A case report of a removable denture using magnetic attachments for a missing mandibular molar with a decreased occlusal vertical dimension followed up for 9 years

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Abstract

This case report describes our establishment of an appropriate OVD for a patient with a decreased OVD to restore the aesthetics and function by the use of magnetic attachments.

As a definitive prosthesis, a maxillary removable overlay denture with coping-type magnetic attachments and a horseshoe plate as the major connector was fabricated, and a mandibular removable partial denture with an extracoronal-type magnetic attachment was also fabricated.

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 maintain a harmonious craniofacial system, it is essential to establish an appropriate occlusal vertical dimension (OVD). [1)] This case report describes our establishment of an appropriate OVD for a patient (missing mandibular molar) with a decreased OVD to restore the aesthetics and function by the use of magnetic attachments.

Clinical History

The patient, a 59-year-old female, complained of aesthetic dissatisfaction and masticatory dysfunction. The patient had a partially edentulous maxilla (Eichner classification :B3, Disease type classification at Japan Prosthodontic Society :1- Ⅰ Level Ⅰ and Occlusal-triangle :area A) (Figs.1, 2, and 3). All fixed prostheses were failed restorations with marginal discrepancies and damaged by caries and periodontal disease. The patient refused to wear a mandibular removable partial denture because of dissatisfaction with a visible metal clasp on the anterior teeth. She was diagnosed with infraocclusion by analysis of OVD.

Fig.1 Intraoral view at the first visit

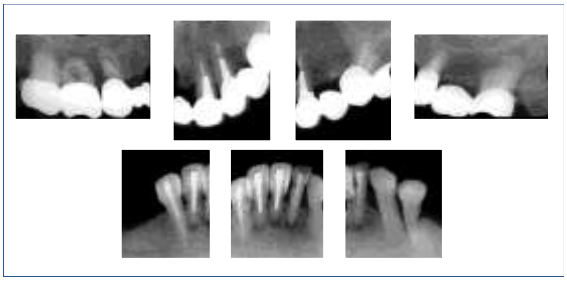

Fig.2 X-ray photographs at the first visit

BOP		○	○	○					○	○					○	
Mobility		1	2	1					1	1					1	
PCR		✕	✕	✕					✕	✕	✕	✕	✕		✕	
EPP		322	234	212					322	223			333		343	
(mm)		422	364	323					322	323			333		444	
Location	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
Location	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
EPP						223	222	212	222		212	343				
(mm)						333	212	111	222		322	323				
PCR						✕	✕	✕	✕		✕	✕				
Mobility						0	1	1	1		0	0				

Fig.3 Periodontal disease examination at the first visit

Treatment Procedure

First, the prosthesis with the marginal discrepancy was removed (Fig.4), and temporary restorations were placed. The 3 and 12 teeth were extracted because of severe caries. After preprosthetic treatment, the OVD was increased by the use of the treatment denture, and the patient obtained an adequate occlusal relationship (Figs.5 and 6).

Fig.4 Intraoral views of removing the prosthesis

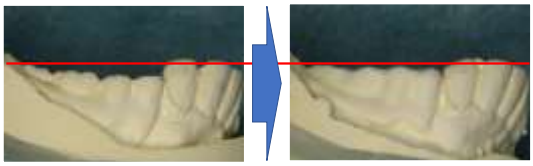

Fig.5 Occlusal reconstruction of denture

Fig.6 Intraoral views of inserting temporary restorations

As a definitive prosthesis, a maxillary removable overlay denture with coping-type magnetic attachments and a horseshoe plate as the major connector was fabricated , and a mandibular removable partial denture with an extracoronal-type magnetic attachment was also fabricated. The magnetic attachments used in this case report were GIGAUSS C400® (GC, Japan). The keepers of the magnetic attachment and magnetic assemblies were fixed with adhesive resin cement (Multilink® Automix, Ivoclar Vivadent, Liechtenstein) (Figs.7 and 8). Figure. 9 shows an intraoral view of the definitive prosthesis.

Fig.7 Maxillary removable overlay denture and the magnetic attachment

Fig.8 Mandibular removable denture and the magnetic attachment

Fig.9 Intraoral view with definitive prostheses

Outcome of Treatment

Presently, 9 years and 6 months have passed since the definitive prosthesis was set(Fig.9). During that time, maintenance was initially carried out every month; however, after 3 years, at the request of the person, it was reduced to every 3 months. The results of the most recent treatment of periodontal disease examination showed no significant change in both periodontal pockets and tooth mobility compared to the end of the definitive prostheses. The results of examination during the most recent treatment of periodontal disease showed no significant change in periodontal pockets or tooth mobility as compared to the end of the definitive prosthesis setting. The results of dental X-ray photographs showed enlargement of the periodontal ligament cavity of the left support tooth from the middle of the mandible (Fig.10). In addition, gingival recession of #34 was recognized in the oral cavity, and significant bite wear of the artificial tooth of #35 was recognized (Fig.11). From the inquiry result that the remaining part of the maxillary abutment tooth was biased to the left side and the habitual chewing side was on the left, it was inferred that this was caused over time because the burden of the bite force was larger than that of the right side.

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

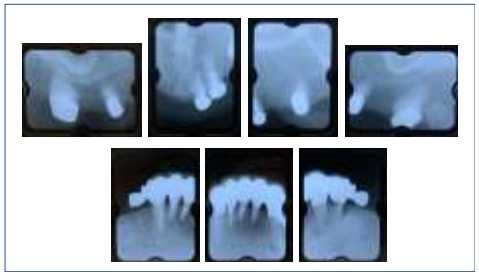

Fig.10 X-ray photographs at 9 years after treatment

Fig.12 Degradation over time

The elution amount of glucose in the masticatory function test 3 years after the operation was 121 mg/dl, but increased to 150 mg/dl after 9 years and 6 months (Fig.12).

Additionally, the score of OHRQoL using OHIP-14[2)] decreased over time, and treatment results were obtained with high patient satisfaction (Fig.13).

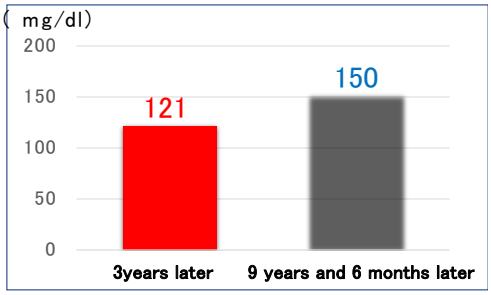

Fig.12 The masticatory function test

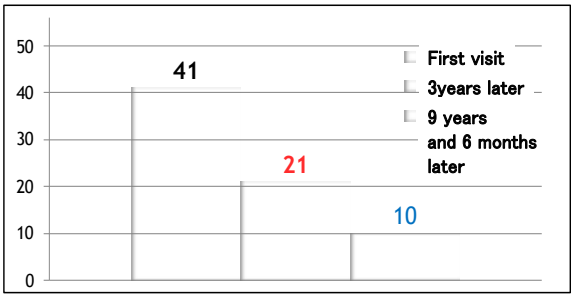

Fig.13 Oral Health Impact Profile-14 for Japanese

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.

References

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