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CASE REPORT

AN ALTERNATIVE FUNCTIONAL IMPRESSION TECHNIQUE FOR MANDIBULAR IMPLANT-SUPPORTED OVERDENTURE-CLINICAL REPORT

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ABSTRACT

The support for overdenture is derived from alveolar oral mucosa and retained roots or implants. Functional loads from the prosthesis must be distributed, optimally, between the supporting structures, for the success of overdentures. To achieve this, a functional impression procedure is required which records the mucosa and overdenture abutments in different forms. A functional impression technique with a custom tray is described for the fabrication of mandibular implant-supported overdenture.

Key Words: Overdenture support; functional impression procedures; mandibular implant-supported overdenture

INTRODUCTION

An overdenture may be defined as a removable prosthesis that covers the entire occlusal surface of a root or implant. Such prostheses have found ever increasing applications in prosthodontics, which may be a reflection on population trends and the demand for better treatment.¹These treatment approach have offered definite advantages like decreased resorption of the residual alveolar ridges, psychological benefits for the patient, and maintenance of masticatory performance.² When compared with the conventional dentures, overdentures are quite different in that the support is derived from both the mucosa and retained roots or implants. Implant-supported overdentures have been documented providing clinical success with long-term outcomes.^{3,4} Most commonly practiced design for mandibular implant-supported overdenture is two or more implants either free-standing or or splinted in the interforaminal region.^{5,6} Several attachments have been suggested to provide retention for the overdenture. Bars, O-ring attachments, and magnets are amongst most routinely used means for achieving such retention. However, the retention of splinted implants to O-ring attachments and magnets decreases over time.⁷

In consideration with the direction of force and its distribution, implant-supported overdentures and Kennedy Class I- bilateral distal extension removable partial dentures (RPDs) behaves in a similar fashion.⁸ Occlusal forces on RPDs must be distributed optimally between the supporting abutments and the residual alveolar ridges. However, the difference in the displaceability between teeth and residual ridge mucosa cannot be captured in a single-stage

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impression technique.^{8,9}Some authors introduced the dual impression techniques, where the teeth are recorded in their anatomic position and the residual alveolar mucosa is registered in their functional form.⁹⁻¹¹ An optimum distribution of functional loads between the mucosa and abutments/implants is the deciding factor for the success of the implant-supported overdentures.¹²While making the definitive impression for overdenture, the soft-tissue supporting areas must be recorded adequately. At the same time, an accurate positioning of implant components is equally important¹³This clinical report describes an alternative functional impression procedure using a custom tray for fabrication of the mandibular implant-supported overdenture.

CLINICAL REPORT

A 42-year-old woman with poor retention of her mandibular complete denture reported the Department of Prosthodontics and requested a new prosthesis for her mandible. Her demand was to replace the existing lower denture with a new one to restore function, phonetics, and esthetics. Intraoral clinical examination revealed the moderately resorbed mandibular alveolar ridge and partially edentulous maxillary arch. After clinical and radiographic examination, the patient was given different treatment approaches including new conventional complete denture and implantsupported prosthesis. In implant therapy, she was offered fixed and removable options. Patient agreed with the implant-supported therapy, but due to financial restrictions a treatment plan was finalized that included placement of two implants in the inter-foraminal region of the mandible to provide retention for the mandibular complete denture. Implants with a diameter of 3.0 mm and a length of 12 mm (ADIN Dental Implant Sys. Ltd., Israel) were placed (Figure 1). After a 3month healing period, the implants were exposed and ball-end abutments were torqued to 35 N/cm (ADIN Dental Implant Sys. Ltd., Israel). Preliminary impressions were made with irreversible hydrocolloid (Vignette CHROMATIC, DENTSPLY, India) and mandibular custom acrylic resin tray (PYREX, Pyrex Polykem, India) was prepared for the definitive impression (Fig.1). A minimum relief and no perforations were provided in the tray to record the alveolar mucosa in a functional state. The two openings in the region of the implants were given for the impression of the ball attachments. The border molding was completed with low-fusing impression compound (TRACING STICKS, DPI, The Bombay Burmah Trading Corporation Ltd., India) (Fig.2 & 3), and the impression of the alveolar mucosa was made with a ZOE impression paste (DPI Impression Paste, DPI, The Bombay Burmah Trading Corporation Ltd., India) under firm finger pressure applied to the posterior region (Fig.4). After removal of the excess impression paste, the impression of the ball-end abutment was made by injecting medium viscosity vinyl polysiloxane impression material (EXTREME, MEDICEPT UK LTD., United Kingdom) through the openings. A functional impression was made by combining both procedures (Fig.5) and master cast was poured (Fig.6).

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Fig.1- An open space provided in the region of implants in the custom tray



Fig.2- Border molding not involving the implant transfer copings



Fig.3- Completed borer molding

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Fig.4- Final impression made without involving implant transfer copings



Fig.5- Pick-up impression made



Fig.6- Master cast obtained

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DISCUSSION

Several authors^{12, 13} have reported 2-stage impression procedures for the fabrication of conventional and implant-retained overdentures. All these procedures have discussed the relation between the soft-tissue-supporting structures and the hard tissue of the retained roots or implants. The procedure described in this clinical report is a 2-stage impression technique that records the residual alveolar ridge in a functional form and implant components accurately. The main advantage of this technique is the decrease in post-insertion adjustment of the prosthesis. However, this procedure is more time-consuming compared with single-stage impression techniques. As, no documentation of outcomes exists for this 2-stage impression procedures for implant-retained overdenture, this procedure can be considered because of the nature of the support derived.

SUMMARY

A functional impression procedure is described in this clinical report, which is used to fabricate mandibular implant-supported overdenture. This 2-stage impression technique registers the alveolar mucosa in a functional state and the implant components accurately.

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