

## Demystifying resorbed ridges- The neutral way.

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### Abstract

One of the most challenging tasks for a prosthodontist is to rehabilitate a patient with severely resorbed ridges with proper retention, stability and support. Stability is an important factor in a denture when retention and support cannot be provided well by the reduced denture bearing areas of the resorbed ridges. Many techniques have been adopted to increase the stability of the denture. The most promising among them is the neutral zone technique which focuses on arranging the teeth in harmony with the stomatognathic system resulting in a stable denture. But not only the position of the teeth but the flanges of the denture also contribute to the stability of the denture which is recorded with the help of cameo surface recording. In this case report, neutral zone technique with cameo surface recording was done to fabricate a denture with severely resorbed mandibular ridge.

**Key words:** Residual ridge resorption, neutral zone technique, cameo surface recording.

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### Introduction

After the extraction of a single tooth or multiple teeth the alveolar ridge heal, both hard and soft tissues. This clinical alveolar ridge shape post healing is called residual ridge. The size of the residual ridge is reduced most rapidly in the first six months after teeth extraction, but the bone resorption activity of the residual ridge continues at a slower rate. This results in loss of significant amount of jaw size and shape. Many anatomic, metabolic and mechanical factors are responsible for the residual ridge resorption.<sup>[1]</sup> Over the years myriad of treatment modalities have been devised to manage prosthetic rehabilitation of excessively resorbed ridges to properly record the remaining denture bearing area and fabricate a denture which is in harmony with the oral musculature that aims to

stabilize the denture. Variations can be brought about in the different stages of fabrication like impression making, cast pouring, teeth selection and teeth arrangement stages. The neutral zone is that area in the potential denture space where the forces of the tongue pressing outward are neutralized by forces of the cheeks and lips pressing inward.<sup>[2]</sup> Since these forces are developed through muscular contraction during the various functions of chewing, speaking, and swallowing, they vary in magnitude and direction in different individuals.<sup>[2]</sup> The central thesis of the neutral-zone approach to complete dentures is to locate that area in the edentulous mouth where the teeth should be positioned so that the muscular forces exerted stabilize the denture rather than unseat it.<sup>[3,4]</sup> The cameo surface of the denture along with the occlusal

surface also contributes to the stability of the denture.<sup>[5]</sup>

This case report describes the rehabilitation of a patient with severely resorbed ridges using the neutral zone technique along with cameo surface recording.

### Case Report

A 56-year-old female patient with completely edentulous maxillary and mandibular arch reported to the department of Prosthodontics and Crown & Bridge, Guru Nanak Institute of Dental Sciences and Research, Kolkata with the chief complaint of inability to use her previous denture and difficulty in speech and mastication. The extraction dated back to around few years with no significant complications to follow up. The mandibular edentulous arch was classified as class V stage of resorption. Her history revealed that she had used several dentures over the past few years which deemed unsatisfactory; including fracture of the prosthesis. The treatment plan was formulated to fabricate a removable complete denture prosthesis using the neutral zone technique along with the cameo surface recording to achieve satisfactory results.

Primary impression was made with irreversible hydrocolloid followed by a custom tray fabrication which was used to make another preliminary impression using the admixed technique for the mandibular arch. The primary impression for the upper arch was made with impression compound. Final impression was made with zinc oxide eugenol of both the arches after satisfactory border moulding (Figure 1). Two sets of record bases were fabricated for the mandibular arch. An occlusal rim was made on one of them and the other was made with three loops of 22 gauge orthodontic wire. Jaw relation was done and mounted on a mean value articulator (Figure 2a & 2b). The lower rim along with the record base was then removed from the articulator and the record

base with the wire loops were placed (Figure 3a & 3b). Green stick modelling compound, was then placed on those wire loops and the height was set at the previously determined vertical dimension on the articulator. This assembly was then transferred to the patient's mouth and the patient was asked to pronounce vowels (a, e, i, o, u) and perform several functional movements like swallowing, sucking, whistling, smiling and licking the lips after the modelling compound had been flamed. Mandibular compound rim was taken out, excess compound was trimmed away and the vertical height was reconfirmed each time on the articulator to avoid increase in vertical dimension. The material was then again re softened and replaced in the mouth asking the patient to repeat the functional movements. This procedure was repeated several times so that a narrow accurate zone could be recorded. The resultant moulded occlusion rim delineated the neutral zone of the patient where the teeth were set (Figure 4a & 4b).

A putty index was then prepared around the moulded rim of the lower arch and the occlusal rim in the first set of record base was removed to be replaced by the moulded occlusal rim according to the index. Baseplate wax was poured into the trough that was created after the index was positioned on the base plate without the rim (Figure 5a & 5b). Teeth arrangement was done for the lower arch according to the zone that was determined using the index followed by the upper teeth placement (Figure 6). Try in of the denture bases were done in the patient's mouth following which the cameo surface recording was performed.

Light body elastomeric impression material was used for the cameo surface recording (Figure 7). Multiple grooves were made in the flange area of the lower base plate and the light body was loaded on both the lingual and buccal flange areas. The patient was asked to

perform the functional movements again. The cameo surface of the denture base was obtained with functionally moulded flange areas. Flasking, dewaxing, packing and fabrication of the final dentures were then done of this moulded denture base with the teeth. The final denture was delivered to the patient and post-operative follow up appointment showed improved stability and comfort of the patient.

### Discussion:

Loss of teeth results in different changes inside the mouth like residual ridge resorption, macroglossia, and laxity of facial muscles. Reduced surface area and inferior muscle activity compromise the stability of dentures especially in the mandibular arch. The greater the ridge loss, the smaller the denture base area and the less influence the impression surface area will have on the stability and retention of the denture.<sup>[6]</sup> As the area of the intaglio surface decreases and the area of the cameo surface increases, the contour of the cameo surface and individual tooth arrangement become more critical. In other words, where there is higher ridge resorption, the retention and stability of the prosthesis become more dependent on meticulous teeth arrangement and careful contouring of the polished surfaces of the dentures. The nature of the forces acting on the external surfaces of the teeth and the polished surfaces are essentially horizontal. When the teeth are not in contact, fit of the intaglio surface the vectors of forces transmitted through the cameo surface determine the stability a denture.<sup>[7]</sup>

This case report utilized this concept of stabilizing the denture by neutral zone technique followed by cameo surface recording. Proper stability of the denture during functional movements was appreciated at the time of delivery of the denture. Patient reported of extreme comfort

and minimum denture displacement in the subsequent follow up appointments.

### Conclusion:

Several treatment modifications have been suggested for the patients with resorbed ridges but the most acceptable and reliable technique has been the neutral zone technique. In addition to it, cameo surface recording has shown improved stability of the denture by bringing the flange area along with the proper positioning of the teeth in the neutral zone in harmony with the surrounding musculature of the cheek and the tongue.

### References:

1. Sheldon Winkler, Essentials of complete denture prosthodontics, 3rd edition
2. Beresin VE, Schiesser FJ. The neutral zone in complete dentures. The Journal of prosthetic dentistry. 1976;36(4):356-67.
3. Bhorgonde D, Nandakumar K, Khurana PR, Kumari VS, Reddy MS, Siddique S. An evaluation of the position of the neutral zone in relation to the crest of mandibular alveolar ridge - An In-vivo study. J Int Oral Health. 2014 Apr;6(2):45-54.
4. Bhat V, Krishna DP, Kant S. Prosthodontic management of resorbed mandibular ridge using neutral zone impression technique: A case report. Journal of Health and Allied Sciences. 2015;5(02):69-73.
5. Porwal A, Jain P, Birader SP, Nelogi S, Naveen HC. 2. Neutral Zone Approach for Rehabilitation of Severely Atrophic Ridge. International Journal of Dental Clinics. 2010;2(3):53-57.
6. Madhumita Sachdeva, et. al. "Complete Denture with Neutral Zone Technique in Atrophic Mandibular Ridge- A Case

Report.”IOSR Journal of Dental and Medical Sciences (IOSRJDMS), 19(8), 2020, pp. 01-04.

7. Philip GB, Thomas V, Rajapur A, Gupta A, Jeetendra. The neutral zone. Dental Impact 2013;5(2):35-43.

**FIGURES:**



Figure 1



Figure 2a



Figure 2b



Figure 3a

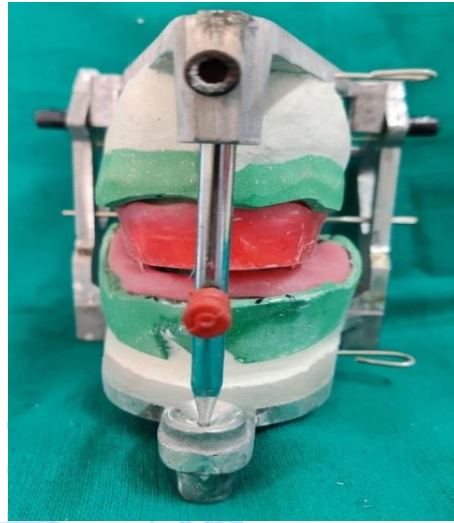


Figure 3b



Figure 4a

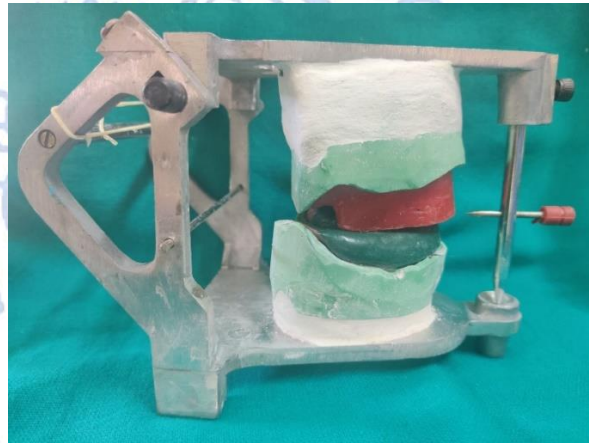


Figure 4b



Figure 5a



Figure 5b



Figure 6



Figure 7

