

COCKTAIL IMPRESSION TECHNIQUE: A DEFINITIVE APPROACH TO RESORBED MANDIBULAR RESIDUAL RIDGE

¹Dr Nitesh shetty, ²Dr Shrinidhi Patla, ³Dr Arya R, ⁴Dr Haifa B, ⁵Dr Amritha Sandhu

¹ Professor & HOD, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India

² Post Graduate Student, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India

³ Post Graduate Student, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India

⁴ Professor, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India

⁵ Assistant Professor, Department of Prosthodontics, Srinivas Institute of Dental Sciences, Mukka, Mangalore, Karnataka, India

ABSTRACT: Residual ridge resorption process is the reduction in size of the bony ridge under the mucoperiosteum. The management of highly resorbed ridge has always posed a challenge to the prosthodontist for years. In particular, Atwood's Order V and Order VI pattern of bone resorption is associated with difficulties in providing successful dentures. The objective of a complete denture prosthesis is restoring aesthetics, comfort, and function by the replacement of missing dental and alveolar structures employing a stable prosthesis. This clinical case report outlines the use of one different impression technique to improve mandibular denture stability in an atrophic mandibular ridge.

Keywords: Impression technique, Atrophic mandibular ridge, Cocktail impression technique, Functional impression technique, Dynamic impression technique.

INTRODUCTION:

Prosthodontists often struggle with an atrophic resorbed ridge while dealing with complete

dentures, which results in a lack of stability and retention of the denture. Residual ridge resorption is a complex biophysical process and a common occurrence following extraction of teeth¹. Ridge atrophy is most aggressive during the first year after tooth loss followed by a slower but more progressive rate of resorption thereafter. Severely atrophied ridges are a more common finding with the mandibular residual ridges than the maxilla because the mandible resorbs at a faster rate than the maxilla. Achieving maximum stability and retention may be especially important for older patients with resorbed mandibular residual ridges. Atwood categorized ridge form into six orders ranging from pre-extraction state (Order I) to the atrophic depressed mandibular ridge (Order VI)^{2, 3}.

For resorbed ridges, an accurate impression is crucial to creating peripheral contours that accommodate normal muscle function and ensure peripheral adaptation without allowing air to penetrate between the denture base and the mucous membrane to overcome dislodgment of lower denture. The dislodgement of the denture occurs due to the muscle attachment which lies closer on crest of ridge. A good impression holds the key to a successful treatment in cases of resorbed

mandibular ridges. No matter how good the prosthesis is constructed, it will not function as intended if it was not made using an accurate impression. The journey towards successful denture fabrication for such resorbed ridges begin with an accurate impression that will help to ensure that the complete denture is stable which provides physiological comfort to the patient.

The use of ridge augmentation and implants is generally advocated for such patients. However, it may not always be possible. Therefore, conventional dentures can have an equivalent positive impact on the health-related quality of life. In this clinical case report, a definitive impression technique is used to ensure better reproducibility and stability in a resorbed mandibular ridge which is referred as Cocktail Impression Technique.

CASE REPORT:

A 70-year-old female patient reported to the Department of Prosthodontics and Crown and Bridge and Oral Implantology at Srinivas Institute of Dental Sciences, Mukka, Mangalore with a chief complaint of loosening of lower denture. Dental history revealed that she lost all her teeth due to periodontal reasons. Medical history was insignificant. The patient was apparently in good health and did not report any systemic disease. Patient was a denture wearer for 10 years but not satisfied with the prosthesis due to poor stability. On intraoral examination, a highly resorbed mandibular ridge was observed. There was no hypermobile tissue on palpation [Figure 1]. Various treatment options were explained to the patient such as ridge augmentation procedures followed by conventional complete dentures, implant-supported prosthesis, and conventional complete dentures following different impression technique. Advantages and disadvantages were also discussed with the patient. Due to patient's compliance, cost factor, and surgical procedure involved, the patient decided to go for conventional complete denture as a treatment option. The patient was informed about the study and an informed consent was taken.



Figure 1: Resorbed mandibular ridge.

PROCEDURE:

- 1) Primary Impression of the maxillary arch and mandibular arch was made using Irreversible Hydrocolloid material [Figure 2].

Figure 2: Conventional Alginate impression



- 2) The custom tray was fabricated with auto polymerizing acrylic resin for secondary impression. One-millimetre wax spacer and cylindrical mandibular rests in the molar region were made at a tentative vertical height where impression compound can be added later on to increase the vertical height [Figure 3].



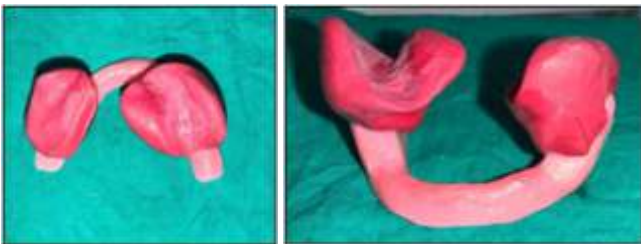


Figure 3: Custom tray fabricated with mandibular rests at increased vertical

- 3) The custom tray was inserted into the patient's mouth and the patient was advised to close her mouth so that the mandibular rests fit on the maxillary alveolar ridge which helps in stabilization of the tray for impression making procedure [Figure 4].



Figure 4: Custom tray with mandibular rest in patient's mouth

- 4) Mccord and Tyson's technique for flat mandibular ridges is followed for definitive impression. 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 90s [4]. Wax spacer is removed, this homogenous mass is loaded and patient is guided to close his mouth on the mandibular rests [Figure 5].



Figure 5: Definitive impression using Mccord and Tyson's technique

- 5) 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 [Figure 6].



Figure 6: Patient performing functional movements with custom tray in position.

- 6) 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 [Figure 7].



Figure 7: Impression is chilled and reinserted

- 7) The operator should place the thumbs on the underside of the patient's 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.
- 8) 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.
- 9) The retrieved impression is visually inspected for surface irregularities, disinfected and poured [Figure 8].



Figure 8: Final impression (McCord and Tyson)

- 10) Maxillary and Mandibular Master cast obtained after beading and boxing of the secondary impression [Figure 9].



Figure 9: Maxillary and Mandibular Master cast

- 11) Denture base with occlusal rims fabricated on the master cast [Figure 10 a]. Maxillomandibular relations were recorded and mounted on an articulator [Figure 10b].



Figure 10a: Denture base with occlusal rims



Figure 10b: Jaw relation

- 12) The trial denture was verified in the patient's mouth [Figure 11a] and the denture was processed and finished [Figure 11b].



Figure 11a: Try in**Figure 11b:** Processed and finished complete denture

- 13) Complete denture insertion and occlusion checked [Figure12]

**Figure 12:** Complete denture insertion.

- 14) Patient recalled after 2 weeks [Figure13].

**Figure 13:** Recall

- 15) Pre-treatment and Post- treatment photographs [Figure14].

**FIGURE 14:** Pre and Post treatment photographs.

DISCUSSION:

Every patient needs unique treatment planning. Fabrication of stable lower denture is strenuous procedure for any dentist especially in the compromised ridge cases. The journey to achieving a successful denture fabrication starts with their precise impression that will provide more retention and stability to final complete denture. Following extraction residual ridge will show diminished quantity and quality due to ridge resorption. In atrophic mandible, problem arises from inability of residual ridge and its overlying tissue to withstand the masticatory forces^[6]. The muscle attachment which are located near to crest of ridge have greater dislocating effect of muscle.

A considerable emphasis is placed on impression technique, as recent studies indicate that flawed impression count for the majority of the dental problems. Two principle forms that must always be considered are lower impression tend to be short of retromolar pads and do not accurately record the functional forms of the floor of the mouth and the retro mylohyoid fossae^[7]. The technique described here utilizes the customized tray fabricated according to Dynamic impression technique described by Tryde et al., impression material recommended by McCord and Tyson's technique for atrophic mandibular ridge^[4] followed by functional impression as in closed mouth impression technique.

The word "Cocktail" refers to the combination of different impression techniques to obtain a definitive impression [5]. Custom tray that is fabricated in this technique has the advantage of avoiding the 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. (Brill et al., 1965). Mandibular rests that are fabricated at an increased vertical height will fit against the maxillary alveolar ridge which offers 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 by the patient. For recording the functional position of the muscles, impression material recommended by McCord and Tyson for atrophic mandibular ridges was used [4]. 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. This technique helped in stabilization of the tray while recording the functional impression which resulted in better reproducibility, retention, and stability of the final prosthesis [5]

CONCLUSION:

To attain the patient's aesthetic and physiological needs, the impression techniques must be modified to gain desired outcome. 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. It is an economical and effective way of rehabilitation in a patient with compromised ridges, thereby improving the function.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES:

- 1) Kondo T, Kanayama K, Egusa H, Nishimura I. Current perspectives of residual ridge resorption: Pathological activation of oral barrier osteoclasts. *Journal of Prosthodontic Research*. 2023;67(1):12-22.
- 2) Atwood DA. Postextraction changes in the adult mandible as illustrated by microradiographs of midsagittal sections and serial cephalometric roentgenograms. *The Journal of Prosthetic Dentistry*. 1963 Sep 1;13(5):810-24.
- 3) ATWOOD DA. The problem of reduction of residual ridges. *Essential of complete denture prothodontics*. 1979.
- 4) McCord JF, Tyson KW. A conservative prosthodontic option for the treatment of edentulous patients with atrophic (flat) mandibular ridges. *British dental journal*. 1997 Jun;182(12):469-72.
- 5) Gugale RR, Mittal R, Sran N, Maheshwari R. Management of atwood class V mandibular ridge using “Dynamic impression technique”: A case report *J Dent Panacea*. 2021;3:88–92.
- 6) Kapur KK, Soman SD. Masticatory performance and efficiency in denture wearers. *The Journal of prosthetic dentistry*. 1964 Jul 1;14(4):687-94.
- 7) Jf M. Impression making. *Br Dent J*. 2000;188:484-92.