

### **Mandibular Ridge Atrophy and Denture Stability- Neutral Zone Impression Technique - Case Report**

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#### **Abstract**

Geriatric patients or patients who have altered neuromuscular control and are long term denture wearers exhibit lack of stability of their mandibular complete dentures because of the high resorption of lower edentulous ridge. Rehabilitation in such patients is possible using the neutral zone technique which aims to construct a denture that is shaped by muscle function and is in harmony with the surrounding oral structures in

order to achieve the near normal functioning. Generally, mandible atrophies at a greater rate than maxilla so this technique has significant implication in case of atrophied mandibular edentulous ridges. This article sights upon the case of a 62 years old male patient with mandibular atrophic ridge treated by utilizing the neutral zone technique.

**Keywords:** Stability, Resorption, Neutral zone, Atrophic Mandibular edentulous ridge

## Introduction

Residual ridge resorption is chronic, progressive, irreversible and cumulative condition associated with teeth loss. Management of a residual ridge with severe resorption to fulfill the patient's esthetic and functional requirements is quite difficult. As the height of the edentulous ridge reduces the mandibular denture functions improperly. Severe resorption of the mandibular alveolar ridge may cause instability and discomfort of the denture. Dealing with this condition requires clinical skills and knowledge. Treating the severely resorbed mandibular ridge is a challenging effort. This report presents a case on neutral zone impression technique used for treating a completely edentulous patient with resorbed ridges. When all the natural teeth are lost, there exists a space in the oral cavity called the potential denture space that is bounded by the tongue medially and by the muscles and tissues of the lips and cheeks laterally. Neutral zone (zone of least interference/ stable zone/ zone of minimal conflict) is defined as the area where the forces of the tongue pressing outward are neutralized by the forces of the cheeks and lips pressing inward (GPT-7). Thus, this technique aims to provide optimum stability, retention of the lower denture and comfort to the patient. The neutral zone technique is relatively feasible to work upon but requires an extra visit of the patient and significant laboratory involvement.

## Case Report

This case report involves the management of a mandibular resorbed ridge with neutral zone technique using admixed compound. A 62 years old male patient reported to the department of Maxillofacial Prosthodontics & Crown and Bridge Desh Bhagat Dental College and Hospital, Mandi Gobindgarh with a

completely edentulous and severely resorbed mandibular ridge (Figure 1). Resorbed ridge could hamper with the stability of the mandibular denture; hence it was decided to proceed with the option of Neutral Zone technique. Alternatively, implants were an option but due to medically compromised patient, neutral zone technique was selected.

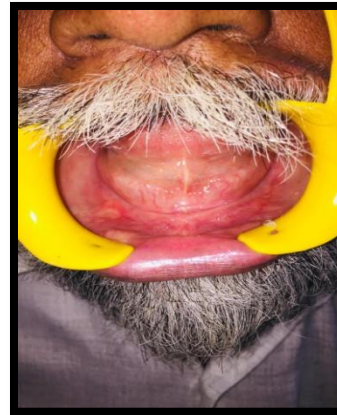


Figure 1

Initially primary impressions of the upper jaw were made with impression compound and lower jaw was made with admixed technique (3 parts of green stick compound and 7 parts of impression compound) (Figure 2) and the impressions were poured with dental stone.

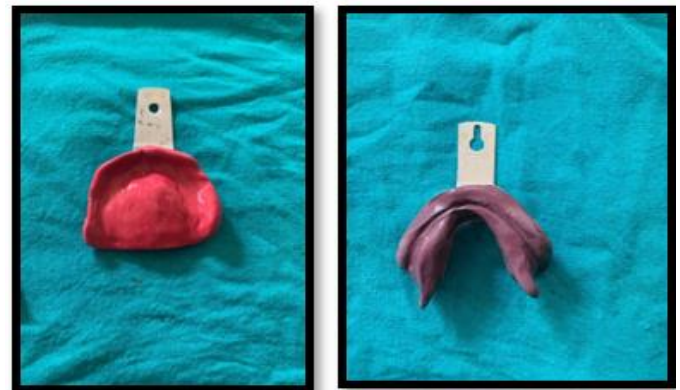


Figure 2

(Maxillary impression- impression compound, Mandibular impression- admixed technique)

After custom tray fabrication, border molding and secondary impressions were made using conventional method for the both the arches and master casts were obtained. (Figure 3)



Figure 3

Occlusal rims were fabricated and maxilla-mandibular jaw relation was recorded. (Figure 4)



Figure 4

#### For recording the Neutral Zone

The mandibular wax occlusion rim then was removed and retentive wire loops were attached to the record base in the premolar and molar area. Acrylic stents were made in the canine region for determination of the vertical height of the rim (Figure 5). Kneaded admixed compound was then adapted to this denture base (Figure 6). Alternatively kneaded impression compound or

tissue conditioner material can also be used for fabrication of occlusal rim.



Figure 5

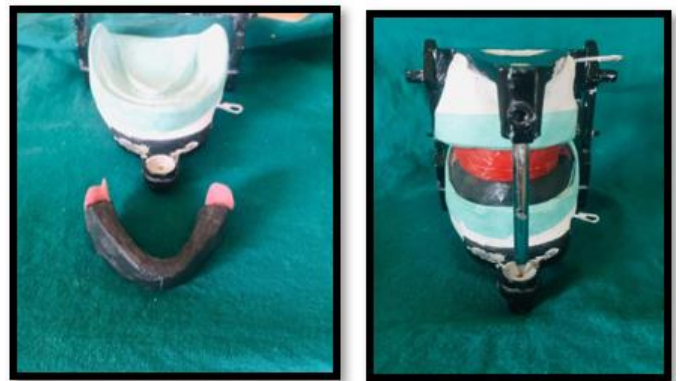


Figure 6

The patient was asked to execute different functional movements like swallowing, sucking, whistling, smiling, licking the lips, puffing of the cheeks, sipping of water from glass, grinning and pronouncing vowels in order to record the neutral zone (Figure 7).



Figure 7

Indexing of the mandibular cast was carried out so as to ease in the re- placement of the silicone putty index to be made. (Figure 8)



Figure 8

Next step involved fabrication of addition silicone putty index (dental plaster can also be used here) over the mandibular cast such that it covers the lingual portion (including the tongue space) as well as the labial and buccal areas surrounding the cast. (Figure 9)



Figure 9

Thereafter the admixed compound rim with the neutral zone recorded, the retentive loops and acrylic stents were removed (Figure 10) and the previously formed putty index was replaced on the cast following which the melted wax was flown over the denture base to obtain a wax rim in the neutral zone area recorded (Figure 11).



Figure 10

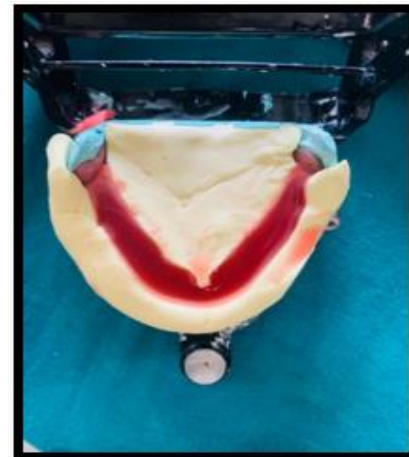


Figure 11



Figure 12

A final wax rim was fabricated as per the the recorded neutral zone impression (Figure 12) and teeth arrangement was done in the area of neutral zone recorded (Figure 13).



Figure 13

Try-In was done and lower denture base was prepared for recording the external surface using light body putty material.



Figure 14



External surface preparation

Light body impression material was loaded on the external surface of the denture base and the patient was asked to exhibit the same movements so as to record the external surface (Figure 15).



Figure 15

Processing of the denture was done using heat cure acrylic (Figure 16).



Figure 16

A rewarding satisfaction was obtained from the patient after the insertion of the prosthesis (Figure 17).



### Discussion

According to Fish- out of the three surfaces of the denture the polished surface is bounded by the tongue and the cheeks, involved in normal physiologic movements such as speech, mastication, swallowing, smiling, and laughing. The fabrication of the denture must be in harmony with these functions. Arranging

artificial teeth within the neutral zone achieves two important objectives:

- 1.No interference with normal muscle function
2. Normal oral and perioral muscle activity imparts force against the complete dentures that serves to stabilize and retain the prostheses rather than cause denture displacement.

Using neutral zone technique in patients with resorbed mandibular ridge can help overcome instability of mandibular denture.

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