

## Prosthetic Rehabilitation of Severely Resorbed Mandibular Ridge: A Case Report

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### ABSTRACT

**Background:** Severely resorbed mandibular ridge is always challenging to the clinician. It is tackled by either surgical or non surgical procedures. In cases, where surgical procedures are contraindicated or unacceptable for the patients, non surgical means are adopted. Utilizing the neutral zone concept itself will help in improving denture stability. Still retention and support will be compromised. To compensate for these, extension of denture to maximum denture bearing area can be achieved by recording sublingual crescent area. This article describes a case report of prosthetic rehabilitation of a severely resorbed mandibular ridge with complete denture using a combined technique of incorporating the sublingual crescent area and neutral zone concept. This method not only improved retention, stability and support, but also the level of patient satisfaction. This method provides a solution for loose-fitting mandibular denture.

**Keywords:** Sub crescent area, Severely resorbed mandibular ridge, Neutral zone concept.

### INTRODUCTION

The objectives of impression making include, retention, stability, support, esthetics and preservation.<sup>1</sup> Accurate border molding within physiologic boundaries accomplishes the most desirable border seal and thereby retention, support and stability.<sup>2</sup> As a modification of impression technique, Lewis ET in 1958 reported about the anterior sublingual area anatomy and utilization of sublingual crescent space by extending the anterior lingual flange of lower denture into the space for improving the retention of mandibular denture in highly resorbed ridges.<sup>3</sup> Sublingual crescent is the crescent shaped area at the anterior floor of the mouth formed by the lingual wall of the mandible and the adjacent sublingual fold.

To enhance the retention and stability, an additional consideration that can be given is the arrangement of teeth in the neutral zone. Neutral zone is the potential space where forces exerted by lips and

cheeks on one side are neutralized by tongue from the other side.<sup>4</sup> The central thesis of the neutral-zone approach to complete denture is to locate that area in the edentulous mouth where the teeth should be positioned so that the forces exerted by muscles will tend to stabilize the denture rather than unseat it. Thus, this technique serves as a guide to arrange the teeth and contour the polished surface of the denture in accordance with the activity of the musculature to ensure optimal stability, retention and facial support.

### CASE REPORT

A seventy five year-old female patient reported to the department of Prosthodontics with the chief complaint of difficulty in chewing food due to loose-fitting lower denture for the past 2 years. Patient was a known complete denture wearer for the past 15 years. She had to change the dentures 6 times

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due to reduced stability and retention of the lower denture.



Fig 1: Primary impression.



Fig 2: Sublingual crescent record.



Fig 3: Final impression.

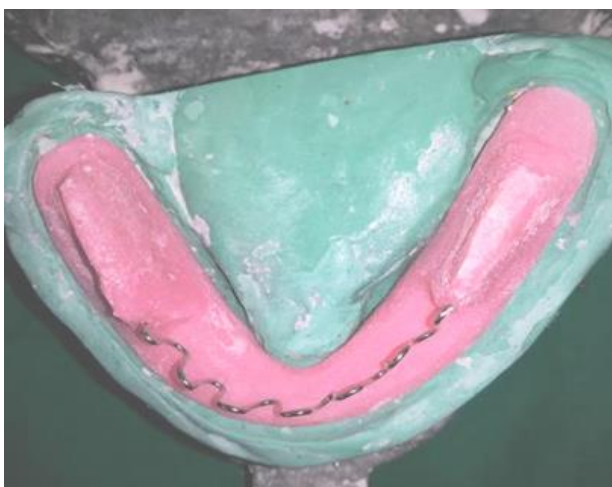


Fig 4: Denture base with retentive loops.



Fig 5: Neutral zone record.



Fig 6: Putty indices on facial and lingual sides.



Fig 7: Teeth arranged in neutral zone.



Fig 8: Processed mandibular denture.



Fig 9: Pre insertion view.



Fig 10: Post insertion view.

Clinical examination revealed Atwood's order V mandibular ridge.<sup>5</sup> On palpation, it was found that the ridge was hard and unyielding and there were no hyper mobile tissues in any region. After discussing about the various treatment options available, considering the age, economic status of the patient, and the unwillingness to undergo ridge augmentation surgical procedure, non surgical means to improve the denture performance was chosen. It was decided to proceed the treatment with a combination of sublingual crescent extension technique and neutral zone technique for better retention and stability of the mandibular denture.

**Procedure:** Primary impressions were made with alginate using stock tray (Fig 1). Special tray was fabricated on primary cast. Extension of special tray was checked in patient's mouth and border molding with low fusing compound was done leaving anterior lingual border from 35 to 45 regions. To record sublingual area, special tray was trimmed 2 mm short of floor of the mouth. Sublingual crescent recording was performed with admix, i.e, impression compound and green stick in the ratio of 3:7.

While recording, the patient was instructed to close the mouth and to place the tongue in normal rest position with the tip slightly touching the lingual surface of the handle of the tray. The procedure was repeated until the sublingual crescent area was recorded perfectly and frenal notch area was relieved for openings of sublingual ducts (Fig 2). Relief holes were made in special tray and

secondary impression was made with zinc oxide eugenol impression paste. (Fig 3)

Following the secondary impression, master cast was obtained. Occlusal rims were fabricated and maxillomandibular relation was recorded. The obtained record was transferred to the articulator. An additional auto polymerizing resin mandibular denture base is fabricated and is attached with retentive loops made of thin orthodontic wire in the centre in the anterior region. In the posterior region, two pillars are fabricated with auto polymerizing resins (Fig 4). The auto polymerizing resin base was then placed in the mouth, checked for stability and ensured that loops and vertical pillars do not interfere with muscle movements during function. Admix is placed over the base and inserted in the mouth and patient is instructed to perform all muscle functions by sucking and swallowing movements and by producing exaggerated 'EEE' and 'OOO' sounds. Excess material if any will be displaced upward from where it can be easily removed. In case of insufficient material, additions can easily be made using extra material and the process is repeated. The final record should be perfectly stable in place (Fig 5).

The impression of denture space is placed over the mandibular master cast. Indexing is made on side and centre of the land area of cast. Lingual matrices of this denture space are made using silicone putty impression material (Aquasil, Soft putty/Regular set, Dentsply, Germany). Putty material is adapted into the tongue space of the neutral zone record, so that it is in level of occlusal plane of record and extends over the posterior land area of cast. Likewise facial matrices are developed along the facial contours of the neutral zone record. Once polymerized, putty matrices are sectioned and removed from the cast. Admix material is removed from the base and replaced with wax using putty matrices (fig 6).

Teeth arrangement is done onto this space on the wax followed by try in and fabrication of the denture using the conventional method of processing, finishing and polishing (fig 7 and 8). The denture insertion was done and required occlusal corrections were completed. Patient was recalled for follow up after 24 hours, one week, two week and four week period. Patient was satisfied with

the denture and had no grievances in the recall visits (fig 9 and 10).

## DISCUSSION

The retention and stability of lower complete dentures are compromised in cases of severely resorbed mandibular ridges. The entire border of the denture should possess contact with the soft tissues to achieve the maximum retention. The concept of extending anterior lingual flange of the lower denture sublingually helps to achieve retention and stability in highly resorbed ridges.<sup>6</sup>

The retention and stability is further enhanced by arrangement of teeth in the neutral zone. The neutral zone concept which was first introduced by Tomes and was later elaborated by Fish and Swenson.<sup>7,8,9</sup> Neutral zone dentures provided adequate space for tongue, better labial flange contours and anterior tooth positions than conventional dentures leading to a successful and comfortable denture prosthesis.<sup>10,11</sup> Several materials have been recommended by different authors for recording neutral zone such as tissue conditioners, impression plaster, modeling compound and polyether impression material.<sup>12,13,14,15</sup>

The aim of neutral zone technique is to construct a denture in muscle balance. A denture shaped by neutral zone technique will ensure that the muscular forces are working more effectively in harmony and gives advantage of stabilizing potential of oral and perioral musculature. This method provides comfort while recording neutral zone with less chair side time. The advantage of technique employed in the present article is that, the admix material provided better flow to record the neutral zone. Also, the vertical stops using wire loops helped in stability of the admix material and prevented the changes that could have occurred in vertical dimension during recording of the neutral zone.

## CONCLUSION

This article presents a simplified approach in combining sublingual flange extension and neutral zone recording to provide a solution for the loose-fitting mandibular dentures, as it helps to enhance the retention and stability of the denture. Clinicians

should always consider non-invasive modifications in the treatment procedures especially in very elderly patients to fulfill their functional and esthetic desires to make the treatment successful.

## CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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