



B-Raw-Ny Dentures- A Case Report On Internally Weighted Dentures

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Abstract

Background- Residual ridge resorption is a progressive, irreversible disease probably of multifactorial origin which can be challenging to the prosthodontists.¹ The neutral zone technique can be helpful in such situations and an internally weighted denture will increase the stability of the dentures and lead to a successful denture fabrication.

Technique – A hollow maxillary denture and an internally weighted mandibular denture was fabricated using metal insert by increasing the weight of the mandibular denture and then processing the dentures using neutral zone technique for achieving a successful denture fabrication in severely resorbed ridge case.

Conclusion- For severely resorbed mandible, the neutral zone technique for denture fabrication is useful since it stabilizes the denture with the surrounding tissues instead of being dislodged by them by increasing the weight of denture.

Keywords: severely resorbed ridge, neutral zone, internally weighted denture, hollow denture, admix technique

Introduction

Residual ridge resorption is a chronic, progressive, irreversible and disabling disease probably of multifactorial origin.¹ It is an inevitable and natural physiologic process. The management of resorbed ridge has been tedious job since years. The neutral zone technique is favourable for patients with resorbed ridge that has unstable and unretentive mandibular complete dentures. Complete dentures are basically devices in the oral cavity which should be functioned such that they are in harmony with normal neuromuscular function.² The fabrication of successful and stable dentures, there should be coordination of complete dentures with the muscles in the oral cavity.

Severe resorption in the maxillary and mandibular ridges leads to increase in the restorative space. Residual ridge resorption leads to decrease in denture

bearing area which in turn will lead to a decrease in retention, stability, and support of the planned complete denture prosthesis. Rehabilitation in such cases results in increased height and weight of the prosthesis aiding in its retention and stability. Various techniques have been put forth to increase the weight of dentures and one such technique is given by *Wormley and Brunton* for making internally weighted mandibular dentures by using metal framework with metal sprues on the facial and lingual sides. Softened sticks of wax were moulded into a triangular cross-section shape directly from the definitive cast to fabricate a metal bar.²

The neutral zone is that area of the potential denture space where the forces of the tongue pressing outward are neutralised by forces of the cheek and lips pressing inwards. The neutral zone philosophy is

based upon the concept that for each individual patient, there exists within the denture space a specific area where the function of the musculature will not unseat the denture and where the forces generated by the tongue are neutralised by the forces of lips and cheeks. So neutral zone technique can come to the rescue for the patients who have unstable and unretentive dentures.³ The main purpose of the branch of Prosthodontics is to restore what is lost and conserve what is present. So when the patient loses teeth, it hampers the form and function which has to be restored with a prosthesis and a fabrication of any prosthesis requires precision in all the steps undertaken to prepare it.

A severely atrophic maxilla and mandible may lead to various problems with prosthetic rehabilitation. Severe resorption may lead to narrow and constricted maxilla, reduced denture supporting area and an increased inter-ridge distance. This can be a barrier to fabricate a stable and retentive maxillary denture, hence, hollow maxillary denture can be prepared to overcome such situations.⁴

This article states a combination method to gain maximum retention, stability and masticatory efficiency for severely resorbed ridges with neutral zone technique to prepare internally weighted mandibular denture and a hollow maxillary denture by using conventional materials.

Case Description-

A 61 year old male patient reported in Mansarovar Dental College, Bhopal with the chief complaint of missing teeth and difficulty in chewing who had been edentulous since one year and has no history of denture wearing. The patient had medical history of diabetes mellitus since 6 years and has neuromuscular atrophy along with facial asymmetry. The intraoral examination revealed moderately resorbed maxillary residual ridge and severely resorbed mandibular alveolar ridge.(fig 1) Thus, it was decided to provide *internally weighted mandibular complete denture* using neutral zone technique and a *hollow maxillary denture* to achieve the maximum prosthesis stability, comfort and function.

Procedure

A preliminary impression of the edentulous arch using irreversible hydrocolloid impression material-

alginate(Septodont Mariflex T^M) in a stock metal tray was made and primary cast was poured with impression plaster (Gem stone T^M). (fig 2) The special tray was fabricated on the primary cast using self-cure acrylic resin (DPI RR- Cold cure T^M) The borders of the tray were moulded with green stick impression compound (DPI PINNACLE Tracing Sticks) and secondary impression was made for maxillary arch with zinc oxide eugenol impression paste (DPI Impression Paste) which was later on poured with dental stone (Gem stone T^M) and the master cast was obtained. (fig 3)

Neutral zone was recorded using Admix technique wherein 7 parts of green stick compound (DPI PINNACLE Tracing Sticks) and 3 parts of impression compound (Prevest HIFLEX) were mixed in a homogenous form.⁵ (fig 3)

Tertiary impression was also recorded for mandibular arch using green stick impression compound (DPI PINNACLE Tracing Sticks) and light body elastomeric impression material.⁵ (GC Flexceed Light Body)(fig 4)

For internally weighted mandibular denture, the final cast was duplicated and two layers of modelling wax (Pyrax) was placed all over one of the casts. A trough was made in the first layer of modelling wax to form a pattern for the metal casting to be fabricated over that. This assembly was then duplicated and a refractory cast was made with investment material (S.P.E Phosphate bonded investment material)and the prepared slot was casted and retentive features for acrylic resin were incorporated, lastly bead like extensions were left over the metal insert for retention. The wax trial denture base was processed for a permanent record base using high impact heat polymerised acrylic resin along with the metal insert. (Trevalon HI) (fig 5) (fig 6) (fig 7)

Orientation jaw relation was recorded with the use of facebow-Spring bow (HANAUTTM) and facebow record was transferred on semi-adjustable HANAU articulator (Whip Mix). (fig 9) Vertical jaw relation was recorded by Niswonger's method for occlusal vertical dimension and verified by phonetics and aesthetics. (fig 8) Centric Jaw relation was recorded by static method using nick and notch.

Maxillary and mandibular occlusal rims were then transferred on semi-adjustable HANAU articulator

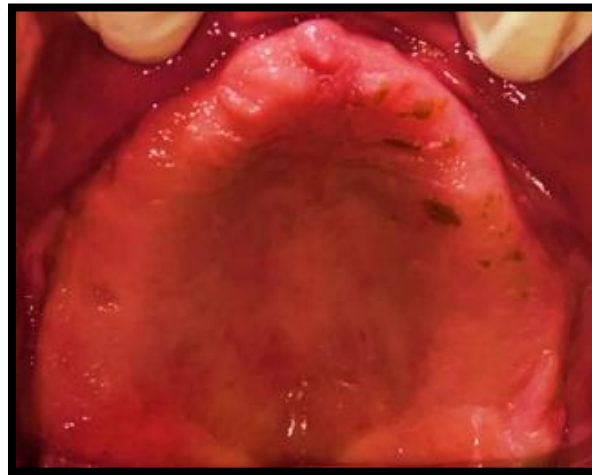
(Whip Mix). The lower rim was removed and vertical stops were made with self-cure acrylic resin (DPI RR- Cold cure T^M).^{2,6,7} (fig 10) Neutral zone was recorded for the patient, hence, another impression was made by mixing- 2 parts of high fusing impression compound-green stick impression compound (DPI PINNACLE Tracing Sticks) and 1 part of low fusing impression compound (Prevest HIFLEX). (fig 11) A putty index of this mandibular occlusal rim recorded with neutral zone was made with condensation silicone (Zhermack Zetaplus). (fig 12) The index was rearranged on the articulator and modelling wax (Pyrax) was flowed into the space to make an occlusal rim to confirm to patient's neutral zone. The teeth arrangement was carried on the occlusal rims and a lingualised occlusal scheme was incorporated in this situation. (fig 13) followed by wax try-in.

For the maxillary hollow denture, after the wax try-in was done, a clear matrix (Dentmark Splint sheet) was

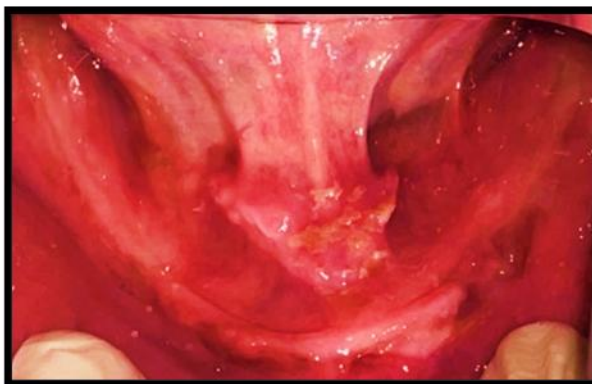
placed on definitive cast along with the arranged teeth on the maxillary cast. (fig 14) Endodontic files (Mani K Files 25mm) with rubber stop were used to measure the space between the matrix and processed base. (fig 15)

Vinyl polysiloxane putty (Zhermack Zetaplus) was adapted on the base and the putty was shaped to leave 2-3 mm space between matrix and base. The putty index was duplicated with soap (Dove) and glycerine mix and the denture was processed with high impact heat polymerised acrylic resin.^{8,9} (Trevalon HI) (fig 16). The prosthesis was then retrieved and later the soap and glycerine were removed with orthodontic wires (SLR Thermal NiTi wire) by drilling escape holes in the most posterior region of the denture behind the teeth and then were sealed with self-cure acrylic resin. The dentures were finished with burs (Zenplus acrylic trimmers kit) and polished (EiTi Acrylic polishers points) for final insertion. (fig 17)

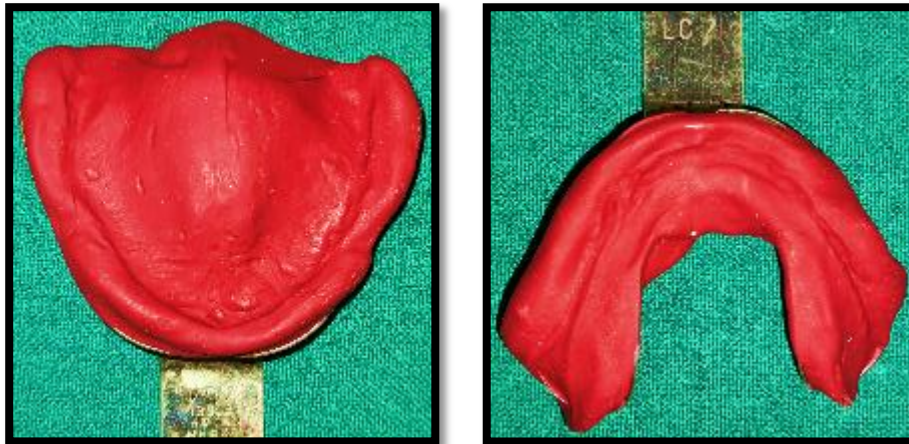
Intra oral examination – maxillary arch(Fig-1a)



Intra oral examination – mandibular arch (Fig 1b)



Preliminary impression using impression compound (Fig 2)



Secondary impression using zinc oxide eugenol and admix technique (fig 3)



Tertiary impression using greenstick and light body impression material (fig 4)



Wax spacer for the metal casting and retrieved metal insert(fig 5)



Processing of metal insert in heat cure record base (fig 6)



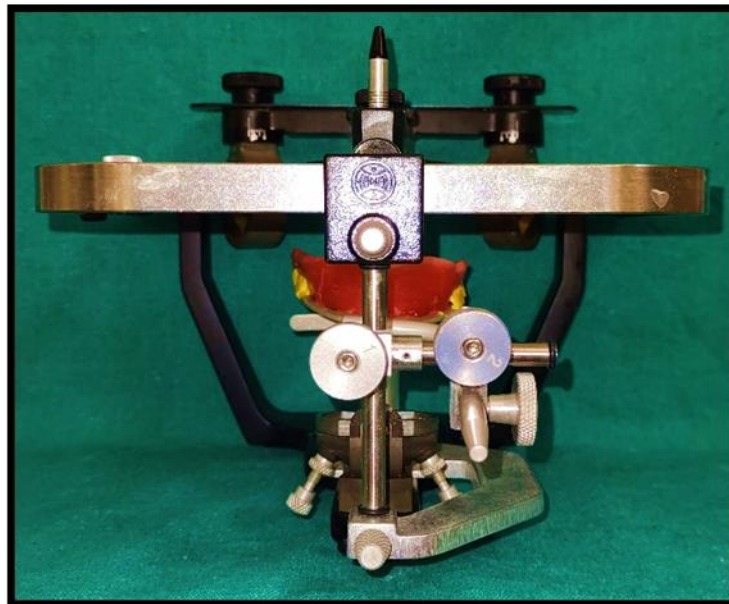
Processed high impact heat cure polyacrylic resin record base with metal insert (fig 7)



Facebow recorded (fig 8)



Facebow transfer done (fig 9)



Vertical acrylic stops and pillars of orthodontic wires (fig 10)



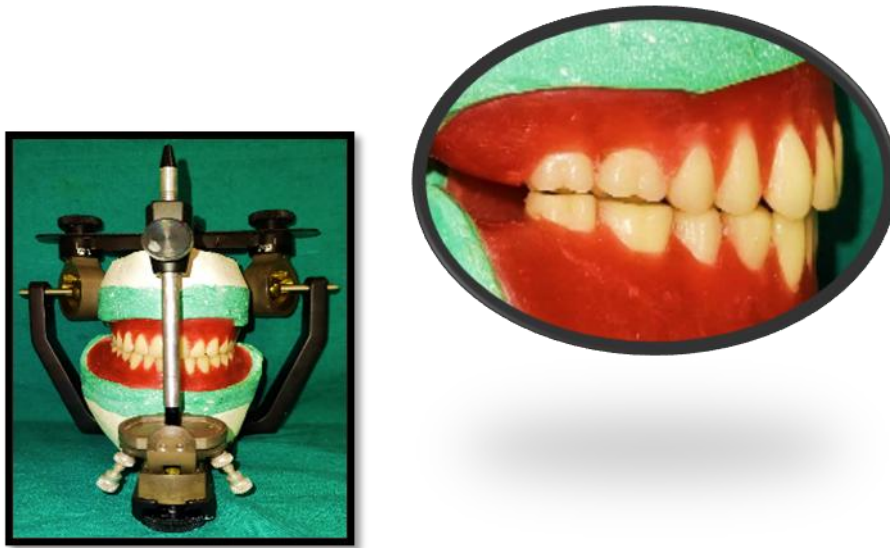
Neutral zone impression technique (fig 11)



Putty index of the rim (fig 12)



Lingualized teeth arrangement (fig 13)



Clear matrix on definitive cast (fig 14)



Endodontic files with rubber stop used to measure space between matrix and processed base.(fig 15)



Duplicate the putty index with agar or soap and glycerine mix (fig 16)



Processed denture (fig 17)



Discussion-

Prosthodontists aim to restore the form and function of the patient. Severely resorbed ridges have been challenging but various techniques have always made it possible to accomplish a successful denture

fabrication. Retention and stability have been enhanced after increasing the weight in the mandibular dentures and that recording of the severely resorbed mandibular ridge by neutral zone technique have been beneficial since it protects the

denture from the dislodging forces acting on it and providing more retention. The facial asymmetry and uncontrolled neuromuscular co-ordination of the patient was taken into consideration and admix technique was hence used to record the neutral zone providing good flow and a more accurate impression. *Kursoglu, Beresin ans Schiesser* (1976) recommended tissue conditioners for recording neutral zone but they are not frequently used as they don't have body hence it is difficult to use over the wire loops.³

In severe atrophied jaws, with increased interarch distance, maxillary hollow denture reduces the weight of the denture preventing the unwanted forces acting on the underlying tissues and bone that would have been worsened by placing conventional heavy prosthesis. Here in this situation we had processed the putty using soap and glycerine whereas other authors advocate use of salt in place of this but it sometimes becomes difficult to remove all the traces of it.⁶

When vestibuloplasty cannot be done, there is a need to construct the mandibular denture strong and functional by using metal based denture.¹⁰ A significant advantage of this metal based denture is customising the weight accordingly and with minimum aesthetic compromise.¹¹ Hurtado had described a method to use tissue stops to position metal frame add considerable weight.¹²

Conclusion-

For severely resorbed mandible, the neutral zone technique for denture fabrication is useful since it stabilizes the denture with the surrounding tissues instead of being dislodged by them. A hollow maxillary denture can be given to patient with severe ridge atrophy and increased inter-arch space. Modifications in conventional procedures are considered to fulfil the patient's functional and aesthetic desires.

Clinical Significance-

In this case, we have come up with a simplified yet affordable technique to fabricate a hollow maxillary denture along with an internally weighted mandibular denture for severely resorbed ridge using specialized techniques and materials over the conventional ones

and have been found successful in this treatment procedure.

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