TELESCOPIC OVERLAY DENTURE- A PREVENTIVE APPROACH FOR MINIMIZING THE CONVENTIONAL COMPLETE DENTURE PROBLEMS: A CASE REPORT

ADITI PATEL, RAVI SUREJA, SUCHETA BECTOR, J. R. PATEL, RAJESH SETHURAMAN, NAVEEN Y.G.

ABSTRACT: Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future prostodontic problems. In the past when patients presented themselves as candidates for a denture with teeth that were badly broken down with periodontal involvement or without the ability to financially support an extensive restorative treatment, those teeth were extracted that could have been retained under more favourable conditions. Retention of the roots of one or more teeth for overdenture offers the patient a lot of advantages like better stability, proprioception, support among a few. The following case report is on telescopic over denture for mandibular arch.

Keywords: Telescopic overlay denture, Preventive prosthodontics, Double coping.

INTRODUCTION
Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future prostodontic problems. The overdenture is a logical method for the dentist to use in preventive prosthodontics. 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. It thereby increases the retention and stability of the prosthesis. 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. Although first described by Starr in 1886, telescopic copings were initially introduced as retainers for removable partial dentures (RPD) at the beginning of the 20th century. 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 denture. Telescoping refers to the use of a primary full-coverage casting (coping/male telescopic portion) luted to the prepared tooth with a secondary casting (superstructure/secondary crown/female telescopic portion), which is a part of the denture framework and is connected by means of interfacial surface tension over the primary casting. Alternate descriptive terms are double crown, crown and sleeve coping, or Konuskrone, which is a German term for a cone-shaped design. They act by transferring forces along the direction of the long axis of the abutment teeth and provide guidance, support, and protection from movements that might dislodge the RPDs. Telescopic crowns can also be used as indirect retainers to prevent dislodgement of the distal extension base away from the edentulous ridge.

These crowns are an effective means for retaining the RPDs and dentures. They transfer forces along the lingual axis of the abutment teeth and provide guidance, support and protection from the movements that dislodge the denture. The double crown systems are usually distinguished from each other by their differing retention mechanisms. There are three different types of double crown systems. These are, telescopic crowns which achieve retention by using friction, and conical crowns or tapered telescope crowns which exhibit friction only when they are completely seated by using a "wedging effect." The magnitude of the wedging effect is mainly determined by the convergence angle of the inner crown: the smaller the convergence angle, the greater is the retentive force. The double crown with a clearance fit (also referred to as a hybrid telescope or a hybrid double crown) exhibits no friction or wedging during its insertion or removal. The retention is achieved by using additional attachments or functional molded denture borders.
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 intersurface 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. In case of the abutments with short clinical height, the walls should be kept parallel or the taper of the wall should be reduced (2-5°) to improve the retention. The taper off the walls of the primary coping can be adjusted to a predetermined angle, according to the special requirements of each patient.

The telescopic denture which was supported by the natural teeth gained significant popularity as an alternative to the conventional dentures during the 1970s and the 1980s. The retained teeth that support the overdentures, preserve the bone and they minimize the downward and forward settling of a denture, which otherwise occurs with alveolar bone resorption. The overdenture occlusion is maintained rather than shifting forward to simulate the appearance of a prognathic mandible.

Telescopic copings have been used for several years in oral rehabilitation of patients with advanced periodontal disease. Patients with periodontal disease undergoing prosthetic reconstruction often present with teeth with minimal supportive tissue and increased tooth mobility. Therefore, it is extremely important for the prosthesis not to cause periodontal destruction or worsen an existing periodontal condition. The different types of double crown systems are used to retain RPDs. They are distinguished from each other by their retention mechanisms.

The telescopic denture philosophy postulated a transfer of occlusal forces to the alveolar bone through the periodontal ligament of 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. 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.

**CASE REPORT**

A 69-years old male reported to department of prosthodontics with complaints of difficulty in chewing due to the missing teeth. After the intraoral examination it was found that mandibular right and left third molar were present, with no periapical pathology. The teeth were periodontally sound, with no mobility. There was sufficient interarch space for the copings, the denture base and the teeth arrangement. [Fig-1]

It was decided to fabricate a mandibular telescopic denture and a maxillary conventional complete denture. After the radiographic evaluation [Fig-2], they were prepared with a tapered round end diamond rotary bur with a chamfer finish line for the primary coping. The finish line had to be prepared subgingivally. After the preparation of the abutments, the impression was made by using a polyvinyl siloxane elastomeric impression material (putty and light body) by a double step putty wash technique. The impression was poured into a die material to obtain the cast, on which the primary copings were fabricated. 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]. Another impression was made by a double step putty wash technique after the cementation of the primary copings, by using a custom acrylic resin tray to obtain a cast on which the secondary copings were fabricated. The frictional contact between the primary and secondary copings helped in the retention of the prosthesis.

This model would be used for fabrication of the cast partial superstructure [Fig-4]. Bite registration was repeated and the models with the copings were mounted on a semi-adjustable articulator using the same face bow record. In the laboratory, the copings on the second master model were milled with a parallelogram to obtain a milled surface of minimum 4 mm for friction. The second master model together with the primary copings was duplicated and the refractory model was prepared. The cast partial framework was waxed up, which was then cast using a base metal alloy (cobalt-chrome) with the secondary coping overlay of the primary coping [Fig-5]. The fit of the secondary copings over the primary copings was evaluated in the patient’s mouth [Fig-6]. A wax rim was prepared on the framework and acrylic teeth were set. The maxillary complete denture was fabricated following normal single denture fabrication protocol [Fig-7a and 7b]. After verification of esthetics, function, and phonetics, the mandibular denture was processed [Fig-8]. The completed prostheses were evaluated for
function, esthetics, and phonetics [Fig-9]. The patient was scheduled for follow-up visits every 3 months and he reported no complaints during the 1 years of follow-up.

Fig: 1 Preoperative intraoral view

Fig: 2 OPG

Fig: 3 Cementation of primary coping

Fig: 4 Wax pattern cast partial superstructure

Fig: 5 Casting of cast partial superstructure

Fig: 6 Evaluation fit of the secondary copings

Fig: 7a and 7b Teeth arrangement
DISCUSSION
A telescopic overdenture was chosen for this patient because of its good retentive and stabilizing properties, rigid splinting action, and better distribution of stresses. Other treatment options included extraction of the remaining teeth, followed by a conventional complete denture. This was not selected because extraction would have decreased the available support and proprioception provided by the teeth and their periodontal ligaments. Implant supported prosthesis was not opted for as the patient was medically compromised and also because of the cost involved in the procedure. Clinical longevity of a telescopic overdenture is essentially influenced by the applied restorative concept of connecting the removable denture with the remaining teeth. With regard to the number, alignment, and periodontal status of the remaining teeth, the clinician needs to select the appropriate retainer for a long-term successful restoration. Telescopic or double crowns have proven to be an effective means of retaining overdenture. This option was thought to have a better prognosis for the remaining teeth as well as to have a more retentive prosthesis.

The advantages and disadvantages of telescopic overdentures are summarized as follows:

**Advantages**
- Creation of a common path of insertion
- Easy to perform routine oral hygiene
- Rigid splinting action
- Distribution of stresses to the abutment teeth
- Provision of suitable abutments for RPDs even when the remaining teeth are periodontally compromised
- Much easier insertion and removal for the patient
- Accommodates future changes in the treatment plan
- Psychologically well-tolerated by patients.

**Disadvantages**
- Increased cost
- Complex laboratory procedures
- Extensive tooth reduction required
- Increased number of dental appointments
- Difficulty in achieving esthetics
- Retention diminishes after repeated insertion/separation cycles
- Readjustment of retentive forces is difficult.

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. 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. The interocclusal gap/interarch distance should be ≥ 10 mm, in order to have sufficient space for the copings, denture base, teeth placement and adequate closest speaking space.

**CONCLUSION**
Tooth-supported, removable overdentures with telescopic crowns may be considered as a good alternative to the conventional removable 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. Also, the rate of the residual ridge resorption was decreased because of the transfer of compressive forces into the tensile forces by the periodontal ligament and better stress distribution.
REFERENCES


