

## CASE REPORT

### PROSTHETIC MANAGEMENT OF SEVERLY RESORBED RIDGE USING NEUTRAL ZONE CONCEPT – A CASE REPORT

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#### ABSTRACT:

The primary objective of complete denture prosthesis for patients with severely resorbed residual alveolar ridges includes the positioning of functional and esthetic dentition in harmony with the normal neuromusculature. The presence of severe resorption in the mandible makes it difficult for the clinician to attain adequate retention and stability. This results due to the absence of adequate bony hard tissue and presence of dislodging musculature at the same time. The neutral zone approach guides the arrangement of artificial teeth as well as the contour of the polished surface of the dentures, in a way that these are in harmony with the forces from the tongue on one side and the lips and the cheeks on the other side. The neutral zone is a stable zone where the net force from either side of the musculature is nullified. Hence the denture remains stable. This article describes the management of a severely resorbed mandibular ridge using the neutral zone concept.

**Key words :** Alveolar ridge, neutral zone, overdenture, prosthetics.

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## INTRODUCTION

Severe residual ridge resorption poses a challenge for the clinician to attain adequate retention and stability in such patients, especially in the mandible.<sup>1</sup> Implant overdentures are a treatment option in such cases providing more predictable and stable results when compared to the conventional complete dentures. However they are not always feasible due to financial constraints and the medical condition of the patients.<sup>2</sup> Hence techniques to improve retention and stability of complete dentures must be considered. Complete dentures are basically mechanically substitutes but as they function in the oral cavity they must be designed in a manner so that they are in harmony with the normal neuromusculature. The synergistic actions of the tongue, lips, cheeks and the floor of

the mouth are responsible for all oral functions. These include speech, mastication, swallowing, smiling and laughing. Thereby the coordination of complete dentures with the neuromusculature is the prime factor for successful complete dentures.<sup>3</sup> Thereby our aim is to position the prosthesis in “the potential space between the lip and cheek on one side and the tongue on the other, that area or position where the forces between the tongue and the cheeks are equal”. This zone is known as the “neutral zone”<sup>4</sup> also known as the “stable zone”<sup>5</sup>, “zone of minimal conflict”<sup>6</sup>, “zone of list interference”<sup>8</sup> or the “zone of equilibrium”.<sup>7</sup> This approach was first described by Wilfred Fish in 1931 who reported the influence of the polished surface of the complete dentures over denture stability and retention.<sup>9</sup>

The present article elaborates the usage of the neutral zone technique for the fabrication of a successful and stable mandibular complete denture with severe ridge resorption

**CASE REPORT**

A 65 year old female patient reported to our department with the complain of missing teeth and wanted the replacement of the same. The patient had no significant medical history. Dental history reveals that the patient had been edentulous for a period of 12 years with no previous denture.

Extra oral examination reveals that the patient had a class 1 profile with the tapering facial form. The lower facial height was also seem to be reduced.

Intra oral examination showed the upper arch size to be small with the tapering arch form and flat ridge contour. The mandibular arch was severely resorbed with shallow sulcus depth (Fig. 1).

It was decided that a complete denture would be provided to the patient using the neutral zone concept in order to enhance the stability of the lower denture. Option of the mandibular implant retained overdenture remained unfeasible due to the expense of the treatment.



**Figure 1:** Edentulous Maxilla and mandible ridge

**Clinical procedure**

**Preliminary impression:-**

Preliminary impression of the upper and the lower arches complete were made with impression compound using metallic stock trays. Fabricated (Figure 2) and custom trays were prepared using self polymerising acrylic resin.

The mandibular custom trays is made without adapting a spacer.

**Final impression:-**

The custom trays were evaluated intra orally for the extensions in both passive and active movements. Border moulding was done and impressions were made with zinc oxide eugenol paste. The maxillary master cast was fabricated and the mandibular custom tray was made with self polymerising resin

over the prepared cast. The mandibular custom tray was loaded with low fusion stick compound and then impression was made. This resulted in mandibular master cast. Temporary denture base was made over the master cast (Figure 3).



**Figure 2:** Preliminary Impression



**Figure 3:** Final Impression

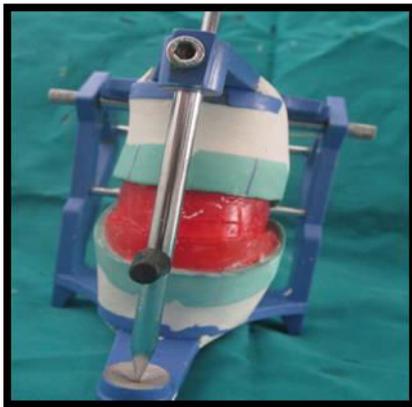
**Tentative jaw relation:-**

Occlusal rims were made over the record bases. the occlusal rims were evaluated and adjusted intra orally so as to have an acceptable vertical dimension at occlusion and a free way space of 2mm.

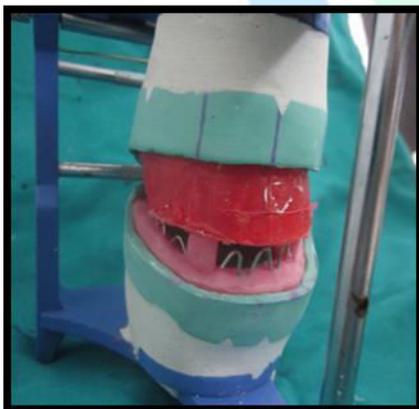
Centric relation was recorded using the static method. The upper and the lower cast were subsequently mounted on a mean value articulator (Figure 4).

**Neutral zone record:-**

The mandibular occlusion rim was removed and was replaced with the denture base wire loops were made and attached to the denture base anteriorly as well as posteriorly. The height of the wire loop was kept same as the mandibular rim anteriorly two vertical stoppers were placed in the premolar region to maintain the established vertical dimension of occlusion (**Figure 5**). The buccolingual position of the wire loops were evaluated intra orally then low fusing stick compound was adopted over the wire loops and placed in the oral cavity of the patient. The patient was then instructed to talk, swallow, drink some water, purse etc. After 5 to 10 min the set impression was removed from the mouth.<sup>8,14</sup>



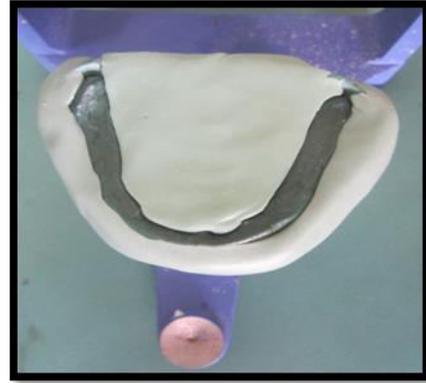
**Figure 4:** Mounted cast with tentative jaw relation.



**Figure 5:** Mandibular denture base with vertical stopper and wire loops.

**Indexing**

The neutral zone record so obtained was placed in the mandibular master model and the orientation grooves were placed on the master cast. Then a silicone putty index was made both on the labial and lingual sides of the neutral zone record. The maxillary tooth arrangement was carried out and the compound occlusal rim in the mandible was removed and replaced with modelling wax using the putty index (**Figure 6**). Then the mandibular teeth arrangement was carried out.



**Figure 6:** Putty index of the neutral zone



**Figure 7:** Tooth arrangement with the index record

**Try in:-**

Try in of the maxillary and mandibular denture was done. The trial denture showed good stability and satisfactory retention then the dentures were acrylised finished and polished (**Figure 7**).

**Denture insertion and follow up:-**

The denture were inspected and laboratory remounting was done to eliminate minor occlusal errors (**Figure 8**). The polished denture were finally inserted in the patients mouth. The patient was recalled after a week (**Figure 9**).



**Figure 8:** Lab remounting



**Figure 9:** Denture insertion

### DISCUSSION

During eruption, the teeth erupt under the influence of the muscular environment created by the forces exerted by the tongue, cheeks and lips, in addition to the genetic factor this forces have a definite influence upon the position of the erupted teeth, the arch form and the occlusion. Generally muscular activity and habits which develops during childhood continue throughout life and even after the loss of the dentition. Thus it is necessary that the artificial substitute be placed in the arch form compatible with these muscular forces.<sup>3</sup>

Various studies have advocated the neutral zone technique to improve the stability of mandibular complete dentures.<sup>3,10-12</sup> This technique is not only useful in edentulous patients but also used for patients with oral deformities. The technique described in this case report is easy and convenient to carryout. However, the only disadvantage of this approach is increased chair side time and laboratory time for recording the neutral zone.<sup>13</sup>

### CONCLUSION

The primary aim of any treatment is good prognosis. It is proven that adequate bony hard tissue results in good prognosis of the prosthesis. However in cases where severe resorption is seen neutral zone approach comes to our help by striking a balance between the muscular forces on either side of the potential space. There by the dislodging muscle force becomes a retentive and stabilising force. Thus aiding in denture stability and restoring the patient to normal function contour, esthetic, speech and health.

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