

**NEUTRAL ZONE IMPRESSION TECHNIQUE FOR STABILIZING MANDIBULAR COMPLETE DENTURE – A CASE REPORT****Jasmin Cyril^{1*}, Arya Aravind², Jinson James³, George Francis⁴, Mathew Malani⁵ and Reshma Raju⁶**^{1,2,3}Post Graduate Students, ⁴Professor and HOD, ⁵Professor, ⁶Senior Lecturer

Department of Prosthodontics and Crown and Bridge, St Gregorios Dental College Chelad, Kothamangalam.

***Corresponding Author: Jasmin Cyril**

Post Graduate Students, Department of Prosthodontics and Crown and Bridge, St Gregorios Dental College Chelad, Kothamangalam.

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ABSTRACT

The resorption of the alveolar ridges especially the mandibular ridge is one of the most commonly faced problem among long term denture wearers. Prosthetic Rehabilitation of a patient with severely resorbed ridge is the most challenging treatment for a prosthodontist. One of the important factor for the success of the complete denture treatment depends mainly upon the proper positioning of the teeth on the denture foundation. The complete denture with neutral zone is not a new concept. In severely resorbed mandibular ridges, we used neutral zone technique for the fabrication of the denture. The neutral zone concept aims in the construction of complete denture using oral structure, when in function and the space available between the surrounding oral structures. In this case report describes the fabrication of mandibular complete denture using neutral zone impression technique for a patient with severely resorbed mandibular ridge.

KEYWORDS: Neutral zone, resorbed ridge, Impression technique.**INTRODUCTION**

In dentistry, the neutral zone refers to that space in the oral cavity where the forces exerted by the musculature of the tongue are equal and balanced with the forces exerted by the buccinator muscle of the cheek laterally and the orbicularis oris muscle anteriorly.^[1] In other words, it is the potential space between the lips and cheeks on one side and the tongue on the other; where the forces between the two are equal.^[2] Other synonyms include: zone of equilibrium, zone of minimal conflict, potential denture space and dead space.^[3] It is in this zone that the natural dentition lie, and this is where artificial teeth of complete dentures should be positioned. Complete dentures that are constructed in this way exhibit enhanced stability, retention and comfort.^[4]

The neutral zone technique is usually indicated in cases where there has been, extensively resorbed mandibular ridge (minimal bone available to support a denture), patients with neurological conditions, patients who have partial glossectomies, mandibular resection and/or motor nerve damage to the tongue and where dental implants are not feasible.^[5] Advantages of constructing a denture within the neutral zone include: improved stability and retention of complete dentures (particularly lower complete dentures), correct positioning of posterior artificial teeth allows for sufficient tongue space, reduced food trapping, improved aesthetics due to facial

support.^[6] The only disadvantage noticed is increased clinical time and patient cooperation. In this case report describes the fabrication of mandibular complete denture using neutral zone impression technique for a patient with severely resorbed mandibular ridge.

CASE REPORT

A 73 years old female patient reported to the OPD of St. Gregorios Dental College, Chelad with the chief complaint of missing upper and lower tooth. On history taking patient had a history of using maxillary and mandibular complete denture for past 20 years. On examination the lower denture was ill-fitting with a severely resorbed mandibular alveolar ridge and also maxillary and mandibular acrylic teeth on both the dentures worn out. Intra oral examination revealed severely resorbed mandibular ridge (figure1). The treatment plan consisted of fabrication of new maxillary and mandibular complete denture and use of neutral zone impression technique for severely resorbed mandibular ridge.



Figure 1

Preliminary and Secondary impression

The preliminary impression was made using impression compound in the maxillary and mandibular arch (Figure-2). Border moulding was done using greenstick

impression compound and secondary wash impression made using zinc oxide eugenol impression paste (Figure-3). Master cast was obtained from the wash impression by pouring it with dental stone.

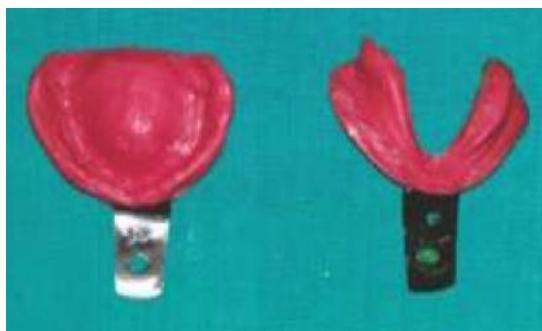


Figure 2



Figure 3

Jaw relation

The permanent denture base using heat cure acrylic were made for the stability. Occlusal rims were fabricated on the permanent record base. Maxillary occlusal rims were

adjusted on to the patient's mouth and centric relation were recorded. Then it is transferred to a semi adjustable Hanau articulator(Figure-4)



Figure 4

Neutral zone impression

Patient was made set an upright position with the head supported. Maxillary occlusal rim was inserted into patient's mouth and the occlusal plane was checked again. Then mandibular occlusal rim was removed from the record base. After that impression compound and

green stickin ratio 3:7 (admix technique) was softened in a 650°C water bath. The softened compound was kneaded and rolled according to the crest of the mandible and was adapt it into retentive loop at the established vertical dimension(Figure 5).



Figure 5

The attached compound was again reheated in hot water bath and carried to patient mouth for recording the neutral zone.(figure 6)



Figure 6

Patient was asked to perform a series of actions like smiling, swallowing, speaking, count from sixty to seventy, sucking, pursing lips, pronouncing vowel sounds, sipping slightly hot water and slightly protruding the tongue several times which simulated

physiological functional of the muscles. (Figure 7) These all actions help to mold the material according to muscular activity. After 10 minutes, the set impression was removed from the mouth.



Figure 7

The neutral zone obtained was placed in a master Cast and Locating grooves were cut on the master

cast(Figure8).



Figure 8

Master cast was covered with a silicone putty index around the impression on both the labial and lingual sides (Figure 9). After that the compound occlusal rim was removed and the index was replaced. This index

would have preserved the space for neutral zone. Wax was poured on to the index space for fabricating occlusal rim according to neutral zone(Figure 10).



Figure 9



Figure 10

Denture fabrication

According to the index, teeth arrangement was done. First the mandibular teeth were arranged in the neutral zone area. And checked by replacing the putty index. The maxillary teeth were arranged according to the mandibular teeth(Figure-11,12). Try-in were done. The

waxed up dentures were placed in the mouth and patient was asked to repeat all the movements previously done while recording the neutral zone. Aesthetics, phonetics and occlusion were assessed. The denture was processed, finished and inserted (Figure-13).

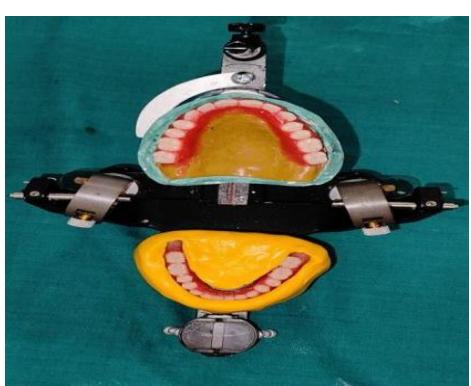


Figure 11



Figure 12

**Figure 13**

On review patient was highly satisfied with the denture stability.

DISCUSSION

Complete denture is influenced by not only the ridge but also by the surrounding oral cavity, occlusion, biting forces and many others.^[7] Fish pointed that out of the three surfaces of the denture the polished surface is bounded by the tongue and the cheeks.^[8] These are involved in normal physiologic movements such as speech, mastication, swallowing, smiling, and laughing.^[9,10] Complete denture must be fabricated with function because physiologically unacceptable denture will have poor prosthesis stability and retention, insufficient tissue support and compromised phonetics.^[11] Wright and associates noticed that the border seal area for the mandibular denture extends downward to the floor of the mouth and posteriorly into the lateral throat form.^[12] A thorough understanding of the anatomy and physiology of structures can help the Clinicians to attain complete denture without any discomfort and without wasting any extra clinical sitting to obtain neutral zone that impact prosthesis stability.^[13,14] Arranging artificial teeth within the neutral zone achieves two important objectives: 1. Prosthetic teeth do not interfere with normal muscle function; and 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.^[15] Conventional methods used for these patients result in denture contours that may not facilitate prosthesis stability against expected oral and perioral muscle function. This may lead to ill fitted prosthesis which might be improper and uncomfortable for the patient.

CONCLUSION

The neutral zone for complete denture fabrication utilizes the surrounding oral tissues, as an advantage to stabilize the denture. Retention and stability of dentures has been greatly improved. When implant overdenture therapy is not the treatment option, the neutral zone technique is of great help.

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