International Journal of Health Sciences and Research
Volume 14; Issue: 12; December 2024
Website: www.ijhsr.org
Case Report *ISSN: 2249-9571*

Stabilizing Mandibular Dentures: Integrating Neutral Zone and Lingualized Occlusion - A Clinical Case Study

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DOI: https://doi.org/10.52403/ijhsr.20241210

ABSTRACT

This case report discusses the successful rehabilitation of a mandibular edentulous patient using the neutral zone technique combined with lingualized occlusion. The aim is to highlight the benefits of this approach in achieving optimal denture stability, retention, and function, particularly in patients with compromised oral anatomy. The neutral zone technique is a vital approach in prosthodontics, particularly for edentulous patients with compromised oral anatomy. The neutral zone technique utilized muscle dynamics to determine the optimal denture base position, while lingualized occlusion provided a balanced occlusal scheme, reducing lateral forces during mastication. The outcome demonstrated that this integrated method offers a promising solution for achieving successful mandibular denture rehabilitation, even in challenging clinical scenarios.

Keywords: Neutral zone, stability, equilibrium, lingualized occlusion, crowding.

INTRODUCTION

Edentulous patients often face challenges in achieving satisfactory denture retention and stability, especially when significant resorption of the alveolar ridge is present[1]. The neutral zone technique is a prosthodontic approach that considers the muscle dynamics to establish the denture's optimal position within the oral cavity. When combined with lingualized occlusion, it offers a balanced occlusal scheme that can enhance patient comfort and chewing efficiency[2]. The neutral zone technique focuses on creating dentures that are in harmony with the dynamic muscular forces of the oral cavity. By recording the space where the forces of the tongue, cheeks, and lips are in equilibrium, this technique ensures that the dentures remain stable and retentive during function[3]. This approach is particularly beneficial for patients with compromised mandibular ridges, where traditional denture methods might fail to provide adequate stability. Lingualized occlusion, on the other hand, is designed to improve masticatory efficiency and

minimize detrimental lateral forces. This occlusal scheme involves creating a contact primarily between the palatal cusps of the maxillary teeth and the central fossae of the mandibular teeth, thereby directing occlusal forces down the long axis of the teeth and enhancing denture stability[4-6].

Combining the neutral zone technique with lingualized occlusion presents a synergistic approach to denture fabrication. The integration of these methodologies aims to maximize the stability and functional efficiency of dentures, particularly in challenging cases involving severe ridge resorption[7-9].

CASE PRESENTATION

A 67-year-old male patient in Department of Prosthetic Dentistry, Jaipur Dental College, presented with a completely edentulous maxillary and mandibular arch and complained of instability and discomfort with his existing mandibular denture. Clinical examination revealed severe ridge resorption and a narrow residual ridge. The patient's primary concern was to improve the stability and comfort of the mandibular denture.

Patient was presented with his old prosthesis, which was needed to be replaced (Fig.2)

Fig.1 Front Profile

Fig.2 Previous Prosthesis

Clinical Procedure-

In examination, Intra orally, the upper arch form was ovoid with adequate height. However, the lower arch revealed severe ridge loss combined with a knife-edge form. The vestibule disappeared and movable tissues were extended onto the residual ridge. (Fig.3). Preliminary impressions for maxillary and mandibular arch were made using Impression Compound (Fig.4), using mucocompressive technique, Primary cast were poured using Dental Plaster, custom trays were fabricated with autopolymerising acrylic resin. Border moulding was done with low fusing impression compound and final impressions were made with zinc oxide eugenol impression paste, cast were poured using Dental Stone.

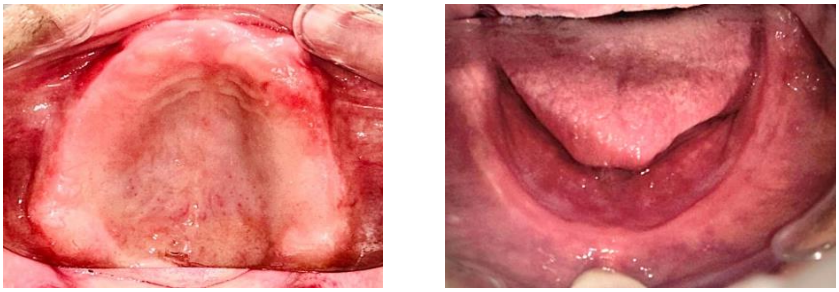

Fig.3 Intraoral photographs

The upper and lower denture base and wax rim were then fabricated. The jaw relation was recorded (Fig.6


Fig.4 Primary Impression

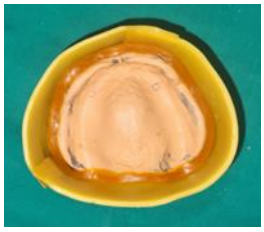
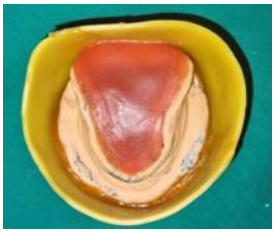

Fig.5 Final Impression

Face bow transfer was done using arbitrary face bow (earpiece type) (Fig.7) and transferred to the Hanau Wide-Vue Articulator (Fig.8),

Fig.6 Jaw Relation

Fig.7 Face Bow

Fig.8 Face Bow transfer

The lower rim was removed and was specially designed (Fig.9), with a compound rim on it. Neutral zone approach to denture fabrication. The rim was relatively very narrow in the buccolingual dimension (Fig.10). The rim was built right on the central line of the alveolar ridge, and they were then carefully examined and adjusted in the patient's mouth to reduce any overextension.

Fig.9 Wax rim removed

Fig.10 Compound rim and replaced

Recording Neutral Zone- The denture base should be stable during speaking, swallowing, and mouth opening. To record the neutral zone, the patient should be in a comfortable, upright position with the upper wax rim inserted. Zinc oxide eugenol impression paste material was loaded on the buccal and lingual sides of the compound occlusal rim and then placed into the patient's mouth. Before the material sets, the patient was instructed to perform functional movements such as licking lips, sucking, puckering, smiling, grinning, swallowing, pronouncing some words, or combination of these. These actions should be repeated until the material has set. After setting, the displaced excess material was removed (Fig. 11). The extension and accuracy of the neutral zone impression area was assessed.

Fig.11 Neutral zone recorded

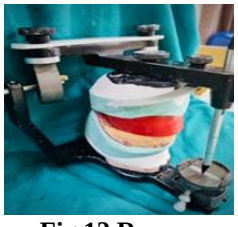

Fig.12 Re-assessed

Plaster Jig was fabricated to confine the area (Fig.13a), the recorded impression was removed, Wax was poured into the space to make a wax rim, which exactly represented the neutral zone (Fig.14).

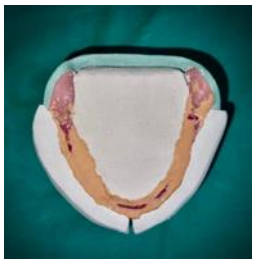
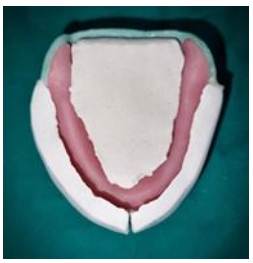

Fig.13 a), b) Fabrication of plaster jig

Fig.14 wax rim fabrication

The artificial teeth were positioned within the matrices (Fig.15). Anatomic teeth were chosen and arranged with lingualized occlusion, where the maxillary palatal cusps articulate with the mandibular central fossae. This setup helps in providing stability during function and reducing lateral forces. Intentional crowding was done to mimic the naturality. A wax try-in was performed to verify the fit, occlusion, and esthetics. Necessary adjustments were made to ensure patient comfort and satisfaction (Fig 16).

Fig.15 Arranging teeth

Fig.16 Try-In

The final mandibular denture was processed and delivered (Fig. 17). An external impression can be performed at this stage to refine the final wax contour of polishing surface if needed. After processing, finishing, and polishing, the dentures were delivered to the patient and tested for stability, retention, intercuspal relation, esthetics, and phonetics. These dentures were followed up for more than 1 year and the new definitive complete dentures successfully improved stability, comfort, and function for the patient. The neutral zone technique described in this article is simplified to record the physiological dynamics of oral and perioral muscle functions.

Fig.17 Final Insertion

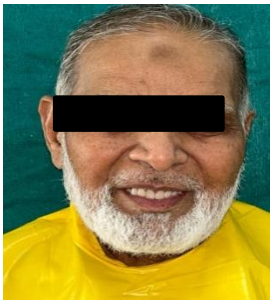

Fig.18 Post-OP

RESULTS

The patient reported significant improvement in denture stability and comfort. The neutral zone technique effectively utilized the muscle dynamics to place the denture in the most stable position, while the lingualized occlusion provided balanced and efficient mastication. The patient was satisfied with the overall fit and function of the new mandibular denture[10]

DISCUSSION

The combination of the neutral zone technique and lingualized occlusion offers a promising solution for edentulous patients with compromised ridge anatomy. By considering the muscle forces and providing a balanced occlusal scheme, this approach can significantly enhance the success rate of mandibular dentures[12].

CONCLUSION

This case report demonstrates the effectiveness of the neutral zone technique combined with lingualized occlusion in improving the stability, retention, and function of mandibular dentures. Further studies with a larger sample size are recommended to validate these findings.

Declaration by Authors

Acknowledgement: None

Source of Funding: None

Conflict of Interest: None

REFERENCES

1. Beresin VE, Schiesser FJ. The neutral zone in complete dentures. J Prosthet Dent 1976;36(4)356-67.
2. The glossary of prosthodontic terms. J Prosthet Dent 2005; 94:10-92.
3. Russell AF. The reciprocal lower complete denture. J Prosthet Dent 1959;9(2):180-190.
4. Makzoumé JE. Morphologic comparison of two neutral zone impression techniques: A pilot study. J Prosthet Dent 2004;92(6):563-8.
5. Tinker A. Ageing in the United Kingdom — what does this mean for dentistry? Br Dent J 2003;194(7): 369–372.
6. Beresin VE, Schiesser FJ. The neutral zone in complete and partial dentures. Mosby Co., Page 15; ed 2: 1978.
7. Basker RM, Harrison A, Ralph JP. A survey of patients referred to restorative dentistry clinics. Br Dent J 1988;164(4):105–108.
8. Atwood DA. Post extraction changes in the adult mandible as illustrated by micrographs of midsagitall sections and serial cephalometric roentgenograms. J Prosthet Dent 1963;13(5):810–824.
9. Ohkubo C, Hanatani S, Hosoi T, Mizuno Y. Neutral zone approach for denture fabrication for a partial glossectomy patient: A clinical report. J Prosthet Dent 2000;84(4):390–393.
10. Fish EW. An analysis of the stabilizing factors in full denture construction. Br Dent J 1931; 52:559–570.
11. Fish EW. Using the muscles to stabilize the full lower denture. J Am Dent Assoc 1933; 20:2163–2169.
12. Lott F, Levin B. Flange technique: an anatomic and physiologic approach to increased retention, function, comfort and appearance of dentures. J Prosthet Dent 1966;16(3):394–413.

How to cite this article: Diksha Verma, Sunil Kumar M.V, Rajesh Kumar, Krishan Kumar. Stabilizing mandibular dentures: integrating neutral zone and lingualized occlusion - a clinical case study. *Int J Health Sci Res.* 2024; 14(12):87-91. DOI: *10.52403/ijhsr.20241210*

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