

Prosthodontics Management to Stabilize the Floating Mandibular Denture

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Abstract

The common problem faced by the dentist in fabrication of complete dentures is the stability of mandibular complete denture in severely resorbed ridge. The neutral zone recording technique is the best method to overcome this problem. It is the zone where the natural dentitions lie and where the artificial teeth should be positioned. This clinical report describes prosthodontic management to get the stability of the denture using neutral zone technique in such mandibular ridge conditions.

Keywords: Floating Dentures; Resorbed Mandibular Ridge; Residual Ridge Resorption; Neutral Zone; Stomatognathic System; Admixed Compound

Introduction

Every human being concern to retain their teeth throughout their entire life for good health and esthetics. In 21st century because of better medical facilities the life expectancy of the population has increased, causing more dental problems including complete edentulous state in older ones.

As a person lost their teeth the stomatognathic system got affected due to multiple factors, one of which is residual ridge resorption. The residual ridge resorption is a chronic, progressive, irreversible situation.

Complete dentures are a mechanical device which should be in harmony with the neuromuscular system to perform various 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.

It is a challenging scenario for prosthodontists to make a stable denture in severely resorbed ridges because it results in dentures with very low retention and stability resulting in floating of denture in mouth.

The neutral zone technique is favourable for these severely resorbed ridges conditions. It is defined as the area in the mouth where during function, the forces of the tongue pressing outwards are neutralised by the forces of the cheeks and lips pressing inwards. The goal of this technique is to place the teeth such that the forces exerted by the tongue and the cheek muscles are nullified and the teeth remain in a safe, protected zone.

Various materials such as impression compound, tissue conditioner, waxes, and impression plaster have been used for recording the neutral zone.

In this clinical technique, admixed material (3 impression compound:1 green stick compound) was used to record neutral zone.

Case Report

A 70 years old male patient, Mr. Rampal was referred to the Department of Prosthodontics, Santosh Dental College, Ghaziabad, with the chief complaint of floating lower denture who wanted to replace it (Figure 1). He has been wearing the denture last 10 years and the present denture was in use for 5 - 6 years.



Figure 1

On intraoral examination, it was found that the lower ridge was severely resorbed (Figure 2). The patient was informed about the options available for his treatment in such conditions which are either implant retained removable prosthesis or conventional removable complete denture with a modified technique. He was also informed about the financial, esthetical and functional viability of the second option.



Figure 2

The preliminary impression of the maxillary arch was made in a non-perforated edentulous metal stock tray using impression compound and mandibular arch in a perforated edentulous metal stock tray with irreversible hydrocolloid (alginate) (Figure 3). The preliminary cast were poured using dental plaster for maxillary impression and dental stone for mandibular impression (Figure 4).

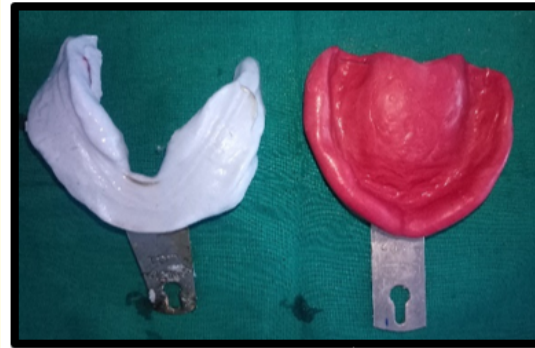


Figure 3



Figure 4

Maxillary custom tray was fabricated using self-cure acrylic resin with 0.5mm wax spacer expect on posterior palatal seal area. Four tissue stops - one on each canine region and one on each molar region. For mandibular custom tray no wax spacer was added and custom tray was fabricated with self-cure acrylic resin with two finger rest on the crestal area of molar region for good stability of custom tray in mouth (Figure 5).

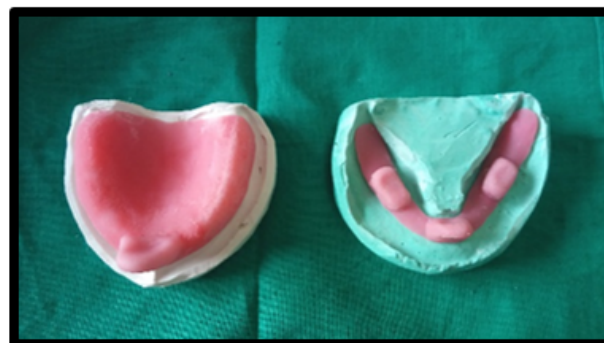


Figure 5

The conventional border moulding procedure was carried out section wise using low fusing compound followed by final impression in zinc oxide eugenol impression paste (DPI) (Figure 6). Impression was poured after beading boxing to get the final cast with dental stone (Figure 7).

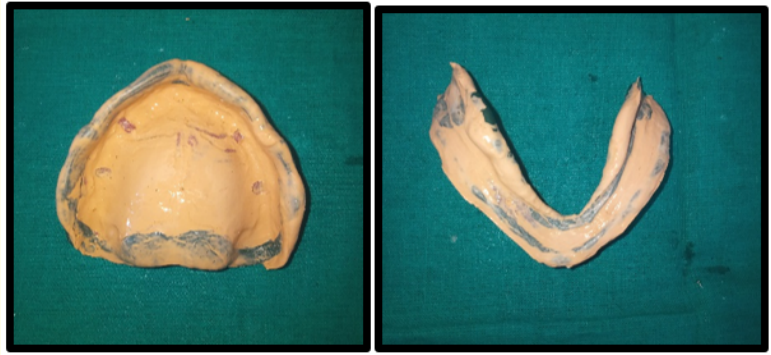


Figure 6

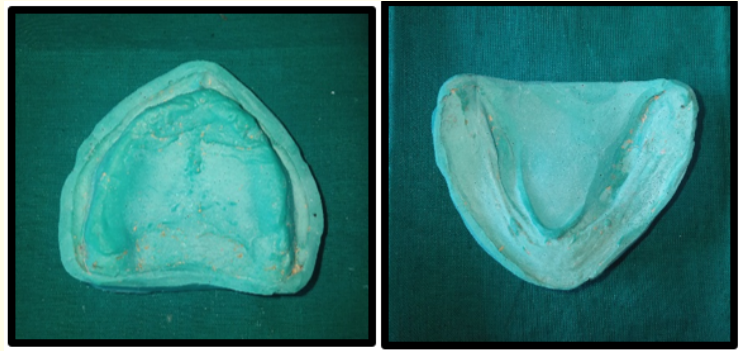


Figure 7

Acrylic resin (cold-cure) record bases and occlusal rims with modelling wax were fabricated. The maxillary cast was mounted on a semi-adjustable articulator (Hanau H-2 series) using the orientation jaw relation record. Vertical height was established and on that vertical relation. The centric jaw relation was recorded and mandibular cast was mounted.

Recording the neutral zone

Mandibular modelling wax occlusal rim was now replaced with admixed compound which was stabilized by using zig-zag made from 21 gauge wire on the finished surface of the denture base which was fixed by self-cure acrylic resin (Figure 8).

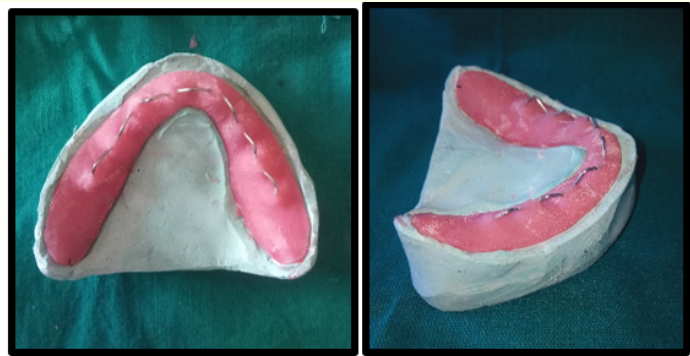


Figure 8

The admixed compound was placed over the retentive zig-zag grooves and softened it and placed carefully in patient's mouth. The patient was asked to perform functional movements like talk, swallow, drinking some water etc. which help in activation of the muscle of the tongue, cheeks and lip, by doing this the admixed compound moulds accordingly to occupy the area of neutral zone. Then the record base with admixed compound is removed and placed in cold water. The rim were transferred again to the mounted casts (Figure 9).

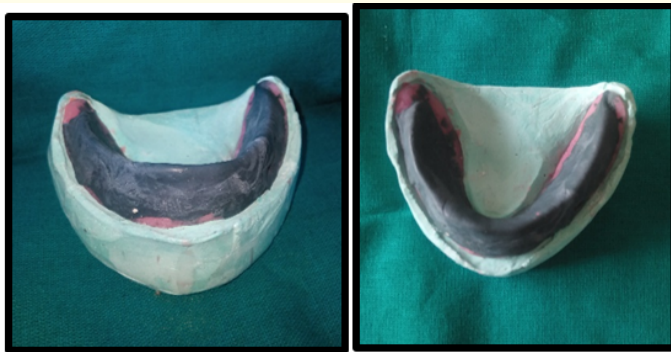


Figure 9

For plaster index two notches were cut on the lingual distal extent of the cast and one notch either side on the molar region and separating media is applied to all over the cast and records. Now beading boxing of the cast was done and dental plaster was poured in that when it was initially set, divided by a centre line so that it will splits into section. When plaster hardens the plaster-index splits into section. The shape of the denture is now permanently register in this plaster index (Figure 10).



Figure 10

The admixed compound was removed to bare the acrylic resin denture base. The plaster index was soaked in water and cooled in water and coated with thin layer of petroleum jelly and assembled with the acrylic resin base in position. The modelling wax was now melted in a container and poured into the index through the space between the labial and lingual indices on the occlusal surface, now it was immersed in cold water. On opening, a hard modelling wax duplicate of admixed compound has been formed for lower occlusal rim (Figure 11).

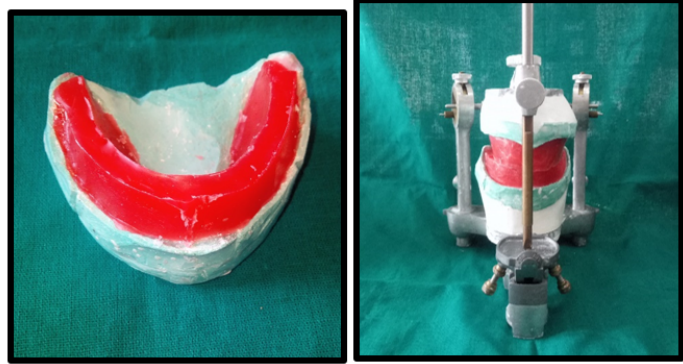


Figure 11

Now all the lower teeth were set first and the position were checked by placing the plaster index. When all the lower teeth have been set, the upper teeth were arranged (Figure 12). The wax trial denture was tried in the patient’s mouth to check appearance and occlusion.



Figure 12

The trial dentures were flask in the usual way. After dewaxing, the mould is packed with DPI heat cure acrylic resin material and cured. After curing selective grinding, finishing polishing of dentures were done (Figure 13).

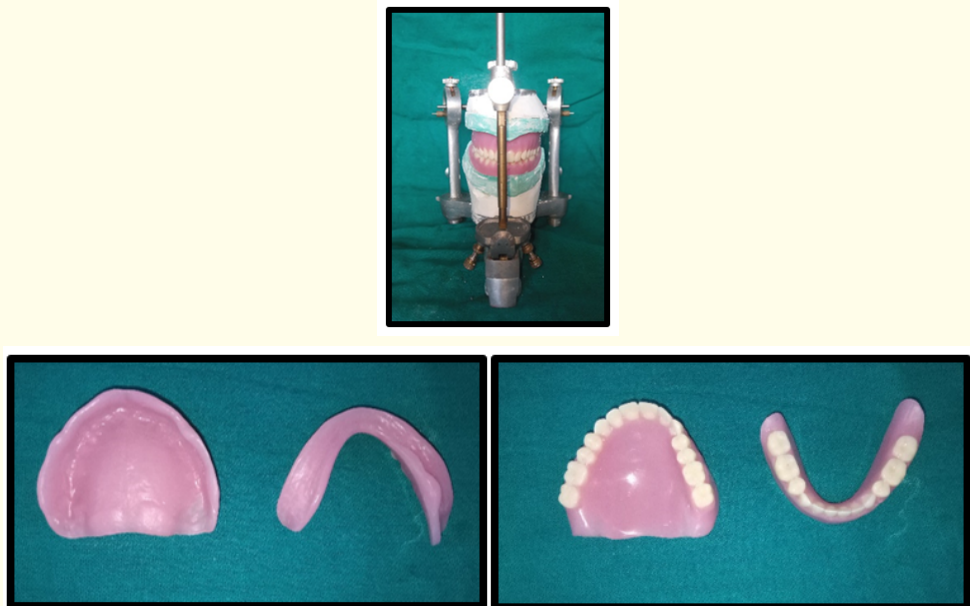


Figure 13

The finished dentures were placed in patient's mouth and checked for any discomfort, esthetic and occlusion and post insertion instructions were given (Figure 14).



Figure 14

Discussion

Removable complete dentures are still the most common treatment option for completely edentulous patients. Severe residual ridge resorption of mandible is seen in of long term edentulism. Clinicians faces difficulty in such cases in stabilizing the mandibular denture. An implant-supported over-denture is another treatment option but was not commonly used because of the cost, duration, and the patient's age. So, for removable complete dentures, to overcome the difficulty of instability various methods are documented in literature, one of which is neutral zone recording technique.

In this case we used the neutral zone recording method to improve the support, retention and stability of the lower denture. The primary impressions were made in impression compound. Other materials for primary impression can be putty but putty system is complex and it requires skills as it sets can cannot be corrected, its cost is also high. So, impression compound we have taken which is thermoplastic material and its manipulation is easy and can be corrected even on a specific area where correction is needed plus it is economical.

Border moulding was done with green stick compound with sectional moulding technique. Polyether can also be used for single step border moulding but as this material is costly and as it sets cannot be corrected so it requires extra skills so green stick material is used as it is economical and is corrected with heat where ever is required.

After making of occlusal rims, jaw relation was recorded and mounting on semi adjustable articulator was done. The mandibular rim was removed and a wire zig was made and attached on the base with the help of cold cure. Then the whole zig was covered with the sufficient amount of admixed compound for neutral zone recording. If we don't put the zig there are chances of collapse of the admixed material. Shekar S Chandra [1] management of a severely resorbed mandibular ridge with the neutral zone technique used the similar wire zig for the support. Prathibha Saravanakumar, *et al.* [2] published a report titled "Improved Neutral Zone Technique in a Completely

Edentulous Patient with an Atrophic Mandibular Ridge and Neuromuscular Incoordination: A Clinical Tip”, they recorded the neutral zone with admixed material and concluded that the admixed material aided in recording the functions of the oral musculature in a patient with poor muscular coordination. The other materials for recording neutral zone are tissue conditioners and putty but they are high in cost. After the neutral zone recording the plaster index was made [3]. Sushant A Pai, *et al.* [4] in a case report of Management of resorbed mandibular ridge using neutral zone concept, made the index with putty consistency elastomeric impression material. As the putty is an elastomeric material with ability to be compressed plus it is expensive, therefore plaster index was preferred in the study as it is rigid and economical. The new wax occlusal rim with the help of the plaster index was made.

After mandibular teeth arrangement in neutral zone, maxillary teeth arrangement was done. Trial denture was cured in heat cure acrylic resin and checked for increase vertical dimension by remounted and selective grinding was done. Finishing polishing of dentures done and checked in patient’s mouth for the objectives of complete denture. The patient was recalled after 3 months for examination and to know his experience with the prosthesis. Patient was quite satisfied with retention stability and esthetics of the new set of dentures.

Conclusion

The mandibular complete dentures on a severely resorbed ridge has been a challenge for dentists to make it stable during function. The dentist should have the proper knowledge about the factors involved in stabilizing the mandibular denture. The denture made by neutral zone technique has proved to be efficient for patients who are not satisfied with regular mandibular dentures. The aim of the neutral zone is to record the muscular activity and to construct a denture within that stabilizing area of oral cavity. The neutral zone recording technique is quite simple and can be done in severely resorbed mandibular ridge situations.

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