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A Technique for Impressing the Severely Resorbed Mandibular Edentulous Ridge

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Abstract

Patients presenting with severe resorption of the residual alveolar ridges are relatively common today in both private practices and teaching institutions. The severely resorbed mandibular ridge is more challenging to impress than is the maxillary ridge. Accurately capturing the denture-bearing surface in its entirety is crucial to providing the patient with a functionally successful prosthesis. This article presents a technique to overcome the difficulties encountered in impressing the severely resorbed mandibular ridge using elastomeric impression materials and a modified special custom tray.

Long-term edentulism and use of ill-fitting dentures usually result in severe resorption of the mandible. Mandibular dentures often present greater difficulty in achieving retention, stability, and support than do maxillary dentures, primarily due to the increased number of anatomic limitations.[1] Achieving maximum stability and retention may be especially important for older patients with atrophied mandibular residual ridges.[2] To a large extent, the impression determines the retention and comfort of dentures made for patients with unfavorable residual ridges.[3] Minimum bone height, unfavorable residual ridge morphology, and/or muscle attachments make the situation more challenging.[4]

Various surgical procedures have been advocated to manage the severely resorbed mandibular ridge. Surgical reconstruction such as vestibular extension procedures, autologous overlay grafts, osteotomy procedures, alloplastic grafts, and implants have been advocated.[5,6] However, these are not always feasible due to the patient's compromised health, preferences, and/or financial considerations.

Hurtado advocated the use of mandibular dentures weighing approximately 30 dwt for the management of severely resorbed mandibular residual alveolar ridges. This, however, requires the use of a chrome-cobalt denture base, which increases the laboratory steps and the cost of the denture.[7]

The modified functional impression technique seems to be a logical option for the management of compromised mandibular ridges. Tan et al advocated the use of a functional impression using fluid wax.[4] Undercuts, however, might possibly limit the use of such waxes. Conventional methods using admix compounds can claim only limited success. Patients do not tolerate the heat used for manipulating the compounds. Use of elastomers has been described in the past and presents several advantages, including fewer insertions, less difficulty, greater time efficiency, and reduced patient discomfort compared to those made with compound.[8,9] This article presents a technique for making impressions of the resorbed and flabby mandibular ridge using elastomeric materials and a modified custom tray.

Technique

1. The mandibular primary impression is made with irreversible hydrocolloid (Tropicalgin, Zhermack Clinical, Badia Polisine, Italy) in a stock tray modified with putty-consistency elastomeric impression material (Affinis, Coltene Whaledent, Cuyahoga Falls, OH).
2. The primary cast is poured in Type III dental stone (Kalstone, Kalabhai Karson Pvt. Ltd., Mumbai, India), and a tray devoid of spacer or relief wax is fabricated over the primary cast using autopolymerizing resin (Rapid Repair, Dentsply India Pvt. Ltd., Noida, India).

3. After evaluation in the mouth, the custom tray is adjusted to be 2 mm short of the functional depth of the labial and lingual sulci.
4. The crest of the ridge is marked using an indelible pencil (CPAN 002, Lilac, Nataraj Color Copying, Hindustan Pencils Pvt. Ltd, Mumbai, India) and is transferred to the tray via placement of the tray on the ridge.
5. A window is cut in the tray using a straight bur (HM 33T, Meisinger, Centennial, CO) outlining the marked area, corresponding to the crest of the ridge (Fig 1).
6. The tray is then seated onto the cast, and softened modeling wax (Y-Dents Modeling Wax, MDM Corporation, Delhi, India) is placed into the window, thereby replacing the eliminated acrylic resin, and shaped to form a handle (Fig 2).
7. Putty consistency elastomer (Affinis) and tray adhesive (Universal Tray Adhesive, Zhermack Clinical) on the borders and intaglio surface of the custom tray are placed on the tray. The tray is seated onto the ridge, and the labial and lingual borders are molded.
8. Areas of overextension indicated by exposure of the tray borders are corrected by removing the putty in the corresponding area and trimming the tray (Fig 3).
9. A second application of putty is made over the first, and the borders are molded again (Fig 4).
10. The borders of the impression are carefully re-examined for any over- or under-extensions and are corrected accordingly.
11. The borders of the impression are trimmed by 0.5 mm using a sintered diamond bur (Taper Round End, Fukuiken Saimeng LLC, Fukuiken, Japan) mounted in a micromotor handpiece.
12. The wax handle is removed (Fig 5), and the putty material over the window is cut out using a sharp Bard-Parker knife.
13. Light-body elastomeric impression material (Affinis) 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 (Fig 6).

Figure 1 Window corresponding to crest of ridge.

Figure 3 Areas of over- and under-extension.

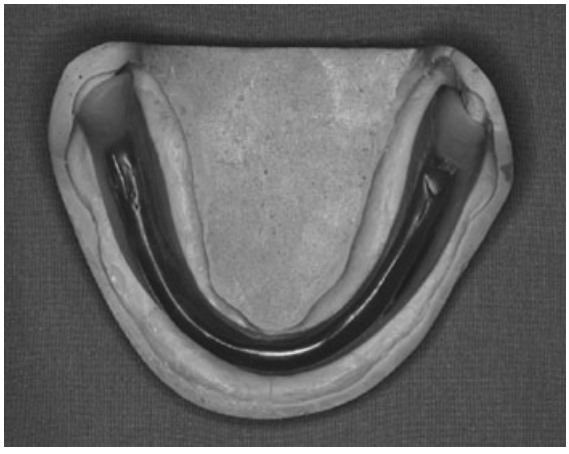

Figure 2 Handle made with modeling wax.

Figure 4 Completed border molding.

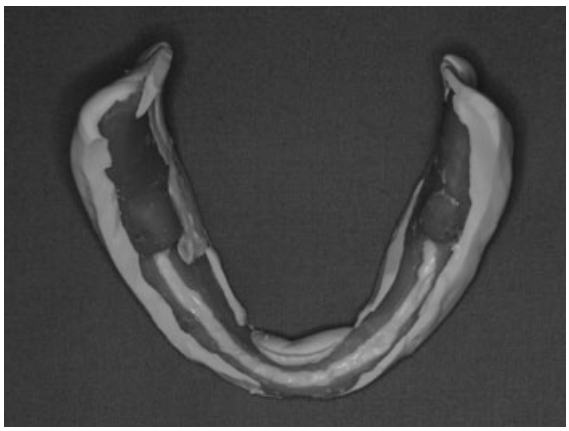

Figure 5 Removal of wax handle (cameo surface view).

Figure 6 Light body expressed into window intraorally.

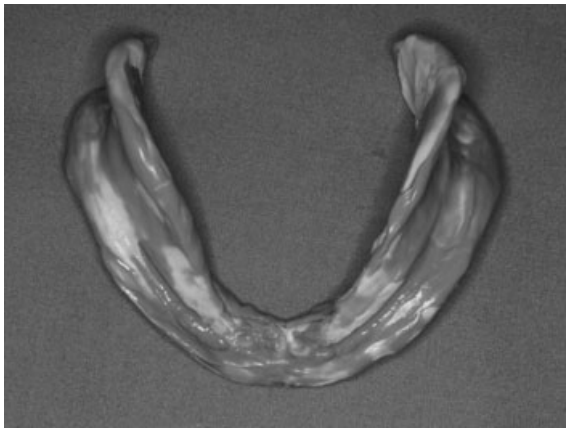

Figure 7 Completed mandibular impression.

14. Once set, the impression is removed, disinfected, and inspected (Fig 7). Beading and boxing is performed, and the impression is poured using Type III dental stone (Kalstone).

Discussion

The Class IV mandible is the most debilitated edentulous condition.[6] When surgical intervention is not an option, specialized prosthodontic techniques are indicated to achieve an adequate treatment outcome.[4,6]

The described technique uses elastomeric impression materials rather than modeling compound, with the former being more patient friendly and more convenient for the operator. Creation of a window following border molding using brittle materials such as wax and compound, in a tray with a narrow faciolingual extent, can jeopardize the latter. Absence of a handle and finger rests can complicate handling and stabilization, which attains greater precedence in such cases. After making the window, flexibility imparted to the tray could pose a problem if brittle materials such as impression compound or materials prone to distortion, such as waxes, are used. In the presented technique, the window is created in conjunction with a handle made in wax. Creation of the window is swiftly achieved by removal of the wax handle.

This technique places pressure on the ridge slopes, which is advocated by Boucher for such clinical situations.[10] While attempting to manage movable tissue no matter which material is used, pressure will be reduced and rebound will be more effective if a relief space is allowed in the tray,[2] which is accomplished with the incorporation of a window over the crest of the ridge.

The area to be relieved, namely the crest of the ridge, is impressed with minimal pressure with the use of light-body impression material. Impression plaster could also be an option, but is difficult to handle and pour.[4]

Conclusion

The presented technique describes a method to impress the Class IV mandibular ridge[6] using a modified special tray and elastomeric impression materials. This technique incorporates theoretical principles to impress such tissues and concomitantly overcomes the practical difficulties commonly encountered during such procedures.

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