

Managing Tilted One-piece Implants Using Bar-Supported Overdenture in Edentulous Mandible - A Case Report

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Abstract

The widespread use of implants in dentistry has opened up a wide variety of treatment options for the rehabilitation of partly and completely edentulous patients. With the advent of newer advances in the field of imaging, it is possible to prepare customized treatment plan for the placement of implant according to hard and soft-tissue conditions of the patient. Failure to plan will lead to malfunction of implant and supported prosthesis. A case is presented where a tilted one-piece implant with ball attachment is managed with a customized bar and clip attachments overdenture for a patient with a severely resorbed mandibular ridge.

Keywords: Customized bar, Overdenture, Tilted single-piece implant.

INTRODUCTION

Despite the advances in modern dentistry, conventional complete dentures (CCDs) therapy has been the most common treatment option for edentulous patients for more than 100 years.^[1] However, well-documented problems and limitations of CCDs have been published, for example, constant residual resorption affects denture stability and retention, which, in turn, compromises patients' adaptation and comfort with dentures.^[2-4] With the advent of osseointegrated dental implants and subsequently the implant-supported mandibular overdenture (ISMOD), there is an alternative to the essentially palliative therapy offered by conventional dentures.^[5] The adequate positioning of dental implants remains an important issue in planning implant-retained overdentures. Placing the implants in an ideal parallel position as often recommended is not such a simple procedure. It requires extensive surgical experience or the use of guided surgical techniques. *In vitro* studies have shown that implant inclination affects the levels of attachment retention.^[6] The types of attachments available in the market include non-splinted attachments (ball, magnet, locator, and double crown attachment) and splinted attachments (bar and clip attachment).^[7]

The ball attachment (O-ring attachment) is the most commonly used in overdentures and contains a ball shape for retention. Its advantages include a simple manufacturing process, the provision of a wide range of movement, cost-effectiveness, ease of use and maintenance, the provision of good retention, hygiene maintenance, and good patient satisfaction. However,

the ball attachment abutment requires implants to be parallelly placed, and the loss of parallelism may cause difficulty while inserting and removing the prosthesis or fracture of the abutment. In addition, the O-ring needs to be regularly changed because it is subject to wear.^[8] The non-parallelly placed implant can be managed with a bar and attachment which helps to reduce issues of placement of prosthetic component in an angulated implant with splinting them together providing a single path of insertion. This case report elaborates a technique to splint 3 non-parallelly placed implants in an edentulous mandible and subsequent prosthetic rehabilitation with custom bar and clip attachment overdenture.

CLINICAL REPORT

A 69-year-old female patient reported to the department of prosthodontics with a complaint of difficulty in chewing with her existing set of dentures. On examination, it was found that the maxillary denture was fractured but retentive and well fitting; however, the mandibular denture was lacking

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in retention as well as stability with single metal housing in place. Her mandibular denture was stable initially but became loose and lost stability after she lost the O-ring. The patient continued wearing the denture and eventually lost one metal housing, after which she could not use the denture to masticate. Intraoral examination revealed a severely resorbed knife-edged mandibular ridge with three one-piece implants (Osstem MS Implant for denture) of size 2.5×10 mm with ball attachment which was placed 13 years back at another tertiary care center (Figure 1). Implants placed at D and E positions were parallel to each other but the implant placed at position B was tilted mesially with angulation of 45° . The surface of all the ball attachments was abraded.

A diagnostic OPG was then taken to confirm the findings (Figure 1). The patient was explained about the different treatment options such as placement of new implant followed by the construction of a new prosthesis. Physicians did not consent to further elective surgery as patient was suffering from severe aortic stenosis. To offer improvement in masticatory ability, a treatment plan was advised to fabricate a customized bar on the existing implant abutments enabled with a clip attachment to optimize retention of an overdenture.

The impression was made in vinyl polysiloxane (GC Flexceed) with a modified one-stage putty wash impression technique. Cast was poured in Type III die stone (kalabhai kalrock) with the area of the implant poured with pattern resin (GC Pattern Resin). After surveying the cast, customized copings were fabricated and splinted to Preci-Horix combi bar (CEKA PRECI-LINE) (Figure 2). Jig trial of the customized bar was done to assess the fit of the assembly intraorally before casting (Figure 3).

The customized bar was fabricated using the conventional “lost wax” casting procedure. Bar is cemented intraorally with temporary luting cement (Ora Temp NE-Prevest DenPro). Maxillary and mandibular final impression was made which was followed by jaw relation. A lingualized type of balanced occlusion was provided to improve denture stability and retention.^[9] Final cementation of the bar was done with resin-reinforced glass ionomer cement (GC FujiCEM).

Retention clips and metal encapsulations were placed over the bar and then transferred to the undersurface of the mandibular denture where adequate space had been created for this attachment assembly (Figure 4). The dentures were tried and minor adjustments done. The patient was trained for the



Figure 2: Surveying

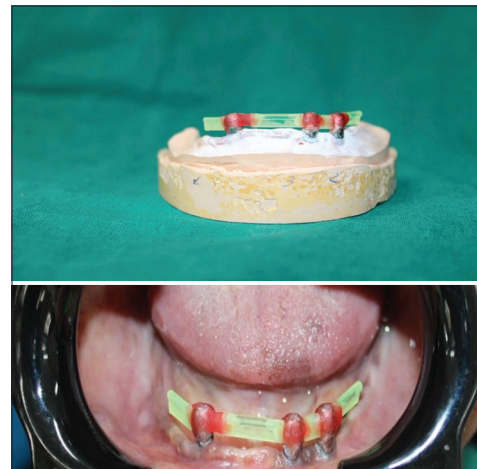


Figure 3: Jig trial

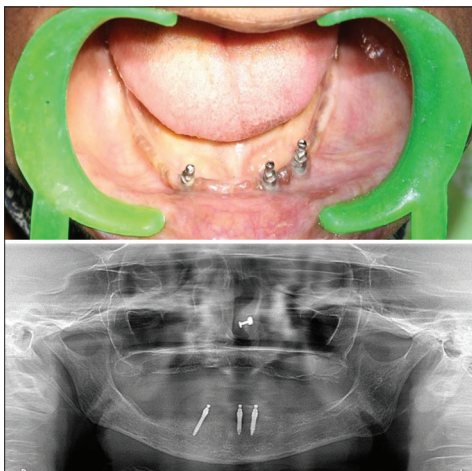


Figure 1: Pre-operative intraoral view and OPG



Figure 4: Final prosthesis *in situ*

insertion and removal of the denture and educated in denture care. Oral hygiene instructions were given. The follow-up protocol included routine check-ups every month. Hygiene maintenance was regularly reinforced.

DISCUSSION

Many patients require more than what conventional dentures can offer, especially in the mandible.^[5] Implant-supported prostheses are a viable alternative to removable dentures. ISMOD treatment can significantly improve biting and chewing function compared to traditional complete dentures when supported by sound implant placement and prostheses. There is well-documented evidence supporting the co-relation between implant placement and stabilization of their mandibular implant-supported overdenture.^[4]

Implant-supported removable prostheses definitely improve patient satisfaction with treatment and quality of life. Improvements, especially in attachment elements, have made this treatment method very predictable.

Some mechanical complications associated with implant-supported overdentures and implant-supported removable partial dentures such as loss of retention of attachment systems, the need to replace retentive elements and to relines or repair the resin portion of the denture, and implant fracture still occur. These complications are exponentially increased in case of unfavorable positioning of the implant. In the present case, inappropriate angulation of previously placed implant calls for a novel approach. Fabrication of a customized cement-retained bar alleviates the issue of tilted placement and passive fit. The bar splints all the implant components and also provides a scaffold to place the retentive elements that retain the denture. Special attention to maintenance of oral hygiene and attachment assembly was given to assure the longevity of the prosthesis.

CONCLUSION

Implant-supported overdentures in the mandible provide predictable results with improved stability, retention, function, and patient satisfaction compared with conventional dentures. Implants in the anterior mandible should be placed with pre-prosthetic planning and utmost surgical care considering the prosthetic component of rehabilitation. Failure to place an implant at the planned site will complicate the prosthetic replacement and reduce the longevity of the final prosthesis. Clinicians should plan for the implant-supported prosthesis, type of attachment, and type of occlusion to be provided before placement of the implant to achieve promising results.

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