

Cocktail Impression Technique: A New Approach to Atwood's Order VI Mandibular Ridge Deformity

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Abstract The management of highly resorbed ridge has always posed a challenge to the prosthodontist for years. Obtaining consistent mandibular denture stability has long been a challenge for dental profession. In particular, Atwood's Order V and Order VI pattern of bone resorption is associated with difficulties in providing successful dentures. Stability of lower denture in such cases is usually the distinguishing factor between success and failure. This article outlines a combination of different impression techniques to improve mandibular denture stability in an atrophic mandibular ridge, keeping in mind the prevention of further ridge resorption.

Keywords Impression technique · Severely atrophic mandibular ridge · Cocktail impression technique

Introduction

The management of highly resorbed ridge has always posed a challenge to the prosthodontist for years. The fact that alveolar bone tends to resorb under complete lower denture is known to both, the clinician as well as the user of complete denture [1]. It is also accepted that the rate of

resorption varies from person to person [2]. Atwood categorized ridge form into six orders ranging from pre-extraction state (Order I) to the atrophic depressed mandibular ridge (Order VI) [3].

Advances in health care have resulted in a number of long term denture wearers [4, 5]. Highly resorbed residual mandibular ridge is commonly observed in older patients, along with thin, atrophic mucosa and lower threshold of pain, with diminished resiliency of tissues and muscle tonicity accompanied by poor adaptive capacity. Providing a stable lower denture for such patients has been a more difficult problem encountered by dentist [6]. The journey towards successful denture fabrication for such patients begins with an accurate impression that will help to ensure that the complete denture is stable, that provides physiological comfort to the patient [7].

The use of ridge augmentation and implants is generally advocated for such patients. However, treatment option of ridge augmentation and implant procedures may not always be possible and conventional dentures can have an equivalent positive impact on the health related quality of life [4]. So, an effort has been made to improve stability of mandibular denture by combining various techniques to obtain an accurate impression.

Preliminary and Definitive Impression Technique

The preliminary impression outlines the support area for the denture base. The impression must therefore be over-extended if the entire basal seat is to be used for support. In subjects where the mandibular ridge is severely resorbed, such that the stock tray may not be accommodated properly, the patient's previous denture may be used for making the preliminary impression. Preliminary impression is

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Fig. 1 Custom tray fabricated with mandibular rests at increased vertical height



Fig. 2 High-fusing impression compound on mandibular rests with maxillary ridge indentation

made using patients previous denture with Irreversible hydrocolloid (Vignette Chromatic, Dentsply, Gurgaon, India) by open mouth technique.

Customized tray (Fig. 1) is fabricated with autopolymerising acrylic resin (Rapid Repair, Dentsply, Gurgaon, India) according to Dynamic Impression Technique [8]. Tray with 1 mm wax spacer and cylindrical mandibular rests in the posterior region are made at increased vertical height. High-fusing impression compound is softened, placed on top of the mandibular rests and inserted in the patient's mouth (Fig. 2). Patient is advised to close his mouth so that the mandibular rests fit against the maxillary alveolar ridge (Fig. 3). This helps to stabilize the tray in position by preventing anteroposterior and mediolateral displacement of the tray during definitive impression. Lingual surfaces of mandibular rests are made concave



Fig. 3 Custom tray fits against maxillary alveolar ridge at increased vertical height

(Fig. 1), to provide space for the tongue to move freely during functional movements.

McCord and Tyson's technique for flat mandibular ridges is followed for definitive impression [1]. Impression compound (DPI Pinnacle, The Bombay Burmah Trading Corporation, Mumbai, India) and green tracing stick (DPI Pinnacle Tracing Sticks, The Bombay Burmah Trading Corporation, Mumbai, India) in the ratio of 3:7 parts by weight is placed in a bowl of water at 60°C and kneaded to a homogenous mass that provides a working time of about 90 s [1]. Wax spacer is removed, this homogenous mass is loaded and patient is guided to close his mouth on the mandibular rests.

For recording the functional state, patient is instructed to run his tongue along his lips, suck in his cheeks, pull in his lips and swallow by keeping his mouth closed, as in closed mouth impression technique, till the impression material hardens (Fig. 4). On removal from the mouth, impression is chilled and reinserted to check the denture bearing area for pressure sensibility by applying heavy finger pressure on the impression to simulate functional loads. The operator should place the thumbs on the underside of the patients' mandible and squeeze. If the mucosa has been properly loaded, the only discomfort that the patient should report is where the thumbs press on the lower border of the mandible [1]. Reheating the impression in whole or part, or adding more material to deficient areas should not be done as this will result in flow of material which in turn will result in differential loading of the tissues. The retrieved impression (Fig. 5) is visually inspected for surface irregularities, disinfected and poured (Fig. 6).



Fig. 4 Patient performing functional movements with custom tray in position



Fig. 5 Recovered single step, functional definitive impression



Fig. 6 Master cast obtained after beading and boxing

Discussion

Every patient has unique treatment requirements. Proper diagnosis and treatment plan are an important aspect of rehabilitation. The technique described here utilizes the customized tray fabricated according to Dynamic impression technique described by Tryde et al. [8], impression material recommended by McCord and Tyson's technique for atrophic mandibular ridge [1] followed by functional impression as in closed mouth impression technique. So the word "Cocktail" refers to the combination of different impression techniques to obtain a definitive impression.

In the atrophic mandible, one of the principal functional problems, other than instability, arises from the inability of the residual ridge and its overlying tissues to withstand masticatory forces [1]. Furthermore, the muscle attachments are located near the crest of the ridge, with greater dislocating effect of the muscles. For these reasons, the range of muscle action, as well as spaces into which the denture can be extended without dislocation, must be accurately recorded in the impression [8]. Such impressions can be made by means of dynamic methods. Customized tray that is fabricated in this technique has the advantage of avoidance of dislocating effect of the muscles on improperly extended denture borders, and complete utilization of the possibilities of active and passive tissue fixation of the denture [9]. Mandibular rests that fit against the maxillary alveolar ridge offer the advantage to stabilize the custom tray by preventing horizontal displacement of the tray during definitive impression. These features of the tray directly result in the impression material being shaped by the functional movements of the muscles and muscle attachments that border the denture base. For recording the functional position of the muscles, impression material recommended by McCord and Tyson for atrophic mandibular ridges was used [1]. This homogenous material permits to mould an impression of sufficient viscosity to obtain the definitive impression in a single step. The working time of 90 s is sufficient to allow the patient to perform all the functional movements. Combination of impression compound with green stick is used as recommended by McCord and Tyson for definitive impression, because this has better body, requires less chair side time and economical as compared to tissue conditioner or reline material. During the entire procedure, custom tray is stabilized by mandibular rests to obtain an accurate, stable, single step, functional impression.

Conclusion

This article highlights the impression technique to achieve effective retention, stability and support for Atwood's

Order VI ridge deformities. Moreover, necessary steps to prevent further damage to patient's already vulnerable residual ridge are taken into consideration. By following this combination of impression techniques to obtain a definitive impression, it would be possible to economically yet effectively rehabilitate a patient with flat, atrophic, depressed, mandibular ridge thereby improving the function.

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