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RESEARCH ARTICLE

MAXILLARY COMPLETE DENTURE AND MANDIBULAR TELESCOPIC OVERDENTURE: A CASE REPORT

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ABSTRACT

Objective: The goal of this article was to describe the importance of saving the natural remaining teeth and the fabrication of telescopic dentures as an alternative to the conventional removable dentures, to minimize the complete denture problems. Background: Telescopic dentures consist of an inner or primary telescopic coping which is permanently cemented to an abutment and an outer or secondary telescopic coping which is attached to the prosthesis. These copings protect the abutment from dental caries and thermal irritations and also provide retention and stabilization of the secondary coping. The secondary coping engages the primary copings to form a telescopic unit and it provides retention and stability to the prosthesis. ***Materials and Methods:*** An impression was made with a polyvinyl siloxane elastomer after preparation of the abutments and primary copings were fabricated on the cast . After evaluating the fit of the primary copings on the abutments, they were cemented with glass ionomer cement. An impression of the cemented primary copings was made for the fabrication of secondary copings with retention beads, which were attached to the prosthesis. ***Conclusion:*** Telescopic overdentures have better retention and stability as compared to complete dentures, they improve the chewing efficiency and the comfort of the patient and they also decrease the alveolar bone resorption.

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INTRODUCTION

A telescopic denture is a type of prosthesis which consists of a primary coping , cemented to the abutments in a patient's mouth and a secondary coping ,which is attached to the prosthesis and snaggly 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. Telescopic crowns were initially introduced in dentistry as retainers for the removable partial dentures at the beginning of the 20th century. They were also known as Double crown, a crown and sleeve coping or as Konuskrone, (1) a German term describing a cone shaped design. These crowns are an effective means for retaining the RPDs and dentures. They transfer forces along the ling axis of abutment teeth and provide guidance, support and protection from the movements that dislodge the denture.

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 interface tension. Tension should be sufficient enough to sustain the prosthesis in its place. An increase in tapering of the coping walls reduces retention between the copings. Smaller the degree of the taper, 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 (2-5º) to improve the retention. The tapering of walls of the primary coping can be adjusted to a predetermined angle, according to the special requirements of each patient natural teeth supported telescopic denture 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 habitual class III. 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 usually affects adjacent roots and the rest of the ridge, due to excessive forces. They also improve functions as compared to the conventional dentures, chewing efficiency and even phonetics. The impairment of these functional parameters, reflects the significant role of the periodontal fibres for a sensory feedback and a discriminatory ability from the retained roots. Tooth loss results in loss of the proprioception mechanism .

CLINICAL CASE REPORT

A 52-years old male reported to Burdwan Dental College and Hospital, for a prosthetic evaluation. The patient had pletely edentulous upper arch and only two canine in lower arch, ie; 33,43. These two teeth were periodontally sound, with no mobility. Diagnostic impression was taken, primary cast was fabricated upon which base plate and bite rim was prepared and jaw relation was taken. Mounting was done articulator just to measure the availability of interarch space. It was observed that sufficient interarch space for the copings, the denture base and the teeth arrangement was available.. It was decided to fabricate a maxillary conventional complete denture and a mandibular telescopic overdenture. After the intentional root canal treatment of the abutments (Table/Fig-1), they were prepared with a tapered round end diamond rotary bur with a chamfer finish line for the primary coping (Table/Fig-2). The finish line had to be prepared subgingivally. the short abutments had to be prepared with parallel walls. 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 (Table/Fig-4). 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 (Table/Fig-5) on which the secondary copings were fabricated (Table/Fig-6). The fit of the secondary copings over the primary copings was evaluated in the patient's mouth. The secondary copings consisted of small metal projections which were known as retention beads, which helped in the mechanical interlocking of the secondary copings in the denture base. The frictional contact between the primary and secondary copings helped in the retention of the prosthesis. The secondary copings had to be placed on the master cast, it had to be covered with wax and the trial denture base had to be fabricated with chemically cured acrylic resins after applying separating media over the master cast. The placement of the wax over the secondary copings helped in the easy separation of the (Table/Fig-1): Natural remaining teeth (Table/Fig-2): Teeth prepared to receive coping (Table/Fig-2): Primary copings cemented on abutments copings from the trial denture base at the time of the dewaxing. Occlusion rims were also 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. A protrusive record was made, to set the articulator's condylar elements and to achieve a balanced occlusal arrangement. After the wax up, the dentures were processed, finished, polished and delivered to the patient (Fig-3).

Figure 1. Pre-prosthetic photograph

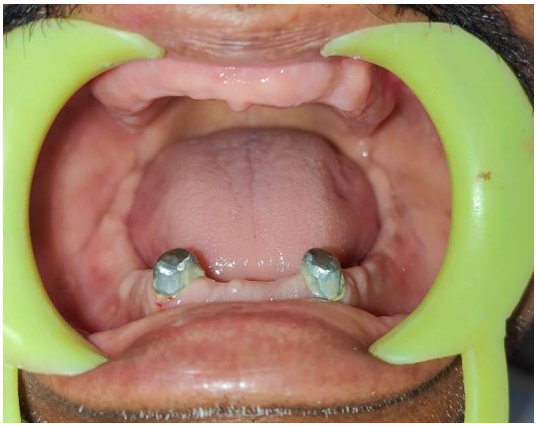

Figure 2. After placement of short coping

Figure 3. Post denture Delivery.

DISCUSSION

Telescopic crowns have been used mainly in RPDs to connect dentures to the remaining dentition[3], 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 overdentures [4,5]. Telescopic crows can also be used as effective direct retainers for RPD[6].

Their degree of retention can be planned to suit different situations by modifying their designs. The amount of intersurface friction depends on the configuration of the taper angle and the area of the surface contact. Telescopic crowns can also be used as indirect retainers to prevent the dislodgement of the distal extension base away from the edentulous ridge. The resistance to this movement is built-in in rigid telescope retainers with cylindrical or conical primary copings, which are designed with no free space between both the components. 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. 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[7]. The selected abutments should be periodontally healthy. 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. The contours and the degree of taper of the outer aspect of the primary coping determine the path of insertion and the amount of retention of the prosthesis.

The retention varies inversely with the taper of the coping. Even copings of minimal taper (approximately 5 degrees) require a height of about 4mm to achieve a significant retention[3]. The height and size of the inner coping also influence the retention. The essential requirements for the long service of the telescopic prosthesis are, to provide adequate height of the vertical walls (at least 4mm), sufficient thickness of the copings (never less than 0.7mm for each casting) and a taper of around 6º's. Adaptation to the conventional removable complete dentures is a complex learning process. It has been found that the telescopic denture have more predictable prosthodontic 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 is possible to use this proprioceptive apparatus with complete dentures. 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 been 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 crownretained dentures (8). Complete denture fabrication for maladaptive elderly patients becomes difficult especially in mandibular dentures. Therefore, they are the group of patients who will benefit most with telescopic dentures.

CONCLUSION

Tooth-supported, removable over dentures with telescopic crowns may be considered as 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. 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.

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