Telescopic Denture: A Case Report

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Abstract: Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future prosthodontic 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 favorable conditions. 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. Retention of the roots of one or more teeth for overdenture offers the patient a lot of advantages like better stability, proprioception, and support among a few. Telescopic crowns were initially introduced as retainers for the removable partial dentures at the beginning of the 20th century. They were also known as a Double crown, a crown and sleeve coping or as Konuskrone. The following case report is on telescopic over denture for mandibular arch.

Key words: Telescopic Denture, Double Crown System, Primary Coping, Secondary Coping, Preventive Prosthodontics, Wedging Effect.

INTRODUCTION

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. 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.

Preventive prosthodontics emphasizes the importance of any procedure that can delay or eliminate future prosthodontic problems. The overdenture is a logical method for the dentist to use in preventive prosthodontics. Overdenture therapy is essentially a preventive prosthodontic concept since it attempts to conserve the few remaining natural teeth. There are two physiologic tenets related to this therapy: the first concerns the continued preservation of alveolar bone around the retained teeth while the second relates to the continuing presence of periodontal sensory mechanisms that guide and monitor gnathodynamic functions.

Telescopic crowns were initially introduced as retainers for the removable partial dentures at the beginning of the 20th century. They were also known as a Double crown, a crown and sleeve coping or as Konuskrone, a German term that described a cone shaped design. These crowns are an effective means for retaining the RPDs and dentures. They transfer forces along the ling 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 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.

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 56-years old male reported to the department of Prosthodontics with the chief complaint of difficulty in chewing due to the missing lower teeth. On intraoral examination all teeth were present in upper arch except 16, 21, 22 and the teeth present in lower arch were 38, 48. The teeth present were firm with generalized abrasion in relation to maxillary teeth. The mandibular edentulous span had favorable ridge with firmly attached keratinized mucosa. Further determination of the vertical dimension of occlusion (VDO) was achieved using Phonetics, Swallowing, patient preferences and facial appearance. It was determined that there was loss of VDO and the TMJ was normal (Fig1).

The treatment plan decided was to fabricate a mandibular telescopic denture and a maxillary interim prosthesis. After the intentional root canal treatment of the abutments 38 and 48, they were prepared with a tapered round end diamond rotary bur with a chamfer finish line for the primary coping. The abutments had to be prepared almost parallel with the minimum taper for a better retention. 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. 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 attached with the metal framework were fabricated (Fig2,3) The fit of the metal framework with secondary copings over the primary copings was evaluated in the patient's mouth. The frictional contact between the primary and secondary copings helped in the retention of the prosthesis.

The metal framework had to be placed on the cast, it had to be covered with wax and the special tray for border moulding and final impression, had to be fabricated with chemically cured acrylic resins after applying separating media over the cast. After the final impression was made, the master cast was obtained and occlusion rims were fabricated over the trial denture base. Horizontal and vertical maxillomandibular records were obtained with the record bases and the occlusion rims and these were transferred to a semiadjustable articulator by using a face bow. The artificial teeth were selected and arranged on the record bases for a trial denture arrangement and they were evaluated intraorally for phonetics, aesthetics, occlusal vertical dimension and centric relation. After the wax up, the dentures were processed, finished, polished and delivered to the patient (Fig4,5). The patient was scheduled for follow-up visits every 3 months and he reported no complaints during the 2 years of follow-up (Fig6,7).

**DISCUSSION**

Telescopic crowns have been used mainly in RPDs to connect dentures to the remaining dentition, 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. Telescopic crowns have also been used successfully in RPDs and FPDs, supported by endosseous implants, in combination with the natural teeth, which includes the overdentures.7

Telescopic crowns can also be used as effective direct retainers for RPD. Their degree of retention can be planned to suit different situations by modifying their designs. The amount of interface friction depends on the configuration of the taper angle and the area of the surface contact. One of the main advantages of the telescopic retainers is that, being pericoronal devices, they transmit the occlusal forces in the direction of the long axes of the abutment teeth. This has proven to be the least damaging application force. The lateral forces exert traumatic pressure on the abutments.8

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.9

The telescopic dentures which are supported by the roots of natural teeth have more predictable prosthetic outcomes because of increased support, stability and retention and decrease in rate of the residual ridge resorption. Patients with natural teeth can masticate more effectively than when they are edentulous. This is due in part to their degree of accuracy in the functional jaw movements, which are possible with a better neuromuscular feedback mechanism from the periodontal ligaments. The proprioceptive nerve endings in the periodontal ligaments feed information into the neuromuscular mechanism. In the absence of teeth, this information is missing. By retaining the roots of some teeth, it may be possible to use this proprioceptive apparatus with complete dentures.7 If this is so, a higher degree of accuracy in the jaw movements and the masticatory performance could result. By this means, teeth that normally might have a very short life span can be retained for long periods of time. This can thus benefit the patients in their denture function.

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 rate of bone remodeling. A clinical study which was conducted by Bo Bergman et al on conical crown
retained dentures, concluded that most of the patients were very satisfied with the restorations, both functionally and aesthetically and it found their chewing comfort to be better after the treatment with the conical crown-retained dentures. 

Complete denture fabrication for maladaptive elderly patients becomes difficult. Therefore, they are the group of patients who will benefit most with telescopic dentures. Overdentures which are supported and/or retained with a few remaining teeth or implants can be a predictable treatment that will fulfill most of the demands of the elderly denture patients.

CONCLUSION

Tooth-supported, removable over dentures 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


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