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Prosthetic rehabilitation of patient with severely resorbed mandibular ridge by using neutral zone and monoplane occlusion

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Abstract

Achieving stability in severely resorbed ridges is one of the most challenging task. However, neutral zone technique can be employed in such case to achieve stability by placing teeth in harmony with the neuromusculature, since complete denture is more likely to be stable if located within this "denture space" or "neutral zone". The stability of mandibular complete denture base can be enhanced through monoplane occlusion, as it reduces horizontal vectors of force at occlusal contact. This article describes the combination of both i. e. neutral zone technique and monoplane plane occlusion to achieve optimum stability in mandibular teeth.

Keywords: denture stability, low fusing compound, neutral zone monoplane occlusion

Introduction

Success of complete denture therapy for patients with severely resorbed residual alveolar ridges is based on placement of teeth in harmony with the normal neuromuscular function which is the neutral zone. The concept of neutral zone in complete denture was introduced by Sir E. Wilfred Fish in 1931. He stated that each tooth assuming a position that is the resulted of various forces acting on it^[1].

Weinberg suggested that the posterior teeth should be arranged such directly over the crest of the ridge since occlusal pressure falls close to the fulcrum resulting in less or no torque^[2]. Pound stated that invariably arranging the teeth over the crest of the residual ridge accentuates facial deformity, provoking phonetic problems and making food manipulation difficult during deglutition. "Tooth over the ridge" concept is a fallacy and has possibly been a powerful influence in retarding the advancement of esthetics and in discouraging research in the fine arts of prosthesis"^[3].

Payne^[4] proposed the idea of placing of the artificial teeth as the natural teeth. Beresin and Schiesser^[5] have suggested that the denture teeth should be arranged in the neutral zone, where during function the outward force generated by the tongue are neutralized by the forces of cheek and lips pressing inward. The greater the ridge loss results in the smaller denture base area leading to less influence the impression surface area on the stability and retention of the denture. As the area of the impression surface decreases and the polished surface area increases, tooth position and contour of the polished surface become more critical.

Zero degree teeth used to create monoplane occlusion enhances the stability of the mandibular denture^[6].

This article presents a case report of prosthetic rehabilitation of patient with severely resorbed mandibular ridge by using neutral zone and monoplane occlusion.

Case

A 65year old reported to department of Prosthodontics and Crown & Bridge and Implantology with the complaint of missing teeth and replacement of the same. On examination, it was found that both the arches were edentulous and the mandibular ridge was severely resorbed. (fig.1)

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**Fig 1:** Edentulous maxilla and mandible

Patient also gave a history of denture wearing since last 10years. On examination of the existing dentures, it was found that there was attrition of teeth and reduced vertical dimension so a treatment was planned for fabrication of complete dentures with help of neutral zone technique.

Primary impressions were made using me cord's technique i.e., seven parts low fusing compound and three parts impression compound. The secondary impressions were made in close fitting zinc oxide eugenol impression material. The obtained impressions were poured in dental stone and stone cast were made on to which occlusal rims were made and vertical jaw relations were recorded.

After obtaining the VDO of the patient articulation was done. The lower occlusal rim was removed and two vertical stops of self-cure acrylic along with wire loops for retaining the neutral zone recording material were placed. Before making the neutral zone impression material patient is asked to sit in upright position with head supported. The low fusing compound along with impression compound was softened in 65°C water bath. The softened compound was knead and rolled in shape of crest to attach it to the lower record base. The attached roll of compound was reheated and place into the patient's mouth. With record base firmly seated, the patient was asked to perform a series of action like swallowing, sucking, pursing lips, pronouncing vowels, sipping water and slightly protruding of the tongue several times which stimulated physiological functioning. During functioning, the softened material was moulded to neutral zone by force exerted by lips, cheeks and tongue.

**Fig 2: a & 2b** putty index of the record and lower teeth arranged into neutral zone

The compound was cooled and placed back to the mandibular cast attached to the articulator. Silicone Putty index was made. The teeth were arranged according to the index so obtained. Zero degree teeth are selected to establish monoplane occlusion.

**Fig 3:** try-in

The trial dentures were checked in patient's mouth for aesthetics, phonetics and occlusion. The trial dentures were processed and the contours recorded previously were unaltered during finishing and polishing of the dentures.

**Fig 4:** complete denture insertion

During denture insertion, the dentures were minutely checked for minor errors.

Discussion

The neutral zone is the specific region where the function of the musculature will not unseat the dentures and the force generated by the tongue are neutralised by the force generated by lips and cheeks. The muscular forces in this region aid in the retention and stability of the denture rather than dislodging the dentures during function. The influence of the tooth position and contours of the denture is utmost important for the stability of the denture [7].

Various materials are used to record neutral zone with their specific advantages and disadvantages. Kursoglu [8], Beresin and Schiesser [9] recommended tissue conditioners for neutral zone. Since the material does not have body, it is difficult to handle the material. Impression plaster advocated by Johnson is messy and cumbersome to use and fracture fragments of plaster can be swallowed by patient while performing functional movements. So, owing to the ease of handling and cost effectiveness, low fusing compound along with impression compound was used to record neutral zone.

Makzoume [11] found significant differences in the position of neutral zone during speech and swallowing. During swallowing, the neutral zone was more lingual compared to conventional complete dentures. The records so obtained provided good facial support, proper positioning of the posterior teeth which allows sufficient tongue space.

Summary

The neutral zone concept along with monoplane occlusion significantly increases retention and stability of the complete

denture in resorbed regions since it eliminates the dislodging forces acting on the denture to unseat it, with esthetic and functional rehabilitation of the patient.

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