

VERTICAL AND HORIZONTAL ALVEOLAR RIDGE AUGMENTATION USING HYDROXYAPATITE-BASED BONE GRAFT WITH FIBRIN GLUE

Antonello Messina, Ettore Marini, Sun-Myoung Song, Sungyun Hann, Philip Y Kang, Richard Yim, Daniel S Oh

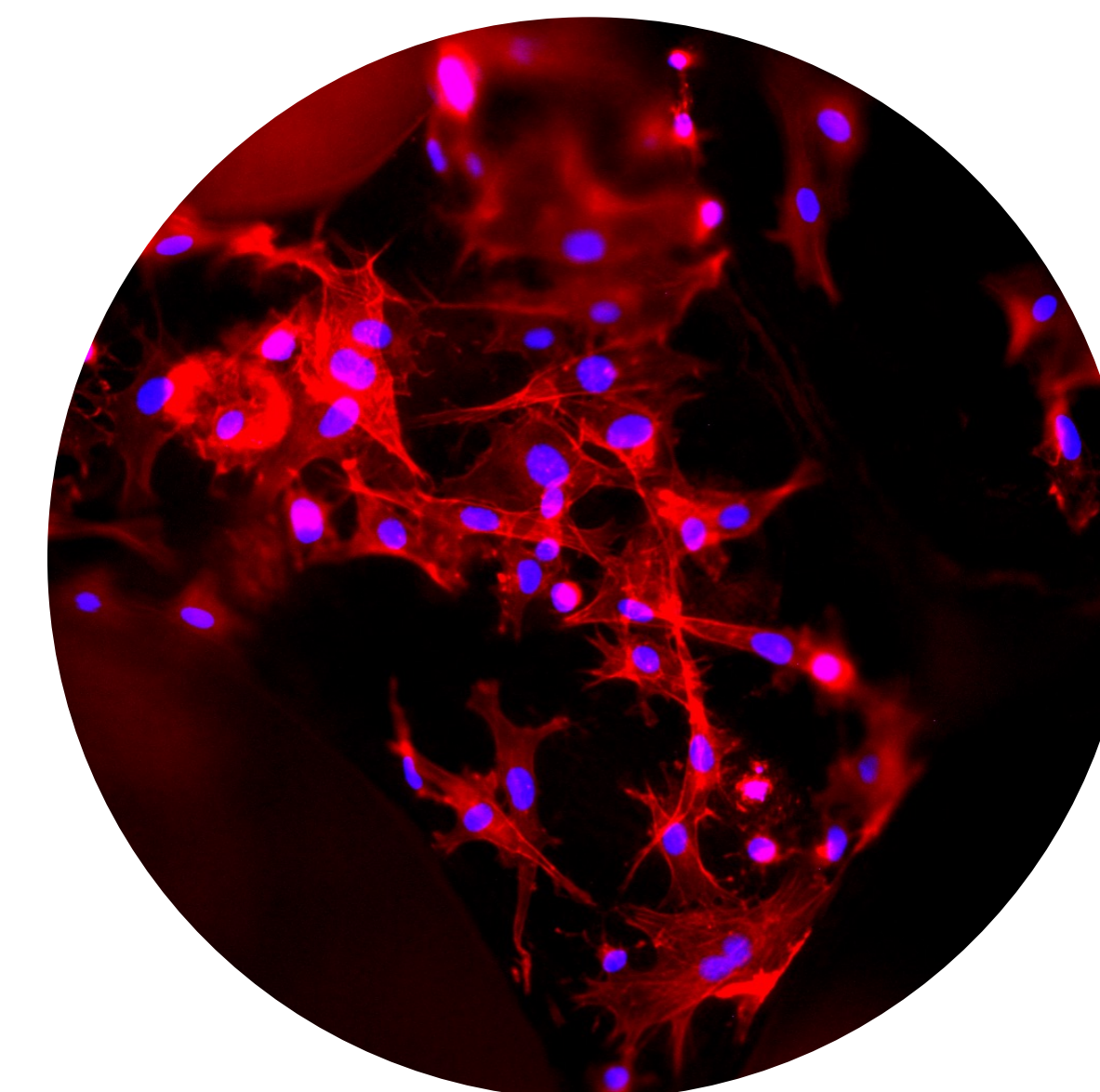


INTRODUCTION

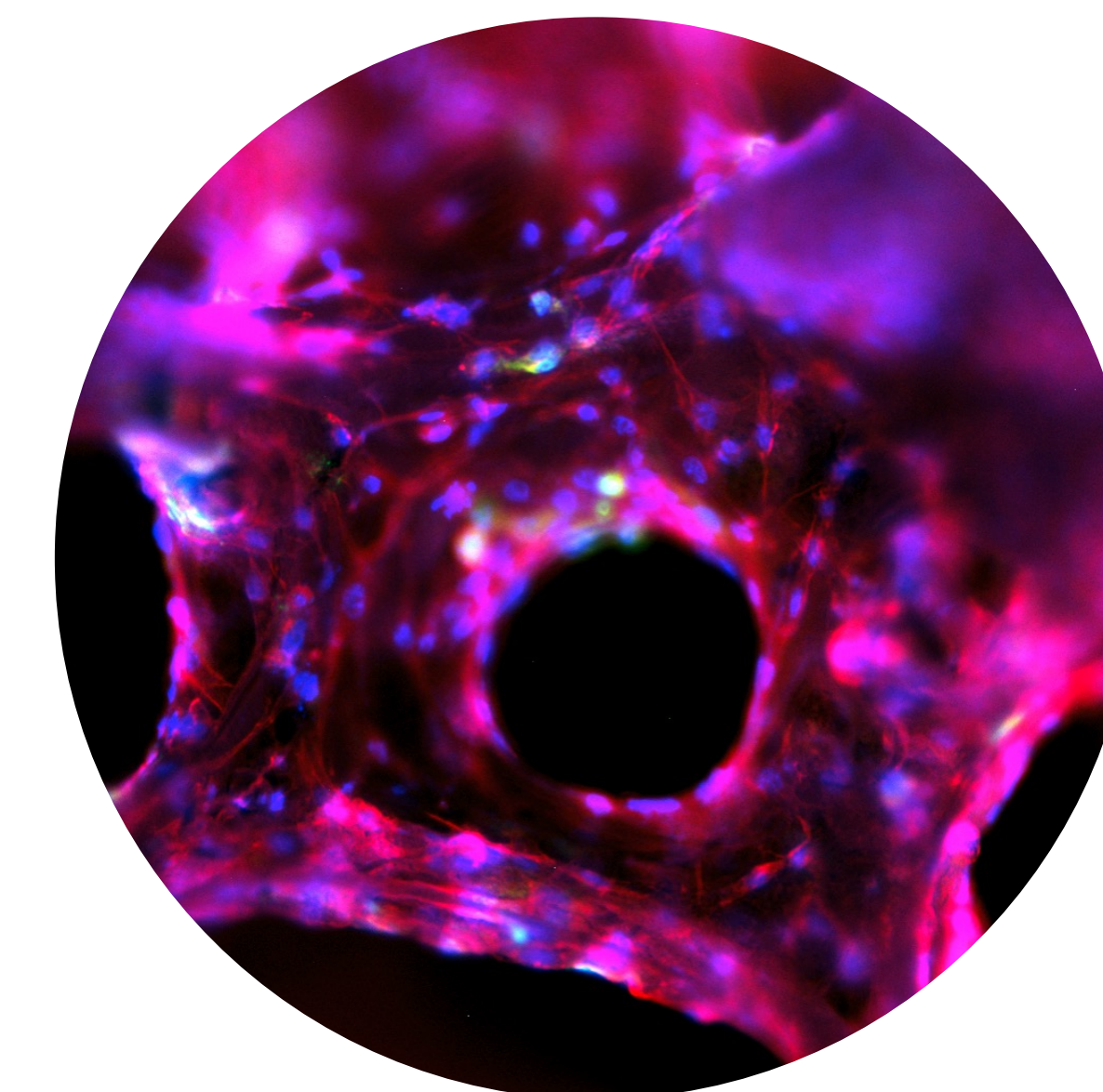
Implant placement in patients with atrophic mandible or maxilla, often caused by factors like periodontal disease, trauma, or post-extraction resorption, is on the rise. When the remaining bone is inadequate for both aesthetic and functional reasons, bone augmentation may be necessary. This new bone aims to support and stabilize future dental implants. ‘inroad®’ hydroxyapatite-based synthetic bone graft (OSTEOGENE TECH CORP., Norwood, NJ), due to its superior blood absorption properties compared to other graft materials, promotes the development of robust and healthier bone structures. The goal is to introduce membrane-free techniques using synthetic bone grafts combined with Tisseel fibrin sealant.



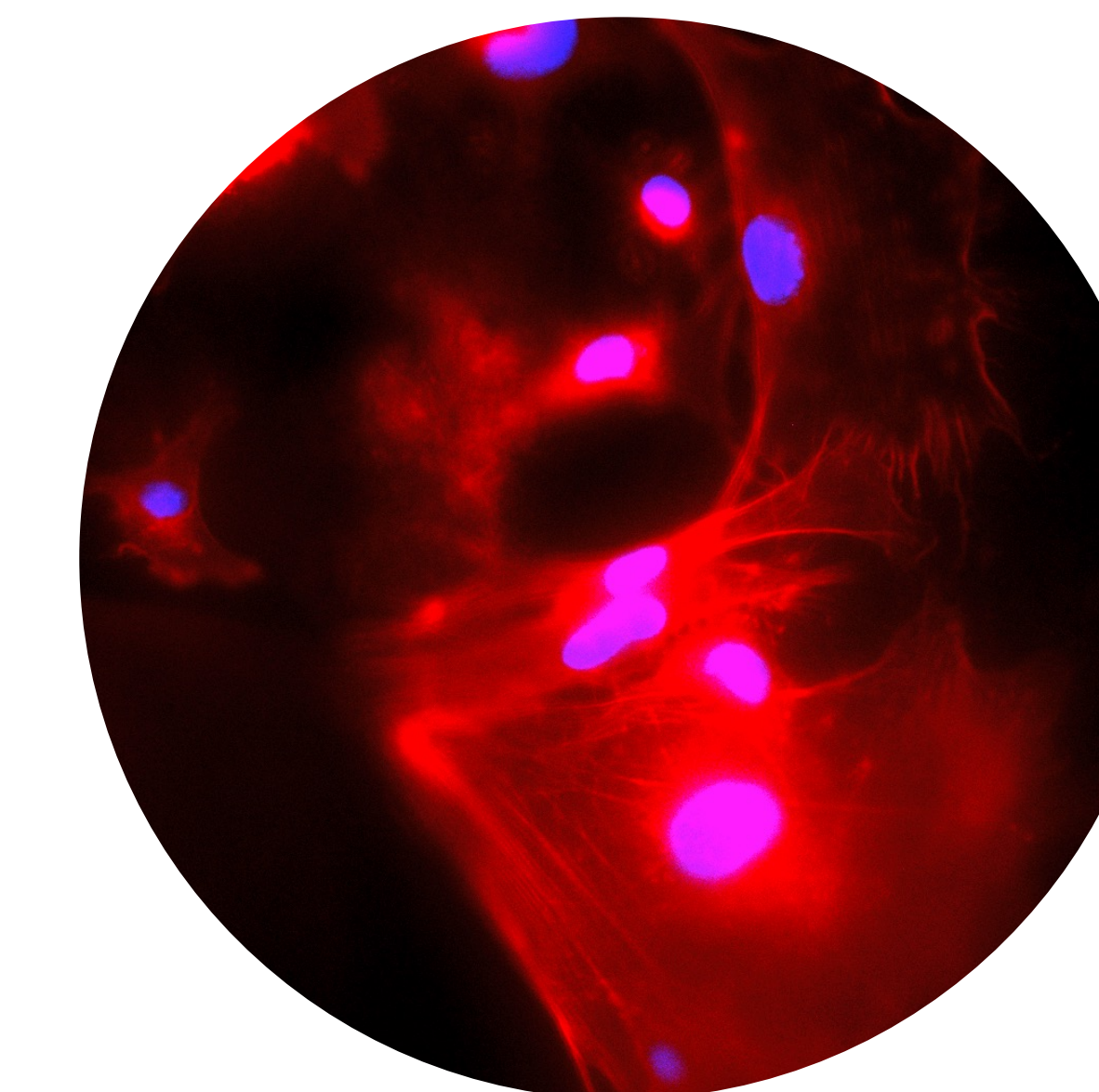
Enhanced Cellular Response (Biogenic Microenvironment)



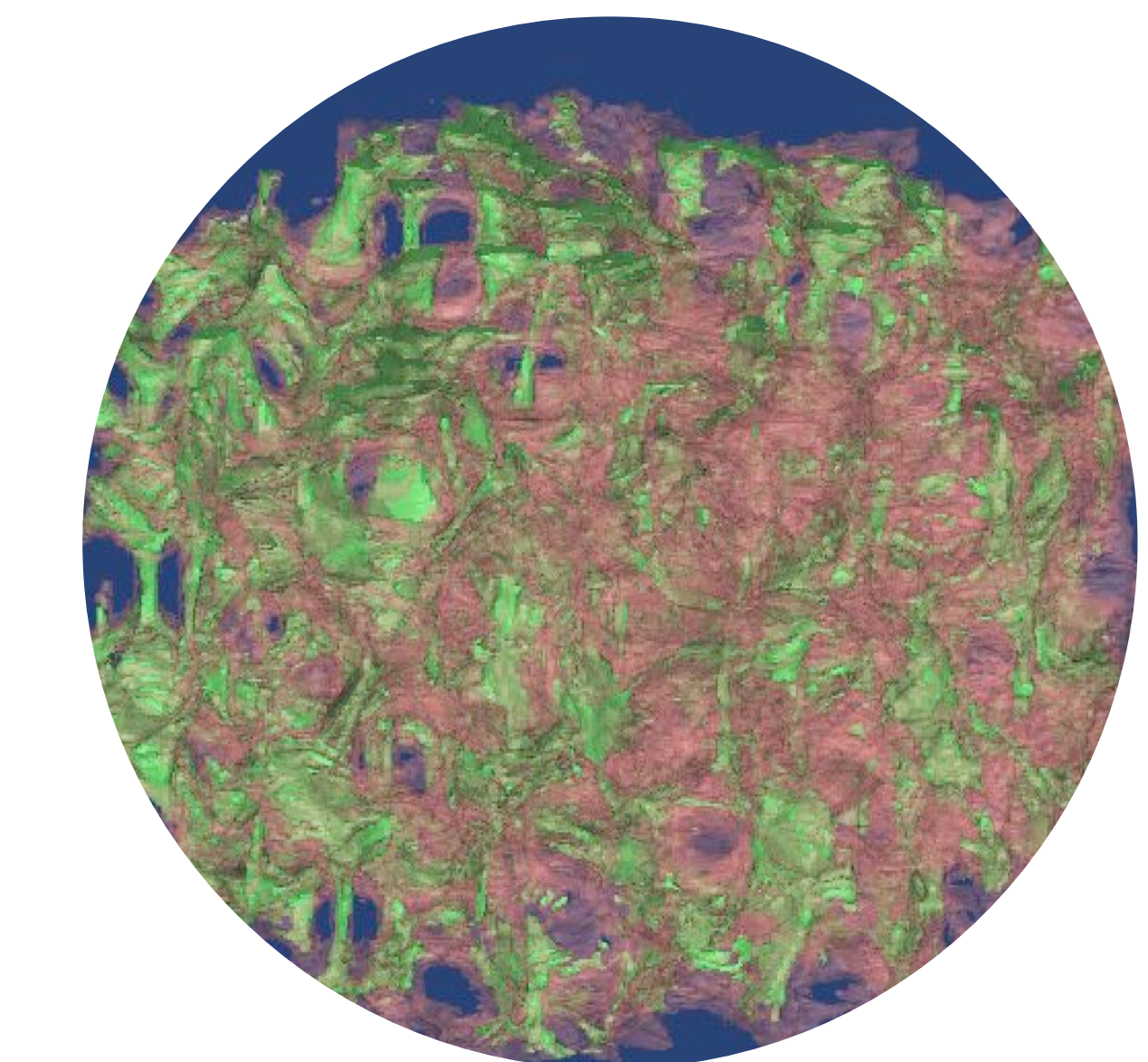
Active Cell
Recruitment



Homogeneous Distribution



Producing Extra Cellular
Matrix (ECM)



Bone Regeneration

MATERIALS AND METHODS

‘inroad®’, a synthetic bone graft, was mixed with Tisseel in a one-to-one ratio within one minute. The resulting composite was skillfully shaped to fit specific recipient sites. The excellent absorption property of ‘inroad®’ ensured firm cohesion with Tisseel, eliminating the need for membranes. The study evaluated clinical, histological, and radiographic outcomes, with recorded implant insertion torques.

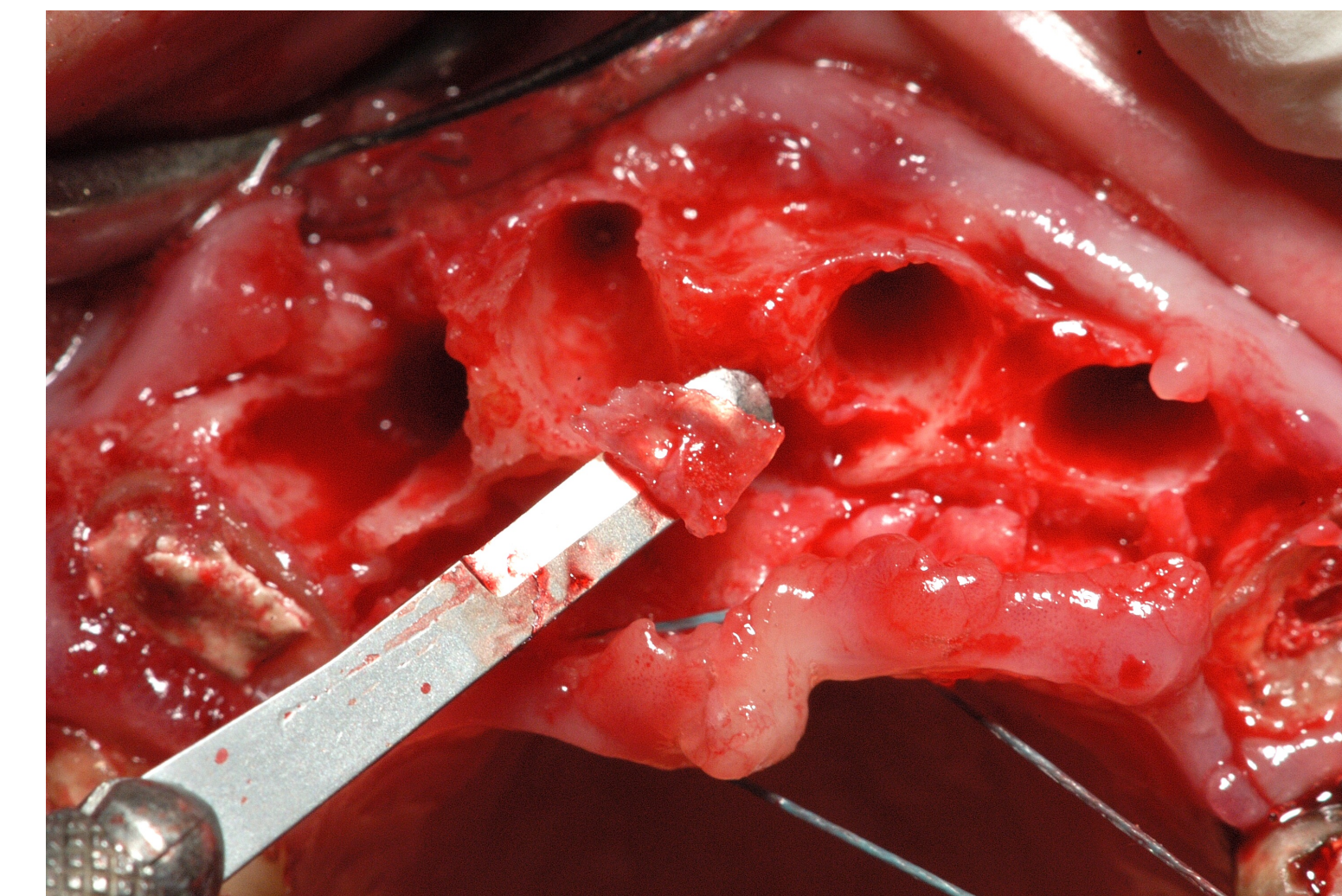
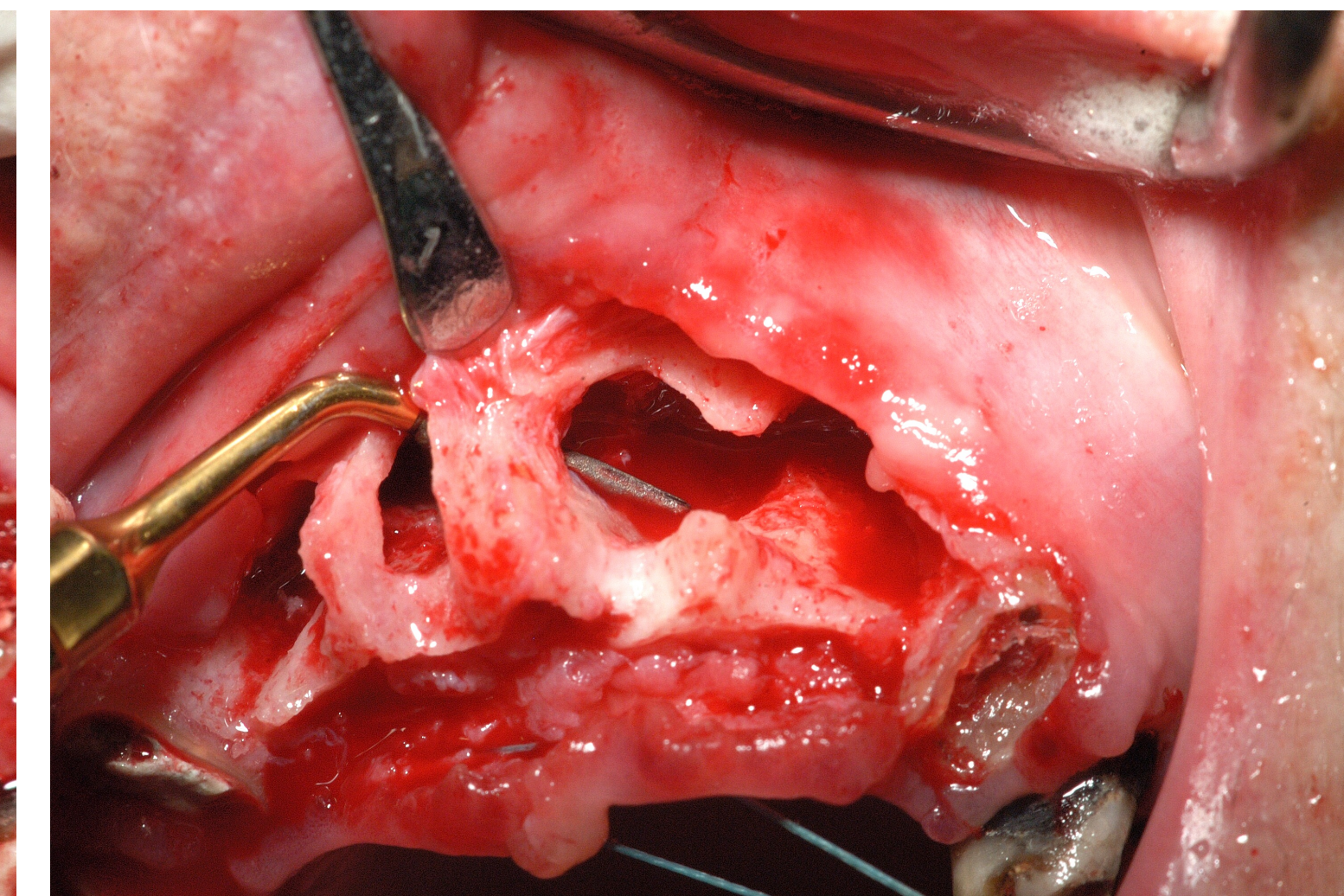
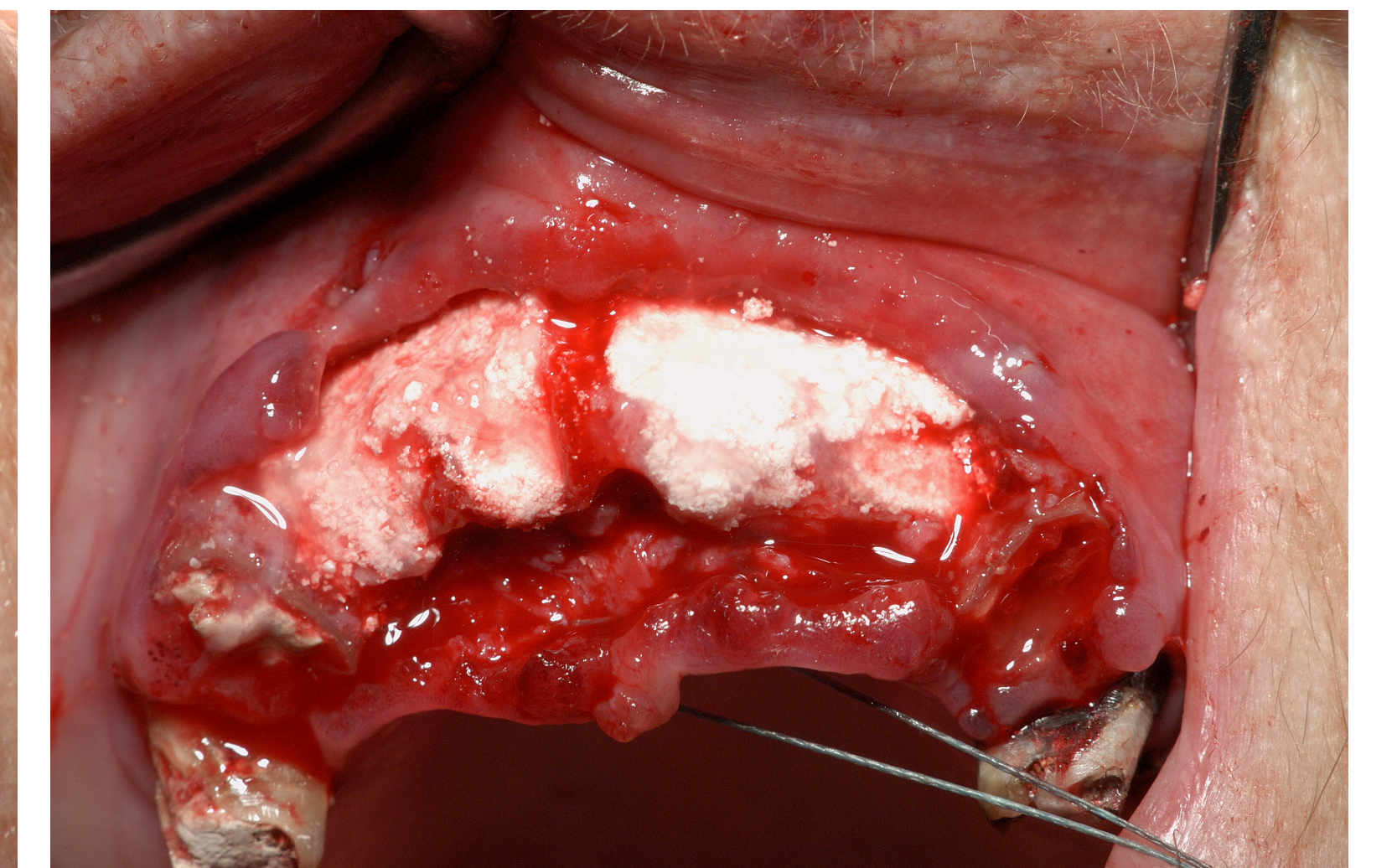


Tisseel
[Fibrin Sealant]



mixing inroad® with HFG (TISSEEL)

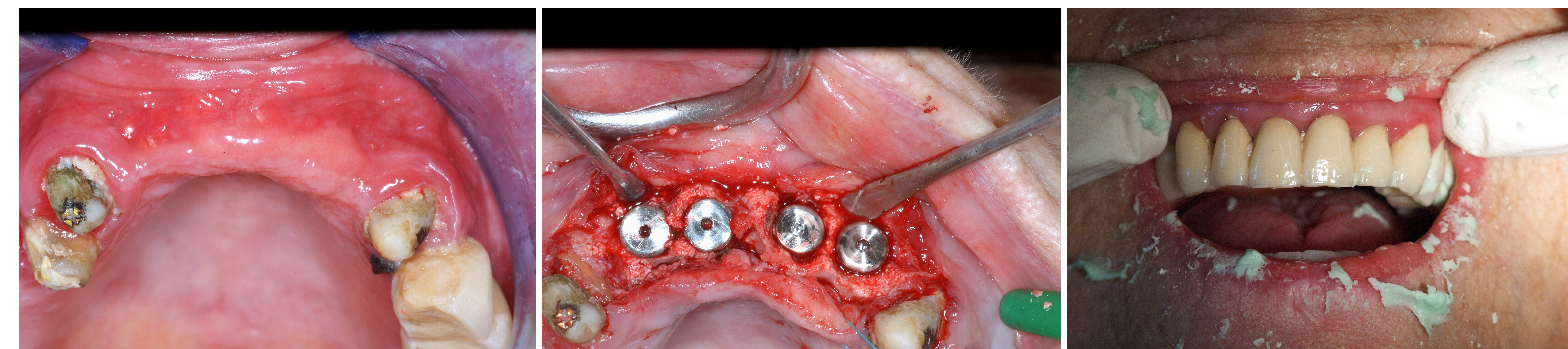
Mixed inroad® with HFG (TISSEEL)



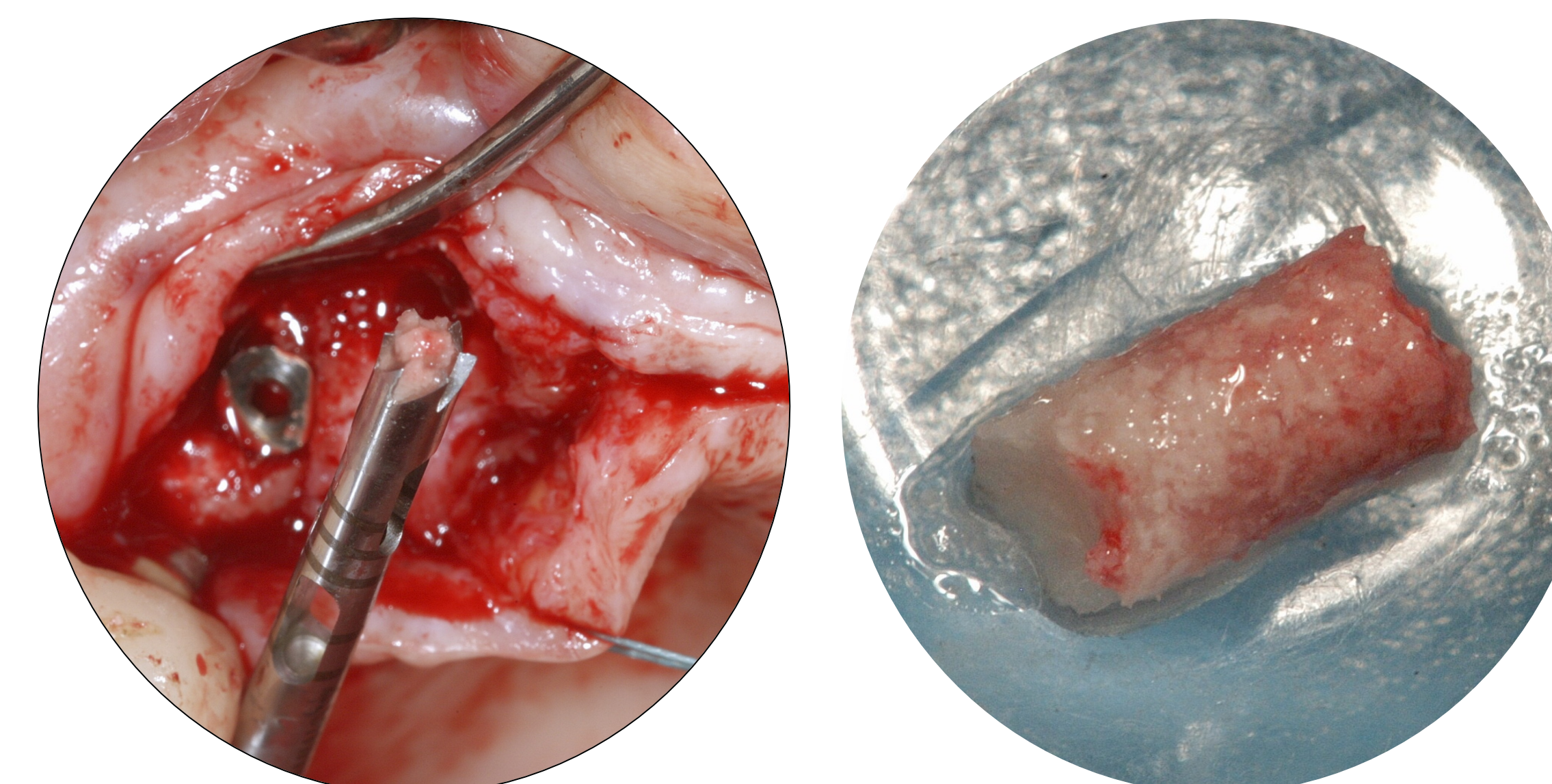
Root removal, debridement, and placement of inroad® at surgical site

RESULTS

The distinctive engineered inner structure of 'inroad®' induced strong absorption characteristics during the mixing and grafting process, leading to a significant enhancement in bone regeneration. The implanted grafts exhibited excellent positioning and remained securely in place at the defect sites, even without the need for membrane coverage. Patients reported no pain or swelling post-surgery. 3 weeks after the surgical procedure, a healthy pink mucosal layer covered the treated area without any signs of inflammation. X-ray examinations revealed a consistent and gradual increase in bone density over time, ultimately reaching a level similar to that of the adjacent healthy bone at around 6 months post-surgery. Implant insertion torques were measured at an impressive 60 Ncm. Histological analysis confirmed the presence of a few fibrils and mononuclear cells, with no observable inflammatory cells.



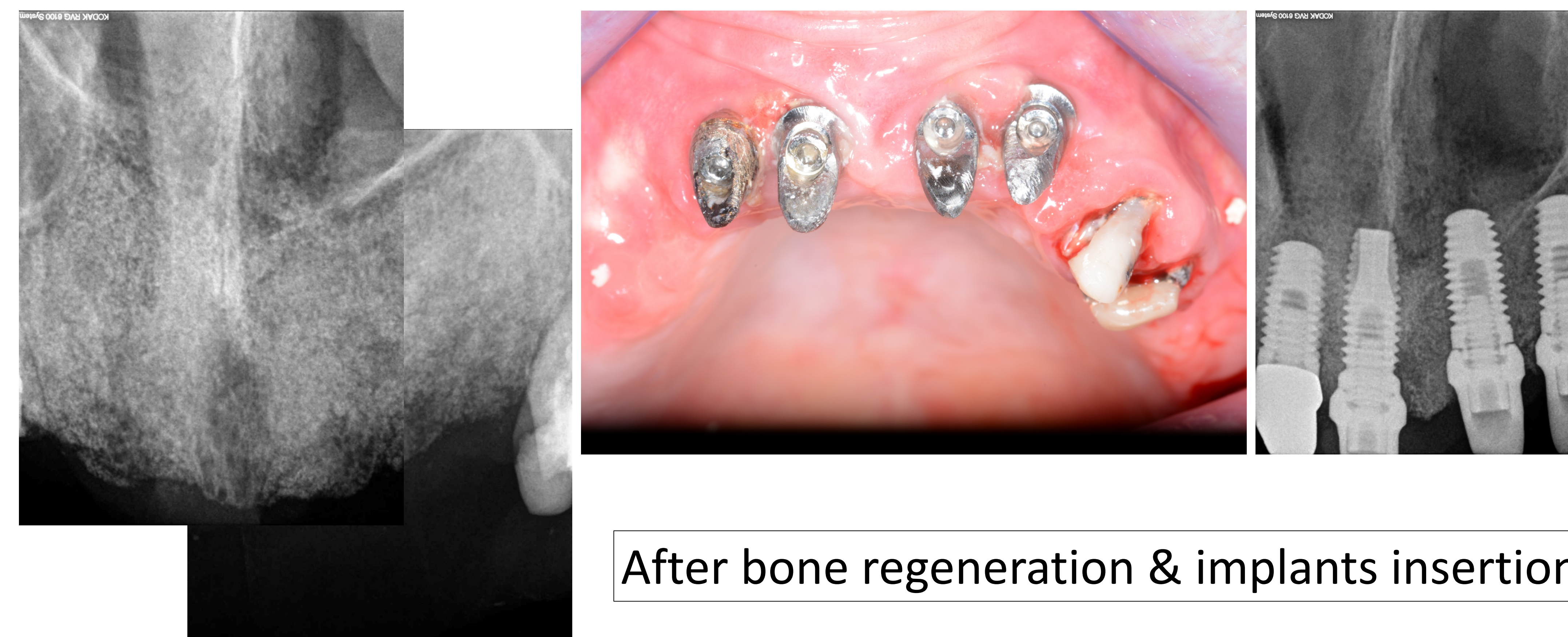
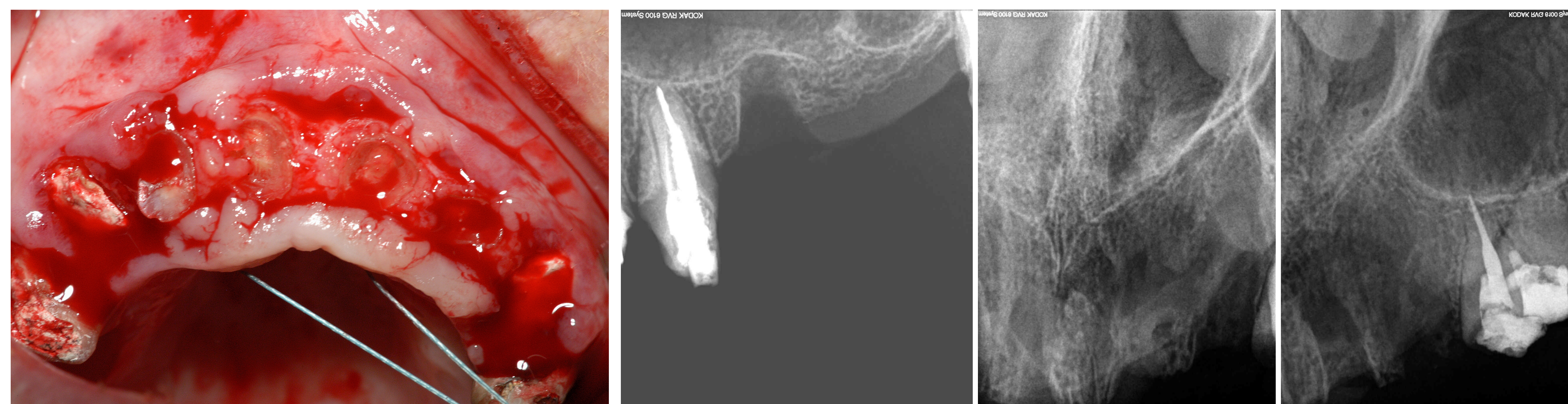
Vertical and horizontal ridge augmentation was successfully finished with four implant with denture. Left: healthy soft tissue recovery was completed 21 days post-op. Middle: four implants placement on the site of vertically and horizontally regenerated alveolar ridge using 'inroad®' synthetic bone graft. Right: full denture was placed for completion of rehabilitation.



Biopsy was taken for the histological analysis.

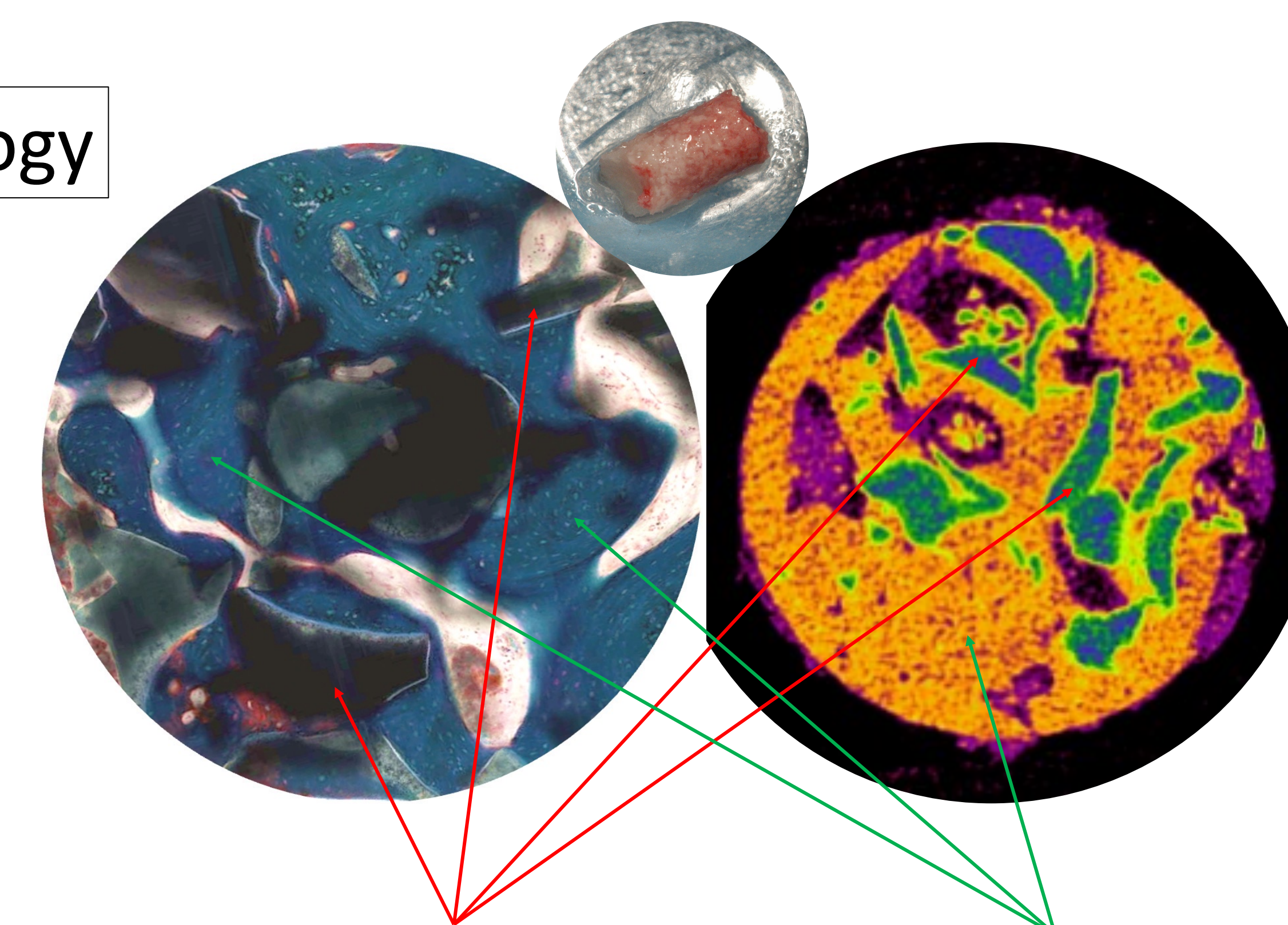
CONCLUSIONS

Innovative synthetic bone grafts, known as 'inroad[®]', not only possess the capability to replace and restore missing segments of the skeletal structure but also excel in performing the mechanical functions required for these reconstituted areas.



Before bone regeneration

Histology



inroad[®]
DENTAL SYNTHETIC BONE GRAFT

Regenerated Bone

