



# 4<sup>th</sup> GBR Symposium 2022

## A novel fully-digital approach for restoration of vertical bone defect.

### A case report.

**Lucia Tedeschi<sup>1</sup>, Sofia Bettini<sup>2</sup>, Raffaele Donati<sup>3</sup>, Stefano Bertoni<sup>4</sup>, Alessandro Cucchi<sup>5</sup>**

<sup>1</sup> Department of Biomedical and Neuromotor Sciences (DIBINEM), University of Bologna, Bologna, Italy

<sup>2</sup> Maxillofacial Surgery and Odontostomatology Unit, Implant Center for Edentulism and Jawbone Atrophies, University of Milan, Milano, Italy

<sup>3</sup> Private practice, Lucca, Italy

<sup>4</sup> Private practice, Brescia, Italy

<sup>5</sup> Private practice, Bologna, Italy

#### BACKGROUND AND AIM

Guided bone regeneration is an advanced surgical technique to achieve vertical ridge augmentation with the aim of restoring adequate bone volume for implant placement. Titanium reinforced PTFE membranes are widely used in the field of GBR, but their modeling is extremely operator dependent. Nowadays new technologies allow us to produce a resin model reducing treatment times and enabling precise and accurate modeling. This clinical case aimed to demonstrate the possibility to restore aesthetics and function in the atrophic posterior mandible for complete "restitutio in integrum", using a novel fully-digital approach for vertical ridge augmentation (VRA).

#### METHODS AND MATERIALS

A 63-year-old non-smoker woman was referred for vertical ridge augmentation in mandible and implant-prosthetic restoration. Digital planning of bone augmentation, manufacturing of 3D-printed models and mesh replica, and customization of reinforced-PTFE-mesh (RPM) was accomplished before surgery. During surgery, RPM was filled with 50:50 of xenograft and autogenous bone, applied using the replica, and finally covered with pericardium membrane. At re-entry, computer-guided surgery was planned and realized for placement of 3 implants. After 3 months, soft tissue management was performed using a collagen matrix. Finally, definitive crowns were realized using a digital approach.

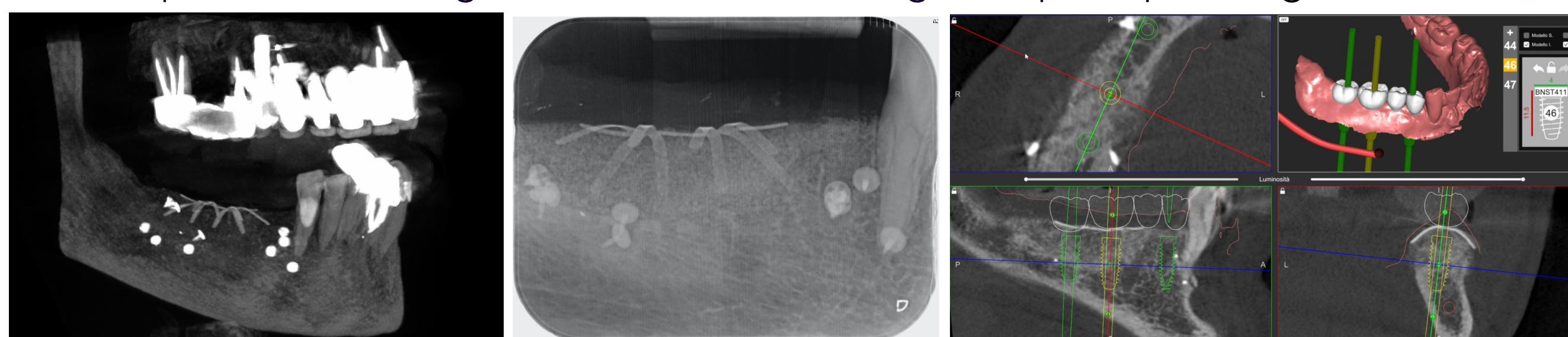
#### RESULTS

No healing and surgical complications were observed, patient-related outcomes as well as clinician-related outcomes were always favourable (VAS<2). Linear and 3D vertical bone defect were 8.9mm and 6.5mm, respectively. Vertical bone gain was complete (6.5mm, 100%), medium bone density, and pseudo-peristeam class 1. An increase of keratinized tissue (tKT and wKT) was observed using collagen matrix. Implant stability > 35 Ncm for all implants. Patient's satisfaction level was maximum.

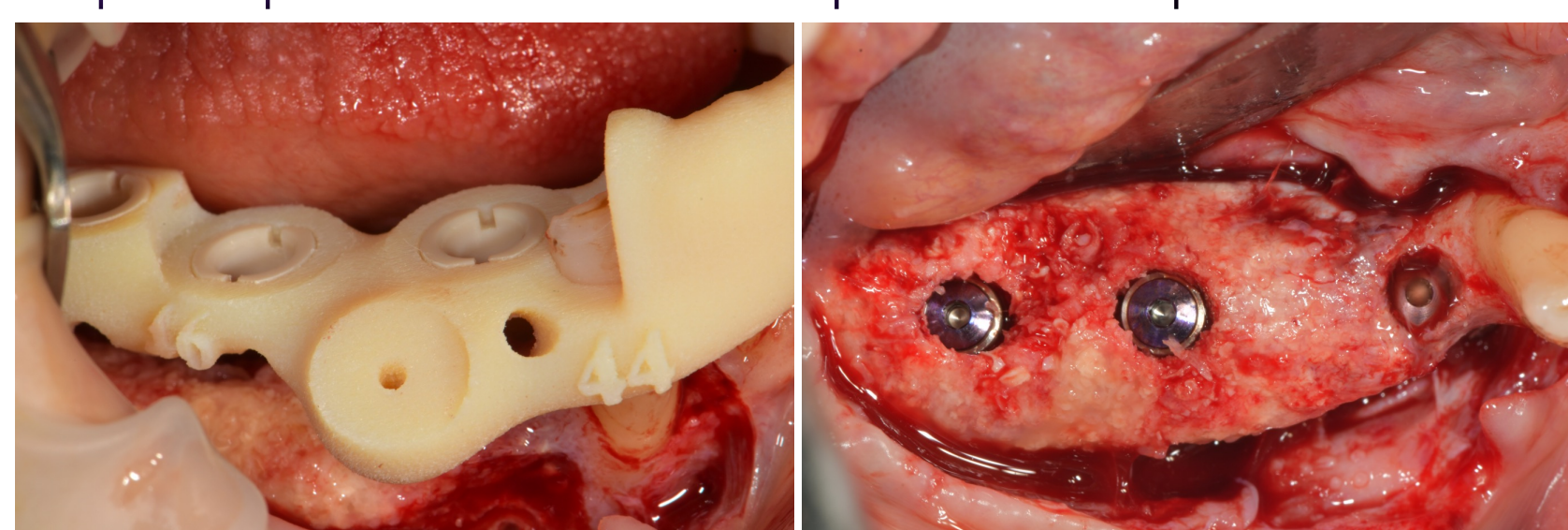
#### CONCLUSIONS

The presented clinical case has showed that this novel digital approach for vertical ridge augmentation and following computer-guided implant surgery was effective and reliable for achieving esthetics and function in atrophic posterior mandible.

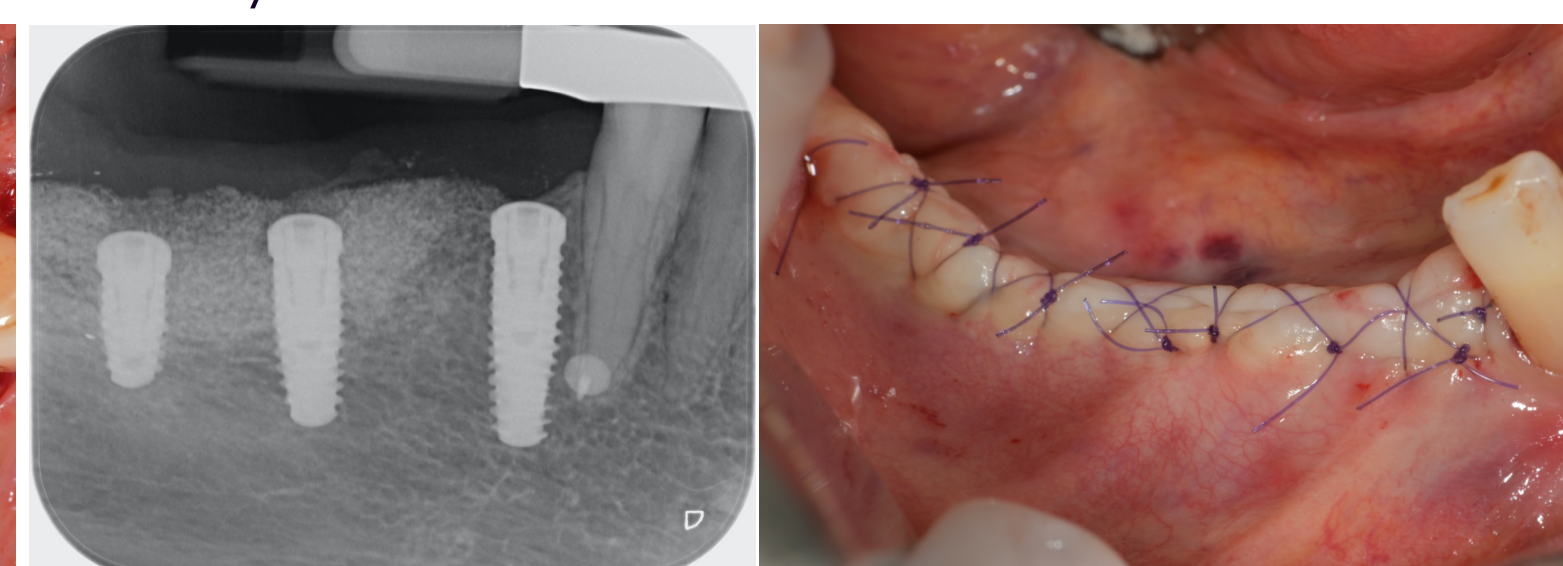
Post – operative radiological assessments and digital implant planning



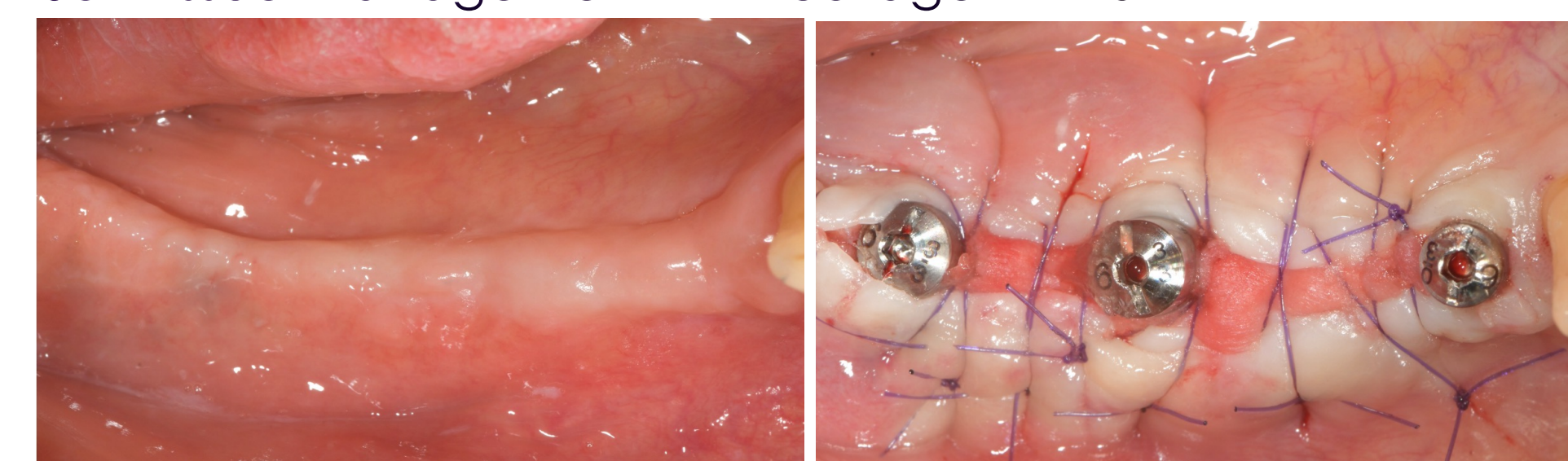
Implant placement with 3D printed template



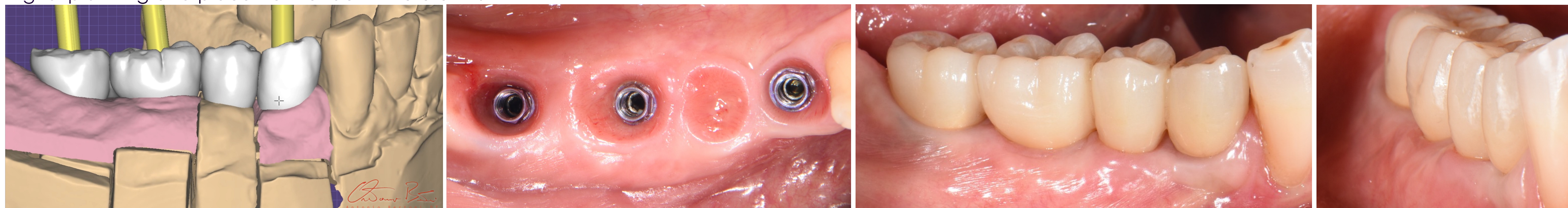
Primary closure



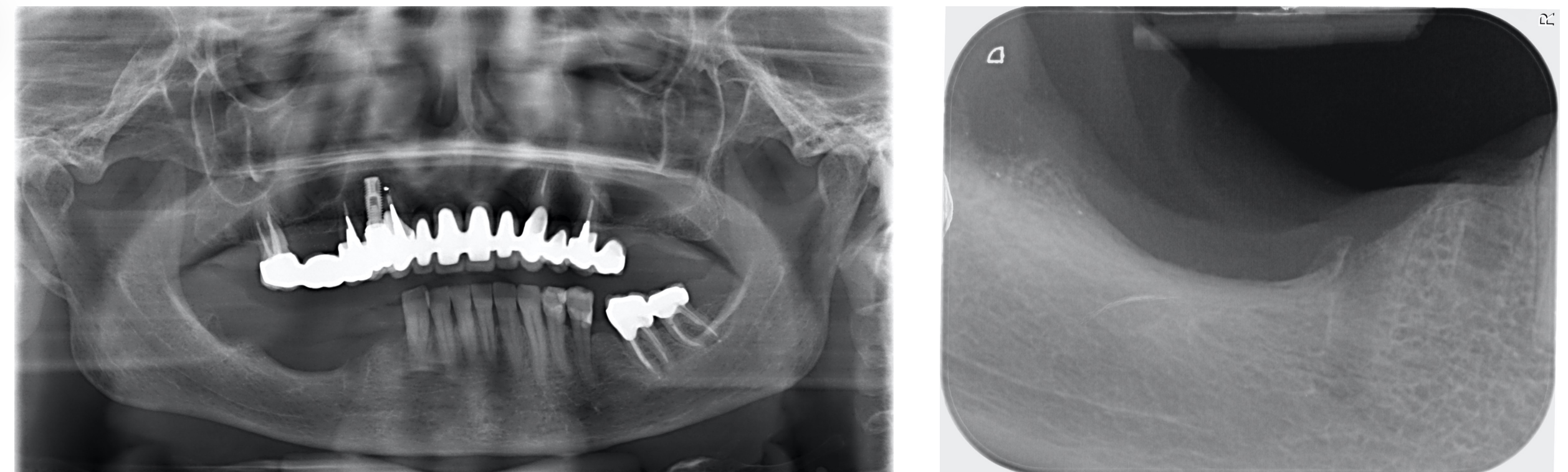
Soft tissue management with collagen - matrix



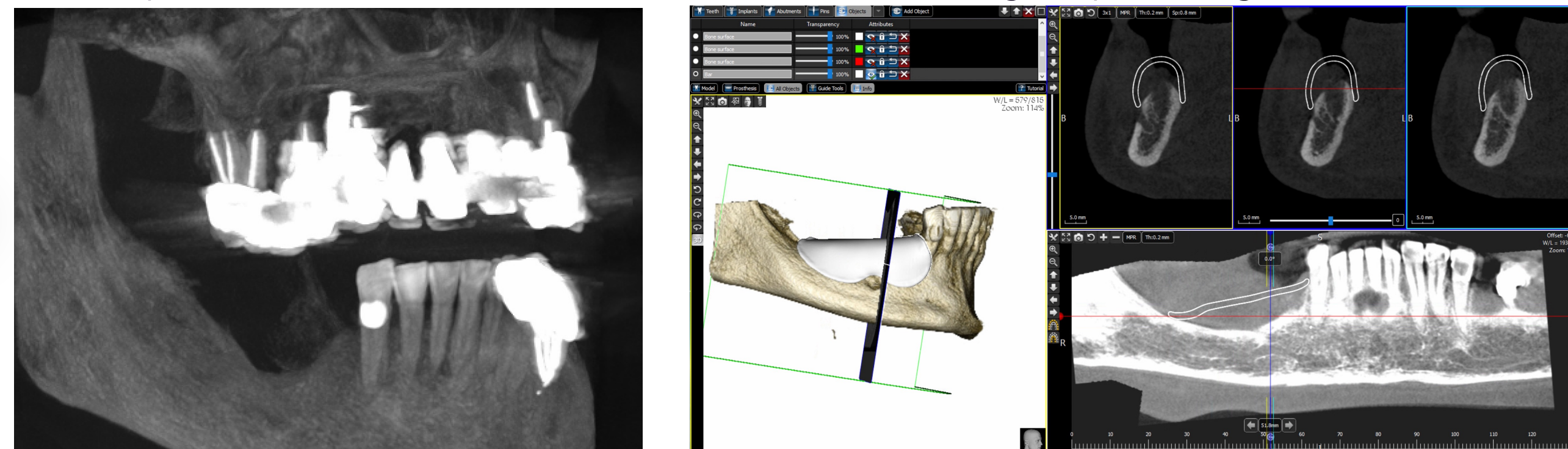
Digital planning and placement of definitive crowns



Pre – operative two dimensional evaluation



Pre – operative three dimensional evaluation and digital planning



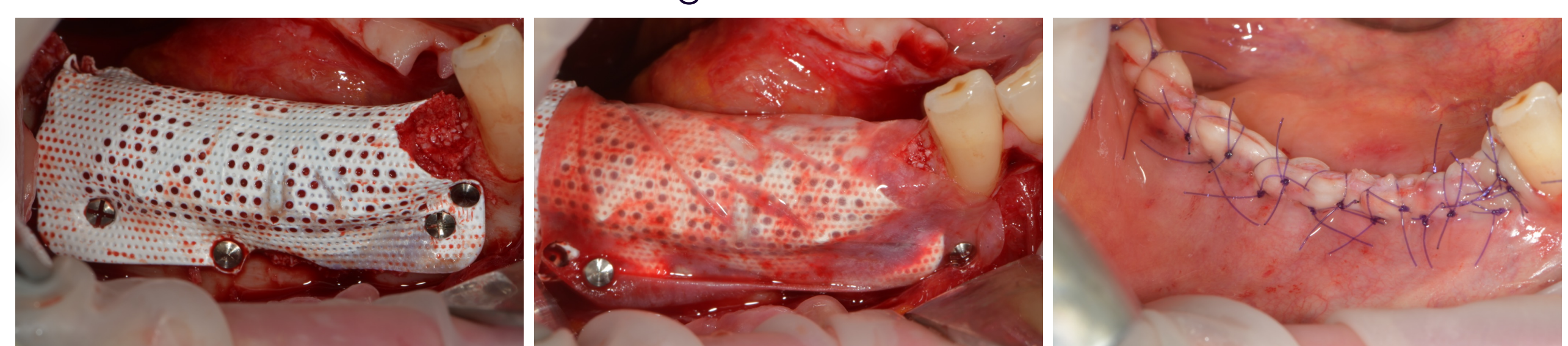
Clinical bone defect



PTFE mesh modeling



Fixation of the PTFE mesh and collagen membrane



Mesh removal and bone evaluation

