

## **A case of overdenture construction using a custom magnetic attachment on an implant placed overseas**

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### **Introduction**

As a remedy for problems, implant-fixed prosthetics are often changed to a removable superstructure<sup>1)</sup>. If an implant placed at the other dental clinics remains and a superstructure needs to be refabricated, the implant manufacturer will be identified, and the necessary parts will be used. In this case, the manufacturer and type of the remaining implant could not be identified, making it difficult to select the abutments and attachments to use.

Therefore, a custom magnetic attachment was used to place on the remaining implant, and an implant overdenture (IOD) was fabricated, resulting in high patient satisfaction and favorable results.

### **Patient characteristics**

The patient was a 67-year-old female. She came to our hospital with a complaint of a defect in the fixed prosthetic device of a maxillary implant that had been treated overseas (Fig.1). The #14, #13, #11, #21, and #22 implants at the first visit were placed in São Paulo, Brazil, between 2020 and 2024. From the panoramic X-ray image (Fig.2), it can be observed that there are two types of implants placed in the maxillary jaw.



**Fig.1 Internal views at the first visit**



**Fig.2 Panoramic radiograph at the first visit**

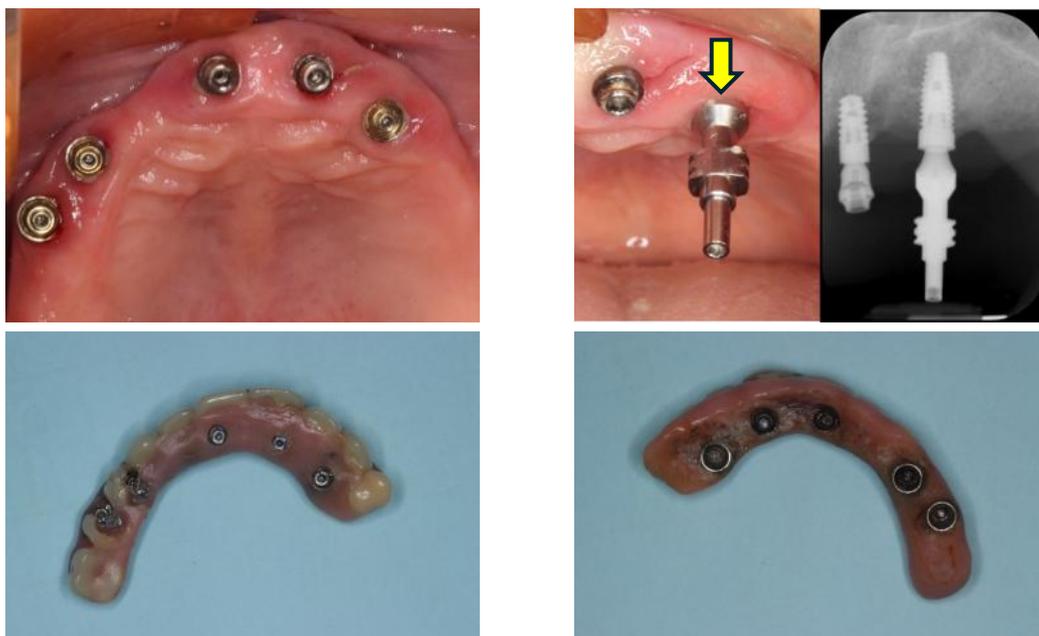
### **Treatment planning**

A suitable abutment was selected for the non-salvageable #21 implant body. Afterward, an implant overdenture with a Co–Cr alloy framework on the maxillary jaw would be fabricated as a final prosthesis.

### **Denture fabrication**

#### **1. Pre-treatment**

The superstructure of the implant was fixed, and the #21 implant was removed. At that time, when an abutment with a shape similar to that of the implant platform was tested, it was confirmed that the implant body indicated by the arrow was compatible with the Brånemark multi-unit abutment (Fig.3). The removable denture was quickly fabricated because the fixed superstructure could not be placed again due to damage.



**Fig.3 Removed implant-fixed superstructure, and trying on an abutment**

**2. Attachment selection with a similar shape to the implant body**

For #14, #13, and #22, we have concluded that a ready-made magnetic attachment keeper (Hyper Slim TK Keeper 4013, KEDICA) fits the Brånemark multi-unit abutment<sup>2)</sup> (Fig.4). In addition, a locator attachment was attached to #11 when using a therapeutic denture, but since the mechanism of the retention force was different, it was decided to apply a magnetic attachment to #11 as well.



**Fig.4 Attachment selection**

**3. Custom magnetic attachment**

The heading abutment of the Ankylos implant was adapted to the remaining implant of #11. However, since no magnetic attachments were commercially available that fit the implant, a custom one would be made (Fig.5-a, b). The housing and healing abutment were then laser welded with access holes to enable screw fastening (Fig.5-c). In addition, the center of the keeper was also given an access hole, and the housing was bonded with resin cement (Panavia V5, Kuraray) (Fig.5-d).



**Fig.5 Fabrication custom magnetic attachment**

**4. Delivered overdenture with Co-Cr alloy framework**

After delivery, it was first used to cover the palate plate. After settling was complete, the palate plate of the denture was removed because it was possible to obtain retention by placing a magnetic attachment to the remaining implant (Fig.6). By removing the palatal floor, discomfort was reduced, and patient satisfaction was improved.



When delivery it before setting. It covered the plate



After palatal plate removal

Fig.6 Implant Overdenture with Co-Cr alloy framework

### 5. Polycarbonate floor dentures

At the request of the patient, a spare denture was also fabricated. The Co–Cr alloy dentures in use were scanned, and based on the scanned data, a spare denture was fabricated by milling from a polycarbonate disc (Fig.7-a). When the denture base was characterized by staining, high patient satisfaction was obtained (Fig.7-b).



Fig.7-a polycarbonate spare dentures



**Fig.7-b Characterization of polycarbonate dentures**

### **Discussion/Conclusions**

The implant overdenture, with a custom-made magnetic attachment, functions as intended and can be used without any problems. By using a custom keeper, we were able to effectively use the remaining implants that had been placed in other countries. Their retention and the stability of the horseshoe-shaped maxillary implant overdenture were good, and the results of a questionnaire confirmed the patient's high level of satisfaction. The maxillary removable overdentures on multiple implants may provide patients with better function than fixed prostheses<sup>3</sup>). However, the prognosis for maxillary IOD shows a high survival rate of 90–95% or more if the observation period is less than 5 years, while the survival rate decreases remarkably to the 80% range after more than 10 years<sup>4</sup>). As a way of avoiding maxillary IOD risk, force control based on prosthodontics is important because anterior implants are prone to load, especially if many teeth remain in the mandibular jaw<sup>5</sup>). In the future, we will proceed with the treatment of the mandibular jaw and perform regular maintenance.

### **References**

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