

A case of implant-retained removable partial denture treatment in crossed occlusion with severely resorbed mandibular alveolar bone

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An crossed occlusion is an occlusion condition in which residual teeth exist both in maxilla and mandible but do not form an occlusal contact. In the crossed occlusion situation, the removable prosthesis is vulnerable to rotation, which can lead to unstable occlusion, resorption of the supporting alveolar bone, and supraeruption of the remaining teeth. One of the treatment methods for such crossed occlusion is to place an implant in the proper edentulous area to regain the occlusal support. This case report describes an implant-retained removal partial denture (IRRPD) treatment in crossed occlusion with severely resorbed mandibular alveolar bone with successful results. (THE JOURNAL OF KOREAN ACADEMY OF OSSEOINTEGRATION 2022;14(1):1-7)

Key words: Implant, Implant-retained removable partial denture, Removable partial denture, Crossed occlusion

INTRODUCTION

An occlusal condition in which residual teeth exist both in maxilla and mandible but do not form an occlusion due to no contact is often called as crossed occlusion situation. Removable partial dentures in crossed occlusion situation will have mandibular denture opposing maxillary dentition and maxillary denture opposing mandibular dentition¹⁻³. As a result, any removable prosthesis delivered on the crossed occlusion will solely depend on mucosal support. In the crossed occlusion situation, the removable prosthesis is vulnerable to rotation, which can lead to unstable occlusion, resorption of the supporting alveolar bone, and super eruption of the remaining teeth. One of the treatment methods for such crossed occlusion is to restore the occlusal support by placing an implant in the edentulous area to prevent aforementioned consequences. This case report will describe a successful implant-retained removable partial denture treatment case in crossed occlusion with severely resorbed mandibular alveolar bone.

CASE REPORT

A 75 years old female patient presented Prosthodontics clinic in Seoul St' Mary's Hospital of Catholic University of Korea with the chief complaints of mobile tooth on her lower right side.

Upon examination, patient had crossed occlusion and the mandibular right side canine had mobility with grade 2 (Figure 1, 2). Radiographic examination showed severely resorbed mandibular alveolar bone on the right side, which is opposing the maxillary teeth (Figure 3). Patient had little problem with the maxillary removable partial denture other than temporary discomfort on the abutment tooth when patient tried to wear the denture in the morning. The patient did not remember the exact date the dentures were fabricated.

Based on the examinations, the problems were listed as follows. Crossed occlusion, super eruption of the remaining teeth, irregular occlusal plane, severe alveolar resorption of mandible on the right side, generalized occlusal/incisal wear, chronic periodontal disease, and lack of retention of the mandibular removable partial denture.

To address these problems and the patient's chief complaints, a mandibular implant-retained removable partial denture treatment was decided in consultation with the patient. Korea's national health insurance system, which covers up to two implants and the removable partial denture, also influenced the patient's decision. The right mandibular canine and first premolar area was decided as implant placement position in consideration of the crossed occlusion situation and the severe resorption of mandibular alveolar bone in the right side posterior region.

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(a) Frontal view



(b) Lateral view



Figure 1. Pre-operative photographs of the case.

The treatment plan was as follows.

Surgical phase:

1. #43 tooth extraction
2. #43i, 44i implant placement

Restorative phase:

1. #43i-44i surveyed implant fixed bridge
2. Mandibular implant-retained removable partial denture
3. Maxillary removable partial denture hard relined
4. Composite restorations on mandibular incisors

The position and the angle of the implants were carefully determined upon CT radiographic examination with the aid of ra-

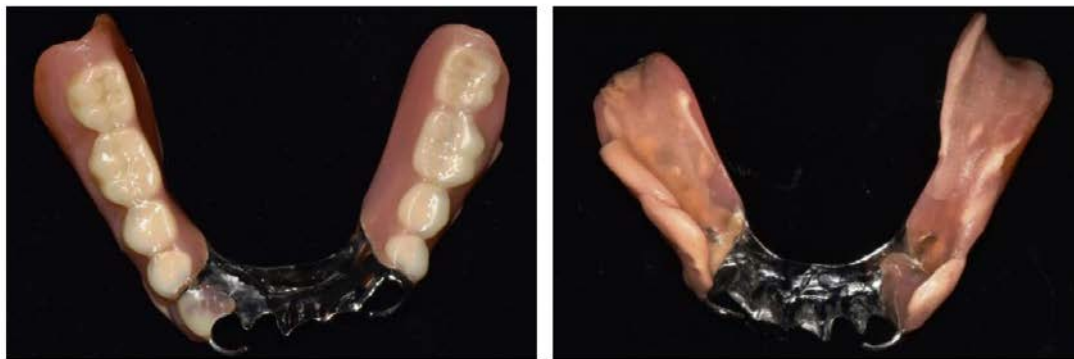
diographic stent (Figure 4). The Osstem TS III SA 4.0 × 10.0 mm fixture was placed on #43 area and the Osstem TS III SA 4.0 × 8.5 mm fixture was placed on #44 area with the aid of prepared surgical stent (Figure 5, 6).

After 3 months of osseointegration period, the restorative procedures were performed. The mandibular implant-retained removable partial denture design included linguoplate major framework, #33 combination clasp, #44i RPA clasp assembly, #44i mesio-occlusal rest, guiding plane on #33 and 44i distal, and lingual rests on #32, 31, 41, 42, 43i for indirect retainer (Figure 7). Both maxillary and mandibular impressions were

(a) Frontal view



(b) Mandibular partial denture



(c) Maxillary partial denture



Figure 2. Pre-operative photographs with existing removable partial denture.

made with alginate and silicone each (Figure 8). A mandibular wax rim was used to register the centric relation at the desired vertical dimension in consideration of restorative space and

occlusal plane (Figure 9). The arbitrary type facebow was used to register the maxillary occlusal plane (Figure 10). The custom abutments for #43i and 44i were milled. The wax-up for the



Figure 3. Pre-operative panoramic radiograph of the case.

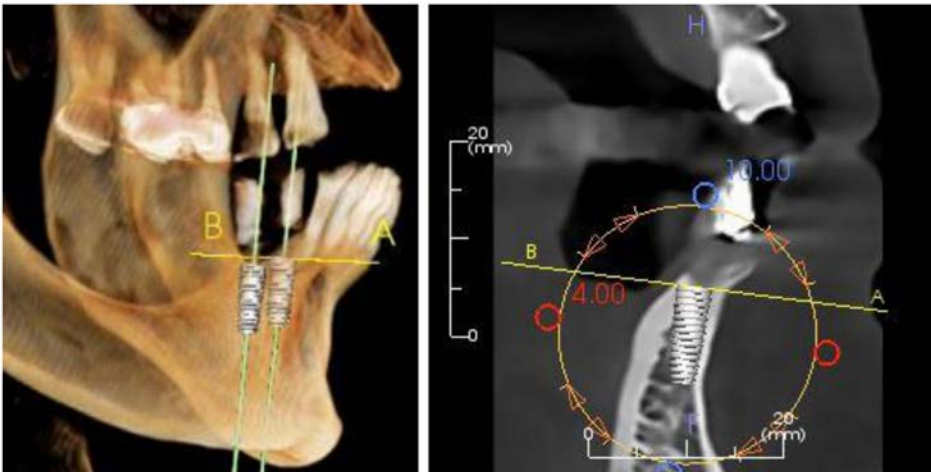


Figure 4. CT scan images for implant placement planning.



Figure 5. Post-surgical panoramic radiograph.

#43i-44i bridge was carved and surveyed (Figure 11). The wax-up was used to cast the metal fused to porcelain bridge framework. After the delivery of the implant abutments and the ce-

ment type bridge (Figure 12), border molding and final impression for the implant-retained removable partial denture was performed (Figure 13). The removable partial denture



Figure 6. Post-surgical photographs of implants.

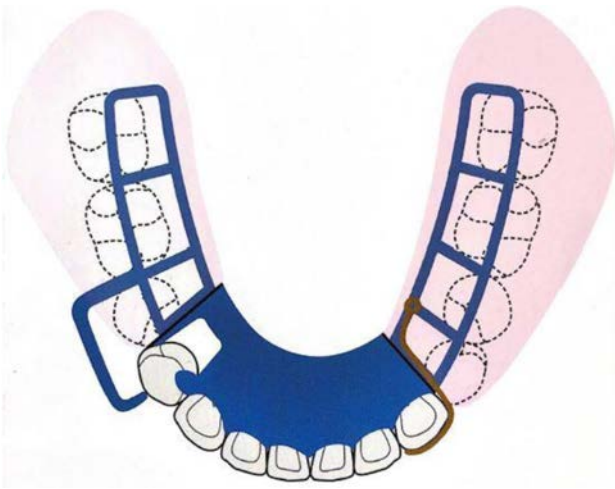


Figure 7. The RPD design.



Figure 8. Final impression.

framework was examined for adaptation, and the occlusion was registered at the same time (Figure 14). And finally, the prostheses were delivered after minor occlusal adjustment (Figure 15).

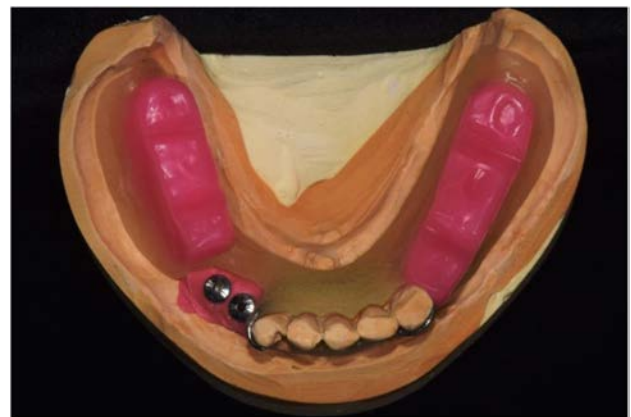


Figure 9. The wax rim for CR registration.



Figure 10. Facebow registration procedure.

The patient showed satisfaction regarding the retention and function of the denture. The treatment was executed without bone augmentation, and within patient's financial limit. The implant restorations provided support to overcome the crossed occlusion situation, and the vertical dimension was increased to compensate the uneven occlusal plane. Long term follow up shall be required to further eval-



Figure 11. The custom milled implant abutments and wax-ups.



Figure 12. The implant abutments and prostheses delivery.

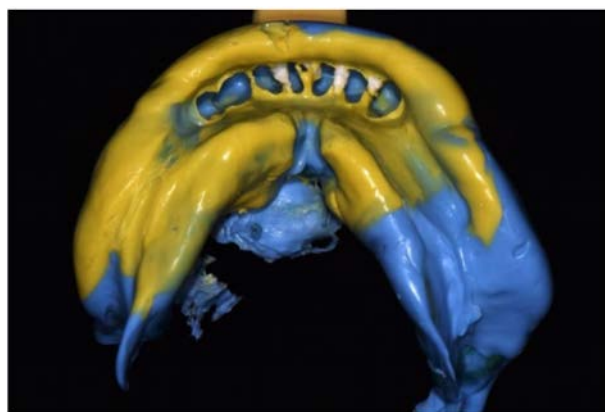


Figure 13. Border molding and final impression for the implant-retained removable partial denture.

uate the success of this treatment.

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Figure 14. Centric relation registration and mounting procedure.

(a) Frontal view



(b) Lateral view



(d) Maxillary and mandibular occlusal view



Figure 15. Post-operative photographs.