

# COMPLETE DENTURE IMPRESSION TECHNIQUES FOR RESORBED RIDGES: A REVIEW

\*Shinto Thomas, \*\*P S Prabu, \*\*\*Meenu Merry C Paul, \*\*\*\* S Laju,  
\*\*\*\*\*Geeth Prasad, \*\*\*\*\* Yehsana N,

\*Post graduate student, \*\*Professor and HOD, \*\*\*Professor, \*\*\*\*Reader, \*\*\*\*\*Senior Lecturer, \*\*\*\*\*Post graduate student,  
Dept of Prosthodontics, Malabar Dental College and Research Centre, Edappal, Malapuram, Kerala | Corresponding  
author : Dr. Shinto Thomas, Email : shintothomas555@gmail.com

## Introduction

Residual ridge is a term used to describe the shape of the alveolar ridge after healing of bone and soft tissues following tooth extraction. Once the teeth get extracted resorption of ridge take place. Resorption is the loss of tissue substance by physiologic or pathologic processes.<sup>1</sup> According to Glossary of prosthodontic terms ninth edition, residual ridge resorption is defined as a term used for the diminishing quantity and quality of the residual ridge after the teeth are extracted.<sup>1</sup>

Residual ridge resorption is considered as a multi-factorial, biomechanical disease that results from a combination of anatomic, metabolic and mechanical determinants. There is a variation of resorption in different patients and different sites. It is mainly because the reason behind this disease is a combination of factors and cofactors in numerous ways.

Residual ridge resorption is a chronic, progressive, irreversible and cumulative disease. It is our main concern as a prosthodontist to incorporate proper impression techniques and measures to minimize the residual ridge resorption in the treatment plan.<sup>2</sup>

In 1971 Atwood described residual ridge resorption as "Major oral disease entity" characterized by loss of oral bone after the extraction of teeth.<sup>3</sup>

Residual ridge resorption is a term that is used to describe the changes which affect the alveolar ridge following tooth extractions, which continue even after healing of the extraction socket.<sup>4</sup>

Compared to the maxilla, the mandibular residual ridge shows more severe resorption. The reason difference in the rate of resorption is comparatively fast in the mandible than in the maxilla.<sup>5</sup>

In patients with severe residual ridge loss, implant supported dentures can be considered as a treatment modality. The implant treatments are still too expensive for the majority of elderly people.<sup>6</sup>

The main mantra we should follow was said by MM Devan "The perpetual preservation of what remains is more important than the meticulous replacement of what is missing."<sup>7</sup>

Many authors described different impressions techniques regarding atrophied ridges. This article combines all the different impression techniques described in the past for residual ridge resorption.

## Impression Techniques

### Conventional technique

The impression is made using the conventional method, that is, zinc oxide eugenol wash impression

after border molding with a green stick compound in open mouth position.

### **Dynamic impression**

Fabrication of the special tray is done. A ridge of self-curing resin is built up in the premolar-molar region on each side to support the thermoplastic material. While the thermoplastic material is soft, the tray is placed in position on the lower ridge in the mouth and the patient is asked to close the jaws slowly. The upper residual ridge will form an impression in the soft thermoplastic material at a height corresponding to the rest mandible. A tray is removed from the mouth and cooled. Lingually the mandibular rests should be concave to provide space for the tongue. Sufficient amount of an irreversible hydrocolloid is mixed with 50% extra water and material are placed directly into the mouth to cover all tissues. The tray is pressed through alginate by digital force until the stops are firmly seated on the residual ridge. Then, the patient is asked to close his mouth slowly until the mandibular rests have obtained firm contact with the maxillae. The patient should swallow three to four times at 10 seconds interval while the final impression material is still in a moldable condition. The action of the muscles that function in deglutition is accentuated because the mandibular rests prevent the mandible from reaching the vertical relation of occlusion and force it to remain in its rest position. This procedure develops a registration of the denture space which ordinarily results in a proper extension of the lingual flanges of the finished dentures. Forceful protrusion of the lips brings the mentalis and orbicularis oris muscles into action and is responsible for forming the labial part of the impression.<sup>8</sup>

### **Dynamic impression second technique**

In another method, an old denture can be used for impression when opposing natural or artificial teeth are present. Often the vertical dimension at occlusion is decreased hence steps are placed at re-established height. The mandibular rests are

built up until including the inter-occlusal distance.<sup>8</sup>

### **Dynamic impression third technique**

The denture is processed conventionally. Then a correcting dynamic impression is made in the denture base to reshape and complete the final design, and the denture is relined.<sup>8</sup>

### **Klein's technique**

Stock tray will cause some tissue distortion as it may not exactly fit over the tissue so he proposed a method without using stock tray. A moldable material like putty silicone was placed over the residual ridge and the borders molded by speech exercises. the material was reinforced by an internal metallic core. A functional preliminary impression is made using a low viscosity material which is placed on the impression surface of this customized tray.<sup>9</sup>

### **Admixed technique**

Proposed by Mccord and Tyson. Impression compound and green tracing stick compound are taken 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 seconds. This homogenous mass is loaded to the tray after wax spacer is removed and the patient is made to do various tongue movements to record the borders.<sup>10</sup>

### **All green technique**

In this technique the mandibular secondary impression is made using green stick tracing compound. Greenstick compound is kneaded to a homogenous mass and was loaded on the special tray and border movements were done. The final impression is made using zinc oxide eugenol.<sup>11</sup>

### **Functional technique**

The technique was proposed by Winkler, a closed mouth functional impression technique. In this

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technique, a denture base and occlusal rims are fabricated on the primary cast and tentative jaw relation is done. Tissue conditioning material is applied on the tissue surface of mandibular denture base do various functional movements such as puffing, blowing, whistling and smiling. Three application of tissue conditioner material is done at an interval of 8–10 minutes. The final impression is made with light body addition silicone material with closed mouth technique.<sup>12</sup>

## Cocktail impression technique

In this technique, a customized tray is fabricated according to the dynamic impression technique using auto polymerizing acrylic resin. A tray with cylindrical mandibular rests in the posterior region and 1mm wax spacer is made at increased vertical height. The patient is advised to close his mouth so that the mandibular rests fit against the maxillary alveolar ridge like in case of dynamic impression. This helps to stabilize the tray in position. Lingual surfaces of mandibular rests are made concave. Mccord and Tyson's technique for flat mandibular ridges is followed for a definitive impression. and functional moments were done till the impression material hardens.<sup>13</sup>

## The technique proposed by Dr. Chandrasekaran Nair

Irreversible hydrocolloid is used for mandibular primary impression. A tray devoid of spacer is made over the primary cast using auto-polymerizing resin. The custom tray is adjusted to be 2 mm short of the functional depth. The crest of the ridge is marked using an indelible pencil and transferred to the tray by placing the tray over the ridge. A window is cut in the tray using a straight bur outlining the marked area, corresponding to the crest of the ridge. The tray is then seated onto the cast, and softened modeling wax is placed into the window, thereby replacing the eliminated acrylic resin, and shaped to form a handle. Putty consistency elastomer with tray adhesive on the

borders and intaglio surface of the custom tray are placed on the tray. The tray is seated onto the ridge with a window corresponding to the crest of the ridge, and the labial and lingual borders are molded. The handle is made with modeling wax. Areas of overextension indicated by exposure of the tray borders are corrected by removing the putty in the corresponding area and trimming the tray. A second application of putty is made over the first, and the borders are molded again. The borders of the impression are carefully re-examined for any over or under-extension and are corrected accordingly. The borders of the impression are trimmed by 0.5 mm using a sintered diamond bur. The wax handle is removed and the putty material over the window is cut out. Light-body elastomeric impression material is loaded into the tray, which is then seated on the ridge. Additional light-body material is then expressed into the window. Lingual and facial borders are molded, ensuring the tray remains steady until the impression material sets.<sup>14</sup>

## Elastomeric technique

In this technique, the mandibular secondary impression was made using elastomeric impression material. Tray adhesive is applied over the border, an internal and external surface of the acrylic custom tray, to facilitate the retention of the silicone border molding material. An addition silicon putty material with an extended working time is loaded along the borders of a special tray. The special tray is placed in the mouth and is border molded; the patient is asked to move the tongue according to standard impression procedures. The tray is removed from the mouth, and the impression is examined. Light-body addition of silicone impression material is loaded in the impression and inserted in the mouth. The patient is instructed to repeat the tongue movements, more vigorously, while the light-body impression material is border molded along the buccal and labial flange areas. After the material is set, the impression is removed from the mouth and examined for any discrepancy.

**Modified fluid wax impression technique**

The preliminary impression is recorded with an irreversible hydrocolloid. A custom impression tray is fabricated on the preliminary cast. Softened modeling plastic impression compound is placed on the intaglio surface of the tray, corresponding to the region of the mandibular central incisors and both the mandibular first molars to serve as a spacer for wax. Segmental border molding is done with a compound. Spacers are removed with a scalpel blade once the border molding is complete. The tray is trimmed over the crest of the residual ridge to create a window opening above the displaceable alveolar ridge using a No.8 round bur.

Mouth temperature impression wax is melted and applied onto the borders of the tray. Ensure that the wax temperature is less than the working temperature of the modeling plastic impression compound to prevent distortion. Place the impression tray immediately over the edentulous ridge, and leave it in the mouth for approximately 5 minutes. Allow adequate time for the mouth temperature impression wax to flow and escape to the periphery of the impression, as well as to solidify. Apply impression wax onto the remaining intaglio surface of the tray. Add impression wax onto the slopes of the ridge, rather than the crest, in increments until a glossy surface is visible. Trim away any excess impression wax on the periphery or over the window opening with a scalpel blade. Apply adhesive on the tray in the area surrounding the window opening, and allow it to dry. Place the impression tray onto the residual ridge and inject vinyl polysiloxane impression material over the window opening. Prevent distortion of the soft tissues by placing the impression material in the most passive manner possible. Remove and box the impression using a mix of plaster and pumice. Avoid using a conventional boxing procedure that requires boxing wax, as it may distort the impression wax.<sup>15</sup>

**The neutral zone technique:**

Primary impression is made using impression compound or impression plaster. Upper wax rim and a lower special tray which is a plate of acrylic adapted to the lower ridge, with spurs or fins projecting upwards towards the upper arch, which helps with retention of the impression material. The upper wax rim is adjusted as in normal registration for a complete denture. The lower special tray is placed in the mouth. Two occlusal pillars are then built up in self-cured acrylic on opposite sides of the lower arch. These pillars are molded and adjusted to the correct height to give the usual 3mm freeway space. A thick mix of viscolgel is then placed around the rest of the lower special tray, distally and mesially to the occlusal pillars. The patient is then asked to talk, swallow etc. After 5-10 minutes the set impression is removed from the mouth and examined. The patient's musculature will mold the viscolgel material into a position of balance. Indices are then constructed with plaster and wax is filled into it, teeth arrangement is done accordingly. More comfortable and be more stable and retentive as the denture will not interfere with functions of the lips, cheeks, and tongues.<sup>16</sup>

**Flange Technique:**

Proposed by Frank Lott and Bernard Levin an anatomic and physiologic approach to increased retention, function, comfort and appearance of dentures. Introduced in 1966 involves making impressions of soft tissues of mouth adjacent to the buccal, lingual, labial, palatal surface and incorporating the resulting extensions or flange in the denture. Flange wax was rolled from the retromolar pad area to the sublingual region, large enough to restore the diameter of estimated resorption and patient is asked to forcefully perform functions of swallowing etc to give border extensions which covers maximum surface area.<sup>17</sup>

**Technique proposed by Athur S Freese.**

The objective is to make an impression which records the surfaces of the tissues without excessive



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displacement in the positions they occupy when in function. An oversize soft metal impression tray is selected and trimmed without any attachments of the border tissues. Low-heat modeling plastic is used and patient is instructed to run his tongue along his lips, suck in his cheeks, pull in his lips, and open and close his mouth.

## Secondary impression:

Acrylic resin tray is made and carefully checked that it does not displace any of the peripheral tissues. Wax stops are built on the tray, the wax stops are built until the vertical dimension at contact is increased about 3 or 4 mm. beyond the normal occlusal vertical dimension. Self-curing acrylic resin reline material is prepared and placed in the tray. The patient is instructed to bite on the wax stops and directed to do the movements like swallow, suck in the cheeks and lips, and to extend his tongue through the spaces between the stops until he can touch his lips and cheeks. zinc oxide eugenol is used for impression.

## Conclusion:

The preservation of supporting tissues is a sacred trust that cannot be ignored.

The application of the basic concepts and the advances made in the basic sciences will help to keep this trust in the hands of the dental professional.

As prosthodontists, we need to perform the most meticulous and intelligent prosthodontic care of the patient within our capabilities and then it would not seem a nebulous hope that someday there will be control over residual ridge resorption.

Utilization of the impression as mentioned above techniques can be chosen in different cases according to clinician's experience and knowledge.

## References:

1. Glossary of prosthodontic terms. Ninth edition.
2. Shalini Karnam, Swapna Basimi, Haragopal Surapaneni, Sreeramulu Basapogu, and Ramlal antala. Severely Resorbed Edentulous Ridges: A Preventive Prosthodontic Approach – A Case Report. J Clin Diagn Res. 2015 Oct; 9(10).
3. Atwood D.A. Reduction of residual ridges: A major oral disease entity. J. Prosthet. Dent. 1971 September ; Volume 26, Issue 3.
4. Derek D'Souza. Oral Health Care – Prosthodontics, Periodontology, Biology, Research, and Systemic Conditions 2012 february.
5. Firtell DN, Koumjian JH. Mandibular complete denture impressions with fluid wax or polysulfide rubber: a comparative study. J Prosthet Dent. 1992 Jun;67(6):801-4.
6. Nevalainen MJ, Närhi TO, Siukosaari P, Schmidt-Kaunisaho K, Ainamo A. Prosthetic rehabilitation in the elderly inhabitants of Helsinki, Finland. J Oral Rehabil. 1996 Nov;23(11):722-8.
7. Tyson KW, McCord JF. Chairside options for the treatment of complete denture problems associated with the atrophic (flat) mandibular ridge. Br Dent J 2000;188:10-4.
8. Gerd Tryde, Kaisa Olsson, S.Aa. Jensen, R. Cantor, Gerd Tryde, Kaisa Olsson, S.Aa. Jensen, Cantor, J.J. Tarsetano. Dynamic impression methods. Journal of Prosthetic Dentistry ,1965 December; Volume 15, Issue 6.
9. Klein IE, Broner AS. Complete denture secondary impression technique to minimize distortion of ridge and border tissues. J Prosthet Dent 1985;54(5):660-64
10. Tyson KW, McCord JF. A conservative prosthodontic option for the treatment of edentulous patients with atrophic mandibular ridges. Br Dent J. 1997;182:469–472.
11. A. Tunkiwala and S. Ram. Management of mandibular poor foundation: conventional complete dentures, Dental Practice March-April 2013 Vol 11 No 5.
12. S. Winkler, Essentials of Complete Denture Prosthodontics, AITBS, New Delhi, India, 2nd edition, 2009.
13. G. Praveen, S. Gupta, S. Agarwal, and S. K. Agarwal. Cocktail impression technique: a new approach to Atwood's order vi mandibular ridge deformity, Journal of Indian Prosthodontist Society, 2011 ; vol. 11, no. 1.
14. Nair K. Chandrasekharan, Ashish T. Kunkel, Mahesh Verma, Rajiv K. Gupta. A Technique for Impressing the Severely resorbed mandibular Edentulous ridge, J Prosthodont. 2012 Apr;21(3):215-8.
15. Kian M. Tan, Michael T. Singer, Radi Masri April. Modified fluid wax impression for a severely resorbed edentulous mandibular ridge. J Prosthet Dent 2009 Volume 101, Issue 4.
16. Beresin VE, Schiesser FJ. The neutral zone in complete dentures. J Prosthet Dent. 1976 Oct;36(4):356-67.
17. Lott F, Levin B. Flange technique: An anatomic and physiologic approach to increased retention, function, comfort and apperence of dentures. J Prosthet Dent 1966 May-Jun;16(3):394-412
18. Freese AS. Impressions for unfavorable mandibular ridges. J Prosthet Dent 1956;6(3):302-04.