

Neutral Zone Technique of Fabrication of Complete Denture for Resorbed Mandibular Ridge –A Clinical Tip

¹Dr R Padmini Rani, Post graduate student, Department of prosthodontics and crown and bridge, Kalinga institute of dental sciences, Bhubaneswar, Odisha, India

²Dr Sonali Perti , Associate Professor, Department of prosthodontics and crown and bridge, Kalinga institute of dental sciences, Bhubaneswar, Odisha, India

³Dr Aswini Kumar Kar, Professor, Department of prosthodontics and crown and bridge, Kalinga institute of dental sciences, Bhubaneswar, Odisha, India

Corresponding Author: Dr R Padmini Rani, Department of prosthodontics and crown and bridge, Kalinga institute of dental sciences, Bhubaneswar, Odisha, India

Type of Publication: Case Report

Conflicts of Interest: Nil

Abstract

Mandibular ridge resorption is chronic, progressive and irreversible process which is multifactorial and can lead to loss of sulcular depth, reduced vertical dimension and lower facial height. Various neurologic, hormonal and metabolic disorders can be related to this disease which can be singled out after taking proper medical history. Neuromuscular control plays a very important role in denture stability. Size and position of artificial teeth and the contours of polished surface play a crucial role as they are subjected to destabilizing forces from the tongue, lips, and cheeks. The neutral zone concept plays a significant role in overcoming these obstacles. Neutral zone technique aims to fabricate a denture that is contoured by muscle function and is harmonious with the rest oral structures.

Keywords: neutral zone, resorption, neuromuscular, complete denture.

Introduction

The stomathognathic system functions by maintaining a harmonious balance between the teeth, muscles and the TMJ. Any structure getting lost or damaged can result in

jeopardizing the normal oral functions. Once the patient loses all teeth rehabilitating the oral function and reciprocating the harmony of muscles of temporomandibular joint and stomatognathic system is a challenging task.¹ With the loss of teeth one more problem arises is that of residual ridge resorption which is an inevitable and natural physiologic phenomenon. Neutral zone technique is very much beneficial for patient with multitudinous and unstable dentures. The main purpose of this technique is arrange the teeth in such a way that the forces from tongue and cheek muscles are nullified and the denture remains in the neutral area. As opposed to the conventional teeth setting, in this technique the teeth setting is dictated by the oral musculature and varies from patient to patient. The neutral zone technique for complete denture construction is not a new concept but is a valuable one. Unfortunately, it is a widely practiced procedure and the proportion of patients that may benefit from this technique is significant. It is cost effective and an alternative to patients who due to medical factors cannot go for newer alternatives like implant supported prosthesis.²

Case report

A 66 year old male patient reported to the Department of Prosthodontics and crown and bridge, Kalinga institute of dental sciences, Bhubaneswar, Odisha, India with the chief complaint of difficulty in chewing food due to loss of teeth. The patient was edentulous for past five years due to lack of motivation. But due to failing health and inability to take food, he was advised by relatives to go for dentures. (Figure 1)

Preliminary Procedure

Clinical evaluation revealed smooth, rounded maxillary ridge and resorbed mandibular ridge of Atwood classification of Order V and an increased interarch space. Patient was advised of implant supported overdenture and conventional complete denture but due to financial problems patient chose to go for conventional complete dentures. So, the treatment plan decided was complete denture fabrication with neutral zone technique. The primary and secondary impressions were made according to conventional method and master casts were obtained.³

Neutral zone technique

Record bases were made with self-cure acrylic, and occlusion rims were prepared using modelling wax. After the registration of orientation jaw relation /maxilla-mandibular relations, the casts were mounted on semi adjustable articulator.

The neutral zone was recorded using impression compound occlusion rim. The mandibular wax occlusion rim was removed and self-cure acrylic stumps were attached to the record base in the premolar and molar area and incisor area for determination of the vertical height of the rim. Kneaded impression Compound was adapted to the roughened denture base.³ (figure2).

Mandibular compound rim was softened in hot water and both the record bases were placed in the patient's mouth. Different functional movements like swallowing, sucking,

whistling, smiling, licking the lips, and pronouncing vowels were done by the patient to simulate the neutral zone. Mandibular compound rim was taken out and excess compound was trimmed away till the level of the acrylic stumps and this procedure was repeated several times. The resultant molded occlusion rim was the neutral zone of the patient where the teeth have to be set. (figure 3)

Three notches were made on the cast: one in the anterior and two in the posterior regions. Separating medium was applied on the cast, the record base, and over the neutral zone record. Boxing was done with modelling wax, and plaster of Paris was poured into the boxing up to the upper surface of the compound. The plaster indices were sectioned into a labial and right and left buccal index and a lingual index in order to guide the removal and placement of these indices. Teeth arrangement was done according to the index. First the mandibular teeth were arranged in the neutral zone area and checked by replacing the plaster index. The maxillary teeth were later arranged according to the mandibular teeth. (figure 4 & figure5)

Try in was done and the denture was processed and finished. Denture insertion was done. The patient was followed for several months and the patient was satisfied with the stability. (Figure 6)

Discussion

Neutral zone is a specific area on the denture base where the musculature will not unseat the denture. When there is resorption the denture base area becomes small, so there is less influence of the impression surface which affects the stability and retention of the denture^{4,5,6}

The force of the anterior teeth and lip against the anterior part of the denture causes to rise unless the flange and teeth are properly positioned. Lammie has shown that as the alveolar ridge resorbs the ridge crest falls below the origin of mentalis muscle, as a result the muscle attachment comes over the alveolar crest which leads to

posterior positioning of the neutral zone and so, the lower anterior teeth should also be placed further lingually than it was in natural setting. Posteriorly the neutral zone is located more buccally than lingually. Razek and Abdalla in their study found that the width of the neutral zone is minimum at the level of the occlusal plane and increases gradually as it proceeds up and down.^{7,8}

Conclusion

Fabrication of complete denture with Neutral zone technique is a simple, effective, noninvasive and economic procedure. Better phonetics, reduced food lodgement, sufficient tongue space, and comfort can also be ensured with such neutral zone dentures as their external surfaces are functionally contoured.^{9,10}

References

1. Residual ridge resorption: A major oral disease entity in relation to bone density. Opinder PS, Ravneet K, Sonia MN. Indian J Oral Sci. 2016;7:3–6.
2. A contemporary review of the factors involved in complete dentures. Part II: stability. Jacobson TE, Krol AJ. J Prosthet Dent. 1983; 49:165–172.
3. The neutral zone impression revisited. Gahan MJ, Walmsley AD. Br Dent J. 2005; 198:269–272.
4. Reduction of residual ridges: A major oral disease entity. Atwood DA. J Prosthet Dent. 1971; 26:266–279.
5. The neutral zone in complete dentures. Beresin VE, Schiesser FJ. J Prosthet Dent. 1976; 36:356–367.
6. Using tissue conditioner material in neutral zone technique. Kursoglu P, Ari N, Calikkocaoglu S. N Y State Dent J. 2007;73:40–42.
7. Flange technique: An anatomic and physiologic approach to increased retention, function, comfort and appearance of dentures. Lott F, Levin B. J Prosthet Dent. 1966;16:394–413.
8. The unstable lower full denture—a practical and simple solution. Johnson A, Northeast SE. Restorative Dent. 1989; 86–90.
9. Enhancement of stability for mandibular complete denture prosthesis in atrophied ridge with neutral zone technique-A case report. Patil V, Hallikerimath RB, Magadam J Adv Oral Res. 2011;2:73–76
10. A simplified approach for recording neutral zone. Agarwal S, Gangadhar P, Ahmad N, Bharadwaj A. J Indian Prosthodont Soc. 2010;10:102–104.

Legends Figure



Figure 1: Resorbed Mandibular Ridge



Figure 2: Cold Cure Acrylic Stumps On Roughned Base.



Figure 3: Moulded Compound Rim.



Figure 4: Plaster Indices Made.



Figure 5: Teeth Arrangement Done According To Indices



Figure 6: Denture Insertion