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Prosthodontic Rehabilitation- Telescopic Overdenture And Cast Partial Dentures

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Abstract

Long span partially edentulous condition presents a challenge for Prosthodontists. A comprehensive treatment plan is necessary to meet the patients demands and tackle their chief complaint. Bearing in mind, the principles of Preventive Prosthodontics, in such conditions with very few natural teeth, telescopic overdentures have proven to be advantageous. An enhanced stability, retention and support is offered by telescopic overdentures over conventional tooth supported overdentures. Another treatment option can be the combined use of fixed partial dentures along with cast partial dentures, in which the abutment teeth can be splinted together and be used for the retention and stability of cast partial dentures in cases with long span edentulism. This case report describes the prosthodontic rehabilitation of the patient using a combination of all the aforementioned treatment modalities to deliver the best possible outcome.

Keywords: Telescopic overdenture, Cast partial denture, Fixed partial denture, Mastication, Aesthetics, Rehabilitation, Prosthodontics

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Introduction

Going by the statement of M.M Devan "It is more important to preserve what already exists than to replace what is missing", modern day dentistry aims to preserve the natural existing teeth which indicate a good prognosis.Any procedure that can delay or eliminate potential future problems come under preventive prosthodontics[1]. In conditions with long span edentulism, the prosthetic replacement options available are tooth or tissue supported removable partial dentures, fixed partial dentures or implant supported prosthesis.

Over denture therapy is essentially a preventive prosthodontic concept since it attempts to conserve the few remaining natural teeth[2].While the bone loss following the removal of teeth is stated to be rapid, progressive, irreversible and inevitable, it is equally well observed that bone is maintained around retained teeth and implants[3]. A telescopic overdenture is defined as any removable dental prosthesis that covers and rests on one or more remaining natural teeth, the roots of natural teeth, and/or dental implants; a dental prosthesis that covers and is partially supported by natural teeth, natural tooth roots, and/or dental implants(GPT 9)[4].

Telescopic crowns were initially introduced as retainers for removable partial dentures (RPDs) at the beginning of the 20th century. Because of its resemblance to the collapsible optical telescope, this system which can be fitted into each other, became known as the telescopic overdenture.A telescopic overdenutre is a prosthesis which consists of a primary coping cemented to the prepared abutments in a patient's mouth and a overlying secondary coping which is attached to the removable prosthesis which fits on the primary coping. The copings are interconnected by friction due to interfacial surface tension.

The tension should be sufficiently strong enough to retain the prosthesis in place.The taper of the walls of the primary coping can be adjusted according to the requirements of each patient[5]. These prosthesis reduce and/or minimise the destructive shear and masticatory forces by directing them along the long axis of tooth and periodontium. Hence, it increases the retention and stability of the prosthesis[4].

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The use of fixed partial dentures(FPDs) in oral rehabilitation may not be recommended when the remaining teeth are unable to withstand masticatory loadings. When the use of dental implants and/or conventional FPDs is limited or contraindicated, combining the principles of fixed and removable prosthodontics can deliver a favourable outcome. The advantages that this setup provides are prosthetic replacement of missing teeth, prosthetic restoration of endodontically treated teeth, splinting of periodontally weaker tooth with sound teeth, thus improving its prognosis. Cast partial dentures provide stress breaking function, enhances retention and stability, patient comfort, durability and are easy to maintain as advantages.

Thus, a prosthetic replacement joining FPDs and CPDs can be used in conjunction for a favourable prognosis.

Case report

A 72 year old female patient reported to the Department of Prosthodontics, D.Y.Patil University School of Dentistry, Nerul, Navi Mumbai, with a chief complaint of difficulty in chewing and poor aesthetics due to multiple missing teeth in both upper and lower arches. On extraoral examination, the patient exhibited a concave facial profile with loss of muscle tone of the cheeks due to reduced facial height.

On intraoral examination there were missing 11,12,13,15,17,21,22,25,26,27 in the maxillary arch and 31,32,33,35,36,41,42,45,47 in the mandibular arch (Fig 1.).

The patient was sent for an orthopantomograph (OPG) and the diagnostic impressions were made using irreversible hydrocolloid material (Zhermack, Plastalgin)

An examination of the OPG was done to check the periodontal prognosis of the remaining teeth, the teeth with unfavourable prognosis were indicated for extraction, 23 was extracted due to severe gingival recession and bone loss. Multiple treatment options were suggested to the patient, including implant therapy. The patient was interested in saving the remaining teeth and was not keen on implant therapy so as to avoid undergoing a surgical procedure owing to her age and the costs involved.

After consideration of all the involved factors, a treatment plan for a tooth and tissue supported telescopic overdenture with respect to 14,16 and 24 was planned. Along with a fixed partial denture with respect to 34,35,36,37,44,45,46,47 was planned with incorporated rest seats to support and retain a cast partial denture for the prosthetic replacement of 31,32,33,41,42,43. Patient underwent periodontal therapy- scaling,

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root planing to preserve and improve the periodontal status of the remaining teeth. All the teeth to be retained were endodontically treated to improve their prognosis and to enable the desired tooth preparation.

The treatment plan was followed by the recording of a diagnostic jaw relation to evaluate the available interarch space. This is done to confirm the presence of adequate space for the planned prosthesis to offer good masticatory, aesthetic and speech support.

In cases with a combination of fixed and removable prosthesis, the planning for the removable denture precedes that of the fixed denture, and the placement of the fixed denture precedes that of the removable prostheis. The mandibular cast was surveyed and the planning for the cast partial design was carried out for the Kennedy's class 4 edentulous space. A lingual plate major connector and direct retainers on 36,37,33,46,47,43 were designed with the rests to be incorparated in the the crowns of the abutment teeth.

Teeth were prepared in the maxillary and mandibular arch. (Fig 2). sAfter preparation impressions of both the arches were made using the two-stage impression technique with a polyvinylsiloxane material (Aquasil Regular Set).

Primary copings were fabricated on the final cast of the maxillary arch, try in of the fabricated copings was carried out in the patients mouth(Fig.3). On confirmation of the fit, they were cemented using glass ionomer cement (HY bond CX Smart).

Bisque trial was carried out on the prepared abutment teeth of the mandibular arch, upon confirmation of an accurate fit, the FPD was cemented using glass ionomer cement.

A metal framework try in was done for the maxillary telescopic overdenture and the mandibular cast partial denture, to confirm the fit and optimal coverage over the soft tissue structures of the oral cavity (Fig.5). Definitive Jaw relation and facebow (Whipmix) records of the patient were recorded and the maxillary and mandibular casts were mounted on the semi-adjustable (Hanau Wide-Vue) articulator (Fig.6). Teeth arrangement was completed on the wax rims on which the jaw relation was recorded (Fig.7). Try in was carried out in the patients mouth. The occlusion was checked along with the centric, protrusive and laterotrusive records (Fig.8).

The aesthetics and speech were also checked.

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The Maxillary telescopic overdenture and the mandibular CPD denture insertion was carried out in the same appointment. (Fig.9 & 10). Follow ups were done so as to confirm the fit and comfort provided to the patient, to check the standard of intraoral hygeine mantainance so as to prolong the life of the underlying abutment teeth.

Discussion

Considering the age of the patient, implant supported prosthesis was ruled out as a treatment option for the patient. It is a documented fact that after the loss of the teeth the residual alveolar ridge undergoes rapid loss in all dimensions. The phenomenon of residual ridge resorption (RRR) following removal of teeth has been well observed and documented in literature[2] . It has been found that telescopic dentures have better retention, stability, support and chewing efficiency as compared to the conventional overdentures and also, there is a decrease in the rate of the residual ridge resorption because of the proprioception, better stress distribution and the transfer of compressive forces into the tensile forces by the periodontal ligament, which effects the rate of bone remodeling[3]. The teeth which are too weak to support a fixed partial denture and are considered unsuitable to support a removable partial denture can often at times be usefully conserved and suitably modified to act as abutments under over dentures for useful span of time[2]. Careful assessment of the interarch space is very important for the successful fabrication of the telescopic dentures. Adequate space must be present to accommodate the primary, secondary copings and denture base thickness to avoid fracture.An even distribution of the abutment in each quadrant of the arch is preferable for better stress distribution and for increased retention and stability of the prosthesis[3].

Full mouth rehabilitation using an FPD/CPD is one of the most conservative and best indicated therapeutic modalities considering the limiting bone condition and the financial status of the patient.In the conventional removable partial denture, forces or loads are directed by the the abutments to supportive bone and periodontium. Factors such as direction and magnitude of forces, the retentive element, asthetics and the maintiainance of the underlying soft tissue must be taken into consideration while designing the CPD.

Furthermore, this treatment option provides a better esthetic appearance and improved retention and function than does a conventional clasp-retained CPD over

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natural teeth with a weaker prognosis[7]. The incorporation of the FPD component not only prevents the extraction of teeth with a fair prognosis, but also avails a fixed prosthesis which is usually preferred by the patient and invokes more confidence within the patient, while acting within the biomechanical principles.

The prognosis of a telescopic overdenture depends upon the health and status of the abutment teeth thus, it is necessary to periodically monitor the condition of these teeth by maintaining a regular followup and take the required steps to prolong the useful span[8].

Conclusion

Although, in comparision to the conventional complete dentures, the number of appointments needed and the costs involved are greater in the above said treatment, it provides a superior health service. They allow the retention of natural teeth, the quality of function of which cannot be emulated by any of the current prosthetic modalities. Provision of much better retention,stability,support and proprioception is made which enables improved masticatory efficiency and phonetics. The additional benefit of reduced alveolar ridge resorption also works in its favour.

The complete absence of the natural teeth also creates a steeper learning curve for the patient to use the prosthesis. Though the use of implants for overdenture support sees a continual increase in use in the current day, tooth/root supported overdentures still is a good treatment modality.

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Pre operative extraoral photographs

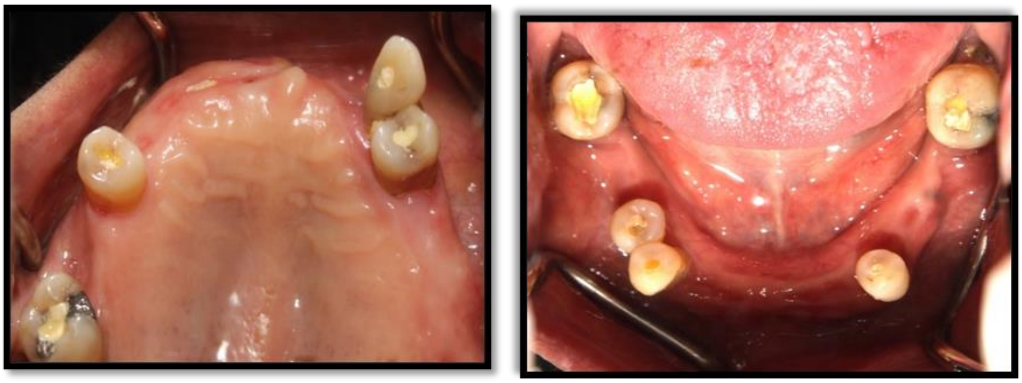

Fig 1: Pre operative intraoral photographs

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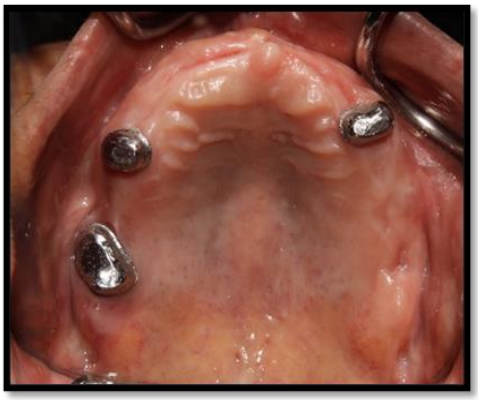

Fig 2 Teeth prepared, with coping tryin

Fig.3 Mandibular teeth prepared

Fig.4 Cementation of FPD with rest seats

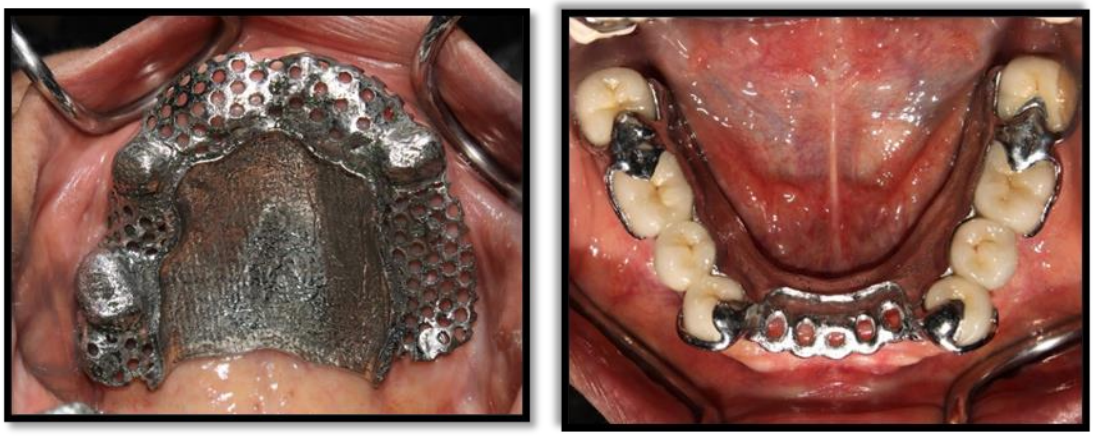

Fig.5 : Metal framework trial

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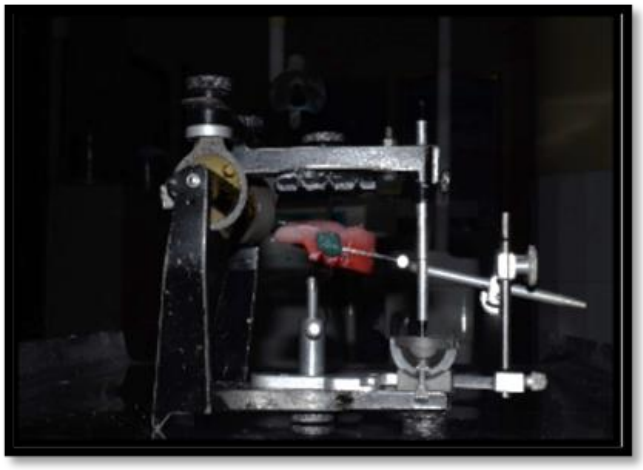

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Fig.6. Facebow transfer and mounting

Fig.7 Teeth arrangement

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Fig.8 Try in of Maxillary Overdenture and mandibular CPD

Fig.9 : Denture insertion

Fig.10 : Extraoral photographs post denture insertion

Pre-operative

Fig. 11

Post-operative