Clinical Application of Magnetic Attachment for Retention and Connection of Maxillofacial Prostheses to an Intraoral Prosthesis

Eri Makihara, DDS, PhD, Shin-ichi Masumi, DDS, PhD, Masahiro Arita, DDS, PhD, and Tadafumi Kurogi, DDS, PhD

Division of Occlusion & Maxillofacial Reconstruction, Kyushu Dental College, Kitakyushu, Japan
Division of Removable Prosthodontics and Management of Oral Function, Nagasaki University, Nagasaki, Japan

Clinical significance
This clinical report describes the treatment of a patient who has maxillary and facial skin defects. Dental magnetic attachment was applied as a retentive structure and connector between a removable partial denture and an obturator, and an obturator and a facial prosthesis.

Abstract
Patient: A 73-year-old male patient was introduced by his plastic surgeon to the Kyushu Dental College Hospital. Numerous surgical excisions resulted in a defect in the region of the right upper palate. He also had a skin defect on the right cheek due to a postoperative infection with MRSA. Although he had worn a removable partial denture and a facial prosthesis, he had been complaining of mastication, articulation, and esthetic problems. The size of the skin defect of the right cheek was 22×27 mm. Although the patient was wearing a facial prosthesis, it was bulky and adhesive material which makes it adhere closely to the skin caused a skin eruption. He had limitation in closing his lips, because his maxillary anterior crowns were made too protruding.

Discussion: Although the new maxillofacial prosthesis was heavier than the old one, the VAS score of the patient’s satisfaction was 100. An articulation, masticatory function, and mealtime were improved.

Conclusion: This clinical report describes the fabrication method for a maxillofacial prosthesis by applying dental magnetic attachments for retention and connection. The evaluation of mastication and articulation was done before and after wearing the new prosthesis and his complaining improved.

Key words: dental magnetic attachment, obturator, facial prosthesis

Introduction
Over 10 years have passed since magnetic attachments have been applied clinically, and the problems of retention, magnetic field, and corrosion have gradually been solved. Recently, these magnetic attachments have been applied as retentive structures of various removable dentures.

In this clinical report, we applied this attachment as a retentive structure and connector between a removable partial denture and an obturator, and an obturator and a facial prosthesis.

Outline of the case
A 73-year-old male patient was introduced by his plastic surgeon to the Kyushu Dental College Hospital. He had an operation on a squamous cell carcinoma of the right maxillary gingival over 2 years ago. Numerous surgical excisions resulted in a defect in the region of the right upper palate. He also had a skin defect on the right cheek due to a postoperative infection with MRSA. Although he had worn a removable partial denture (Fig. 1-a,b) and a facial prosthesis, he had been complaining of mastication, articulation, and esthetic problems. The size of the skin defect of the right cheek was 22×27 mm. Although the patient was wearing a facial prosthesis, it was bulky and adhesive material which makes it adhere closely to the skin caused a skin eruption. He had limitation in closing his lips, because his maxillary anterior crowns were made too protruding (Fig. 2,3). His intraoral defect area included the right hard palate, the right alveolar bone of the molar...
region, and the right soft palate (Fig. 4). He had complained of his partial denture in regard to the poor esthetics of the clasps on the upper right canine and the left premolars, the accumulation of food debris due to a bad fit of his denture, and a masticatory disorder.

After removing all crowns of his upper jaw, seven inner crowns with keeper of magnetic attachment (Physio magnet direct keeper set; Nissin Co. Ltd., Kyoto, Japan; 3|45: φ3.0 mm, thickness 1.3 mm, 2|2: φ2.5 mm, thickness 1.3 mm) were fixed to the abutment teeth with an adhesive resin cement (Panavia; Morita, Tokyo, Japan) (Fig. 5). The inner crowns were made with an Au-Ag-Pd alloy. The outer crowns and metal frame of the upper removable partial denture were also made with an Au-Ag-Pd alloy. Metal welding was done between the outer crowns and metal frame. Magnetic assemblies (Physio magnet; Morita, Tokyo, Japan) were fixed into the outer crowns with the same cement. The hollow obturator was made for weight reduction with a heat-curing acrylic resin (Acron; G-C, Tokyo, Japan) and a soft lining material (Sofreliner; Tokuso, Japan). Four magnetic attachments (Physio magnet direct keeper set; Nissin Co. Ltd., Kyoto, Japan; φ5.5 mm, thickness 1.3 mm) were applied to connect the partial denture and the obturator (Fig. 6). The hollow facial prosthesis was made with medical silicone material (Silskin; Thackray, England) around acrylic resin frame. Two magnetic attachments (Physio magnet direct keeper set; Nissin Co. Ltd., Kyoto, Japan; φ4.0 mm, thickness 1.3 mm) were fixed into the resin frame to connect the facial prosthesis and the obturator (Fig. 7,8). These treatment improved patient’s complaining (Fig. 9,10).
Discussion

It was suggested that prosthesis with dental magnetic attachments for patients who take periodic MRI examinations must be fabricated easy to remove because magnetic attachments can cause MRI degradation. In this case, keepers of magnetic attachments were fixed to the inner crowns with an adhesive resin cement. It is possible to remove the keepers from inner crowns easily, because a cement line appears which serves as a guide for removing the keepers.

The total weight of the old maxillofacial prosthesis was 45 g (maxillary denture: 30 g, facial prosthesis: 15 g), and that of the new maxillofacial prosthesis was 85 g (maxillary denture: 55 g, obturator: 20 g, facial prosthesis: 10 g). Although it was heavier than the old one, the VAS score of the patient's satisfaction was 100, and there was no problem about the weight of the prosthesis. It was thought that the attractive force of the magnetic attachments made good retention and stability of the prosthesis. The new facial prosthesis was small and its adhesion was strong enough for the magnetic attachments without adhesive material for his skin. The limitation of closing his lips was improved by changing the axis of the anterior teeth. An articulation test for pronouncing 67 single sounds (62 consonants and 5 vowels) was applied to the patient and he improved from 6.6% with the old prosthesis to 60.7% with the new one. A masticatory function test of 20 foods was also given to the patient before and after treatment. 12 of 20 foods had improved masticatory function and mealtime improved from 60 min to 20 min.

Conclusion

This clinical report describes the fabrication method for a maxillofacial prosthesis by applying dental magnetic attachments for retention and connection. The evaluation of mastication and articulation was done before and after wearing the new prosthesis and his complaining improved. Although it has been passed several years since we fabricated a new prosthesis, the patient has kept himself in good condition.

References

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