

Neutral Zone Revisited: A Modified Approach Case Report

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ABSTRACT

Background: The basic need of edentulous patients is retention and maximum functional efficiency of their prosthesis. The success of the prosthesis is dependent on its retention and stability order to be able to perform the functions such as mastication, speech, smile, etc. In order to achieve this basic requirement of denture bearers the clinician tries to fabricate dentures that substitute natural tooth loss and to help patients restore normal functioning. The neutral zone technique provides the denture stability by balancing the muscular activity. It is the area where the displacing forces of the lips, cheeks and tongue are in balance. It is in this zone that the natural dentition lies and this is where the artificial teeth should be positioned. The neutral zone technique provides the denture stability by balancing the muscular activity. This case report describes neutral zone technique in which it describes an alternative approach for denture construction in a resorbed mandibular ridge.

Keywords: Neutral zone, atrophic ridge, stability, resorption.

INTRODUCTION

A multitude of concepts have been presented over the years with considerations in mind. The following case report is an attempt to focus our attention on theories presented in relation to one particular criterion the neutral zone can be described as it is the potential space or dead space between the lips and cheeks on side, and the tongue on the other side or that space or area or denture position where the forces between the tongue and cheeks or lips are equal. Russel (1959)¹ who termed it as "Reciprocal space", Robert (1960)² called it the "Potential space", Heath (1970)³ as "Denture space" Bates (1984) as "Reciprocal zone", Mathew (1961)⁴ as "Zone of minimum conflict" and Fenn (1986)⁵ termed it "Zone of neutral muscular forces".

Soft tissues that form the internal and external boundaries of the denture space exert forces which greatly influence the stability of the dentures. 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 forces exerted by muscles will tend to stabilize the denture rather than unseat it.⁶ Heath (1970)³ has demonstrated that there is a difference in the shape of the denture space and resultant arch form at rest as compared to the denture space and arch form established by function. The neutral zone is that area in the mouth where, during function, the forces of the tongue pressing outward are neutralized by the forces of the cheeks and lips pressing inward.^{7,8} Since these forces are developed through muscles contraction during the various functions of chewing, swallowing and speaking, they vary in magnitude and direction in different individuals and in different periods of life. The way these forces are directed against the dentures will either help to stabilize them or will tend to dislodge them.

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Fig 1: Primary impression of the patient.



Fig 2: Tentative jaw relations of the patient.



Fig 3: Occlusal pillars made with green stick impression material.



Fig 4: Occlusal pillars adjusted in the patient's mouth after the lower occlusal rim is removed.



Fig 5: Tissue conditioner injected in the patient's mouth and placed until the material sets.



Fig 6: Articulation with the tissue conditioning material.



Fig 7: Putty index of the cast for teeth arrangement.

In general, neutral zone technique is indicated when stability and patient's acceptance of lower CD are in question. Searching the literature, this technique is found to be used in the following clinical situations:

- Severely atrophic mandibular ridge (Atwood's V).
- Patients with prominent and highly attached mentalis muscle, lateral spreading of tongue as a result of poor transition from dentate to edentulous state and severe resorption.^{9,10,11,12}



Fig 8: Trial denture.



Fig 9: Final denture inserted.

There are several materials which have been recommended for shaping the neutral zone such as soft wax, modeling plastic impression compound, a polymer of dimethyl siloxane filled with calcium silicate, silicone, tissue conditioners and resilient lining materials and several techniques have been suggested using the materials described previously in combination with movements including grinning and whistling, sucking and pursing the lips. The neutral zone can be located using swallowing/modeling plastic impression compound technique in which swallowing is used as the principle modeling function.

A 65-year-old female patient was seen at the Department of Prosthodontics with previously repaired but ill-fitting upper and lower denture. On examination, mandibular arch was severely resorbed Having shallow sulcus depth, and she was using complete denture since 2 years but unable to use it during having food for its instability.

Primary impression of the upper jaw and primary impression for the lower jaw are taken and models were prepared. On the upper model wax rim is made and a lower special tray is constructed. Border molding and final impression recorded with

the conventional technique. Bite registration is then performed as in conventional treatment. In the lab, the lower occlusal rim is removed from baseplate and substituted with a baseplate with greenstick pillars in the premolar regions and/or wire loops on the remaining areas of the baseplate. The pillars preserve the VDO recorded in bite registration stage. It is essential the the pillars are relatively thin bucco-lingually and are positioned directly over the ridge. The base plate is then fitted in the patient's mouth and VDO and extensions are checked. Then impression material such tissue conditioner, is applied to the baseplate and retained by the wire loops and/or acrylic pillars. Before setting of material, patient is asked to perform functional movement such as, licking lips, swallowing, pronouncing some words or combination of these. Care should be taken that the patient should continue performing functional movements until the full setting of material; otherwise material might flow back and give inaccurate recording of the neutral zone. It is useful if the chosen material has relatively long working time to allow the required movements to be carried out before the material becomes rigid. In the lab, the baseplate carrying recording material is fitted on the master cast again and VDO is checked. A putty or plaster index is made around the N record. Placement of three orientation grooves is recommended as these help in repositioning the index on the master cast. Impression material is then removed and replaced by wax; the use of the index will make sure that wax replicates the neutral zone record. Subsequently, teeth should be set and flanges contoured according to the index that represents. In the lab, the baseplate carrying recording material is fitted on the master cast again and VDO is checked. A putty or plaster index is made around the NZ record. Placement of three orientation grooves is recommended as these help in repositioning the index on the master cast. Impression material is then removed and replaced by wax; the use of the index will make sure that wax replicates the neutral zone record. Subsequently, teeth should be set and flanges contoured according to the index that represents neutral zone.

CONCLUSION

The neutral zone philosophy is based on the concept that for each individual patient there exists

within, the denture space, a specific area where the function of the musculature will not unseat the denture, and at the same time where the forces generated by the tongue are neutralized by the forces generated by the lips and cheeks. Furthermore, denture stability is as much or more influenced by tooth position and flange contour as to any other factor. Regardless of the method of treatment, any part of the dentition out of harmony with the neutral zone will result in instability, interference with function, or some degree of discomfort or will bother the patient. 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. Thus this paper tries to establish the need for neutral zone in the successful rehabilitation of the complete denture patients.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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