



Stabilization of a Floating Mandibular Denture with Neutral Zone Concept and Metal - Base Denture: A Case Report

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ABSTRACT: Residual ridge resorption becomes a very challenging job for a clinician during fabrication of complete dentures. To overcome these challenges, neutral zone concept plays a major role. If the denture stays outside / inside the neutral zone it will be unstable during the activities such as talking, swallowing and mastication. The neutral zone technique is used to minimize the displacing forces of the surrounding structures. This clinical report describes the fabrication of complete dentures for a patient with poorly formed mandibular ridges and also giving the metal denture for extra stability.

KEYWORDS : Residual ridge resorption (RRR), Dead space, Neutral zone

I. INTRODUCTION

The stability of complete denture depends upon the surrounding neuro-muscular system in the oral cavity. Oral functions viz. speech, mastication, swallowing, smiling and laughing, involve the collaborative actions of the tongue, lips, cheeks, and floor of the mouth that are very complex and highly individual.

Residual ridge resorption (RRR) is a chronic, progressive, irreversible, and disabling disease, probably of multifactorial origin.¹ RRR is an unavoidable and natural physiologic process. The patients with multitudinous, unstable, unretentive mandibular complete dentures can benefit from neutral zone technique. The 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".² Various materials such as impression compounds^{2,3}, tissue conditioners, waxes, and impression plaster have been used for recording the neutral zone, and each material has its inherent merits and demerits.⁴ The most common presenting complaints for lower denture are pain and looseness. Fish (1931), first described the influence of the polished surfaces on retention and stability. He also gave description for constructing the dentures in the 'dead space', which later came to be known as the Neutral zone.^{5,6}

II. CASE REPORT

A 58 years old man reported to the Department of Prosthodontics and crown & bridges, at Himachal Dental College Sundernagar, with the chief complaint of an unstable mandibular denture. The patient was advised for the fabrication of complete denture with neutral zone technique. Other treatment options like implant supported overdenture were explained to patients but she was not in the favour of that. The patient was hypertensive, and under medication. On extra-oral examination patient had bilaterally symmetrical facial profile (fig.1). On intra-oral examination there was highly resorbed mandibular ridge (fig.2)

On day one primary impression was made with impression compound (fig.3) and cast were poured.

Closely fitting custom tray was fabricated and the border moulding was performed with green stick to represent muscle activity and width of the sulcus and secondary impression was made (fig.4). Master cast was poured with dental stone. Both the casts were then duplicated.



Figure. 1: Bilaterally symmetrical facial profile



Figure.2: Highly resorbed mandibular ridges



Figure.3: Primary impression



Figure.4: Secondary impression

The occlusal rims were then constructed. Jaw relations were done to record vertical and centric relation and the cast was articulated on the articulator. Then the other set of record rims were fabricated on the new denture bases on duplicate master cast. First the mandibular rim was adjusted at the same vertical height with maxillary rim maintaining the vertical stop. The mandibular green stick compound rim was then inserted into patient's mouth and the patient was asked to perform some movements designed to simulate the physiological functioning, such as asking the patient to smile, grin, pout/purse lips, count from 60 to 70, speak

aloud, pronounce the vowels, sip water, swallow, slightly protrude the tongue and lick the lips and by producing EEE and OOO sounds.^{4,5,6} These actions were repeated for 10 minutes until the compound became hard (fig.5). After articulation plaster indices were fabricated around the green stick impression compound (fig.6). Later the compound was replaced by wax and teeth arrangement was done according to plaster indices (fig-7). A wax try in was performed to evaluate the stability, aesthetics and intraoral occlusion. All the movements mentioned earlier were successfully performed by the patient.

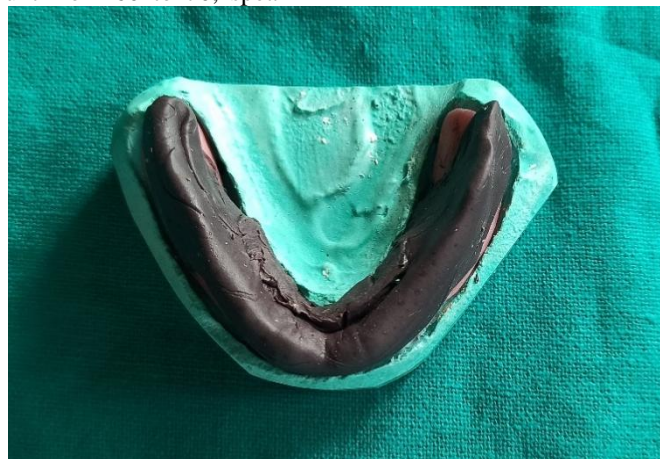


Figure.5: Neutral zone record with green stick compound



Figure.6: Plaster indices around moulded green stick impression compound and then replaced by wax.



Figure.7: Teeth arrangement according to plaster indices

For better stability of the denture in severely resorbed ridge we can also give internally weighted mandibular dentures. Soa cast metal base was inserted during packing of the denture and denture was processed with heat cure acrylic resins(fig-8). The prosthesis was then recouped and

polished for insertion. Figure-9 shows the intaglio surface of the processed denture with minimal metal display. Patient was completely satisfied with the prosthesis and post insertion instructions were given to the patient[(fig-10) and (fig-11)].



Figure.8: Before packing metal denture is placed in mandibular cast



Figure.9: Intaglio surface of mandibular denture



Figure.10: Final insertion of complete denture

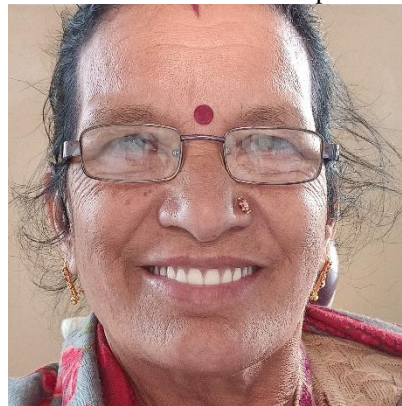


Figure.11: Post insertion image of patient

III. DISCUSSION

Neutral zone technique is a simplified technique to record the physiological dynamics of oral and perioral muscle functions.^{7,8}

It is a challenge to provide a stable mandibular denture for patients with severely resorbed mandibular ridges. If dentures are fabricated with their contours harmonizing neutral zone, this problem can be solved. The aim of this technique is to construct a denture in muscle balance.^{9,10} Such a denture is in harmony with its surroundings and provides optimum stability, retention and comfort.^{11,12} Soshaping a denture by neutral zone technique ensures that the muscular forces are working more effectively in harmony and gives advantage of stabilizing potential of oral and perioral musculature.^{13,14,15} Different materials have been recommended by different authors for recording neutral zone.

IV. CONCLUSION

The neutral zone is an alternative technique for the construction of a lower complete dentures on highly atrophic ridges and quite useful

in cases where dental implants are not possible. Since the muscular control is the main stabilising and retentive factor during function, hence the aim of the neutral zone technique is to construct a denture in muscle balance. Although the technique is relatively simple, but there are increased chair time and laboratory costs. The concept for neutral zone is 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, at the same time, where the forces generated by the tongue are neutralized by the forces generated by the lips and cheeks. Teeth placement should be dictated by the musculature and will vary for every patient. The neutral zone did not receive enough importance in the literature but as a determinant of occlusion, it cannot be ignored. Non-compliance with neutral zone factors may lead to complete and partial denture failures.

REFERENCES

- [1]. Barrenas L, Odman P. Myodynamic and conventional construction of complete



- dentures: a comparative study of comfort and function. *J Oral Rehabil* 1989;16:457-65.
- [2]. The glossary of prosthodontic terms. *J Prosthet Dent* April 2017, Vol 117 issue 5S
 - [3]. Miller WP, Monteith B, Heath MR. The effect of variation of the lingual shape of mandibular complete dentures on lingual resistance to lifting forces. *Gerodontology* 1998;15:113-9.
 - [4]. Ohkubo C, Hanatani S, Hosoi T, Mizuno Y. Neutral zone approach for denture fabrication for a partial glossectomy patient: a clinical report. *J Prosthet Dent* 2000;84:390-3
 - [5]. Kursoglu P, Ari N, Calikkocaoglu S (2007) Using tissue conditioner material in neutral zone technique. *N Y State Dent J* 73(1):40–42
 - [6]. Beresin VE, Schiesser FJ (1973) The neutral zone in complete dentures. C.V.Mosby Company, Saint Louis, pp 1–150
 - [7]. Johnson A, Northeast SE (1989) The unstable lower full denture— a practical and simple solution. *Restor Dent* 5:82–90
 - [8]. Morrow RM, Rudd KD, Rhoads JE (1986) Dental laboratory procedures-complete dentures, vol 1, 2nd edn. Mosby, St. Louis, pp 276–318
 - [9]. Beresin VE, Schiesser FJ (2006) The neutral zone in complete dentures. *J Prosthetic Dent* 95:93–101
 - [10]. Gahan MJ, Walmsley AD. The neutral zone impression revisited. *Br Dent J* 2005;198:269-72.
 - [11]. Watt DM. Tooth positions on complete dentures. *J Dent* 1978; 6:147-60.
 - [12]. Watt DM, MacGregor AR. Designing complete dentures (2nd ed). Bristol: IOP Publishing Ltd 1986:1-31.
 - [13]. Robinson SC. Physiological placement of artificial anterior teeth. *J Can Dent Assoc (Tor)* 1969;35:260-66.
 - [14]. Murray CG. Re-establishing natural tooth position in the edentulous environment. *Aust Dent J* 1978; 23:415-21.
 - [15]. Rahn AO, Heartwell CM Jr. Textbook of complete dentures. (5th ed). Philadelphia: Lippincott, Williams & Wilkins 1993:352-56