

Prosthetic Rehabilitation of a Marginally Resected Mandibular Arch With a Metal Reinforced Telescopic Overdenture

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Received: 23 July 2012 / Accepted: 6 September 2012 / Published online: 16 September 2012
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Abstract Success of the prosthesis after mandibular resection is related directly to the amount of the remaining bone and soft tissue present. The prognosis for mandibulectomy patients becomes less favorable as the size of the resection increases. Prosthetic rehabilitation for such patients is a challenge for clinicians. Without preprosthetic reconstructive surgery, denture fabrication for mandibulectomy patients becomes extremely difficult. Telescopic dentures is a modality of treatment consisting 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. This clinical report aims at

utilizing the remaining natural teeth for a mandibular overdenture with telescopic coping.

Keywords Removable prosthesis · Overlay denture · Double crown · Over denture · Telescopic denture

Introduction

The postoperative facial disfigurement and disability associated with a segmental resection of the mandible has been well documented. Consequently, surgeons try to preserve the continuity of the mandible, whenever feasible, by marginal resection of the mandible and in selected patients by bone grafting [1]. However, the soft tissue configuration and the outcome of the final prosthesis in the marginal resection patient is often considerably compromised. Rehabilitation of such patients can be established using a wide range of prosthetic treatment options. Depending upon the clinical need and demand, restoration of the lost structure can be achieved by using a conventional denture, overdenture, or dental implants which can be fixed or removable. Many elderly patients exhibit a highly reduced dentition with regard to number of teeth lost due to periodontal disease or caries and fabrication of fixed prostheses becomes impossible [2, 3].

In such cases a tooth supported complete denture or an overdenture, is a viable option [2, 4]. The diagnosis, treatment planning and clinical procedures of this type of denture involves knowledge and skill in several areas of dentistry. The procedures apply to either of the arches, but with greater impact on mandibular denture stability.

Overlay dentures, over dentures, telescopic dentures are some of the names to describe a tooth supported complete denture. The name telescopic denture implies as the male

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and female overdenture copings slide on top of each other to provide friction grip and provide greater stability for the prosthesis. A telescopic over denture is a prosthesis which uses one or more natural teeth as support and male and female copings present opposite to each other to fit exactly and provide resistance to the forces of mastication [5].

Telescopic crowns were initially introduced as retainers for removable partial dentures at the beginning of the 20th century. They are also known as a double crown, crown and sleeve coping (CSC) or as Konuskronen, a German term that described a cone shaped design. These crowns consist of an inner or primary telescopic coping, permanently cemented to an abutment, and a congruent detachable outer or secondary telescopic crown, rigidly connected to a detachable prosthesis [2]. They may be designed only to provide support, or to provide support and retention [5]. A telescopic prosthesis is a more versatile alternative because the prosthesis can be repaired without reconstruction of the entire superstructure, despite a localized failure. The patient can disengage telescopic restoration with dislodgment of the outer telescopic crowns from their coping [2].

This clinical report describes the prosthetic rehabilitation of a patient having a partially edentulous mandibular arch who underwent marginal mandibulectomy with a telescopic overdenture.

Case Report

A 36 year old female patient reported to the Department of Prosthodontics, with the chief complaint of missing teeth in her lower arch and undesirable esthetics and function. History revealed the diagnosis of osteosarcoma of anterior left mandible 2 years back which was subsequently resected involving removal of the teeth on the ipsilateral side.

Extra oral examination revealed immovable scar tissue at the midline of the mandible and loss of fullness on the resected side owing to the loss of teeth and surgical repositioning of the muscles (Fig. 1). Intra oral examination revealed dentulous maxilla and partially dentate mandibular arch with mandibular premolars and mandibular second molar on contralateral side and a crater like depression on mandibular anterior region, extending from the central incisor to the second premolar area on the ipsilateral side (Fig. 2). Radiographic examination demarcated the bony defect and the remaining vital mandibular teeth with adequate bone support favorable to be used as overdenture abutments (Fig. 3).

A conventional complete denture or removable partial denture was ruled out because of the few remaining teeth present and the surgical defect accompanied by loss of soft tissue and alveolar bone which would be detrimental for



Fig. 1 Pre operative extra oral view



Fig. 2 Intra oral view of the surgical defect

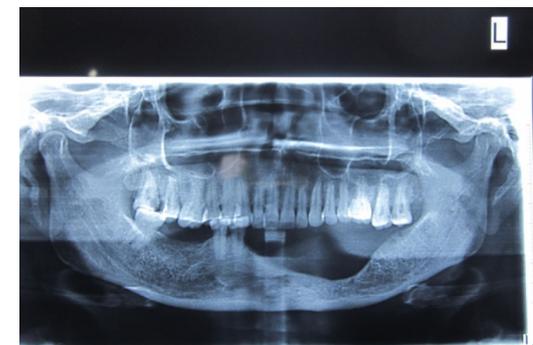


Fig. 3 OPG showing the post surgical defect

denture stability. A telescopic overdenture was planned instead which could offer adequate retention and additional support for the surgical site, lower lip and buccal mucosa.

Intentional root canal treatment was done for the remaining periodontally sound mandibular teeth and prepared to receive overdenture primary metal copings with subgingival margins to increase the retention. The occlusing height was maintained to provide adequate inter arch distance. Conical shaped preparations were done in relation to the premolars and molar and the molar was

provided with retention grooves for added retention of the metal copings. After the preparation of the abutments, the impression was made by using a polyvinyl siloxane elastomeric impression material by a double step putty wash technique. The impression was poured with a die stone 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. 4). Following this using a custom acrylic resin tray, border moulding with low fusing compound and final impression with light poly vinyl siloxane was made and cast poured on which the secondary copings were fabricated (Fig. 5). Telescopic overdenture copings (secondary copings) were then fabricated by laser milling to maintain the parallelism of the primary and secondary copings to slide on top of each other. 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 (Fig. 6). The frictional contact between the primary and secondary copings helped in the retention of the prosthesis.

A metal framework was designed for better strength to the acrylic denture. The framework used to connect the secondary copings and to provide strength to the bulky denture extended from the lower right molar area crossing the midline into the area of bony defect and was provided with two acrylic retention plugs in the mandibular anterior region. The metal frame work was laser welded to the three female copings and incorporated into the final denture base during denture fabrication. The secondary copings along with the metal framework were placed on the master cast, covered with wax and the trial denture base 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



Fig. 4 Primary copings cemented in place



Fig. 5 Final impression with primary copings cemented intraorally



Fig. 6 Secondary coping seated on the primary copings

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 these were transferred to a semiadjustable articulator by using a face bow. A protrusive record was made, to set the articulator's condylar elements and to achieve a balanced occlusal arrangement. 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. Wax up was done with additional wax added to the area of surgery where alveolar bone was lost to provide adequate bulk to the denture. The wax up ensured that there is adequate lip support in the defect area and provided support to the sunken cheeks on the left side.

After the wax up, the dentures were processed, finished, polished and delivered to the patient (Figs. 7, 8). The procedure ensured a stable final prosthesis restoring the contour and fullness of the lips and cheek in spite of lack of bilateral bone support as well as multiple missing teeth in the arch. The patient was scheduled for follow-up visits every 2 months and is successfully using the denture at 2 years of follow-up.



Fig. 7 Final denture with the metal frame work and secondary copings



Fig. 8 Finished denture placed intra orally

Discussion

Rehabilitation of a partially edentulous patient can be established using a wide range of prosthetic treatment options [2]. Patients who have originally adapted to wearing complete dentures may become maladaptive with time, due to the continual residual ridge resorption, intra oral physiological changes and the development of an altered muscle pattern [6].

Success of the prosthesis after mandibular resection is related directly to the amount of the remaining bone and soft tissue present. Prosthetic rehabilitation for such patients is a challenge for clinicians. Frequently, the edentulous mandible requires reconstructive plastic surgery to create a buccal or lingual sulcus to provide a suitable tissue foundation for an acceptable mandibular denture or a special prosthesis that can compensate for the loss suffered [7].

Telescopic crowns have been used mainly in such situations to connect dentures to the remaining dentition, and these can be used effectively to retain complete dentures which receive their support partly from the abutments and partly from the underlying residual tissues [6]. They

transfer forces along the long axis of the abutment teeth and provide guidance, support, and protection from movements that might dislodge the denture [8]. It has been found that the telescopic dentures which are supported by the roots of natural teeth have more predictable prosthodontics outcomes because of increased support, stability and retention and decrease in rate of the residual ridge resorption [6]. Similar to combined fixed-removable restorations with precision attachments, abutment selection is crucial for the long-term success of the whole restoration when the removable denture is retained by only two or three selected abutment teeth of the remaining dentition. Because abutment loss will usually result in costly repair or redoing of the complete restoration, only teeth with an excellent prognosis should be selected to retain the RPD. The splinting effect of a telescopic superstructure is similar to an FPD and has a favorable influence on stabilization of the remaining dentition and improves periodontal health [9]. In conclusion dentures retained by double crowns with clearance fit and constructed with a metal framework provide good clinical longevity.

In the clinical report, the premolars and the second mandibular molar on the contralateral side were used as the abutment teeth and using double crown system, a telescopic overdenture was fabricated. The patient was recalled after 3 and 6 months to evaluate the gingival and periodontal health and patient satisfaction. There were no significant marginal gingival changes observed around the tooth and implant supporting the overdenture and no significant change in the probing depth around the teeth supporting the overdenture. Further the patient acceptance, ease of oral hygiene, general satisfaction with overdentures, ability of speak, comfort, esthetic appearance, stability of overdenture during function, and ability to chew showed marked improvement when assessed using visual analogue scale.

Summary

This article describes the prosthetic rehabilitation of a patient having a partially edentulous mandibular arch who underwent marginal mandibulectomy with a telescopic overdenture. Stabilization of compromised teeth with fixed splinted restorations is usually inadvisable because of the risk factors involved, such as eventual localized abutment failure. Detachable telescopic prostheses may be preferred as a near equivalent or substitute because they can be detached and repaired without reconstruction of the entire restoration. Telescopic restorations can be retrieved by the patient for cleaning and easy access to the entire marginal periodontal circumference of the abutments. This promotes effective home care and oral hygiene.

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