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Case Report

An easy technique to record Neutral zone: A case report

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***ABSTRACT*:**
Neutral zone is defined as that area or position where the forces between the tongue and cheeks or lips are equal. We should not be dogmatic and insist that teeth be placed over the crest of ridge, buccal or lingual to the ridge. Rather teeth should be placed as dictated by the musculature, and this will vary for different patients. The influence of tooth position and flange contour on denture stability is equal to or greater than any other factor. Recording neutral zone is most required for patients where there is a highly atrophic ridge. Various materials like tissue conditioners, Impression compound, Waxes, Impression plaster have been advocated to record neutral zone which has their own advantages as well as disadvantages.
Key words: Neutral Zone, Technique

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INTRODUCTION

Neutral zone is defined as 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.[1] The fundamental concept of the neutral-zone in complete dentures is to establish an area in the edentulous mouth where the teeth should be placed so that the muscular forces will tend to stabilize the denture rather than unseat it.The soft tissues that form the inner and outer boundaries of the denture space exert forces which greatly influence the stability of the dentures. Often, this zone is ignored while fabrication of complete dentures leading to unstable and unsatisfactory dentures which are not harmonious with the normal neuromuscular function.[2] Neutral zone concept is useful where the ridge is highly atrophic. This case report describes an easy method of fabrication of complete dentures for a patient with poorly formed both maxillary and mandibular ridge.

CASE REPORT

A 68-year-old male patient reported to the Department of Prosthodontics, H.P. Government Dental College and Hospital, Shimla with a chief complaint of old unstable maxillary and mandibular complete denture. The patient was advised fabrication of complete denture with neutral zone technique as other treatment options like implant supported complete denture was not feasible due to the age and cost factors. Fig. 1

Fig. 1 Frontal profile of patient

PROCEDURE

A detailed examination was completed and his previous dentures were evaluated for retention and stability. The old denture was found to be unstable and was not retentive. As the old denture cannot be relined. The lower ridge was highly resorbed whereas maxillary ridge was slightly resorbed posteriorly on the both sides (Figs 2A and B)

Fig 2 a Maxillary ridge

Fig 2 b Mandibular ridge

1. The primary impression was made using Mc-cords technique (3:7 by weight) using impression compound.[3]

Fig 3A Primary impression: Maxillary arch

Fig. 3B Primary impression: mandibular arch

2. Closely fitting custom tray was fabricated and the border molding was performed with low fusing type I impression compound (green stick) to represent muscle activity, recording functional depth and width of the sulcus.

3. The final wash impressions were made with a low viscosity mucostatic zinc oxide eugenol paste on light body addition silicone with a window technique [Zafarullah khan technique] for the maxillary arch since the maxillary alveolar ridge had a flabby anterior region and conventional wash impression with zinc oxide eugenol for mandibular ridge.[4] (Figs.4).

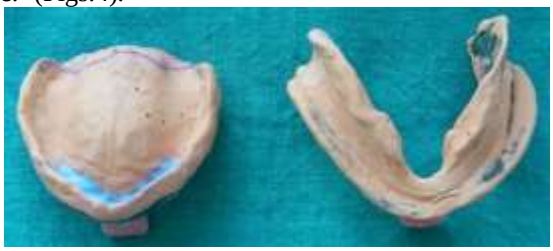

Fig. 4 Final impression

4. Impressions were evaluated for accuracy and master cast was poured with dental stone. Both the casts were then duplicated in reversible hydrocolloid duplicating material (Agar-Agar).

5. The wax record rims were then constructed and assessed for extension, comfort and stability. Jaw relation was carried out conventionally to record vertical and centric relation and the cast was articulated on mean value articulator.

6. Then the other set of duplicate record rims made up of type I and type II impression compound in the ratio of 7:3 by weight were fabricated on the new denture bases on duplicate master cast.

7. First the mandibular rim was adjusted at the same vertical height with maxillary rim maintaining the vertical stop.

8. Before recording the neutral zone the patient was made to sit in a comfortable, upright position with the head unsupported.

9. The mandibular compound rim was then inserted into patient's mouth and checked for comfort, proper extension and stability, then he was asked to perform a series of actions designed to simulate the physiological functioning, such as asking the patient to smile, grin, pout/purse lips, count from 60 to 70, talk aloud, read newspaper loud, pronounce the vowels, sip water, swallow, slightly protrude the tongue and lick the lips. These actions are repeated for 10 minutes until the compound became hard.[5,6]

Figure 4a: Mandibular record base with impression compound conformed to patient's neutral zone.

Fig 4 b: Mandibular record base with impression compound conformed to patient's neutral zone.

10. Now the maxillary rim was adjusted at the same vertical height with mandibular rim maintaining the vertical stop. Same actions were repeated again for 10 minutes thereafter jaw relation records are made and rims sealed with groove cut on mandibular compound rim. Fig5a and 5b.

Fig 5a: Jaw relation recorded and transferred to the articulator.

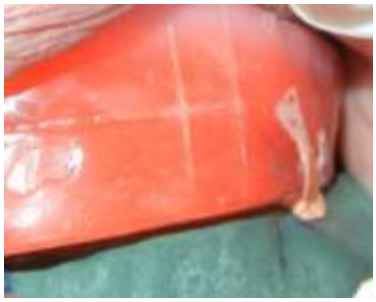

Fig 5b: Jaw relation recorded and transferred to the articulator.

11. Jaw relation records mounted on a mean-value articulator. Fig. 6

Fig. 6 Rims mounted on mean value articulator.

12. The addition silicone (putty) Indices were made around the molded impression compound rims (Figs 7).

Fig. 7. Putty index around molded compound rims

13. Then the molded impression compound rims were removed from the base plate and the index was replaced.
14. The indices preserved the space of the neutral zone. Molten wax then replaces the space occupied by impression compound. This newly formed wax rims were then replaced on the articulator.

Fig. 8 Newly formed wax rims

15. Teeth arrangement was done exactly following the indices. Following which the wax is removed, just enough wax is left to hold the tooth in position. During the setting up of the teeth their position was checked by putting the indices together around the wax rims. (Fig 9)

Fig 9 Teeth arrangement according to the index

16. Trimming of the artificial posterior teeth has to be done to accommodate it on the narrow space of neutral zone followed by wax try-in.

After satisfactory wax try-in medium body addition silicone was applied to the facial and lingual surface of waxed-up dentures and a physiologic molding was made so that the external surfaces are functionally compatible with muscle action.

Fig 10 waxed dentures with physiologic molding according to the muscular forces

17. The dentures were processed and finished in a routine manner. Polishing was done lightly so as to preserve the contour of the flanges.

Fig 11 Final prosthesis delivery

18. Dentures were finally inspected and clinical remounting was done to eliminate minor occlusal errors.

DISCUSSION

The ultimate aim of prosthodontics is to restore form, function and esthetics. With advancement of alveolar bone resorption the maxillary ridge moves lingually and mandibular ridge moves buccally.[7,8] Atwood divides the factors related to the rate of resorption into the categories of anatomic, metabolic, functional and prosthetic.[9] Our understanding of these factors is imperfect and it is well known that resorption is inevitable despite our best preventive efforts. The neutral zone approach determines the placement of teeth at a proper position after resorption has occurred.[10] It is opinion of many that the maxillary anterior teeth should be placed close to the position of the natural anterior teeth.[11] If this is not done then esthetics and phonetics might be compromised. The maxillary teeth must be set to according to the patient desires. Neutral zone registrations may dictate that the mandibular anterior teeth be placed lingually by the lower lip.[13] This usually can be accomplished without sacrificing esthetics. When the patient functionally molds the maxillary and mandibular rim into the area of the neutral zone, the result is a more stable record base.[12,13]

CONCLUSION

The use of the neutral zone concept for denture fabrication has been advocated since the 1930s. The neutral zone is an alternative technique for the construction of complete dentures on highly atrophic ridges. It is useful in cases where dental implants are not feasible and denture duplication would be inappropriate. The aim of the neutral zone is to construct a denture in muscle, as muscular control will be the main stabilizing and retentive factor during function. The technique is relatively easy, simple but there are increased chair time, laboratory time and enhanced treatment costs.

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