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Attachment supported dentures

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Abstract: *Over-dentures have been successfully used for many years in clinical application. They are one of the favored treatment modality in elder patients with few remaining teeth. Also it is an economic optionfor many other removable replacement treatments. The remaining teeth maintained under the denture preserve the alveolar ridge, provide sensory feedback and improve the stability of the dentures. The attachments on the remaining teeth enhances the retention of these dentures. This clinical report describes a method of fabricating a tooth supported over-denture retained with a prefabricated magnetic attachment and a cast partial denture with precision attachment for enhancing the retention of the prosthesis.*

Keywords: *Over-denture, cast partial denture, magnets, precision attachment.*

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I. Introduction

Overdenture treatment uses a removable complete denture that overlies retained teeth, tooth roots, or dental implants. This treatment is not a new concept and practitioners have successfully employed existing tooth structures or retained roots to assist with complete denture treatment for more than a century. The presence of a healthy periodontal ligament maintains alveolar ridge morphology, whereas a diseased periodontal ligament, or its absence, is associated with variable but inevitable time-dependent reduction in residual ridge dimensions.

To avoid this, two or more, coronally modified or restored retained teeth abutments are frequently endodontically prepared and are used as abutments for an overdenture. The objective is to distribute stress concentration between retained abutments and denture-supporting soft tissues. Retained root abutments can give better retention, support, and stability to an overdenture and also provide proprioception which would otherwise be lost with conventional denture treatment.An attachment retained dental prosthesis can improve patient esthetics and facilitate function. Implant retained prosthesis is an option but is sometimes not possible due to insufficient amount of bone or economic reasons.

Rehabilitation of partially edentulous arch can be challenging when it is a distal extention situation classified under Kennedy's class I and class II situations. In such a condition, a fixed partial denture cannot be fabricated because of missing distal abutment. Implant-supported prosthesis can be planned, but it is sometimes not feasible due to insufficient amount of bone and economic reason. So, in such situation an acrylic partial denture or a cast partial denture is largely preferred. Cast partial dentures are made retentive by the use of retainers and precision attachment components. Precision attachments could be extracoronal and intracoronal. Attachment-retained cast partial dentures facilitate both esthetic and functional replacement of missing teeth.

Magnetic and precision attachments have been successfully used in clinical practice, and so many clinicians feel that it is already part of everyday dentistry. Attachments provide some straight forward and effective solutions for the dentists working with removable prosthesis.

II. Case report

A 55 year old reported with multiple missing teeth in maxillary and mandibular arch. She gave a history of fractured lower partial denture. On intraoral examination it was noted that the patient had only maxillary second molars present bilaterally (Kennedy's class IV) and missing 36 37 44 45 46 47 and 42 (Kennedy's class I mod 1). The remaining teeth in maxillary and mandibular arch wereperiodontally stable.

After complete clinical and radiographic examination, a prosthetic treatment plan was set up. Prosthesis with endodontic treatment and Intraoral magnetic attachment was planned on 17 and 27. Prosthesis with extra-coronal precision attachment was planned for mandibular bilateral distal extension arch .Tooth 17 27 were endodontically treated and prepared to receive magnets intra-coronally. Tooth preparation for 31 32 33 34 35 and 41 43 abutment teeth was performed to receive porcelain fused to metal crowns. The abutments prepared were temporized after making definitive upper lower impression. Interim upper lower prosthesis was given to the patient.

Jaw relation was done. Lower metal copings with OT attachments with posterior metal framework was fabricated and tried in patient's mouth. Upper lower set up trial and lower bisque trial was tried in patients mouth. After evaluation of occlusion esthetics and phonetics dentures were flaked.

Lower porcelain fuse to metal crowns were luted in patients mouth with GIC. Complete seating of finished mandibular combined prosthesis with extracoronalcastable distal extension precision attachment was evaluated clinically and maxillary magnet supported overdenture denture was also seated in the patient's mouth and the patient was recalled after 24 hrs for postinsertion checkup.

III. Discussion

Overdenture is a kind of treatment option which anchors the denture to the abutment to provide better retention, support and stability and also increases the oral health related quality of life of the patients. Previously repelling force of magnets also have been used to prevent dislodgement by embedding magnet in posterior teeth of maxillary complete denture and with repelling magnet in mandibular denture. So as they come in close approximation magnet in upper denture repels the magnet of lower denture to prevent dislodgement. 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 mainly because of 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.

There are 2 possible ways by which a magnet cancause injury to the tissue.

1. Physical effect due to magnetism.
2. Chemical effect due to corrosion product.

Many aspects like cell toxicity, cell growth, and allergic response were tested for Morden magnets and the results meet international standards. According to Gillings and Samant , the lateral forces imposed on the root are very small as magnetic retention presents very little risk of trauma to the root that supports the overdenture.

The magnetic assembly contains the magnet inside and is set in the denture base. The keeper is magnetically attracted to the magnetic assembly and is attached to the tooth root. Additional retention of the prosthesis is thus provided by the attraction between the magnet in denture and the keeper on the root face.

An overdenture retained using magnetic attachment is easy to insert and remove and so has widespread application for the older patients who need nursing care and disable patients and those with reduced manual dexterity. It expands the possibility of using for preserving tooth roots for retention as well as support which are otherwise lost with conventional denture treatment. Clinical advantages of magnetic attachment are superior aesthetics, protection of abutment teeth, easy insertion and removal, easy technical operation, easy cleaning.

Dr. Herman Chayes first reported the invention of attachment in early 20th century. Removable partial denture with semiprecision or precision attachments for retention and support are best prosthesis available to dentistry where fixed restorations are contraindicated. Precision attachment has feature of being removable prosthesis with improved aesthetics, less postoperative adjustments and better patient comfort.The stress on the abutment due to the difference in nature and behavior of the tissues supporting RPD is critical for long term success of prosthesis. The stress control on this abutment is achieved through dual impression technique, broad coverage and stable denture base, rigid design, splinting of dentition, proper selection of attachments and clasp design.

An appropriate attachment is to be selected for each individual case depending on many factors like periodontal condition, amount of space available, quality of bone support, location of abutment, angulation of the roots to occlusal plane and patient desire.

The tooth must have adequate crown height to house the attachment components and effectively offset the leverage forces exerted on the crown. In addition adequate height must be present for the corresponding attachment components to be housed within the RPD framework or supportive acrylic resin while allowing an optimal artificial tooth replacement. In this case abutments were of adequate clinical crown height to receive attachments.

Staublihas categorized attachments into six classes from rigid to universal resiliency. The greater the degree of resiliency suggests less torque transfer to the root and implant abutment. Attachments for Kenedy's I and II which are increased tissue supported should be considered resilient as resilient attachment allow for a spectrum of movements, hence reducing the stresses on abutment. They also permit vertical movement during mastication reducing stress transfer to the abutments (stress breaking function) and direct the forces to the residual ridge acting as stress redirectors . The attachments used in this case were extracoronal OT Cap, which are castable attachments with elastic retention. With its elasticity it is possible to control the flexure and constrict a resilient and shock absorbing prosthesis.

IV. Conclusion

Removablepartial dentures with attachments are the viable options for patients where other treatment alternatives like implants and fixed partial dentures are contraindicated. They provide not only with functional ability, but also with good satisfactory esthetics. Proper diagnosis, systematic treatment planning, proper selection of attachments and periodic recall preventive therapy would result in a successful treatment and patient satisfaction.

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Fig.1 Preoperativeextraoral view

Fig.2 Preoperative extraoral side view

Fig.3 Intraoral view of maxillary arch

Fig.4 Intraoral view of mandibular arch

Fig.5 Preoperative Intra oral view of maxillary arch

Fig.6 Preoperative Intraoral view of mandibular arch

Fig.7 Border bolding for maxillary arch

Fig.8 Final pick up impression with magnet for maxillary arch

Fig.9 Final impression for mandibular arch

Fig.10 Teeth set up trial for maxilla and bisque trial for mandible

Fig.11 Teeth set up trial for maxilla

Fig.12 bisque trial and lower CPD trial for mandible

Fig.13 Final magnet supported denturefor maxilla

Fig.14 Final anterior bridge with posterior attachment supported CPD

Fig.15 Maxillary and Mandibular prosthesis in centric occlusion

Fig.16 Magnets picked up in maxillary denture

Fig.17 Postoperative extraoral view

Fig.18 Post operativeextraoral lateral view