

Prosthodontic Rehabilitation Of A Case Of Amelogenesis imperfecta Using Magnet Retained Overdenture.

Dr. Arka Swarnakar*

Abstract

Amelogenesis imperfecta is a developmental disorder where there is defective enamel deposition and maturation. This leads to early loss of tooth structure. The roots remain unharmed. The use of magnets has been a boon in the field of dental science and are used to retain overdentures, maxillofacial prosthesis, and obturators. These magnets are attached with either any root structure or osseointegrated implants which transfer the occlusal load to the bone. This case report describes the use of a magnetic assembly in fabricating a mandibular overdenture on retained roots and a conventional maxillary complete denture. Magnetic assembly consists of magnet within the prosthesis and a keeper on the remaining tooth structure. The magnetic attachments did aid in providing support, stability, and retention.

Key Words Overdenture, Amelogenesis imperfect, Magnetic attachments, Retention

Key Message Overdentures preserve alveolar bone by reducing the rate of residual ridge resorption and magnetic attachments aid in retention.

INTRODUCTION

Retention of prosthesis is effectively improved by using magnetic attachment systems. Rare earth metals like samarium-cobalt (Sm-Co)¹, neodymium-iron-boron (Nd-Fe-B)¹ and other alloys like EFM alloy (Pd-Co-Pt)² are used to develop intraoral magnets. They provide stronger magnetic force than the earlier used aluminum-nickel-cobalt (Al-Ni-Co) magnets³. The magnet is embedded in the denture base and its corresponding keeper is inserted into the abutment root. The magnetic assembly attracts its keeper with a force which aids in the retention³. This clinical report describes the fabrication of a magnet retained overdenture to rehabilitate a patient having hereditary X recessive amelogenesis imperfecta.

CASE REPORT

A 23-year-old male came to the Department of Prosthodontics with a chief complaint of difficulty in chewing and poor esthetics generalized wearing off teeth. He gave a history that his teeth started wearing off 8-9 years ago and became sensitive. He got some of his teeth extracted while remaining were treated endodontically. Full coverage extracoronary restorations were not fabricated for these treated teeth. Within a span of 4 years after the treatment all his teeth either wear off or broke without any external trauma. Intraoral examination revealed grossly decayed and attrited teeth in both maxillary and mandibular arch. [Figure 1]. His radiograph showed no pathology

ABOUT THE AUTHORS

*Senior Lecturer
Dept. of Prosthodontics
Kothiwal Dental College and Research Centre.



Figure 1: Pre-operative Intraoral picture

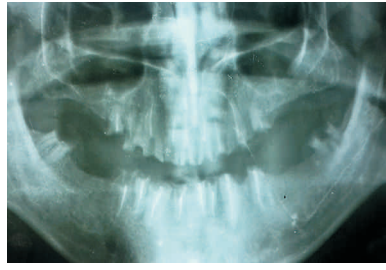


Figure 2: Pre-operative orthopantomograph



Figure 3: Post extraction Intraoral picture



Figure 4: Try in of finished denture



Figure 5: Preparation of keeper space



Figure 6: Prepared keeper space on abutment root



Figure 7: Keeper after cementation



Figure 8: Magnets secured to keeper using composite resin

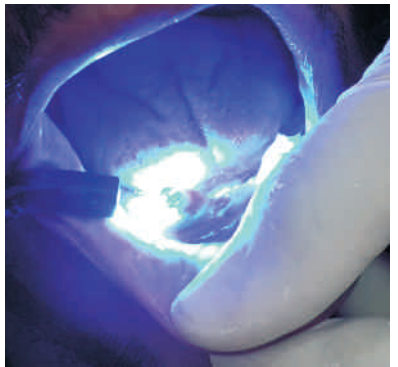


Figure 9: Magnets secured to keepers

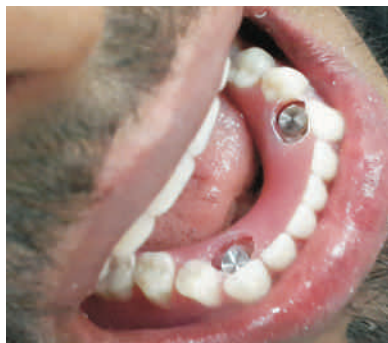


Figure 10: Mandibular denture perforated for receiving the magnets



Figure 11: Magnets secured in final denture

in maxilla or mandible [Figure 2]. He gave a family history of similar illness with his elder brother and his uncle. He was diagnosed of having Amelogenesis Imperfecta (AI) II B which was an X-linked recessive type of hypo maturation amelogenesis imperfect. Patient was made aware of the clinical condition. All decayed teeth and retained roots were extracted except roots of tooth number 33 and 43 because they were periodontally healthy [Figure 3].

CLINICAL PROCEDURE

Fabrication of conventional complete dentures

After the extraction sockets healed, a conventional complete denture was fabricated and tried in. [Figure 4].

Abutment preparation

The endodontically treated teeth were prepared parallel to the alveolar crest for receiving the magnetic keepers using the Dynaspiral and seat drills (Dyna Dental Engineering, Bergen, Holland) [Figure 5 and 6]. Following the preparation glass ionomer cement (GC Fuji I, GC Corporation, Tokyo, Japan,) was used to cement the Dyna Direct keeper (Dyna Dental Engineering, Bergen, Holland) into the abutment root [Figure 7].

Fixation of the magnet into the denture base.

The magnets were placed onto the keepers and were temporarily stabilized using composite resin (Filtek, 3M ESPE, USA) [Figure 8 and 9]. The finished denture was hollowed [Figure 10] and were placed onto the keepers with the stabilized magnets in place. On confirming the proper seat, the oral tissues were coated with petroleum jelly and autopolymerizing polymethyl methacrylate resin was flown into the hollow space. After final setting of resin the magnets got embedded in the denture base. Excess of resin was trimmed out [Figure 11]. Deflective occlusal contacts were selectively removed and dentures were finally delivered to the patient after finishing and polishing [Figure 12].

DISCUSSION

Amelogenesis Imperfecta II B is an X-linked recessive hypo maturation type of amelogenesis imperfecta which affects the males of a family. Multiple mutations of the AMELX gene has been identified in this type of amelogenesis imperfect⁴. It leads to continued wear of teeth leading to sensitivity of newly erupted teeth. It also make teeth susceptible to dental caries.

Magnetic system can be used an

implant-supported overdenture, or with magnets incorporated into the denture acting upon keepers attached to implant abutments.⁵ Most commonly used magnetic attachments are composed of a magnet and keeper made from ferromagnetic material.⁶ In this clinical case palladium cobalt platinum alloy (EFM alloy) has been used.² After endodontic treatment the abutment tooth is decoronated and the final preparation was made with two drills supplied with the system. An open field I magnet-retained mandibular overdenture was fabricated on the abutment teeth.

Advantages of intra-oral magnets include: Easy incorporation into a denture involving simple clinical and technical procedures, ease of cleaning, ease of placement for both dentist and patient (physically disabled or neuromuscular compromised), automatic reseating, and constant retention with number of cycles.⁷ They decrease the lateral and rotational stresses transmitted to abutments.⁸ They also accommodate a moderate divergence of alignment between two or more abutment⁹.

On the other hand, poor corrosion resistance of magnets in oral fluid.⁸ They do not provide a positive locking device, thus the retention provided is generally less than with intra-radicular retention systems.¹⁰

CONCLUSION

Magnetic assembly used in this case is an open field new age magnetic attachment system which provides predictable retention, stability, support, with long-term durability. This system has successfully rehabilitated the patient when compared to overdenture with implants, when cost and time factors were considered. Magnet-retained overdenture provided better proprioception and satisfaction by preserving natural abutment teeth.

REFERENCES

1. Akin H, Coskun ME, Akin EG, Ozdemir AK. Evaluation of the attractive force of different types of new-generation magnetic attachment systems. *J Prosthet Dent* 2011 Mar;105(3):203-7.
2. Vrijhoef, Mezger, Van der Zel, Greener: Corrosion of ferromagnetic alloys used for magnetic retention of overdentures, *J Dent Res* 1987 Sep;66(9):1456-9.
3. Sagawa M, Fujimura S, Togawa N, Yamamoto H, Matsuura Y. New material for permanent magnets on a base of Nd and Fe. *J Appl Phys* 1984;55:2083-7.
4. Shafer, Hine, Levy. *Shafer's textbook of oral pathology*. 7th ed. Elsevier 2014. pp 49-51.
5. Saha S, Ray-Chaudhuri A. Mandibular

implant-retained complete overdenture using retentive abutments: A case report. *Dent Update (England)* 2009;36:154-8.

6. Maeda Y, Nakao K, Yagi K, Matsuda S. Composite resin root coping with a keeper for magnetic attachment for replacing the missing coronal portion of a removable partial denture abutment. *J Prosthet Dent* 2006;96:139-42.

7. Riley MA, Walmsley AD, Harris IR. Magnets in prosthetic dentistry. *J Prosthet Dent* 2001;86:137-42.

8. Akaltan F, Can G. Retentive characteristics of different dental magnetic systems. *J Prosthet Dent* 1995;74:422-7.

9. Carreiro AFP, Guerra CMF, De Moraes SLD, Neto AF, De Torres EM, De Almeida EO. The use of a magnetic attachment in a removable partial denture of a patient with periodontal tissue loss. *Int J Dent* 2009;8:215-9.

10. Smith GA, Laird WR, Grant AA. Magnetic retention units for overdentures. *J Oral Rehabil* 1983;10:481-8.