

**COMPLETE DENTURES IN POOR FOUNDATION CASES  
USING TWO DIFFERENT TECHNIQUES: A RETENTION  
AND FUNCTIONAL CHALLENGE IN REMOVABLE  
PROSTHODONTICS  
-A CASE REPORT**

**Dr. Mayuri Bachhav**

Associate Professor, Department of Prosthodontics D.Y. PATIL (Deemed to be University)  
School of Dentistry

**Dr. Sheetal Parab**

Associate Professor, Department of Prosthodontics, D.Y. PATIL (Deemed to be University)  
School of Dentistry

**Dr. Maithilee Hoskale**

Lecturer, Department of Prosthodontics, D.Y. PATIL (Deemed to be University) School of  
Dentistry

**Dr. Vidhi Karia**

students. Department of Prosthodontics, D.Y. PATIL (Deemed to be University) School of  
Dentistry

**Dr. Ashmita Chabria**

Students, Department of Prosthodontics, D.Y. PATIL (Deemed to be University) School of  
Dentistry

**Dr. Juhi Aswani**

Postgraduate Students, Department of Prosthodontics D.Y. PATIL (Deemed to be  
University) School of Dentistry

**ABSTRACT**

In the socially active and digitally advanced era of social media, dental aesthetics as well as function play a key role even in the lives of geriatric patients. Keeping this in mind, majority of patients are reluctant to step out with ill fitting, loose dentures which lead to a major social embarrassment. Despite poor foundation and resorbed ridges, it is our responsibility as Prosthodontists to offer better and stable solutions with removable prosthodontics for patients with economic and physical limitations who cannot undergo fixed therapy. This is where the classic neutral zone and lingualized occlusion techniques come into play which in turn help us deliver complete dentures overcoming all challenges entailing atrophied and resorbed ridges.

**Key words:** neutral zone, lingualized occlusion, resorbed ridge, complete denture

**Introduction:**

Bone is a dynamic tissue that undergoes continuous remodelling throughout life. Residual ridge resorption (RRR) may be defined as continuous reduction in size of the residual ridge, largely due to bone loss after tooth extraction<sup>1</sup>. RRR is a chronic, progressive, irreversible

and disabling disease, of multifactorial origin<sup>2</sup>. RRR is inevitable and a natural physiologic process<sup>3,4,5</sup>

The primary goal of providing complete denture prosthesis is to restore aesthetics and function which is a massive challenge to achieve in poor foundation cases. Poor, atrophied ridges can be dealt with in numerous ways. Neutral zone is defined as 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<sup>6</sup>. The main aim of neutral zone technique is to fabricate a denture with muscle harmony while performing various oral functions such as speech, swallowing and mastication in atrophied and poor foundation cases. Along with muscular harmony/balance, occlusion also plays a vital role in achieving stability in addition to retention and support in complete dentures<sup>7</sup>

Occlusion is defined as a static relationship between the incisive and masticatory surfaces of the maxillary and mandibular teeth or analogues of teeth<sup>6</sup>. Various occlusal schemes can be implemented while fabricating dentures, however, lingualized occlusion has favourable prognosis and is thus propagated in severely atrophied and resorbed ridges. Lingualized occlusion is defined as a form of denture occlusion that articulates the maxillary lingual cusps with the mandibular occlusal surfaces in centric, working and nonworking mandibular positions<sup>6</sup>.

This article is a case report discussing various complete denture rehabilitation techniques in severely resorbed, atrophied and poor foundation cases with two different case discussions.

### **Case report:**

#### **Case 1-**

A 60-year-old female patient reported to the department of Prosthodontics at D Y Patil University, School of Dentistry, Navi Mumbai with a chief complaint of loose dentures and desired for better fitting, stable dentures. The patient was edentulous since the past 6 years and had not been wearing the old set of dentures because of discomfort and instability of the dentures. Patient had no relevant medical history, ideally implants would have most favourable prognosis, but due to financial circumstances of the patient, we opted for removable complete denture prosthesis. Intra oral examination revealed severely atrophied, knife edge maxillary and mandibular ridges (Attwood order IV) (fig. 1). On extra oral examination, the face was flaccid and lacked adequate fullness.

**Clinical Procedure:**

Primary impressions were made using medium fusing impression compound (Y-Dents impression composition, MDM Corporation) and metal stock trays and primary casts were poured using type II gypsum. Custom trays were fabricated with autopolymerising acrylic resin (DPI RR Cold Cure, Dental Pharmaceuticals of India) with appropriate spacer designs. Border moulding for maxillary arch was done with low fusing impression compound (DPI Pinnacle, Dental Pharmaceuticals of India) and final wash impression (fig. 2) was made in zinc oxide eugenol impression paste (DPI Impression Paste, Dental Pharmaceuticals of India). Border moulding for mandibular arch was done with medium-body polyether material (3M ESPE Polyether Impression Material, Medium-Bodied Consistency) and wash impression (fig. 3) was made with light body condensation silicone (Zhermack Zetaplus Impression Material). Impressions were poured with type III gypsum.

Maxillary and mandibular record bases were made with autopolymerising acrylic resin (DPI RR Cold Cure, Dental Pharmaceuticals of India) and occlusal wax rims were made with modelling wax (Maarc Modelling Wax). Maxillomandibular relationships were recorded with face bow record and transferred on a Hanau Wide-View semi adjustable articulator (fig. 4). Mandibular wax occlusal rim was removed and three acrylic stops (one in the anterior and two in the posterior region) were made and adjusted to the level of the maxillary wax rim. This was then checked intra orally for stability and any interference during various functional movements, and adjustments were made accordingly. Admix impression material consisting of medium and low fusing impression compound in the ratio of 3:7 by weight was kneaded and placed over the mandibular base plate and both the maxillary and mandibular rims were inserted in the patient's mouth. Neutral zone was recorded by asking the patient to perform various movements such as swallowing, pouting, grinning, sucking, whistling, wetting her lips (fig. 5). Mandibular rim was taken out, excess was trimmed, material was resoftened and replaced in the mouth and the patient was asked to repeat all the functional movements again so that a narrow accurate zone could be recorded. A plaster index of this recorded neutral zone was made (fig. 6). The compound rim and acrylic stops were removed, the index was repositioned and molten wax was flown in the neutral zone to obtain a mandibular rim (fig. 7).

Anterior teeth selection was done according to patient's skin tone and facial form and monoplane teeth were selected for occlusion. First the mandibular teeth were arranged in the

neutral zone area and confirmed by replacing the plaster indices (fig. 8). The maxillary teeth were arranged according to the mandibular teeth (fig. 9). Try in was done, dentures were then processed with heat cure acrylic resin (fig. 10) (Dentsply Lucitone Denture Resin) and delivered (fig. 11).

The patient was recalled at regular intervals and denture stability was evaluated at every visit.

## **Case 2-**

A 58-year-old female patient reported to the department of Prosthodontics at D Y Patil University, School of Dentistry, Navi Mumbai with a chief complaint of missing teeth and desired replacement for the same. The patient was edentulous since the past 2 years and had no relevant medical history. Ideally implants would have most favourable prognosis, but due to financial circumstances of the patient, we opted for removable complete denture prosthesis. Intra oral examination revealed a well rounded maxillary ridge (Attwood order III) and a severely atrophied and resorbed mandibular ridge (Attwood order V) (fig. 12). On extra oral examination, the face was flaccid and lacked adequate fullness.

## **Clinical Procedure:**

Primary impressions and custom trays were made. Border moulding for maxillary arch was done with low fusing impression compound (DPI Pinnacle, Dental Pharmaceuticals of India) and final wash impression (fig. 13) was made in zinc oxide eugenol impression paste (DPI Impression Paste, Dental Pharmaceuticals of India). Mandibular impression was made using all green technique. Later appropriate thickness of impression compound was scraped out and wash impression (fig. 14) with light body condensation silicone (Zhermack Zetaplus Impression Material) was made. Impressions were poured with type III gypsum. Milled metal framework design (fig. 15, fig. 16) was made for the mandibular denture and try in was done to check the fit.

Maxillomandibular relationships were recorded with face bow record and transferred on a Hanau Wide-View semi adjustable articulator (fig. 17).

Maxillary and mandibular anterior teeth arrangement was done first. Maxillary posterior teeth were set such that only the palatal cups of the teeth would articulate with the central fossa of mandibular teeth making sure there is no contact on the buccal side (fig. 18, fig. 19).

Try in (fig. 20, fig. 21) was done and lingualized occlusal scheme was verified. Dentures were processed with heat cure acrylic resin (Dentsply Lucitone Denture Resin) and delivered (fig. 22).

The patient was recalled at regular intervals and denture stability was evaluated at every visit.

## DISCUSSION

Providing a stable and retentive mandibular denture in edentulous patients is a challenge. Careful treatment planning and execution is crucial to achieve success in such rehabilitations. Numerous techniques have been advocated to overcome the various hurdles, two of which were described in this report.

Different authors have recommended the use of various materials for recording neutral zone. Kursoglu et al <sup>8</sup>, Beresin and Schiesser <sup>9</sup> recommended tissue conditioners for recording neutral zone. Since tissue conditioner does not have body, one finds it difficult to use even after supporting it with wire loops. Impression plaster advocated by Johnson et al <sup>10</sup> is messy and cumbersome to use and fractured fragments of plaster can be swallowed by patient while performing functional movements. Beresin and Schiesser<sup>9</sup> used modeling plastic for recording neutral zone. Uniformly reheating the modeling plastic occlusal rim is critical for success. If this step is not performed exactly, an incorrect occlusal vertical dimension may result. Admix material was used for recording neutral zone since mixing of low and medium fusing impression compounds results in a low viscosity material allowing for ease in manipulation of the oral musculature<sup>11</sup>. The admix technique allowed better flow and an accurate impression and additionally the vertical acrylic stents provided a vertical stop preventing increased vertical dimension thereby modifying the conventional technique.

There are numerous occlusal schemes for complete denture rehabilitation for atrophied ridges. The choice of lingualized occlusion can be justified based on the fact that they satisfy esthetics along with form and function. This concept was first introduced by Gysi in 1927. His arrangement showed linear cusps of maxillary artificial teeth entering in contact with shallow mandibular teeth depressions<sup>12,13</sup>.

Later on, Payne in 1941 used a 30-degree maxillary tooth to attain a lingualized occlusion on shallow mandibular depressions. These mandibular teeth had no cuspal morphology<sup>14</sup>. With the advancement in artificial teeth choices over time, Pound used a similar set up as explained by Payne with the use of a 20 degree semi anatomic teeth for the mandibular arch in addition to 30-degree maxillary teeth<sup>15,16</sup>.

Some of the main advantages of this scheme are<sup>17,18</sup>:

- Aesthetics and function are combined in this occlusal scheme
- Mandibular teeth centralize vertical forces as the palatal cusps of maxillary teeth rests on the central fossae of mandibular posteriors.
- Better food bolus penetration
- When bilateral balanced occlusion is used with Lingualized occlusion (Lingualized Balanced Occlusion), it provides more stability and favorable stress distribution in parafunction and excursive movements than balanced occlusion alone.

Different methods have been proposed to manage patients with severe mandibular alveolar ridge resorption, including modified design of the denture flanges, the occlusal scheme, and improving residual ridge contact<sup>19</sup>.

Reinforcing a complete denture with a metal framework improves fracture resistance, stability, accuracy, weight and retentive properties of the denture<sup>20</sup> while helping manage unfavourable resorbed ridges.

Grunewald introduced gold framework to compensate for the weight lost after tooth extraction and extensive resorption in resorbed mandibular residual ridges<sup>21</sup>. Belfiglio also advocated the use of metal bases to reinforce the complete dentures when a higher degree of dimensional change is expected during processing or when an increase in strength is needed<sup>22</sup>. DeFurio and Gehl described the use of chrome-cobalt as one of the most retentive base material for the foundation of maxillary complete dentures<sup>23</sup>. Similar principles were kept in mind while advocating the mandibular complete denture with a metal framework.

## **CONCLUSION**

Removable complete denture prosthodontics presents no less of a challenge to the restoring dentist as stability, retention and support are of utmost importance especially in poor foundation cases. Nevertheless, it is one of the most rewarding work for the dentist as well as the patient on account of its long term tangible benefits in renewing patient well-being and elevating their overall quality of life.

**Figures**



**Fig. 1 Intra oral view**



**Fig. 2 Maxillary final impression**



**Fig. 3 Mandibular final impression**



**Fig. 4 Jaw relation**



**Fig. 5 Recording Neutral zone**



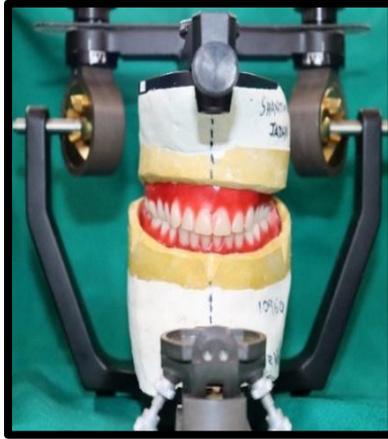
**Fig. 6 Plaster index**



**Fig. 7 Wax rim according to neutral zone**



**Fig. 8 Mandibular teeth arrangement according to neutral zone**



**Fig. 9 Teeth arrangement**



**Fig. 10 Right and left occlusion**



**Fig. 11 Post operative extra oral view**

**Case 2-**



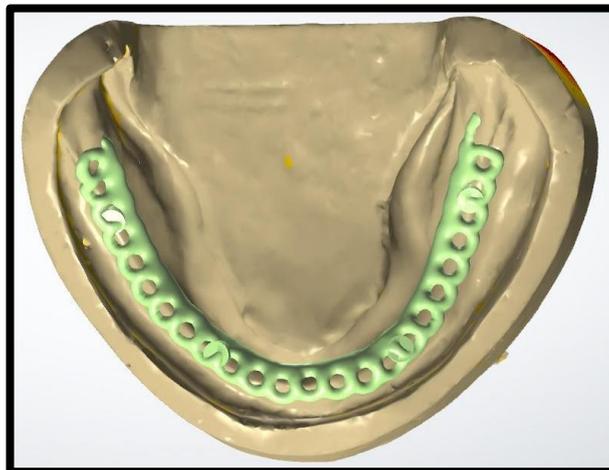
**Fig. 12 Intra oral view**



**Fig. 13 Maxillary final impression**



**Fig. 14 Mandibular final impression**



**Fig. 15 Metal framework design**



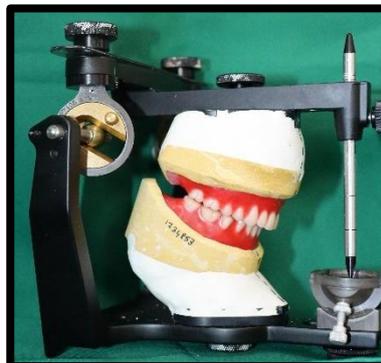
**Fig. 16 Milled metal framework**



**Fig. 17 Jaw relation**



**Fig. 18 Left side lingualized occlusion**



**Fig.19 Right side lingualized occlusion**



**Fig. 20 Left side lingualized occlusion try-in**



**Fig. 21 Right side lingualized occlusion try-in**



**Fig. 22 Post operative extra oral view**

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