

Extraction with immediate full mouth implant surgery at Mx. edentulous patient without surgical stent: case report

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Treatment of a patient with few remaining teeth in a compromised condition, seeking full mouth reconstruction with extraction and immediate implant placement at his initial visit is often challenging for a clinician. Because, the ideal placement of dental implants in a non-guided surgery while considering anatomic landmarks (e.g. anterior nasal spine, canine fossa, maxillary tuberosity, etc.) and optimal prosthetic requirements is difficult and unpredictable. Without the use of a surgical stent, therefore, the clinician needs to place implants on both sides in a single visit to achieve predictable and symmetrical results. Here, we want to present a successful case of a patient who had all compromised teeth removed and received immediate implant placement in full-arch without the surgical guide during his first visit. (THE JOURNAL OF KOREAN ACADEMY OF OSSEOINTEGRATION 2021;13(1):1-9)

Key words: Extraction with immediate full mouth implant surgery, Implant operation without surgical stent, Free hand full mouth surgery, Implant, Immediate implant, Bone graft

INTRODUCTION

Many surgeons may have difficulty establishing implant placement in an ideal prosthetic position if a patient with a multiple loss of teeth is in a first visit and wants to have an implant surgery immediately. If the patient is on the first visit and wants to immediately install the full-arch implant, the surgeon has to establish the position of the implant based on anatomical structures without any surgical stents. Anterior nasal spine, canine fossa, maxillary tuberosity, etc. can be anatomical criteria and must be performed bilaterally to obtain symmetrical results. We would like to present a successful case which is the one-day extraction and immediate reconstruction of full-arch implantation based on anatomical structures without the surgical stent.

CASE REPORT

The maxilla of the patient was edentulous with only #11, 13, 22 retained roots and both maxillary sinuses were in a pneumatization state with the bone level of 3~4 mm based on alveolar

crest (Figure 1, 2). The immediate extraction and implant installation were conducted on the first visit with the reference to anatomical structures without a surgical stent.

Even in the case of an operation with a surgical stent, full-mouth operation is conducted by only checking the location of #13, 23, which are the most important landmarks of implant installation. Therefore, full-mouth implant installation could be easily conducted by identifying anatomical structures.

Under local anesthesia, we opened one flap from #17 to #27 and extracted the retained roots (Figure 3). By using an EO gas-sterilized pencil, we checked anatomical landmarks on alveolar bone surface with reference to anterior nasal spine (ANS), intermaxillary suture, canine fossa, and maxillary tuberosity.

We marked the midline from ANS along intermaxillary suture and marked the distal border on both canine fossa. 2 mm mesial from the point, we set the installation location (Figure 4). After setting both intermaxillary suture and canine fossa lines parallel, we formed holes on #13 and #23 with point drill and 2.0-diameter drill. Afterwards, with guide pins, panoramic photo was taken to check the proper location. Then, with a ster-

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ilized pencil, we marked the location of #14~16, #24~26, and lateral walls of maxillary sinuses (Figure 5).

After marking all important anatomical landmarks, we

opened lateral walls of both maxillary sinuses with sinus bur and a handpiece. Sinus mucosal elevation without any perforation was also conducted with sinus elevator and sinus curette.

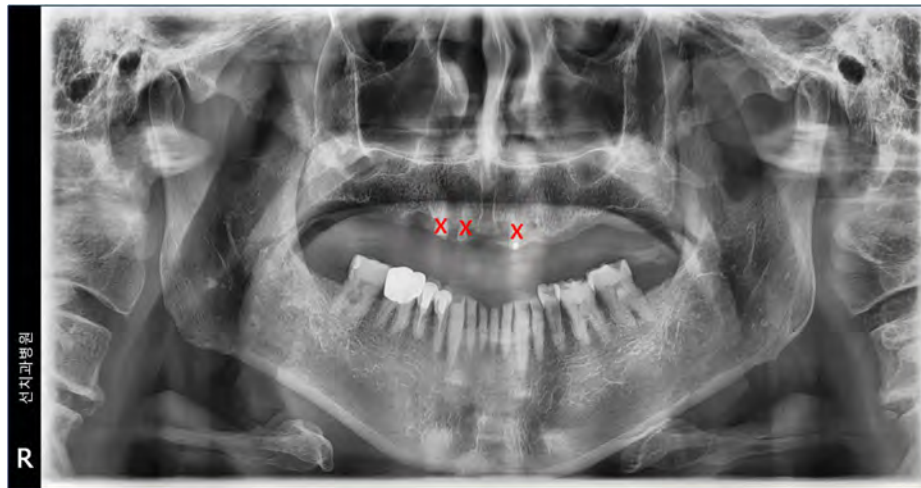
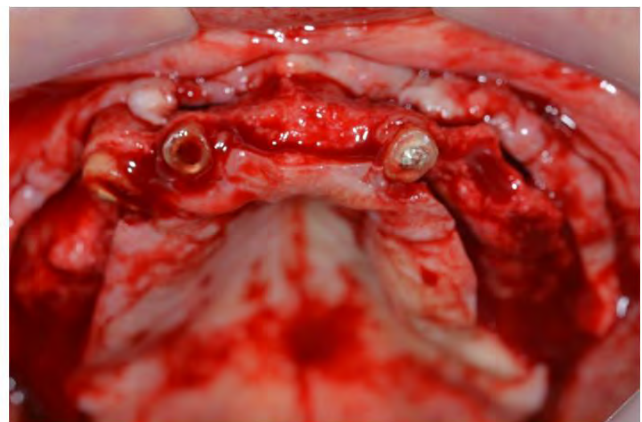
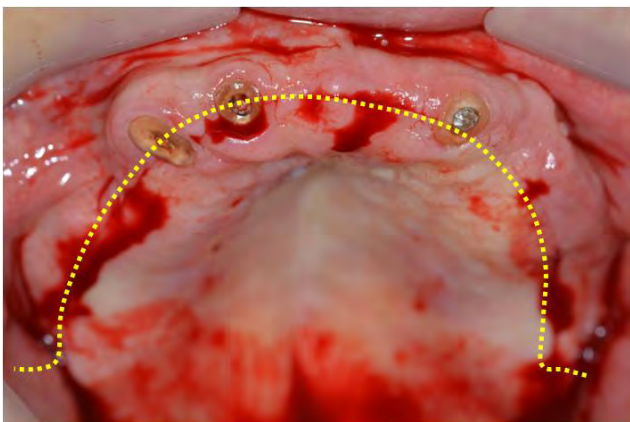


Figure 1. 1st visit panorama.

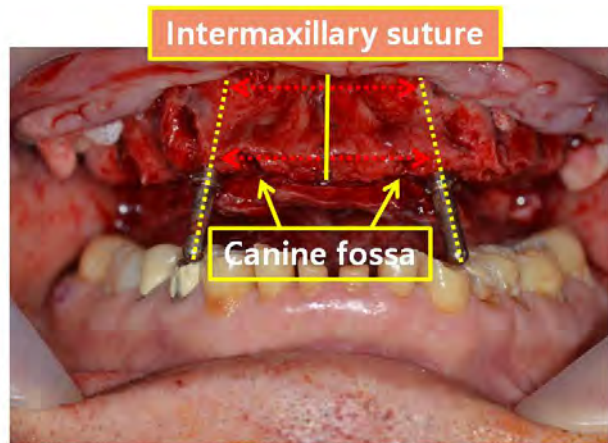


Figure 2. 1st visit intra-oral view.



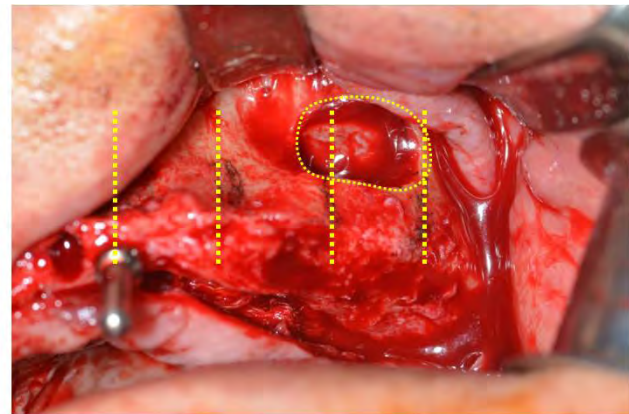
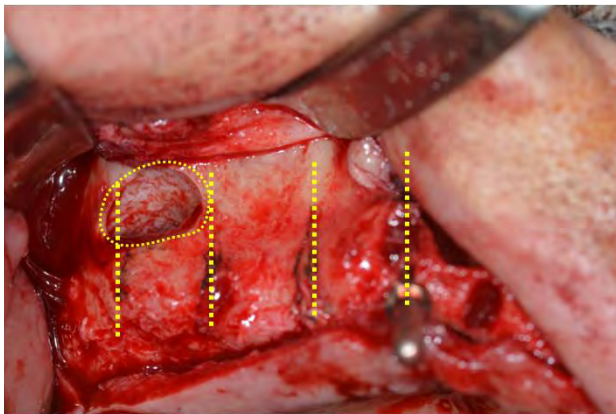
#17~#27 Vertical incision , single flap elevation and residual teeth extraction

Figure 3. Flap design and elevation after extraction of root rest.



- Reference line marking with EO gas sterilized pencil : Intermaxillary suture, Canine fossa, Maxillary tuberosity
- Mid line marking along intermaxillary suture on ANS
- Distal border line marking on both canine fossa and #13, #23 location on mesial side

Figure 4. Anatomical landmark (anterior maxilla).



- Distal border line marking on both canine fossa and #13, #23 location on mesial side
- #14,15,16, and #24,25,26 location and marking of lateral wall

Figure 5. Anatomical landmark (posterior maxilla).



BMP + Lidocain



BMP + Lidocain + Bone + Fibrin glue

Figure 6. Bone graft material preparation.

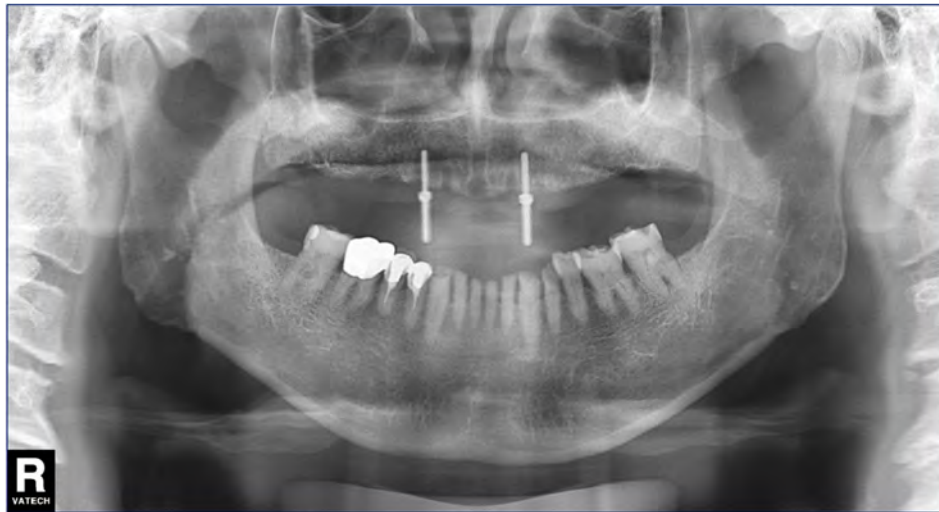
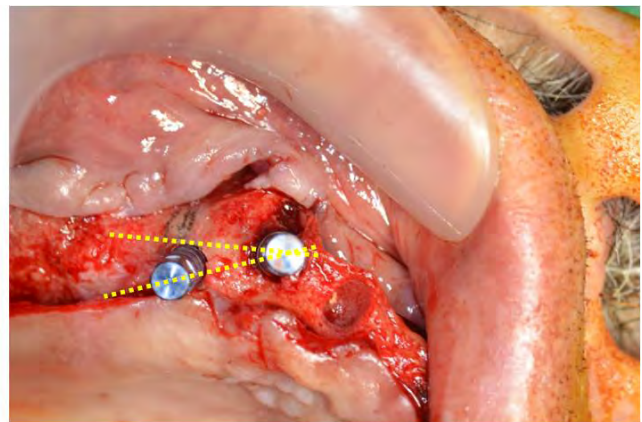
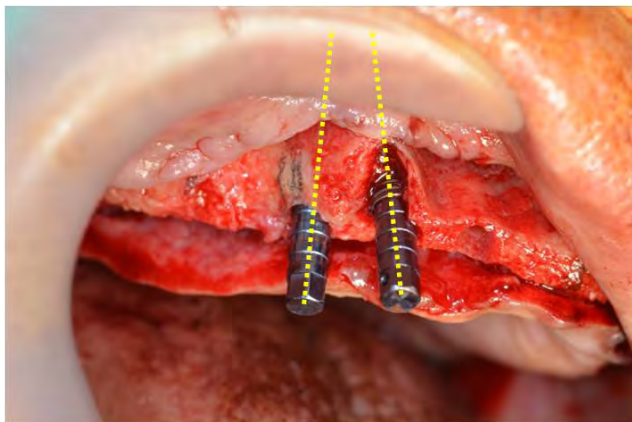
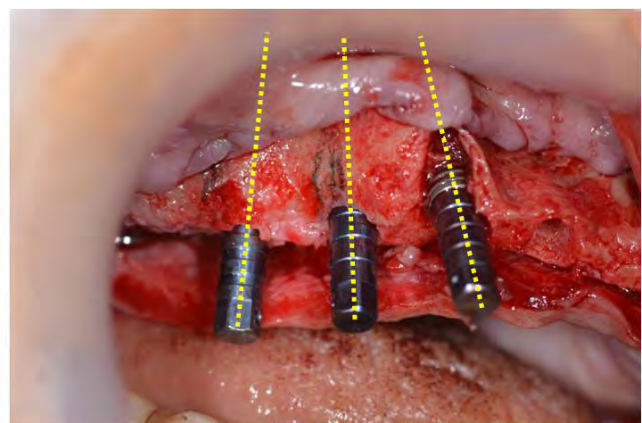
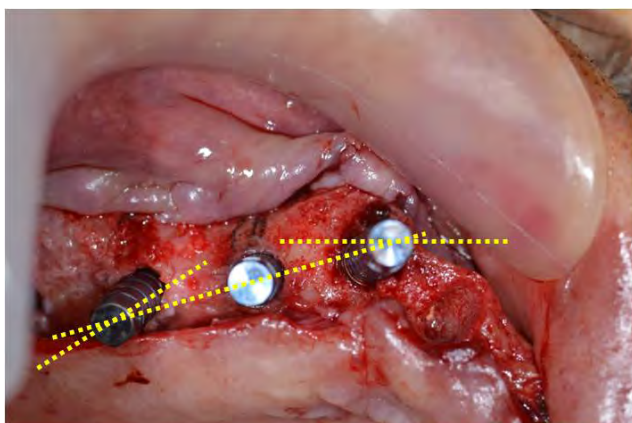


Figure 7. Guide pin panorama.



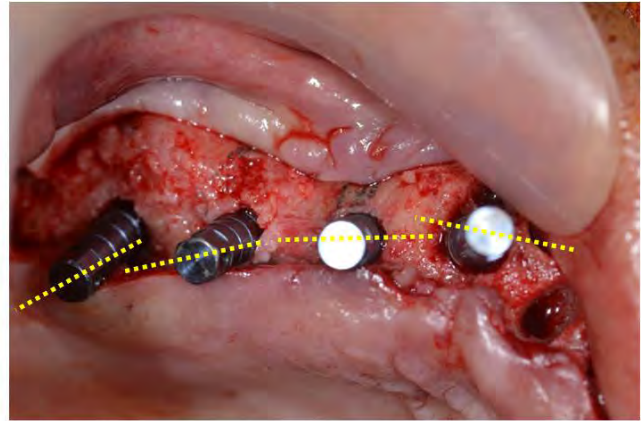
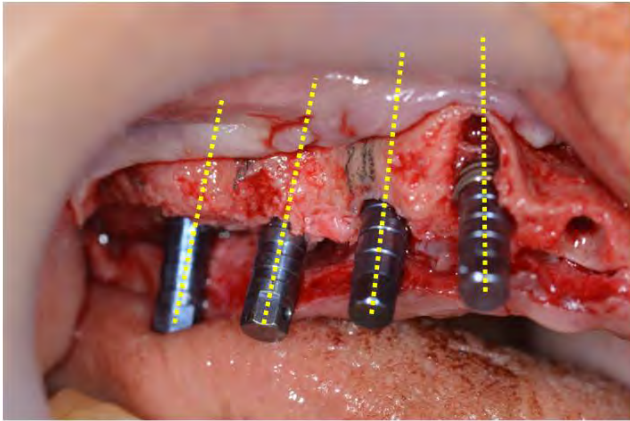
#14 implantation, orienting 10° to distal and 10° to palatal based on #13.

Figure 8. Direction and angulation formation of implant (#13,#14, Dio UV, Dio implant, Seoul, Korea).



**#14 implantation, orienting 10° to distal and 10° to palatal based on #13.
#15 implantation, orienting 10° to distal and 10° to palatal based on #14.**

Figure 9. Direction and angulation formation of implant (#14,#15, Dio UV, Dio implant, Seoul, Korea).



**#14 implantation, orienting 10° to distal and 10° to palatal based on #13.
 #15 implantation, orienting 10° to distal and 10° to palatal based on #14.
 #16 implantation, orienting 10° to distal and 10° to palatal based on #15.**

Figure 10. Direction and angulation formation of implant (#15, #16, Dio UV, Dio implant, Seoul, Korea).

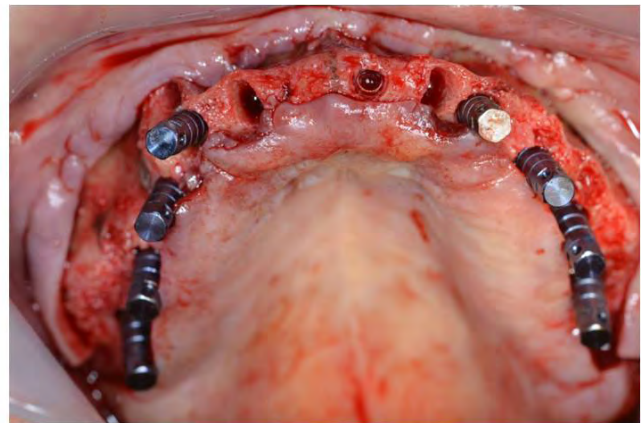
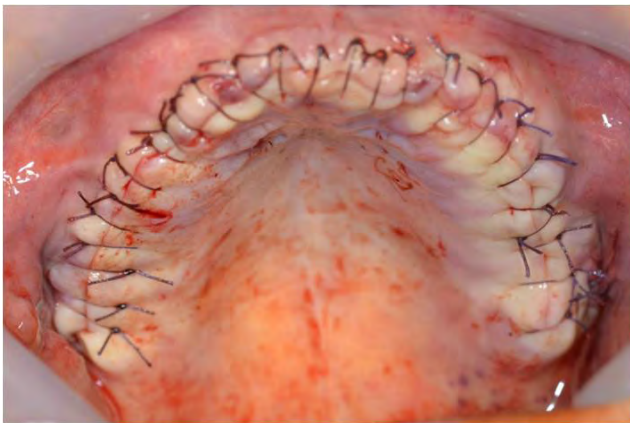


Figure 11. After 1st operation intra-oral view.

Heterogeneous bone graft material (EQUIMATRIX, NIBEC, Seoul, Korea), Fibrin Glue (TISSEEL, Baxter, Wien, Austria), Lidocaine (1:100,000, Huons, Seoul, Korea), and Bone Morphogenic Protein (NOVOSIS, Daewoong Pharmaceutical, Seoul, Korea) were mixed and sinus bone graft was completed (Figure 6, 7).

Implant (Dio-UV, Dio, Seoul, Korea) was installed at #13 and another implant at #14 was placed orienting 10° to distal and 10° to palatal according to #13 (Figure 8). With the same method, #15 and #16 were installed based on the location of #14 and #15 respectively (Figure 9, 10).

By setting #23 as a standard, we placed #24, 25, and 26 with the same pattern. To determine the direction of each implant, occlusion pattern and the Curve of Spee of maxilla and mandi-

ble were considered.

Lastly, we installed an implant at #21 which had better alveolar bone condition than #11 (Figure 11).

Finally, additional ridge augmentation was conducted at the site with inadequate bone level and the operation was finished after suturing each site (Figure 12).

Second surgery was conducted 5 months after the first surgery and the ISQ value was measured with Ostell mentor. The values of each implant on maxilla were over 80 (Figure 13, 14).

Intra-oral scan was taken with TRIOS III scanner (3shape TRIOS, Copenhagen, Denmark) and an intra-oral model was printed by 3D printer (Cara printer, Kulzer Korea, Seoul, Korea). We tried in abutment on the model and completed the temporary crown (Figure 15).

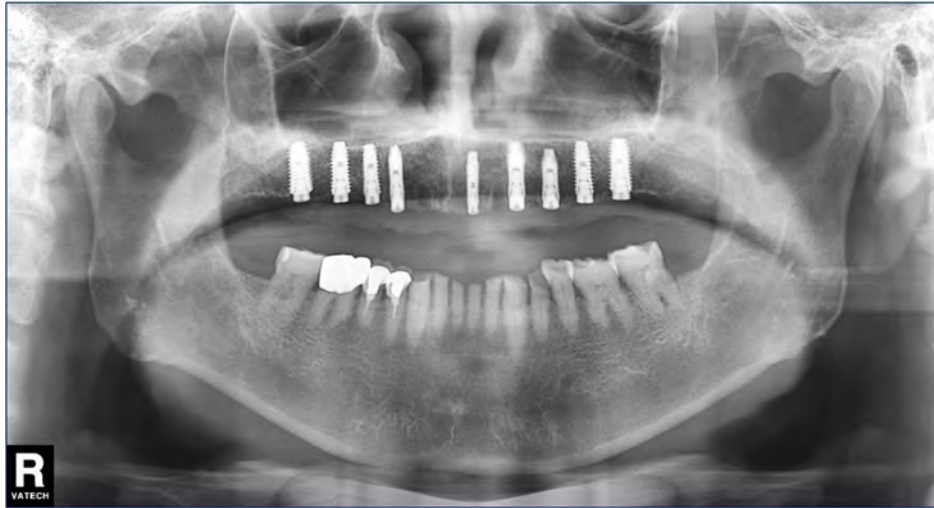


Figure 12. 1st operation panorama.



Figure 13. After 2nd operation intra-oral view.

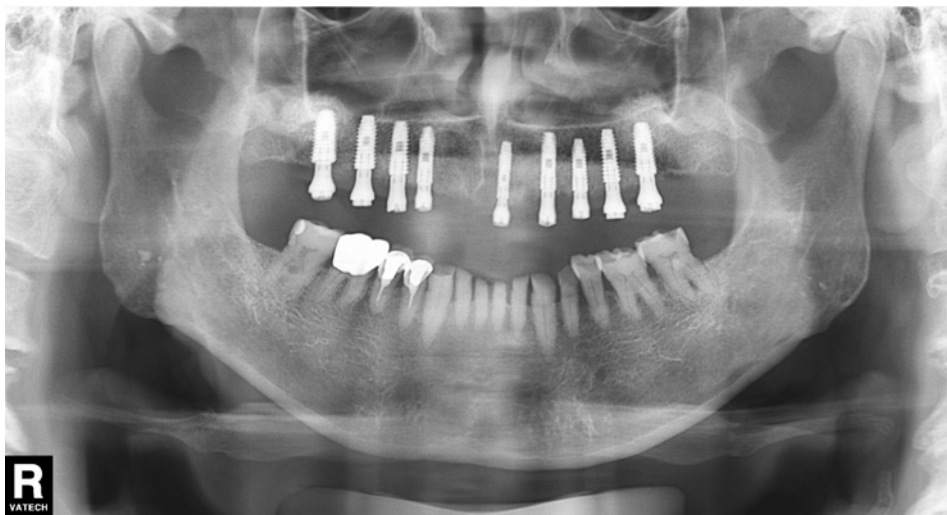


Figure 14. 2nd operation panorama.



Figure 15. Print out intra-oral model & temporary crown.



Figure 16. Temporary crown connection panorama.



Figure 17. Final zirconia crown connection intra-oral view (coronal).



Figure 18. Final zirconia crown connection intra-oral view (axial).



Figure 19. Final zirconia crown connection panorama.

Occlusion force was applied for 8 weeks with temporary crowns and the temporary crowns were replaced by final zirconia crowns after fine occlusal adjustment (Figure 16).

6 mandibular incisors were restored with zirconia crowns after the endodontic treatment in order to obtain stable occlusion (Figure 17~19).

DISCUSSION

The advantages of guide implant surgery using surgical stent have been discussed through several studies^{1,2}. Implant surgery with Surgical stent shows higher accuracy than implant surgery without surgical stent, and this exact implant positioning reduces the risk of complications in implant surgery³. It also has the advantage of reducing the exchange rate of complications

through minimally invasive surgery.

However, implant surgery using surgical stent requires digital implant planning and CBCT image analysis through digital waxing before surgery⁴. Due to these factors, surgery using surgical stent takes a lot of time and additional cost⁵⁻⁷. Therefore, it is impossible for a surgeon to use a surgical stent when performing full-arch implantation of a patient on the same day. In this case, the patient who visited the hospital on the same day was reconstructed by immediately installing the implant. Therefore, the position of the implants was established based on the anatomical structure without the surgical stent. Anterior nasal spine (ANS), intermaxillary suture, canine fossa, and maxillary tuberosity were established on an anatomical basis, and implantation was carried out bilaterally to obtain symmetrical results.

CONCLUSION

A surgical stent based on CT images is essential to obtain stable surgical results and occlusion. However, even if implantation is carried out in the absence of a surgical stent due to various requirements such as cost and time limitation, successful surgery results can be obtained if the implant is operated based on the surrounding anatomical structure.

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