

The stability of three horizontal guided bone regeneration simultaneous with dental implant placement, including a novel approach.

Hiroyuki Matsuda DDS, Ph.D /Chiba Oral Surgery Clinic, JAPAN

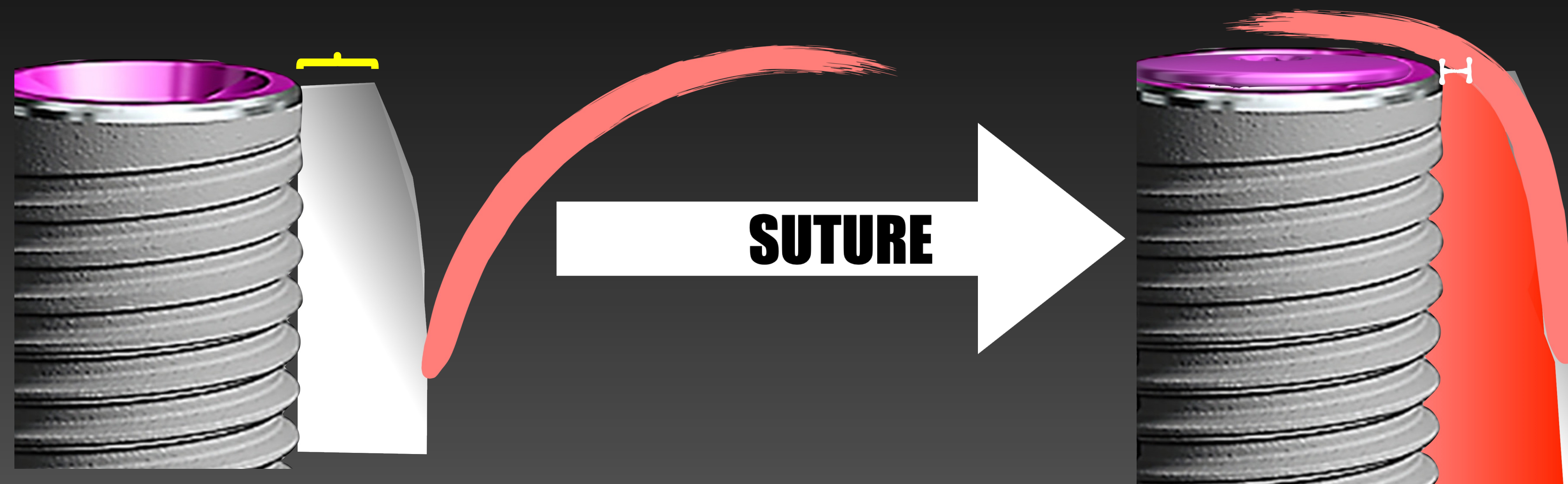
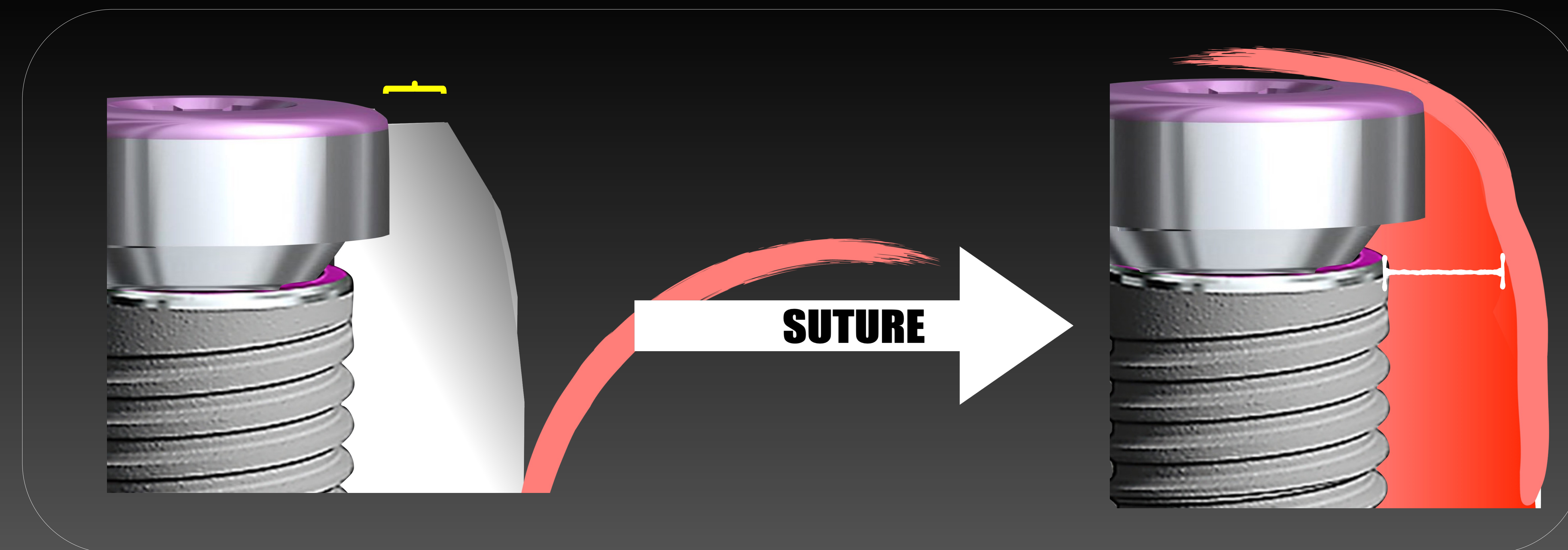
BACK GROUND:

The missing area for implant placement is not ideal situation due to the dimensional changes in both soft and hard tissue after tooth loss must occur. GBR is one of the most common and versatility regenerative techniques applied to reconstruct alveolar bone. It shows good predictability and high implant survival rates after augmentation. **Space maintenance and graft stabilization** under the periosteal flap is a one of the major factor for successful bone augmentation.

Implant placement simultaneous with GBR or using screw for GBR are other useful technique to maintain the bone regenerative space as a tenting effect . Also the GBR using stretchy membrane and fixing pin was recently widespread as a established method. On the other hand, the use of submerged healing abutment for horizontal GBR simultaneous with implant placement may be able to create horizontal gap at the implant platform level and maintain the space by **tenting effect**.

PROPOSE:

To evaluate clinical and radiographic data of patients treated with three type of horizontal GBR.



MATERIALS & METHODS:

Inclusion criteria:

Surgical implant placement simultaneous with GBR for the replacement in a partially edentulous between April 2020 and July 2022.

Taking cone beam computed tomographic (CBCT) before and after surgery, and performing GBR by bone particle and resorbable membrane.

Exclusion criteria:

(a) immediate implant placement

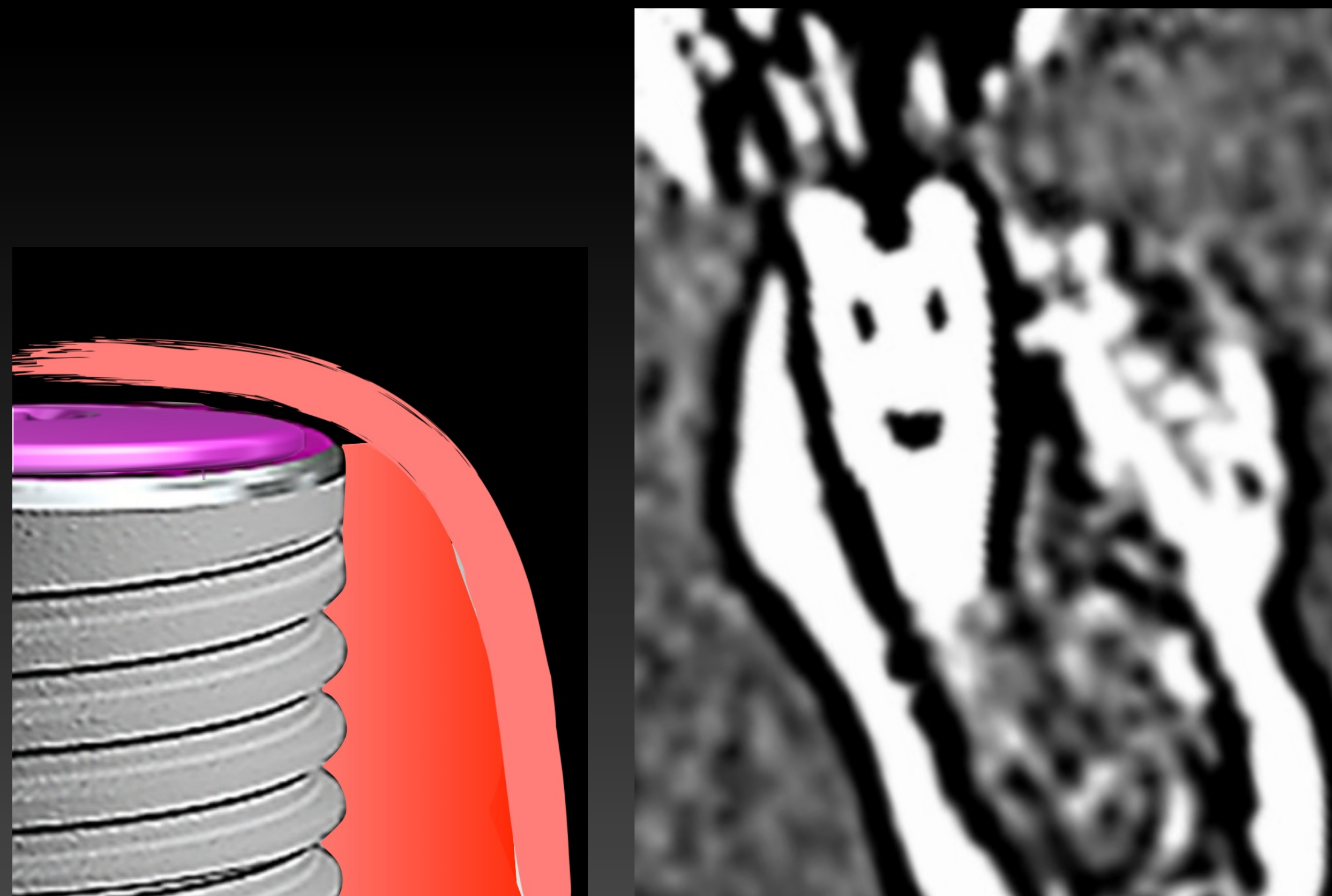
(b) history of multiple GBR

(c) combination GBR with autogenous block

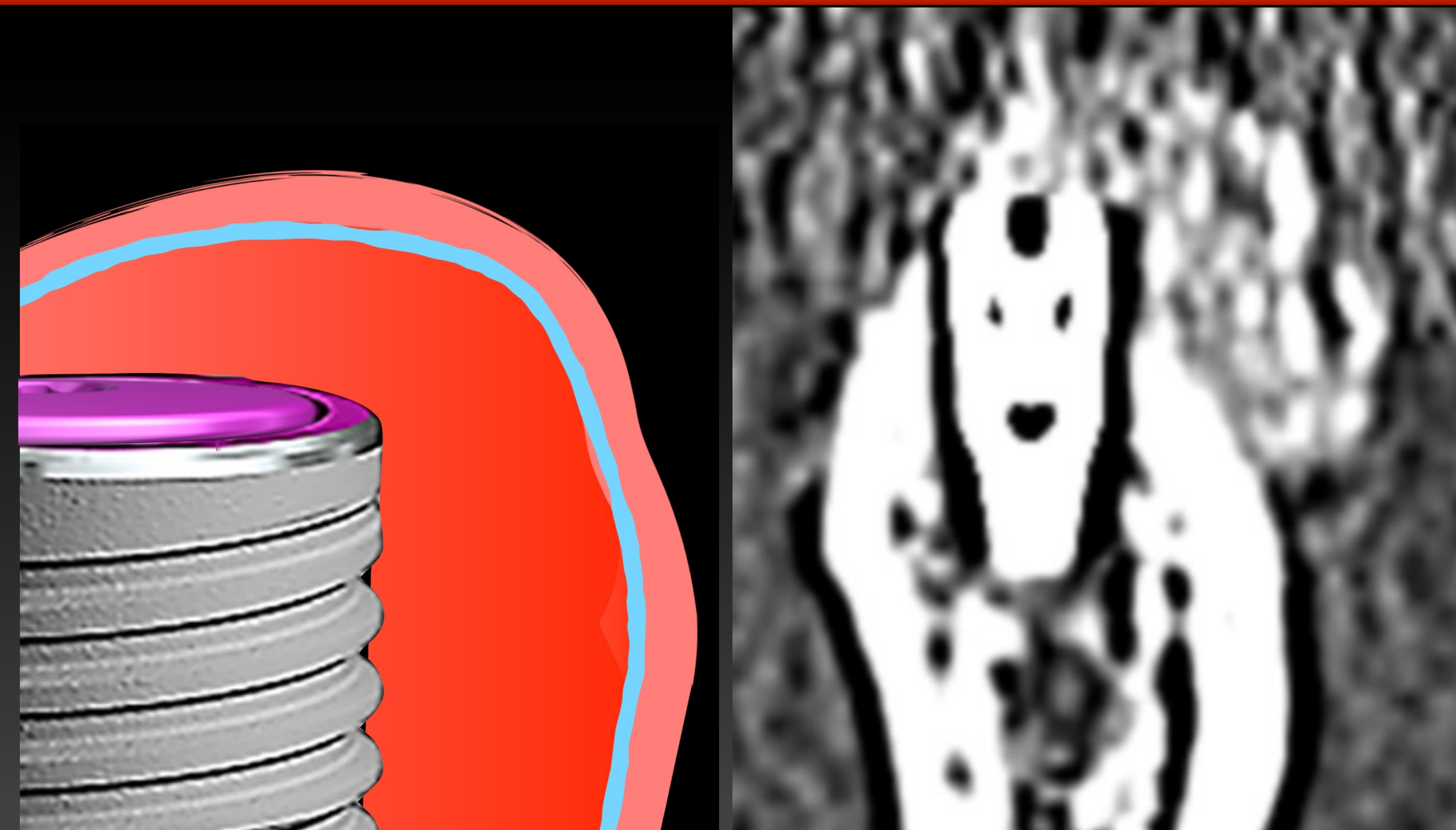
(d) GBR using tenting screw.

Surgical Procedure:

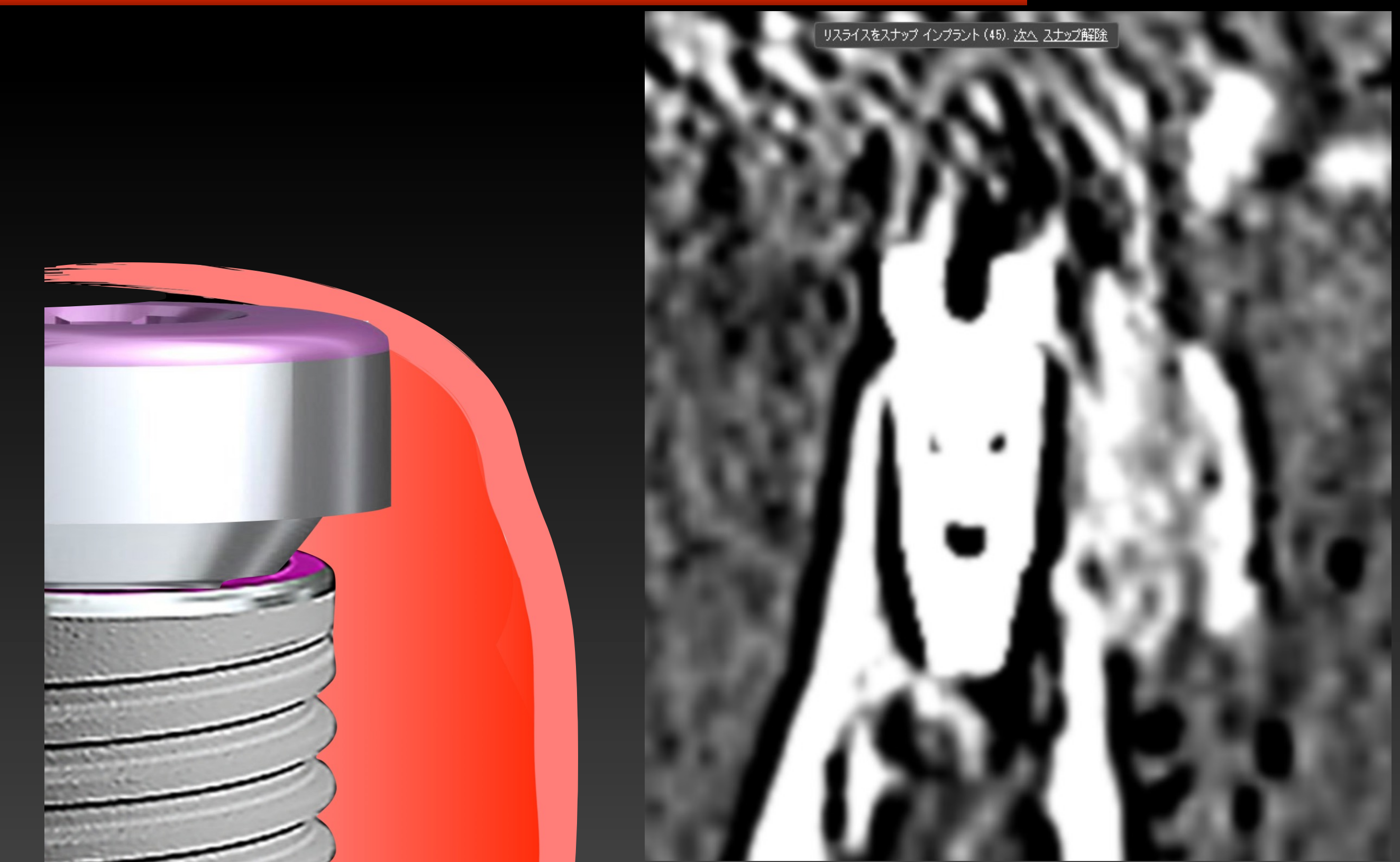
The bone level implant (3.0 Nobel Active or Nobel parallel CC, Nobel Biocare, Göteborg, Sweden) was inserted using the surgical template, and different lengths and diameters of implants were used according to the anatomical structures of each patient. GBR by freeze-dried Bone Allograft (MinerOss, BioHorizons, Inc, Birmingham, AL) covered by collagen resorbable membranes (Ossix ColBar R&D Ltd., Ramat Hasharon, Israel) in Group 1 and 2, and by poly(lactic acid/caprolactone) membrane (Cytrans® Elashield, GC, Tokyo, Japan) with bone tacking in Group 3.



GROUP 1
conventional GBR



GROUP 2
GBR using stretchy membrane and fixing pin

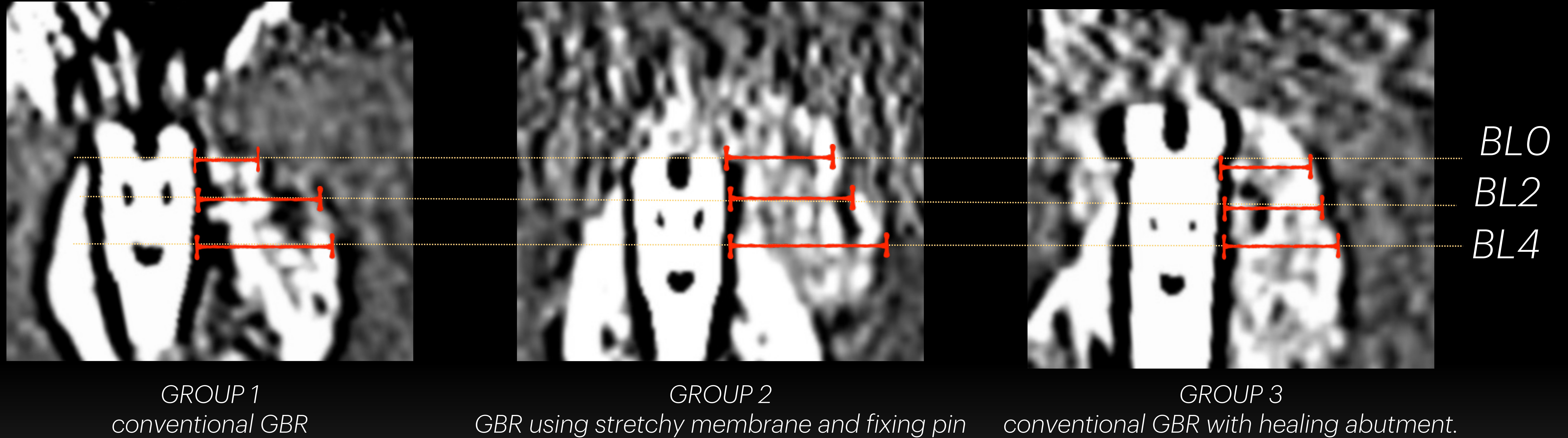


GROUP 3
conventional GBR with healing abutment.
Abutment Step Technic

Assessment:

The study documented pertinent patient demographics and surgical durations.

The buccal bone width at three levels - 0mm, 2mm, and 4mm from the implant platform (BL0, BL2, and BL4) was measured and evaluated using pre-operative and post-operative CT images.



Abutment Step Technic

Statistical Analysis:

All data were collected and analyzed by a single examiner to ensure reliability. Testing for differences in means was performed using an independent samples *t*-test for all parameters. A statistically significant difference was considered when the *p*-value was less than 0.05, which corresponds to a 95% confidence interval.

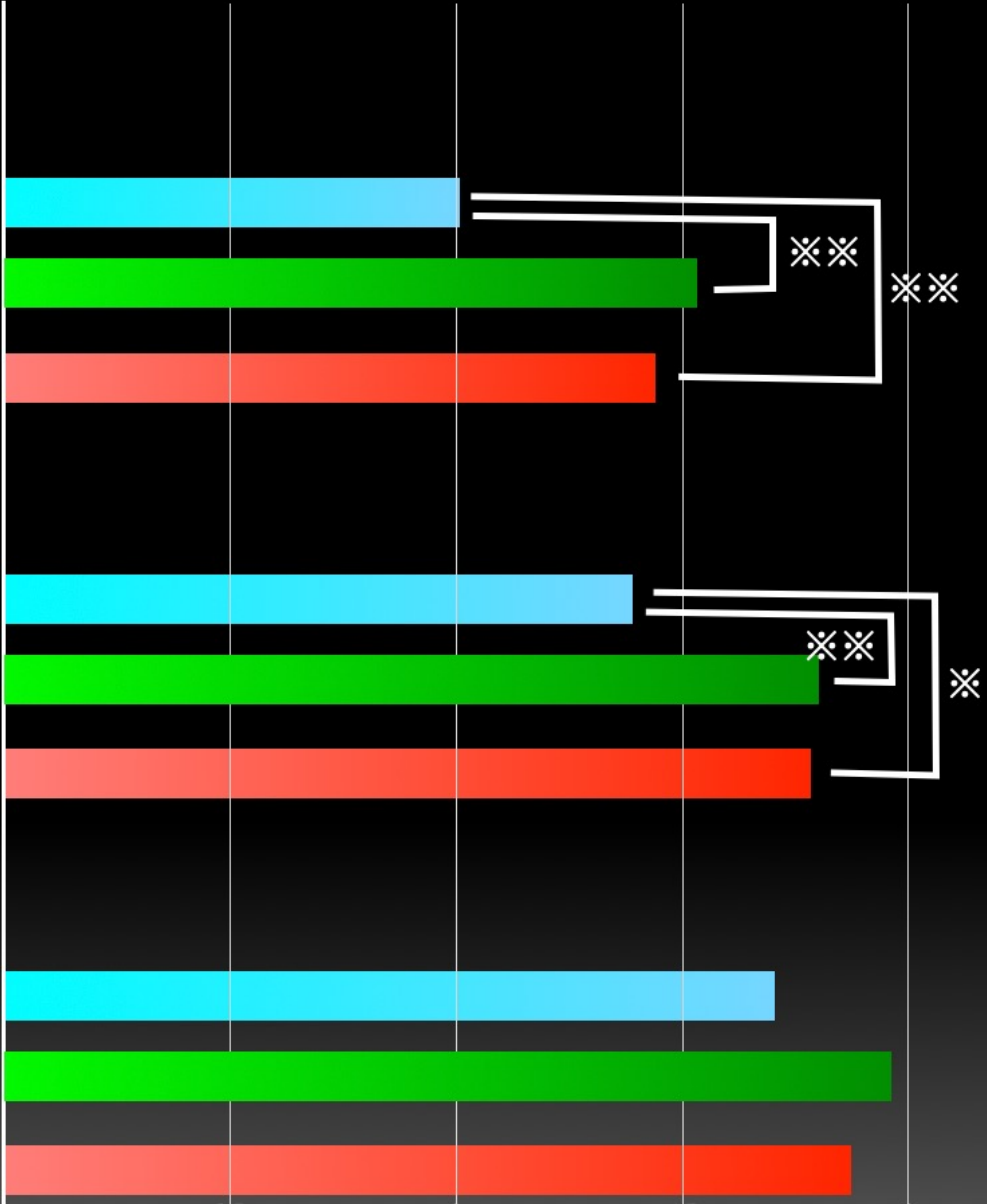
RESULT:
A total of 88 implants, selected from 45 patients who met the inclusion criteria.
19 male and 26 female patients between the ages of 32 and 78 years(mean 59.2).

	Post-OP Buccal thickness (mm)			Time of Surg (min)	
	BL0	BL2	BL4		
 GROUP 1	3.30	4.57	5.46	87	* * *
 GROUP 2	4.60	5.41	5.89	107	
 GROUP 3	4.32	5.35	5.62	80	

BL0

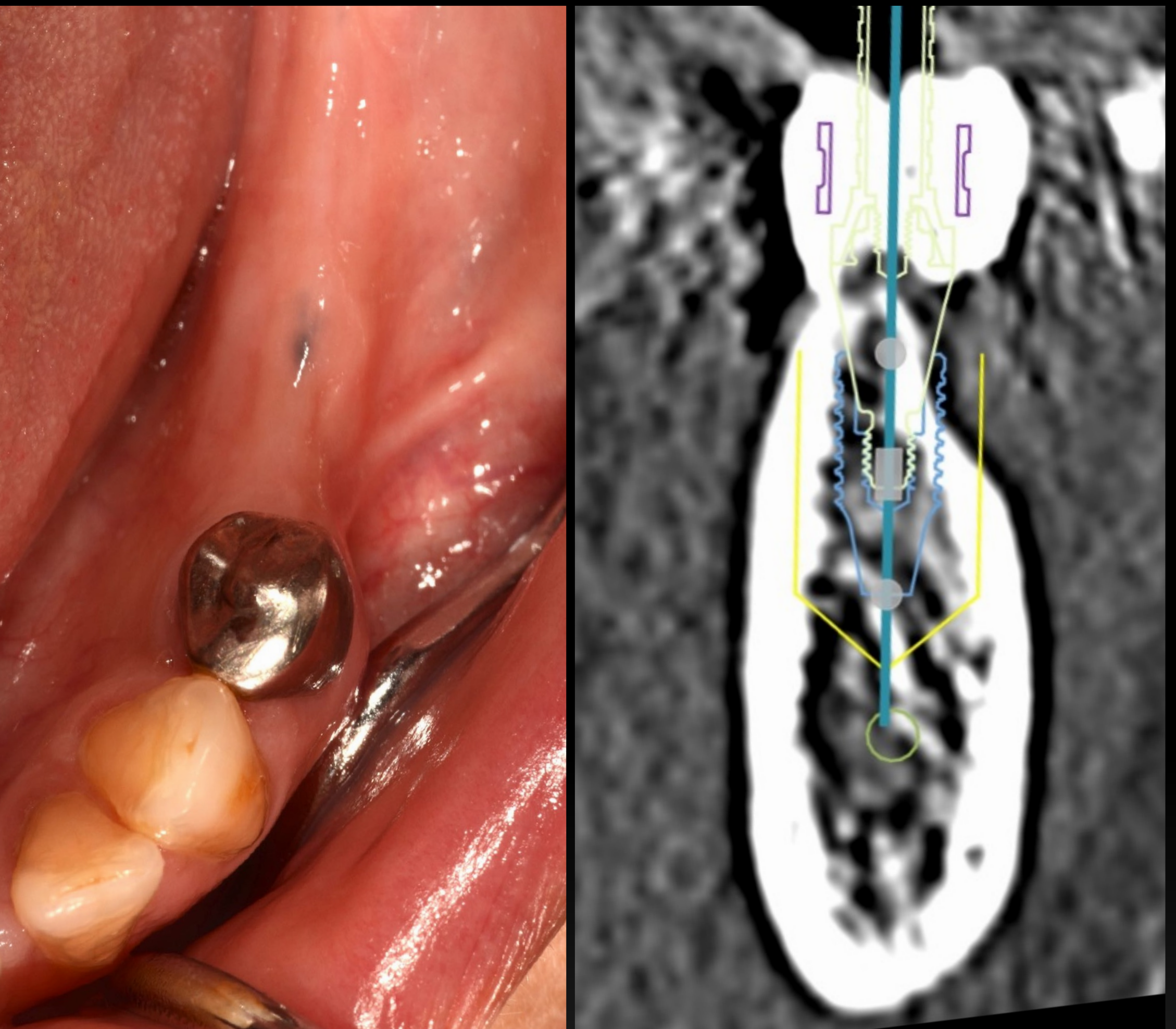
BL2

BL4

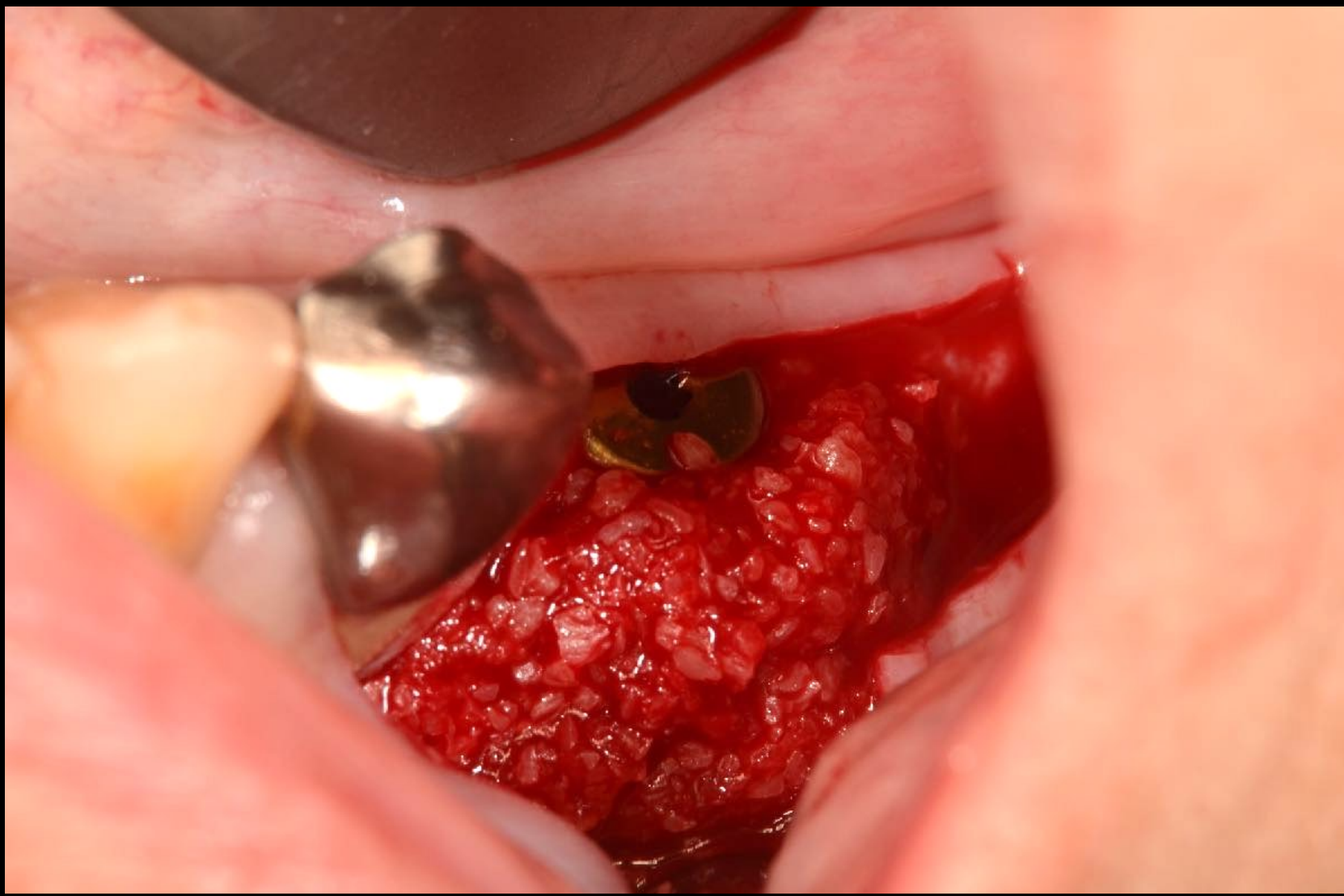


** : P<0.01 * : P<0.05

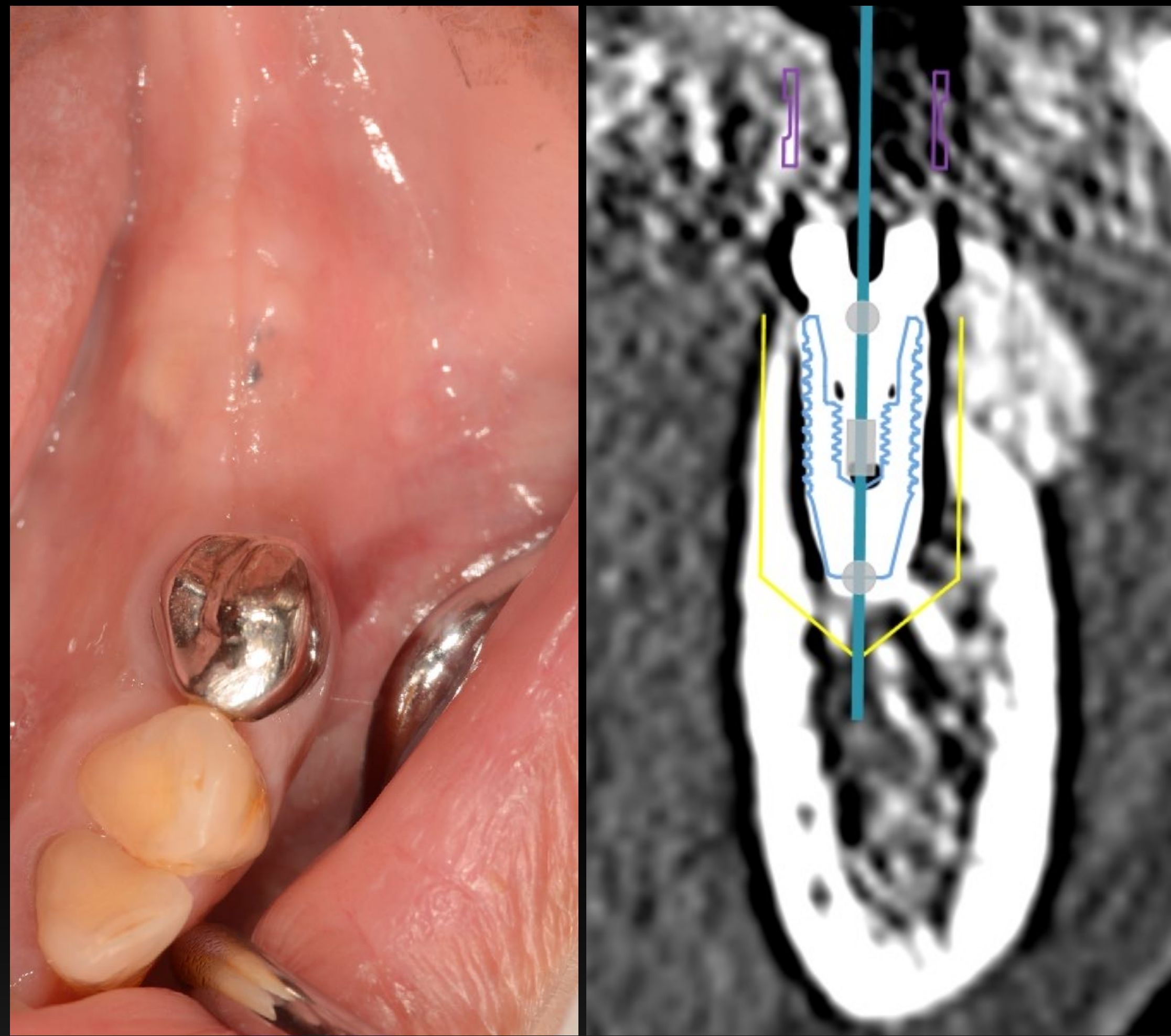
Abutment Step Technic



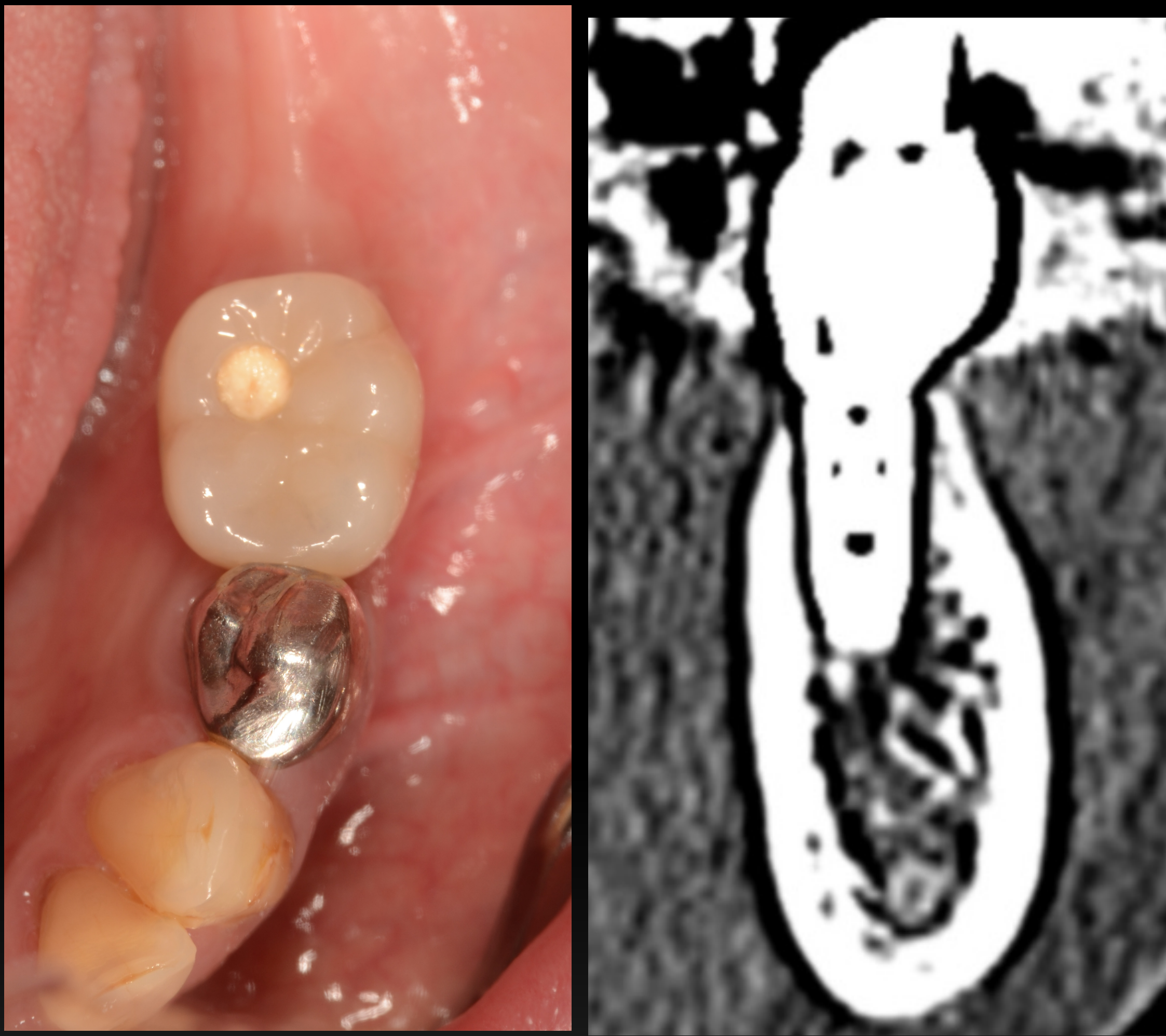
Pre-OP & Diagnosis



Surgery



Pre-OP



2Y after loading

CONCLUSION:

This study clinically compared three types of GBR procedures. We explored minimally invasive and cost-effective methods, obtaining results that suggest their utility.

REFERENCE:

1) Mir-Mari, J., Wui, H., et al.: Influence of blinded wound closure on the volume stability of different GBR materials: An in vitro cone-beam computed tomographic examination. Clin Oral Implants Res. 27: 258-265 2016.
2) Arunjaroensuk, S., Panmekiate, S., et al.: The Stability of Augmented Bone Between Two Different Membranes Used for Guided Bone Regeneration Simultaneous with Dental Implant Placement in the Esthetic Zone. Int J Oral Maxillofac Implants. 33: 206-216 2018.
3) Urban, I.A., Nagursky,H., et al.: Horizontal ridge augmentation with a collagen membrane and a combination of particulated autogenous bone and anorganic bovine bone-derived mineral: a prospective case series in 25 patients. Int J Periodontics Restorative Dent. 33: 299-307 2013.