

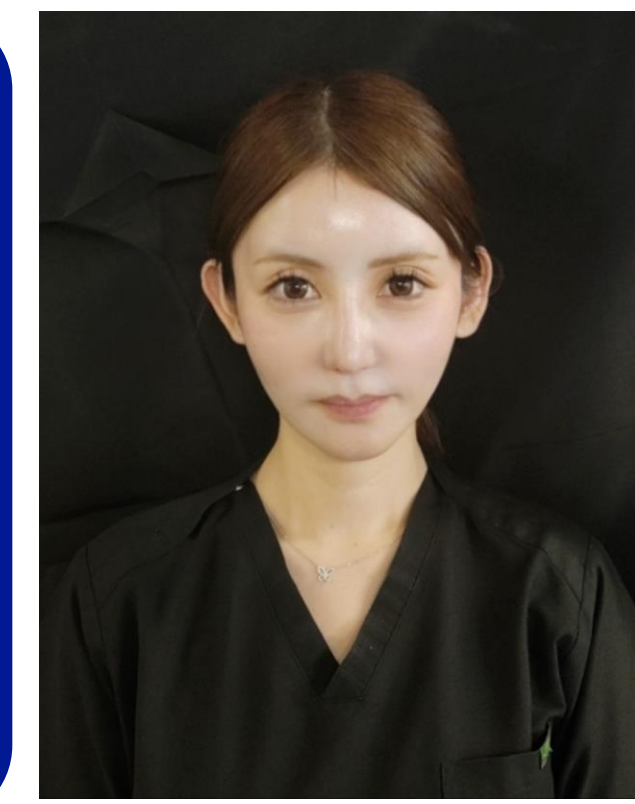


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A Clinical Case of Modifying the Scanbody for a Patient With Limited Mouth Opening

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Introduction

In implant treatment, digital impression offers advantages over conventional impressions including improved patient comfort and acceptance.^{1,2} However, in clinical practice, attaching the scanbody in the molar region can be difficult when taking digital impressions of patients with limited mouth opening.

In this case, the scanbody was modified for the patient in order to attach the scanbody. Furthermore, after modification, the scanbody was examined both occlusally and coronally to determine if the design of the modification affects the matching process.

Fig. 1 Initial Visit



1a. Panoramic X-ray



1b. Lower occlusal view

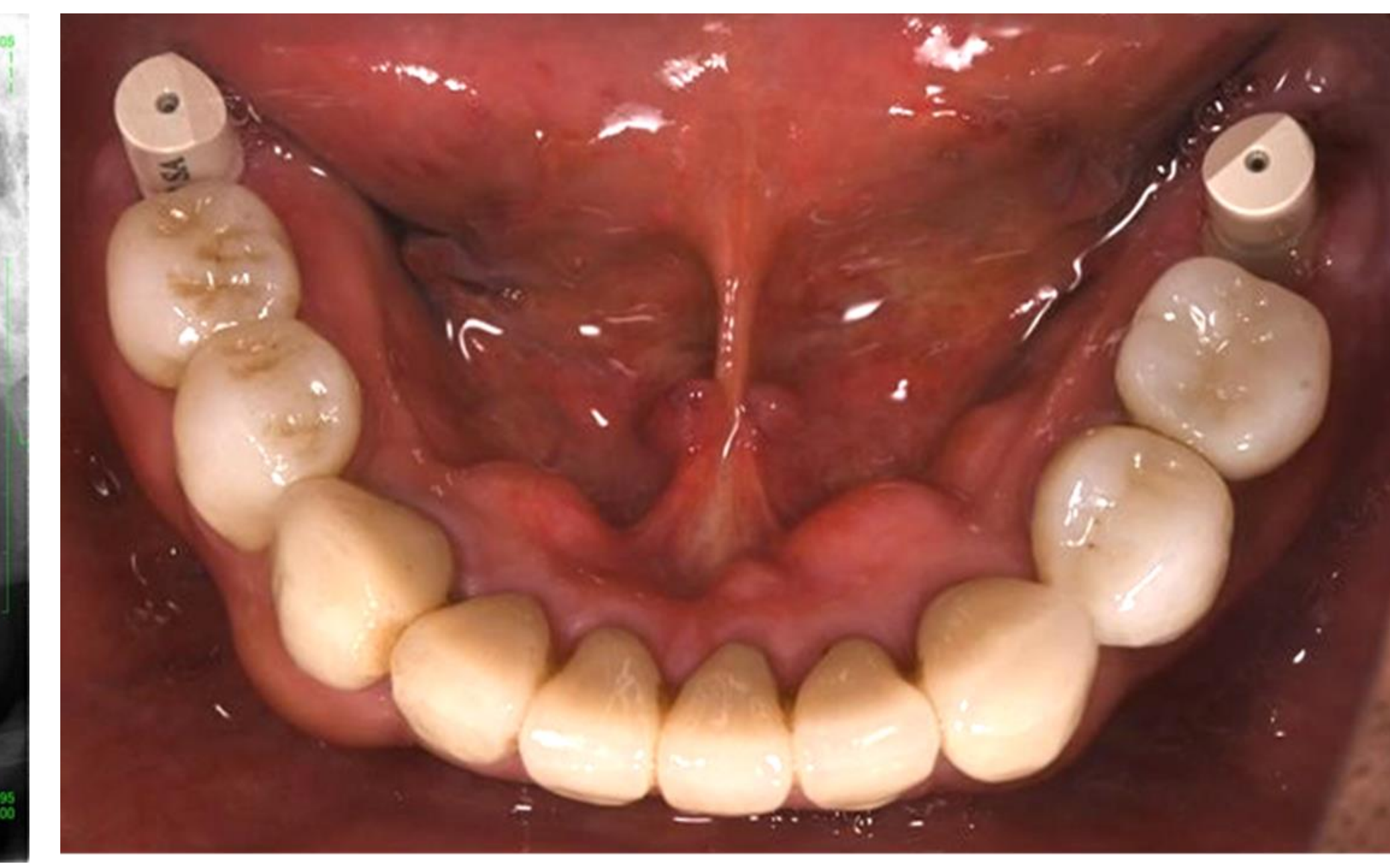


1c. Mouth opening of 33.0mm

Fig.2 Post Surgery



2a. Panoramic X-ray



2b. Lower occlusal view with scanbodies

Case

The case involved a patient with missing teeth #5, #4, #19, #18, #30, and #31, with a maximum mouth opening of 33.0 mm. Implants ($\phi 4.3 \times 10$ mm, tapered) were placed in positions #19 and #30, and a second surgery was performed. Digital impression was taken using an intraoral scanner to reduce strain.³ However, during the attachment and detachment of the scanbody, the patient complained of temporomandibular joint pain, making it difficult to insert the implant driver.

References :

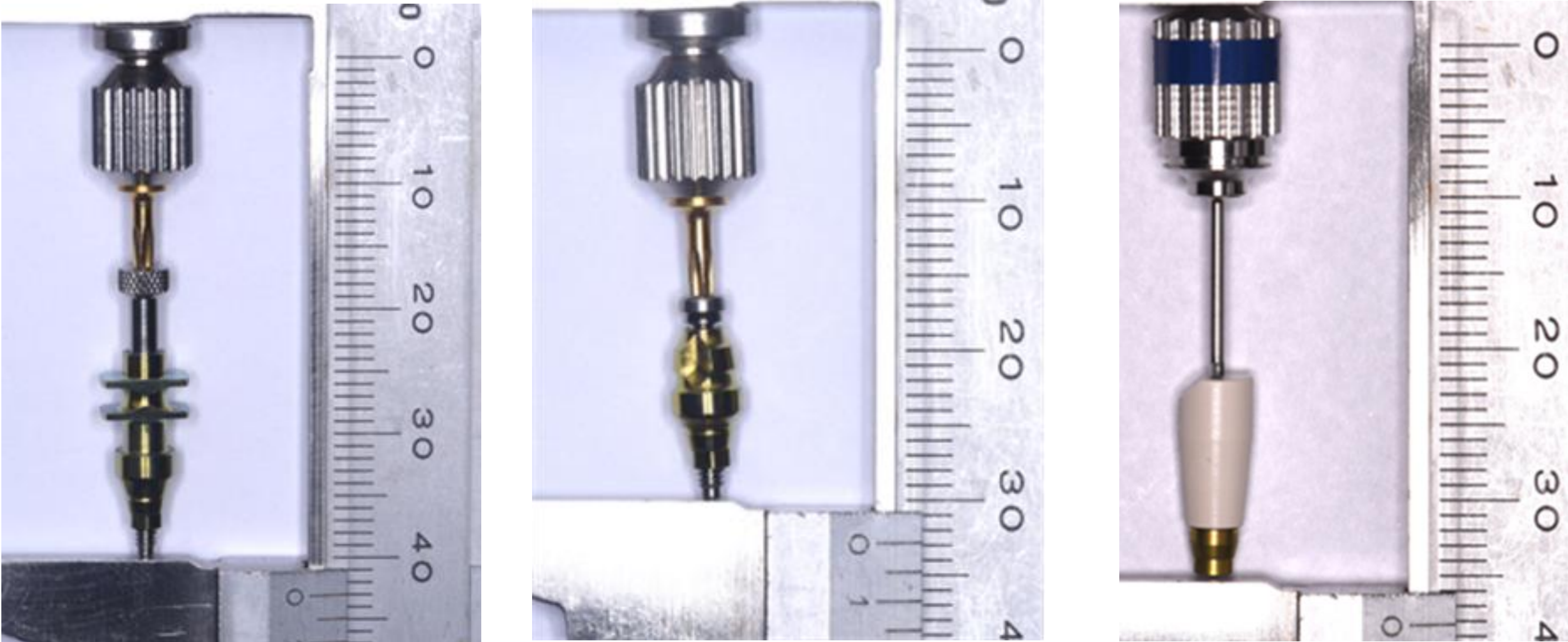
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2. Mizumoto RM, Yilmaz B. Intraoral scan bodies in implant dentistry: A systematic review. J Prosthet Dent. 2018 Sep;120(3):343-352. doi: 10.1016/j.prosdent.2017.10.029. Epub 2018 Apr 5. PMID: 29627211.
3. Brandt J, Lauer HC, Peter T, Brandt S. Digital process for an implant-supported fixed dental prosthesis: A clinical report. J Prosthet Dent. 2015 Oct;114(4):469-73. doi: 10.1016/j.prosdent.2015.03.022. Epub 2015 Jul 14. PMID: 26187099.

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Method

A groove was created in the PEEK scanbody with a diamond bur to allow the driver insertion. Based on the intraoral scan data, a 3D-printed model and provisional restoration were fabricated, and the final restoration was completed.

Fig.3 Amount of Vertical Mouth Opening Required for Each Impression Coping



3a.Open tray impression coping

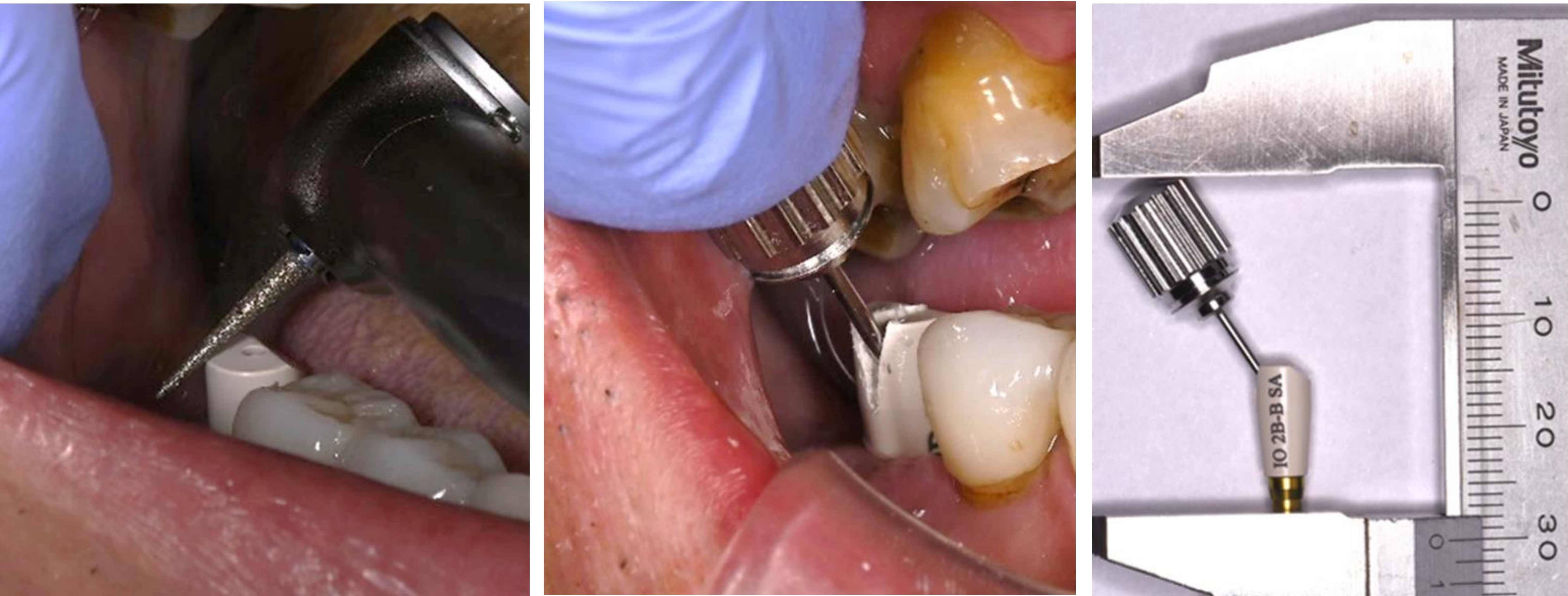
3b.Closed tray impression coping

3c. Scanbody

Impression Copings + Implant Driver	Vertical Length (mm)
With an Open Tray Impression Coping	43mm
With a Closed Tray Impression Coping	33mm
With Scanbody	38mm
With Modified Scanbody	30mm

3d.Vertical length required when inserting each coping

Fig.4 Modification of the PEEK Scanbody



4a. A groove is made with a diamond bur

4b. Screwing out the scanbody

4c. Less vertical length is needed when the scanbody is modified



4d. Intraorally modified scanbody



4e. Extraorally modified scanbody

References :
1. Akagawa, Y., Hosokawa, T., Yokoyama, A., Miyamoto, Y., & Kondo, N. (Eds.). (2023). Fundamental concepts and techniques of oral implants (p. 271). Medical Dental Publishing.
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Fig.5 Digital Workflow

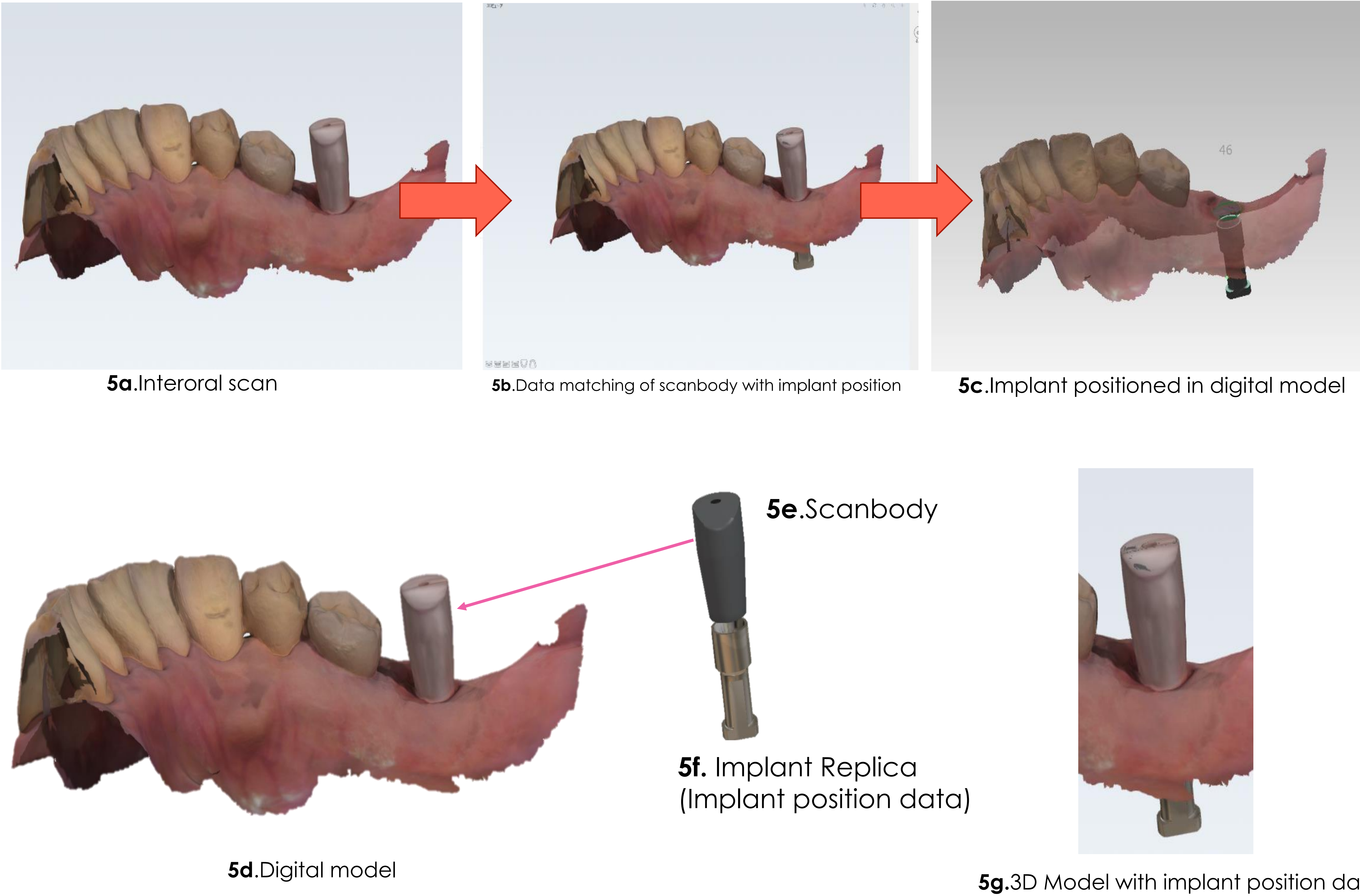
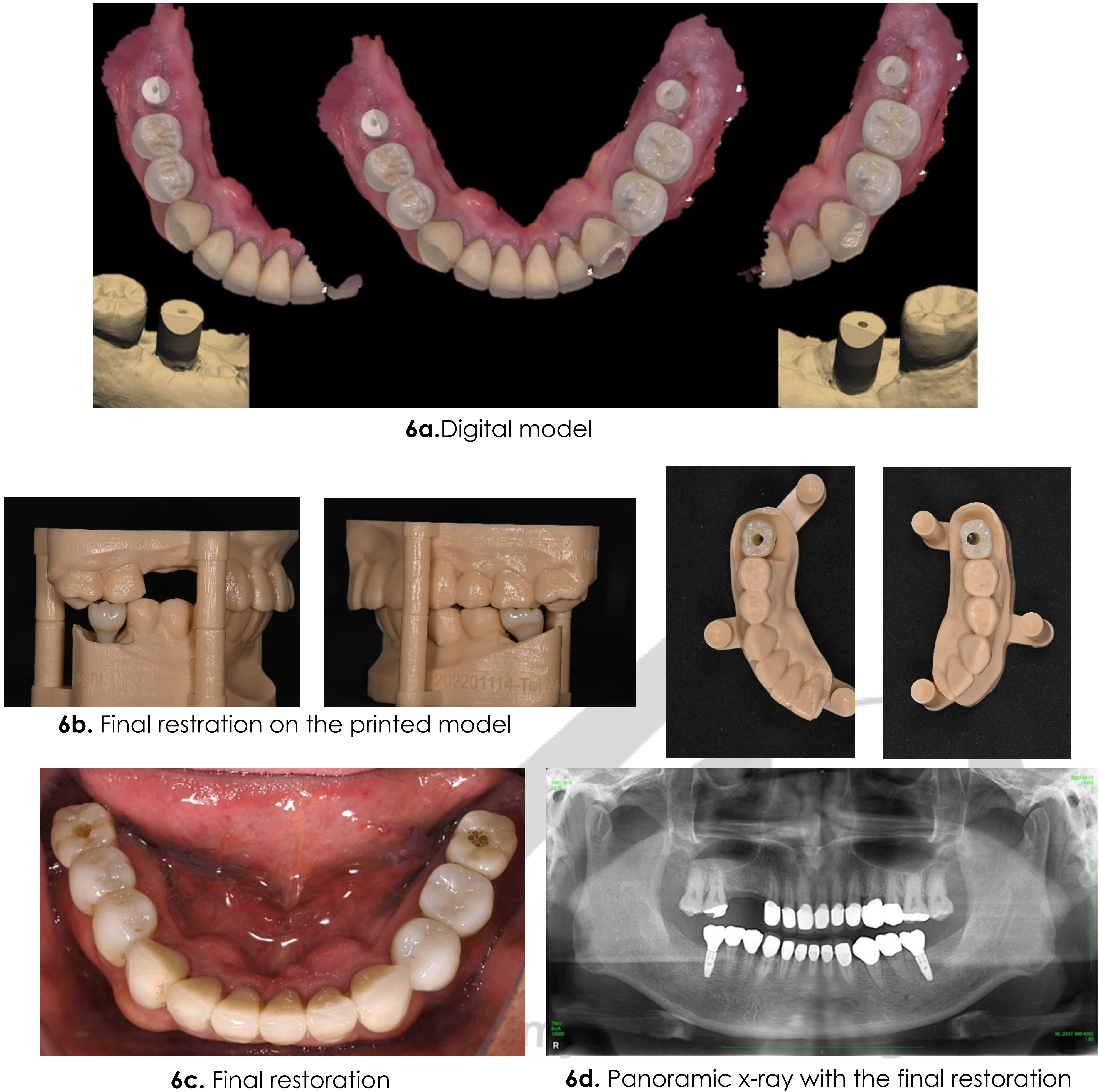


Fig.6 Fabrication of Final Restoration



References :
1. Akagawa, Y., Hosokawa, T., Yokoyama, A., Miyamoto, Y., & Kondo, N. (Eds.). (2023). Fundamental concepts and techniques of oral implants (p. 271). Medical Dental Publishing.
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Method

The occlusal surface of the scanbody was divided into six areas, and the coronal surface of the scanbody was divided into three areas: coronal half, coronal one-quarter, and defects below the slice plane. Data loss was artificially created for evaluation.

Fig.6 Evaluation of Data Matching

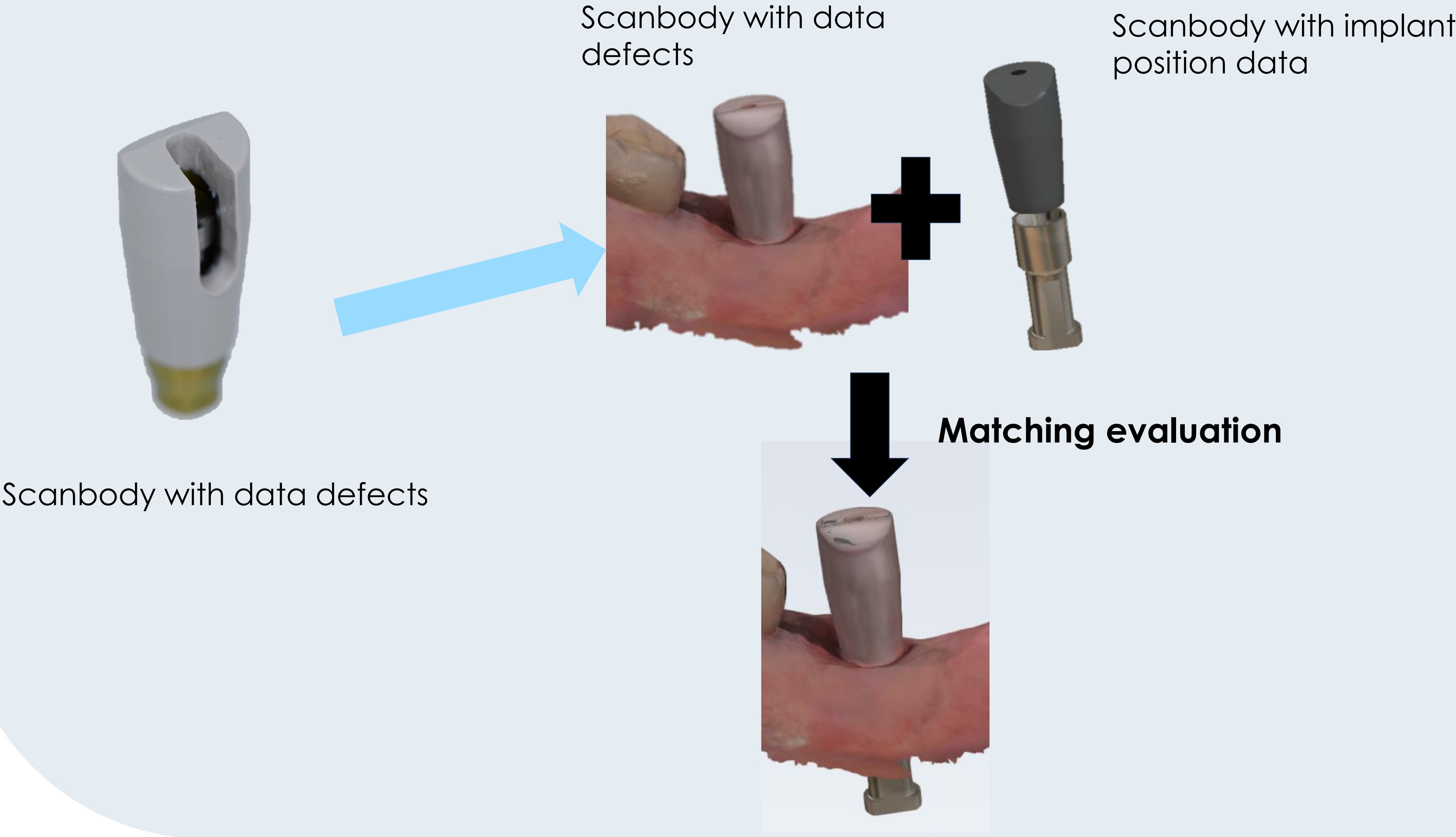


Fig.7 Occlusal Surface Divided into 6 areas

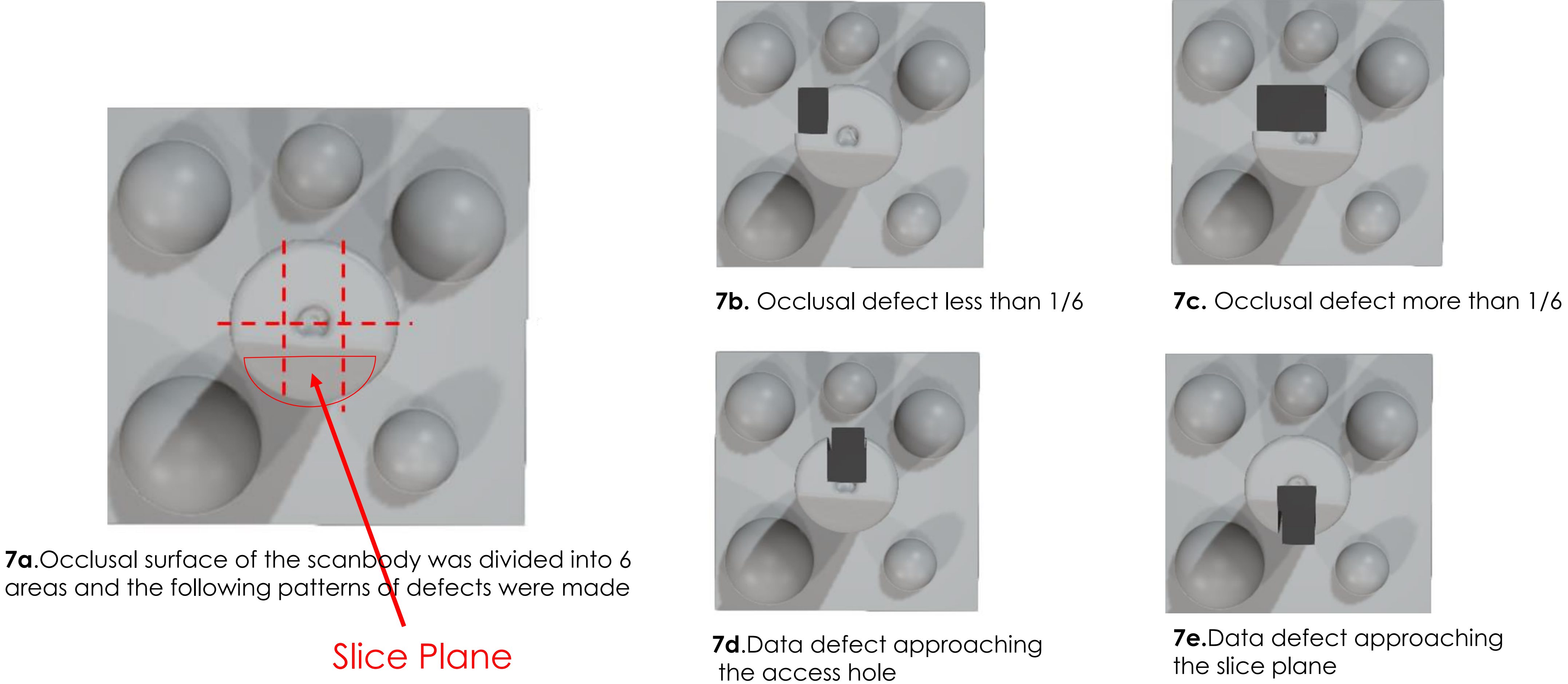
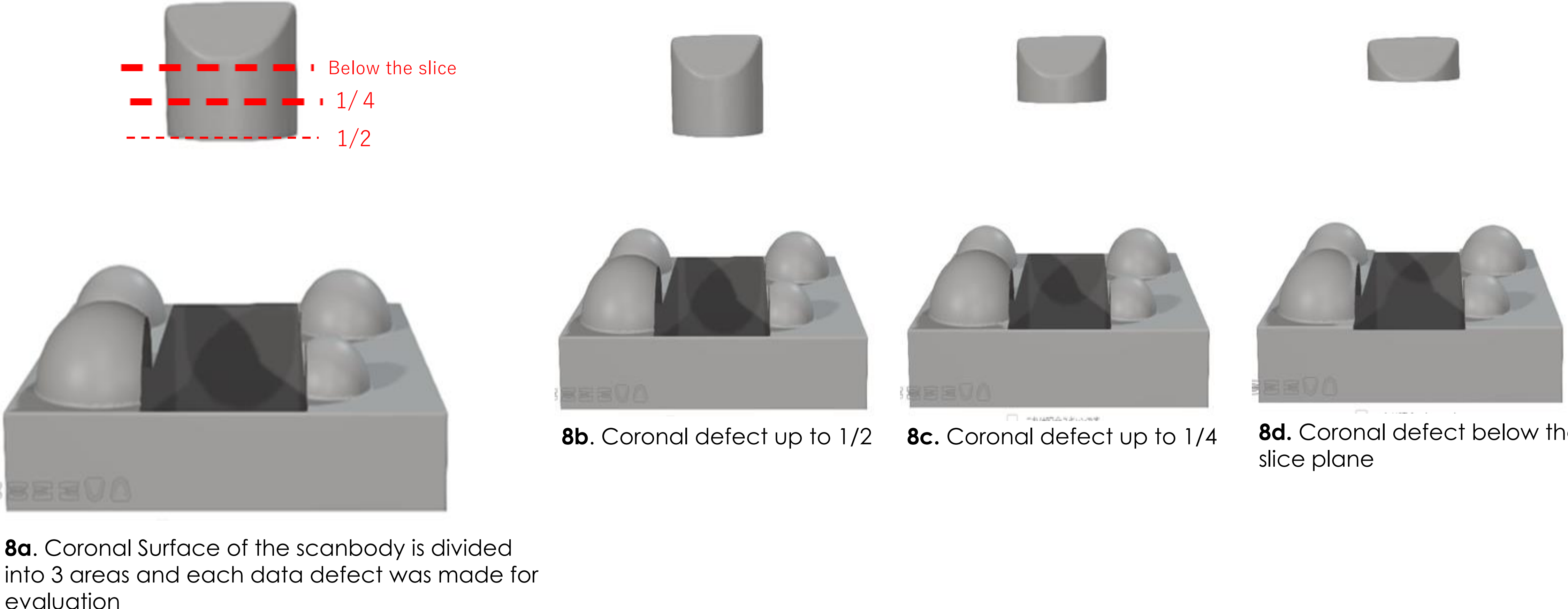


Fig.8 Coronal Surface Divided into 3 areas



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Results As long as the slice plane is preserved AND the defect is within one-sixth of the scanbody, the data matching process is not affected.

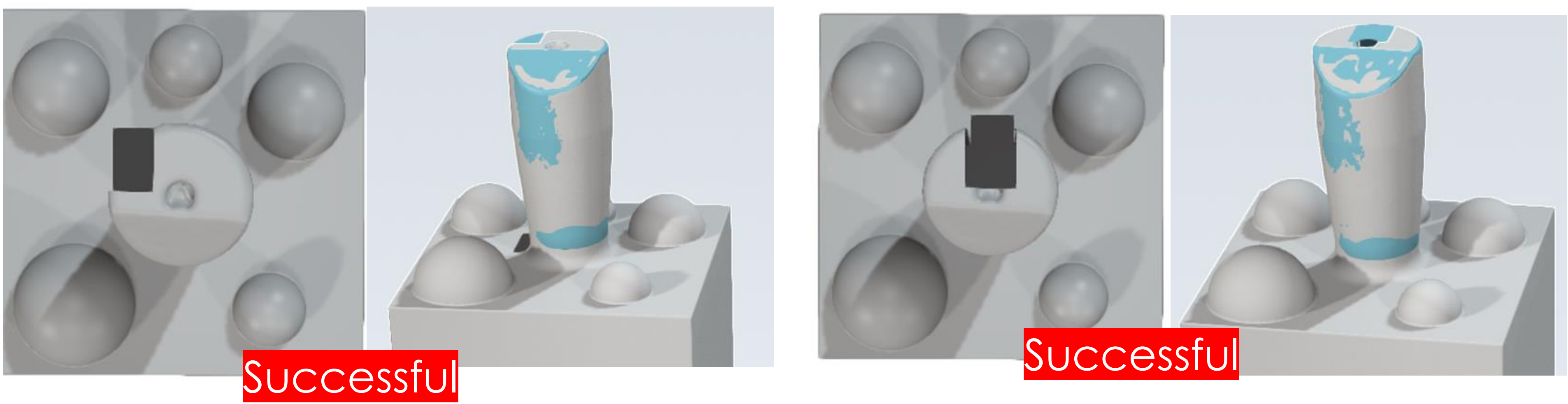


Fig.9a When the occlusal defect is less than 1/6, matching is successful regardless of the presence or absence of the access hole

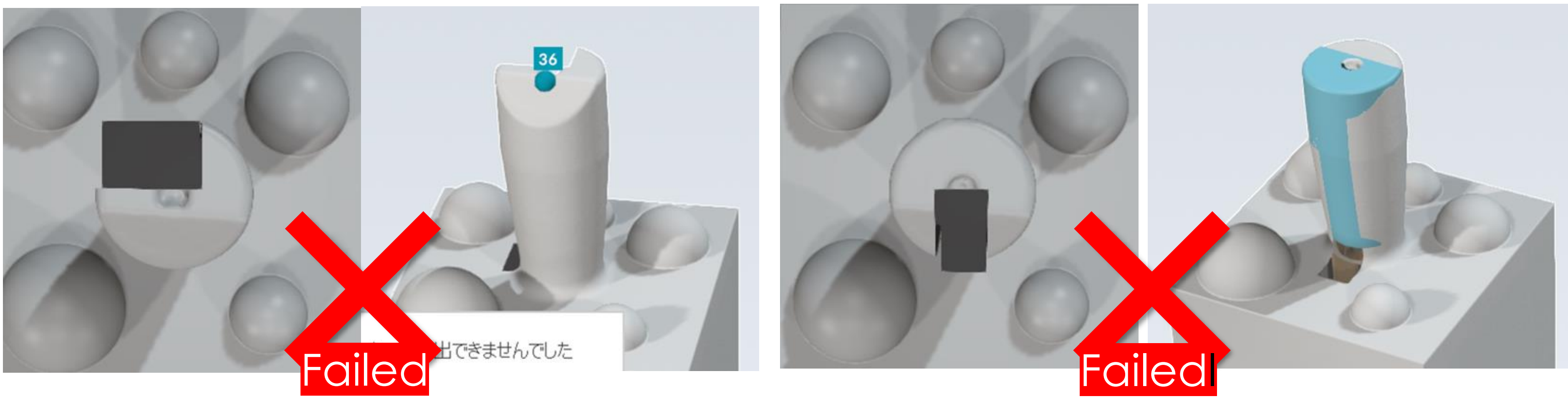


Fig.9b Data matching is unsuccessful when the defect exceeds one-sixth or involved the slice plane.

Areas of Defect	Data Matching Outcome
Occlusal Defect <1/6 AND The Slice Plane is Preserved	Successful
Occlusal Defect >1/6	Failed
Occlusal Defect Involves the Slice Plane	Failed
Coronal Defects below the Slice Plane	Successful



Fig.9c Coronal defects of all three are matched successfully.

Conclusion

To achieve successful matching between optical scan data and the scanbody which records implant position information, it is essential to preserve the slice plane and limit defects to within one-sixth of the scanbody.

This suggests that even for patients with restricted mouth openings, modifying the scanbody beforehand allows for successful digital impressions and reduces strain for patients with such conditions. Further studies should explore whether similar modifications can be applied to other types of scanbodies.

References :
1. Akagawa, Y., Hosokawa, T., Yokoyama, A., Miyamoto, Y., & Kondo, N. (Eds.). (2023). Fundamental concepts and techniques of oral implants (p. 271). Medical Dental Publishing.
2. Mizumoto RM, Yilmaz B. Intraoral scan bodies in implant dentistry: A systematic review. J Prosthet Dent. 2018 Sep;120(3):343-352. doi: 10.1016/j.prosdent.2017.10.029. Epub 2018 Apr 5. PMID: 29627211.
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