## A case report of a removable partial denture using a magnetic attachment considering the load-bearing capacity of abutment teeth

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#### Abstract

In this presentation, we report on a case in which two different types of magnetic attachments, depending on the load-bearing capacity of the abutment teeth, were applied to one removable partial denture.

The patient, a 59-year-old male, complained of masticatory dysfunction. He had a partially edentulous maxilla (Kennedy Class II). After the initial preparation, the distal root of the mandibular right second molar was fitted with a coping magnetic attachment in consideration of its load-bearing capacity as an abutment tooth, and we decided to fabricate an extracoronal magnetic attachment using an EC Keeper Tray (GC, Japan) for the mandibular right first and second premolars.

The definitive denture had the first molar as a homemade metal tooth and the second molar as a hard resin tooth (SR-Orthosit-PE, Ivoclar-Vivadent AG, Liechtenstein). In addition, GIGAUSS (GC) was used for a magnetic attachment (the coping type was the D400, and the D600 was applied to the extracoronal type).

### Introduction

Prosthetic treatment options for a partially edentulous maxilla have been increasing in recent years. In particular, many patients choose implant treatment rather than a removable partial denture due to the superiority of chewing efficiency and foreign body sensation (Fig. 1).



However, in Japan, patients with systemic diseases are increasing, and as an alternative to implant treatment, conventional treatment using partial dentures that have "Syoku-Riki" (the ability of predation, mastication and swallowing) is necessary for maintaining patients' QOL, which leads to the extension of healthy life expectancy.<sup>1)</sup>

A magnetic attachment (Fig. 2) can exert stable maintenance power by using the suction force of the magnet for the desorption of the denture at the time of chewing. In addition, it is possible to apply various support devices to the abutment teeth in various conditions, which has various advantages for the elderly, such as easy attachment and removal by the patient. In other words, depending on the application method, denture support device can maintain and improve "Syoku-Riki". In this presentation, we report on a case in which two different types of magnetic attachments, depending on the load-bearing capacity of the abutment teeth, were applied to one removable partial denture.



### **Clinical History**

Clinical History: The patient, a 59-year-old male, complained of masticatory dysfunction. He had a partially edentulous maxilla (Kennedy Class II) and a history of arrhythmia. He complained that he wanted to seat the denture firmly on his right jaw, but he did not want the implant treatment due to his current systemic history.



Treatment Procedure: Based on dental X-ray photographs (Fig. 4) and periodontal disease examination (Fig. 5), the distal root of the mandibular right second molar was fitted with a coping type of magnetic attachment (Fig. 6) in consideration of its load-bearing capacity as an abutment tooth, and we decided to fabricate an extracoronal magnetic attachment using an EC Keeper Tray (GC, Japan) for the mandibular right first and second premolars (Figs. 7 and 8).



Fig. 4 X-ray photographs at the first visit



Fig. 5 Periodontal disease examination at the first visit







Fig. 7 Extracoronal

magnetic attachment



Fig. 8 EC Keeper Tray

After fixing the coping type of magnetic attachment to the oral cavity, the pick-up impression was taken in the oral cavity for making a working model, and a framework of the denture was fabricated on it (Fig. 9). The definitive denture had the first molar as a homemade metal tooth, taking into account the space of the housing portion of the extracoronal magnetic attachment, and the second molar as a hard resin tooth (SR-Orthosit-PE, Ivoclar-Vivadent AG, Liechtenstein) (Fig. 10). In addition, GIGAUSS (GC) was used for a magnetic attachment (the coping type was the D400, and the D600 was applied to the extracoronal attachment).



## Conclusion

Magnetic attachments can be used as support teeth by reducing the lateral pressure as coping types, even if the remaining teeth have problems with the crown-to-root ratio due to the absorption of alveolar bone. In addition, if the crown-to-root ratio is good, it is possible to produce highly stable dentures by having the abutment teeth carry the retention force and bracing force as an external type of crown (Fig. 11).<sup>2)</sup> In this case, we applied these advantages and produced a denture. As a result, OHIP-14, which is related to QOL, was 0 points of the minimum value. By analyzing the amount of glucose discharge during gumi-jelly chewing, mandibular movements were quantitatively evaluated to be 188 mg/dl. Therefore, we were able to produce a prosthesis device that could maintain and improve "Syoku-Riki" (Fig. 12). We plan to confirm the postoperative course while performing regular maintenance in the future.



# References

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