Liberation of a Severely Resorbed Mandibular Ridge with a Neutral Zone Technique: A Case Report

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ABSTRACT

The basic need of edentulous patients is retention and maximum functional efficiency of their prosthesis. The success of the prosthesis is dependent on its ability to stay firmly in mouth in order to be able to perform the functions such as mastication, speech, smile, etc. In order to achieve the basic retention requirement of denture bearers, a considerable research efforts and experimentation were tried to get perfect dentures that substitutes natural tooth loss and to enhance retention by any possible means, such as attachments, springs, magnets, clasps, adhesive paste and powder. All have been tried but having less success rate. 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: Denture, Mandibular ridge, Neutral zone technique

INTRODUCTION

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.¹ This zone is also known by various names, including the dead space and zone of minimal conflict. Knowledge of the neutral zone concept may be advantageous when fabricating complete dentures. Arbitrary tooth arrangement and arbitrary shaping of the external and internal polished surfaces may lead to failure of the prosthesis. This is mostly true for patients with resorbed mandibular residual ridges, yielding flat or concave foundations due to severe bone resorption.² Many techniques depending on function to develop the shape of the neutral zone and polished surface of mandibular dentures have been described. The technique reflects the actions of the lips, cheeks, tongue, and floor of the mouth during a specific oral function, to push the soft material into a position where buccolingual forces are neutralized. 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 materials³ 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.³,⁴ According to the same, a person swallows up to 2400 times/day and also that during the entire sequence teeth comes into contact for <1 s, it may be concluded that <40 min of tooth-to-tooth contact occurs/day during function.⁵,⁷ In this case report swallowing, technique (SNZ) of neutral zone is described.

CASE REPORT

Impression Techniques Utilizing the Neutral Zone Concept Case

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 (Atwood’s class IV)
Having shallow sulcus depth, and she was using complete denture since 2 years having complain of instability of the lower denture and lack of food chewing efficiency.

**Procedure**

1. Primary impressions of both the maxillary and mandibular arches were made by using her previous denture as impression recording tray with a mixture of three parts impression compound +7 parts greenstick compound also known as McCord’s technique (Figure 2)⁸,⁹

2. Then the impressions were poured with the dental plaster

3. The casts were retrieved and prepared for the fabrication of the custom trays

4. Custom tray of acrylic resin adapted to the lower ridge, without a handle, with spurs or fins projecting upward toward the upper arch as retentive loops (Figure 3)⁸-¹⁰

5. Greenstick compound i.e., softened low fusing compound was placed in the patient’s mouth; this tray was very carefully adjusted in the mouth to be sure that it was not overextended and remained stable during opening, swallowing, and speaking. The patient was then asked to talk, swallow, drink some water, etc. After 5-10 min, the set impression was removed from the mouth and examined⁸,¹¹

6. After that, a tentative vertical dimension is recorded, and centric relation have been established, the final impression was made with a closed-mouth procedure. Only when the final impressions were completed were the occlusal vertical dimension and centric relation finally determined (Figure 4)¹¹,¹²

7. Then, the putty index is made in which final master cast is notched. One notch is made in the lingual side at the center, and two notches are cut on each of the buccal sides, one in the cuspid and one in the molar region. Putty is mixed and is placed on notches around the impression recorded in neutral zone (Figure 5)¹³

8. Then modeling wax was poured in the putty index after removal of greenstick impression compound (Figure 5)
9. Teeth arrangement was done as conventional protocols but following the putty index (Figure 6).
10. Then the wax trial dentures are tried in the oral cavity to see the appearance, stability, and occlusion. The upper denture is finished in the usual manner. While in lower denture light body impression material is placed on polished surface and same neutral zone impression is recorded. Then the wax trial dentures are tried in the oral cavity to see the appearance, stability, and occlusion. The upper denture is finished in the usual manner. While in lower denture light body impression material is placed on polished surface and same neutral zone impression is recorded.
11. Denture is delivered with post-delivery instructions. And the patient is recalled for follow-up (Figure 7).

DISCUSSION

The goal of prosthodontics is to restore form, function, and esthetics. The pattern of resorption is lingual in mandible while buccal in the maxillary arch that result in bone movement buccally in mandible and lingually in maxillary arch. Atwood gives the residual ridge resorption classification and factors related to the rate of resorption into different categories of anatomic, metabolic, purposeful and prosthetic. The neutral zone approach registers the zone in which there are balanced muscular forces to find out the proper teeth arrangement after resorption has taken place. The principle of the neutral zone concept remains the same as it has been given by many authors. However, the impressions for neutral zone can be recorded in various techniques and has number of modifications, not only various impression materials used or different denture bases used to record, but also in terms of the functional movements performed and alteration to the original record. Neutral zone records may dictate that the mandibular teeth are be placed according to the index. This usually can be accomplished without compromising esthetics. When a patient gives functional record of the mandibular rim into the area of the neutral zone, the result is a stable denture base and ultimately patients happiness.

It is important to note that the technique presented here slightly differs from the other technique described in the earlier text. In this case report our approach is, the neutral zone impression are made and jaw relation records were made on same compound rim only and which was mounted and putty index was made with cast and neutral zone record on articulator only which ultimately reduces time of operator and extra visit of patient, combined in one appointment instead of taking the neutral zone record first and then the jaw relation replacing neutral zone record by wax in different appointments. However, it is crucial that the preliminary impression and individual tray should be functionally accurate and stable.

CONCLUSION

A complete denture will not have a good prognosis if there is no bony hard tissue. The neutral zone technique is based on the - concept that the muscular balance retain the denture in place without dislodgement i.e. the forces generated by the tongue are equalized by the forces generated by the lips and cheeks.

While taking consideration on other issues, we should not be rigid and persist in teeth arrangement i.e., the teeth should always be placed over the crest of the ridge, or lingual to the ridge or buccal to the ridge. Placement of the teeth should be according to the musculature record, and it will vary patients to patients. This technique of neutral zone allows continued adaptation of the denture to the mucosa in the resting and functional states, thereby providing proper retention, stability, support and comfort to the patient.
REFERENCES