

INTRODUCTION

- Osteblastoma (OB) is a rare benign slow-growing bone tumour, which represents less than 1% of all tumours in the maxillofacial region.
- Tend to be diagnosed in 4th or 5th decades of life. Commonly arises on the cranial vault surfaces, jaws, paranasal sinuses, and orbit.
- Often presents asymptotically, although when large may result in a painless swelling, facial asymmetry, symptoms related to nasal or paranasal sinus obstruction and ocular abnormalities.
- Excision is the treatment of choice relative to the tumour extent and may require maxillofacial reconstruction.
- A MDT approach is required in the management of these patients, with the common goals of restoration of function, aesthetics and quality of life.

METHOD

- 19-year-old female referred to the Royal London Dental Hospital for replacement of teeth in the right maxillary quadrant.
- Previous en bloc resection of an OB from the right maxilla in Italy at the age of 13 followed by a fibula bone graft reconstruction.
- Unhappy with her removeable partial prothesis due to aesthetics and fit.
- Two tissue level implants were digitally planned to achieve bicortical fixation within the fibula graft in the UR3 and UR5 positions.
- Due to the hollow structure of the fibula bone a mixture of autogenous bone scrapings and bovine-derived bone graft material were inserted through the implant osteotomy sites to help achieve stability and osteointegration.

PRE-TREATMENT



- Low smile line
- Upper lip asymmetry due to scarring and palsy from surgery



- Frontal view
- Retained deciduous As were extracted and composite build ups of the LR2 and LL2



- Maxillary occlusal view
- Right fibula bone graft with lack of vestibular sulcus and keratinized tissue.



- Right lateral view
- Edentulous posterior maxilla from previous resection



- Left lateral view
- Good interdigitation and stable intercuspal position

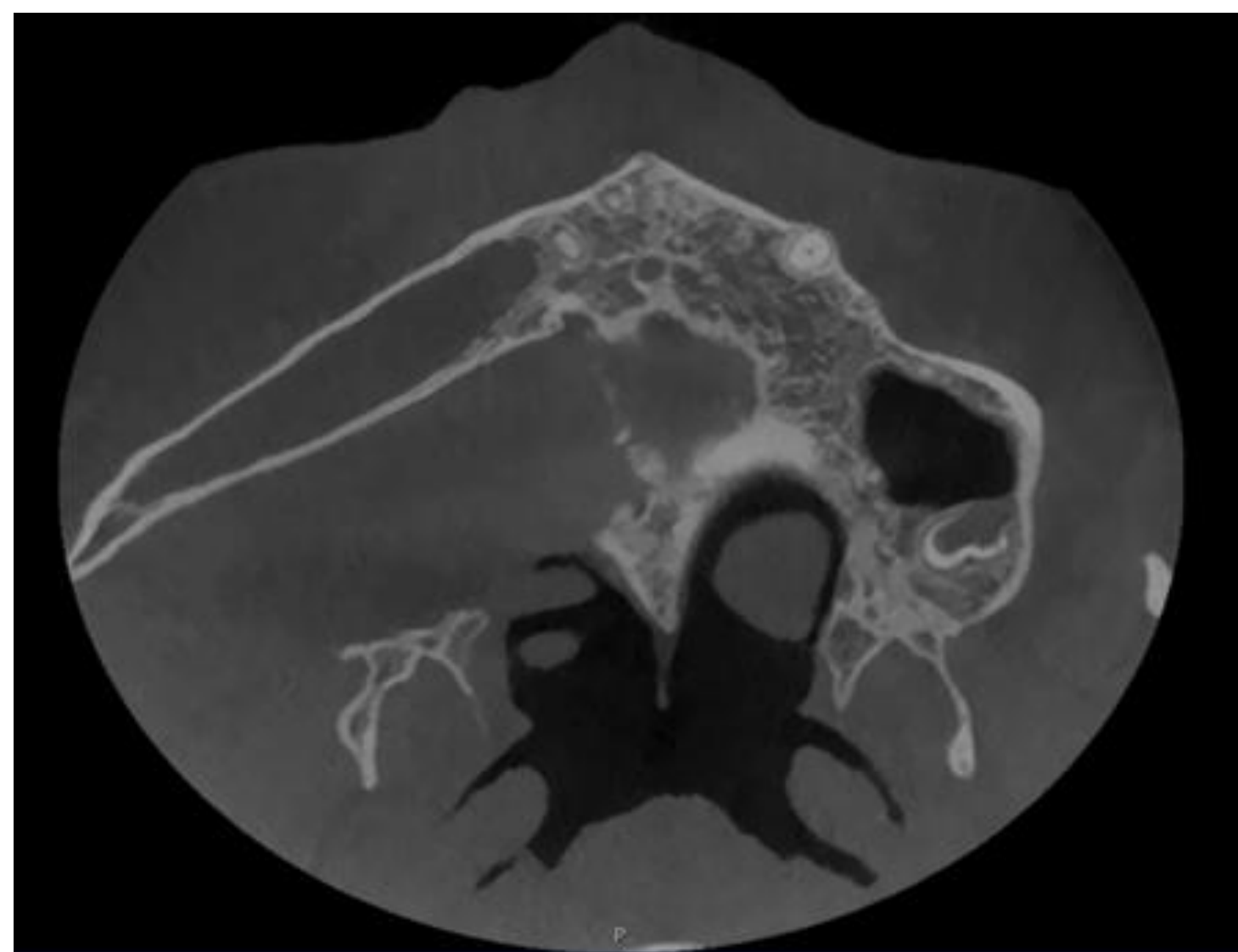


- Maxillary and mandibular articulated casts
- Light contact of LR7 with opposing soft tissue

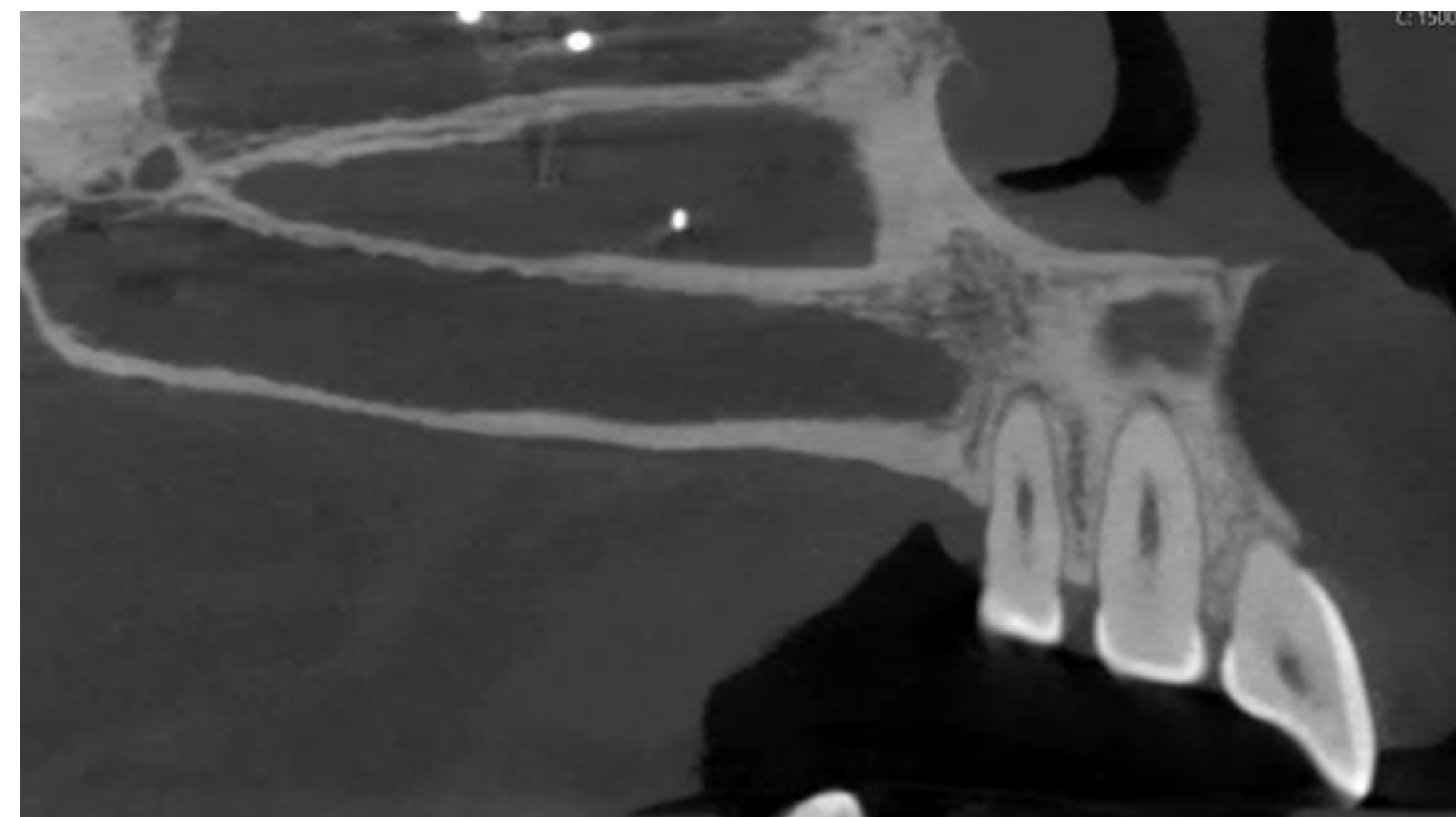
RADIOGRAPHIC IMAGING



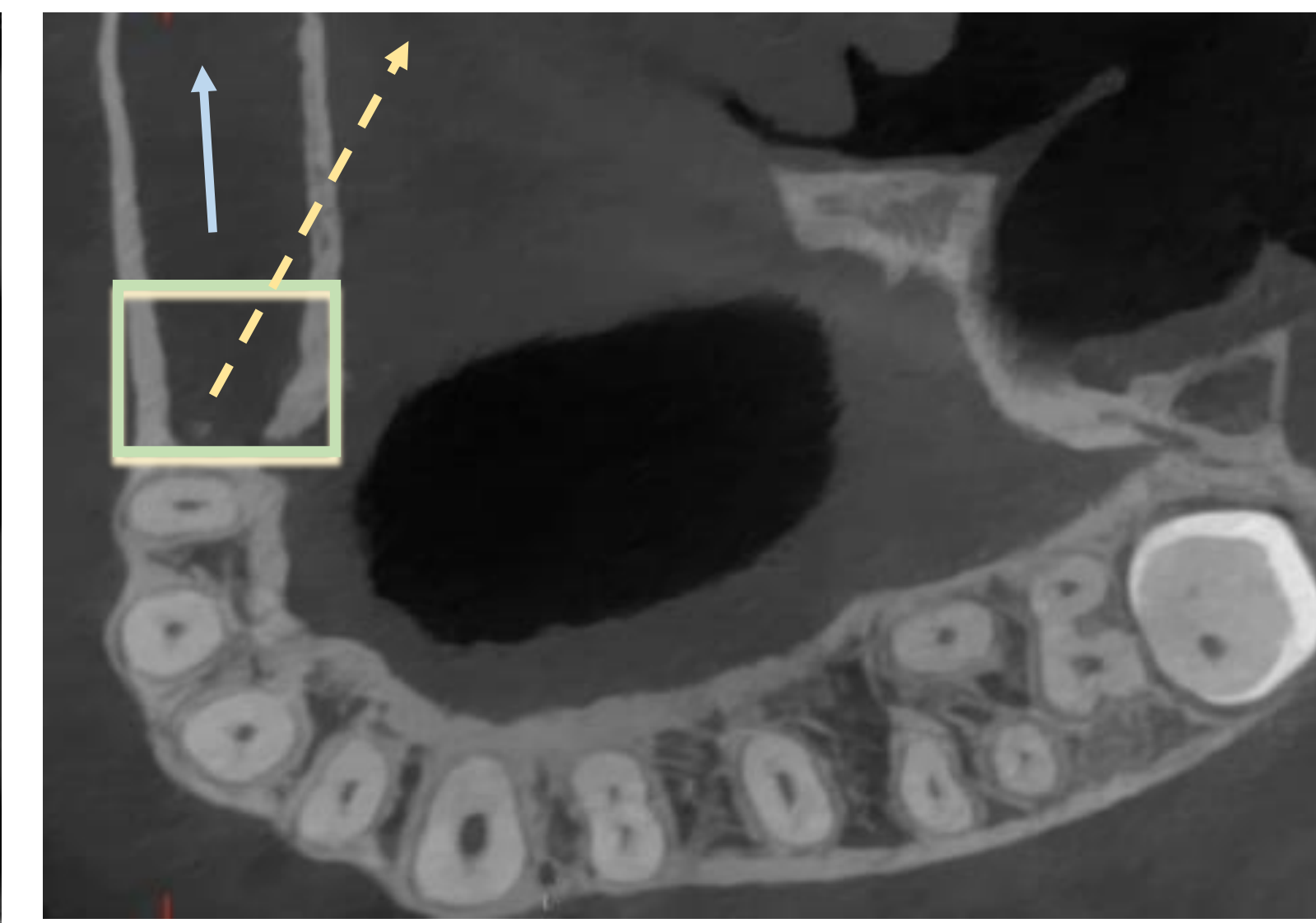
- Pre-treatment dental panoramic showing patient is periodontally stable
- Right fibula bone graft present of the maxilla
- Ligatures present around right mandibular region from pedicle



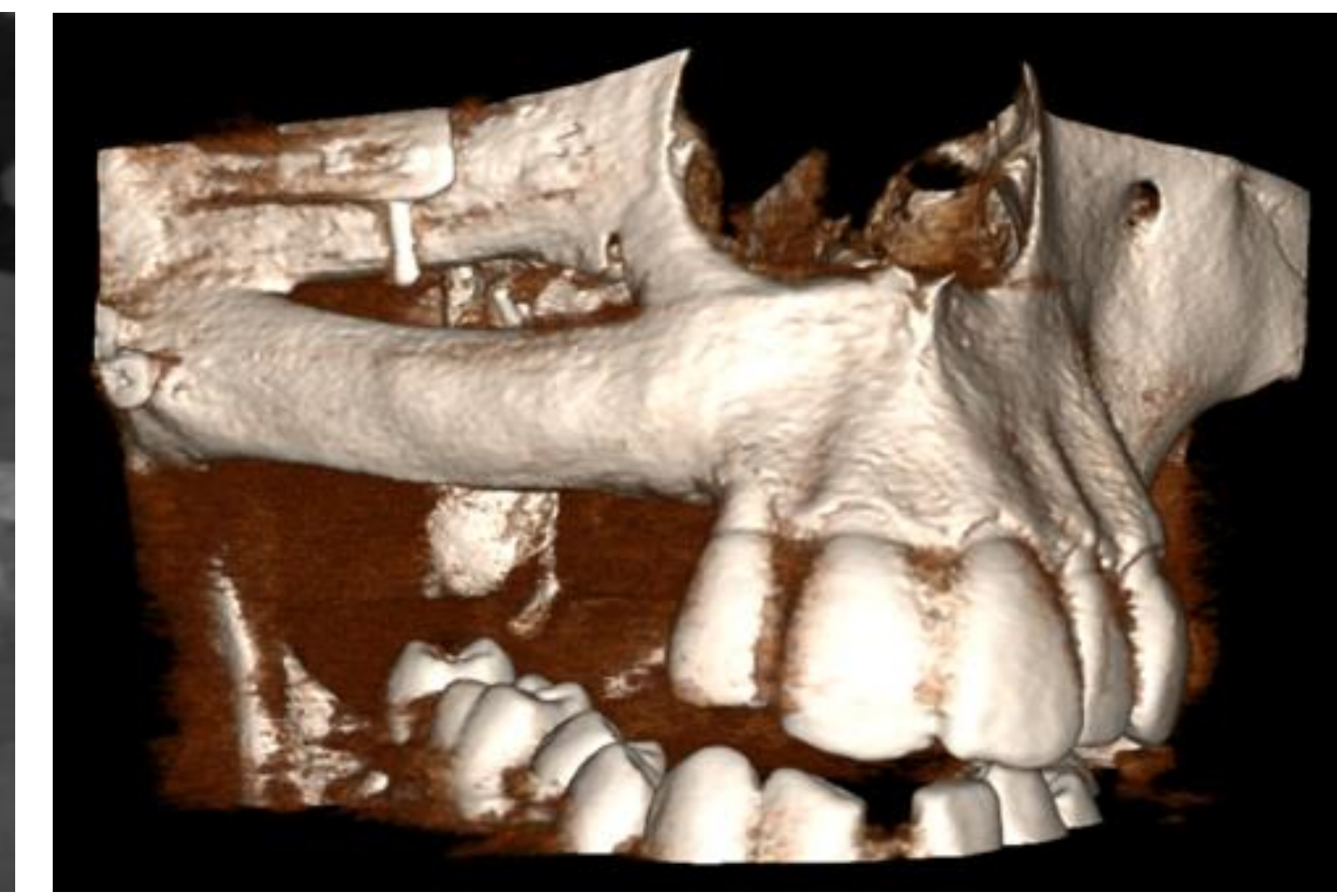
- Cone beam CT axial view showing right maxillary fibular bone graft hollow and slender form.



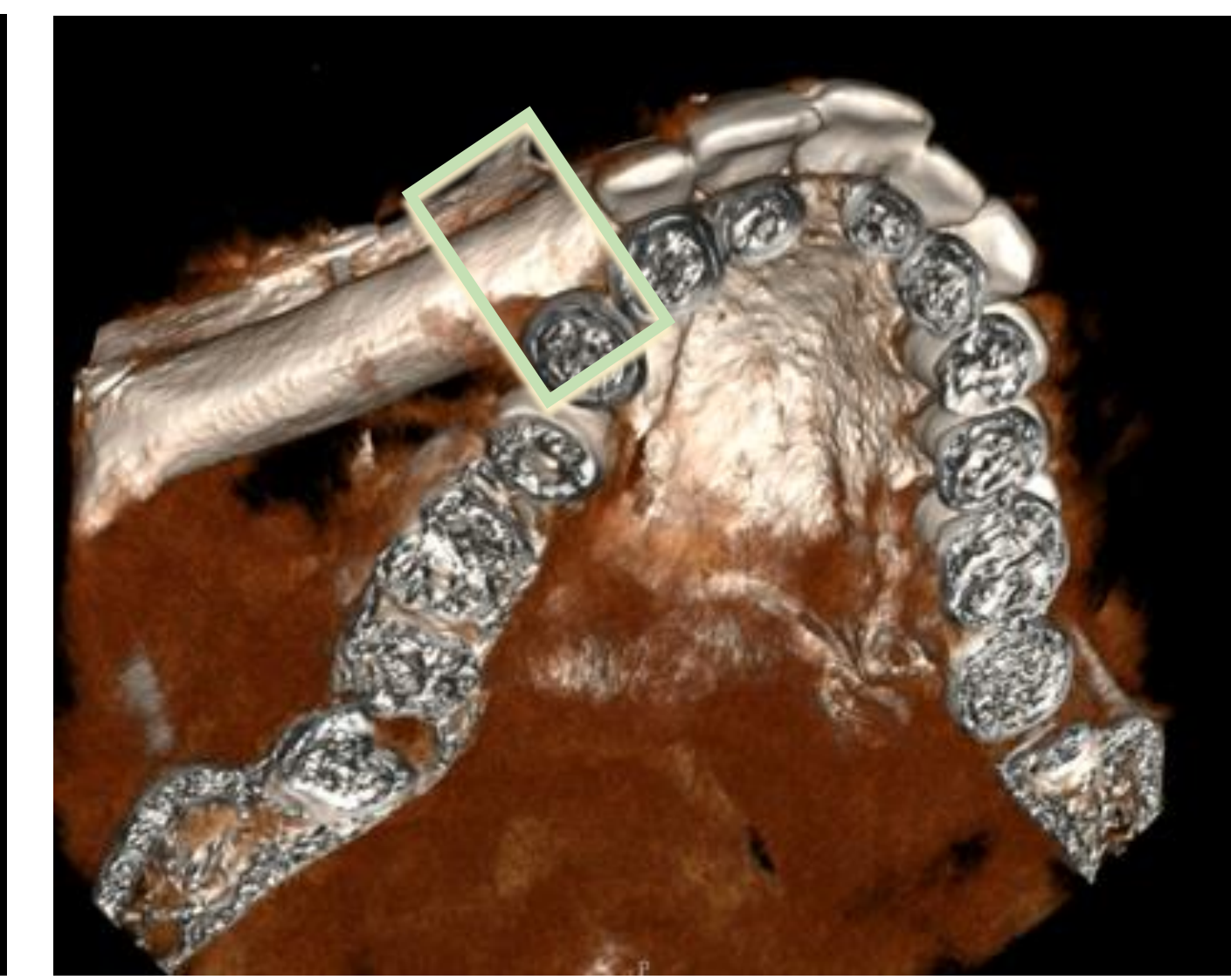
- Sagittal view of CBCT showing the thin cortices of the fibula bone graft.
- Anteriorly there is good union between the grafted bone and maxilla



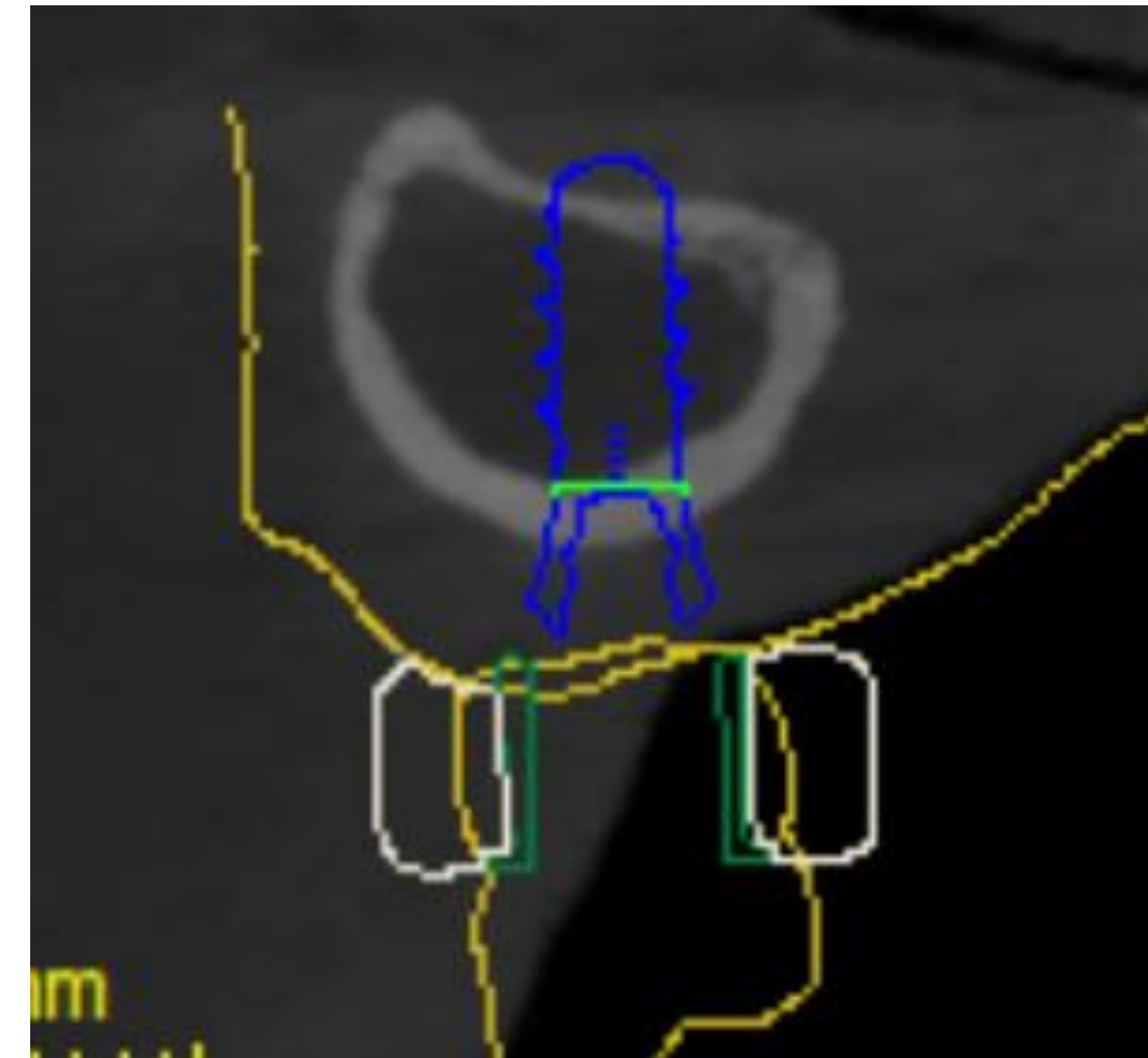
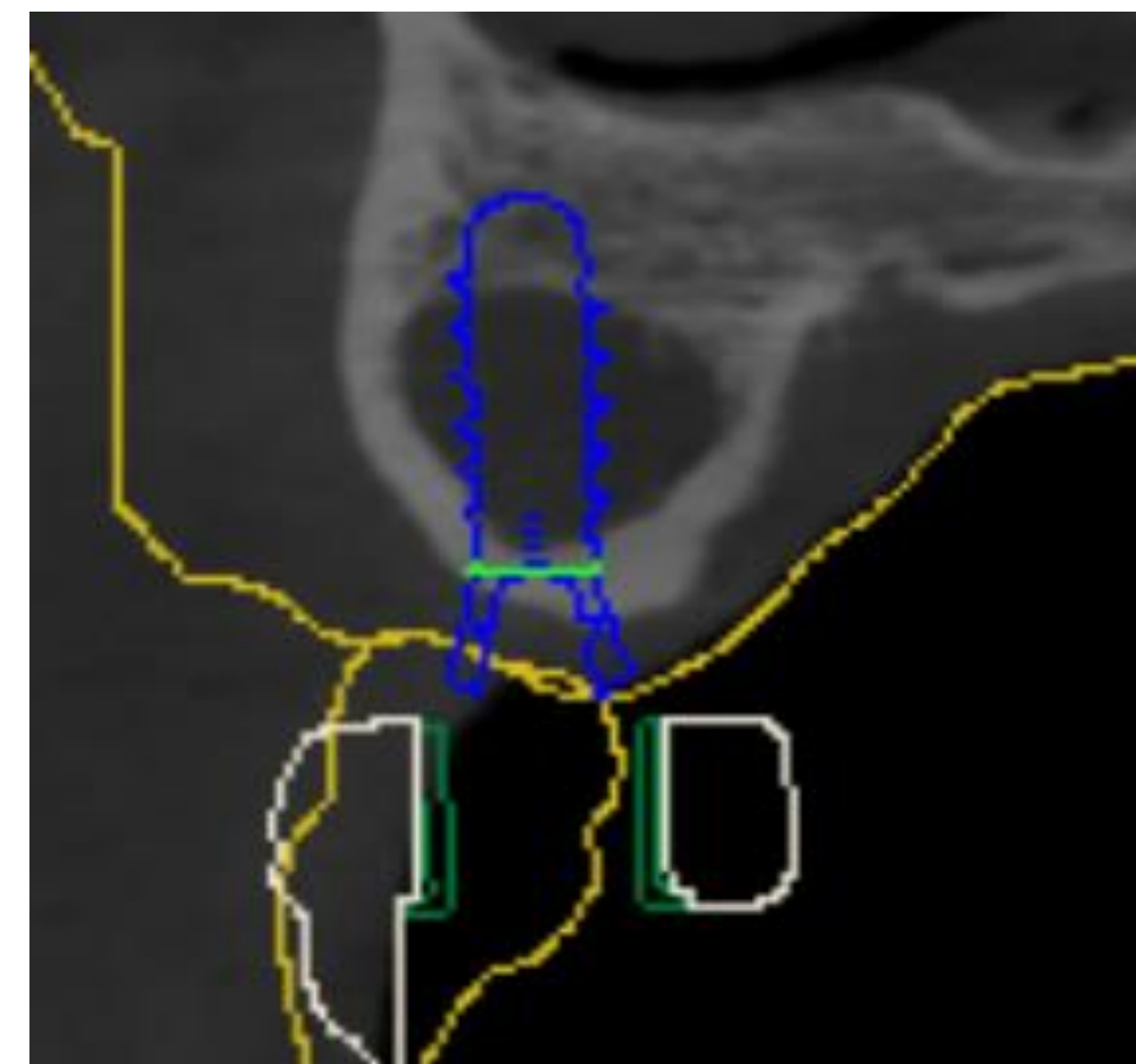
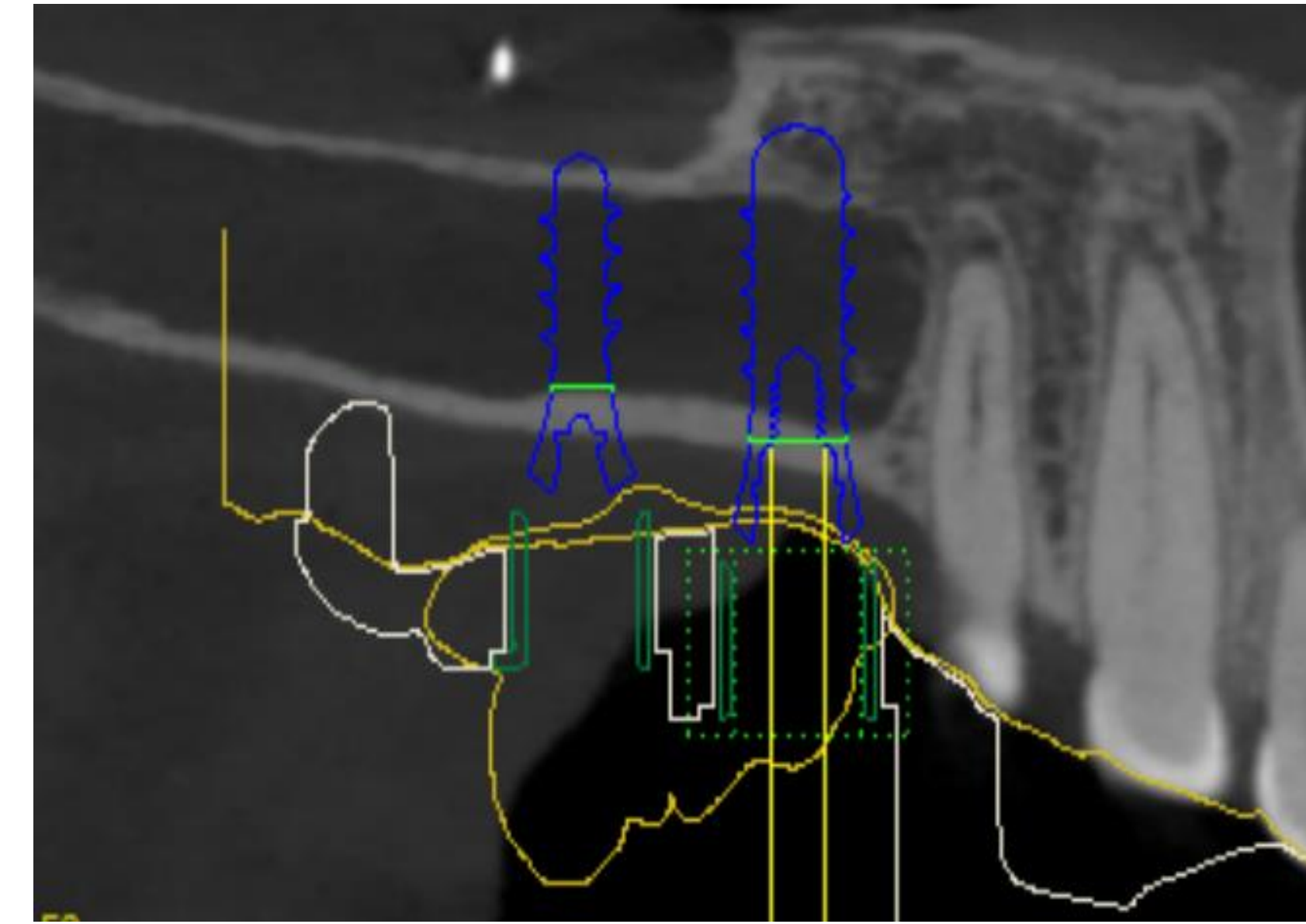
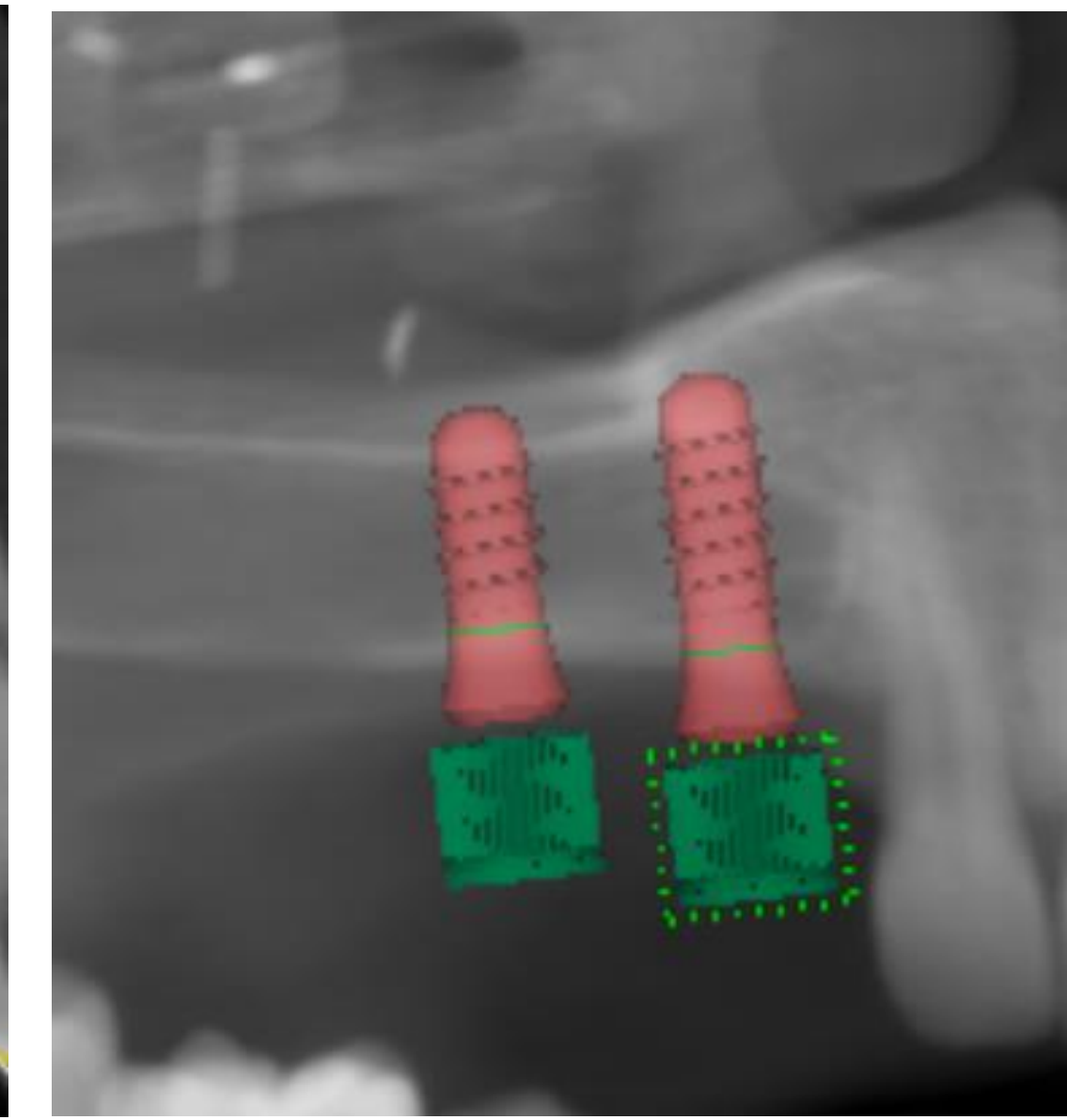
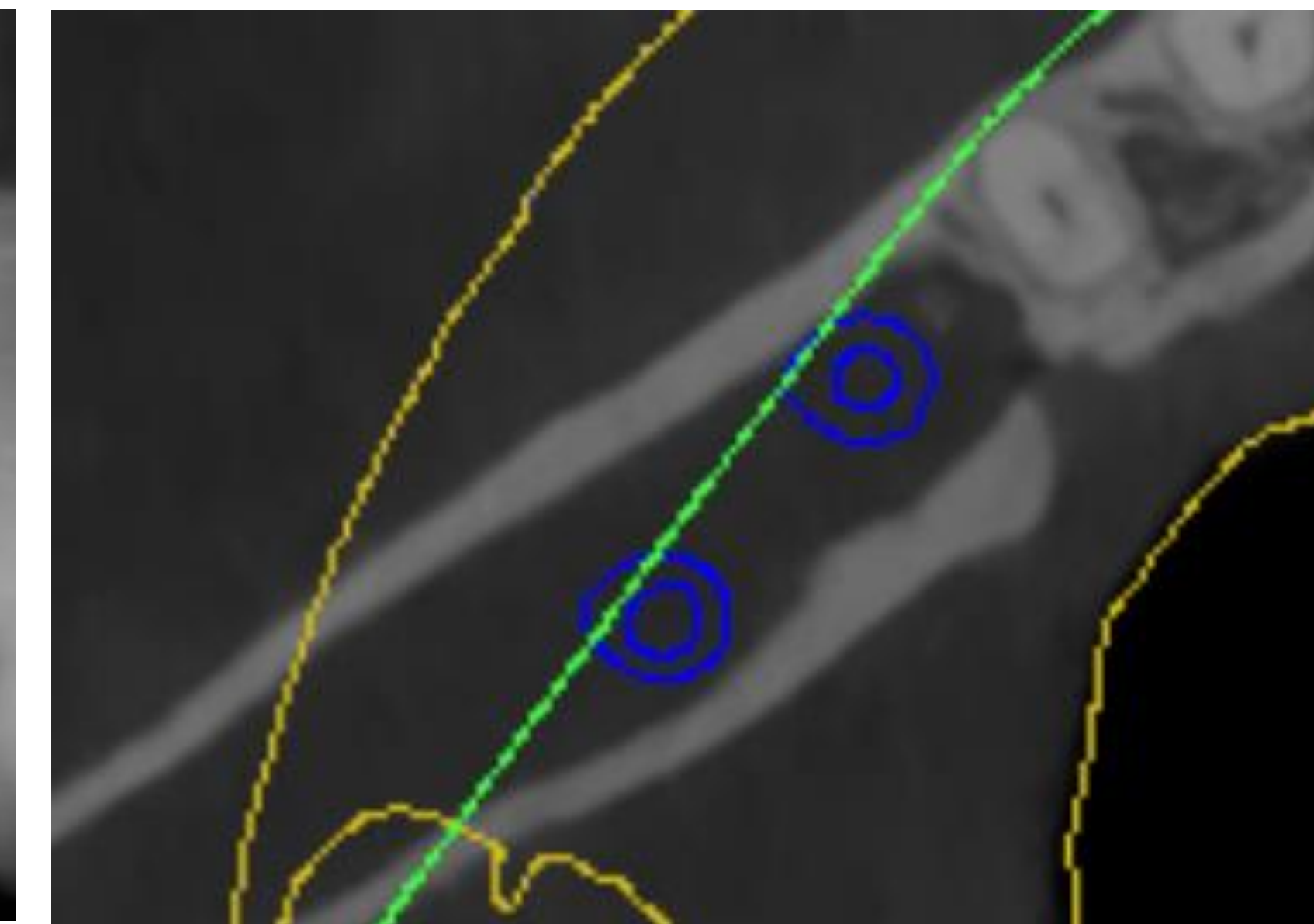
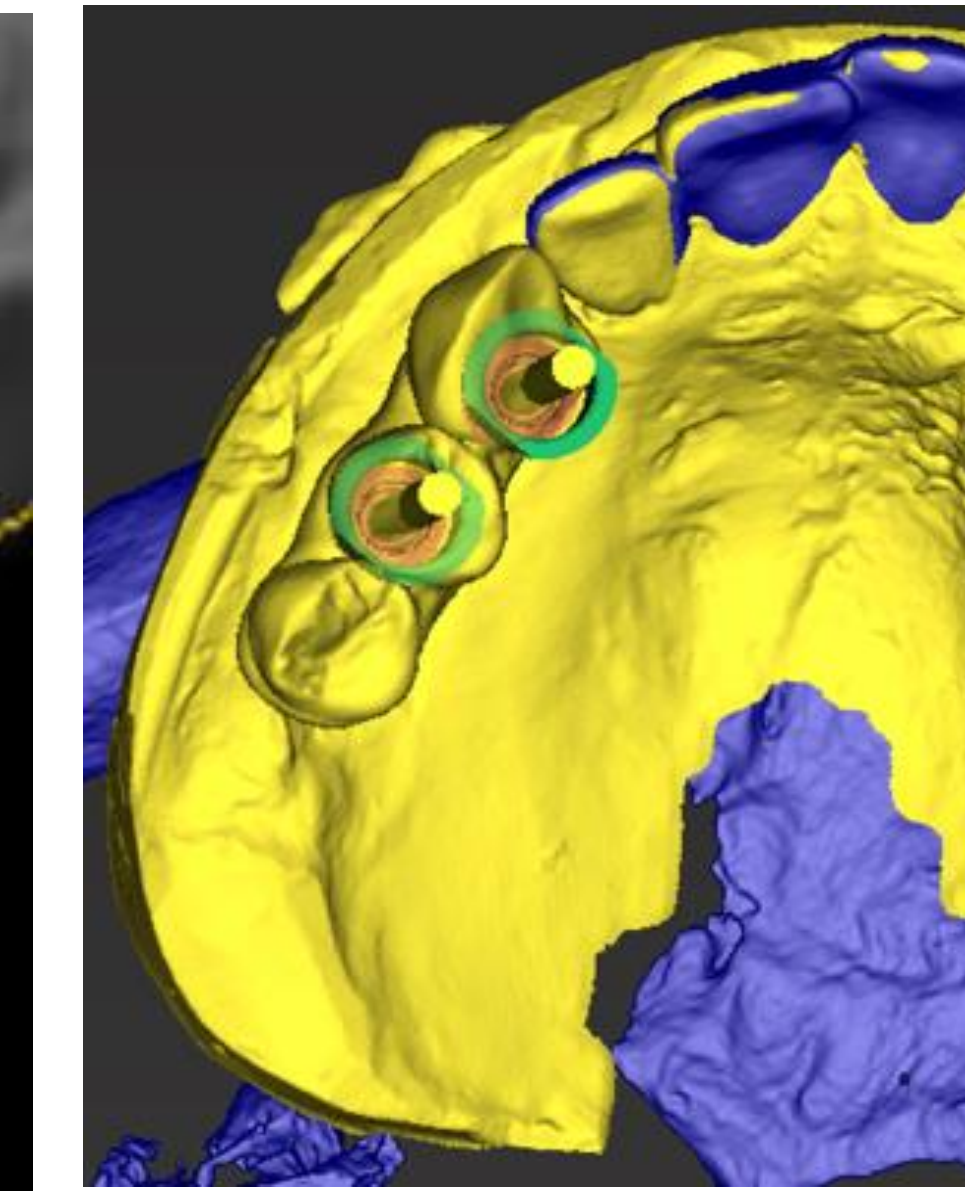
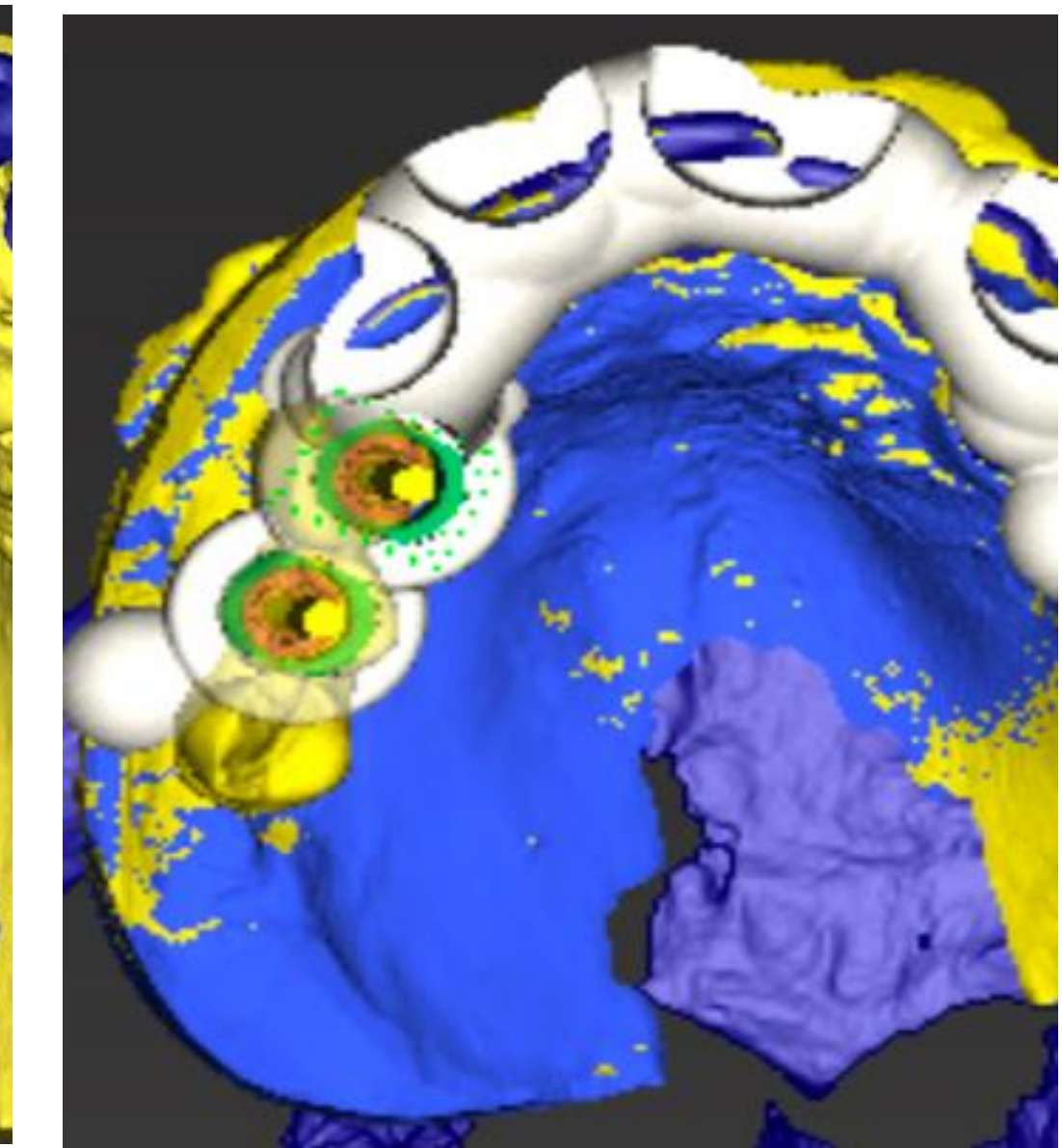
- Conventional arch form of maxilla without surgery (dotted yellow arrow)
- Laterality of fibula bone relative to maxillary arch (blue arrow)
- Area available for dental implants (green box)



- Three-dimensional reconstruction of maxilla showing the right fibula bone graft
- Area available for implant placement (green box)
- Inferior view showing the laterality of the fibula graft required to restore right zygomatic region



IMPLANT PLANNING



- Using Co-diagnostix® implant planning software
- Two tissue level (TL) standard implants were planned for a fixed-fixed implant-retained prosthesis
- Due to the hollow nature of the fibula bone, TL implants were selected due to the tulip design to help provide primary stability

- Without the tulip design, there was a risk the implants could end more apical to the intended position
- The implants were planned to achieve bicortical fixation to help with primary stability
- Implants were planned to be parallel to facilitate the passivity of the prosthesis

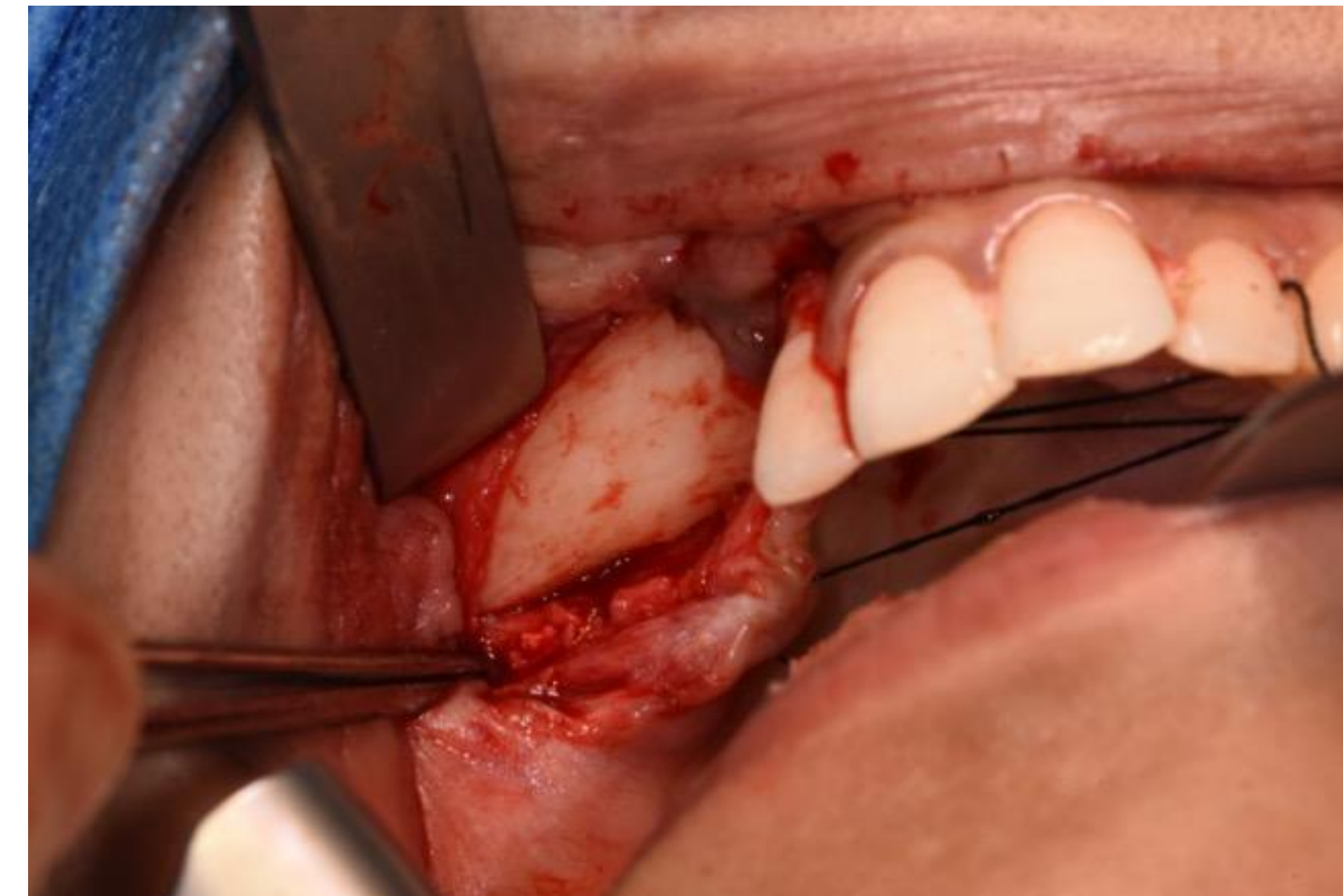
- The implants had to follow the arch form despite the fibula bone extending more laterally to support and restore the right zygomatic region
- Due to the hollow nature, bone grafting would be required in order to further establish osteointegration and thus longevity of the implants

- Screw-retained access was planned to aid retrievability
- Due to precise nature of the implant positions, a bone supported guide was constructed

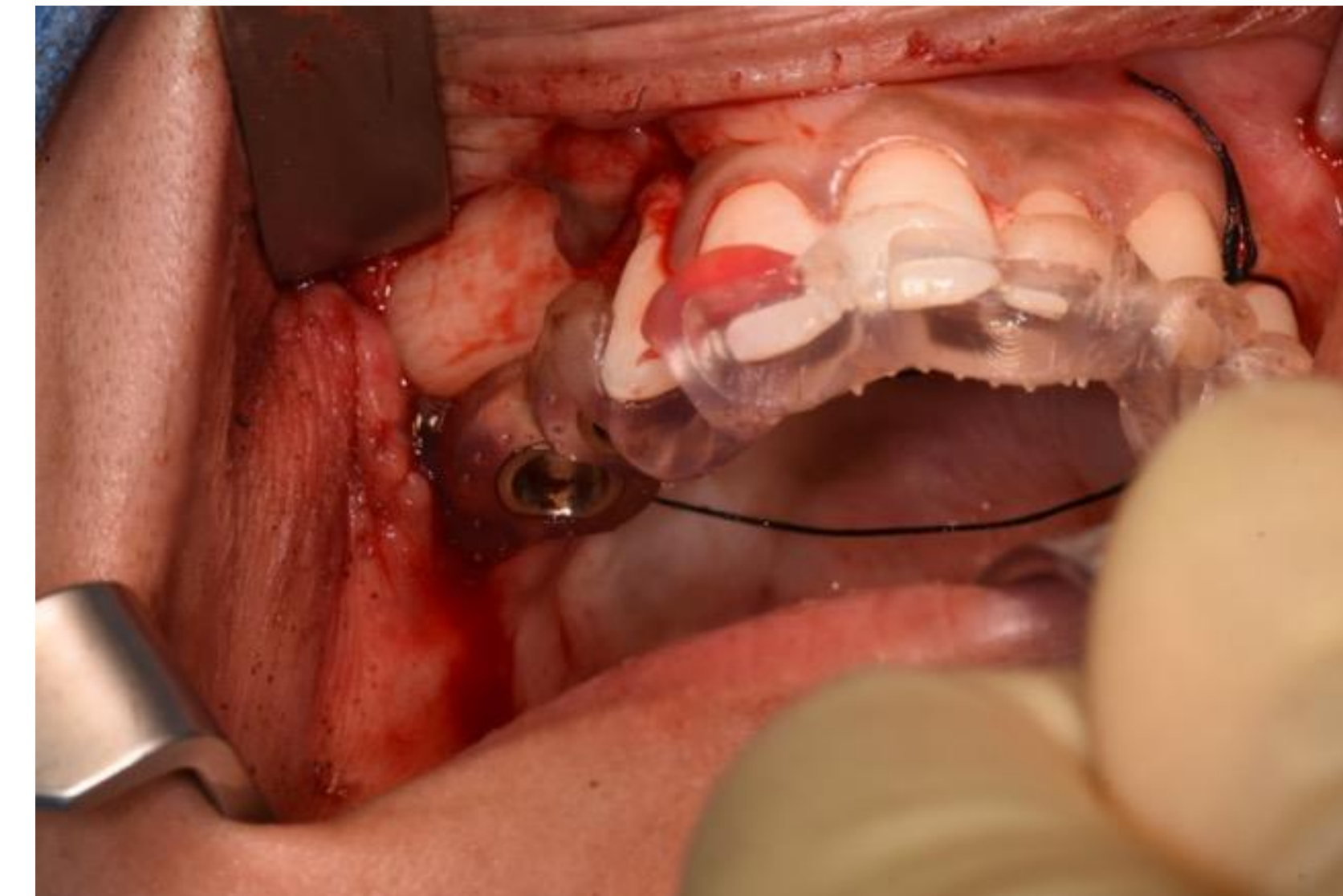
IMPLANT SURGERY



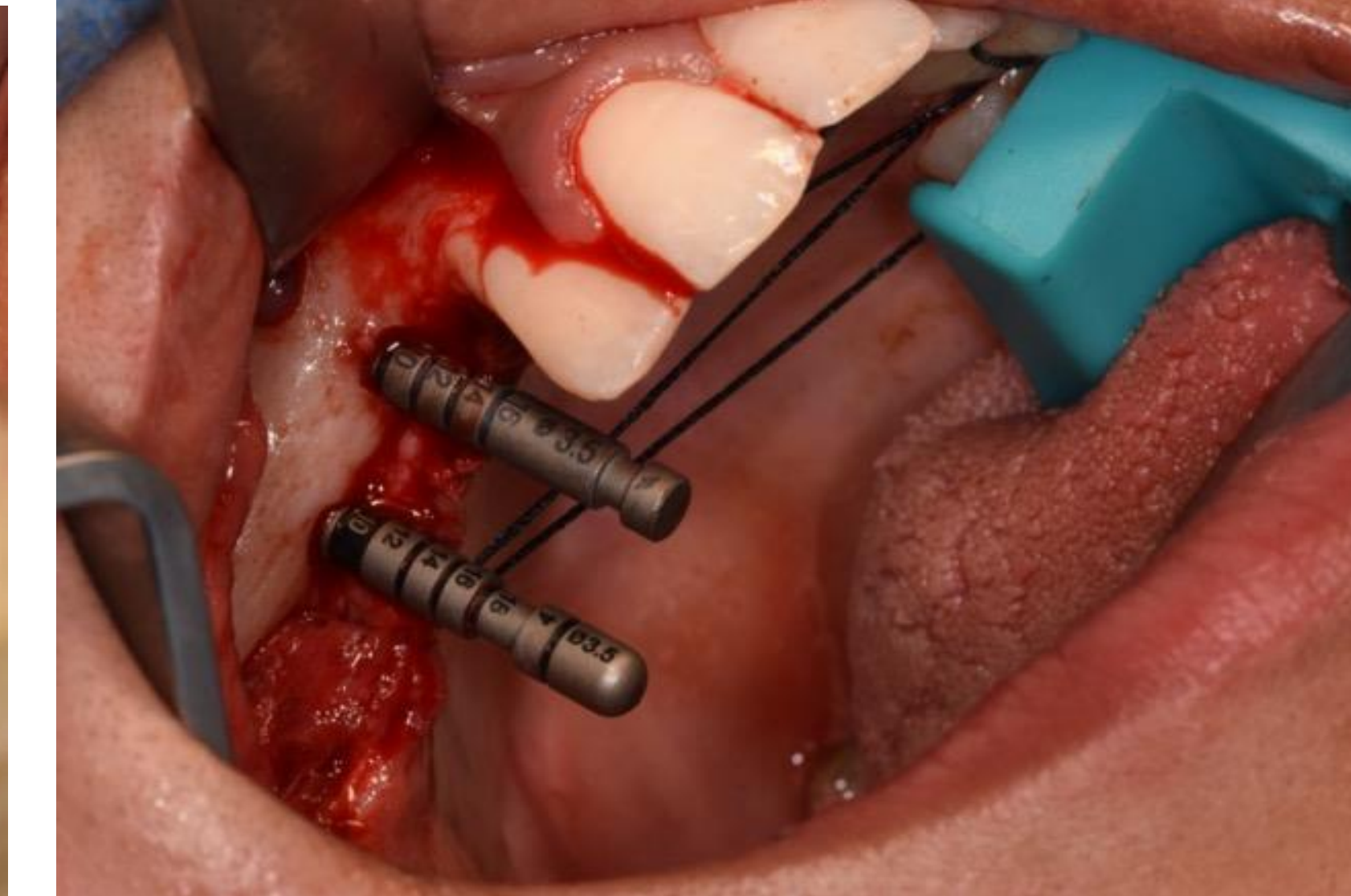
- Anatomical boundaries of the fibula bone palpated and surgical incision marked out



- Flap raised and reflected
- Holding sutures in place to maintain access.



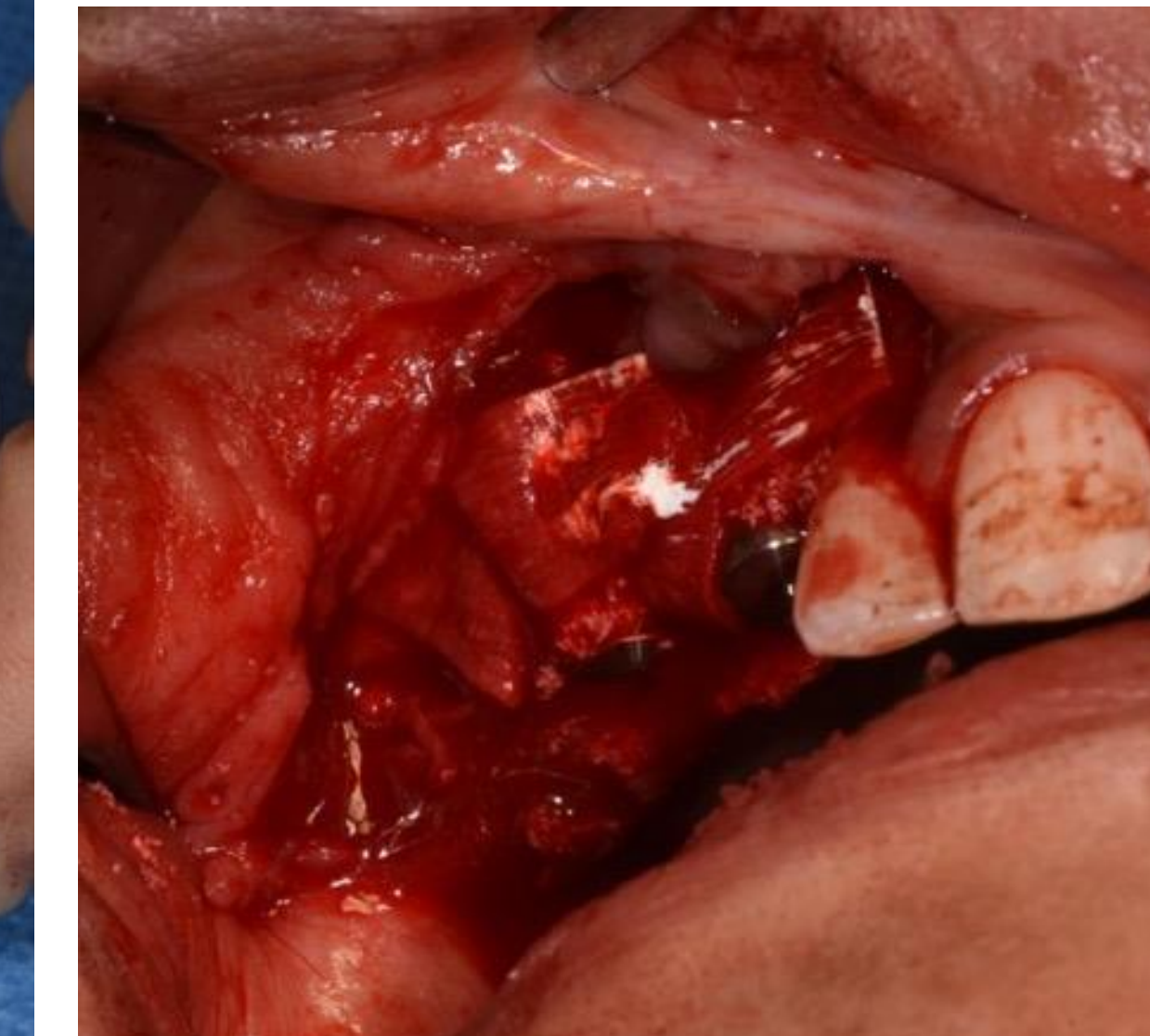
- Fully guided stent in place with bone support on the fibula bone distally



- Implant osteotomy sites drilled using Straumann® surgical protocol
- Depth gauges used to assess three dimensional positioning apico-coronal, mesio-distal and bucco-palatal.



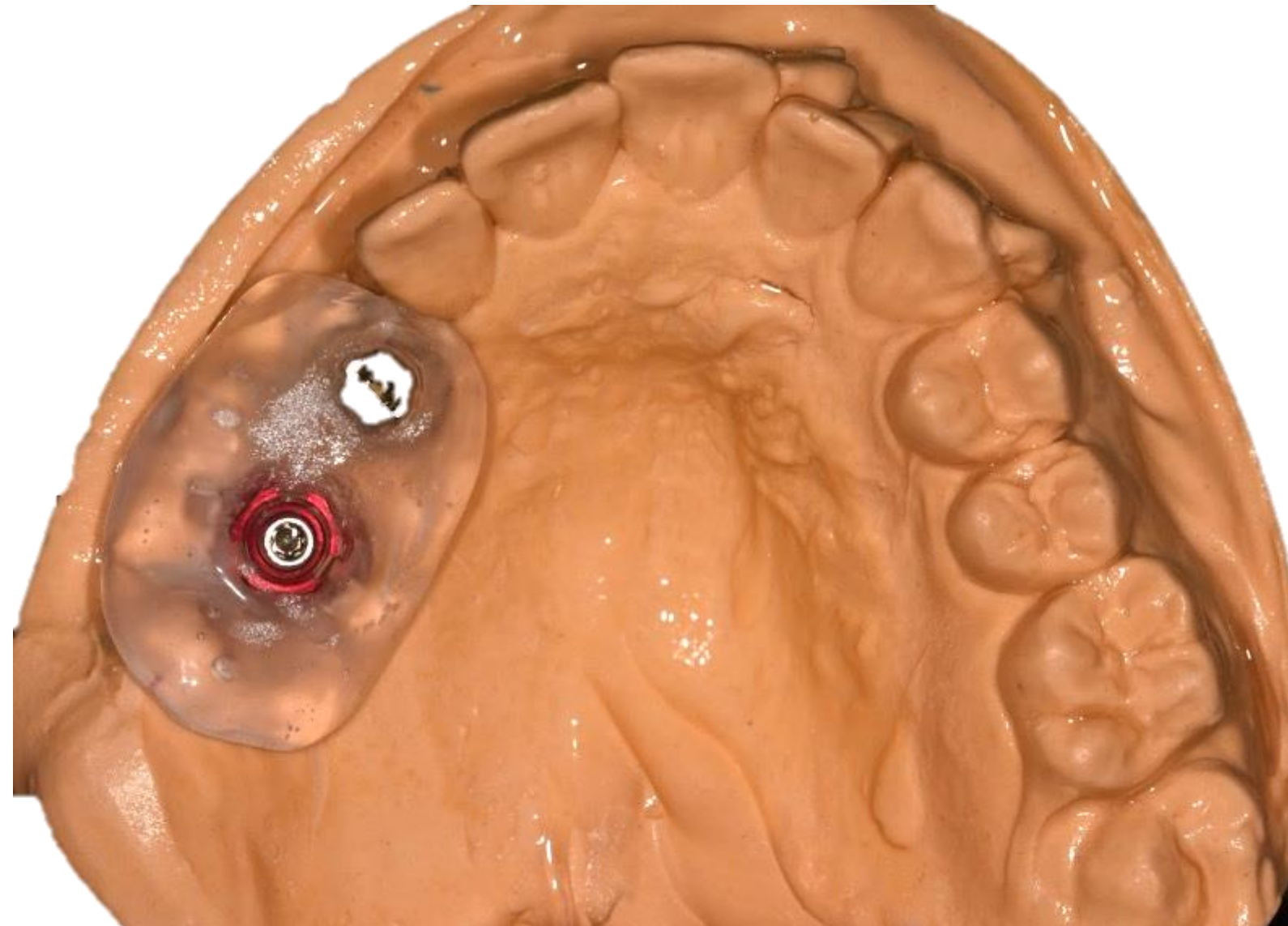
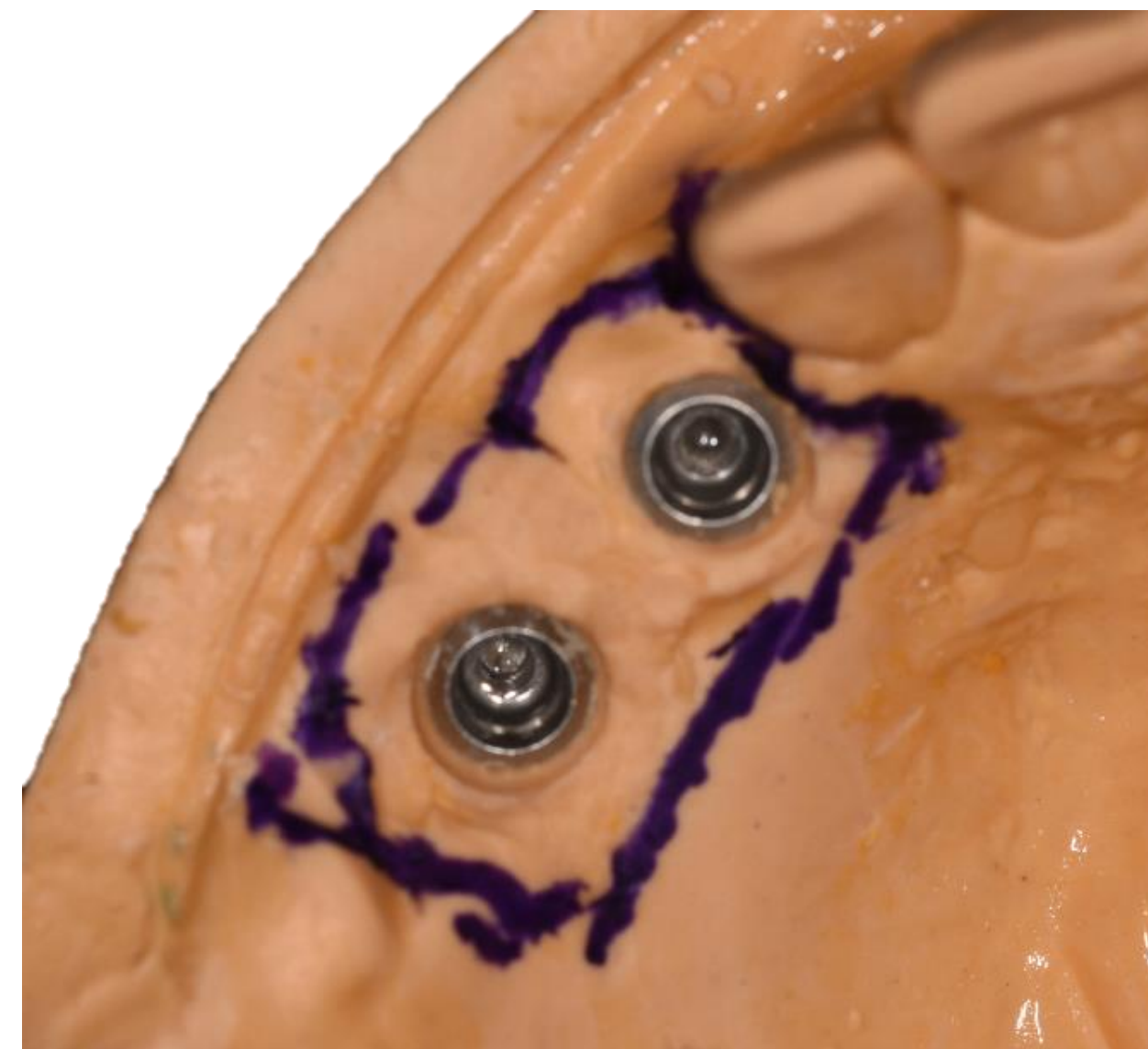
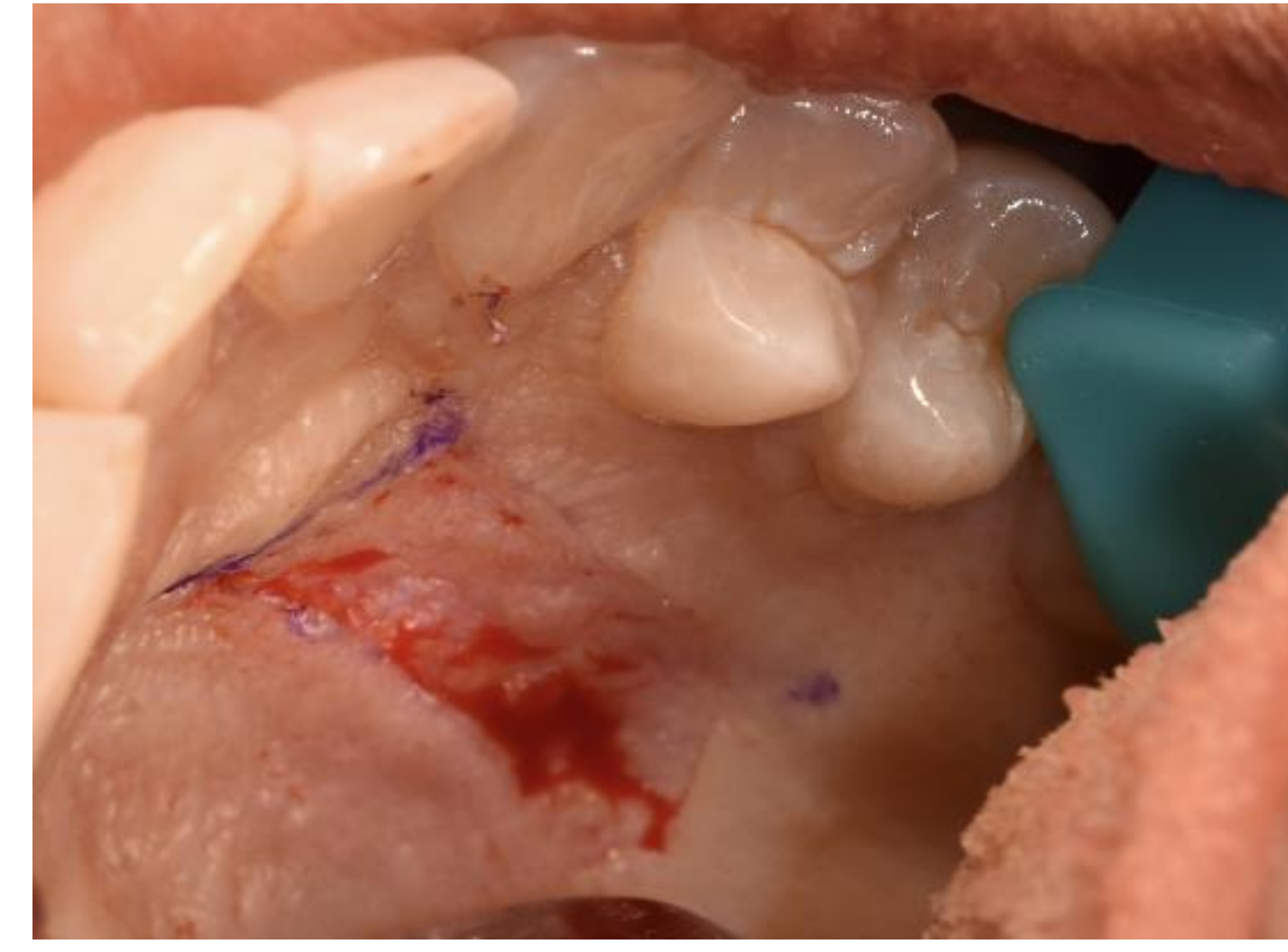
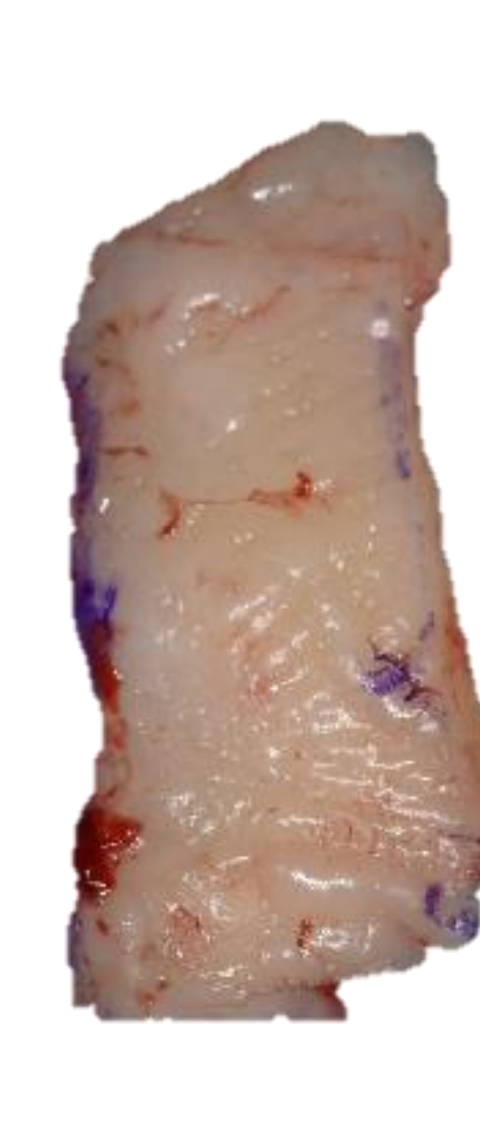
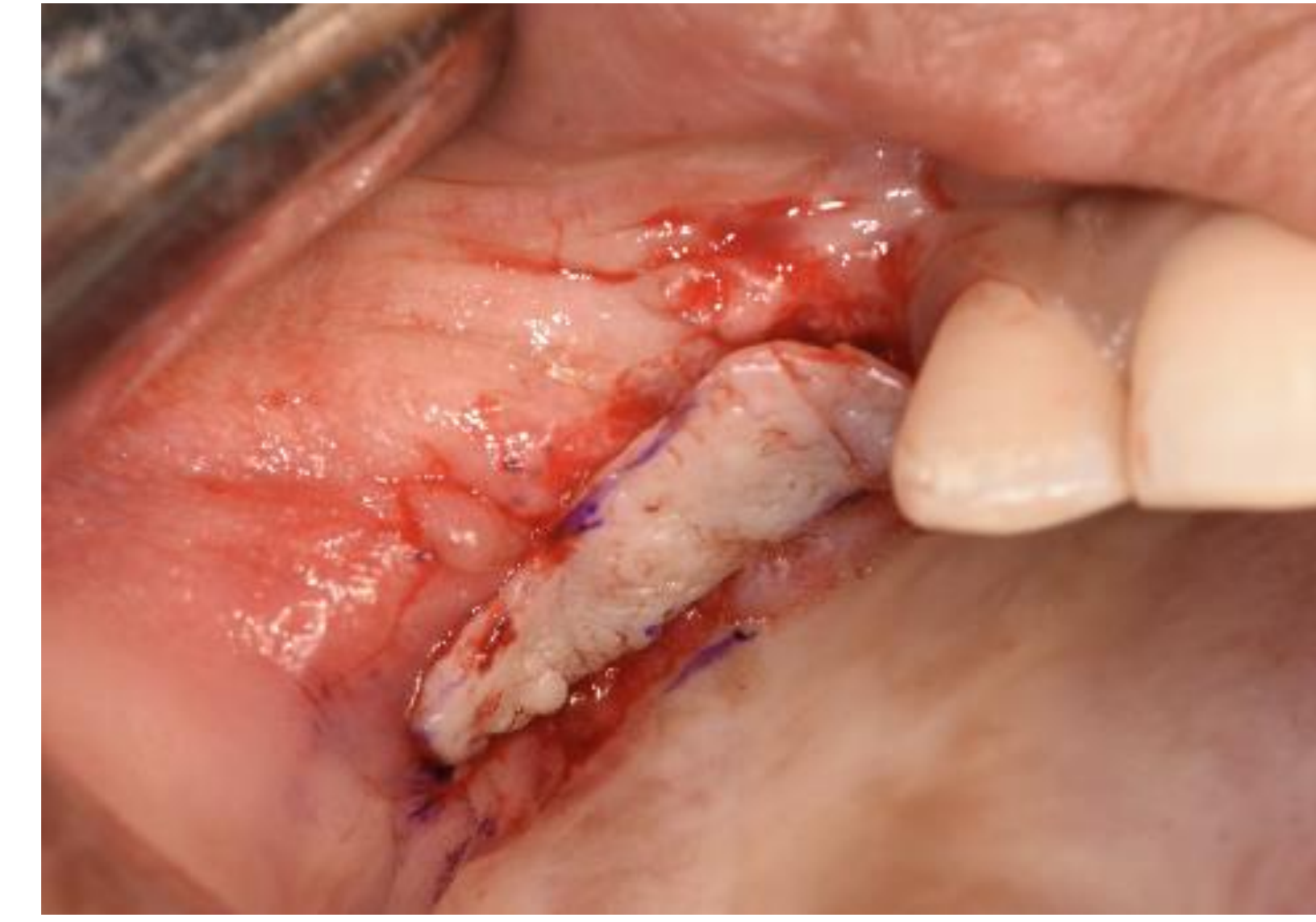
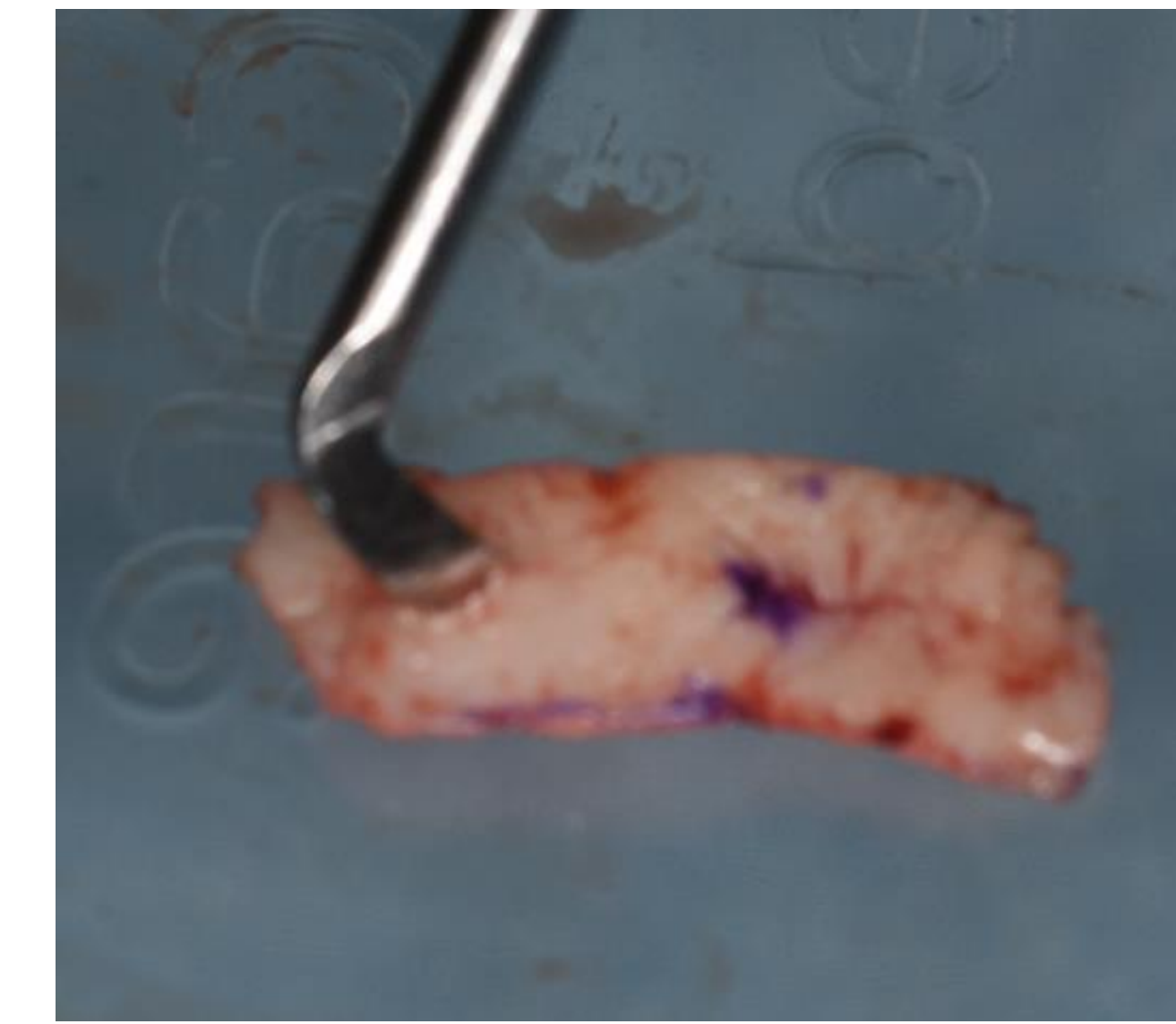
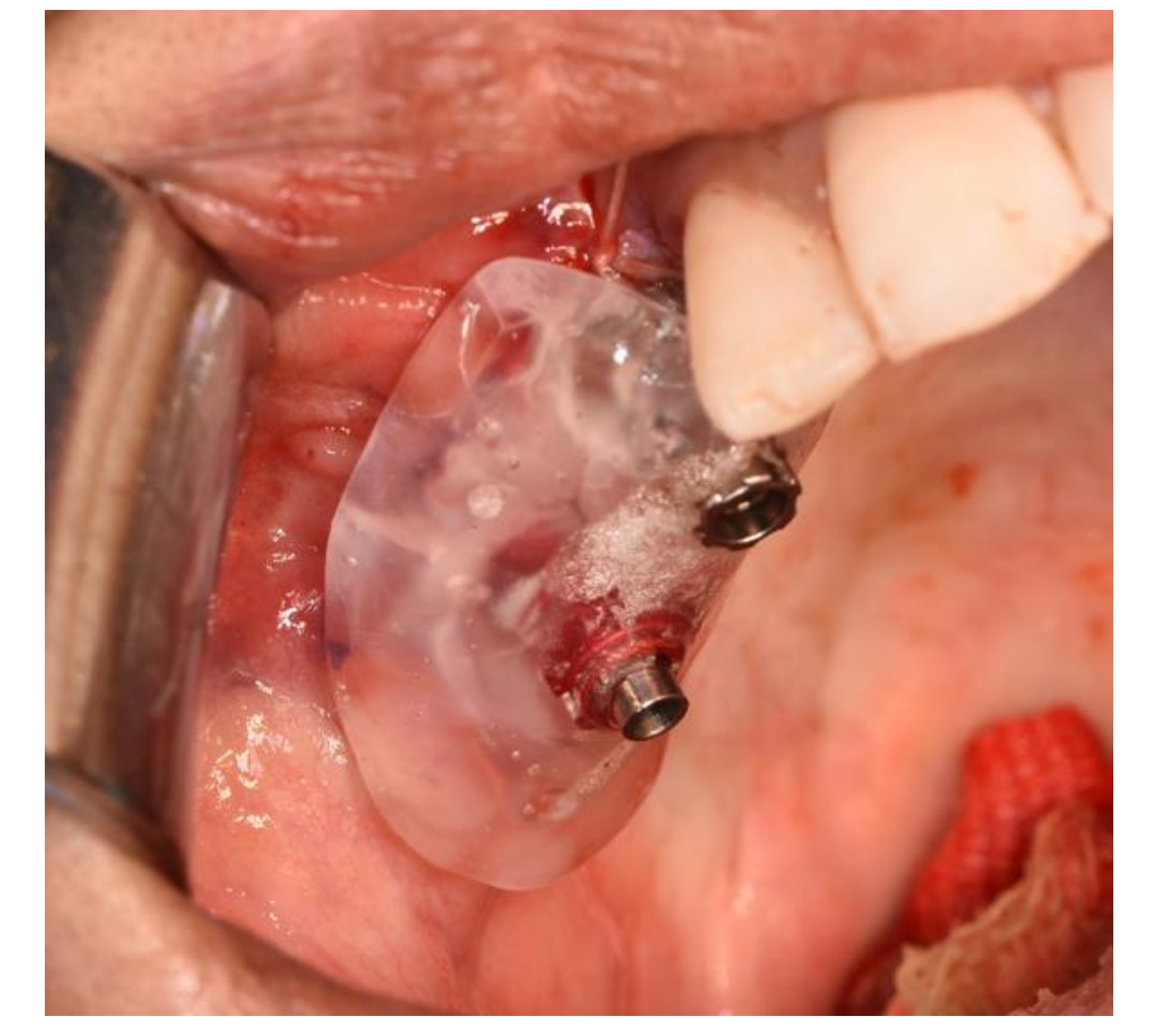
- Autogenous and bovine-derived bone (Bio-Oss®) mixed
- inserted through the osteotomy sites to fill the hollow space with bone for establish osteointegration



- Implants were placed and healing caps placed
- Porcine-derived membrane (Bio-gide®) placed and primary closure achieved
- Post-op radiograph shows good placement of implants which complements implant plan.



SURGERY



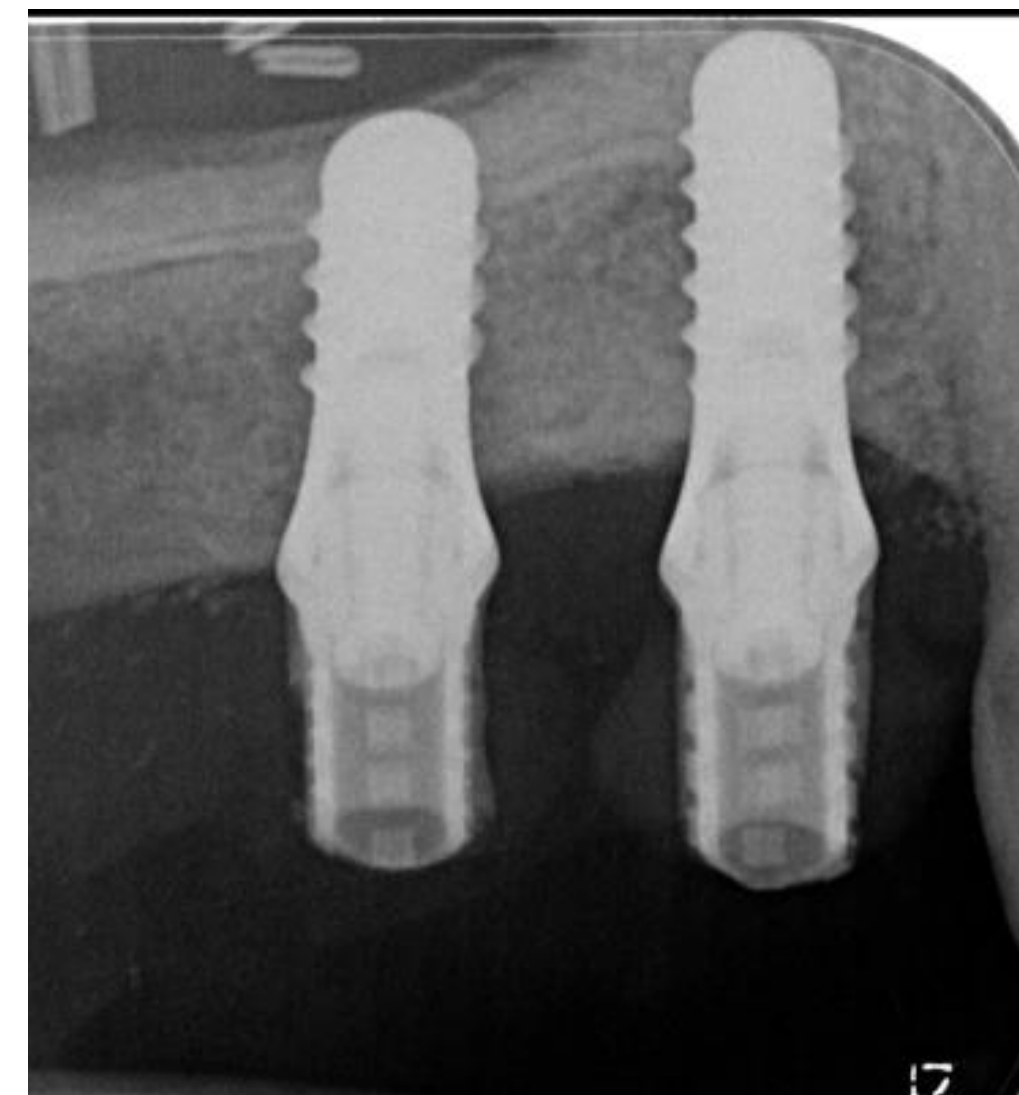
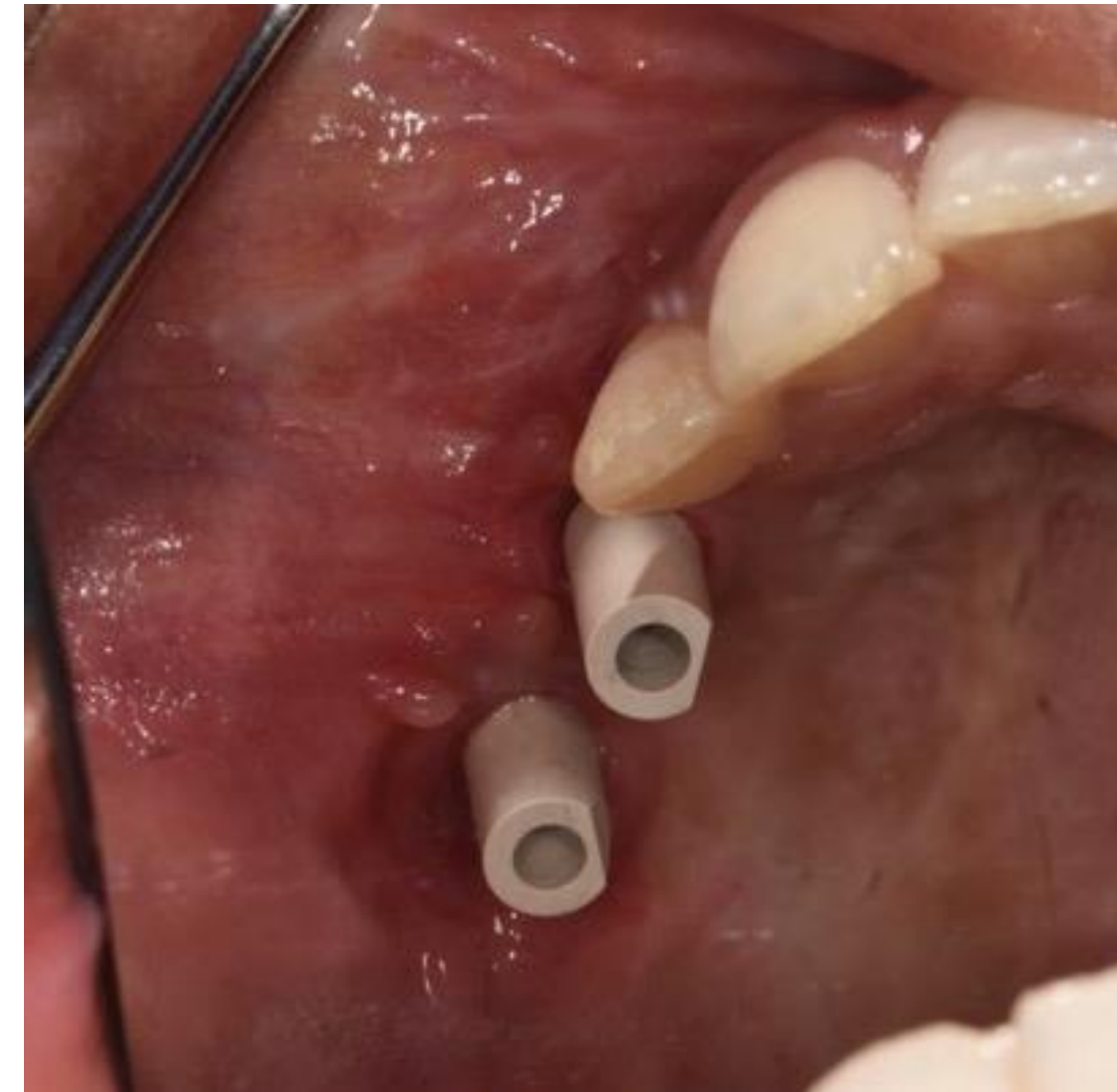
- Due to a lack of keratinised peri-implant tissue and reduced sulcus depth screw-retained acrylic plate was constructed to stabilise a free-gingival graft
- A wax spacer was used to prevent the plate from compressing the soft tissue
- Sulcoplasty would achieve little due to the laterality of the bone.

- Free-gingival graft (FGG) taken from left palatal maxilla. Recipient site mucosa de-epithelialised with round bur
- Graft size was measured as per dimensions shown on dental cast

- FGG taken to recipient site to ensure enough coverage over implants
- To permit screw access the soft tissue was perforated instead of punching an access to maintain area of keratinized tissue

- Screw-retained plate was hand-tightened once the graft was sutured
- Post-surgery advice was given

RESTORATIVE



- 6 months post-op – customized healing abutments were placed
- Radiograph showed increased radiodensity around the implants following bone grafting
- Scan bodies were placed and an intra-oral scan undertaken

- A verification jig was constructed and transferred intra-orally to check for passive seating
- The Sheffield test was undertaken to check for passivity

- A provisional bridge was constructed to restore occlusion and assess aesthetics.
- Intraoral photograph shows the screw access channels

- Front view shows prosthesis in situ
- Smile photo shows patient does not show teeth on right hand side to lip palsy
- Patient due to have restorative treatment to further improve aesthetics of the UR1, UR2 and UR3

RESULTS

- Meticulous digital planning and adherence to drilling protocol to execute guided implant surgery precisely and bone grafting techniques were essential to enable precise and predictable execution of treatment.
- It is important to understand the anatomy of the bone being grafted and adherence to biological principles.
- To date the patient is under regular review with no apparent issues thus far.

CONCLUSION

- There are no long-term studies detailing the clinical success or patient-reported outcomes in the use of delayed implant placement in fibular graft bone in the maxilla.
- This case demonstrates implant rehabilitation coupled with bone grafting techniques within the fibula bone graft can achieve good primary stability to help restore function and aesthetics.