

THE NEUTRAL ZONE TECHNIQUE REVISITED

Ayesha Razzaque* , Sunil Dhaded**

Dept. Of Prosthodontics, AMES Dental College & Hospital, Raichur-584103

***- PG Student**

**** -Professor and Head**

ABSTRACT: The major aim of treating a completely edentulous patient is restoring the aesthetic, form and function by replacement of the lost structures within the oral cavity. One of the most commonly faced problems among long term denture wearers is the reduction in the denture bearing area due to resorption. Prosthetic Rehabilitation patient with severely resorbed ridge is one of the most challenging task a prosthodontist can undertake. This article describes the use of neutral zone (NZ) technique in an effort to achieve successful complete denture therapy with enhanced stability.

KEYWORDS: Neutral zone, Atrophic mandible, Impression technique, Stability.

INTRODUCTION

Complete dentures are primarily mechanical devices, but since they function in the oral cavity, they must be fashioned so that they are in harmony with normal neuromuscular function. All oral functions, such as speech, mastication, swallowing, smiling, and laughing, involve the synergistic actions of the tongue, lips, cheeks, and floor of the mouth which are very complex and highly

individual. Failure to recognize the cardinal importance of tooth position and flange form and contour often results in dentures which are unstable and unsatisfactory, even though they were skilfully designed and expertly constructed. The coordination of complete dentures with neuromuscular function is the foundation of successful, stable dentures.¹

Loss of teeth leaves us with multifactorial changes occurring in the mouth in the form of resorption of alveolar ridge, tongue expansion, laxity of muscles of cheek and face which are unable to counteract tongue forces towards buccal aspect. Hence, leaving crest of residual alveolar ridge, is not an ideal foundation for placement of artificial teeth.²

Many edentulous people can experience difficulty in carrying out functional activities when wearing complete dentures. This may be due to a number of factors, one of which is the ability to control the dentures effectively during mastication and speech. For this reason, it is critical when constructing complete dentures to incorporate features in their design which will aid stability in function. Successful treatment of patients with complete dentures depends mainly upon the proper positioning of the teeth on the denture foundation. Neutral zone was defined as "that area in the mouth where the forces of tongue pressing outward are neutralized by forces of cheeks and lips pressing inward". This concept was followed and prescribed by many since then for e.g.: Russel (1959) who termed it as "Reciprocal space", Robert (1960) called it the "Potential space", Heath (1970) as "Denture space" Bates (1984) as "Reciprocal zone", Mathew (1961) as

"Zone of minimum conflict" and Fenn (1986) termed it "Zone of neutral muscular forces".

Instability in mandibular complete dentures may be present due to a number of reasons. The common ones, as described by Jagger & Harrison³ are:

- a) Inappropriate extensions of buccal and lingual flanges of a denture;
- b) Poorly adapting denture fitting surface;
- c) Severely atrophic mandibular alveolar ridge;
- d) Poorly contoured polished surfaces of a denture;
- e) Abnormal denture teeth positions, inappropriate orientation and high level of the occlusal plane and presence of occlusal errors.

The neutral zone is the potential space between the lips and cheeks on one side and the tongue on the other, that area or position where the forces between the tongue and cheeks or lips are equal.⁴

Many materials have been suggested for shaping the neutral zone: modeling plastic impression compound, soft wax, a polymer of dimethyl siloxane filled with calcium silicate, silicone, and tissue conditioners and resilient lining materials. Many techniques have also been suggested using the materials in conjunction with movements including sucking, grinning

and whistling, and pursing the lips. The swallowing/ modeling plastic impression compound technique located the neutral zone, using swallowing as the principle modeling function.⁵

INDICATIONS OF NEUTRAL ZONE:

It is basically advocated in the following conditions:

- Severly atrophic mandibular ridge
- Patient with high mentalis attachment
- Patient with partial glossectomy
- To facilitate in locating optimal position for implant
- Patient with partial mandibular resection

ADVANTAGES OF NEUTRAL ZONE:

- Improved stability
- Better retention
- Posterior teeth will be correctly positioned allowing sufficient tongue space
- Enhanced aesthetics due to facial support
- Improved masticatory function
- Better comfort
- Improved speech

CASE REPORT:

A 52 year old female patient reported with the chief complaint of ill-fitting denture

associated with discomfort on wearing the dentures. On examination, it was found that both the upper and the lower arches were edentulous and severely resorbed. (Figure 1) The patient gave a history of wearing dentures since past 10 years. On examination of the existing dentures, attrition of the denture teeth was found as well as a reduced vertical dimension was observed. Hence, fabrication of complete dentures with the help of neutral zone technique was planned and the patient was explained about the same.



Fig 1: Resorbed maxillary and mandibular arches

Primary impressions of the upper and lower jaw were made with impression compound using metal stock trays and the model was poured in dental plaster. Following which closed fitting upper and lower custom trays were fabricated using self-cure acrylic resin. The extensions of the custom trays were evaluated intra-orally border moulding was done with the help of green stick compound and secondary impressions were recorded using zinc-oxide eugenol impression paste. The master casts were poured in dental stone. After obtaining the master cast,

upper and lower base plates were fabricated using acrylic resin. The base plates were trimmed and checked for extensions, retention and stability in the patient's mouth. For the mandibular cast another base plate was fabricated on which orthodontic wire bent in the form of loops was attached, these spurs were made in order to aid in retention of the admix material while recording the neutral zone (Figure 2). Wax occlusal rims were made over upper and lower base plates and occlusal registration was recorded in a conventional manner. The height of the wax rims were adjusted intraorally to permit an acceptable occlusal vertical dimension (OVD) and a freeway space of 2mm. Centric relation was recorded and articulation was done. (figure.3)



Fig 2: Crib placed on denture base



Fig 3: Jaw Relation recorded

An admix ratio of impression compound and green stick compound (7 parts impression compound and 3 parts green stick compound) was softened in water bath at 65 °C and moulded into the shape of a rim and adapted on the wire loop, following which it was placed in the patient's mouth. The patient was then asked to perform various repeated actions like sucking, swallowing and taking frequent sips of water, pursing lips, pronouncing E and O sounds and protruding the tongue to simulate physiological movements. Performing these various oral movements helps in shaping / moulding of the material thereby facilitating the recording of the neutral zone. After 5–10 min, the set impression was removed from the mouth and examined (Figure 4).



Fig 4: neutral zone recorded

The neutral zone impression so obtained was placed on master cast and location grooves were made on the master cast. A silicone putty material was mixed and adapted on both labial and lingual sides around the neutral zone impression to

obtain an index (Figure 5) The compound material along with the wire-loops were removed and were replaced with modelling wax using the putty indices (Figure 6) and the height of the mandibular occlusal rims were adjusted according to the articulated maxillary occlusal rims.



Fig 5: Putty index made of the neutral zone record



Fig 6: Wax placed in the area of neutral zone

Maxillary teeth arrangement was done in a conventional manner and the mandibular teeth were placed exactly following the index. The position of the teeth was verified by placing the index together

around the wax try-in(Figure 7).The waxed up dentures were checked in the patient’s mouth for esthetics, phonetics and occlusion. Once the try in was found satisfactory, the dentures were processed, finished and inserted.



Fig 7: Teeth arrangement



Fig 8: Try -in done



Fig 9:Prosthesis Insertion



Fig 10: Pre-operative and post-operative view

CONCLUSION: Neutral zone technique is one of the best alternative techniques for fabricating a complete denture for patient with highly resorbed ridge, but it is generally not practiced because of the extra clinical step involved. The neutral-zone philosophy is based upon the concept that within the mouth there exists a specific area where forces generated by the tongue and those generated by the lips and cheeks are neutralized by each other, where the function of the musculature will not unseat the denture. The neutral zone technique is considered to be an alternative approach for patients complaining of unstable dentures, especially when it is not feasible to do implant therapy.

REFERENCES:

1. Beresin VE, Schiesser FJ. The neutral zone in complete dentures. *The Journal of prosthetic dentistry*. 1976 Oct 1;36(4):356-67
2. Fahmi FM. The position of the neutral zone in relation to the alveolar ridge. *J Prosthet Dent* 1992;67:805-09.
3. Jagger D, Harrison A. *Complete Dentures-problem solving*. London; BDJ Books. 1999.
4. The glossary of prosthodontic terms. *J Prosthet Dent* 2005;94:10-92.
5. Makzoumé JE. Morphologic comparison of two neutral zone impression techniques: A pilot study. *J Prosthet Dent* 2004;92(6):563-8.
6. Porwal A, Jain P, Biradar SP, Nelogi S, Naveen HC. Neutral zone approach for rehabilitation of severely atrophic ridge. *International journal of dental clinics*. 2010 Sep 30;2(3).
7. Arora V, Nagpal V, Setia P, Mittal N. Complete Denture in Neutral Zone: Case Report. *International Journal of Enhanced Research in Medicines & Dental Care* ISSN: 2349-1590, Vol. 2 Issue 7, July-2015.
8. Pawah S, Gupta A, Madan B. The relation of the Neutral zone to the crest of the residual alveolar ridge in completely edentulous subjects-A clinico-Radiological study. *Journal of Oral Health and Community*. 2011;5:90-3..
9. Cagna DR, Massad JJ, Schiesser FJ. The neutral zone revisited: from historical concepts to modern application. *The Journal of prosthetic dentistry*. 2009 Jun 30;101(6):405-12.
10. Lynch CD, Allen PF. Overcoming the unstable mandibular complete denture: the neutral zone impression technique. *Dental update*. 2006 Jan 2;33(1):21-6.
11. Fahmy FM, Kharat DU. A study of the importance of the neutral zone in complete dentures. *The Journal of prosthetic dentistry*. 1990 Oct 1;64(4):459-62.

12. Alfano SG, Leupold RJ. Using the neutral zone to obtain maxillomandibular

13. Relationship records for complete denture patients. The Journal of prosthetic dentistry. 2001 Jun 30;85(6):621-3.

14. Ohkubo C, Hanatani S, Hosoi T, Mizuno Y. Neutral zone approach for denture fabrication for a partial glossectomy patient: a clinical report. The Journal of prosthetic dentistry. 2000 Oct 31;84(4):390-3.

15. Lee JY, Choi SY, Lee JH. Neutral zone approach for rehabilitation of severely atrophic maxillary and mandibular ridges: A case report. The Journal of Korean Academy of Prosthodontics. 2016 Oct 1;54(4):407-12.

Conflict of interest declared: Nil

Corresponding author: Dr. Aayesha Razzaque,
PG student, Department of Prosthodontics, AME's Dental College, Bijanjereroad
, near Govt Polytechnic, Raichur-584103.
Email id: aayesharazzaque@gmail.com.

How to cite: Razzaque A, Dhaded S, Neutral zone technique revisited, Annals of Clinical Prosthodontics, Vol.2 Issue 1, 14-20