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Telescopic Overdenture - A Case Report

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Abstract: ***Complete denture fabrication can be a treatment challenge for many dentists, especially when the patient has remaining teeth. So, planning for use of clinical alternatives to improve the treatment prognosis and to enable greater comfort to patient must be considered. Bearing in mind the philosophy of Preventive Prosthodontics, tooth supported overdenture therapy has long term advantage, by preserving the proprioception and thereby residual alveolar ridge. A telescopic denture is a prosthesis which consists of a primary coping which is cemented to the abutments in a patient's mouth and a secondary coping which is attached to the prosthesis and which fits on the primary coping. This clinical report describes the prosthodontic rehabilitation of a patient with the remaining maxillary natural teeth by telescopic overdenture for added advantages like better retention, stability, support and psychological benefits of the patient.***

Keywords: Preventive prosthodontics, Telescopic overdenture, Primary coping, Secondary coping, Double crown, Retention bead

1. Introduction

Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future problems [1]. Retention of teeth, roots of one or more teeth for overdenture offers the patient a lot of advantages like better retention, stability, proprioception, support, maintenance of alveolar bone and psychological aspect of retaining teeth. The use of tooth-supported overdenture is a common form of treatment.

Telescopic crowns were initially introduced as retainers for removable partial dentures (RPDs) at the beginning of the 20th century. They are also known as a double crown, crown and sleeve coping (CSC), or as *Konuskrone*, a German term that described a cone shaped design. Because of its resemblance to the collapsible optical telescope, this system of double crowns, which can be fitted into each other, became known as the telescopic overdenture [2].

According to GPT, a telescopic denture is also called as an overdenture, which is defined as any removable dental prosthesis that covers and rests on one or more of the remaining natural teeth, on the roots of the natural teeth, and/or on the dental implants. It is also called as overlay denture, overlay prosthesis, and superimposed prosthesis [3].

Telescopic overdenture is a prosthesis which has primary full coverage crowns (primary coping) which are luted on the prepared tooth and a secondary superstructure casting which is then fabricated on this (secondary coping) and is attached to the removable prosthesis [2]. Both the components are interconnected by friction due to interfacial surface tension.

The retention and the stability of the telescopic denture are directly related to the number and the distribution of the abutments along the dental arch and the taper of the wall of the primary coping. The tapered configuration of the contacting walls generates a compressive interfacial surface tension. The tension should be sufficiently strong enough to sustain the prosthesis in its place. An increase in the tapering of the coping walls reduces the retention between the copings. The smaller the degree of the taper, the greater is the frictional retention of the retainer [4]. In case of abutments with short clinical height, the walls should be kept parallel or the taper of the wall should be reduced (2-5 degree) to improve the retention. The taper of the walls of the primary coping can be adjusted to a predetermined angle, according to the special requirements of each patient.

The telescopic overdenture philosophy postulated a transfer of occlusal forces to the alveolar bone through the periodontal ligament of the abutment teeth or the retained roots. A proprioceptive feedback from the periodontal ligament prevents the occlusal overload and it consequently avoids the residual ridge resorption which is adjacent to the roots and the rest of the ridge, due to excessive forces [5]. They also provide improved functions as compared to the conventional dentures, such as an improved biting force, chewing efficiency and even phonetics. The impairment of these functional parameters which are created by edentulism, reflects the significant role of the periodontal receptors for a sensory feedback and a discriminatory ability from the retained roots. Tooth loss results in loss of the proprioception mechanism that has been a part of the sensory programme throughout life.

2. Case Report

A 55 years old female patient, reported to the Department of Prosthodontics, Dayananda Sagar College of Dental Sciences & Hospital, Bangalore, with a chief complaint of difficulty in chewing due to ill fitting upper removable partial denture and missing lower teeth.

Intra oral examination showed:

- Ill fitting maxillary RPD w.r.t 11,12,13,21,22,23 and 24
- Missing teeth w.r.t 34,35, 36,37,45, 46 and 47
- Grade III mobility w.r.t 31,32,33,41,42 and 43
- Grade II mobility w.r.t 14, 15,16, 25,26 and 44

The clinical and radiographic examination revealed that only 17 and 27 presented with no periapical pathology or

mobility and so the rest of the teeth were indicated for extraction.

All treatment options were presented and discussed with the patient, which included total extraction and conventional denture or telescopic complete denture for maxillary arch and conventional denture for mandibular arch. After considering the financial aspects and amount of time, the patient elected to have telescopic maxillary over denture and conventional mandibular complete denture.

After taking consent from the patient, all the periodontally compromised teeth were extracted, oral prophylaxis, root planning and endodontic treatment of abutment teeth, i.e. 17 and 27 were carried out, emphasizing oral hygiene instructions and maintenance

Post extraction, after complete healing, the maxillary and mandibular edentulous ridge was favorable with firmly attached keratinized mucosa and the abutment teeth were also firm. There was sufficient interarch space for the copings, the denture base and the teeth arrangement (Fig 1).

After assessing endodontic therapy, tooth preparation was done, preparing a chamfer finish line and parallel walls, for receiving primary copings to 17 and 27. Impressions were made by the putty reline technique. The impression was poured to obtain the cast, on which the primary copings were fabricated (Fig 2). The fit of the primary coping was evaluated in the patient's mouth, after which they were cemented on the abutments with glass ionomer cement (Fig 3). Alginate impression for maxillary arch (Fig 4) and conventional impression with impression compound for mandibular arch was made and custom tray was fabricated. Border moulding was performed in a conventional manner and final impressions were made with regular body elastomeric impression material (Fig 5) and master cast was poured. On the maxillary cast secondary copings were fabricated which consisted of small metal projections known as retention beads (Fig 6), which helped in the mechanical interlocking of the secondary copings in the denture base. The frictional contact between the primary and secondary copings was checked in the patient's mouth. The secondary copings were placed back on the master cast and covered with wax and the trial denture base was fabricated with autopolymerizing acrylic resins. The placement of the wax over the secondary copings helped in the easy separation of the copings from the trial denture base at the time of the dewaxing. Occlusal rims were fabricated over the trial denture base and maxillomandibular relation was obtained and transferred to a semi adjustable articulator by using a face bow. The artificial teeth were selected and arranged after which denture trial was done to evaluate for phonetics, aesthetics, occlusal vertical dimension and centric relation (Fig 7). After the patients' approval was taken, wax up was done and the dentures were processed, finished and polished. Final insertion of the maxillary denture with secondary copings attached (Fig 8) and conventional mandibular denture, was done and post insertion instructions were given (Fig 9). During the following recall visit the patient reported with satisfactory fit and ease of use of the dentures.

3. Discussion

The phenomenon of residual ridge resorption (RRR) following removal of teeth has been well observed and documented in literature[6]. 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 standing teeth and implants [7]. The few remaining teeth can often at times be usefully conserved and suitably modified to act as abutments for over dentures.

Telescopic crowns have been used mainly in RPDs to connect dentures to the remaining dentition [8] and also as effective direct retainers [4], but these can be used effectively to retain complete dentures which receive their support partly from the abutments and partly from the underlying residual tissues.

The telescopic overdenture system used in this case in maxillary arch revealed a long lasting usefulness in the prosthetic treatment of the patient. There are many advantages of telescopic crowns like axial load of the tooth and full covering of the abutment, which may reduce tilting forces with their negative influence on abutment supporting tissues [2]. It has been found that telescopic dentures have better retention, stability, support and chewing efficiency as compared to the conventional complete dentures and also, there is a decrease in the rate of the residual ridge resorption because of 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.

Careful assessment of the interarch space is very important for the successful fabrication of the telescopic dentures. Sufficient space must be present to accommodate the primary and secondary copings, to have a sufficient denture base thickness to avoid fracture, space for the arrangement of the teeth to fulfill the aesthetic requirements and to have an interocclusal gap. The space consideration usually requires the devitalization of the abutments [9]. The selected abutments should be periodontally sound with adequate bone support and no/ minimal mobility. There should be at least one healthy abutment in each quadrant. 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.

As the status of telescopic overdenture prosthesis and its benefits to the patient depend solely on the continued retention of the underlying abutments, it is necessary to periodically monitor their health through recall and review appointments and institute necessary steps to prolong their useful span which helps in making the telescopic over denture therapy a continued service [10].

4. Conclusion

Telescopic overdenture may be considered as a good alternative to the conventional dentures, because they provide better retention, stability, support, stable occlusion, decrease in the forward sliding of the prosthesis and better

control of the mandibular movements because of the proprioception feedback which increases the chewing efficiency and even phonetics, as compared to the conventional complete dentures. Retaining teeth permit the stresses of occlusion to be borne partially by the teeth, thus reducing the abuse, which the alveolar process and the mucoperiosteum undergo when dentures are worn. By reducing the trauma to the mucosal tissues, it is reasonable to expect that resorption of the alveolar process will be lessened.

5. Future Scope

The future possibilities of improvement in telescopic overdenture includes, the use of magnetic telescopic crowns, o- ring coping attachment and also prefabricated telescopic attachments

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Figure 1: Intra oral view with remaining natural teeth

Figure 2: Cast showing prepared tooth over which the primary copings will be fabricated.

Figure 3: Primary copings cemented on the abutments

Figure 4: Alginate impression after the cementation of primary copings.

Figure 5: Border moulding and secondary impression with medium body elastomer.

Figure 6: Secondary copings with retention beads fabricated on the master cast.

Figure 7: Trail denture

Figure 8: Intaglio view of maxillary denture with secondary coping

Figure 9: Post insertion view of telescopic over denture.