Case Report

LINEAR OCCLUSION AND NEUTRAL ZONE RECORDING USING TISSUE CONDITIONER – REPORT OF A SEVERELY RESORBED RIDGE

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Abstract

Alveolar Ridge Atrophy possesses a clinical challenge towards the Fabrication of successful Prosthesis. Successful Denture treatment in these situations is dependent on the position of Denture Teeth and External Contours of Dentures. Hence, Neutral Zone Technique and Linear Occlusion Scheme had been incorporated for Denture Fabrication1 in the present case presenting with severe mandibular alveolar ridge atrophy.

Keywords: Alveolar ridge atrophy, Denture stability, Neutral Zone Technique, Linear Occlusion, Tissue Conditioner

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INTRODUCTION

Stability in complete dentures is defined as the resistance to Horizontal Displacement. It depends upon teeth arrangement, contour of polished surface, residual ridge anatomy, quality of impression, quality of soft tissue and denture base adaptation.
In 1933, Sir Wilfred Fish introduced the concept of Neutral Zone/Reciprocal Space/Potential Space/Denture Space. It is that area where the forces of Tongue pressing outwards are neutralized by the forces of Cheeks or Lips pressing inwards. Therefore Neutral Zone Concept states that Artificial Teeth should not be placed on the crest of the Ridge or Buccally / Lingually, but should be placed as dictated by the Musculature.

With Resorbed Ridges vectors of forces that are transmitted through Anatomic Cusps will dislodge Lower Denture.\textsuperscript{2,3} Hence, Linear Occlusion concept was designed. Linear Occlusion consists of following requirements, i.e., Zero Degree Teeth are opposed by Bladed Teeth, Mandibular teeth are set to Flat Occlusal Plane and there are no anterior teeth interferences to Protrusive / Lateral Movement.

In the present case report wherein the patient presented with a severely resorbed and atrophic mandibular ridge, both the concepts of neutral zone recording and linear occlusion have been brought into consideration. The recording of the neutral zone was carried out with the help of Tissue Conditioner, and linear occlusion was provided to enhance the stability of Lower Denture.

**CASE REPORT**

A 60 year old male patient came to Department of Prosthodontics, with chief complaint of multiple missing teeth in the Maxillary and Mandibular arch and wanted replacement with a new Denture. His history revealed that he was edentulous since the last 4 years.

On clinical examination, it was seen that the patient presented with severely Resorbed Mandibular Ridge (Figs. 1 – 3), with loss of vertical dimension and Class 3 jaw relation so in order to enhance the stability of Lower Denture Neutral Zone was recorded followed by Linear Occlusion.

Figs. 1 – 3: - 1).Pre-operative Maxillary Ridge, 2), Pre-operative Mandibular ridge (Atwood’s order VI Mandibular ridge), 3). OPG
The patient was not willing for an implant supported denture in the present case. Therefore, a decision was made whereby which a complete denture was constructed with the neutral zone technique for improving the denture stability. Also along with the neutral zone, in this case, the concept of linear occlusion was also implemented to attain maximum stability, comfort and function.

Primary impression for maxilla was made using impression compound and Mandibular impression was made using admixed technique. Primary casts were poured with type II gypsum. Maxillary border molding and secondary impression was made, master cast was poured with dental stone. Maxillary denture base and occlusal rim were prepared. (Fig. 4 – 6)

Figs. 4 – 6: - 4). Maxillary and Mandibular Final impressions (McCords technique); 5). Maxillary and Mandibular final casts; 6). Jaw relation recorded

Maxillary rim was adjusted for proper esthetics, occlusal plane, phonetics and lip support. Midline, canine line, high lip lines were marked. Mandibular custom tray was a plate of acrylic, without the handle. Three vertical stops of acrylic were adapted over the special tray. Mandibular custom tray overextention and stability was checked. The patient was trained properly for various functional movements before inserting the tray.

With the help of tissue conditioner functional movements were carried out. Patient was instructed to do functional movements like sucking, swallowing, smiling, pursing of the lips, slightly protruding the tongue and licking the lips. After the vertical dimension and centric relation had been established, the final impression was made with closed-mouth procedure. Only after the final impression was made the centric relation was sealed. (Figs. 7 – 11).

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Figs. 7 – 11: 7, 8). Removal of wax rim and fabrication of vertical stops with wire; 9, 10). Using Tissue Conditioner to record Neutral Zone; 11). Recording neutral zone with tissue conditioner.

The plaster index of the neutral zone was prepared and the corresponding occlusal rim was fabricated. (Figs. 12 – 15) Teeth arrangement was then done onto this new occlusal rim according to the Linear Occlusion scheme.

Figs. 12 – 15: - Preparation of the plaster index

Linear occlusion usually involves a one dimensional contact between the two opposing posterior teeth. The contact is found only in one dimension and that is the length of the contacting blade and not the surface. In this case, linear occlusion was obtained wherein maxillary non anatomic posterior teeth and mandibular anatomic
teeth were used. (Figs. 16, 17) This was done in order to achieve denture stability.

Figs. 16 – 20. 16,17). Trial Done, 18). Denture insertion done, 19,20). Post insertion frontal and lateral view

DISCUSSION

Neutral Zone refers to that space in the oral cavity wherein the forces exerted by the musculature of the tongue are equal and balanced with the forces exerted by the buccinator muscle of cheeks laterally and orbicularis oris (i.e. the lips) anteriorly.\textsuperscript{4,5} One of the prime objectives of a prosthodontist is, therefore, to recognize and utilize those forces resulting from muscle function so that they have positive inference on the stability of the denture base.

Such stability can only be accomplished if we are aware of the anatomy as well as methods or techniques available in the literature for recording of the neutral zone. Many materials have also been proposed for obtaining adequate records of the neutral zone and each has been suggested for individual techniques of recording the neutral zone. These include impression compound, soft wax, silicone based impression materials and sometimes a tissue conditioner.

In the present case, a tissue conditioner has been used for recording the neutral zone. The various advantages associated with the use of tissue conditioners are that they are mucostatic, hence, they will not apply pressure on the tissues like impression compound does being a mucocompressive material. Also it is odorless and tasteless and provides a long setting time that gives enough time to perform all functional movements.

Linear Occlusion has also incorporated in this case to increase the stability of the
denture base. There is minimal surface contact area between a flat Plane and blade as is the case in Linear Occlusion. Thus, denture base movement due to frictional resistance is minimized. Hence both of these are helpful in improving stability of denture bases especially in cases of severely resorbed and atrophic ridges as was the requirement of the present case.

REFERENCES


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Nagri D et al. Linear occlusion and Neutral Zone recording for severely resorbed ridges