

## **A case rehabilitated using overdentures with magnetic attachments for a partially edentulous patient with severe periodontal disease**

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### **Abstract**

The patient was a 71-year-old partially edentulous patient suffering from masticatory disturbance caused by a reduction of occlusal contacts in posterior regions and severe tooth mobility with severe periodontitis. Treatment dentures were delivered to maintain oral functions and initial periodontal therapy was performed, followed by rehabilitation with maxillary overdenture and mandibular clasp-retained removable partial denture placement as the definitive prosthodontic treatment. By application of magnetic attachments incorporated in an overdenture, the disarranged occlusal plane was corrected and denture stability was achieved. Based on the oral health impact profile (OHIP-14) assessment, the oral health-related quality of life (OHRQoL) of the patient was improved with the prosthodontic treatment.

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### **Introduction**

There are several factors that make a prosthodontic treatment clinically difficult as follows: abnormal bone resorption after tooth extraction with severe periodontitis; flabby tissue with combination syndrome<sup>1)</sup>; and difficulty in acquiring overdenture stability with severe displacements of remaining teeth. For the cases with those factors, an application of magnetic attachment would help to stabilize overdenture while saving remaining teeth and protecting residual ridge. In this case, magnetic attachments were incorporated into an overdenture to reconstruct a partially edentulous dental arch with severe periodontal disease, and the patient's satisfaction was obtained.

### **Clinical history**

The patient was a 71-year-old male without any systemic health problems who claimed difficulty in eating due to a reduction of occlusal contacts in posterior regions. Over the past 20 years, posterior teeth had been lost and the patient had undergone dental therapy. For several months, he had realized the remaining teeth mobility. Figure 1 reveals the intraoral views and Figure 2 reveals a panoramic radiograph at the first visit (8th July 2020), while the periodontal assessment is shown in Figure 3. The remaining teeth were #11, #12, #13, #16, #17, #22, #23, and #25 in maxillary and #31, #32, #33, #34, #41, #42, and #43 in mandibular (Eichner classification B4 and Miyachi classification Area B). #25 revealed severe caries without a tooth crown. Based on the Miller index of tooth mobility, a fixed bridge restoring #14 and #15 with abutment teeth of #13, #16, and #17 showed a mobility of Grade I as well as #11, #12, #13, #22, #23, #25, #31, #32, #33, #41, #42, and #43. Meanwhile, #44 revealed a mobility of Grade II. Additionally, the alveolar bone resorption was severe, resulting in a diagnosis of severe periodontitis. Especially in #16 and #17, the attachment loss

reached the root apex, while reaching at half or two-thirds of the root length in #22, #23, #25, and #44. The occlusal plane was disarranged with the extruded remaining teeth (#11, #12, and #22). The disease type classification of the Japan Prosthodontic Society was level II<sup>2)</sup>. Based on the lower facial height and freeway space, the occlusal vertical dimension (OVD) was diagnosed to be clinically acceptable. The overall diagnosis was masticatory disturbance caused by a reduction of occlusal contacts in posterior regions and severe tooth mobility with severe periodontitis.



Fig.1 Intraoral views at first visit



mandibular.

To apply magnetic attachments, #11, #12, and #13 were endodontically treated and cut their crowns, followed by modification of the maxillary treatment denture to be an overdenture type with additional artificial teeth. After acquiring the denture stability, #13 was judged not to be accepted for a magnetic attachment abutment tooth due to its severe attachment loss and shortened root length. Therefore, only #11 and #12 were converted to abutment teeth of magnetic attachments (MAGFIT M400, AICHI STEEL CORPORATION, Aichi, Japan), whereas #13 was covered with a composite resin (ESTELITE UNIVERSAL FLOW, Tokuyama Dental Corporation, Tokyo, Japan) and used just as a resin coping. The magnetic attachments were fixed to #11 and #12 with an adhesive resin cement (Super-Bond, Sun Medical Co., Ltd., Shiga, Japan).

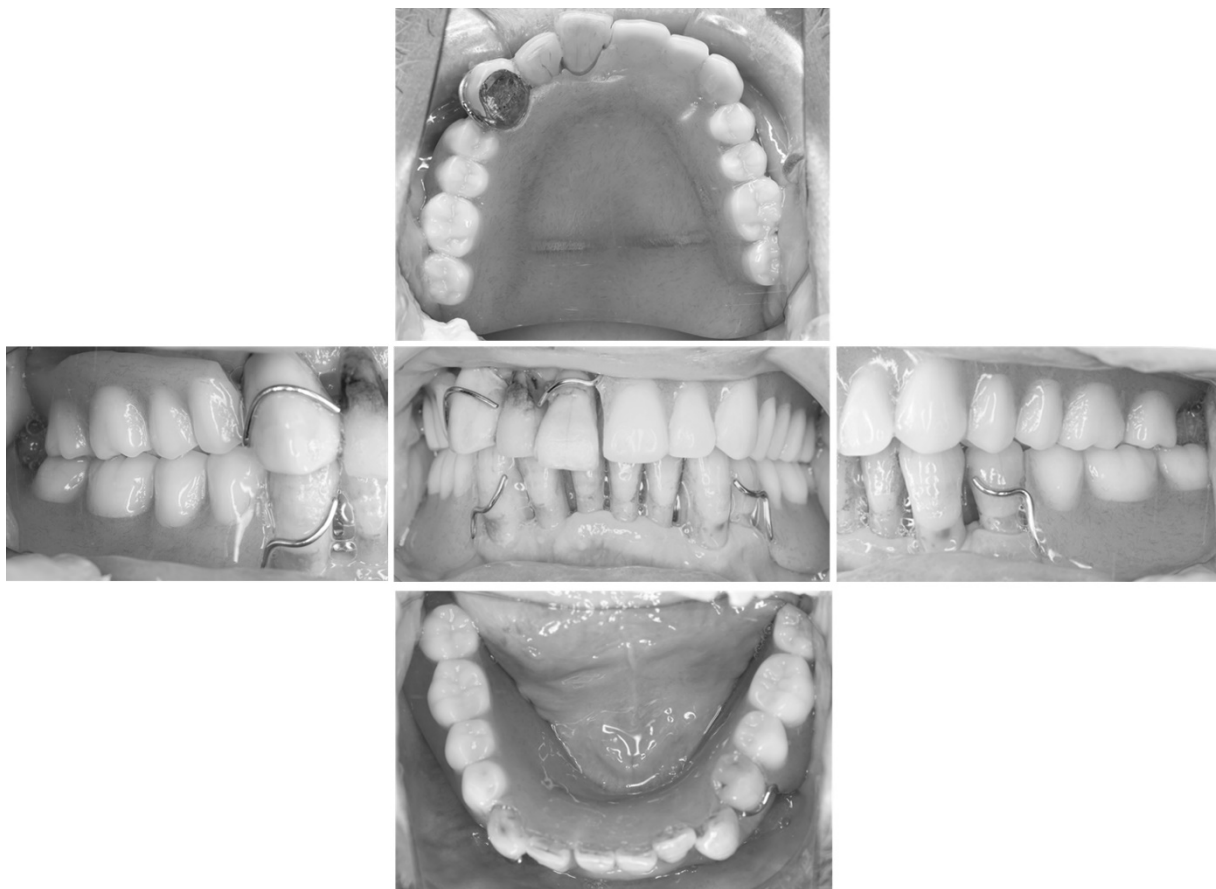


Fig.4 Intraoral views with treatment denture placement





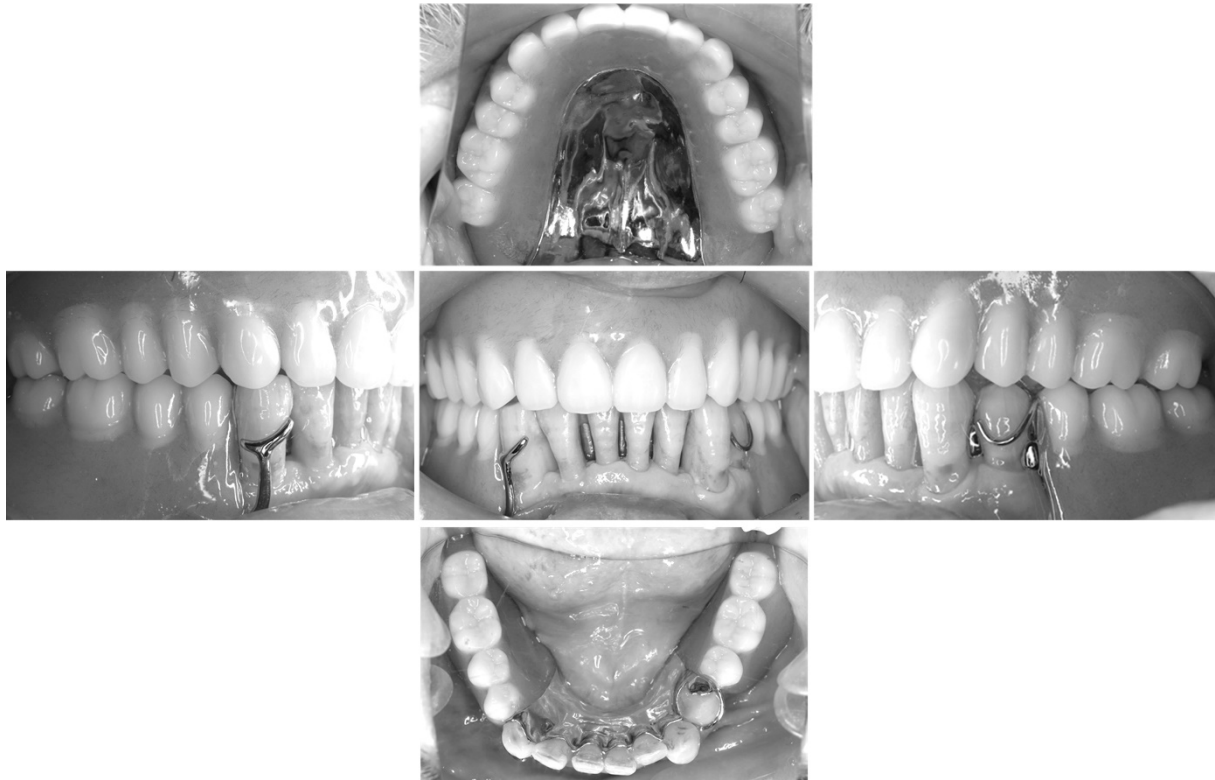


Fig.6 Intraoral views with definitive denture placement

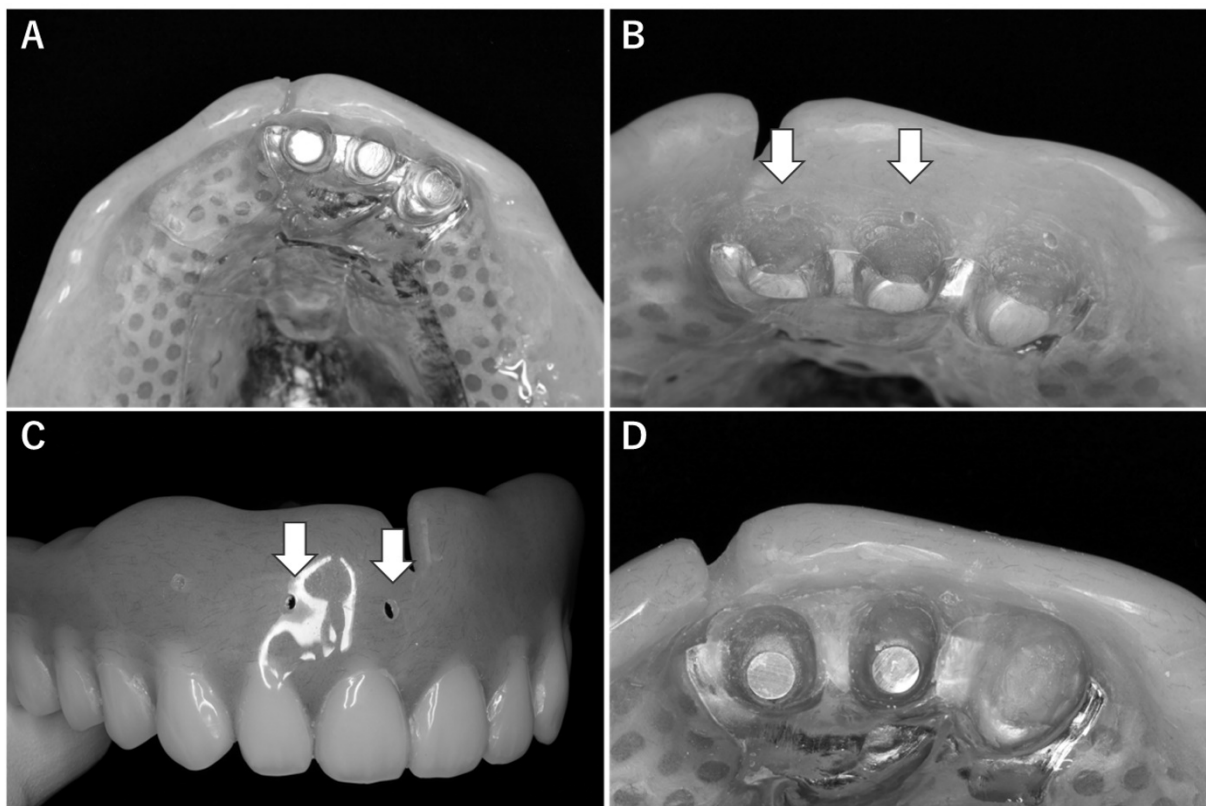


Fig.7 Images of the housing structure in the maxillary definitive denture. A: overall image; B and C: the magnified image of the inner and outer surfaces before magnet placement (arrows reveal spillways); and D: the magnified image of the inner surface after magnet placement.

## **Outcome of treatment**

Using the short version of the oral health impact profile (OHIP-14)<sup>3)</sup>, the oral health-related quality of life (OHRQoL) was assessed both before and after the prosthodontic treatment. The assessment before the treatment revealed an OHIP-14 score of 33 including especially high scores in “physical pain”, “social disability”, and “handicap”. On the other hand, the score after the treatment was 12 including especially low scores in “handicap”, indicating that the prosthodontic treatment with the magnetic attachments was successful based on the subjective assessment of the patient. To date, periodontal and prosthodontic maintenance has been conducted every two months.

## **Discussion**

In this case, the periodontal assessment at the first visit revealed a deep pocket depth and hypermobility in each remaining tooth in the maxillary. Meanwhile, magnetic attachments were applied for #11 and #12 instead of tooth extraction because those teeth had strategic values to be maintained from the prosthodontic viewpoint. Thanks to the magnetic attachments, preferred outcomes have been obtained to date. However, the long-term prognosis of overdenture treatment would depend on several factors, such as the age of patients, habits, occlusal force, and the condition of periodontal tissues of the remaining teeth. To achieve long-term success, in addition to the patient's oral hygiene, clinical follow-up focusing on the occlusal position stability and the artificial teeth wear is necessary to prevent excessive occlusal stress on the anterior region<sup>4)</sup>.

## **Conclusion**

In this case, a partially edentulous dental arch with severe periodontitis and hypermobility of remaining teeth was rehabilitated using maxillary overdenture and mandibular clasp-retained RPD. By application of magnetic attachments incorporated in an overdenture, the disarranged occlusal plane was corrected and denture stability was achieved. Based on the OHIP-14 assessment, the OHRQoL of the patient was improved with the prosthodontic treatment.

## **Acknowledgment**

All the authors of this study would like to thank the patient who willingly consented to publish our treatment for him including his clinical history.

## **Conflict of interest statement**

None.

## **Reference**

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