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A multi-modality treatment approach with precision attachment and implant overdenture for geriatric patient: A case report

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Abstract--Partial and complete edentulous conditions are a common occurrence in the field of dentistry. Many patients report to the dentist with the loss of posterior teeth or complete loss of teeth with compromised bone conditions. Often, these scenarios are difficult to treat with a one-way approach and may require a multidisciplinary approach. Complete loss of bone or compromised bone conditions may delimit the fixed options. Hence, a treatment option that can bridge the pathway between fixed and removable options can be elected, to give patients a satisfactory restorative treatment which will fulfill both functional and esthetical demands. This clinical report describes the complete rehabilitation of partial and complete edentulism by combining the principles of fixed and removable prosthodontics to obtain the benefits of both the treatments.

Keywords--precision attachment, mandibular implant overdentures, partial edentulous, complete edentulous, RHEIN 83 attachments, O-Rings.

Introduction

DeVan stated: "Perpetual preservation of what remains is more important than the meticulous replacement of what is missing" Hence, the objective of preventive prosthodontics should be towards preserving the existing teeth and utilizing them to provide functionally and esthetically satisfactory restoration to restore the overall well-being of an individual. Precision attachment serves as a very good option to utilize the existing teeth, providing benefits like proprioception, reduced bone loss and cost-effective treatment.^[1] Implant overdentures enhance the stability and increase the retention of prosthesis while providing adequate support. Enhanced osseointegration with lesser complications makes overdentures a good treatment option in the mandibular anterior region.^[2]

Case Report

A 62-year-old female patient reported to the Department of Prosthodontics with chief complaint of missing teeth in maxillary posterior region since last six months and mandibular anterior as well as posterior region since last one year. No relevant medical history was unveiled. Dental history disclosed loss of teeth was due to periodontal reasons. Patient was a lower complete denture wearer for eight months and was willing for a fixed prosthesis. On extra-oral examination, no abnormalities were detected. Intra-oral examination revealed maxillary fixed partial denture extending from right second premolar to left second premolar and Kennedy's class I condition, completely edentulous mandible with complete denture [Figures 1,2 and 3].



Fig1: Pretreatment intraoral view



Fig2: Pretreatment maxillary intraoral view



Fig3: Pretreatment mandibular intraoral view

A full mouth Cone-beam computed tomography was advised [Figure 4].

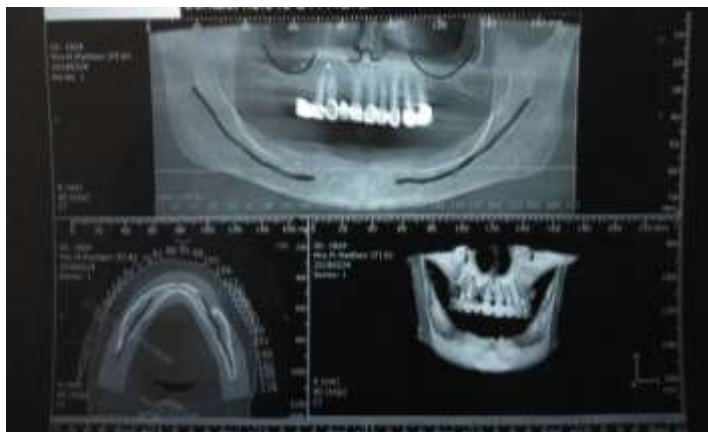


Fig 4: Cone beam computed tomography

Radiographic examination revealed acceptable endodontic condition with reduced maxillary posterior bone height. In mandible anterior region, bone height was good however posteriorly bone height was compromised. Patient was advised multiple treatment options. In maxilla, patient opted for fixed prosthesis with posterior precision attachment and in mandible, with implant over denture as the patient wanted to avoid complex grafting procedures.

Treatment Protocol

Maxillary and Mandibular diagnostic casts were fabricated for future reference. Implant placement surgery was planned with two implants in canine locations for mandibular implant-supported overdenture. For implant surgery, conventional protocol was followed: Flap reflection was done in the mandibular implant region. Stent fabricated using previous denture was placed and implant location was marked. Drilling protocol was followed; paralleling pins were used to verify the angulation, location of implants clinically and radiographically. After confirming with the radiographs, the implants were placed [Figure 5] and suturing was done.



Fig 5: Implant placement

Post-surgical instructions were given and follow-up was done. Suture removal was done for the patient after a week. It was decided to wait for a period of three months for final placement of implants. Complete denture prosthesis was given to patient till then.

Simultaneously maxillary procedure was started. The fixed partial denture was cut and removed. The tooth preparation was refined. The right maxillary central incisor was grossly decayed palatally and needed post and core treatment. Tooth preparation was refined for remaining maxillary teeth and post space preparation was done for central incisor. Cast post was planned. An acrylic impression of post space was made and the post was casted. The metal post was finished and polished followed by cementation [Figure 6].



Fig 6: Cast post cemented

Maxillary final impression was made for fabrication of wax pattern to which precision attachments had to be attached. Wax pattern was designed and surveyed for attaching the precision attachment components. Parallelism of attachments was evaluated on surveyor. After verifying all the components were casted. Metal trial was done followed by bisque trial and pick-up impression. [Figure 7].



Fig 7: Bisque trial with attachment

Maxillary fixed partial denture was cemented. Cast partial denture pattern for maxillary posterior teeth was designed and counter components of precision attachment were incorporated and casted. Metal cast partial denture was checked in the patient's mouth [Figure 8].



Fig 8: Metal framework try in

After three months, radiographic examination was done of mandibular implants and second stage was completed [Figure 9].



Fig 9: Second stage

After two weeks of second stage, mandibular border molding and pick-up impression was made [Figure 10].



Fig 10: Bordermoulding and pickup impression

Lab analogues were used to retain the over denture components. Wax teeth trial of maxillary posterior teeth and mandibular complete denture was done. Maxillary cast partial denture was inserted and mandibular implant ball attachments were placed on implants and O-rings were incorporated into mandibular denture. Mandibular overdenture was delivered to the patient [Figures 11,12 and 13].



Fig 11: Maxillary final prosthesis



Fig 12: Mandibular final prosthesis



Fig 13: Post treatment intraoral view

Patient was given instructions on how to remove and wear the dentures. Maintenance protocol was explained to the patient. This was followed by regular follow-ups.

Discussion

Patients often report with reduced bone loss conditions narrowing down the available treatment options. Whenever patients report with few natural teeth, saving the natural teeth serves has a best option due to various reasons like

proprioception, better distribution of forces and greater patient satisfaction.^[3] Precision attachment is a connector system consisting of various components. One component is adapted to the fixed prosthesis during the fabrication of the wax pattern and the second component is placed in the removable partial denture. The system used in this case is RHEIN 83 OT CAP which is a castable extracoronal attachment with male component casted with crowns and female components which are nylon caps are inserted in removable partial denture.^[4] There are various advantages to this treatment option such as better retention and stability. It also helps in splinting to provide better biomechanics of fixed prosthesis as well as esthetics, hygiene and maintenance qualities of removable dentures.^[5] However, there are certain disadvantages like it requires good skill and more time. The components are subjected to wear and tear over a period of time which might need replacement.^[6] Overdentures serve as a better alternative compared to complete dentures. Overdentures provide advantages like less cost compared to fixed implant options, shorter appointments and prosthesis being less complicated.^[7] Ball attachments are chosen because they are cheaper in cost, less technique sensitive and easier to maintain.^[8] However, due to varied loading patterns and bone conditions, there are some evidence of bone loss in mandibular over denture cases.^[9] Yet mandibular overdentures serve as a good alternative treatment to conventional dentures particularly for the elderly age group with limited income and reduced physical ability as compared to fixed implant options. In cases of partially edentulous conditions, precision attachments provide better chewing ability, comfort, and better patient satisfaction.^[10]

Conclusion

The success of any treatment depends on a good step-wise diagnostic approach followed by a sequential treatment plan. Sometimes the patient may report with compromised oral conditions, utilizing the existing tooth and bone condition to maximum benefits may give patient better satisfaction functionally and esthetically. This may sometimes require combining the biomechanics and science of both fixed and removable treatment options to provide patients with prosthesis that satisfies biomechanical, functional and esthetic requirements. The patient was completely satisfied with treatment.

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Conflicts of interest

There are no conflicts of interest

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