

Bracknet overdenture: Brainstorming a nominal approach for tooth supported over denture with magnets and brackets – A case report

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Abstract

This case report of a 65 year old female explores a cost-effective method for fabricating a tooth-supported over denture using bracket and magnet attachment. Emphasizing affordability without compromising quality, the report delves into the intricacies of the technique, highlighting key steps and considerations to achieve optimal results. Balancing affordability with precision, this approach seeks to address the growing need for economically viable tooth-supported over denture solutions in dental practice.

Keywords: Bracket, Magnet. Tooth Supported Overdenture.

Introduction

The modern dental realm witnessed the numerous evolutions in prosthetic options to improve the patient’s life quality. Practitioners worldwide have successfully employed remaining tooth structures or retained roots to assist in prosthesis efficiency & patient compliance for more than a century¹. By preserving the remaining healthy teeth as anchors for the over denture ensures enhanced support, stability, retention, and a more natural feel through proprioception.² Troublesome unemployed

mandibular arches with its unique anatomy often fail to provide a well-functioning denture³. A variety of attempts were employed to overcome these issues such as adhesives, implants, and numerous attachment systems to connect either individual teeth or splinted teeth to prosthesis.⁴ Blending the improvements and innovations in dentistry to an 'affordable dentistry' concept has always been a challenge in the dental sphere. In the dental literature there is ample evidence of magnetic retention systems and its successful use in prosthetics with excellent clinical results and patient compliance. These are expensive and are complex preformed or cast magnetisable alloy root elements, or 'keepers'⁵ and magnets in denture systems offer simplicity, inherent stress-breaking, automatic repositioning after denture displacement, comparative freedom of lateral denture movement, reduces trauma to retained roots and minimal review needs. This case report is an attempt to showcase a creative solution and its execution by combining the simplicity of brackets and the efficiency of magnets to improve tooth-supported over denture thereby shedding light on its transformative potential in offering a pragmatic, simple and affordable solution for dental rehabilitation.

Case Report

Prosthodontics department at St. Gregorios Dental College, Chelad, Kothamangalam, Ernakulam received a 65-year-old female patient with chewing inefficiency complaints resulted from multiple missing teeth since 2 years. (Figure:1) Patient gave history of past uneventful extractions resulted in completely edentulous maxillary (fig 2) arch and partially edentulous mandibular arch and presented no other relevant medical history. Retained teeth in the mandibular arch (34, 44) were vital and Periodontally sound and moderate resorption was recorded in relation to bilateral mandibular posterior

ridge. (fig 3) The patient was positively motivated to preserve the comparatively sound remaining teeth to utilize for retention of conventional complete dentures. After a careful consideration the treatment mutually agreed was to have an over denture with magnetic attachment. An informed consent was then obtained from the patient.



Figure1: Extraoral photograph of the patient



Figure 2



Figure 3

Fig: 2 & 3: Intraoral view of the completely edentulous maxilla and partially edentulous mandible with 34 and 44 present.

Clinical Procedures

Endodontic treatment and abutment teeth preparation for mandibular teeth

Abutment teeth (34, 44) were endodontically treated and decoronated, reduced equally till the gingival margin, and a cavity was prepared to lute the bracket into the root surface. Cervical portion of all the abutment teeth were marginally bevelled to prevent any stress concentration eventually to prevent root fracture.

Luting of the bracket into the prepared teeth

The premolar brackets of 0.022inch slot (American ortho) were chosen according to the size of the teeth and the slots were sandblasted and the fit was checked in the inverted dome prepared. The brackets were cemented with luting GIC (3M) with the slots facing towards the root surface and the mesh placed occlusally. (fig:4) The bracket attachment was equigingival, therefore not tampering with the available interarch space. The edges of the brackets were also bevelled.

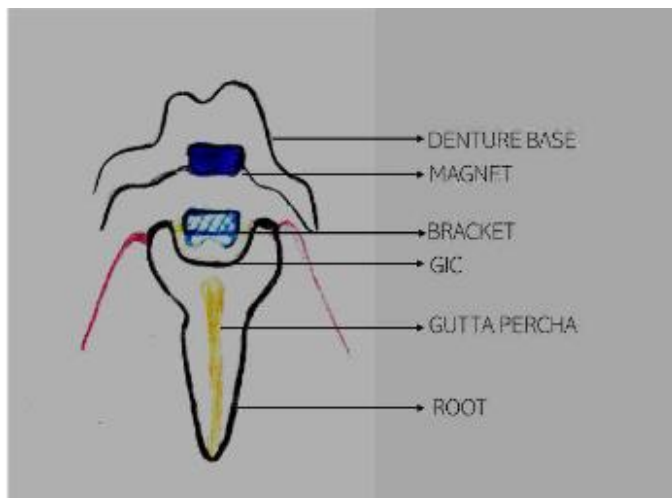


Figure 4: Diagrammatic representation of the method of placement of bracket and the magnet



Figure 5: The brackets luted into the prepared root surface with the slots facing the root surface and mesh facing occlusally.

Following this the custom tray were fabricated using self-cured acrylic resins, border moulding for maxillary arch and mandibular arches were made using the low fusing green-stick compound material, final impressions for maxillary arch and mandibular arches was made using light bodied addition silicone . Record bases were fabricated. Then occlusal wax rims were prepared after which the tentative jaw relation was done. Face bow transfer was carried out and articulated in Hanau articulator. Teeth arrangement and further try-in procedures were carried out to check the esthetics and occlusion. The maxillary and mandibular dentures were processed using the conventional methods of processing. Bilaterally the intaglio surface of mandibular denture on the premolar region was relived using carbide burs to incorporate female component. At the time of insertion of the denture, the magnetic assembly with the magnet inside was kept on top of the bracket and space created in the tissue surface of the denture for the magnetic attachment.(fig 6) Auto polymerizing resin was used to pick up the magnetic attachment intra orally. During the pickup of the magnetic attachment, care was taken to seat the denture in the correct position and occlusion maintained by having the mouth closed in centric relation as the resin was polymerizing. The resin was

allowed to completely harden and the excess were removed and polished around the magnetic attachment. Finished denture was reinserted to check for adequacy in retention by asking the patient to move the tongue in lateral and protrusive movements.



Figure 6: Intaglio surface of the final processed denture after magnet pick up



Figure 7

Discussion

Magnet systems have been used as aids to denture retention for many years with some success⁷. These attachment systems, consisting of a magnet and a keeper, are used to retain removable partial dentures and maxillofacial prostheses. Magnetic system can also be used in an implant supported overdenture with magnets comprises magnets incorporated into the denture acting upon keepers attached to implant abutments Dental

magnetic attachments of various types and sizes that have satisfactory retentive force and stability are now commercially available. An overdenture with a magnetic attachment is a useful choice for an abutment tooth with chronic periodontal disease, because the magnetic attachment dissipates the lateral stress component on the abutment teeth and improves poor clinical crown-to-root ratios⁸⁻¹¹

Orthodontic brackets are an essential component of modern fixed appliances. Most orthodontic brackets are made from AISI type 304L SS. Such steel contains 18–20 per cent chromium and 8–10 per cent nickel with a small amount of manganese and silicon, and has a low carbon content, typically less than 0.03 per cent. They are also highly corrosion resistant and a ferromagnetic material. Since these brackets are approved by national health authorities it can very well be used intraorally as an attachment.^{12, 13, 14, 15}

Despite the many advantages of implant supported overdentures, they too have limitations.

Patients who could benefit from implant therapy may reject them due to fear of oral surgery or other psychological issues¹⁶. Cost plays a major role for some patients, systemic diseases can restrict operative procedures, and a long duration of treatment is undesirable, especially for the elderly¹⁷

Advantage of intra oral magnets include easy incorporation into the denture involving simple clinical and technical procedures, ease of cleansing, ease of placement for both dentist and Patient. There are typically useful for patient with restricted inter occlusal space, can also accommodate a moderate divergence of alignment between two or more abutment and dissipate lateral functional forces. On the other hand, poor corrosive resistance of magnets within oral fluid requires

encapsulation within a relatively inert alloy such as stainless steel or titanium.¹⁸⁻¹⁹

Moreover, the magnetic properties contribute to the preservation of the remaining dentition. By reducing lateral forces and stress on the supporting teeth, the brackets' magnetic coupling distributes forces more evenly, potentially minimizing the risk of undue pressure on the natural teeth, thus promoting their longevity. Furthermore, patients with physical disabilities such as those experienced by frail older adults, have reported that magnet-retained dentures are relatively easy to place and remove.²⁰⁻²¹

However, it's crucial to address potential limitations, such as the susceptibility of brackets to collect debris or plaque, necessitating regular cleaning to maintain optimal function. Additionally, individual variations in magnetic sensitivity among patients might influence their perception of comfort or tolerance.

Conclusion

In conclusion, the magnetic properties integrated into the brackets of this inventive method underscore a paradigm shift in the realm of dental prosthetics, offering a promising solution that amalgamates reliability, ease of use, and enhanced patient comfort in tooth-supported over dentures.

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