

A CONSERVATIVE APPROACH FOR THE REHABILITATION OF SEVERELY ATROPHIC MANDIBULAR RIDGE: A CASE REPORT

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Abstract:

Obtaining consistent mandibular denture stability has long been a challenge for the dental profession. Atrophic ridges in particular is often associated with difficulties in providing successful denture. Stability of lower denture in such cases is usually the distinguishing factor between success and failure. Various conservative prosthodontic techniques have been implemented to improve denture stability in atrophic ridges. Neutral zone technique is long being used for the management of atrophic ridges. In severe cases where neutral zone is not effective, a combination of neutral zone along with sublingual crescent technique can be followed to obtain maximum stability. This paper highlights such a case where the mandibular denture stability was attained by the combination of the above techniques .

Keywords: *Neutral zone technique; sublingual crest technique; Sublingual crescents; Retention; Stability; Severely resorbed mandibular ridge.*

Introduction

The great challenge of a prosthodontist is the rehabilitation of a completely edentulous patient with good functional and aesthetic outcome. This is even more challenging when the patient presents with a severely resorbed residual alveolar ridge.

The retention and stability of the mandibular dentures in such cases are more dependent on the impression procedures and the positioning of the teeth in the neutral zone. The neutral zone concept was first described by Sir Wilfred Fish in 1931.^{1,2} The neutral zone is the potential space between the lips and cheeks on one side and the tongue on other, that area where forces between the tongue and cheeks or lips are equal. This concept is not new but is less often practiced.³

In a severely compromised ridges, the stability can be attained by positioning the teeth in the neutral zone where as the retention can be achieved by another conservative approach, the sublingual crescent technique.⁴ Sublingual crescent recorded in the lower denture provides effective peripheral seal in the vulnerable anterior part of the alveololingual sulcus resulting in excellent retention in ridges with normal height while satisfactory retention in compromised ridges, where achieving retention is just a dream.⁵ This article highlights a case of severely compromised ridge rehabilitated using the combination of two conservative techniques- sublingual crescent technique and neutral zone concept.

Case report

A 65-year-old female patient presented with the complaint of ill-fitting denture. History revealed

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her 30 years of edentulousness and on examination it was evident that her mandibular ridge was severely compromised and had epulis fissuratum. In left mandibular sulcus due to this ill-fitting denture. [Fig 1] She was advised to discontinue her existing denture and later reviewed after two weeks to assess the relief of symptoms. As there was no relief the epulis fissuratum was surgically excised. After the healing period, considering her severely resorbed mandibular ridge and the chances of recurrence of epulis fissuratum, the treatment planned was the fabrication of conventional complete denture combining two conservative approaches- neutral zone technique and sublingual crescent technique. This was to attain maximum denture stability and retention possible.

Clinical procedure

After the preliminary impression of the maxillary

and mandibular arches were made, the cast were poured and the special tray was fabricated conventionally. In the mandibular arch, the border moulding with the low fusing compound (DPI Pinnacle, the Bombay Burmach Trading Corporation Ltd, Mumbai) was first done in the mylohyoid, retro mylohyoid and the distal extension of the tray, initiated from one side followed by the other side. Thickness was kept approximately 3mm in the lingual borders to stabilize the tray. Buccal and labial areas were then border moulded.

Sublingual crescent recording was initiated using admix technique. The softened material was added in layers over the borders of the tray from premylohyoid area of one side to the other, finally spanning the entire anterior lingual area with the admix compound. The added compound is then tempered in hot water and premoulded to approximate shape of sublingual crescent with the fingers. The special tray was placed in the mouth and the patient was instructed to gently place the



Fig 1 Intraoral view showing the highly resorbed mandibular ridge



Fig 2 Sublingual crescent recorded



Fig 3: Secondary impression made



Fig : 4 Additional positive replica of the sublingual crescent



Fig 5: Neutral zone record base



Fig 6: Neutral zone is recorded

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tongue against the lingual side of the tray handle. In order to relieve the lingual frenum, the area was moulded using low fusing compound. [Fig 2] Secondary impression was made using zinc oxide eugenol impression paste (DPI Impression paste, The Bombay Burmah Trading Corporation Ltd, Mumbai) [Fig 3] Maxillary border moulding and the impression was made in the conventional manner. The casts were poured to get the mandibular master cast with the additional positive replica of the sublingual crescent. [Fig4]

Jaw relation was recorded and the lower occlusal rim was removed and a neutral zone record base was fabricated using acrylic resin. [Fig 5] Admix impression material was softened in a water bath of 65°C and attached to the record base. The record base was reheated and seated in the patients mouth and was asked to perform the actions of smiling, pursing the lips, sucking and tongue movements to register a neutral position where buccolingual forces are neutralized [Fig 6]. A labial and lingual index with additional silicone (elite HD+, Zhermach, Italy) was made over the neutral zone record to guide the positioning of the

teeth on the mandibular definitive cast limited to neutral zone. [Fig 7] Admix impression material was removed from the record base and the index was replaced to establish the space of neutral zone. Molten wax was poured in the space and the teeth arrangement was done respecting the index limits. [Fig 7 and Fig 8]

Waxed trial denture was checked intraorally for esthetic, phonetics, occlusal vertical dimension, centric relation, stability and retention. [Fig 9] Trial denture was invested, processed, finished, and polished. Denture was evaluated in the patient for retention and stability. Patient was extremely satisfied with the new prosthesis without any discomfort. [Fig 10]

Discussion

The factors affecting retention are highly compromised in a severely compromised mandibular ridge. Such patients are prone to develop discomfort with the dentures made in the conventional design. Although dental implants can improve the retention of mandibular dentures,



Fig 7: Molten wax poured within index limits

Fig : 8 Teeth arrangement done in the neutral zone

Fig 9 Try in done



Fig 10 [a, b] Post insertion view

Fig 11 Pre and post operative view

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implant therapy is not viable in some patients because of age, medical or economic constraints.⁵ Extending the anterior lingual flange of the lower denture sublingually makes it possible to achieve satisfactory retention in these severely resorbed ridges. Lewis ET et al was the first to report about the anterior sublingual area anatomy and some of its problems and solution, which then he called it as the genial tubercle or 'sublingual fold space'.⁶ Friedman also has described the moulding of the anterior lingual border of the impression but its inadequacy has been mentioned by Lawson later in his technique.^{7,8} The tongue movements may be limited slightly due to the presence of sublingual crescents which the patient gets adapted, if extensions are proper. The patient can also perform functional movements of the tongue sufficiently without dislodging the denture.

From 1930s the neutral zone concept is known by different terminologies like dead zone, stable zone, zone of minimal conflict, zone of least interference, zone of equilibrium, biometric denture space, denture space, and potential denture space.⁹ In 1976, the term neutral zone was introduced by Beresin and Schiesser which is now widely used.³ According to GPT 9 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 dentures fabricated in this zone will be more stable as during functional activities, the forces exerted by the tongue are neutralized by the lips and cheeks within the neutral zone. Admix technique described by McCord and Tyson was used to record the sublingual crescent and neutral zone.¹¹ It's a combination of impression compound and green stick (low-fusing) compound in the ratio of 3:7. The mixing of a low-fusing compound with the impression compound results in a low viscosity material allowing for ease in manipulation of the oral musculature. The admix material allowed better flow and an accurate impression as it removes the soft tissues folds easily and reduces

any potential discomfort from the denture.¹²

Conclusion

Consistent mandibular denture stability has long been a challenge particularly in atrophic ridges. Various conservative approaches have been implemented to improve the denture stability in atrophic ridges including the neutral zone technique which is long being used. So, in cases where the neutral zone technique alone is ineffective, its combination with the sublingual crescent technique can be advocated to obtain maximum retention. This case approves the success of such a combined conservative approach.

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