

# Neutral Zone Technique for Rehabilitation of Resorbed Mandibular Ridge : A Clinical Report

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## Abstract

Neutral zone technique aims to construct a denture that is shaped by muscle function and is in harmony with the surrounding oral structures. It is widely and concisely described as a treatment modality for unstable lower complete denture cases. It serves as a guide of where to set teeth and how to contour the polished surface of the denture to ensure optimal stability, retention, facial support and aesthetics. In patients with compromised support and poor denture adaptability, this technique is considered as a valuable tool in the prosthodontist's armoury especially where dental implants are contraindicated or unfeasible. This clinical report describes the fabrication of complete dentures for a patient with poorly formed mandibular ridges.

**Key Words:** Neutral zone, Complete denture, Resorbed mandibular ridge.

## Introduction

Stability and retention of lower complete denture is well recognized as a potentially difficult treatment aim to achieve. Looseness and discomfort are the most frequent complaints reported by patients. To increase stability and retention of mandibular complete denture many concepts and theories emerged to describe where prosthetic teeth of CD should be positioned. Some of them adopted mechanical principles<sup>1,2</sup> others used biometric guides<sup>3</sup> and a minority advocated mathematical formulas based on natural teeth position and dimensions.<sup>4</sup> These techniques have been challenged and found insufficient in fact not only by rigorous research but also by failure to restore function, aesthetic and comfort in patients with severely atrophic mandibular ridges (Class V Atwood's<sup>5</sup>). To overcome such problem, the neutral zone technique was advocated.

The neutral zone has been defined as the potential space between the lips and cheeks on one side and the tongue on the other; that area or position where the forces between the tongue and cheeks or lips are equal.<sup>6</sup> Zone of minimal conflict,<sup>7</sup> zone of equilibrium,<sup>8</sup> potential denture space<sup>9</sup> and the dead space<sup>10</sup> are all terms used to describe the Neutral Zone.

Sir Wilfred Fish in 1931, first described the influence of the polished surfaces on retention and stability.<sup>11</sup> He also described how dentures should be constructed in the neutral zone.<sup>12</sup>

The purpose of this article is to present the use of the neutral zone technique for the fabrication of successful and stable

mandibular complete denture with severely resorbed ridges.

## Case Report

An 71-year-old female patient reported to the Department of Prosthodontics, D.J. College of Dental Sciences and Research, Modinagar with a chief complaint of old unstable mandibular complete denture. The patient was advised for the fabrication of complete denture with neutral zone technique as other treatment options like implant supported complete denture was not feasible due to the systemic diseases and cost factors. (Fig-1)

## Procedure

A detailed examination was done and her previous dentures were evaluated for retention and stability. The old denture was found to be unstable and was not retentive. The lower ridge was highly resorbed whereas maxillary ridge was fine. (Fig-2)

1. Primary impressions were made using elastomeric impression material (alginate) with a perforated edentulous stock tray.
2. Closely fitting custom tray was fabricated and the border molding was performed with low fusing type I impression compound (green stick) to represent muscle activity, recording functional depth and width of the sulcus.
3. The final wax impressions were made with a low viscosity mucostatic zinc oxide eugenol paste and master cast was poured with dental stone.
4. Baseplate with wire loops on premolar and molar region was made on the mandibular cast and conventional base plate was made on maxillary cast. (Fig. 3)
5. The wax record rim was then constructed on maxillary cast and impression compound rim was constructed on mandibular cast and assessed for extension, comfort and stability. (Fig. 4)
6. Face-bow transfer was done. (Fig. 5)
7. Jaw relation was carried out conventionally to record vertical and centric relation and the cast was articulated on Hanau articulator.
8. Patient was made to sit in a comfortable, upright position with the head unsupported. The mandibular compound rim was softened in hot water and then inserted into patient's mouth and he was asked to perform a series of actions designed to simulate the physiological functioning, such as asking the patient to smile, grin, pout/purse lips. (Fig. 6)
9. Notches were made on the mandibular cast. The putty indices were made around

the molded impression compound rims.

10. Then the molded impression compound rims were removed from the base plate and the index was replaced. The indices preserve the space of the neutral zone. (Fig. 7)
11. Wax was then poured into the space giving an exact representation of the neutral zone. (Fig. 8)
12. Teeth arrangement was done exactly following the indices. During the setting up of the teeth their position was checked by putting the indices together around the wax try-in. (Fig. 9)
13. Trimming of the artificial posterior teeth has to be done to accommodate it on the narrow space of neutral zone.
14. Wax try-in was done. (Fig. 10)
15. Dentures were processed and finished in a routine manner. Polishing was done lightly so as to preserve the contour of the flanges.
16. Dentures were finally inspected and clinical remounting was done to eliminate minor occlusal errors.
17. Finally the polished dentures were delivered to the patient. (Fig. 11)

## Discussion

The ultimate aim of prosthodontics is to restore form, function and esthetics. Realizing the importance of the forces generated by various oral structures on the teeth and polished surfaces of CDs and their effect on the stability of CD sheds light on the Neutral zone technique.<sup>10</sup> It has been shown that compromised retention, poor stability, phonetic problems, inadequate facial support, inefficient tongue posture/function and increased gagging are all associated with functionally inappropriate setting of denture teeth and physiologically inadequate contours or volume of the denture base.<sup>13</sup>

Denture fabricated over a severely resorbed mandibular ridge by neutral zone impression technique will insure that the muscular forces aid in the retention and stabilization of the denture rather than dislodging the denture during function.<sup>14</sup> The dentures will also have other advantages such as reduced food lodgment, good esthetics due to facial support, proper positioning of the posterior teeth which allows sufficient tongue space.

## Conclusion

NZ concept is considered as exceptionally important when considering treatment options for patients complaining from unstable lower CD particularly if implant treatment is not feasible. It aims to place lower CD where forces generated by

lips, cheeks and tongue have a stabilizing rather than dislodging effect. The principle technique used to record neutral zone is extensively recorded; yet it needs to be backed up with high quality clinical trials to push it further up on the hierarchy of evidence. It is not a widely practiced procedure while the proportion of patients that may benefit from is significant.

**References**

1. Wright Cr, Swartz Wh, Godwin Wc. Mandibular Denture Stability: A New Concept. Overbeck;1961.
2. Lammie G. Aging Changes and the Complete Lower Denture. J Prosthet Dent. 1956;6:450-64.
3. Pound E. Esthetic Dentures and Their Phonetic Values. J Prosthet Dent. 1951;1:98-111.
4. El-Gheriani As. A New Guide for Positioning of Maxillary Posterior Denture Teeth. Journal of Oral Rehabilitation. 1992;19(5):535-8.
5. Atwood Da. Postextraction Changes in the Adult Mandible as Illustrated by Microradiographs of

- Midsagittal Sections and Serial Cephalometric Roentgenograms. The Journal of Prosthetic Dentistry. 1963;10(1);13(5):810-24.
6. The glossary of prosthodontic terms. J Prosthet Dent 2005;94: 10-92.
7. Matthews E. Br Dent J. 1961;111(The Polished Surfaces):407-11.
8. Grant Aa, Johnson W. An Introduction to Removable Denture Prosthetics. C. Livingstone; 1983.
9. Roberts A. The Effects of Outline and Form Upon Denture Stability And Retention. Dent Clin North Am. 1960;4:293-303.
10. Fish E. Using The Muscles To Stabilize The Full Lower Denture. J Am Dent Assoc. 1933;20:2163-9.
11. Fish EW. An analysis of the stabilising factors in full denture construction. Br Dent J 1931;52:559-70.
12. Wright CR. Evaluation of the factors necessary to develop stability in mandibular dentures. J Prosthet Dent 2004;92:509-18.
13. Cagna Dr, Massad Jj, Schiesser Fj. The Neutral Zone Revisited: From Historical Concepts to Modern Application. The Journal of Prosthetic Dentistry. 2009;101(6):405-12.
14. Fahmi F. The position of the neutral zone in relation to

the alveolar ridge. The Journal of Prosthetic Dentistry. 1992;67(6):805-9.

**Legends**

- Fig.1 Extra-oral view of the Patient.
- Fig.2 Maxillary and mandibular arches.
- Fig.3 Mandibular baseplate with wire loops
- Fig.4 Wax record rim on maxillary baseplate and impression compound rim on mandibular baseplate.
- Fig.5 Face-bow transfer done.
- Fig.6 Mandibular compound rim after smile , grin and purse lips movements.
- Fig.7 Index placed after removal of impression compound.
- Fig.8 Wax poured into the space.
- Fig.9 Teeth arrangement done following the indices.
- Fig.10 Waxed-up denture on articulator.
- Fig.11 Dentured delivered.



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