

Case Report

Neutral Zone Approach for Complete Denture Fabrication: A Case Report

Ranjan Kumar¹, Rajesh Khan²¹3rd year PGT, ²2nd year PGT,

Department of Prosthodontics, Dr R Ahmed Dental College and Hospital, Kolkata- 700014.

Corresponding Author: Ranjan Kumar

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ABSTRACT

Primary objective of CD are retention, stability and support and these are dependent on so many factors i.e. surface area of the denture wearing tissue and surrounding muscular force are the most important factor. In case of highly resorbed mandibular ridge it is very difficult to achieve these primary goals. So, neutral zone technique is an alternative approach for construction of complete denture in highly resorbed mandibular ridge. This technique aims to construct a denture that is harmonized with muscle function and surrounding oral structure to provide the stability of lower denture. The aim of this paper is to present a case report of complete denture fabrication applying the concept of neutral zone.

Keywords: Neutral zone; Atrophic mandible; Impression Technique; Stability

INTRODUCTION

Stability in lower complete denture is most difficult in patients who have highly resorbed lower edentulous ridges. Multiple changes like alveolar ridge resorption, expansion of the tongue, and laxity of muscles of face occurs due to teeth loss. [1] 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. The most common complain of patients is, about the looseness and discomfort caused by their mandibular complete dentures which is quite difficult task for a prosthodontist to manage. For the success of complete denture, the neuromuscular coordination for the denture wearer is an important factor. [2] 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 to each other. [3]

Highly resorbed mandibular are very challenging for the fabrication of the complete denture. In mandibular ridge resorption occurs from the lingual plate allowing for more space for tongue movement leading to tongue enlargement mainly due to hypertrophy of intrinsic tongue muscle. On the contrary the cheek and lip muscles lost their tonicity with the advancing age. [4] This results in a shift of the neutral zone more towards the buccal and labial sides. [4] Accurate recording of this zone and arranging the teeth in this zone is very important in purely mechanical and leverage point of view for increasing the denture stability.

CASE REPORT

A seventy three year old female patient reported to the Department Of Prosthodontics, Dr R Ahmed dental college

and hospital with the chief complaint of difficulty in chewing food. The patient was edentulous for past nine years and was wearing complete denture prosthesis since then. Patients last set of dentures was ill-fitting and discarded by patient six months back. Since then she was without having any denture. [Picture 1]

Intra oral examination: Clinical evaluation revealed resorbed maxillary ridge [Picture 2], and flat (atrophic) mandibular ridge [Picture 3] and an increased interarch space.



Picture 1: Patient front view



Picture 2: Maxillary arch



Picture 3 Mandibular arch



Picture 4: Mandibular arch primary impression and Maxillary arch primary impression

Clinical Procedure: Impression making: The primary impressions were made using impression compound and metal stock trays [Picture 4], and the cast poured using type II dental plaster [Picture 5]. Border molding was done using low fusing impression compound (green stick) and wash

impression was made with zinc oxide eugenol impression paste [Picture 6].

Mandibular neutral zone impression recorded: Record base was made with selfcure acrylic resin, and occlusion rims were prepared using modeling wax. After the registration of maxillamandibular

relations, the casts were mounted on a mean value articulator. The neutral zone was recorded using mandibular compound occlusion rim. The mandibular wax occlusion rim was removed and retentive wire loops were attached to the record base in the premolar and molar area. Acrylic stents were made in the canine region for determination of the vertical height of the rim [Picture 7]. Kneaded impression Compound was adapted to the denture base.



Picture 5: Primary Cast



Picture 6: Border molding and Impression of upper and lower arch



Picture 7: Occlusal rim and base plate

Mandibular compound rim was softened in hot water and both Maxillary and mandibular record bases were placed in the patient's mouth. The patient was asked to carry out different functional movements like swallowing, sucking, whistling, smiling, licking the lips, and pronouncing vowels. Mandibular compound rim was taken out and Excess compound was trimmed away till the level of the acrylic stents. The compound material was re-softened and replaced in the mouth asking the patient to repeat the functional

movements, so that, the base of the cast was indexed by making notches. Type II dental stone index of this recorded zone was made. The compound rim, the retentive loops and acrylic stents were removed. The dental stone index was replaced on the cast and melted wax was flown to obtain a wax rim in the neutral zone.

Teeth arrangement: First the mandibular teeth were arranged in the neutral zone area, and checked by replacing the plaster index. The maxillary teeth were arranged according to the mandibular teeth.



Picture 8: Teeth setting on articulator



Picture 9: Denture insertion

Follow up: The patient was followed for several months and was highly satisfied with his new denture.

DISCUSSION

The main purpose of any prosthodontic treatment is to restore the form, function, and esthetics. Fish describe the three surfaces of the denture, the polished surface is bounded by the tongue and the cheeks, the occlusal surface articulated with the opposing arch during

function, and the impression surface is in intimate contact with the residual ridge and its adjacent tissue. The complete denture are involved in normal physiologic movements such as speech, mastication, swallowing, smiling, and laughing, hence, it must be in harmony with these functions. Denture fabricated over a severely resorbed mandibular ridge by neutral zone impression technique will insure that the muscular forces aid in the retention and stabilization of the denture rather than

dislodging the denture during function. [5]
The dentures will also have other advantages such as reduced food lodgment, good esthetics due to facial support, proper positioning of the posterior teeth which allows sufficient tongue space.

CONCLUSION

Recording of the Neutral zone is a simple effective noninvasive and economic procedure which improves the denture stability tremendously. This procedure should be performed for all the complete denture resorbed ridge patients either solely or in conjugation with other procedures to improve the denture stability.

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