NEUTRAL ZONE: A KEY TO SUCCESS TO AGED POPULATION

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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 in cases of the atrophic and highly resorbed ridges. Teeth should be placed as dictated by the musculature, and this will vary for different patients. Therefore, neutral zone technique is the most effective way of improving the stability of complete denture especially in such cases. The technique involves recording neutral zone 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 such cases mentioned above for improving denture stability.

Keywords: Atrophic Ridges, Neutral Zone, Unstable Denture.

Introduction

The neutral zone 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 main aim 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 favorable for stability and retention.[2]

Case Report

A 70 year aged male patient reported to the department of Prosthodontics of Saraswati Dhanwantari Dental College and Hospital with complete edentulous maxillary and mandibular arches. He wanted replacement of the same. On clinical examination it was found that mandibular arch was severely resorbed.

The primary impression of the maxillary were made with the help of impression compound and mandibular were made using Mccords technique, mixture of green stick and impression compound. (7: 3) (FIG1).The cast were poured with dental plaster. On the diagnostic cast custom tray was fabricated. Secondary impression was made on custom tray with zinc oxide eugenol impression material. While making secondary impression the patient was asked to do all the functional movements. The secondary impression was poured with dental stone.The record bases were fabricated with cold cure acrylic resin and occlusal rims with modelling wax and vertical and centric jaw relations were recorded and mounted.

Making Neutral zone impression:

Before making the neutral zone impression, the patient was made comfortable in an upright position with the head unsupported. Maxillary wax rim was inserted in the mouth and reassessed for support & occlusal plane. The green stick and impression compound in ratio(7:3) was softened in a 65^0 C water bath. The softened compound was kneaded and a roll was formed according to the crest and was adapted to the retentive loop at established vertical dimension. The attached roll of compound was reheated in the water bath and was carried into the patient's mouth[2 3 4]. The patient was asked to perform a series of actions like swallowing, speaking, sucking, pursing lips, pronouncing vowels sipping water and slightly protruding the tongue several times which simulated physiological functioning (FIG2). These actions molded the material by muscle activity. After 10mins, the set impression was removed from the mouth. The neutral zone impression obtained was placed on the master model, locating grooves were cut on the master cast and was covered with a silicone putty to form the index around the impression on both the labial and lingual sides .The compound occlusal rim was then removed from the base and the index is replaced. The index would have preserved the space of the neutral zone. Teeth arrangement was done exact following the index. The position of the teeth was checked by placing the index around the waxed denture (FIG 3).

Completion of Denture: The waxed up dentures were placed in the mouth and patient was asked to repeat all the movements previously mentioned. The denture was stable after all the movements. Aesthetics, phonetics and occlusion were assessed. The dentures were then processed as a conventional denture. Finishing and polishing of denture was done carefully so that the contour of the polished surfaces remained unaltered. On insertion of denture, minor occlusal discrepancies were corrected. Dentures provided enhance retention and stability during function because they are in harmony with their surrounding musculatures (FIG 4) (FIG 5)

(FIG 1) Primary Impression with Mc Cords technique (FIG 2) Recording the neutral zone

(FIG 3)The artificial teeth setting done in the neutral zone

(FIG 4 & FIG 5) Post Treatment

Discussion

Reduced stability and retention are more commonly associated with mandibular complete denture. This isbecause the mandible resorbs at a greater rate than the maxilla and has less surface area for retention and support. Dental implants may provide stabilization 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]Thefunctions of lips, cheek and tongue and their controlling action on the dentures during function is a fundamental principle behind the neutral zone concept.

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. The neutral zone technique helps us to construct denture in harmony with muscle balance, as muscular control will be the main stabilizing and retentive factor during function. The technique is relatively simple but requires increased chair time and laboratory costs.

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