

Long-term follow-up cases of magnetic attachment denture with different prosthetic designs

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Introduction

The magnetic attachments can be small and powerful attractive force by using a neodymium magnet which is one of rare earth magnets. This system can be used as abutment teeth by decreasing the lateral force even if crown-root ratio is poor. Therefore, the clinical efficacies of a magnetic attachment have been widely demonstrated^{1,2)}. The most important advantage of the magnetic attachment is that it can be used in the root cap type or MT (Magno telescopic) crown type according to the clinical conditions of the abutment tooth. As a result, it is possible to preserve abutment teeth with maximized support ability by using either type of them, which is considered to have great clinical advantage. This report is a case study of partial denture prosthesis designed with magnetic attachments of the MT (Magno telescopic) crown type for the maxilla and the root cap type for the mandible, which are followed in good condition for a long time.

Summary of the case

Patient is a 71-year-old woman. The chief complaint was to look better, worry about the bite, and not be able to bite things.

Medical history was hypothyroidism. History of present illness was stained teeth, misalignment of the bite, difficulty in biting, and pain in TMJ. After splint treatment at the previous doctor, the TMJ problem was improved. However, in May 2007, the patient requested mastication and aesthetic treatment and thus consulted the department.

In the present illness, many restorations set on the remaining teeth in the maxilla and gingival recession at the margin was observed. In the mandible, as well as in the maxilla, all remaining teeth except for the residual root were set with restorations. 35 of the intermediate defect was set with the fixed partial denture incorporating a bar-type retainer. 45 was a residual root and 46,47 was distal extension missing. The facing of restorations that had been set was discolored. Mandibular tors was found on the lingual of the mandible. In addition, when the removable partial denture was set, it was observed the bite raising (Fig.1).

From panoramic radiographs at the time of initial examination, radiolucency at the apex was observed in 25, 27 and 36, and poor root canal filling was observed in 16 and 26. Poor crown-root ratio was observed in the mandibular anterior teeth region. In addition, incompatibility of the restorations in the maxillary and mandibular molars was observed (Fig.2).

Based on the above findings, it was diagnosed as masticatory disorder due to mandibular molar defect and esthetic disorder due to discoloration of the facing of the maxillary and mandibular fixed



Fig.1 Intraoral views and mandibular removable partial denture at the time of initial examination



Fig.2 Panoramic radiographs at the time of initial examination

partial dentures.

Treatment and progress

Using the occlusal vertical dimension of the old denture as a reference, the study cast was mounted on a semi adjustable articulator and examined. The presence of the vomiting reflex was found in the maxilla during the taking of preliminary impression.

Imaging examination using panoramic radiographs showed a poor crown-root ratio in the remaining mandibular teeth. Then, it was decided to remove all prosthesis for remaining teeth of the mandible and to make treatment denture of overdenture type. Before making the treatment denture, we had to remove the mandibular torus that was thought to cause pain when wearing the denture. Next, the poor prosthesis for the remaining mandibular teeth were removed and treatment denture was set. The maxilla, as well as the mandible, were also set with a provisional bridge after the poor prosthesis were removed. While adjusting the interim prosthesis set on the maxilla and mandible, re-root canal treatment was performed for 15,16,26,27,36,45. 36 of the distal root was treated with hemi section because of poor prognosis.

After re-root canal treatment, the definitive prosthesis was designed (Fig.3). The design of the definitive prosthesis for the maxilla was a removable dental prosthesis with MT (Magno telescopic) crown type using magnetic attachments for the retainer, because the clinical condition of the abutment teeth was good. The reason for making it a removable dental prosthesis was to consider how to deal with 13 defects and the vomiting reflex. In the mandible, considering the clinical condition of the abutment teeth and the crown-root ratio, the overdenture was made with a root cap with keeper as the retainer.

After taking precise impression of the maxillary and mandibular abutment teeth, the inner crown of the MT crown and the root cap with keeper were made. After making the inner crown of the MT crown in the maxilla, pickup impression was taken and the outer crown of the MT crown was made. Then, according to the conventional method, the maxillary and maxillary definitive prosthesis was made (Fig.4,5). In the maxilla, the magnet assembly was set at the time of placement of the definitive prosthesis. In the mandible, one month after the definitive prosthesis was set in place, a magnetic assembly was set on the abutment tooth after checking that there was no pain in the mandibular residual mucous membrane. The fit of the definitive prosthesis was good, and the patient was satisfied both functionally and aesthetically. After that, it was recalled once every three months.

However, one year and three months after the definitive prosthesis was set in place, mobility of teeth 45 and 36, which were of uncertain prognosis, increased. Therefore, it was diagnosed that it was difficult to preserve them, and the teeth were extracted. After healing of the extraction socket, metal plate denture with the two-piece artificial resin tooth was made to improve the rigidity of the denture

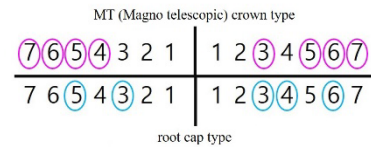


Fig.3 The design of the definitive prosthesis

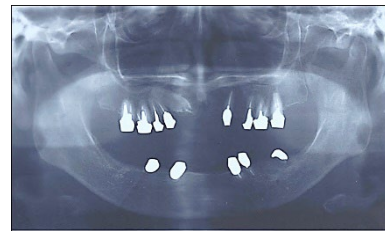


Fig.4 Panoramic radiographs of the inner crown of the MT crown and root cap with keeper (2011.8)



Fig.5 Intraoral view of the definitive prosthesis and placement (2011.8)

and to maintain the stable occlusal relationship (Fig.6). To obtain an occlusal surface in harmony with jaw movement, the two-piece artificial resin tooth was used for about two months. Then, the occlusal surface was replaced with lithium disilicate glass ceramics.

After the metal plate denture was set in the mandible, it was recalled regularly every six months. The purpose of the recall is to manage the periodontal disease of the remaining teeth and to check and adjust the occlusal changes of the denture and remaining teeth. At present, the dentures and remaining teeth are in good condition (Fig.7,8,9,10).

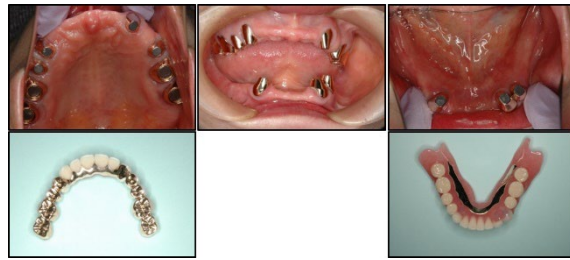


Fig.6 Intraoral view and the prosthesis for maxilla and mandible (2013.7)

Max	0	0	0	0					0	0	0	0
BOP	3	3	3	3					3	4	4	3
PD	3	3	3	3					3	3	3	3
BOP	8	7	6	5	4	3	2	1	1	2	3	4
ISI*	8	7	6	5	4	3	2	1	2	3	4	5
PD	8	7	6	5	4	3	2	1	2	3	4	5
BOP												
Max									0	1		

2015.2

Max	0	0	0	0					0	0	0	0
BOP	4	3	3	3					3	3	3	3
PD	4	3	3	3					3	3	3	3
BOP	8	7	6	5	4	3	2	1	1	2	3	4
ISI*	8	7	6	5	4	3	2	1	2	3	4	5
PD	8	7	6	5	4	3	2	1	2	3	4	5
BOP												
Max									0	1		

2019.2

Max	0	0	0	0					0	0	0	0
BOP	4	3	3	3					3	3	3	3
PD	3	3	3	3					3	3	3	3
BOP	8	7	6	5	4	3	2	1	1	2	3	4
ISI*	8	7	6	5	4	3	2	1	2	3	4	5
PD	8	7	6	5	4	3	2	1	2	3	4	5
BOP												
Max									0	1		

2017.3

Max	0	0	0	0					0	0	0	0
BOP	4	3	3	3					3	3	3	3
PD	4	3	3	3					3	3	3	3
BOP	8	7	6	5	4	3	2	1	1	2	3	4
ISI*	8	7	6	5	4	3	2	1	2	3	4	5
PD	8	7	6	5	4	3	2	1	2	3	4	5
BOP												
Max									0	1		

2021.6

Fig.7 Periodontal conditions



Fig.8 Panoramic radiographs of the current condition (2021.12)



Fig.9 Intraoral view of the prosthesis for maxilla and mandible and placement (2017.6)



Fig.10 Intraoral view of the prosthesis for maxilla and mandible and placement (2021.6)

Conclusions

This time, MT (Magno telescopic) crown type was selected for the retainer in the maxilla, where the clinical conditions of the abutment teeth were relatively good. Since the clinical conditions of the abutment teeth were poor, a root cap type was selected for the retainer in the mandible. Finally, the partial denture prosthesis was designed using different methods of magnetic attachments in the maxilla and mandible.

The most important advantage of the magnetic attachment is that it can be used in the root cap type or MT crown type according to the clinical conditions of the abutment tooth. As a result, it is possible to preserve abutment teeth with maximized support ability by using either type of them, which is considered to have great clinical advantage. Therefore, it is considered that this case had a good long-

term, functional and aesthetic follow-up. The maintenance of the dentures and remaining teeth will be continued with the main purpose of checking and adjusting the occlusal changes.

References

1. Tanaka Y. New Magnetic Attachment –New Prosthetic Treatment using magnets-.1st Ed. Tokyo: Ishiyaku Publishers Inc; 2016.
2. Tanaka Y, Nakamura Y, Hoshiai K. General remarks concerning magnetic attachments in dentistry. Proc Japan Acad; 78(5): 97-105,2002.