

## Magnetic attachment for complete overdenture: A case report

Utari Kresnoadi <sup>1,\*</sup>, Muhammad Genadi Askandar <sup>2</sup> and Pramesti Prirastika <sup>3</sup>

<sup>1</sup> Department of Prosthodontics, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia.

<sup>2</sup> Resident, Department of Prosthodontics, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia.

<sup>2</sup> Undergraduate, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia.

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### Abstract

**Background:** Overdenture is a partial or complete denture that has support from natural tooth roots that have been treated with endodontic treatment. Retain the remaining teeth prevent resorption of alveolar ridge. An overdenture with a magnetic attachment can be used to increase the retention of the denture. The magnets transfer the occlusal load to the bone through the periodontal ligament of retained roots that are attached with remaining root structure

**Objectives:** This case report is aimed to report the step-by-step treatment of complete denture mandibula and complete overdenture maxilla with magnetic attachment retained design

**Case Report:** A 62-year-old female visited the Prosthodontic Clinic of Dentistry Faculty, Airlangga University with a chief complaint of difficulty in eating. Clinical examination shown partial edentulous in the mandibula. The remaining teeth were 18, 14, 23, 25 and 43.

**Case management:** After thorough observation from the clinical presentation and radiographic, magnetic attachment was planned on 14 in order to retain the remaining tooth and improving retention and stabilization of the maxillary denture. **Conclusion:** Magnetic maxilla overdenture is able to provide support, stability and retention.

**Keywords:** Magnetic attachment; Retention; Overdenture; Medicine

### 1. Introduction

Denture retention and stability has long been a clinical practice issue for dentists. The remaining soft and hard tissue must be preserved in order to adhere to the fundamental overdenture principle. Magnetic attachment is one of the therapy strategies for retaining natural tooth while providing retention and stabilization of the denture, especially in older patients. Treating and preserving some teeth might provide vital support to the prosthesis instead of eliminating all remaining teeth [1].

Magnetic attachment overdenture is an overdenture that uses magnet to improve retention and stability of the denture. The magnetic assembly is embedded in the denture base during traditional overdenture implantation, and its equivalent keeper is inserted into the abutment root. The magnetic assembly applies a retentive force to keep the keeper in place [2].

By applying magnetic attachments, the residual roots are positively indicated for denture retention. Until now, the principal goal of maintaining residual roots was to reduce the resorption of alveolar ridge, which supports the base of dentures. Residual roots play a role for retentive and support properties of the denture. Numerous attachment

\* Corresponding author: Utari Kresnoadi

technologies, such as stud, magnet, and bar attachments, have been used successfully and predictable in the therapeutic setting [3]. In this case report, we would like to detail the step-by-step of creating magnetic overdenture.

## 2. Case Report

A 62-year-old woman visited the Prosthodontic Clinic, Universitas Airlangga Dental Hospital with a chief complaint of difficulty in eating. Last extraction was performed two months ago. Clinical examination showed partial edentulous in the maxilla and mandibula. The remaining teeth were 18, 14, 23, 25 and 43. 14 is vital tooth without mobility. 18, 23, 25 and 43 are vital teeth with mobility<sup>o</sup>3. Radiographic examination on tooth 18, 23, 25, 43 showed severe resorption.



**Figure 1** Intra oral examination



**Figure 2** Panoramic radiography of patient

### 3. Case Management

The case was planned to receive tooth-supported overdenture using magnets. The remaining teeth 18, 23, 25, 42 were extracted. Tooth 14 had undergone root canal treatment. The location of the remaining teeth was favorable for an overdenture. The teeth were endodontically treated and prepared sub-gingivally with a diamond burs to create a chamfered finish line. The procedure was followed by removal of two-third root canal filling material with a rotary drill instrument to prepare the post space (Figure 4). The attachment selected was MAGTEETH MT 700 (MagneDesign, Nagoya, Japan) (Figure 3). Attachment was planned on 14. The abutment tooth was decapitated until it has the same height as the gingival margin. A bevel around the circumference was made. Surface shape of the root tooth was concave. Keeper magnet was carefully cemented using dual cured resin cement and excess cement was carefully removed.

Primary impression of the maxilla and mandibula arch were made using irreversible hydrocolloid. Centric tray (Ivoclar) was used to record the centric relation and vertical dimension. The individual tray (SR Ivolen, Ivoclar) was fabricated and rechecked for its alignment at semi-adjustable articulator (Figure 5). Functional impression was done using elastomer (polivinylsiloxane) regular body with closed mouth method (Figure 6). The bite position of patient was determined using Gnathometer M (Ivoclar). Patient was guided to do protrusive movement, lateral and retrusive movement resulting reverse arrow shape on the Gnathometer M (Figure 7). Bite registration was also recorded using O-Bite, DMG (Figure 7). Maxilla position was recorded and transferred into articulator using the UTS Universal Stratos 300 transfer facebow which attached to the centric tray. It was then mounted in a semi-adjustable articulator with guidance from the centric tray (Figure 8). The denture teeth was arranged and try-in wax was done (Figure 9). The process was continued with acrylic processing, remounting, first selective grinding and polishing. Intermaxillary record with a bite registration (polyvinyl siloxane) was made, followed by second selective grinding and final polishing. The denture was finally ready for insertion (Figure 10).

To incorporate magnet into the denture, the intaglio area of tooth 14 was reduced to create space for magnets (Figure 11). Fabrication of the magnet was done after a week of insertion. The magnet was positioned align with the keepers. Resin was added to the reduced area and the maxilla denture was placed over the magnet under proper occlusion (Figure 12). After the resin was set, denture was removed with the magnets picked up in the denture. Excess resin was trimmed and the denture was polished. The denture was re-checked for comfort, occlusion and retention.



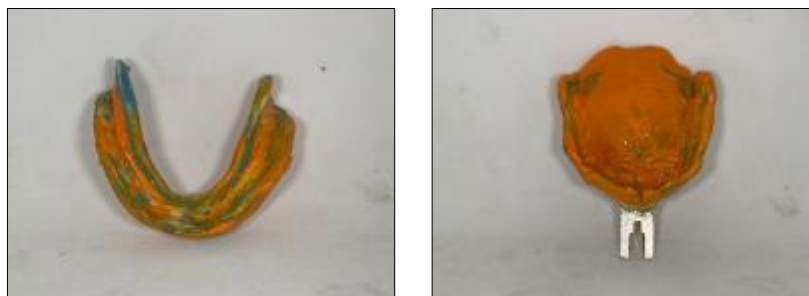
**Figure 3** Magteeth MT 700



**Figure 4** Preparation abutment tooth and cementing keeper magnet



**Figure 5** Individual tray



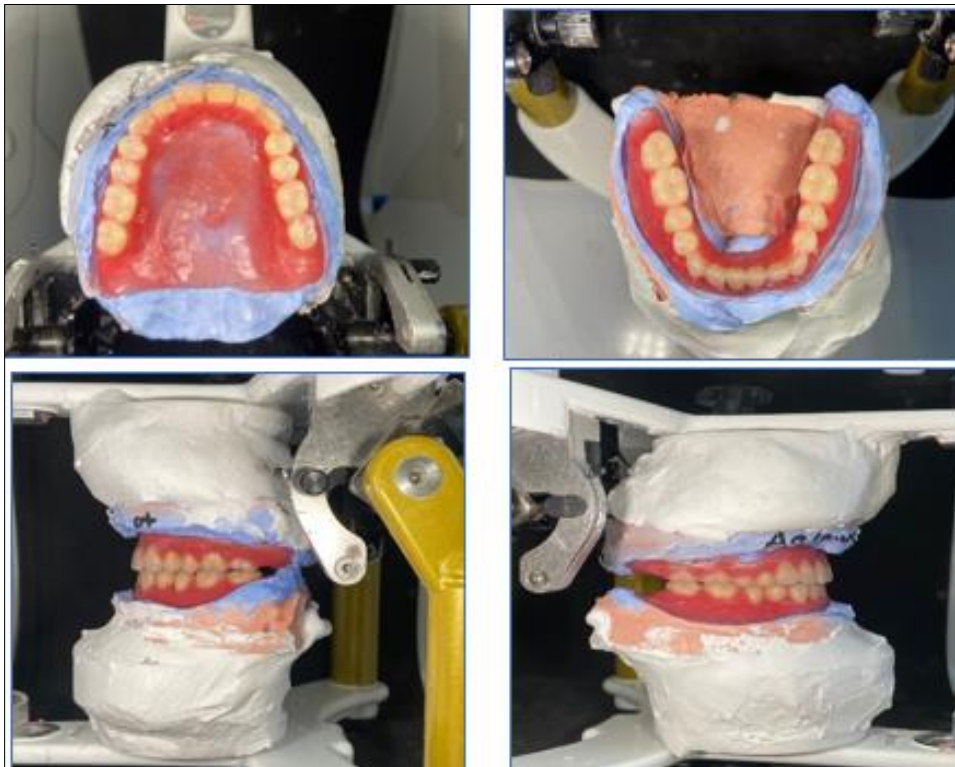
**Figure 6** Functional impression



**Figure 7** Gothic arc tracing and bite registration



**Figure 8** Facebow transfer



**Figure 9** Teeth arrangement



**Figure 10** Try in denture



**Figure 11** Denture preparation



**Figure 12** Pickup magnet assembly

#### 4. Discussion

According to Glossary of Prosthodontic Term, overdenture is known as any removable dental prosthesis that rests on one or more remaining natural teeth, natural tooth roots, or dental implants. An overdenture is an appealing option for treatment since it is thought to be able to keep teeth in the alveolar process and provide more retention and stability than conventional dentures. Tooth extractions should be avoided whenever possible in order to maintain periodontal proprioception and minimize alveolar bone loss. Periodontal ligament proprioceptors offer distinct, more discriminating sensory input than the mucosa, which aids in detecting the position and movement of the mandible, reduces excessive occlusal stress, and enhances masticatory function [4].

The benefit of overdentures with magnetic retention is enhancing retention of denture, easily self-adjustment of seating denture, and reducing the lateral stresses of the supporting tooth. Magnetic attachment used in this case was the direct-bonding root-keeper-type Magteeth™ MT700. The RK type can be easily incorporated into the denture since the keeper already consists of prefabricated intra-radicular post components. This design enables direct bonding to the tooth without additional laboratory casting procedures, thereby eliminating the risk of magnetic keeper distortion during the casting process, which decreases the retentive force. Moreover, the easy and fast approach enables the conversion of an existing conventional denture to a magnet-retained one in a single visit [5].

Magnet-retained has the benefit over other attachments including maintains their initial tensile force over the course of treatment, compact and simple to be incorporated into the dentures, and easily adjusted denture for the patient [6]. Metal components are also covered by the denture, thereby provide aesthetic for the patient [7].

The patient is instructed to remove the denture before going to bed. The ideal method for taking care of dentures is to wash them first with liquid soap before soaking them in denture cleaning solution. Since most toothpastes contain abrasives that might wear away the surface of the acrylic resin, it is not advised to use them to clean dentures [8].

The prognosis and longevity of an overdenture depends on the patient's ability to maintain oral hygiene. Magnetic attraction may become less powerful as plaque. After every meal, the overdenture should be cleaned. To achieve long-term success, the patient was suggested to visit the dentist every six months [9].

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#### 5. Conclusion

Magnet-retained tooth-supported overdenture is able to provide support, stability and retention of denture that leads to patient's satisfaction.

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#### Compliance with ethical standards

##### *Disclosure of conflict of interest*

No conflict of interest.

##### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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