Case Report

Prosthodontic Management of a Severely Resorbed Mandibular Ridge Using McCord–Tyson Admixed Impression Technique : A Case Report

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Abstract

Residual ridge resorption of the mandible presents significant challenges in achieving retention, stability and support for complete dentures. Conventional impression techniques often fail to record compromised tissues accurately. This case report describes the rehabilitation of an edentulous patient with a severely resorbed mandibular ridge using the McCord–Tyson admixed impression technique. The technique records tissues under functional conditions, enhancing denture stability and patient comfort.

Introduction

Residual ridge resorption (RRR) is a chronic, progressive and irreversible process that occurs following tooth extraction, resulting in loss of alveolar bone height and width. The rate of resorption is greater in the mandible than in the maxilla, often leading to a flat or knife-edge ridge with reduced denture-bearing area. It is influenced by multiple factors like anatomic, metabolic and mechanical factors. Anatomic factors include the initial ridge size, morphology and bone density with narrow or less dense ridges resorbing more rapidly. Metabolic conditions such as osteoporosis, hormonal imbalances and nutritional deficiencies can accelerate bone loss. Mechanical factors, including occlusal forces, unfavorable denture wearing patterns and parafunctional habits further contribute to ridge resorption. It leads to a reduced denture-bearing area, approximation of muscle attachments to the ridge crest, increased denture instability and pain during function. Due to these changes, impression making becomes the most critical step in denture fabrication for such patients to ensure optimal support and stability.[1,2,3]

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Case Report

A sixty eight year old female patient reported to the Department Of Prosthodontics and crown & bridge, Kothiwal dental college with the chief complaint of replacement of loose existing dentures. The patient was edentulous for the past three years and was wearing complete denture prosthesis since then. The mandibular denture was loose and ill-fitting causing discomfort.

Treatment Plan

Clinical evaluation revealed resorbed flat (atrophic) mandibular ridge [Figures 1] and increased interarch space. The existing dentures were unstable and non retentive. After a thorough evaluation of the patient's history, radiographs and existing clinical conditions, the various treatment options were discussed. The patient did not gave any relevant medical history that could have possibly contributed to ridge resorption. Treatment options included pre-prosthetic surgeries followed by conventional complete denture prosthesis, implant supported prosthesis, conventional complete denture prosthesis. However, the patient was not interested in any surgical intervention and opted for a conventional complete denture. After discussing treatment options, a conventional complete denture using the McCord–Tyson impression technique was planned due to patient preference for nonsurgical management.

Fig 1. Atrophic mandibular ridge

Clinical Procedure

A primary impression was made using impression compound, ensuring maximum extension to outline the available denture-bearing area, as the primary impression determines the support area for the definitive prosthesis [Figures 2]

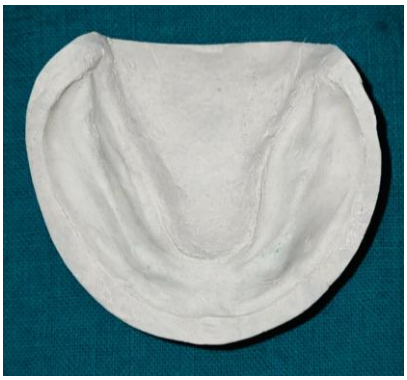

Fig 2. Primary mandibular cast

A lower customised tray with 1 mm full spacer is made using modelling wax and only stub handles were given in the premolar area [Figures 3]. These stub handles will avoid distortion of labial peripheral roll when the impression is taken.

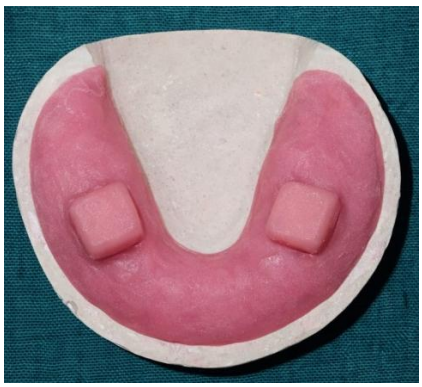

Fig 3. 1mm full spacer and custom tray

The tray was placed in the mouth with the tongue relaxed. The patient is asked to touch the upper lip with the tongue which is a reasonable guide to a functional position. Movement of the tray during these actions guided assessment of overextension or underextension in the posterior lingual sulcus. If the tray lifts posteriorly then it is overextended but if it remains seated then it is in a functionally accepted position.[1]

Functional border molding was performed and final impression was taken with zinc oxide eugenol in the maxilla. For the mandibular secondary impression Admixed material was prepared by combining impression compound and tracing compound (approximate ratio 3:7 by weight) to obtain a homogeneous mass. The softened admixed material was molded into the tray and inserted into the patient's mouth. The tray was positioned carefully to avoid trapping soft tissue folds, particularly in the buccal and lingual regions. Before final seating, the patient was instructed to protrude the tongue to a functional position to allow recording of the posterior lingual sulcus. The tray was held steadily until the material sets.

This technique allowed the material to flow into functional spaces while smoothing displaceable tissues over the mandibular bone, producing an impression with even tissue loading. Patient was instructed to perform functional movements which included tongue movements, swallowing, lip movements and cheek movements. This allowed dynamic molding of borders and tissue surfaces. After setting, the impression was removed and re-evaluated to assess pressure distribution[4] [Figures 4] .

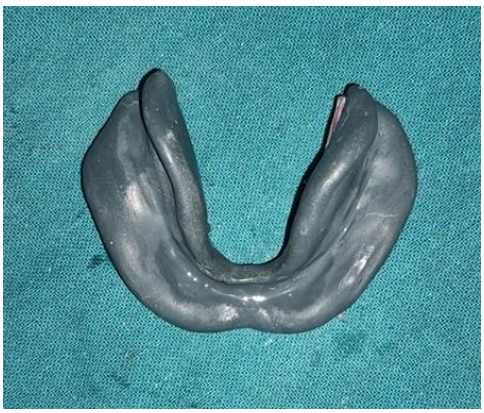

Fig 4. Mandibular final impression

While reassessing, the impression was reinserted and heavy finger pressure was applied onto the stub handles to simulate functional loads. The thumbs are placed on the undersides of the patients mandible and squeezed. If the mucosa has been properly loaded the only discomfort that the patient should report is where the thumb press on the lower border of the mandible. Absence of any localized discomfort indicates uniform loading of the denturebearing mucosa, suggesting that the impression will provide acceptable denture support and function.

If a small area of discomfort is reported then that area of the impression (identified via disclosing paste) eased by scrapping the offending area with an instrument such as large excavators or wax knife. The impression is then again checked in the mouth for comfort under pressure. Reheating the impression in whole or part or adding more material to deficient areas is not recommended as this will result in flow of the material which in turn will result in differential loading of tissues. Any discrepancies in the impression should result in the operators stripping out the tray, remaking the impression and reassessing the ability of mucosa to tolerate loading.[1,4]

Registration of maxillo-mandibular relations using face bow transfer was done and casts were mounted on a Hanau articulator. Semi anatomic teeth were used for teeth arrangement and a bilaterally balanced occlusion was given.

Wax try-in was done with trial denture bases [Figures 5].

Fig 5. Denture try-in

Trial dentures were evaluated intraorally for esthetics, phonetics and occlusion. After approval dentures were processed using heat-cure acrylic resin, finished, polished and delivered [Figures 6,7].

Post-insertion instructions were given and recall visits were scheduled at 24 hours, 1 week and 1 month.

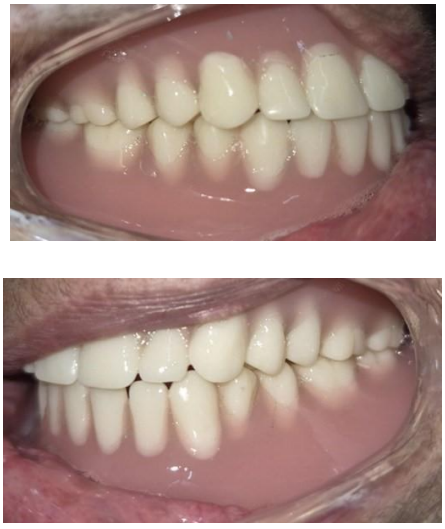

Fig 6. Denture insertion

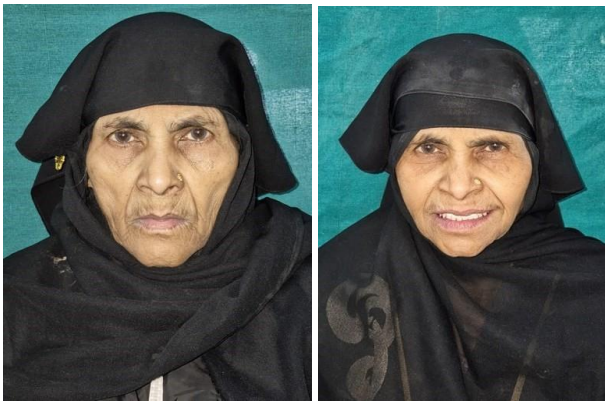

Fig 7. Pre and post insertion

The patient was reviewed after a week and minor denture related complaints were corrected. The patient was satisfied with the stability and retention of the given denture. After that the patient never reported back to the department.

Discussion

Complete dentures are provided to edentulous patients to restore lost functions and aesthetics**.** In cases with severely resorbed mandibular ridges, achieving satisfactory results becomes challenging because of the reduced supporting area and the unfavorable influence of nearby muscles. As the ridge height declines, the proximity of muscle attachments to the crest increases, thereby enhancing the dislodging forces acting on the denture. The primary aim of the definitive impression in such cases is to contour the impression surface and peripheral borders in a manner that optimizes denture support, retention and stability. Over time, prosthodontists have extensively debated over the relative advantages of mucostatic versus mucocompressive (now called mucodisplacive) techniques. A purely mucostatic impression if achievable records tissues in their static state, capturing regions with variable compressibility and displaceability. Consequently, this results in uneven force distribution under load and the development of fulcrum points in less displaceable areas, which can lead to denture instability. Such an impression surface is particularly unsuitable for patients with an atrophic mandible. The objective in these cases should be to obtain an impression that allows the denture base to exert uniform pressure on the underlying mucosa, ensuring balanced stress distribution across all denture-bearing regions. Because as mucosal thickness varies, thicker tissues should be compressed more than thinner ones to achieve consistent loading. To address this, a controlled pressure impression technique was advocated, using a combination of materials that yields dentures with improved function. This approach enhances retention and reduces movement during mastication and speech. In contrast, conventional impression methods often fail to capture oral tissues in their functional state, resulting in prostheses with compromised stability.[3]

The McCord–Tyson technique is particularly beneficial for such challenging ridges, as it records tissues under functional loading, accurately representing how they behave during actual use. It also registers muscle attachments in their natural positions and maximizes the limited denture-bearing area. This technique provides a stable foundation for denture fabrication and serves as a conservative, cost effective alternative for patients unsuitable for surgical or implant-based interventions.[4]

Conclusion

Management of severely resorbed mandibular ridges requires modification of conventional prosthodontic procedures. The McCord–Tyson admixed impression technique which is also a controlled pressure technique, provides a reliable method to enhance retention and stability of mandibular complete dentures in such challenging cases. Proper case selection and meticulous clinical execution are essential for successful outcomes.[3]

References

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