

# Maxillary Tuberosity Bone Graft

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Department of Periodontology and Oral Implantology ; Maurice Kornberg School of Dentistry; Temple University; Philadelphia, Pennsylvania

## Introduction

Severe bone resorption can occur after tooth loss, which makes the site unamenable for implant placement. There are various techniques and bone grafting materials which can be employed to augment the planned implant site. Autogenous bone grafts have always been considered "the gold standard" due to their biocompatibility as well as their osteogenic potential to form new bone, which allografts, xenografts and alloplastic materials lack. Common intra-oral donor sites for harvesting of block bone grafts include the ramus and the symphysis. However, the maxillary tuberosity has not been extensively used as a site for block bone graft harvests despite its lower associated morbidity, due to its expected poorer bone mineral density and hence bone quality.

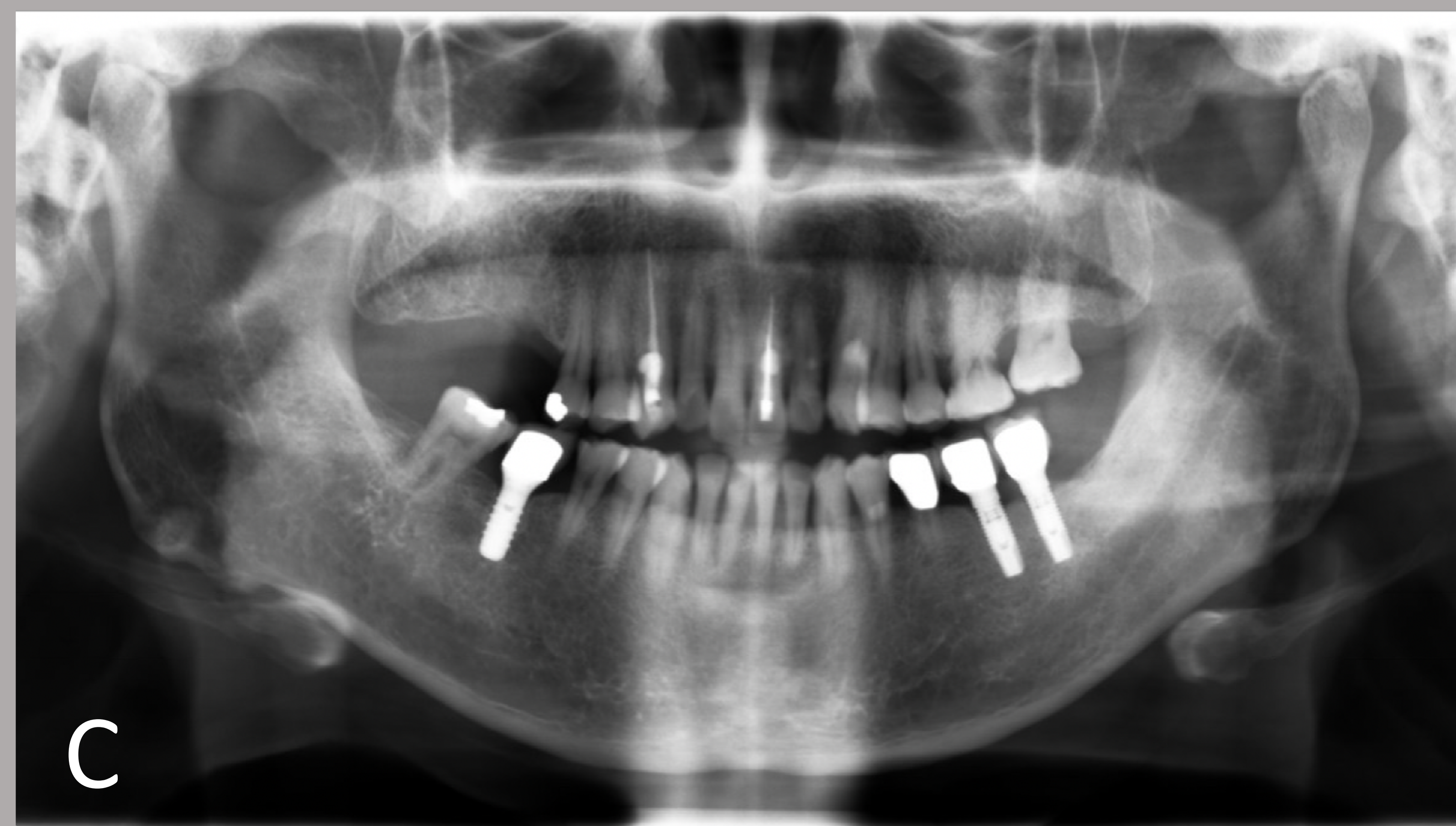


Figure 1:  
A, Pre-operative right buccal view;  
B, Pre-operative partial occlusal view;  
C, Pre-operative panoramic radiograph  
D: Pre-operative periapical radiograph



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## Clinical Case

- A 71 year old male presented with the request for a dental implant to replace his missing maxillary right first molar, which was extracted about 10 months previously due to caries.
- Clinical and radiographic examination revealed clinical periodontal health on a reduced periodontium, and a prominent maxillary right tuberosity.
- The planned implant site presented with a defect measuring 5-6mm bucco-palatally, 5mm apico-coronally at the mid-buccal aspect, and 10mm mesio-distally.

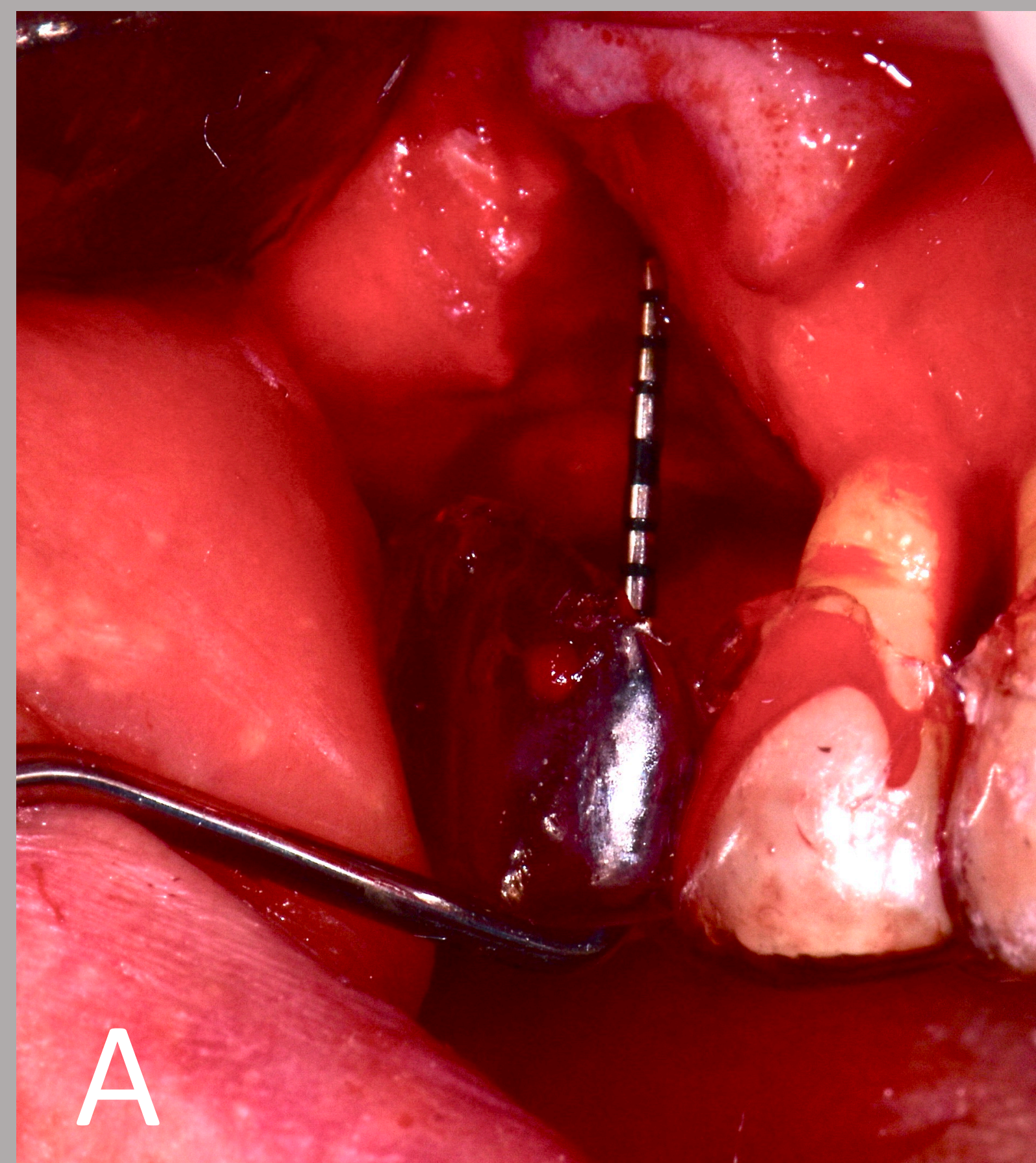
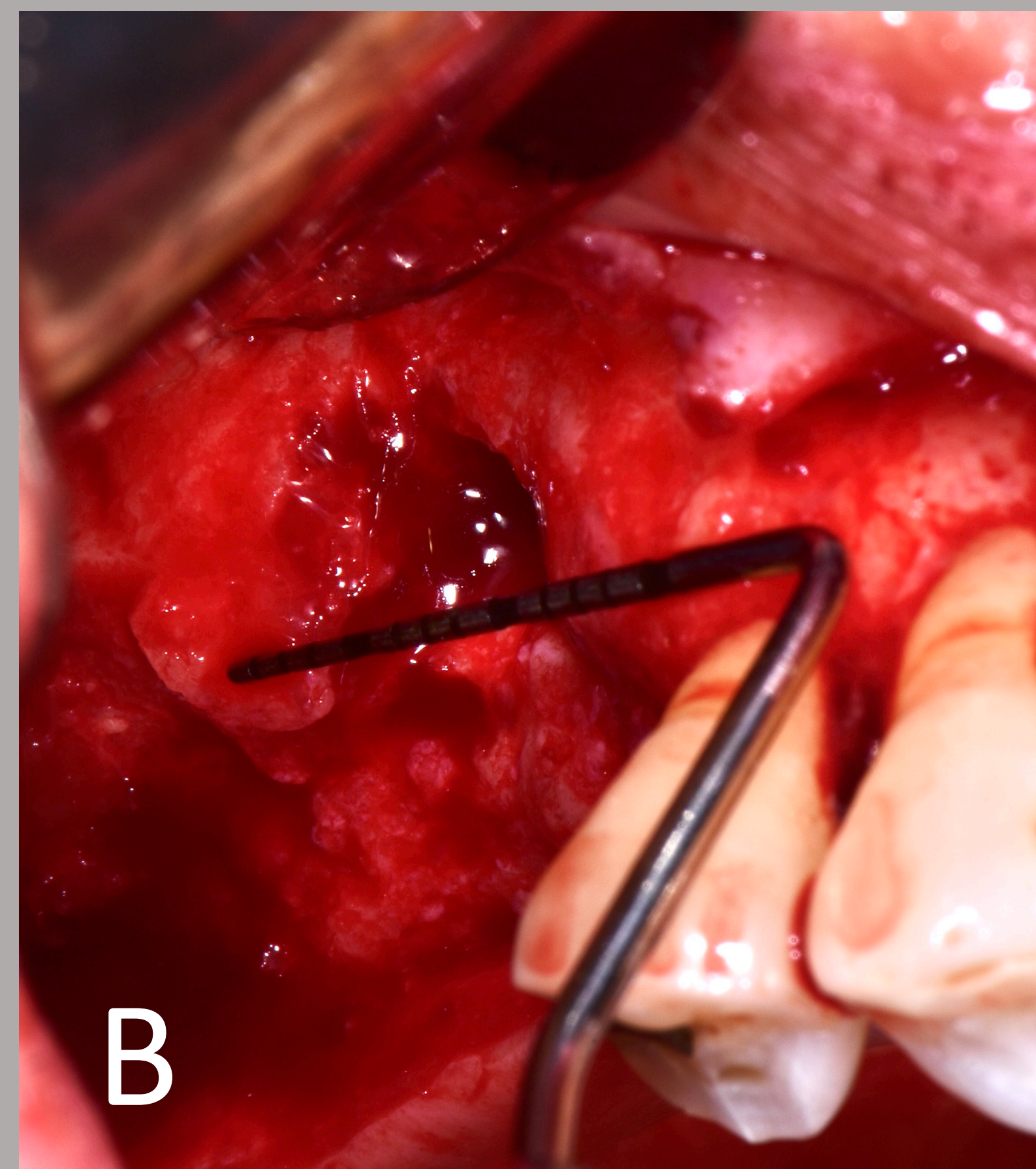
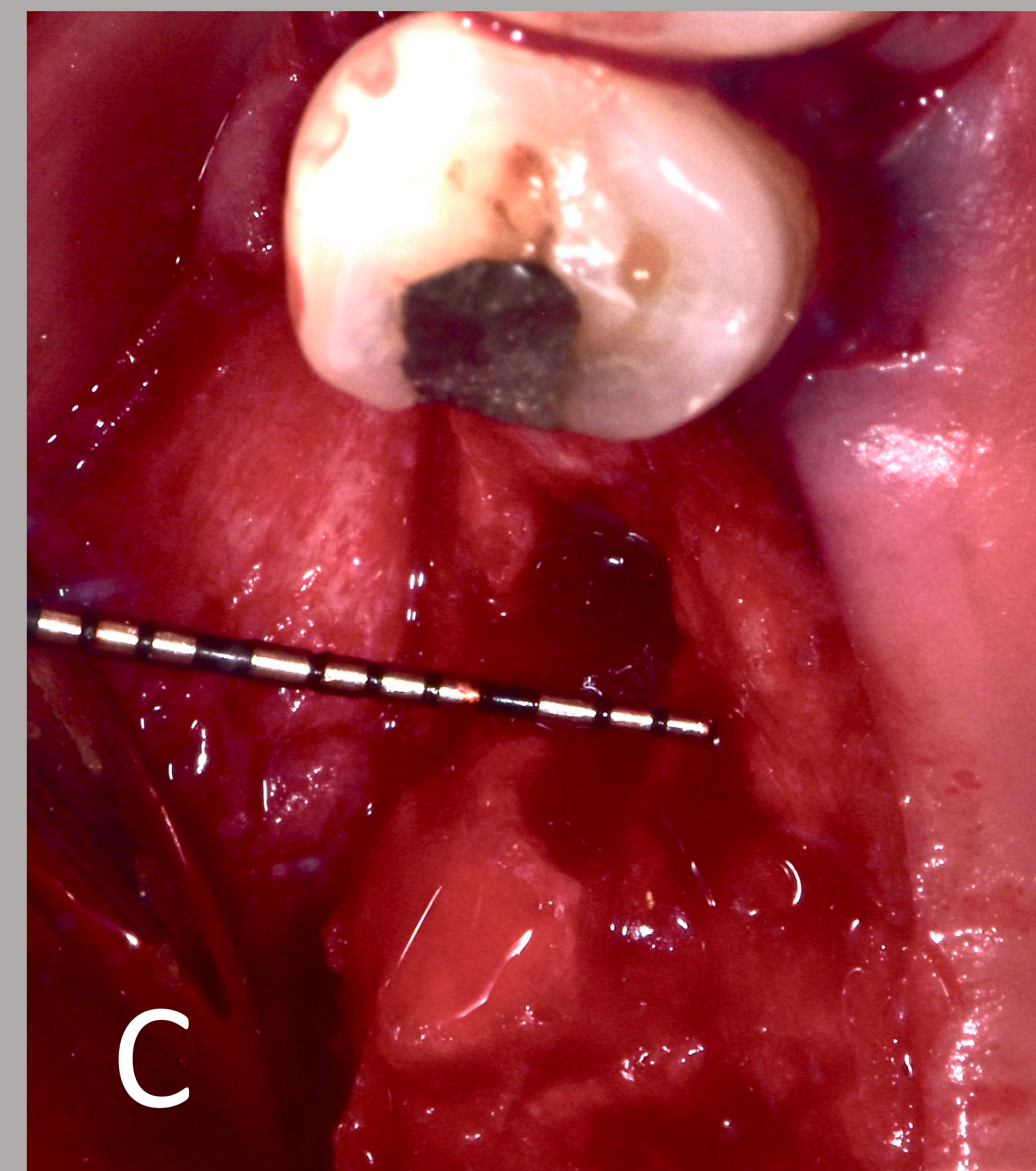


Figure 2:  
Implant site defect measuring  
A: 5mm apico-coronally at the mid-buccal aspect;  
B: 10mm mesio-distally; and  
C: 5-6mm bucco-palatally.



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## Pre-implant bone augmentation

A block bone graft measuring 7mm by 11mm and 2mm in thickness was harvested from the crest of the maxillary right tuberosity using a surgical handpiece with a surgical fissure bur to make an incomplete section of the graft, before out fracturing it with a chisel and mallet. The graft was then fixated at the planned implant site using a bone fixation screw. Particulate bone graft was also harvested from the maxillary right tuberosity using a back-action chisel and used to augment the planned implant site. The bone grafted site was covered with a resorbable collagen membrane and allowed to heal for 4 months prior to re-entry for implant placement.

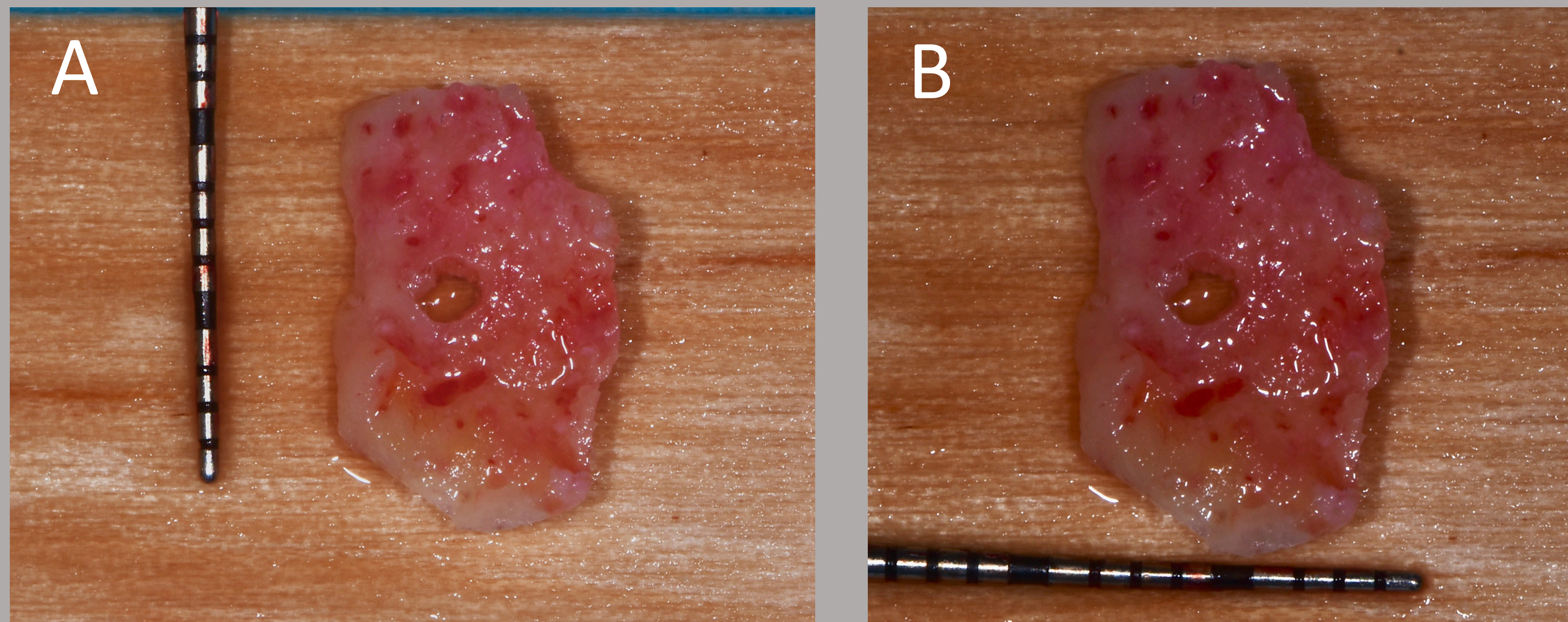


Figure 3 (A,B)  
Maxillary tuberosity block bone graft (7 x 11 x 2mm)

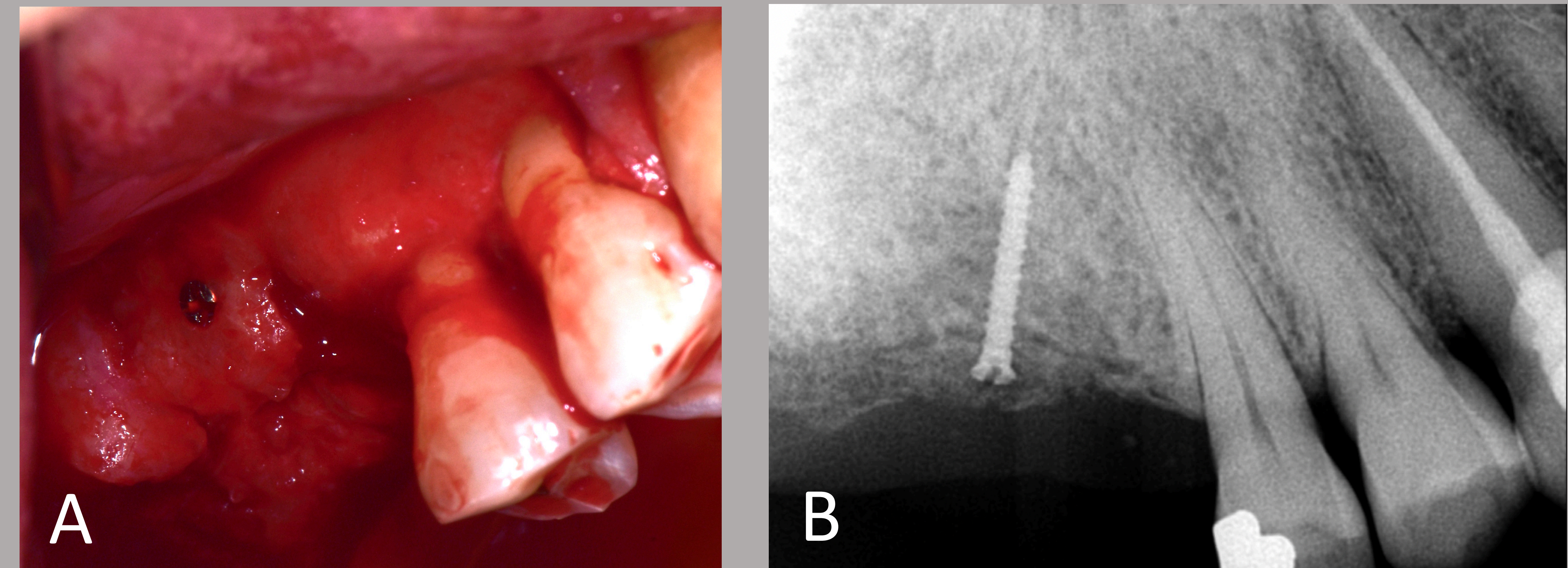


Figure 4:  
A: Fixation of maxillary tuberosity block bone graft at planned implant site  
B: Post-surgical peri-apical showing fixation screw



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## Implant placement

Upon re-entry, the bone graft was well integrated. The bone fixation screw was removed and an implant measuring 4.8 by 12mm was placed and submerged. The submerged implant was allowed to heal for 4.5 months before a second stage uncover surgery was performed. The implant stability quotient (ISQ) reading at the time of uncover was 81, indicating high stability. Clinically, the implant was well integrated with a buccal bone thickness of approximately 2mm at the crest. There were no evident clinical or radiographical signs of crestal bone loss.

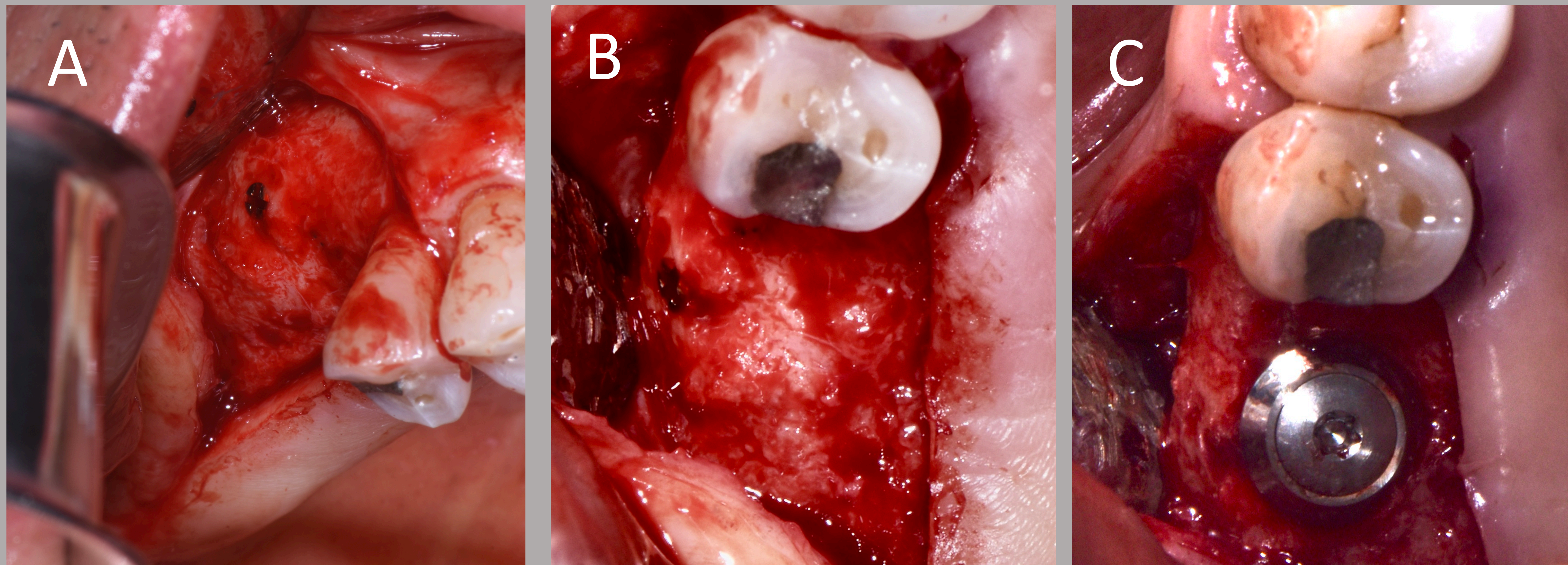


Figure 5  
A,B : Successful integration of tuberosity bone graft at 4-month re-entry  
C: Placement of 4.8 x 12mm implant with 2mm buccal bone

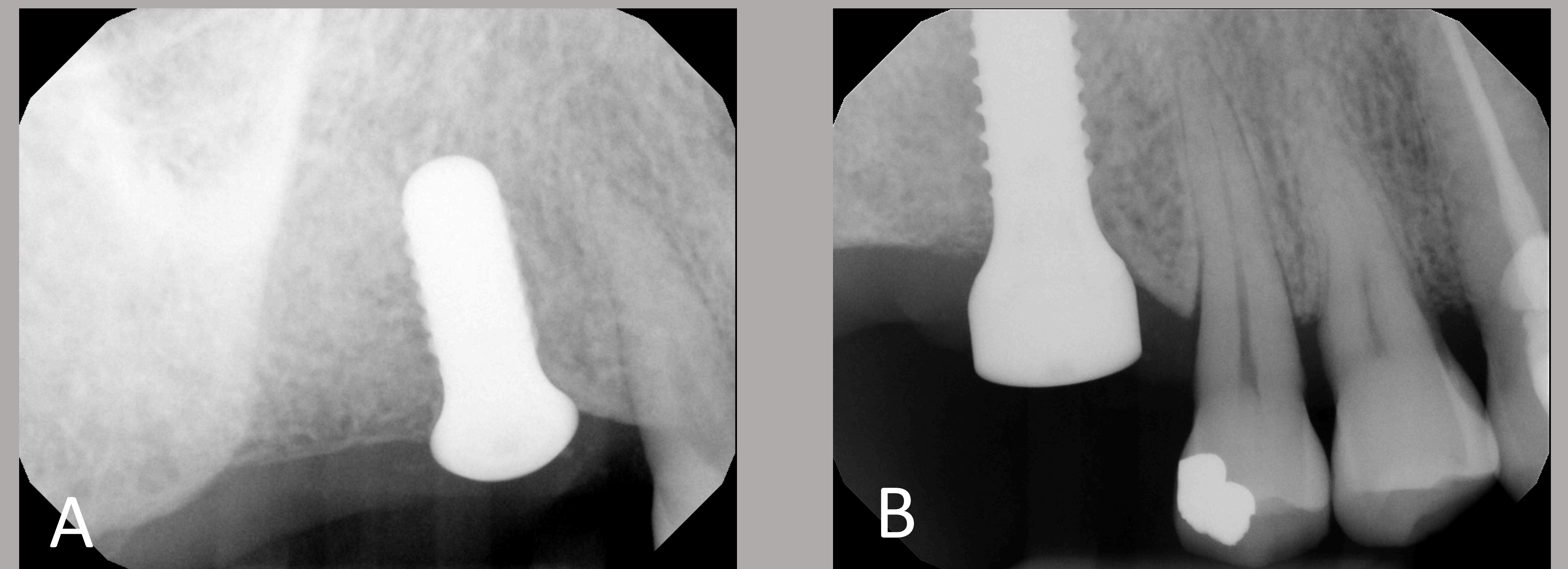


Figure 6  
A: Periapical radiograph at time of uncover.  
B: Periapical radiograph showing implant with healing abutment well seated with no evident crestal bone loss.



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**Conclusion: The maxillary tuberosity can be a safe and cost-effective alternative source for harvesting of autogenous block and particulate bone grafts for alveolar ridge reconstruction prior to implant placement.**

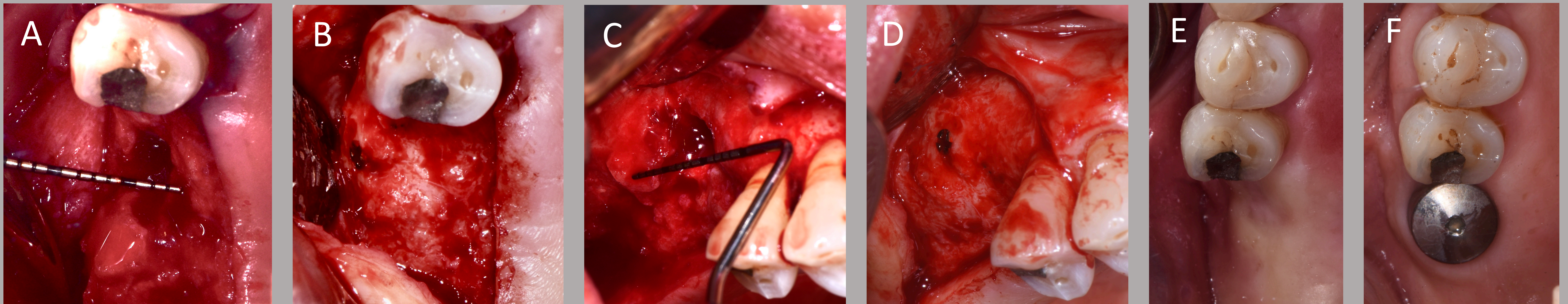


Figure 7:

A,C : Implant site defect

B,D: Re-entry at 4 months after grafting with maxillary tuberosity block and particulate bone graft

E: Pre-operative clinical photo

F: 2 month review after uncovering; with healing abutment