Telescopic overdenture: Perio-prostho concern for advanced periodontitis

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Abstract

The crown- and sleeve-coping denture is a removable prosthesis that is supported by both selectively retained teeth and the residual ridge or mucosa. It is a versatile and successful means of achieving long-term restoration of a partially edentulous jaw. Insertion and removal of the denture and routine oral hygiene are easy to perform. The beneficial results of this form of treatment can be considered for a wide variety of clinical applications for the severely advanced periodontitis case. This paper presents a case report on the prosthetic rehabilitation of a partially edentulous patient with a telescopic overdenture for the mandible and complete denture for the maxilla.

Keywords: Crown and sleeve coping, double crown, telescopic

Introduction

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.[1] 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.[2] 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.[3,4] Alternate descriptive terms are double crown, crown and sleeve coping, or *Konuskrone*, which is a German term for a cone-shaped design.[1] 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.[5] Telescopic crowns can also be used as indirect retainers to prevent dislodgement of the distal extension base away from the edentulous ridge.[4]

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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.[3,6] Three different types of double crown systems are used to retain RPDs. They are distinguished from each other by their retention mechanisms:[2,5]

- Cylindrical crowns that exhibit retention through friction fit of parallel-milled surfaces
- Conical crowns or tapered telescopic crowns that exhibit friction only when completely seated 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
- Double crown with clearance fit (hybrid telescope or hybrid double crown) exhibits no friction or wedging during insertion or removal. Retention is achieved by using additional attachments or functional-molded denture borders.

Case Report

A 65-year-old male reported to the Department of Prosthodontics, Subharti Dental Meerut, with a chief complaint of loose dentures and soreness of the mouth. Patient gave a medical history of diabetes mellitus since 15 years and hypertension since 23 years. He was currently on oral hypoglycemic and antihypertensive. He gave a dental history of wearing the same maxillary denture and mandibular RPD since 10 years, which gradually became loose. The patient also gave a history of undergoing periodontal surgeries around 8 months back.

A preliminary examination revealed that the patient had missing 31, 32, 37, 41, 42, 47 and completely edentulous

maxillary arch. There were grade II mobility with respect to 36 and 46. There was generalized grade I mobility of the remaining teeth. Also there was grade II furcation involvement of 36 and grade I furcation involvement of 46. A generalized pocket depth of 4-6 mm was noted. Oral hygiene was fair. Diagnostic impressions were made using irreversible hydrocolloid impression and an inter-occlusal bite registration was taken. The impressions were poured and the diagnostic models were mounted on a semi adjustable articulator. A diagnostic surveying of the models was done [Figure 1]. A complete radiographic survey was carried out to correlate with the clinical findings. The OPG revealed generalized horizontal bone loss up to the middle 1/3rd of the roots, and bone loss up to apical 1/3rd was seen in 36 and 46. Also, furcation involvement was seen in 36 and 46, thus indicating severe periodontitis. It was decided to extract both the mandibular molars due to advanced periodontitis followed by a thorough oral prophylaxis and a flap surgery in 35, 45 regions to decrease the pocket depth. The periodontal status was reviewed after 6 weeks. After ascertaining the decrease in tooth mobility and pocket depth, prosthetic rehabilitation was carried out. During the definitive intra-oral examination the potential abutments were evaluated clinically to determine their periodontal condition, pockets, mobility, caries, old restorations, vitality, abrasions, and supra-eruption [Figure 2].

The diagnostic findings were as follows:

- A discrepancy in the occlusal plane was noted due to supra-eruption of 33, 45
- The potential abutments had varying paths of insertion
- The mandibular teeth were lingually inclined
- The abutments had a large crown: Root ratio.

Treatment plan

It was decided to prosthetically rehabilitate this patient with a telescopic denture for the mandibular arch and to use a complete denture for the maxillary arch. Intentional RCTs were performed on 33, 34, 35, 43, 44 and 45. Tooth preparation was done by preparing a chamfer finish line of 0.7 mm and axial wall heights of 4 mm in 33, 43, and 6 mm in 34, 35, 44, and 45 with a taper of approximately 8-10°. After the mouth preparation in the mandibular arch, gingival retraction was done and a final impression was made with addition silicone using the putty-wash technique. The first master model was prepared from the impression for fabrication of the primary copings. This was followed by making an interocclusal record using putty and a face bow transfer. In the laboratory, the wax patterns were prepared for the primary copings on 33, 34, 35, 43, 44, and 45. The patterns were milled to obtain a frictional surface for retention and then cast in to nickel chrome alloy (high chrome soft). Once the primary copings were evaluated for fit [Figure 3], the copings were luted with temporary cement (zinc oxide eugenol) and an overimpression was made using the medium viscosity addition silicone impression

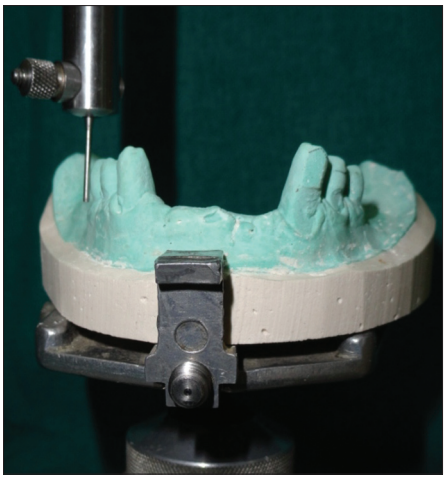

Figure 1: Surveying of patient cast

Figure 2: Intraoral view

Figure 3: Primary coping fabrication

material and the second master model was made [Figure 4]. This model would be used for fabrication of the cast partial superstructure. 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 parallelometer 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. After evaluating the fit of the framework in the mouth [Figure 5], it was used as a carrier for cementing the primary copings in place. The primary copings were luted with glass ionomer luting cement (Type I; GC Fuji). A wax rim was prepared on the framework and acrylic teeth were set with the same shade as were veneered over the secondary coping. The maxillary complete denture was fabricated following normal single denture fabrication protocol. After verification of esthetics, function, and phonetics, the mandibular denture was processed [Figure 6]. The completed prostheses were evaluated for function, esthetics, and phonetics [Figure 7].

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. In this situation, a total of 6 abutments for telescopic copings were used to support the overdenture, thus creating a quadrilateral configuration. It has been reported that at least two abutment teeth should be splinted when attachment prostheses are used to make the stress patterns more favorable.[7] The advantage of opting for this treatment plan was to distribute the load among the remaining periodontally weakened teeth, thus acting as a rigid splint. This option was thought to have a better prognosis

Figure 4: Master cast after lutting of primary coping

Figure 5: Metal framework with secondary coping

Figure 6: Final prosthesis

Figure 7: Intraoral view of final prosthesis

for the remaining teeth as well as to have a more retentive prosthesis. The recommended alloys for fabrication of copings are the high noble (ADA Type IV). Ag-Au-Pd alloys have better precision and better retention, but are technique sensitive and costly. Base metal alloys (Cr-Co) can also be used because they have low thermal conductivity, thus the patient does not experience unpleasant thermal sensation caused by excessive tooth preparation. Moreover, they are easy to fabricate and more economical.[8] The advantages and disadvantages of telescopic overdentures are summarized as follows:

Advantages[4,9,10]

- 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[4,9,11]

- 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.

Conclusion

Although fixed restoration provides favorable conditions for preservation of oral function, telescopic overdenture may be considered as another option, combining good retentive and stabilizing properties with a splinting action. The telescopic system may therefore be seen as providing suitable abutments for overdenture even when the remaining teeth are compromised. For other prostheses, excellent oral hygiene maintenance is essential for an optimal prognosis. With telescopic construction, apart from the splinting of the abutment teeth with the telescopic system, the gingival tissues are easily accessible around the entire marginal circumference of the abutment, thus permitting easy home care and oral hygiene. However, correctly implemented plaque control is fundamental in the prevention of recurrence of gingivitis.

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