REHABILITATION OF EDENTULOUS ARCH WITH MAGNET RETAINED OVERDENTURE: A CASE REPORT

PARMAR V1, SHAH A2, CHAUHAN S3, CHAPLA R4

1Post-Graduate Student, Department of Prosthodontics, Crown & Bridge, K M Shah Dental College & Hospital, 2Post-Graduate Student, Department of Public Health Dentistry, K M Shah Dental College & Hospital, 3Post-Graduate Student, Department of Prosthodontics, Crown & Bridge, K M Shah Dental College & Hospital, 4 Post-Graduate Student, Department of Prosthodontics, Crown & Bridge K M Shah Dental College & Hospital. Corresponding author: Dr. Vishal Parmar, Address: B-3/127, Laxmi Sagar, Above Bank of Baroda, Bhaudaji Road, Matunga, Mumbai-400019. Email: drvishalparmar28@gmail.com, M. No: +91-9904858682

ABSTRACT

Overdentures cover a number of possible solutions for patients with nearly all the teeth missing. Even though it resembles a complete denture externally the combination of periodontal and mucosal support in the prosthesis is what that makes overdentures special. In addition to retention and support that can be gained from the retained roots, overdentures are actually superior to conventional complete denture in biting force, chewing efficiency and force discrimination. Healthy retained roots are natural implants and although some may have limited length of usefulness, using them will improve the quality of patient lives. Various attachments can be added for these overdentures to increase the retention. Also, the use of magnets has been very popular in dentistry nowadays. They are used as retentive aids for overdentures, removable partial dentures, implants, to connect multiple components in maxillofacial prosthesis, in orthodontics for correction of malocclusion and for treating unerupted teeth. Here we discuss a case report of rehabilitation of a 65 year old male patient with tooth supported, magnet retained overdentures.

Keywords: Rehabilitation, magnet retained overdentures.

INTRODUCTION

For many years complete denture was the only choice in edentulous cases, but the major problematic situation that come across by using this conventional design is the lack of retention, stability, support as it is totally supported by mucosa and also later it becomes maladaptive with time due to on-going residual ridge resorption. Implants are a good solution but a healthy root system of teeth deteriorated above the gum line always surpasses the value of the artificial root due to the presence of periodontal ligament which enable the transmission of axial forces towards the alveolar bone. Overdentures cover one or more teeth or dental implants, restoring the entire dentition. They help preserve natural teeth or roots that are often indicated for extraction because of periodontal tissue loss. Maintaining these teeth or roots enables a delay in alveolar bone resorption and preserves periodontal proprioception and masticating efficiency, improving the quality of life and oral health of older people. The present article demonstrates the rehabilitation of partially edentulous patient with the help of magnetic assembly mandibular overdenture and maxillary conventional removable partial denture. Clinical presentation showed few remaining teeth in relation to the mandibular ridge. A multidisciplinary approach was adopted to retain the remaining teeth in the mandibular arch with the help of endodontic treatment (root canal treatment) followed by prosthetic rehabilitation.

CASE REPORT

A 69-year-old male patient reported to the Department of Prosthodontics with the chief complaint of difficulty in chewing food due to missing teeth. Intraoral evaluation revealed partially edentulous maxillary and mandibular arch (Fig 1). Remaining teeth in the maxillary and mandibular arch were periodontally sound, with slight gingival recession in the maxillary arch. Patient was made aware of the clinical condition and he was willing to preserve the remaining teeth as long as possible. Examination of radiographs revealed that the existing teeth in mandibular arch (34, 35, and 44) were endodontically treated. The location of the remaining teeth was favourable for an overdenture. A diagnostic jaw relation was taken to analyse the amount of space available for any attachment. The space was found to be sufficient for using magnetic attachments. After confirming from the patient about the treatment options, it was decided to use the remaining lower natural teeth as the abutment for magnet placement and overdenture fabrication.

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A full extension primary impression using irreversible hydrocolloid was made for the maxillary and mandibular arch and cast was obtained (Fig. 2 & Fig. 3). The teeth were reduced slightly above the gingival margin (2 mm) followed by removal of appropriate root canal filling material with a peso reamer and drills provided to prepare the post space to accommodate the keeper [Fig. 4].

Attachment selected was DYNA Magnets of diameter 5.5 mm depending on the available space. There are different sizes available for these attachments. Attachments were planned in 34 and 44 and metal copings on 35. Post space preparation was done for teeth 34 and 44 and tooth preparation to receive metal copings was done for 35. After the post space preparation, the keeper is placed for evaluation of fit and angulation. The prepared post space was thoroughly washed with distilled water and dried thoroughly with endodontic aspirator and absorbent paper points. The magnetic keeper was then cemented using Resin modified Glass Ionomer Cement (RM-GIC, GC Corp.). Also metal coping (35) was cemented using RM-GIC. Excess cement was carefully removed without disturbing the cemented prosthesis. (Fig. 5)

Special trays were fabricated on both the cast after application of sufficient wax spacer. Final Impression for the lower arch was made using low fusing impression compound and Light body Elastomeric Impression material with the cemented keeper and metal coping. Final Impression for the upper arch was made using dual impression technique (Fig. 6). Both impressions were carefully poured in die stone and final casts were obtained. Occlusal rims were fabricated on final cast and Jaw relation was done (Fig. 7).

After the approval of try in by the patient, the denture (Upper Removable Partial Denture and Lower Complete Denture) was processed using Heat cure acrylic resin. The dentures were carefully trimmed and polished after retrieving from the flasks. Dentures were inserted in patient’s mouth and necessary adjacent were made. Border extensions and occlusion were checked. To incorporate magnets in the denture, the area on the impression surface of the mandibular denture corresponding to 34 and 44 region where magnets were need to be placed was scraped to make space for magnets. The magnets were positioned on the keepers in the mouth. Resin was added to the scraped area and the mandibular denture was placed over the magnets in mouth under proper occlusion. After the resin was set, denture was removed with the magnets picked up in the mandibular denture. Excess resin was trimmed and denture polished (Fig. 9). After polishing, the denture was again placed intra-oraally and checked for comfort, occlusion and retention. Patient was instructed how to wear and remove the denture, on denture maintenance and oral hygiene as well. Patient was recalled after 24hrs, after 7 days for evaluation. On recall it was observed that patient was satisfied with his new dentures and was able to masticate properly.
DISCUSSION
The use of the attractive force between 2 magnets for denture retention was reported in the early 1960s. Early attempts at using magnets for denture retention were unsuccessful, mainly because of the large size of magnets at that time and the inadequate forces that they provided. However, since the introduction of rare earth magnets such as Sm-Co and Nd-Fe-B, it has become possible to produce magnets with small enough dimensions to be used in dental applications and still provide the necessary force. This negates the need to implant the materials; consequently, interest in using magnets for denture retention has once again increased as is demonstrated by the number of clinical reports on this subject.

It has to be noticed that magnets increase retention of partial or complete dentures and overdentures regardless of the path of insertion. Magnets are easy to use alone or together with any type of retainers. The most important aspect to be cleared is the influence of magnetism to human body.

There are 2 possible ways by which a magnet can cause injury to the tissue.
1. Physical effect due to magnetism.
2. Chemical effect due to corrosion product.

Modern magnets were tested in many aspects (cell toxicity, cell growth, allergic response) and the results meet international standards. The magnetic field leakage is extremely weak compared to daily use magnetic appliances. For a long time the saliva corrosion of rare-earth magnets was the reason which determined the decrease of magnetic attractive force. The problem was solved through the enclosure of magnets in anticorrosive steel with a small percentage of iron. According to Gillings and Samant, magnetic retention presents very little risk of trauma to the root that supports the overdenture, and the lateral forces imposed on the root are very small. Additionally, the magnetic overdentures are more stable and retentive than conventional partial dentures and they are easily removed and seated. As such, a magnetically-retained overdenture may represent a good alternative for rehabilitating patients with reduced periodontal support. This type of retention is effective, as it dissipates lateral forces to underlying abutment teeth. The magnetic attachments can be easily inserted in the prostheses, do not require any specialized manufacturing technique and facilitate oral hygiene because retentive areas of the dental biofilm are smaller.

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