



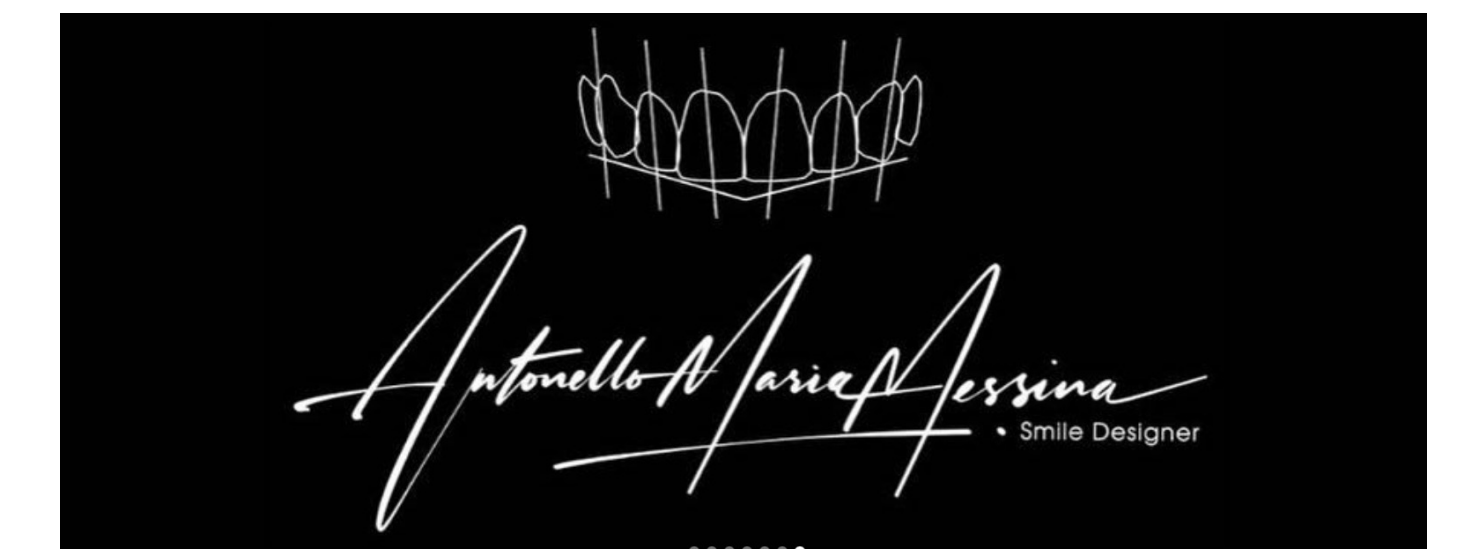
YONSEI UNIVERSITY
College of Dentistry



COLUMBIA UNIVERSITY
College of Dental Medicine

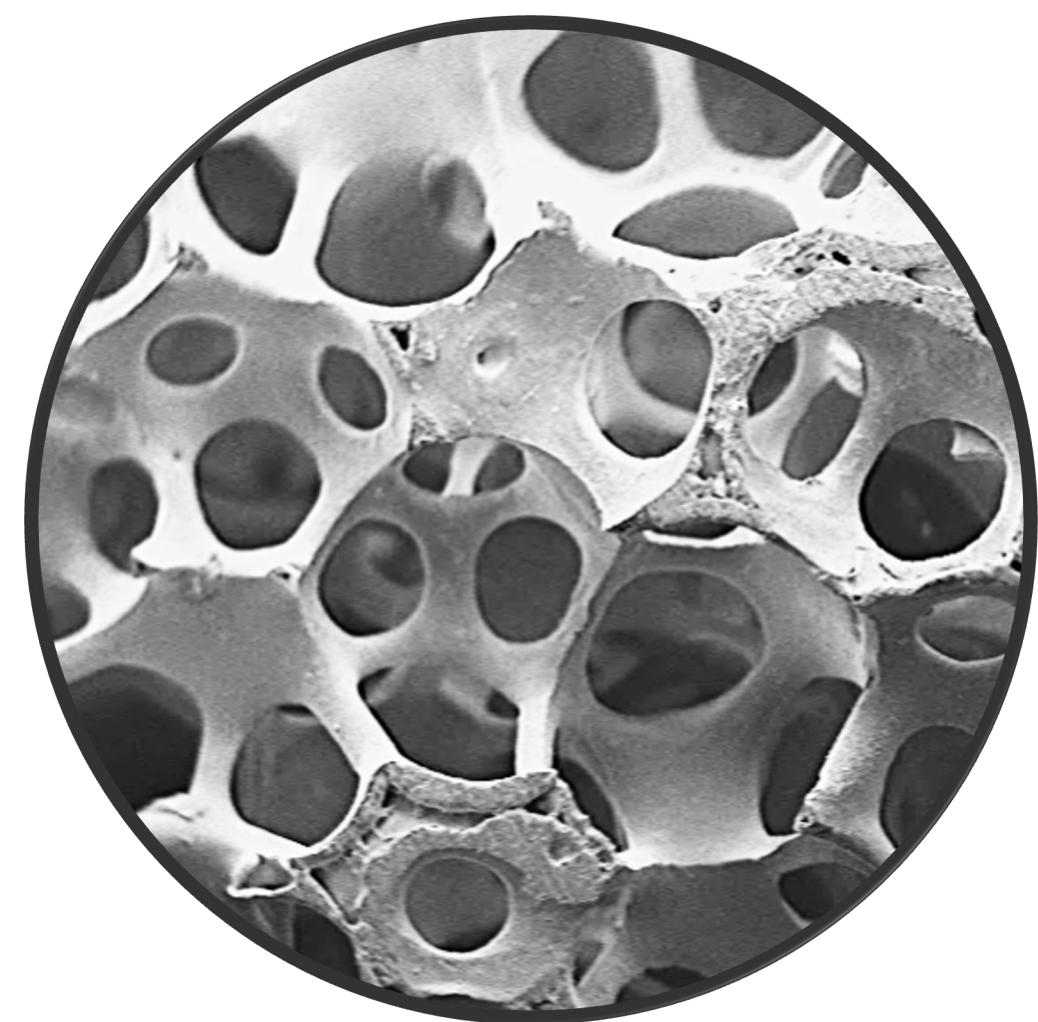


International University of Rabat
Dental Medicine



FULL MAXILLA RECONSTRUCTION USING TRIPLE STRUCTURED SYNTHETIC BONE GRAFTS WITHOUT MEMBRANE

Antonello Messina, Ettore Marini, Sun-Myoung Song, Esther Neves, Philip Y Kang, Sahng-Gyoon, Kim, Daniel S Oh

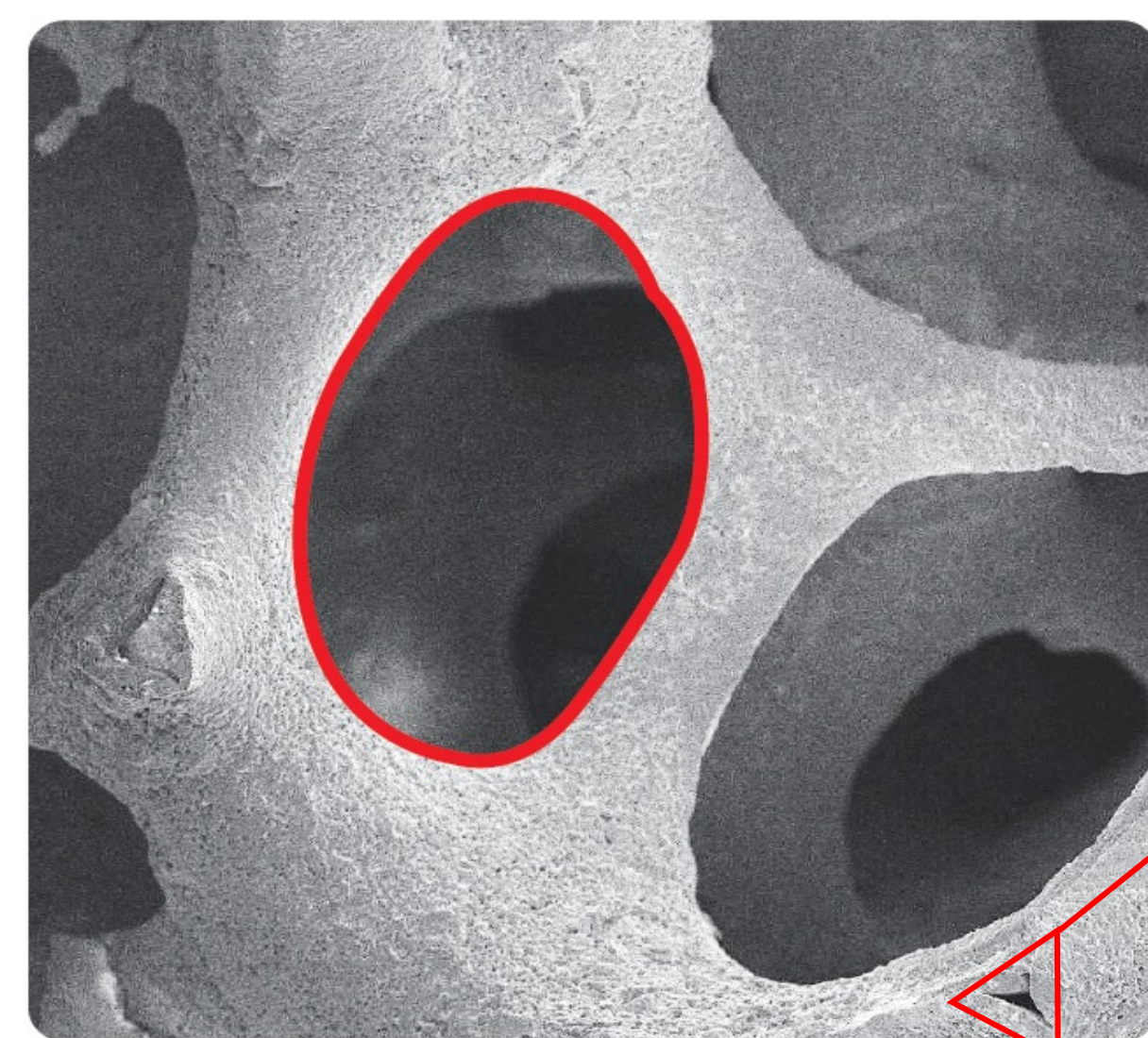


INTRODUCTION

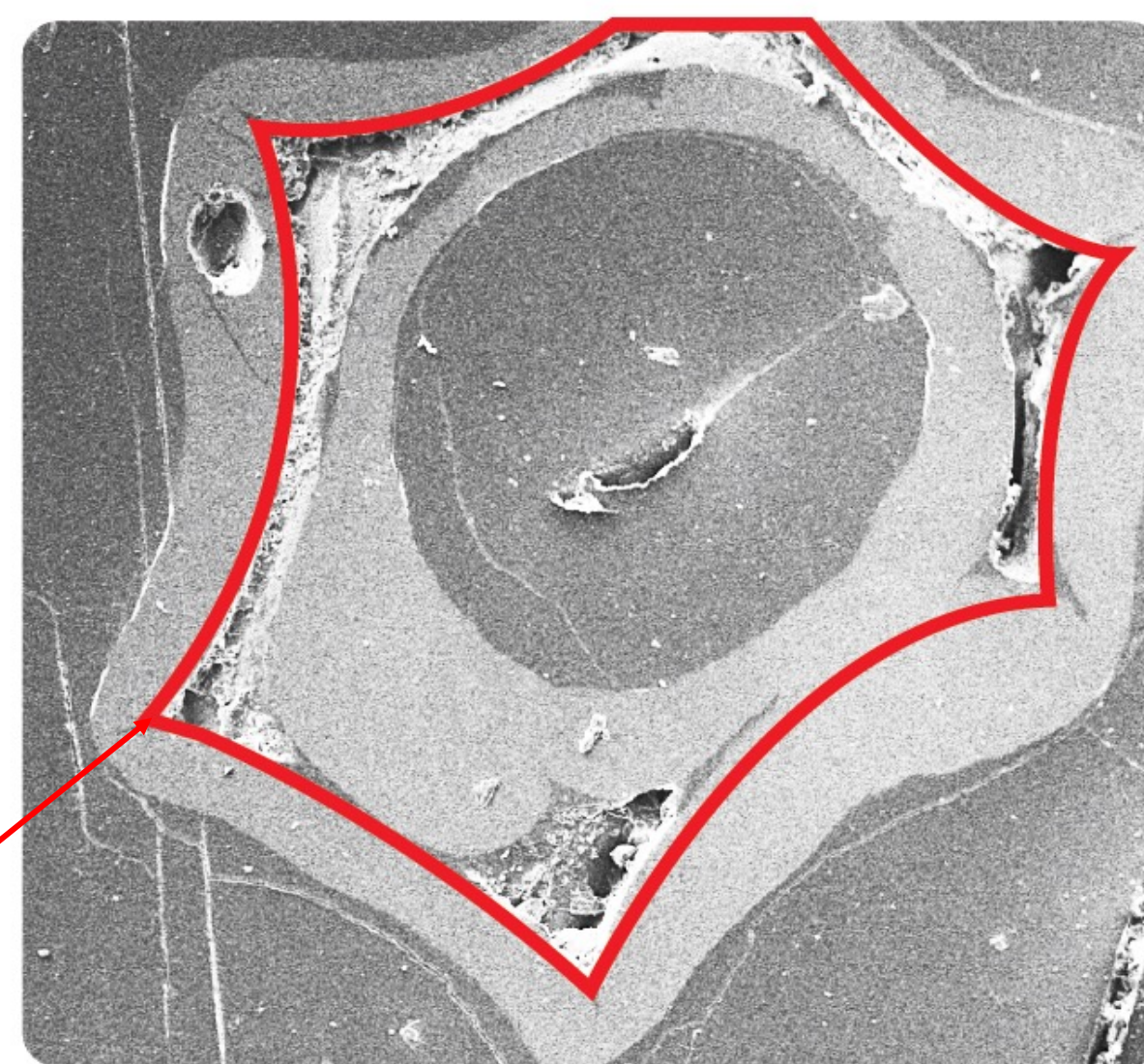
To secure implants placement for full denture rehabilitation, a solid bone is essential. When a prompt and uniform blood circulation follows on implanted bone grafts, there is a high expectation for healthy bone regeneration. Current methods for bone regeneration display a shortcoming for greater fluid absorption and healthier bone generation and recovery. InRoad® allows for the formation of stronger and healthier solid bones with implant placements, and projects a novel and efficient way of doing so. The aim is to introduce membrane-free bone reconstruction techniques using synthetic bone grafts, which has a superior sucking property via a macro-micro-nano engineered structure mixed with homologous fibrin glue (HFG).

in|road
DENTAL SYNTHETIC BONE GRAFT

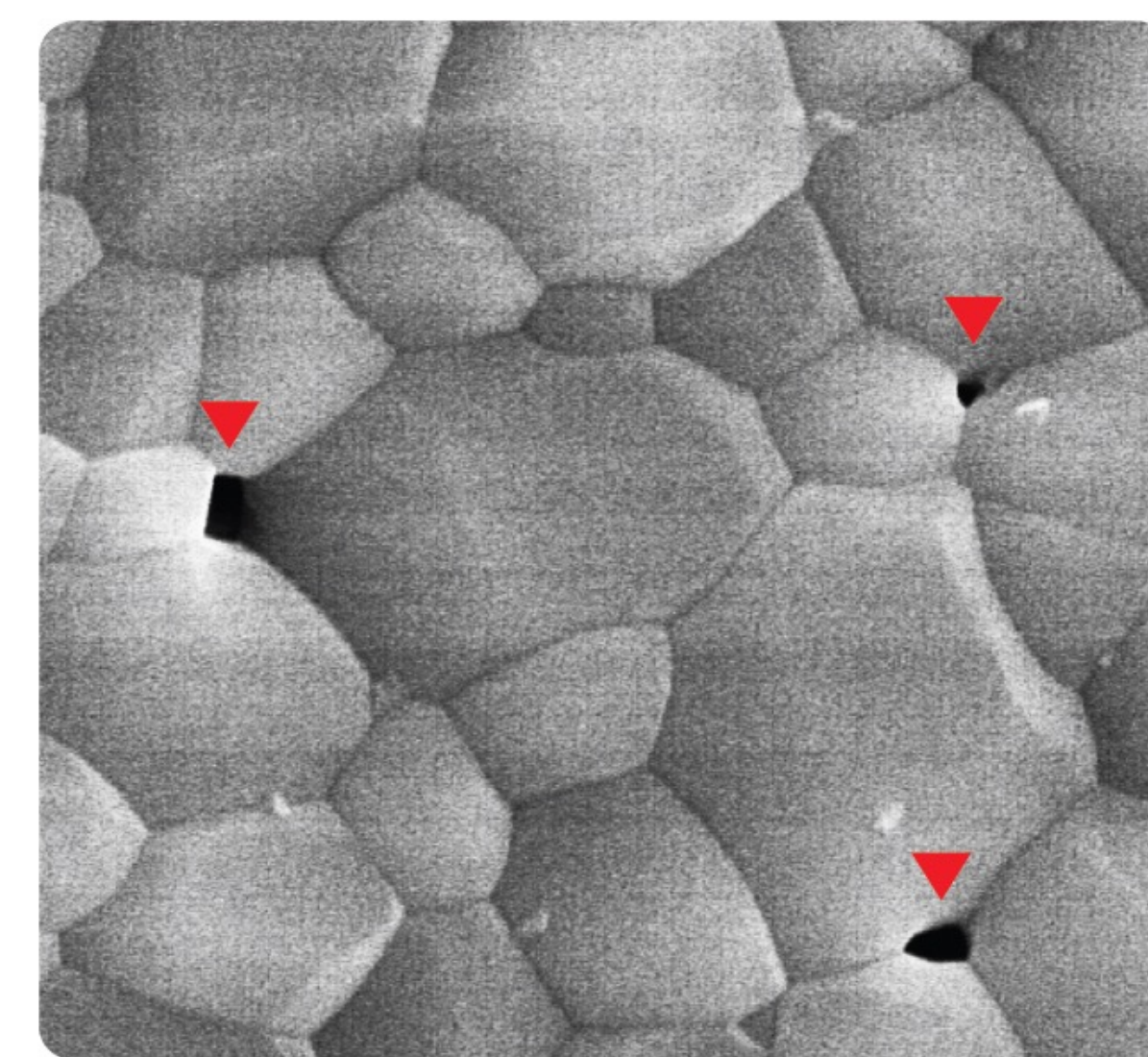
Interconnected Multi-porous Structure



Primary Pores



Secondary Channel



Tertiary Holes



Bovine Bone



InRoad®



Bovine Bone



InRoad®

MATERIALS AND METHODS

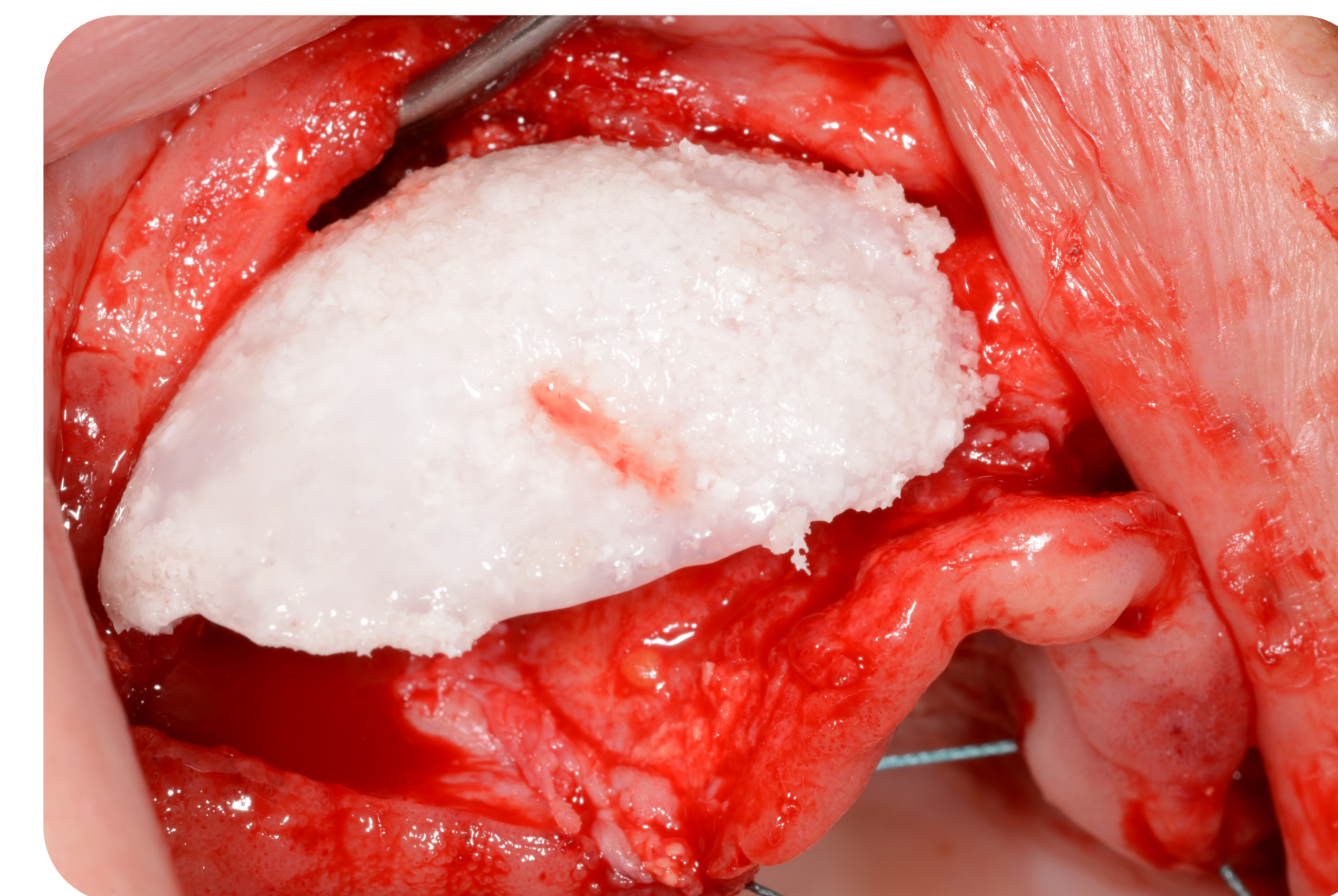
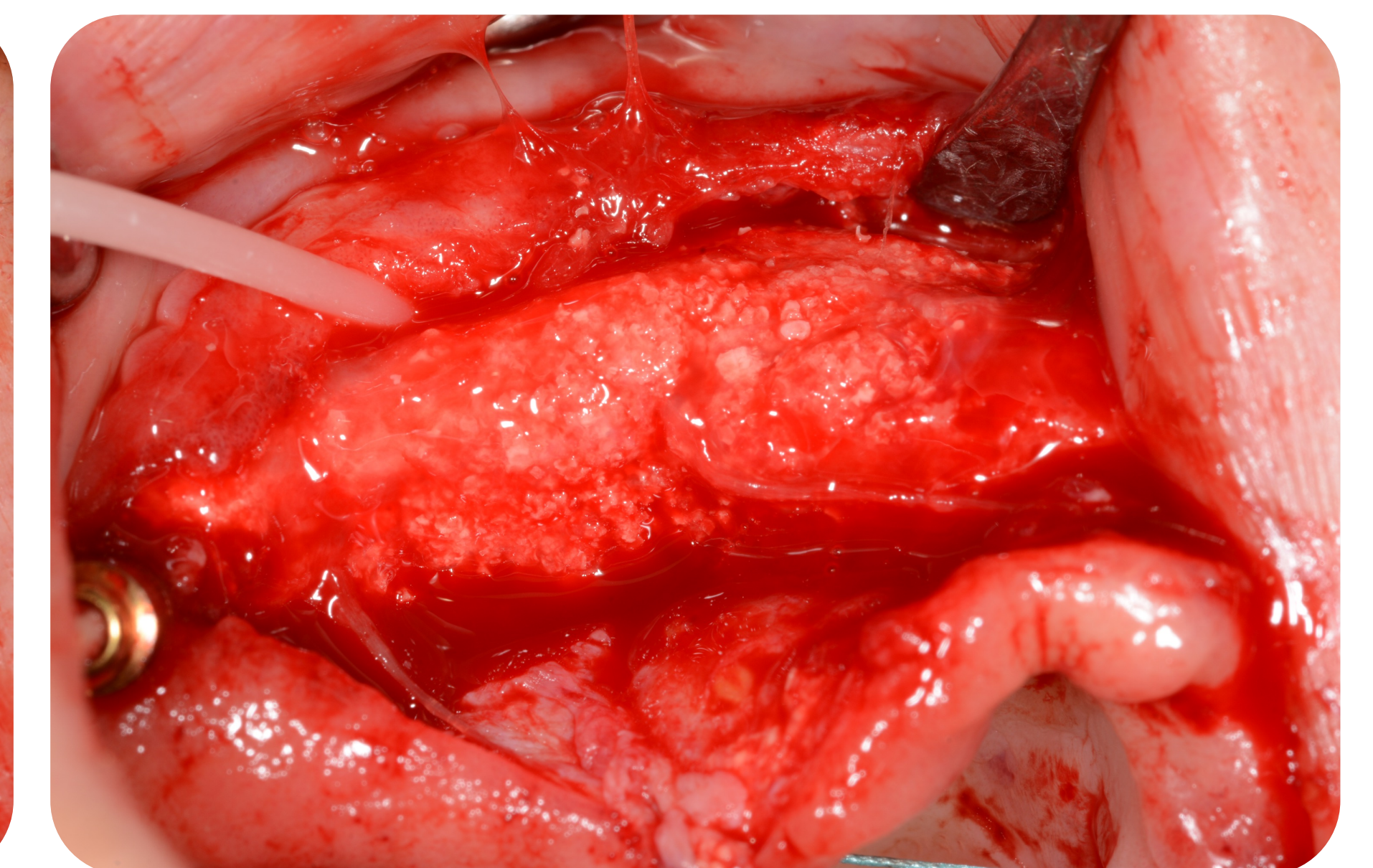
A synthetic bone graft, InRoad[®], was mixed with HFG (TISSEEL, Baxter) . Mostly, one part of InRoad[®] with one part of HFG mixing is appropriate within one minute. The bone grafts mixed with HFG were modeled in the desired shape and volume at recipient sites. Synthetic bone grafts were firmly compacted during mixing with HFG owing to superior sucking property by capillary action. All the grafts were not covered by membranes since both the HFG adhesive properties, and the capillary action of the grafts enhance a natural bone regeneration cascade. Clinical, histological, and radiographic outcomes were evaluated, and implant insertion torques were registered.



Mixing InRoad[®] with HFG (TISSEEL)



Mixed InRoad[®] with HFG (TISSEEL)



Placement of InRoad[®] at surgical site



RESULTS

The unique structure of novel synthetic bone grafts induced capillary action during mixing and grafting, resulting in enhanced bone regeneration. Implanted grafts were well-positioned and maintained at the defected sites even without membrane coverage. No pain or swelling was reported. 2-3 weeks following surgery, a pink mucosa covered the surgical area without inflammation. X-ray examination revealed a progressive increase in bone density. Bone density became similar to that of the adjacent healthy bone at 5–6 months. Implant insertion torques were measured up to 70 Ncm. A few fibrils and mononuclear cells and no visible inflammatory cells were confirmed by histology.

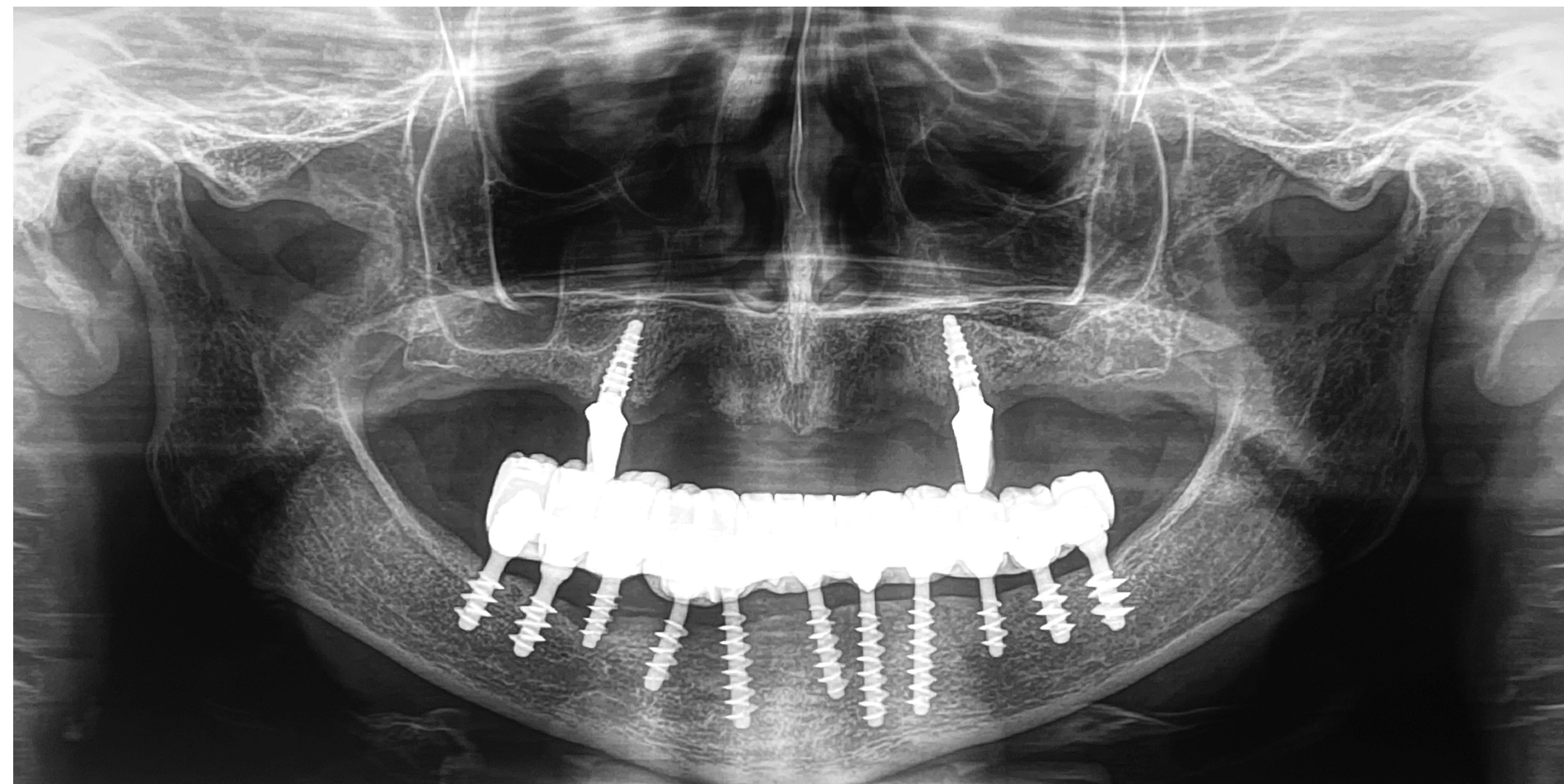


Before bone regeneration (top), after bone regeneration and prosthesis (middle). 3d simulation for implant design (bottom left). Healthy new bone formation was evidenced by histology (x10, bottom right). Synthetic bone grafts (arrowhead), new bone formation (black star), supportive connective tissue (red star).

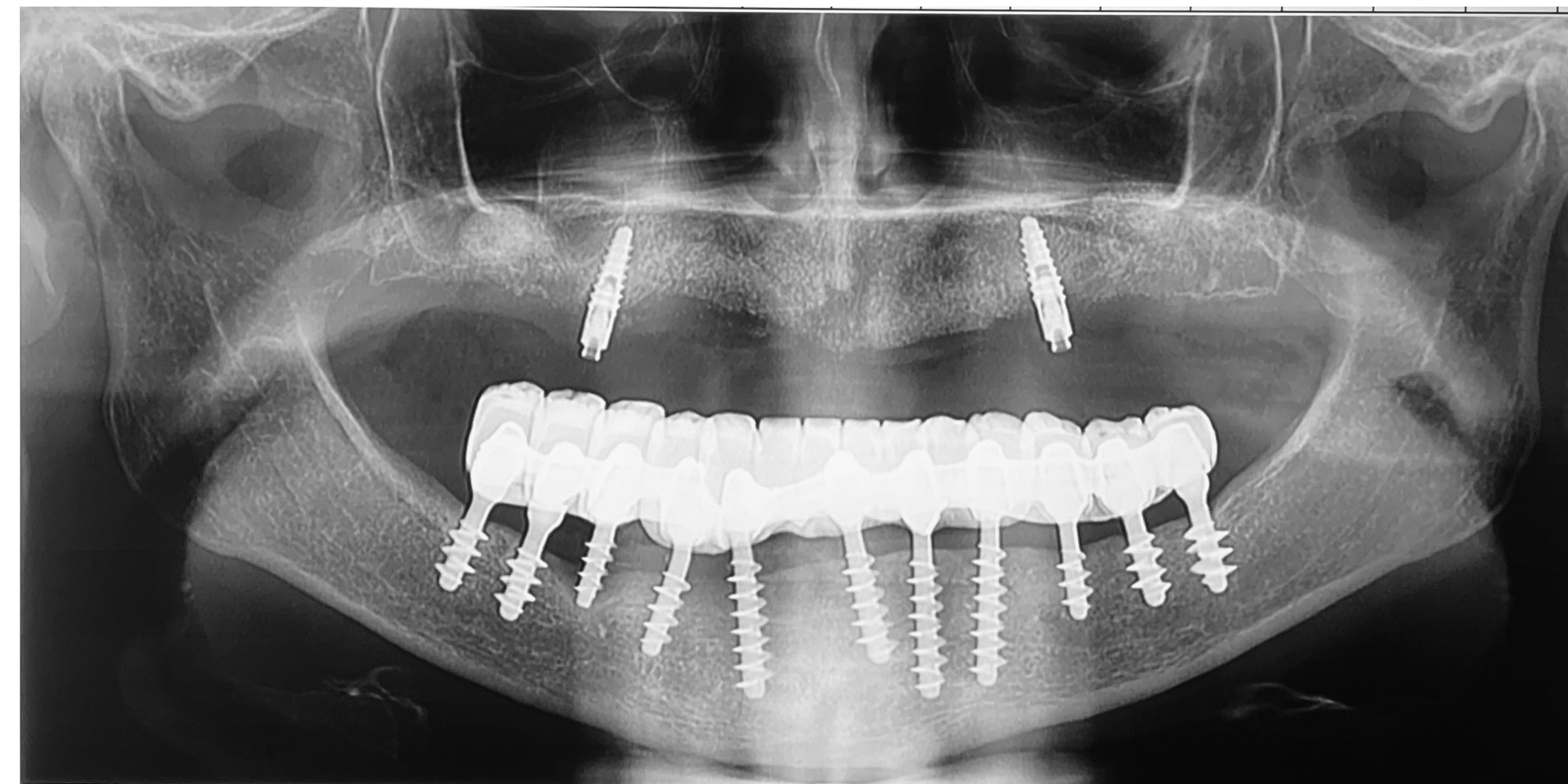


CONCLUSIONS

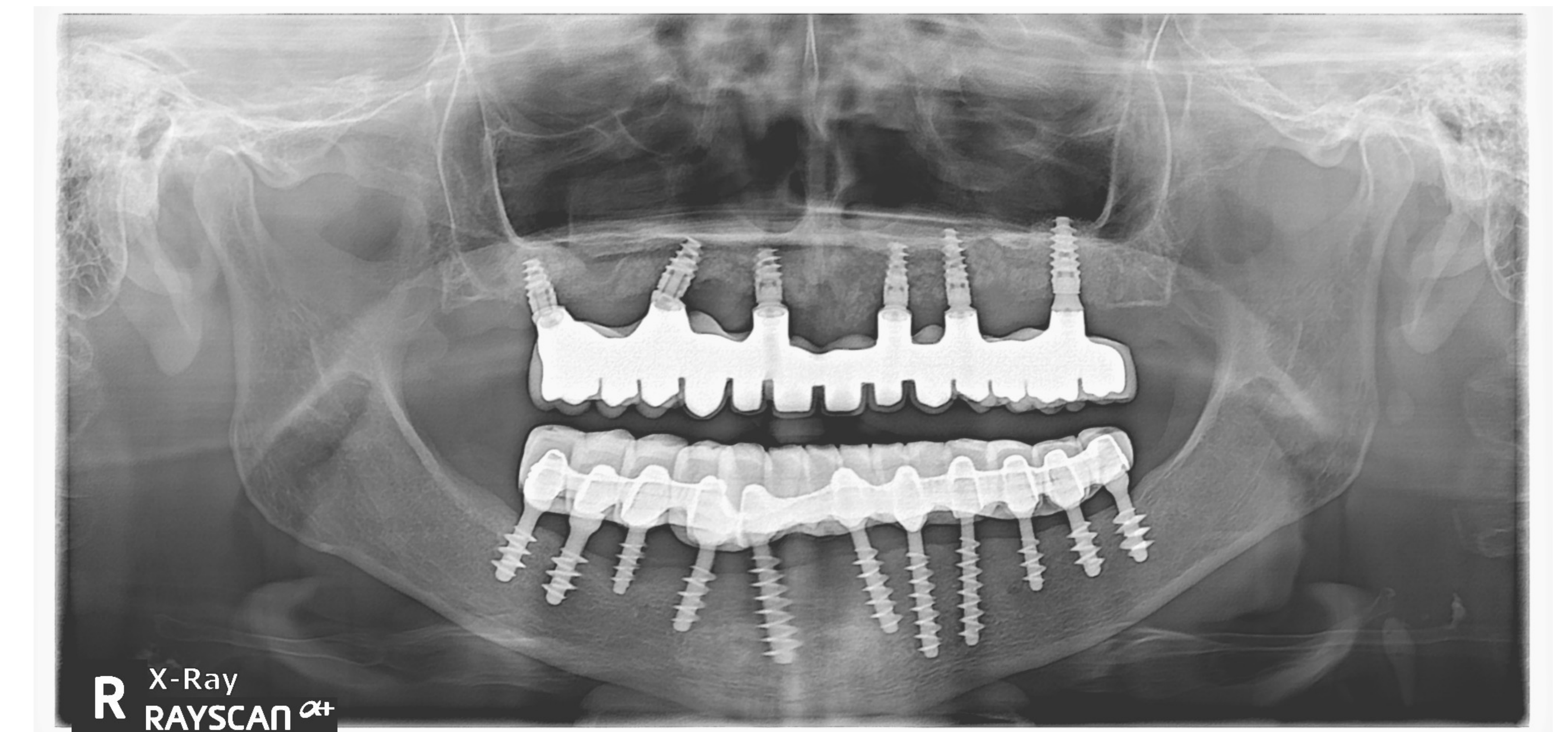
Novel synthetic bone grafts, InRoad®, are not only able to replace and reconstitute missing parts of the skeleton, but also fully capable of carrying out the mechanical functions of the reconstituted segments and, if necessary, can accept the implantation and support the prostheses.



Before bone regeneration



After bone regeneration



After prostheses