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# EXPLOITING THE ADMIX TECHNIQUE AND THE NEUTRAL ZONE CONCEPT FOR STABILIZING LOWER COMPLETE DENTURE ON ATROPHIC MANDIBULAR RIDGE- A CASE REPORT

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## ABSTRACT

Construction of complete denture on a severely resorbed ridge is difficult because retention stability and support are compromised in those cases. Modifications in impression technique like usage of Admix [McCord and Tyson] technique and application of certain principles like neutral zone concept improves the stability of the dentures. In Admix [McCord and Tyson] technique a viscous admixes of impression compound and low fusion compound is used to remove any soft tissue fold and smoothen them over the mandibular bone. The neutral zone was recorded to determine the space within which the denture could be seated without being subjected to excessive displacing forces from the surrounding musculature. This is a clinical case report of the construction of complete dentures using Admix [McCord and Tyson] technique and neutral zone technique.

## INTRODUCTION

The mandibular bone resorbs at a greater rate than the maxilla. Minimal residual alveolar ridge available for denture construction often leads to compromised retention and support, leading to pain and looseness being the most common complaint in complete denture wearers.[1]

The neutral zone technique has proven to be one of the most effective techniques in denture construction for patients with repeated failing, unstable, un-retentive lower complete dentures. The role of the polished surfaces on retention and stability was first described by Sir

Wilfred Fish in 1931 where he also described how dentures should be constructed in the 'dead space', which now is referred to as the neutral zone.[2,3]

In order to construct dentures which are functionally superior during chewing, swallowing, speaking etc. determination of a proper tooth position, fit and contour of the polished surfaces is vital. As ridge resorption continues the role of lip support on the stability of the denture becomes more important. Neutral zone technique ensures muscular efficiency and harmony.

Other advantages of this technique are

- Improved stability and retention
- Placement of Posterior teeth provides sufficient tongue space
- Minimal food entrapment in the molar region
- Improved aesthetics due to better facial support.[4]

## CASE REPORT

A 63 year aged male patient reported with complete edentulous maxillary and mandibular arches. He wanted the replacement of the same. On examination, it was found that maxillary [Fig-1] and mandibular [Fig- 2] arches were severely resorbed. Macroglossia was also observed. The treatment plan decided for the patient was the fabrication of a complete denture combined with neutral zone concept to enhance the retention and stability of dentures. Various materials that are available for the fabrication of complete denture were explained to the patient and considering the patient's priorities in mind, the following treatment objectives were planned.

- To rehabilitate the patient with complete denture therapy.
- To achieve maximum stability, comfort, and function of the prosthesis
- To locate the neutral zone and accordingly arrange the denture teeth
- To minimize the ongoing diminution of the residual alveolar ridges.

### First appointment

**Clinical Procedure:** A thorough case history of the patient was taken and radiographic evaluation of the bone was made using Orthopantomograph. The patient was explained with the procedure and informed consent was taken. The primary impression was taken using irreversible hydrocolloid impression material (alginate).

**Laboratory Procedure:** The impression was poured with Type III gypsum product (dental stone) and the primary cast was obtained. Modified Boucher's wax spacer was adopted over the primary cast and a self-cure acrylic special tray was made.

**SECOND APPOINTMENT**

**Clinical Procedure:** The acrylic special tray was evaluated in the patient's mouth for the proper extension of the tray. It was made sure that the tray is uniformly 2mm short of the sulci. Conventional border moulding was done for the maxilla using low fusing impression compound and a secondary impression was taken with Polyvinyl Siloxane Light body material. [Fig 4].

For the mandibular arch, the border moulding was done with the Admix of type I and type II impression compound (McCord and Tyson's technique). The special tray was loaded with the Admix material and the tray was inserted in the patient's mouth and all the necessary movements were performed. [Fig-5] The tray was removed once the material was set and checked for the extensions. Upon satisfactory extensions, scraping of the impression was done in order to provide space for the secondary impression material. The tray was loaded with the addition silicone light body material and placed in the patient's mouth and all the movements were repeated. Once the material was set the tray was removed from the patient's mouth. [Fig- 6].

**Laboratory Procedure:** Beading and boxing of the secondary impression was done and the impression was poured with dental stone. Once the material was set the master cast was obtained. Trial denture bases were made on the master casts and wax occlusal rims were made.

**Third appointment: Jaw relation and Recording the Neutral Zone**

**Clinical Procedure:** Jaw relation was performed using the wax occlusal rims. The maxillary occlusal rim was adjusted so that it is parallel with the interpupillary line, anteriorly and Ala-Tragus line, posteriorly. The Vertical height was determined by the free way space. Centric relation of the patient was obtained.

**Laboratory Procedure:** Mounting of the casts was done on an articulator. Wax in the premolar region was removed and filled with cold-cure acrylic resin. This acts as a vertical stop admixed material.

**Clinical Procedure:** The denture base with admix material occlusal rim was softened and put in patient's mouth. All the necessary functional movements such as swallowing, whistling, smiling and making of the 'S' sound were done. Once the material was hardened, it was removed and the denture base with the recorded material was kept back on the articulator to check for loss of vertical dimension. No change of vertical dimension was observed.

**Laboratory Procedure:** The denture base was kept on the master cast and Condensation putty index was made around the occlusal rim [Fig- 7]. Once the putty was set, the Admix material was substituted with modelling wax. Lines corresponding to the midline of the ridge were drawn [Fig- 8]. Mandibular teeth were arranged first. They were arranged in this zone [Fig- 9]. Maxillary teeth were then arranged according to the mandibular teeth. The buccolingual position of the teeth was determined with the putty index which enabled to confine the teeth in the neutral zone . Finishing and carving were done.

**Fourth appointment**

**Clinical Procedure:** wax try-in was done and dentures were evaluated for the stability, speech, and esthetics. [Fig-10].

**Laboratory Procedure:** Upon the patient's informed consent, Acrylisation of the try-in denture was done with heat cure polymethyl methacrylate. Finishing and polishing were done.

**Fifth appointment**

Denture insertion was done and post insertion instructions were given. The patient was recalled after 24 hours as well as after 1 week. [Fig-11].

Fig- 1


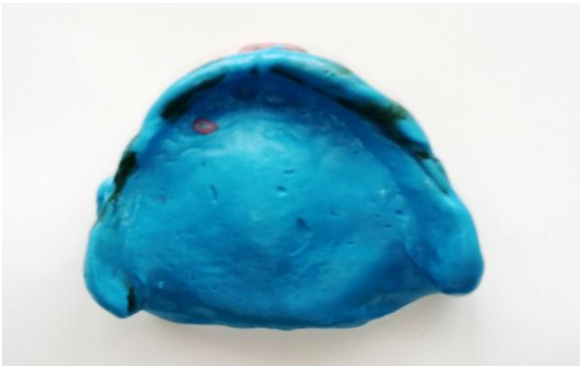

**Fig 3.**

**Fig-4.**

**Fig-5.**

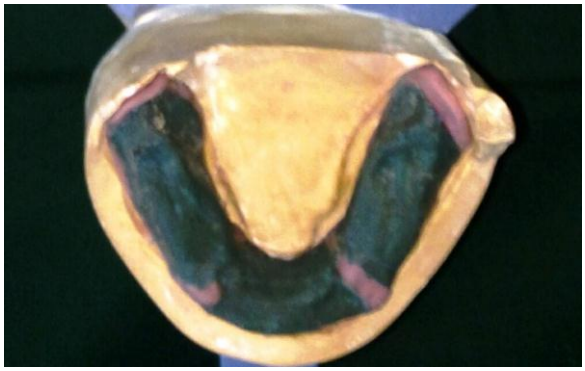

**Fig-6.**

**Fig-7.**

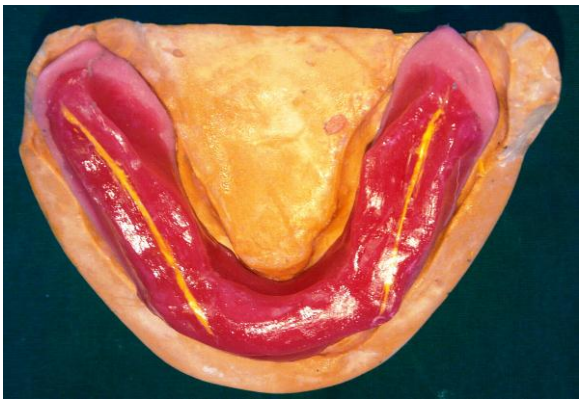

**Fig-8**

**Fig-9.**

**Fig-10.**

**Fig 11.**

## DISCUSSION

Complete dentures are given to the fully edentulous patients to restore the lost functions (chewing, speech) as well as esthetics. The success of complete denture therapy is determined by the satisfaction of the patient. Retention, stability, and support of the dentures provide satisfaction to the patients. Retention, stability, and support are determined by various factors, most importantly by the impression of the edentulous arches.[5]

Atwood's class IV mandible poses difficulty to the dentist because of the anatomical limitations. In these situations, the clinician has to advocate certain pre-prosthetic procedures to manage the severely resorbed ridge. Surgical reconstruction like vestibular extension procedures, osteotomy procedures, alloplastic grafts, autologous overlay grafts, and implants

have been advocated.[6,7] These procedures are not always feasible because of the patient's medical conditions, and/or financial considerations. The weight of the mandibular denture can be increased by using the cobalt-chromium denture base. However, it increases the number of laboratory procedures as well as the cost of the denture.[8] Usage of modified impression technique such as Admix impression technique described by McCord and Tyson seems to be a solution in such compromised situations. Admix of three parts by weight of impression compound and seven parts by weight of tracing compound is the material used for this technique. The viscous admix of impression compound and tracing compound removes any soft tissue folds and smoothes them over the mandibular bone.[9]

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.[10] The forces that are developed through muscular contraction during the various functions of chewing, speaking, and swallowing vary in magnitude and direction in different individuals. The neutral-zone approach registers the neutral zone to determine the proper placement of teeth after resorption has taken place. · Space within which the denture could be seated without being subjected to excessive displacing forces from the surrounding musculature has been determined by neutral zone mandibular impression. Modelling impression compound was used by Tench et al for the first time to record neutral zone.[4] Although this material is widely used, other materials have also been successfully employed such as tissue conditioners, wax, zinc oxide eugenol impression material, chairside relining material and acrylic resin.[11]

Recording of tongue positions and movement receives close attention in the neutral-zone approach.[4] The effect of tongue size and position do not appear to have as profound an impact on the stability of a maxillary denture as compared to the mandibular denture. Hence the Maxillary neutral zone impression was not recorded. Besides, the position of the mandibular teeth arranged in the neutral zone was used as a guide to position the maxillary teeth in the neutral zone.[12] The dentures should provide the patient with improved facial appearance, stability, and retention during function — as they have been constructed in harmony with their surroundings.

## CONCLUSION

The neutral zone technique is an alternative to conventional techniques while constructing dentures for atrophic mandibular arches where implants and other surgical procedures are not

feasible. Although this technique is relatively simpler, it is not commonly used because it is time-consuming.

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