

An implant-assisted removable partial denture in a severely resorbed partially edentulous mandible; A case report

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An implant-assisted removable partial denture have some advantages for stabilizing the removable partial dentures in vertical direction, providing comfort, maintaining oral hygiene and alveolar ridge, and increasing masticatory satisfaction. The objective of this article is to present a case report of a mandibular implant-assisted removable partial denture in a severely resorbed partially edentulous patient. In this case, a 47-year-old male patient showed mobile mandibular anterior teeth and several missing teeth. The implant-assisted removable partial denture with surveyed prostheses was determined to rehabilitate mandibular teeth. With implant surveyed prostheses in left and right side, the stability of removable partial denture was increased and the patient was satisfied with the treatment. (THE JOURNAL OF KOREAN ACADEMY OF OSSEOINTEGRATION 2023;15(1):10-17)

Key words: Implant, Removable partial denture

INTRODUCTION

Implant-supported fixed restorations are predictable treatment options and have a good prognosis for partially edentulous patients¹. However, in situations with multiple missing teeth, severe alveolar bone loss, financial limitations, or systemic conditions, these are not always primary treatment options². For the situations, a removable partial denture using dental implants can be an effective alternative option³⁻⁵. It is called as an implant-assisted removable partial denture (IARPD)⁶. There are some advantages for using implants, such as stabilizing the removable partial dentures in vertical direction, providing comfort, maintaining oral hygiene and alveolar ridge, and increasing masticatory satisfaction^{5,7}. The implants could be used with healing abutment and attachments⁸. Also, implant surveyed prostheses are another option, providing support and retention⁹. Moreover, some prospective clinical studies recommend the use of the implant surveyed prostheses for RPD over that of conventional RPD, as improving chewing capacity and patient satisfaction^{10,11}.

The objective of this article is to present a case report of a mandibular implant-assisted removable partial denture in a severely resorbed partially edentulous patient.

CASE REPORT

A 47-year-old male patient presented Prosthodontics clinic in Seoul St' Mary's Hospital of Catholic University of Korea with the chief complaints of extraction on his mobile anterior teeth and to rehabilitate maxillary and mandibular teeth (Figure 1). The patient's medical history was irreversible dilated cardiomyopathy, heart failure, hyperlipidemia and atrial fibrillation. According to intraoral examination and radiographic examination, it was found that there were root remnant of mandibular first premolar on the right, alveolar bone loss and grade 3 mobility on mandibular canine on the right, grade 2 mobility of mandibular central incisor, and grade 3 mobility of mandibular lateral incisor on the left. The patient had a maxillary provisional denture and provisional crowns on maxillary right second molar and maxillary right canine. Moreover, there was no implant prosthesis over implant abutment on mandibular right second molar implant fixture.

There were two treatment options on mandibular restoration; mandibular IARPD or mandibular fixed partial denture. As for the maxillary restoration, conventional removable partial denture with #17, 13 crown was planned. First

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of all, #44, 43, 31, 32 teeth were extracted (Figure 2) and #45 implant provisional crown and mandibular provisional denture were fabricated (Figure 3). After 3 months, CBCT was taken and implant guide program (One-guide, Osstem) was used for determining treatment plan and position of the implants and fabricating stent for guide surgery (Figure 4). As the narrow bucco-lingual width on mandibular anterior was observed, mandibular IARPD with #45, 46, 47 implants was decided as the final treatment plan. The Osstem TSIII SA 5.0 x 10.0 mm fixtures were placed on #46 and 47 area with guide stent and instrument. After 3 months of osseointegration period, the restorative procedures were performed. The final impressions for #17, 13 surveyed crown, #46, 47 implant surveyed bridge, and #45 implant surveyed crown were performed. The wax-up for the crowns were tried to the patient for checking the fit, vertical dimension, and esthetics (Figure 5). The final prostheses for the crowns were fabricated (Figure 6). With the final surveyed crowns, the final impression for maxillary RPD and mandibular IARPD were performed (Figure 7). The maxillary RPD design in-

cluded full palatal plate major framework, #17 mesial rest, #13 cingulum rest, #17 mesial Akers clasp, #13 distal combination clasp, and guiding plane on #13 distal and mesial, and #17 mesial. The mandibular implant-retained removable partial denture design included linguoplate major framework, #47i distal rest, #46i mesial rest for indirect retainer, #45i mesial rest, #33 cingulum rest, #34 mesial rest for indirect retainer, #35 mesial rest for indirect retainer, #37 mesial rest, #47i distal Akers clasp, #45i mesial RPA clasp, #33 mesial combination clasp, and #37 distal Akers clasp. The removable partial denture framework was examined for adaptation and centric relation was recorded. The artificial teeth were arranged and evaluated intraorally (Figure 8). The maxillary RPD and mandibular IARPD were completed and delivered after occlusal adjustment (Figures 9, 10). The patient showed satisfaction regarding the retention and function of the denture.

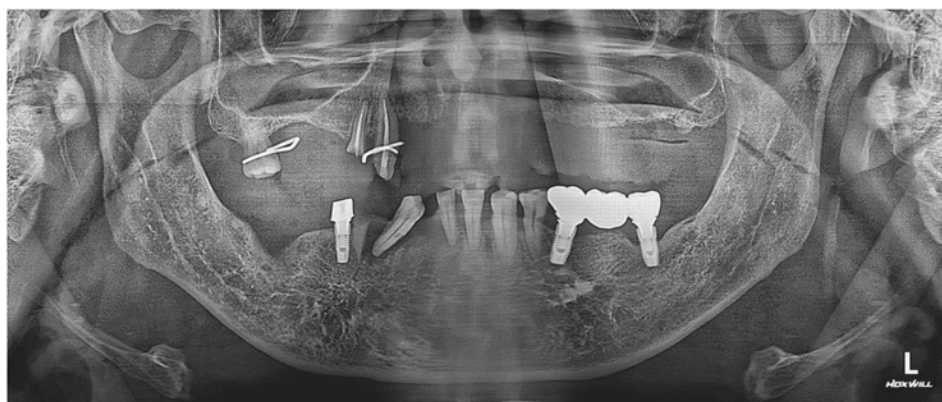


Figure 1. Panoramic radiograph on the first visit.

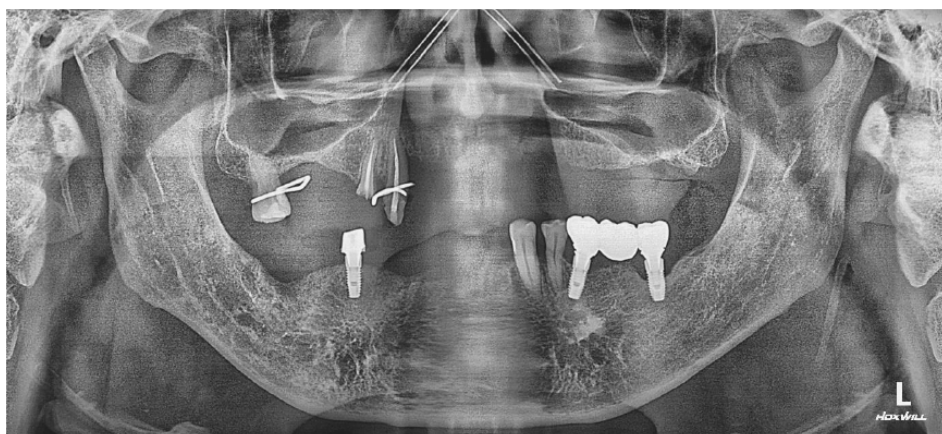


Figure 2. Panoramic radiograph after extraction of #44, 43, 31, 32 teeth.

(a) Frontal view



(b) Lateral view

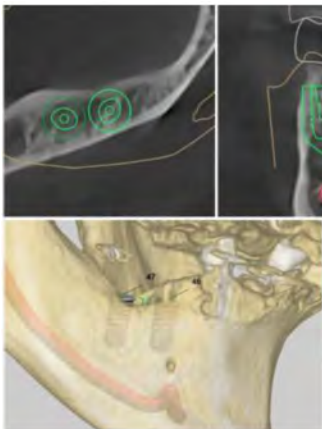


(c) Occlusal view



Figure 3. Maxillary and mandibular provisional denture.

(a) The position for #46 implant



(b) The position for #47 implant

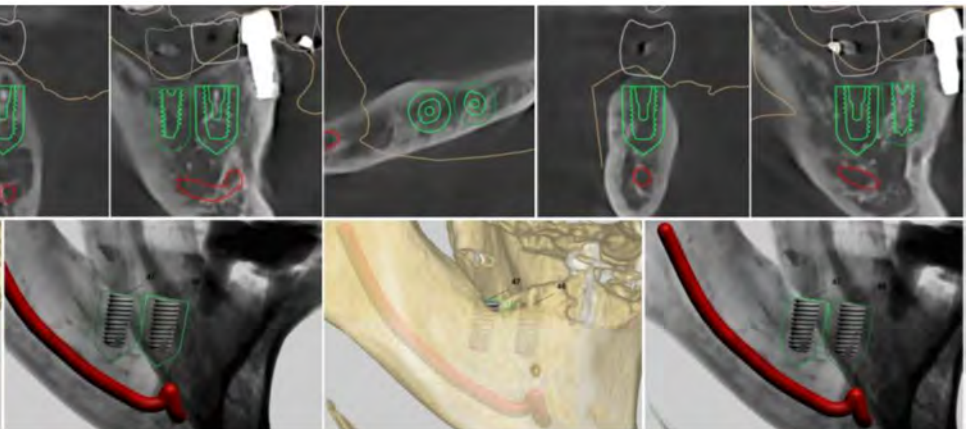


Figure 4. CT image for implant placement planning.

(a) Frontal view



(b) Lateral view



(c) Occlusal view



Figure 5. Wax-up crowns try-in.

DISCUSSION

Implant-assisted RPDs can improve the stability of RPD and patient satisfaction by increasing supporting teeth and preventing bone resorption. Some studies have reported biological and prosthetic complications of IARPDs with surveyed prostheses¹²⁻¹⁵. Biological complications include sore spots around major connectors and denture bases, loss of opposing teeth due to frac-

ture, alveolar bone resorption below the denture bases, greater marginal bone loss around dental implants with 2 threads exposed, and disintegration of dental implants¹²⁻¹⁵. Prosthetic complications include screw fracture, screw loosening, detached implant-supported surveyed single crowns due to loss of temporary cement, clasp loosening, crown veneer fracture, and fracture of artificial tooth, clasp, and rest of RPDs¹²⁻¹⁵. Moreover, the effective position of implant has been reported. Yuseung et al con-

(a) Frontal view



(b) Lateral view



(c) Occlusal view



Figure 6. Definitive prostheses of maxillary surveyed crown and mandibular implant surveyed fixed restorations.

cluded implant abutments adjacent to the natural tooth showed higher success rates than those distant from the natural teeth¹⁶. Octavi et al reported positioning implant in the first molar could improve biomechanical behavior of implant-assisted partial removable dental prosthesis¹⁷.

CONCLUSION

Implant-assisted RPD with supported prostheses could be a predictable and effective treatment option to improving support, stability and patient satisfaction.

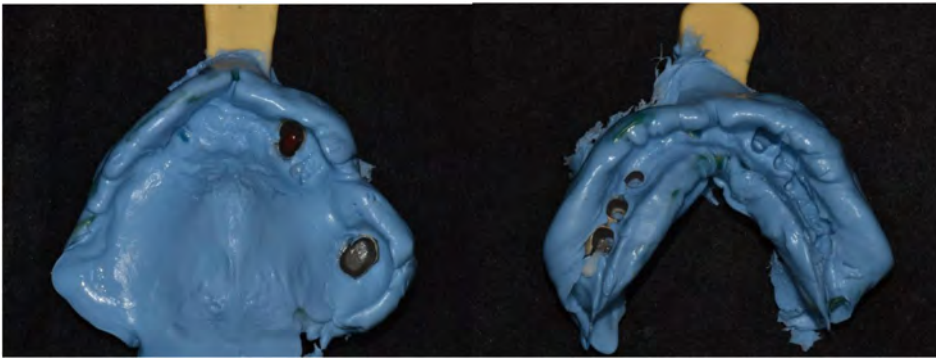


Figure 7. Final impression for maxillary RPD and mandibular IARPD.

(a) Frontal view



(b) Lateral view



(c) Occlusal view



Figure 8. Wax denture try-in.

(a) Frontal view



(b) Lateral view



(c) Occlusal view



Figure 9. Definitive dentures.

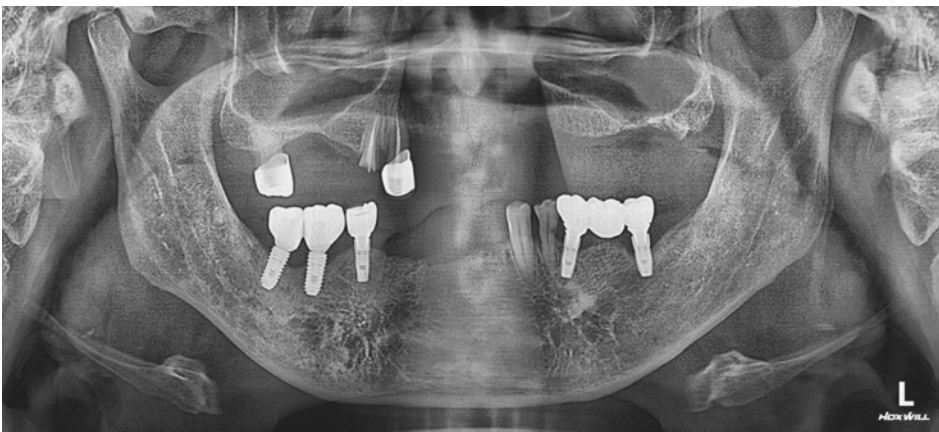


Figure 10. Panoramic radiograph after definitive prosthesis delivery.

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