# A case report of a removable denture using magnetic attachment and circumferential clasp followed up for 9 years

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**Abstract**

To reconstruct a harmonious craniofacial system, it is essential to maintain an appropriate occlusal vertical dimension (OVD). This clinical report describes the prognosis of a magnetic attachment denture that improved an immediate denture to maintain an appropriate OVD and the optimum mandibular position. As a definitive prosthesis, a removable maxillary overlay denture was fabricated that included a coping type of magnetic attachment, copings, and circumferential clasps.

Nine years after the denture setting, the definitive prosthesis has been used without serious problems, and the magnetic attachment has no clinically significant loss of retention.

## Introduction

To reconstruct a harmonious craniofacial system, it is essential to maintain an appropriate occlusal vertical dimension(OVD). This clinical report describes the prognosis of a magnetic attachment denture that improved an immediate denture to maintain an appropriate OVD and the optimum mandibular position.

## Clinical History

The patient, a 63-year-old female, complained of masticatory dysfunction. The patient had received a maxillary fixed bridge from tooth #3 to tooth #11 in 1989; however, the restoration failed, having a marginal discrepancy and damage by caries (Fig.1). We did not diagnose infraocclusion by analysis of the OVD. Finally, we suggested fabricating a removable maxillary overlay denture with a coping type of magnetic attachment as a definitive prosthesis by use of an immediate denture to maintain the optimum

Fig.1 Intraoral view at the initial examination

mandibular position, which the patient found acceptable.

## Treatment Procedure

As the first therapy, the incompatible fixed bridge in a marginal portion was removed, and tooth #3 was extracted. Then an immediate maxillary denture was set on a portion of the missing teeth. With the immediate denture, the patient obtained an adequate occlusal relationship and maintained the optimum mandibular position (Fig.2).

Fig.2 Intraoral view with immediate denture

As a definitive prosthesis, the reinforcement structure of the framework for preventing denture base fracture was made to cover about three quarters of the circumference of the magnetic attachment, and protrusion of the labial side was avoided (Fig.3). GIGAUSS C600® (GC, Japan), the magnetic attachment in this case report, was applied to tooth #6. The keeper of the magnetic attachment and magnetic assembly were fixed with adhesive resin cement (Multilink® Automix, Ivoclar Vivadent, Liechtenstein) (Fig.4).

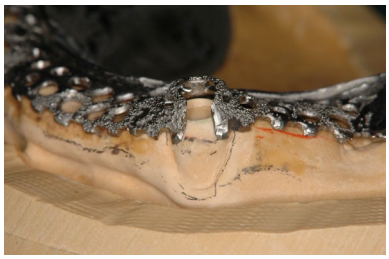

Fig.3 Reinforcement structure of framework

Fig.4 Keeper of the magnetic attachment

A removable maxillary overlay denture was fabricated and included a coping type of magnetic attachment,

Fig.5 Removable maxillary overlay denture

circumferential clasps (wire type), and a horseshoe plate as the major connector. This denture was fabricated with the existing occlusal height and the optimum mandibular position (Fig.5). Figure 6 is an intraoral view of the definitive prosthesis.

Fig.6 Intraoral view with definitive prostheses

## Outcome of Treatment

Presently, 9 years and 7 months have passed since the definitive prosthesis was set (Fig.7). Maintenance was initially performed every month, but since the prognosis was good, it has been changed to every 3 to 4 months after the first year. In addition to PMTC, maintenance included cleaning and cleaning guidance by various cleaning tools such as Taft brushes, disinfection around the branch teeth by chlorhexidine hydrochloride, and the application of plaque dye in the oral cavity and denture every 6 months. At that time, TBI was always performed for #6 (Fig.8). After about 8 years, there was no problem with #6, but secondary caries was observed in #10. There may have been an effect that the maintenance interval became a little longer due to the situation of COVID-19, but it is also possible that too much attention was focused only on cleaning the coping type of magnetic attachment (#6) (Fig.9). In this case, many fulcrum lines could be set because the front, back, left, and right of the abutment teeth could be arranged. In addition, molar abutment teeth with crown morphology have an excellent bracing function as compared to abutment teeth with crown morphology in the form of the root surface, and it seems that the burden of the coping type of magnetic attachment for #6 was reduced (Fig.10).

Fig. 7 Intraoral view with definitive prosthesis at 9 years after treatment

Fig.8 Maintenance

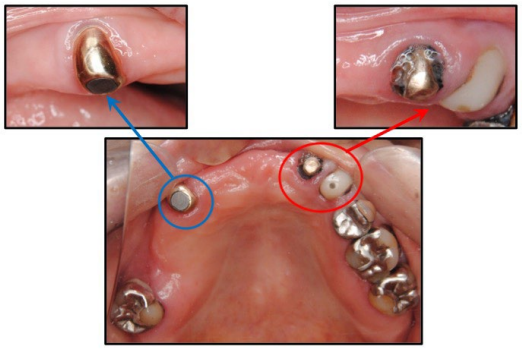

Fig.9 Intraoral view with definitive prosthesis at 8 years after treatment

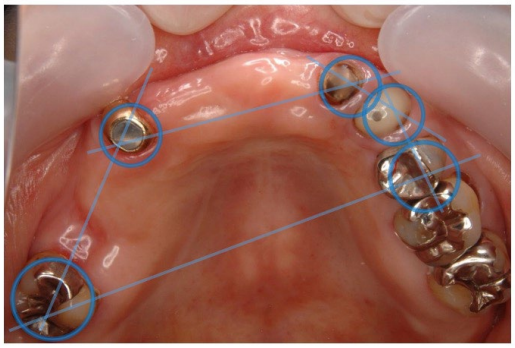

Fig.10 The fulcrum line

## Conclusions

A magnetic attachment could be provided as a useful retentive appliance for alleviating patient complaints regarding aesthetics and function. It is difficult to maintain an ideal combination of aesthetics and functionality because the design of a final prosthesis is complex. Therefore, continuous follow-up is necessary with occlusal adjustment and relining of the denture base to prevent any reduction of the OVD.