

Neutral zone concept for unstable mandibular complete denture : A case report

Bhuvana Sachin¹, Jayesh Jain², M. Kalavathi³, Nirmala kumari⁴

Reader¹, Asst. Professor^{2,4}, Department of Prosthodontics and Crown and Bridge, College of Dental Sciences, Davangere

Lecturer³, Prosthodontics and Crown and Bridge, Govt. Dental College & Research Institute, Bangalore.

Abstract:

The tooth position and flange contour have great influence on the stability of a denture. We should not be dogmatic and insist that teeth be placed over the crest of the ridge, buccal or lingual to the ridge. Teeth should be placed as dictated by the musculature, and this will vary for different patients. The neutral zone technique is the most effective way of improving the stability of complete denture especially for patients with atrophic ridges or diminished neuromuscular control. The technique involves recording neutral zone using tissue conditioner and fabrication of a denture which is in harmony with the surrounding oral musculature. This article aims to increase the awareness of dental practitioners to use neutral zone concept in case of denture stability difficulties.

Keywords: Atrophic Ridges, Neutral Zone, Unstable Denture.

Introduction

The neutral zone (NZ) is defined as “the potential space between the lips and cheeks on one side and the tongue on the other; the area and or position where the forces between the tongue and cheeks or lips are equal.”¹ Regardless of the fabrication technique used, functionally inappropriate bucco-lingual denture teeth positioning or physiologically unacceptable denture base volume/contour have been implicated in poor prosthesis stability and retention, compromised phonetics, inadequate facial tissue support, hyperactive gagging, inefficient tongue posture and function. The central thesis of the neutral zone approach is to position the teeth and develop the external denture surfaces such that all the forces exerted by oral and para-oral muscles are neutralized, and the denture is maintained in a state of equilibrium.

Positioning of artificial teeth in neutral zone achieves two objectives – Firstly, teeth will not interfere with the normal muscle function and secondly, the forces exerted by the musculature against the denture are more favourable for stability and retention.²

Corresponding Author:

Dr. Bhuvana Sachin,
Reader,
Department of Prosthodontics and Crown and Bridge,
College of Dental Sciences, Davangere,
Karnataka, India.
Email: dr.bhuvana.sachin@gmail.com
Mobile: 9008540750

Case report

A 65 year old male patient was referred to the Department of Prosthodontics, College of Dental Sciences, Davangere for complete denture. Patient had been edentulous for 8 years and complained of loose mandibular dentures. On intraoral examination, it was noted that mandibular residual ridge was severely resorbed with enlarged tongue and moderately resorbed maxillary ridge. Hence the neutral zone technique was planned for the construction of complete denture.

The primary impressions were made in a stock tray with impression compound. Border moulding was done using low fusing compound with the custom trays, recording the functional depth and width of the sulcus. The final impressions were made using zinc oxide eugenol. The wax record rims were constructed on self-cured acrylic bases and assessed for extension, comfort and stability.

The upper occlusal rim was carved to provide support for the musculature labially and buccally. It is vitally important that the record rim is correctly trimmed to the full width of the sulcus; otherwise the correct width of the lower arch cannot be developed. After establishing the correct incisal level, occlusal planes and palatal contour, the mandibular occlusal rim was adjusted to the correct occlusal vertical dimension (OVD). Jaw relation was recorded and the rims were articulated on a mean value articulator.

The NZ impression required a tissue conditioner material that could be moulded by muscle activity. A high viscous mix of Viscogel (Dentsply, Weybridge, UK), was advocated for the impression. So the wax was then removed from the mandibular

denture base and acrylic blocks and staples were attached to provide support for the tissue conditioning material and to maintain vertical dimension (Fig. 1). The Viscogel mix was loaded for the mandibular denture base. The volume of the material should be controlled and kept to a minimum so that the sulci were not distorted. The denture base was inserted in to the patient's mouth and he was asked to perform a series of actions designed to stimulate physiological functioning like smile, grin, pout lips, count from 60-70, talk loud, sip water, swallow, slightly protrude the tongue and lick the lips.^{2,3,4} These actions were repeated for 10 minutes until the material was set. Fig. 2 shows NZ impression, the characteristic shape contoured by the oral musculature. The silicone putty index of the NZ impression was prepared (Fig. 3). Then the tissue conditioner and staples were removed from the denture base. The index was replaced on the cast and wax was poured into the space giving an exact representation of the neutral zone. Teeth arrangement was done following the index. The posterior teeth were trimmed lingually as a narrow space existed. The wax try-in was done and the denture was processed in usual manner (Fig. 4). The patient was recalled after 7 days for a routine check-up. It was found that the patient was satisfied with the improved stability, retention and facial appearance



Fig 1: The mandibular denture base with vertical acrylic blocks and staples.

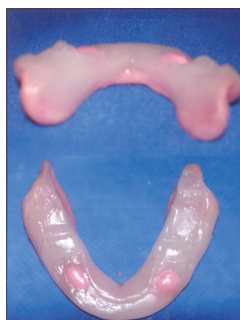


Fig 2: Completed neutral zone impression.



Fig 3: Putty index of the NZ impression made.



Fig 4: The completed mandibular denture.



Fig 5: Post treatment.

(Fig. 5). The tooth position and functionally contoured external surfaces of the NZ dentures are the important contributing factors for the improved results.

Discussion

Reduced stability and retention are more commonly associated with mandibular complete denture. This is because the mandible resorbs at a greater rate than the maxilla and has less surface area for retention and support. Dental implants may provide stabilisation of mandibular complete dentures for the atrophic mandible, however there may be situations when it is not possible to provide implants on the grounds of medical, surgical or costs factors. The neutral zone technique is an alternative approach for such complex cases.⁵ The functions of lips, cheek, and tongue and their controlling action on the dentures during function is a fundamental principle behind the neutral zone concept. The NZ technique is useful for improving the stability of complete denture especially for patients with atrophic ridges, diminished or altered neuromuscular control, surgical resection and Parkinson's disease.

Conclusion

Management of an unstable complete denture can often be difficult and frustrating for both clinician and patient. The neutral zone is an alternative technique for the construction of mandibular complete dentures on severely atrophic ridges. It is especially useful in cases where dental implants are not possible. The neutral zone technique helps us to construct denture in harmony with muscle balance, as muscular control will be the main stabilising and retentive factor during function. The technique is relatively simple but requires increased chair time and laboratory costs.

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