

Management of resorbed mandibular ridge resorption using the neutral zone technique - A case series.

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Abstract

Purpose: The effect of use of neutral zone technique for fabrication of mandibular dentures in patients with severely resorbed ridges.

Study selection: Studies on use of neutral zone technique in patients with atrophic mandibular ridges.

Results: The cases described in this article showed that dentures fabricated in neutral zone for patients with severely resorbed mandibular ridges have better adaptability, stability and patient satisfaction.

Conclusion: The Neutral zone is an effective technique for achieving denture stability and adaptability in severely resorbed ridges.

Keywords: Complete denture prosthesis, Loss of vertical dimension, Neutral zone, Residual ridge resorption.

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Introduction

Severely atrophied mandibular ridges present a difficulty in attaining denture adaptability, stability, and retention. This is mainly due to the fact that there is a decrease in sulcus depth and supporting bone for the mandibular denture to attain stability. Various methods have been quoted in literature to record the atrophied ridges. The neutral zone technique is one method which is known to aid in the stability of lower complete dentures. The neutral zone technique is particularly beneficial for patients with severely resorbed mandibular ridges and a history of denture instability. This technique allows for the construction of a denture that has been formed by functional movements of the surrounding muscles and harmony between the tongue, cheeks, and lips surrounding the edentulous lower residual alveolar ridge. The major benefits of this method are that it permits the construction of lower dentures with better adaptability, stability, and retention which in turn can improve the patient's masticatory efficiency and result in

a better prognosis. This clinical report case series describes techniques for recording the neutral zone using different materials

Case Series:

Case No. 1

A 65 years old male came to the department of Prosthodontics at the Institute of Dental Studies and Technology, Modinagar, Ghaziabad with the chief complain of missing teeth and he wanted replacement for the same. There was no significant medical history and the past dental history revealed that the patient was a previous denture user for 3 years and wasn't satisfied with the stability and retention of the former lower denture.

Intraoral examination revealed severely resorbed mandibular edentulous ridges. Labial, buccal mucosa were healthy with decreased sulcus depth. The palpation the ridge was found to be smooth. It was decided to fabricate a fresh conventional maxillary denture and a mandibular denture utilising

the neutral zone approach after examining the available treatment alternatives.

Technique:

1. Primary and secondary impressions for maxilla were made using the conventional method. The primary impression for the mandible was made using admix technique (Fig. 1).
2. Facebow transfer was done and jaw relations were recorded (Fig. 2).
3. This conventional jaw relation was then transferred to a semi adjustable articulator. After articulation an additional lower denture base was fabricated on the mandibular cast with acrylic stops at the canine region were made (Fig. 3). These stops were then joined using a thin orthodontic wire. The height of these stops was adjusted as per the previously established vertical dimension.
4. Following this this new denture base was seated in the patient's mouth and checked for any hindrance in movement. Then green stick compound was taken and softened in a hot water bath and then kneaded and loaded onto this denture base and fitted in the patient's mouth. The patient was then instructed to do functional motions like swallowing warm water, puckering, sucking, pronouncing exaggerated "EEE" and "OOO" sounds followed by tongue movements such as touch the palate and wet upper lips The greenstick rim thus made was shaped with these functional movements and the neutral zone identified (Fig. 4).
5. Now this neutral zone rim was then transferred to the articulator and a putty index was fabricated around it (Fig. 5).

6. After making putty index the compound is then removed from this denture base and index obtained previously is again adapted around the same denture base. In this potential space molten wax was then poured and allowed to cool off. After cooling the rim obtained is the neutral zone (Fig. 6).
7. The lower teeth are then arranged on this rim in neutral zone. The sequence of teeth arrangement was maxillary anterior then mandibular anterior followed by mandibular posterior and finally maxillary posterior teeth (Fig. 7).
8. The dentures were then tried in the patient mouth.
9. The dentures were then flaked, cured finished and polished following conventional methods. The final dentures were then delivered to the patient (Fig. 8-10).

Case No. 2

A 60 years old male patient came to the department with poor upper denture retention and unstable lower dentures. On intraoral examination, mandibular edentulous ridges were found to be severely resorbed. During further inspection, the mandibular ridges were found to be completely missing. There were no abnormalities in the labial, buccal mucosa, hard or soft palate, or the floor of the mouth. It was determined to fabricate a mandibular full denture using the neutral zone approach and a traditional maxillary denture after examining the available treatment alternatives.

Technique:

1. The maxillary and mandibular primary impressions were made using alginate

2. Then border molding was done for both maxilla and mandible and final impressions made.
3. Jaw relations were recorded and mounted on articulator then additional denture base was made with stops in canine region same as case one but this time impression compound was used to record the neutral zone (Fig. 11).
4. Putty index was then made around the impression compound rim and teeth arrangement was done.
5. Wax try in was done for the patient.
6. After that, the patient received final, polished dentures (Fig.12-14). After a week, the patient was reevaluated, and little modifications were made.

Discussion

Residual ridge resorption is a primary outcome of edentulism. It is a continuous progressive disease and occurs in response to change in bone stimuli. Edentulism leads to a horizontal disparity between original teeth position and the resorbed ridge crest causing denture instability.^[1] As residual ridge resorption progresses the surface area and the height of the ridges decrease as a result any dentures made on such ridges have compromised retention and stability. Treatment options for resorbed ridges include implant-supported overdentures surgical augmentations such as sulcus deepening and ridge augmentations, and retentive aids such as suction devices and adhesives.^[2]

Dentures fabricated using neutral zone technique have shown to be more stable than conventional dentures. In 1976, Beresin and Schiesser used the term "Neutral Zone" for the first time.^[3]

According to the Neutral Zone philosophy, each patient's denture area contains a certain location where the function of the musculature won't cause it to fall out and where the forces produced by the tongue are

balanced by the forces produced by the lips and cheeks.^[4]

Swallowing and phonetics are the two methods most frequently utilised to record the neutral zone. The neutral zone can be captured via gestures like whistling, smiling, sucking, masticating, and mouth exercises (including tongue motions, blowing, tongue protrusion, and workout movements of the lips, cheeks, and tongue).^[4]

Wax, tissue conditions, green stick, impression plaster, impression compound, and polyether are some of the materials that can be used to record neutral zone.^[5] The ease of manipulation and individual preference decides the choice of material. The direction of resorption in maxilla is inward and backward while in the mandible its downward and outward leading to a condition where reverse articulation may be required.^[6] Such was the case in the first case report. The sequence of teeth arrangement was anterior maxilla followed by anterior mandible then posterior mandible and finally maxillary posterior. Two key goals can be accomplished when prosthetic teeth are arranged in the neutral zone –

- A. Prosthetic teeth do not interfere with perioral musculature and its function
- B. Normal oral and perioral muscle activity imparts force against the complete dentures that serves to stabilize and retain the prostheses rather than cause denture displacement.^[7]

The cases in this article discuss about using two distinct materials for capturing the neutral zone. In both the cases the dentures made were reported to have better retention, stability and adaptability.

Neutral zone dentures provide much superior patient satisfaction than traditional dentures in terms of comfort, aesthetics, and over all functionalities.^[8]

Conclusion

The cases in this article discuss about using two distinct materials for capturing the neutral zone. In both the cases the dentures made were reported to have better retention, stability and adaptability.

References

1. Rajdey S, Parashar H, Rani S, Poduval S. Neutral zone technique: An aid of the prosthodontist-A case series. *Journal of Dental Specialities*. 2021;9(1):36-41.
2. Shah P, Singh RK, Suwal P. STABILITY-A KEY TO SUCCESS USING NEUTRAL ZONE TECHNIQUE: A CASE REPORT. *Guident*. 2020;13(9).
3. Beresin VE, Schiesser FJ. The neutral zone in complete dentures. *The Journal of prosthetic dentistry*. 1976 Oct 1;36(4):356-67.
4. Srivastava V, Gupta NK, Tandan A, Kaira LS, Chopra D. The neutral zone: Concept and technique. *Journal of Orofacial Research*. 2012:42-7.
5. Saravanakumar P, Thangarajan ST, Mani U. Improvised neutral zone technique in a completely edentulous patient with an atrophic mandibular ridge and neuromuscular incoordination: A clinical tip. *Cureus*. 2017 24;9(4).
6. Massad JJ, Cagna DR, Goodacre CJ, Wicks RA, Ahuja SA. Application of the neutral zone in prosthodontics. *John Wiley & Sons*; 2017 Aug 14.
7. L Anooj, Dable RA, Tandon P et al. NEUTRAL ZONE – A CASE REPORT. *TMU J. Dent*. 2014;1(4): 152-154.
8. Al-Magaleh WR, Swelem AA, Abdelnabi MH, Mofadhil A. Effect on patient satisfaction of mandibular denture tooth arrangement in the neutral zone. *J Prosthet Dent*. 2019 ;121(3):440-446.

FIGURES



Figure No. 1



Figure No. 2



Figure No. 3



Figure No. 4



Figure No. 5



Figure No. 6



Figure No. 7



Figure No. 8



Figure No. 9



Figure No. 10



Figure No. 11



Figure No. 12



Figure No. 13



Figure No. 14