

NEUTRAL ZONE –A CASE REPORT

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Abstract

Long term denture wearers often pose a problem due to lack of stability of their mandibular complete dentures because of high resorption of lower edentulous ridge. It is the duty of a prosthodontist to rehabilitate those patients to near normal function, irrespective of the clinical picture. This paper presents neutral zone technique in a functional approach to overcome the problem of instability of lower dentures caused in patients by a more potential musculature or in patient who have dimensional or altered neuromuscular control.

Key Words: Neutral Zone, Poor Neuromuscular Coordination, Over Musculature.

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 the 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 skill-fully designed and expertly constructed. The coordination of complete dentures with the neuromuscular function is the foundation of successful, stable denture.¹ When all of the natural teeth have been lost, there exists within the oral cavity a void which is the potential denture space. 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.²

Incorrect tooth placement and arbitrary shaping of the polished surfaces may have an adverse effect on the success of the prosthesis. This is particularly true for patients with reduced mandibular residual ridges, yielding flat or concave foundations due to severe bone resorption. The unstable lower complete denture is a continuing problem for our profession.³ 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.⁴

Case Report

Here in this case report the management of a mandibular resorbed ridge with neutral zone technique using low fusing compound has been described. A female patient aged about 52 years reported with a completely edentulous and severely resorbed mandibular ridge. (Figure 1)

Primary impressions of the upper jaw was made with impression compound and lower jaw was made with admixed technique (3 parts of green stick compound and 7 parts of impression compound) in a 65degree C water bath and the model was poured.



Figure 1: Lower resorbed mandibular ridge.

Maxillary secondary impression was made and a wax rim and a lower special tray were constructed. The special tray was a plate of acrylic adapted to the lower ridge, without a handle, with spurs or fins projecting upward toward the upper arch. (Figure 2)



Figure 2: Special trays with spurs

These help with the retention of the low fusing compound. The lower special tray with the softened low fusing compound in a 65° C water bath. was placed in the patient's mouth; this tray was very carefully adjusted in the mouth to

be sure that it was not overextended and remained stable during opening, swallowing, and speaking. The patient was then asked to talk, swallow, drink some water, etc. After 5–10 min, the set impression was removed from the mouth and examined. (Figure 3)



Figure 3: Neutral zone recorded

The internal and external muscle groups have been brought into play, moving them through their respective action paths. In doing so, reciprocating pressures have been exerted upon the compound, which had gradually molded into a state of neutral balance and become centrally inert in relation to all of the complex forces acting upon it. After a tentative vertical dimension and centric relation have been established, the final impression was made with a closed-mouth procedure. Only when the final impressions were completed were the occlusal vertical dimension and centric relation finally determined.

The neutral zone impression so obtained was placed on master model, location grooves were cut on the Master cast and was covered with a silicone putty index around the impression on both the labial and lingual sides. (Figure 4)



Figure 4: Putty index with lower record base

The compound occlusal rim was then removed from the base plate and the index is again replaced neutral zone space can be preserved using putty index and teeth were arranged exactly following the putty index. (Figure 5) The position of the teeth was checked by placing the index together around the wax try-in. Once the waxed up dentures were ready, they were checked in the patient's mouth for esthetics, phonetics and occlusion. Once the try in was

deemed satisfactory, the dentures were processed, finished and inserted. (Figure 6)

Discussion

Fish pointed that out of the three surfaces of the denture the polished surface is bounded by the tongue and the cheeks. These are involved in normal physiologic movements such as speech, mastication, swallowing, smiling, and laughing.



Figure 5: Teeth arrangement with putty index



Figure 6: - Final prosthesis.

Hence, the fabrication of the denture must be in harmony with these functions.

Technique described here is intended to emphasize and illustrate the clinical value of recording the physiologic dynamics of oral and perioral muscle function and of using this information to develop complete denture contours and denture tooth positions. Arranging artificial teeth within the neutral zone achieves two important objectives:

1. Prosthetic teeth do not interfere with normal muscle function; and
2. 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.

Conventional methods used for these patients result in denture contours that may not facilitate prosthesis stability against expected oral and perioral muscle function. This may lead to ill fitted prosthesis which might be improper and uncomfortable for the patient.

From the technique illustrated in the paper we came to know that, whatever the materials are used, it seems that two factors cannot be overlooked: The impression of the neutral zone must be recorded at the occluso-vertical dimension determined at a previous visit using an occlusal rim. The material should be reasonably slow setting to permit the oral musculature to shape it to the appropriate contour and dimensions.

Conclusion

Neutral zone technique is one of the best alternative techniques in case of highly atrophied mandibular residual ridge, but it is rarely used because of the extra clinical step involved and complexity. Complete and partial denture failures are often related to non-compliance with neutral zone factors. Thus the neutral zone must be evaluated as an important factor before one rates any changes in arch form or alignment of teeth.

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. Makzoum 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 midsagittal 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.
13. Fahmi FM. The position of the neutral zone in relation to the alveolar ridge. *J Prosthet Dent* 1992;67(6):805–809.

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