the edentulous site with dental implants. Techniques such as Partial Extraction Technique, Socket Shield Technique, and Root Membrane Technique have been introduced. However, there is scarce evidence of long-term survival and success results. Peri-implantitis and retrograde peri-implantitis associated with the retained RF have also been reported¹. Given the unpredictability of the potentially detrimental effects of a retained RF in contact or in close proximity of the implant, the removal of RF is highly advised. Conventional methods of removing RF oftentimes require a varying degree of bone removal, especially the buccal and coronal alveolar bone to create sufficiently sized access. Unfortunately, such sacrificial reduction of the surrounding bone may create osteotomies that are not amenable to simultaneous implant placement, and guided bone regeneration may to be performed first prior to implant placement². With buccal window approach, the accessibility to the RF is significantly improved, enabling the preservation of neighboring bony architecture. By preserving the alveolar bone crest together with the apical alveolar bone, the circumferential support from both the coronal and apical bone contributes to improved implant primary stability. Furthermore, the coronal strip of the buccal plate serves as a good boundary for guided bone regeneration³. In this sense, the graft particles are well-confined within natural bony housing with sufficient vascular supply from all directions, resulting in a more predictable guided bone regeneration.

Conclusion

WASRIP technique to retrieve RF by creating a buccal bony window allows good visualization and access to the RF with preservation of the alveolar bone crest and the apical bone for simultaneous implant placement with ideal primary stability.

References

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