

# Creating Esthetic and Function for Patient with Evident Ectodermal Dysplasia by Magnetic Over-Denture- A Clinical Case Report

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**Abstract:** *The ectodermal dysplasia's is an extremely rare congenital, heterogeneous and non- progressive disorder. The clinical manifestations of ectodermal dysplasia cause considerable social problems. Prosthodontic treatment of the clinical traits of ectodermal dysplasia can have a deep impact on these patients. The possibility to look and feel like their peers is paramount for their psychological development. The literature has demonstrated the benefits that corrective prosthodontics has for the self- esteem and social well-being of these patients. Magnets have been used in prosthodontics for many years, but success has been limited because of their susceptibility to corrosion by the saliva and their retentive force is weak relative to the initial retention offered by mechanical attachments. This present article describe the esthetic rehabilitation of partially edentulous ectodermal dysplasia patient with the help of over-denture on roots with magnetic post.*

**Keywords:** Ectodermal dysplasia, Hypo-dontia, Magnetic over-denture.

## 1. Introduction

Ectodermal dysplasia is the term used to describe a group of rare, inherited disorders characterized by dysplasia of tissues of ectodermal origin-primarily, nail, teeth and skin, and occasionally, dysplasia of meso-dermally derived tissues. The condition is thought to occur in approximately 1 of 100,000 live births. Clinically, ectodermal dysplasia may be divided into two broad categories: the Hypohidrotic form (x-linked recessive) and the Hydrotic form (Autosomal inherited) [1]. Ectodermal dysplasia is characterized by a triad of signs comprising sparse hair (hypotrichosis), abnormal or missing teeth (hypodontia or anodontia), and an inability to sweat because of the lack of sweat glands (anhidrosis or hypohidrosis) [2-5]. Hypodontia, in turn, causes reduced alveolar bone growth and lack of development of the alveolar ridges which often appear clinically to be extremely narrow and concave lingually. Teeth, if present, are often conical in shape, malformed, widely spaced and compromised oral health [6]. The preservation of remaining root structure and alveolar bone covering them with denture has been used since many years [7]. In prosthodontics any dental prosthesis that covers and is partially supported by natural teeth, natural tooth roots, and/or dental implants is known as over-denture or overlay prosthesis [8].

Magnets have generated a great interest within dentistry and their applications are numerous. They are being used as retentive aids for over dentures, removable partial dentures, implants, and in orthodontics for corrections of malocclusion and for treating un-erupted teeth In Maxillofacial Prosthodontics they have been used for decades to reconstruct large defects with the help of multiple component prosthesis [9]. Dental magnetic attachment systems have been increasingly utilized in prosthodontics due to the development of hard magnetic substances such as samarium-cobalt and iron-neodymium-boron magnets (Fe14Nd2B). Conventional over-denture placement involves embedding the magnetic assembly in the denture base and inserting its corresponding keeper into the abutment root. The magnetic assembly holds

the keeper with a retentive force. These magnets have been used previously to stabilize the prosthesis in patient with advanced alveolar bone resorption [10]. This case report essentially emphasizes the Prosthodontic management of appearance and functionality of treatment in the form of a complete over-denture on root retained magnetic posts.

## 2. Case Description

19 year old female patient reported in department of prosthodontics crown and bridge, with the chief complaint of difficulty in chewing due to loss teeth. ACP classification class II Extra oral examination showed facial form ovoid, profile convex, facial muscle tone normal, adequate mouth opening. Mandibular movements were smooth with normal TMJ.

### Examination:

Extra oral examination: reveals broad forehead with frontal prominence, high hair line, low seated ears, thick slightly everted lips. Scalp, body hair, eyebrows and lashes are fine sparse and light in colour. The patient's skin was scaly, smooth, dry, wrinkled and hypo-pigmented. Intra-oral examination a showed hypo-dontia with micro-dontia. Early permanent teeth loss was reported because of compromised periodontal health for maxillary (11, 13 and 23) and mandibular anterior teeth (31, 32, 41 and 42) and sever carious evasion for mandibular posterior teeth (37 and 47). Grade II and grade III mobile teeth and grossly decayed teeth were advised for extraction (Fig no. 1&2).

On the basis of the clinical findings, different possible treatment options given for this patient were. (a) Extraction of remaining teeth followed by conventional complete denture. (b) Removable partial denture with respect to the missing teeth. (c) Full mouth extraction followed by fixed implant prosthesis/ removable implant supported over denture. (d) Teeth /root supported magnetic retained over denture for both maxillary and mandibular arches.

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The case was planned to receive tooth/root supported over-denture using magnets. Root canal treatment was advised for all remaining teeth. The location of the remaining teeth were favourable for an over-denture. After confirming from the patient about the teeth as abutments and fabricate an over-denture with treatment options, it was decided to use magnetic attachments owing to the obvious advantages of the retention of the roots. A diagnostic jaw relation was taken to analyze the amount of space available for any attachment. The space was found to be insufficient for using any attachments, a submerged roots with magnetic post on each quadrant was planned.

**Endodontic and Prosthetic therapy:** Root canal treatment were carried out for all the remaining teeth (14, 15, 16, 26, 33, 34, 43 and 46) followed by post space preparation for cast post. Keeper element were attached to the wax pattern of the post and it was casted along with it (irt 16, 34, and 46).

In this case report neodymium–boron–iron (NdBFe) magnets, stainless steel (AUM20) keeper was used. The heights of magnets were 1.0 mm and keepers height and diameter were 0.5 mm and 3.0 mm respectively, selected according to the cross section of the retained root. Selection of keeper (Cement-in keeper) is based on availability of denture space limited because, when completed, the root face is level with the gingiva. It is not suitable for small roots, because of the danger of lateral root perforation, or for patients with high caries susceptibility. The cast post with magnetic element is 5mm long, 3mm wide and 1.2mm thick, and root face should be large enough to accommodate a cavity of this size. This was soon followed by the technique of cementing magnets within the retained roots for the retention of over-dentures(Fig no. 3&4).

Border moulding and final impressions were made with selective impression technique followed by jaw relation, try in and acrylization procedure with heat polymerization technique (DPI) (Fig no. 5&6) was carried out. Final finishing and polishing done and checked in patients mouth for retention and stability. The magnetic element were placed in position, marked and trimmed on the tissue surface of both maxillary and mandibular denture and fixed with auto polymerizing resin.

Clinically acceptable and satisfactory retention achieved with help of magnetic farce. Interferences in denture were eliminated by lab and clinical remounting and denture is inserted in patient mouth. The patient was satisfied with the outcome of the denture (Fig no. 7). Post insertion instructions were given to the patient regarding maintenance and use of the prosthesis. At the 3 and 6months recall visits, no treatment complications were noted.

### 3. Discussion

The ectodermal dysplasia's are group of genetically inherited disorders that are characterized by primary defects in the development of 2 or more tissues derived from embryonic ectoderm. The tissues primarily involved are the skin, hair, nails, exocrine glands, and teeth. The most common ectodermal dysplasias are X-linked recessive hypohidrotic

ectodermal dysplasia (Christ-Siemens-Touraine syndrome), and hidrotic ectodermal dysplasia (Clouston syndrome)[11]. The clinical expression of ectodermal dysplasia varies, depending on the specific syndrome. Several ectodermal dysplasia syndromes may manifest in association with mid-facial defects, mainly cleft lip, cleft palate, or both. Patients with these form of ectodermal dysplasia exhibit the following abnormalities such as (1) hair anomalies (trichodysplasias), (2) dental abnormalities (Hypo-dontia), (3) nail abnormalities (onycho-dysplasias), and (4) exocrine gland dysfunction (dyshidrosis). The face of these patients is often smaller because of frontal bossing and a depressed nasal bridge. Oral traits such as anodontia, hypodontia, and conical teeth can be detected; anodontia also manifests itself by a lack of alveolar ridge development [12].

Oral rehabilitation of patients with ectodermal dysplasia is necessary to improve sagittal and vertical skeletal relationships during cranio-facial growth and development as well as esthetics, speech, and masticatory efficiency[2]. In addition to decreased vertical facial height of this patient resulted from the congenital absence of teeth leading to underdevelopment of the alveolar ridges. In order to enable a further unrestricted development, the dentures have to be adapted to the changing intra-oral situation due to growth. Historically, prosthetic treatment for ectodermal dysplasia patients involved removable partial dentures, removable partial or complete overlay dentures fixed partial dentures and Implant-supported denture[13]. Implant-supported denture is also suggested as the ideal reconstruction modality. The main problem is insufficient bone; if bone atrophy progresses in these already alveolar deficient patients, implant placement may not be possible without bone grafting. Early implant placement in a growing child may cause cosmetic problems because implants act similar to ankylosed teeth. Along with the cranio-facial growth, implant over-structures may not be in occlusion with opposite teeth and even the adjacent teeth may tilt into the space. Thus implant supported prosthesis may be less favorable, and therefore, the use of implants in young children should be considered carefully [14].

There are aesthetic, functional and psychological reasons that make it important to start oral rehabilitation early in life. However, this is usually a difficult condition to manage Prosthodontically, because of the typical oral deficiencies and patient's age. Numerous clinical reports have demonstrated the importance of prosthetic dental treatment in ectodermal dysplasia patients for physiologic and psychosocial reasons.

Magnetic forces are suitable for the retention and overcoming these difficulties. Devices retaining the over denture magnetically are called as 'magnetic attachments'[15]. Early attempts for using attractive force of magnet between 2 magnets for denture retention was reported in the early 1960s for denture retention were unsuccessful due to the large size of magnets at that time and the inadequate forces. Now a days use of rare earth magnets such as Sm-Co and Nd-Fe-B which come in small enough dimensions to be used in dental applications and still provide the necessary force [16].

The current resurgence of interest in this type of attachment appears justified because, unlike mechanical attachments, magnets have potential for unlimited durability and might therefore be superior to mechanical ball or bar attachments for the retention of removable prostheses on implants. To date, no long-term prospective trials have been conducted to confirm the clinical durability of this new generation of magnets for retaining dentures on either teeth or implants. These magnets became popular due to their small size and attractive forces; which allowed them to be placed within the prosthesis without creating an obstruction in the mouth. The standard magnetic retention unit consists of the magnetic retention element and keeper element. Magnetic retention element is made up of paired magnets, an attached keeper, and two protective end plates covering the paired magnet faces. Keeper element is detachable, oval-shaped, magnetizable, preformed disk or a cast root cap[17].

**Advantages of magnetic attachments:** a) Small size within over denture. b) Magnetic force work together with the negative pressure and adhesive retention over denture base. c) Increases the stability. d) Easily constructed without special technique. e) Insertion and removal of over-denture is easy. f) Reduces lateral forces on the abutment tooth. g) Teeth in poor condition such as residual root with caries and cyst, impacted teeth, loose teeth can be used as abutment due to minimal lateral pressure on the teeth. h) Also available for other prosthetic treatment such as retention of a removable bridge, minor tooth movement, and eruption of tooth.

**Disadvantages:** a) Low corrosion resistance. b) Cytotoxic effects of the leachants. c) High cost. d) Short track record. e) Physical effect due to magnetism.

**Clinical problems:** In comparison with other denture retention systems, magnetic over-denture retention gives few clinical problems. (i)The retentive force does not deteriorate with time or use, and may even increase if the contacting surfaces of the denture and root element wear slightly to produce a more intimate contact. (ii)Keeper element wear is not a problem, and the protective end plate thickness is sufficient to give a service life estimated to be at least 10 years before the underlying magnet alloy is exposed. (iii)Magnets may corrode, if they are not completely surrounded by denture base resin, and saliva penetrates around them. (iv)As with all over dentures, denture base fracture may occur, unless the base material is thick[18].

#### 4. Conclusion

Patients with ectodermal dysplasia are unique and oral problems must be evaluated individually to provide most ideal treatment. Magnetic assembly used in this case is a new generation magnetic attachment system which provides predictable retention, stability, support, and offers long term durability. This system has successfully rehabilitated the patient when compared to over-denture with implants, when cost and time factors were considered, however success of any prosthesis depend on the cooperation and communication between the dental team and patient.

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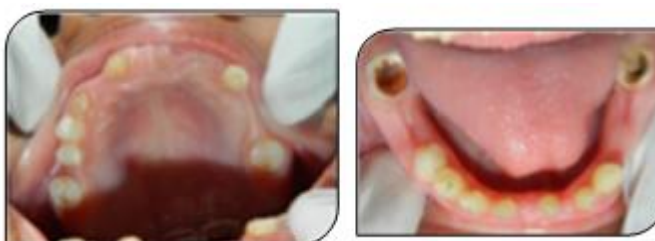
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**Figure No. 1 & 2: Intro-Oral View**



**Figure No. 3 & 4: Radicular Post With Magnetic Element Cementation**

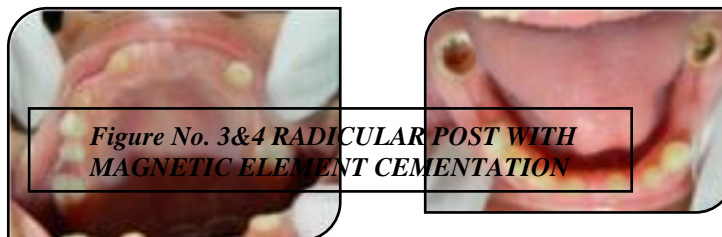


**Figure 5 & 6: Final Prosthesis with Keeper Element**



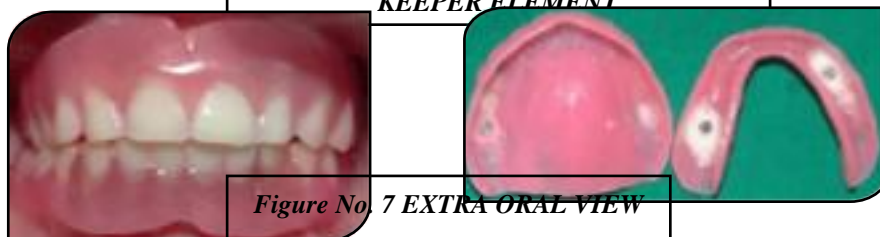
**Figure 7:** Extra Oral View

*Figure No. 1&2 INTRO-ORAL VIEW*



*Figure No. 3&4 RADICULAR POST WITH  
MAGNETIC ELEMENT CEMENTATION*

*Figure No. 5&6 FINAL PROSTHESIS WITH  
KEEPER ELEMENT*



*Figure No. 7 EXTRA ORAL VIEW*

