

Stability of Wing Structured Implant ; 9 Years Follow-up Cases

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Introduction

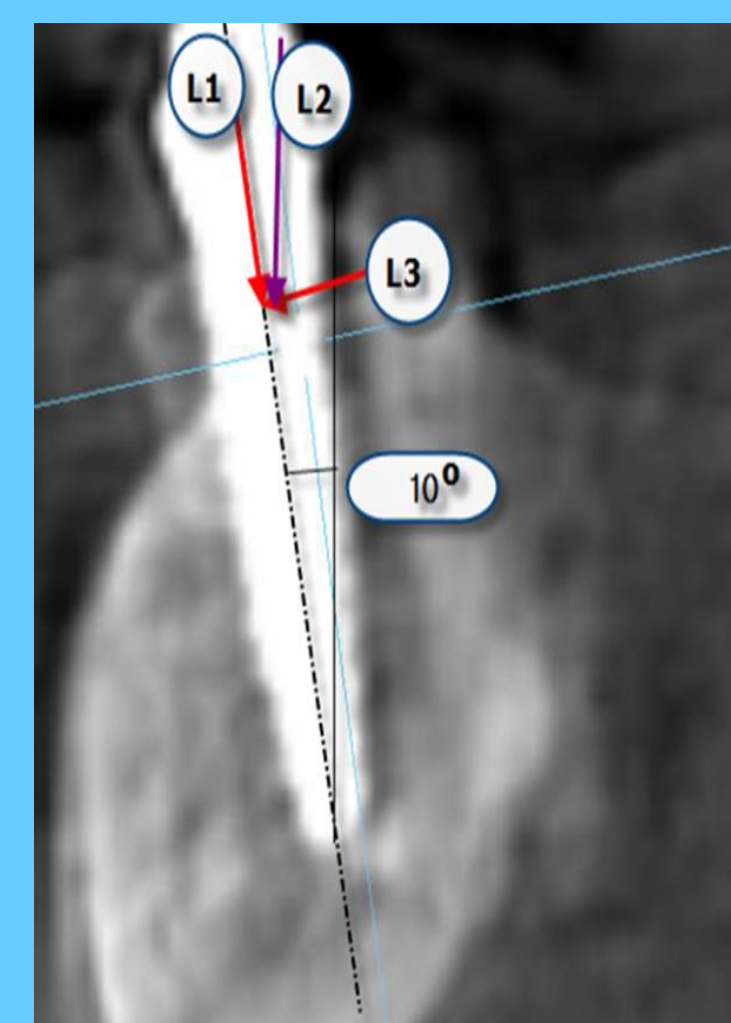
- In these cases, GBR is done usually and make recessed bone wide. But this technique is more specific and not easy to do for most clinicians.
- If Narrow diameter implant can be used in posterior area safely, implant is more easily done and it also makes the patients more satisfied and comfortable.
- Narrow implants with wing structure were used for 9-year used in posterior area. 4,057 implants were inserted from June of 2014 to June of 2023. Among them 1,904 narrow implants were used, and 683 narrow implants were selected for molar area.
- Tearing of implant on connecting point with abutment has not occurred.

Purpose of Study

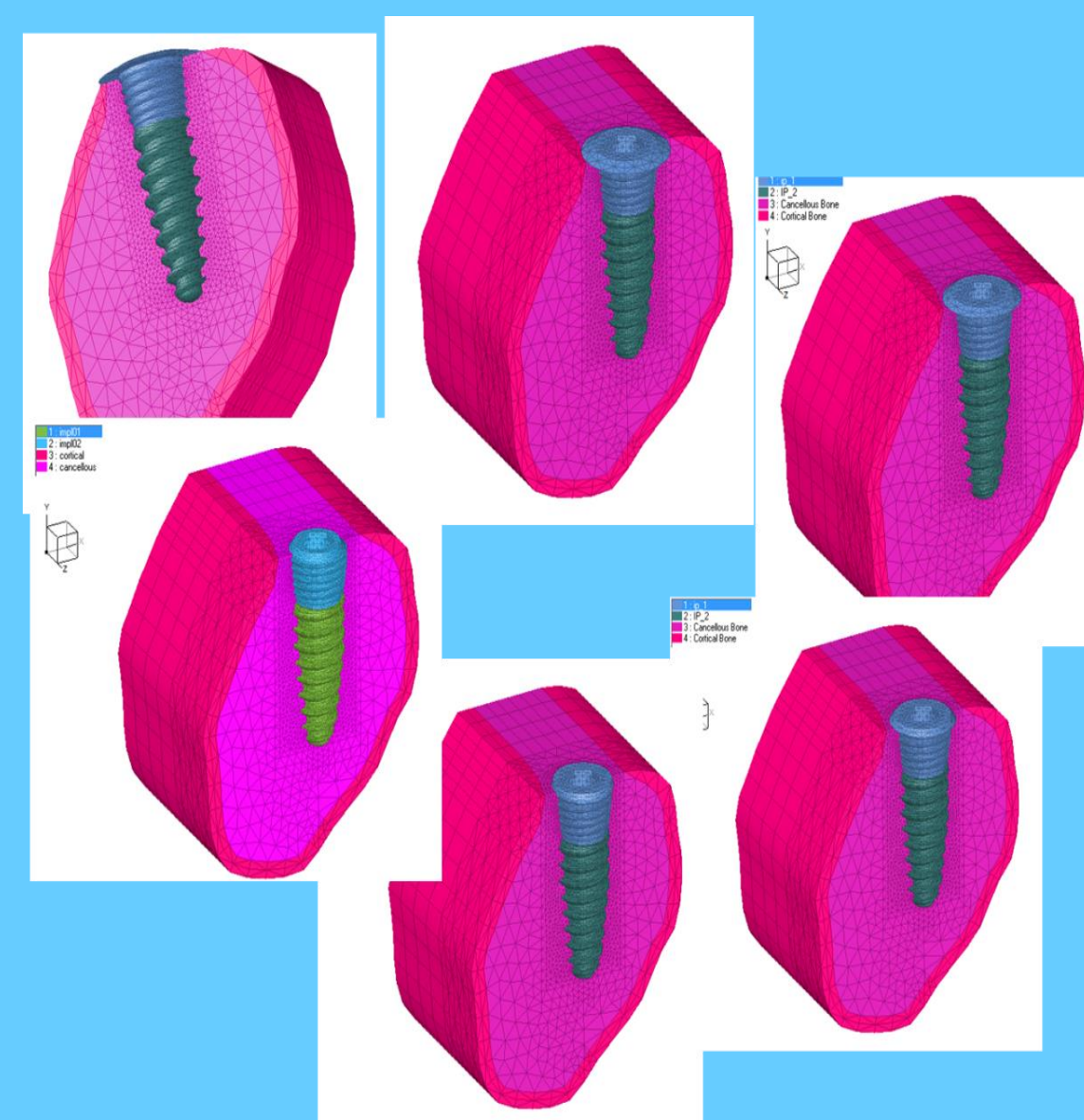
This study was designed to evaluate the long-term stability of newly designed implant and clinical usefulness of wing type implant

Wing-Type Implant

Design for Implant Modification

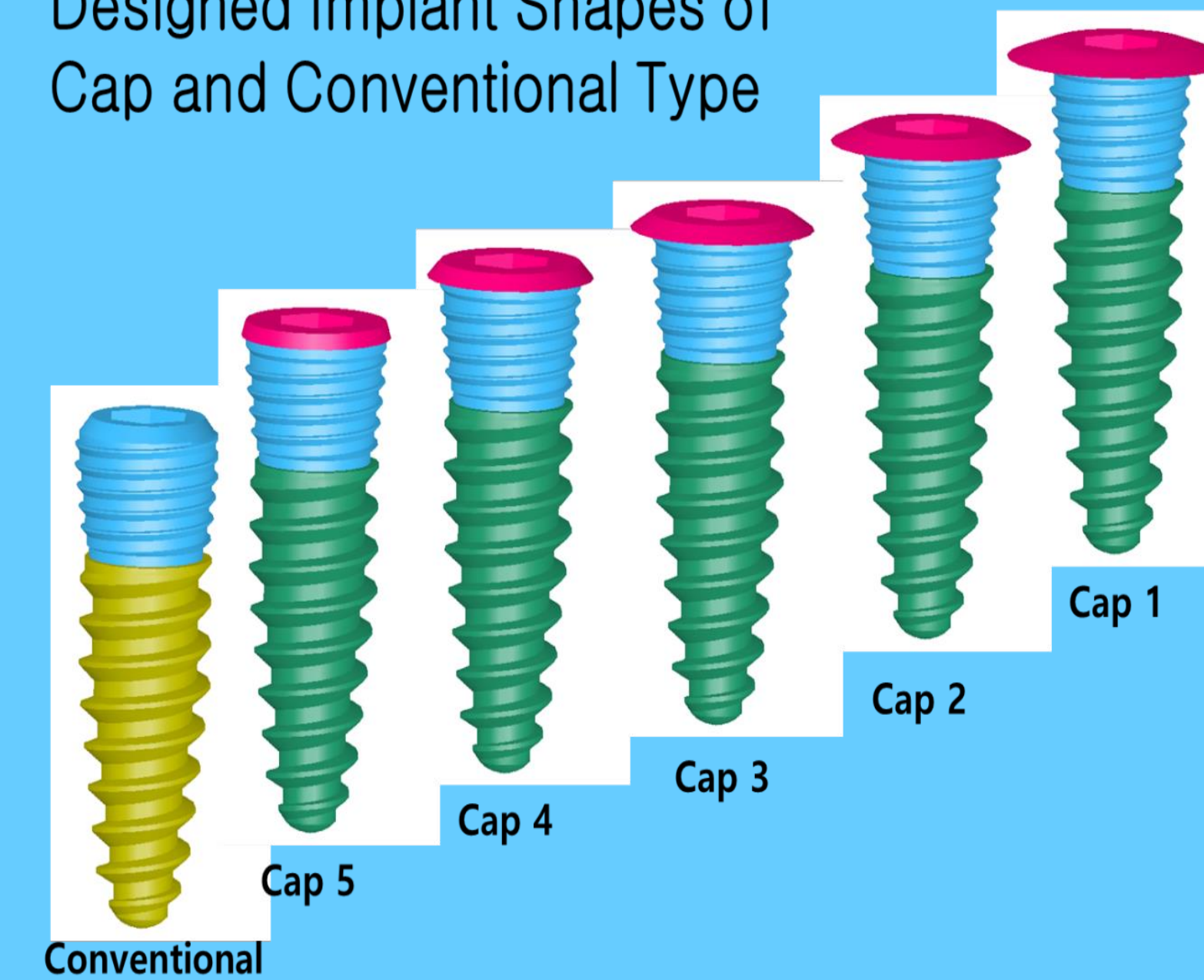


L2 : Oblique Load : 300 N
L1 : Vertical Load : $300 * \cos(10^\circ) = 295.4$ N
L3 : Horizontal Load : $300 * \sin(10^\circ) = 52.1$ N

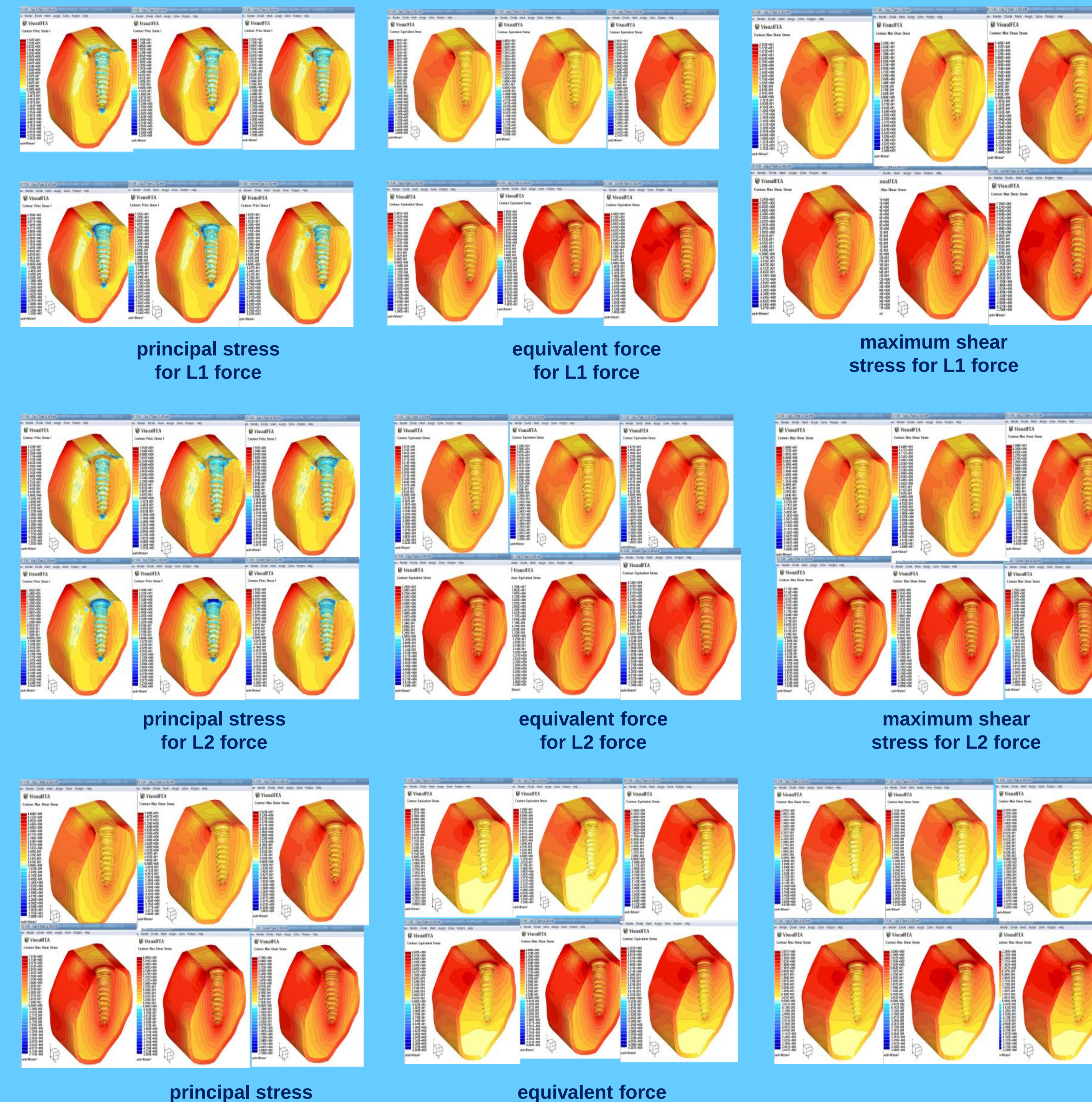


FEM Model was designed by CT Image with the various lengths of the Cap

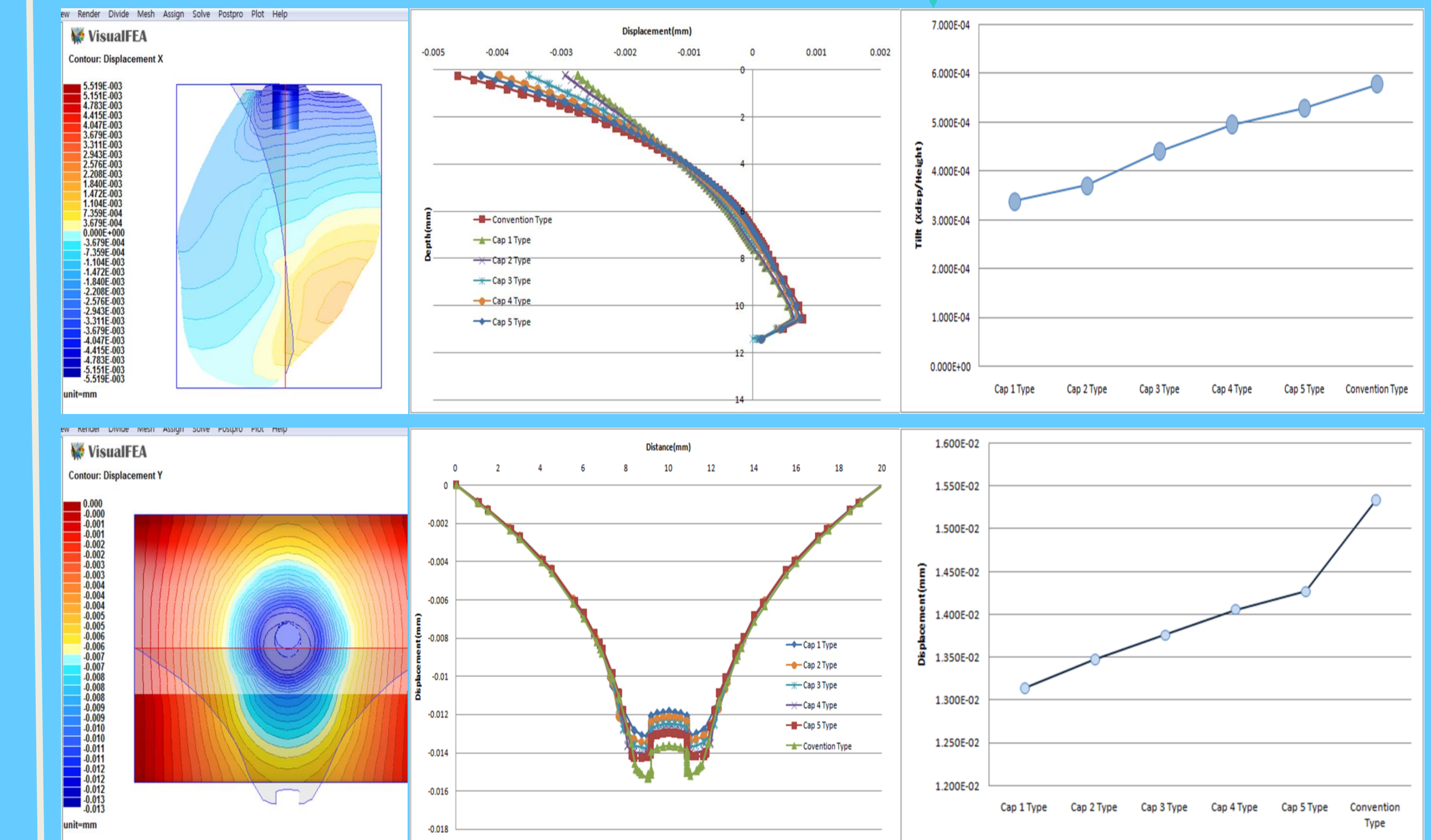
3D Models of the New Designed Implant Shapes of Cap and Conventional Type



Cap 1 : 1.0mm
Cap 2 : 0.7mm
Cap 3 : 0.5mm
Cap 4 : 0.3mm
Cap 5 : 0.1mm

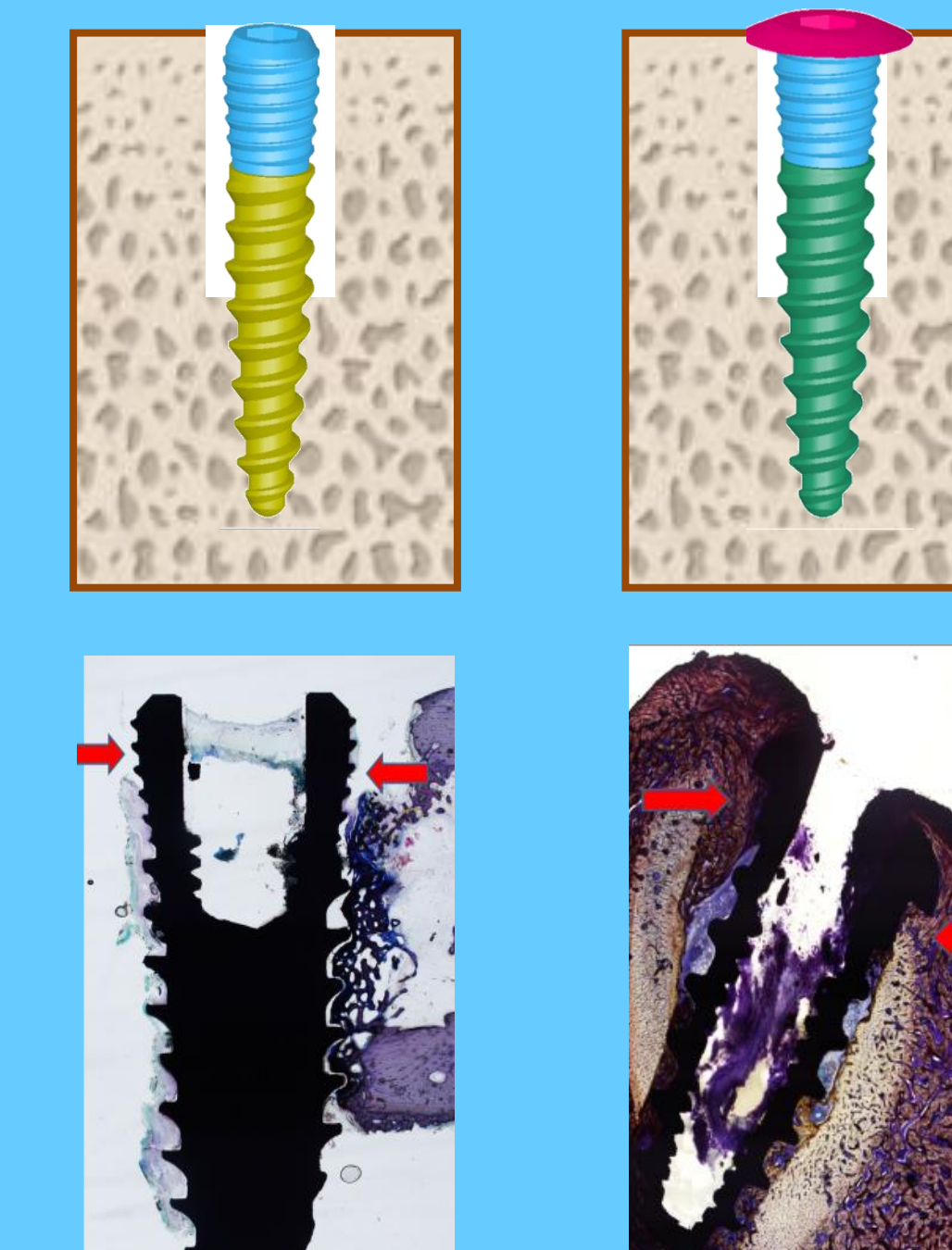


Results of FEM



lateral displacement and vertical displacement is decreased with wing size is increased

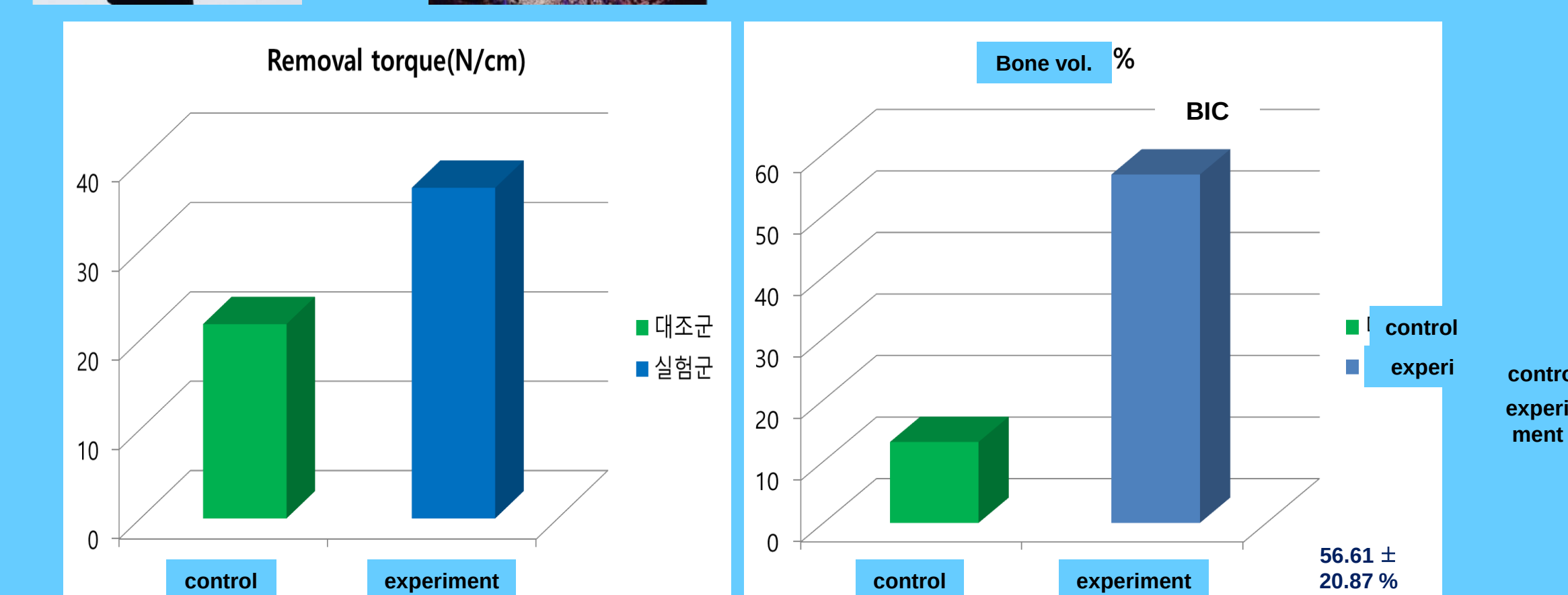
Animal Study



For get the evidence of the effects of the bone formation, animal study was done.

Upper part of bone was widely removed. Gap was prepared around the implant, 1mm wider then implant and two types of implant, conventional type and 1mm winged implant, was installed.

More bone formation occurs in case of wing type implant and shows greater removal torque and BIC



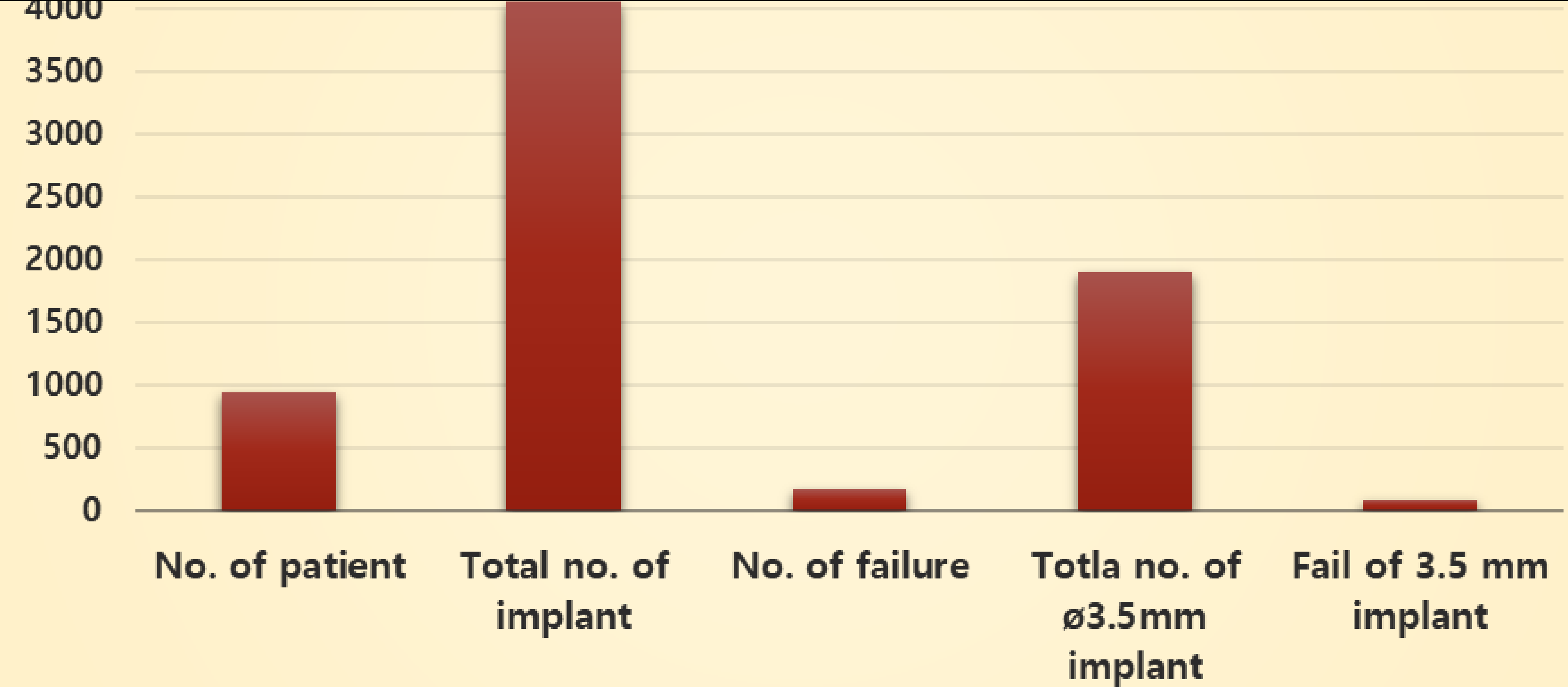
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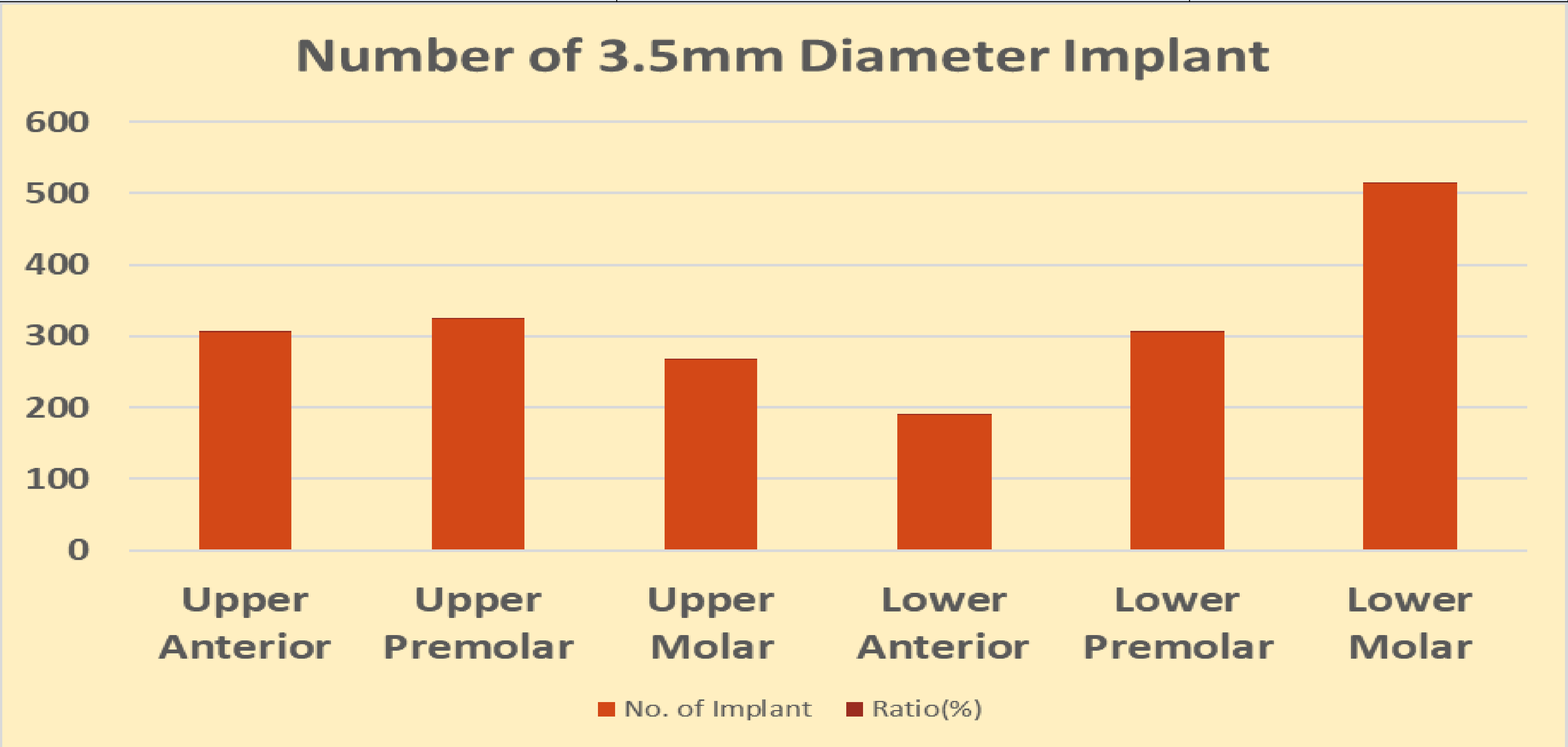
No. and portion. of Narrow Implant inserted

Duration	2016.08.04~2023.06.30
Clinic	Life Dental Clinic
No. of patient	940
Total no. of implant	4,057
No. of failure	178
Totla no. of ø3.5mm implant	1,904 (46.9%)
Fail of 3.5 mm implant	84



No. and portion. of Narrow Implant by Location

Location	No. of Implant	Ratio(%)
Upper Anterior	305	16%
Upper Premolar	323	17%
Upper Molar	267	14%
Lower Anterior	190	10%
Lower Premolar	305	16%
Lower Molar	514	27%
Total	1904	100%



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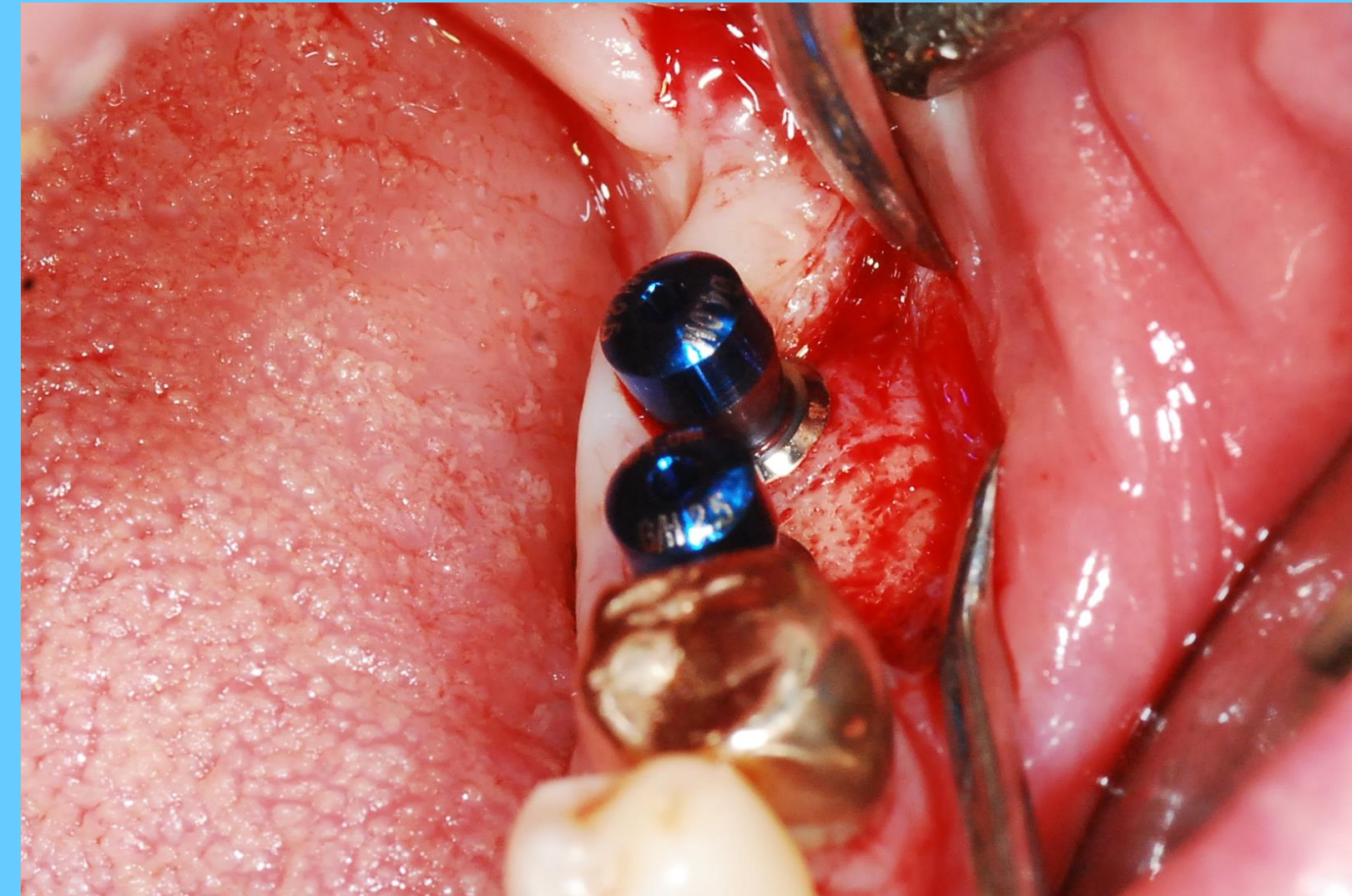
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On Narrow Ridge

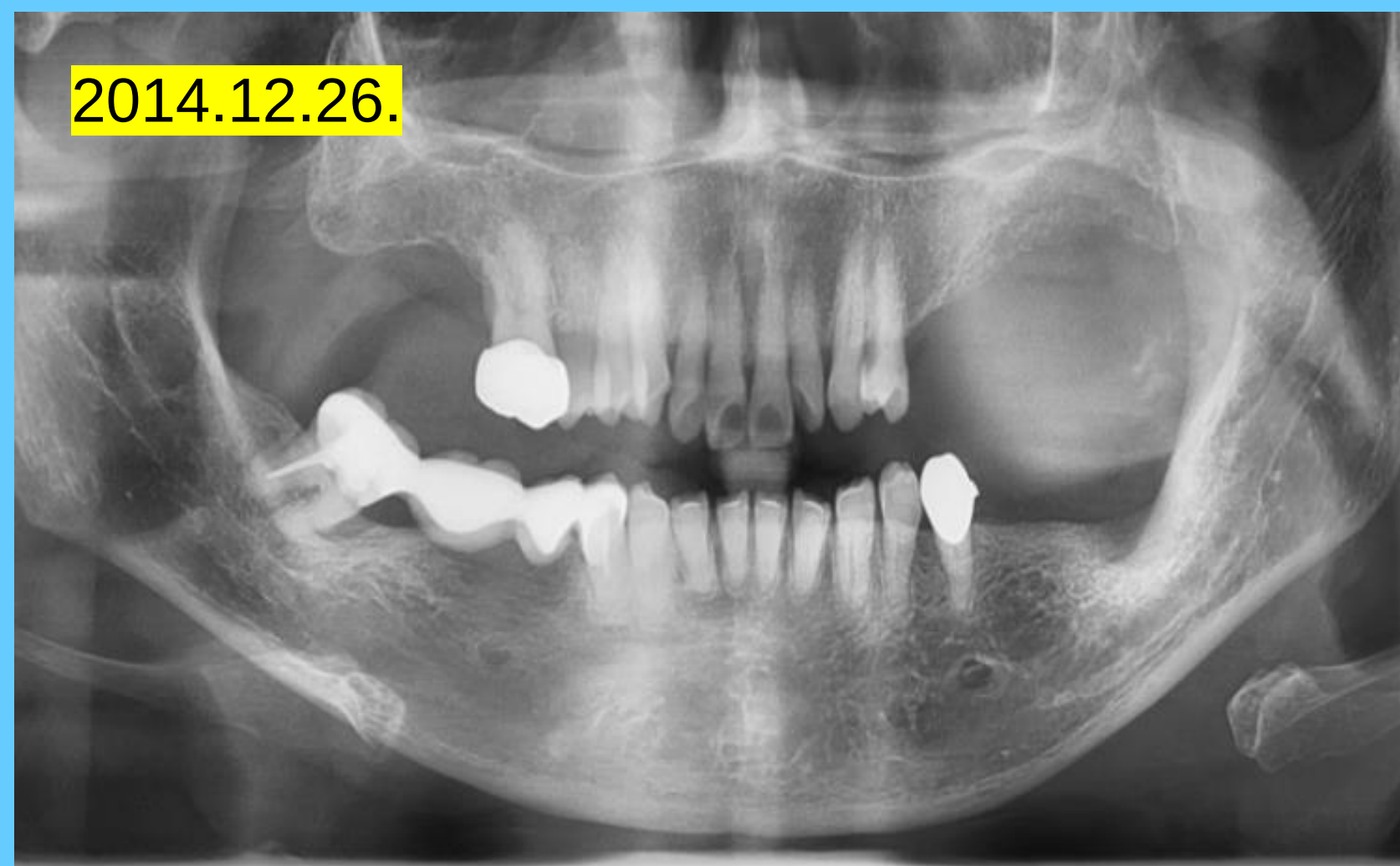
< Case 1 >



Patient with very thin alveolar crest



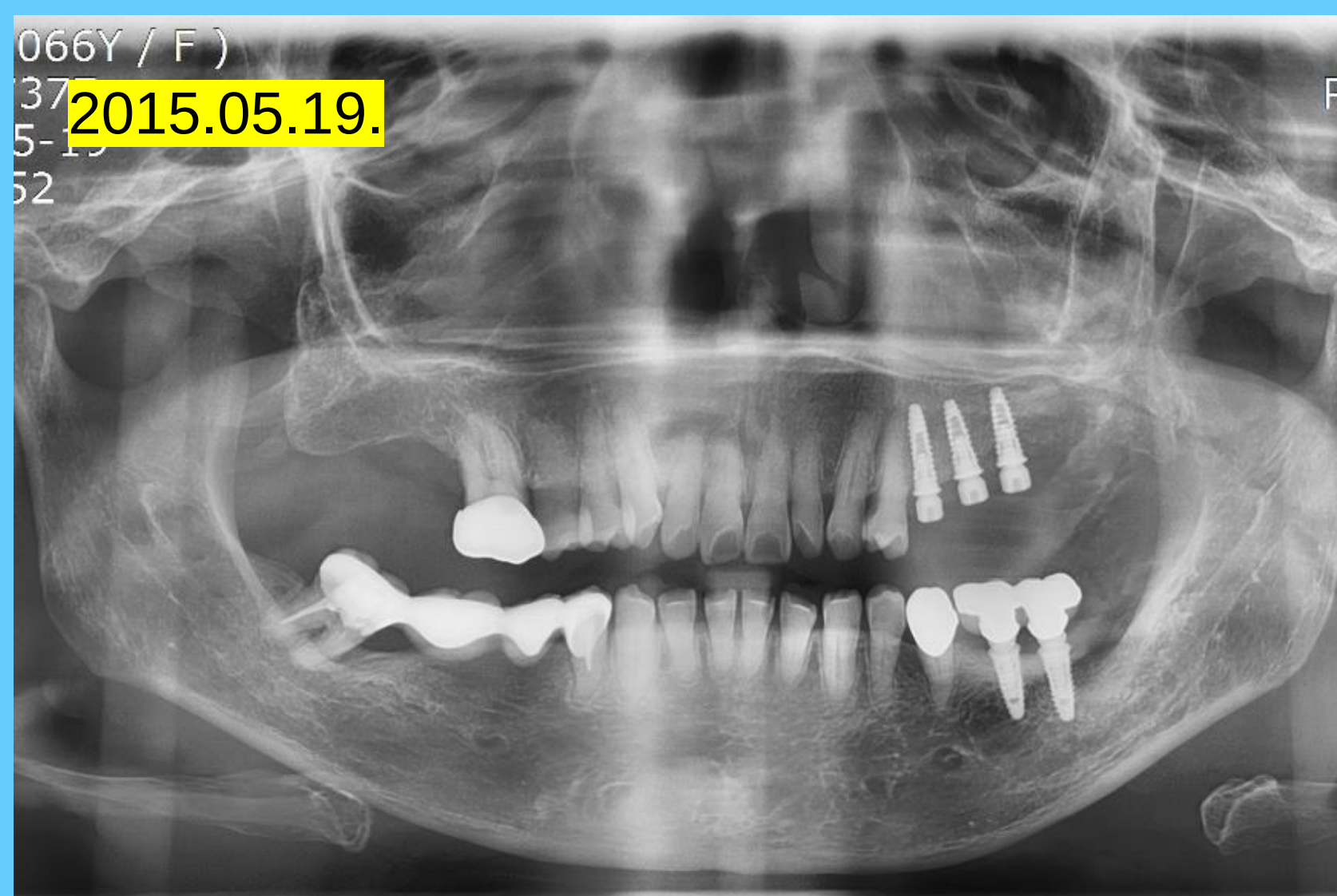
After position of Implant



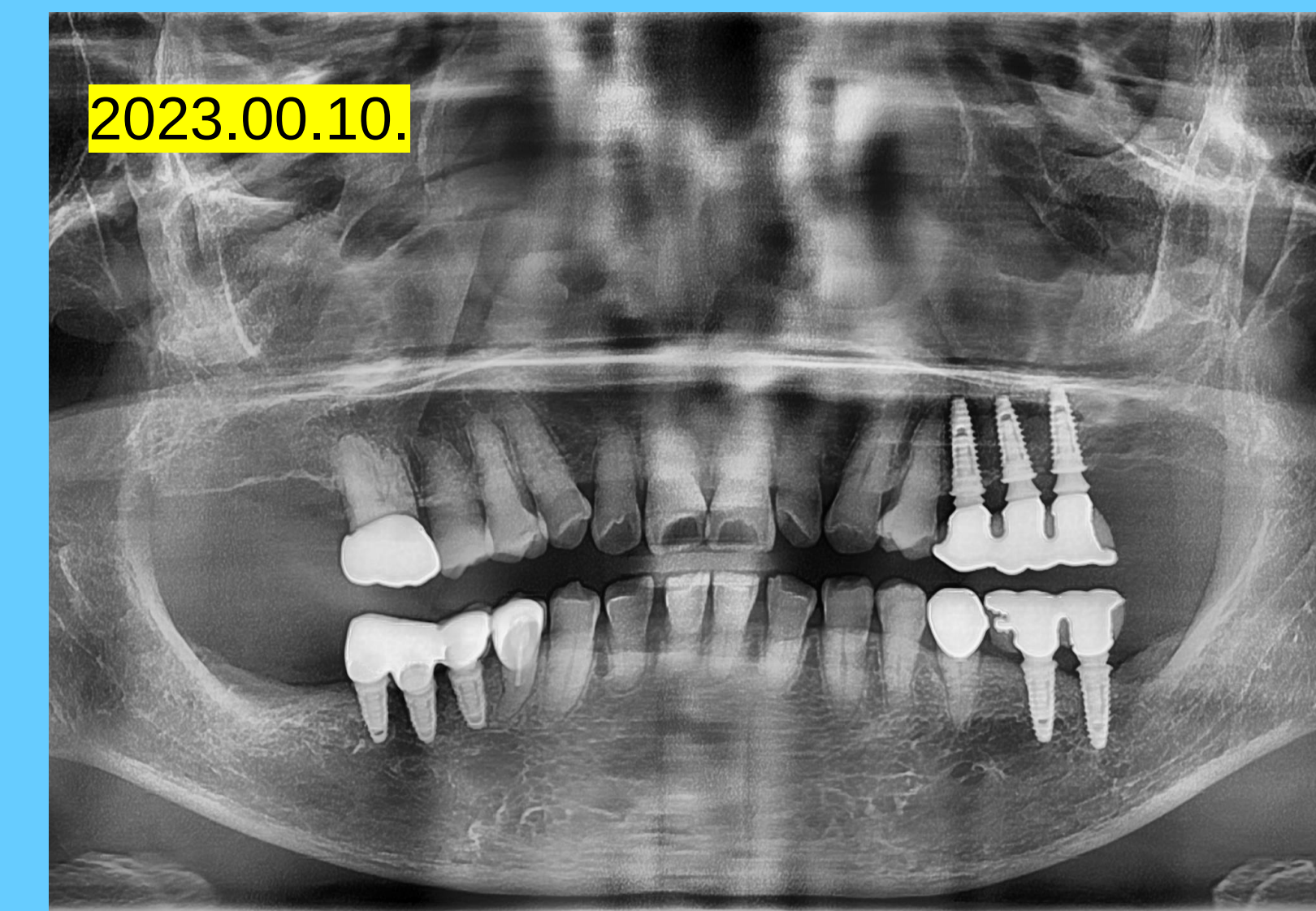
Panoramic view ; before surgery



Panoramic view ; after surgery



Panoramic view ; after 5 months



Panoramic view ; 8 years later

< Case 2 >



Implant on defected bone



After 2 years : well healed bone

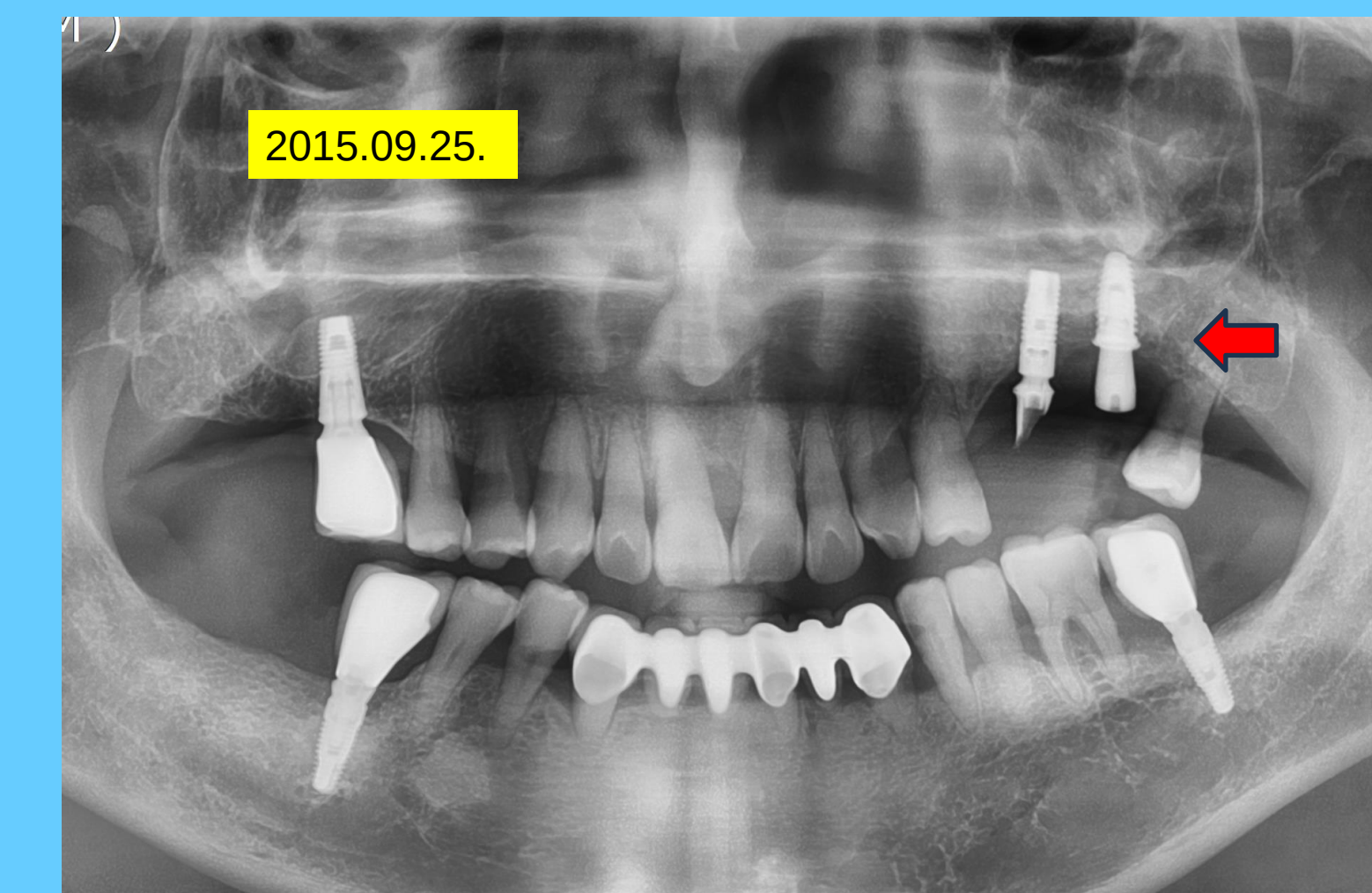


Peri-apical view shows stable bone level

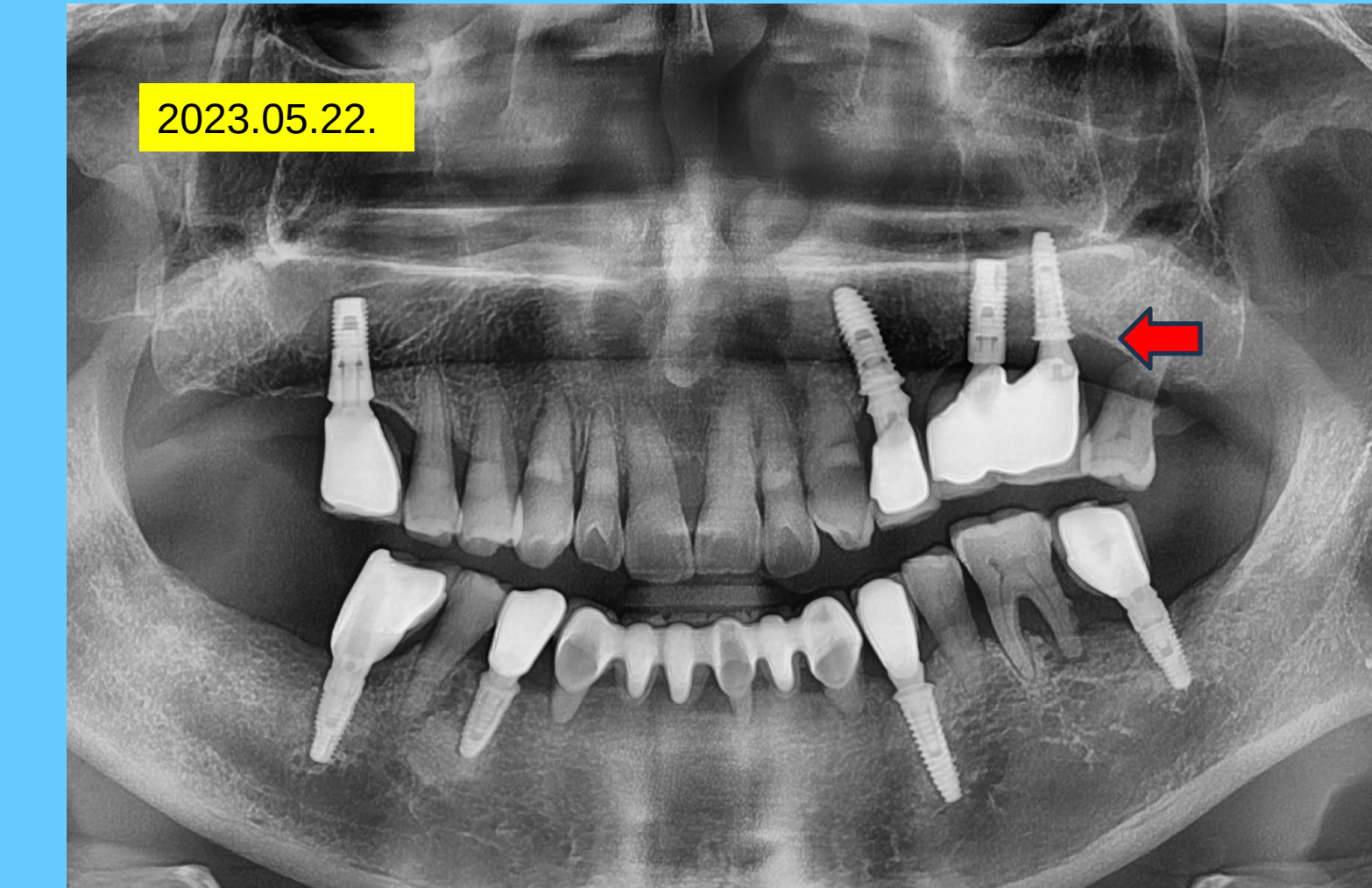


Healthy gingiva is seen

< Case 3 >



Wing implant after previous implant was removed



Stable bony contour is maintained for long time

- **Ghazal SS, et al (2019)** ; compare crestal bone level change between narrow implant(3.3mm) vs standard implant(4.1mm)
 - : 6, 12 months post-loading
 - : $-0.27 \pm 0.34(\text{sdi})$, $-0.48 \pm 0.67(\text{sdi})$**Narrow Diameter Implant shows significantly smaller crestal bone level change but resistance to fracture is decreasing 25%**

<Wing Implant>

- **1904 narrow implants** were inserted in from june, 2014 to june, 2023 in dental clinic. (514 on lower molar area, 267 on upper molar area).
- **1409 implants** were inserted in **posterior area** including premolar.(one implant was fx on same patient, same position-#24)
- 84 implants were removed because of loss of stability, most of them were inserted in severely resorbed alveolar bone (in very poor bone quality)

Conclusions

1. Wing type implant has ability to promote bone regeneration around implant and it also reduce alveolar bone resorption around implant
2. Even narrow diameter implant can be used on posterior site because the wing structure can resist to tearing of implants
3. Gingiva around implants show less peri-implantitis and less spontaneous bleeding and bleeding on probing (BOP)
4. It is believed that, based on the above-mentioned results, the wing-type implant is clinically stable structure