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Concept of Neutral Zone in Management of Resorbed Mandibular Ridge-A Case Report

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ABSTRACT

The goal of modern dentistry is to restore the form, function and esthetics of the completely and partially edentulous patients. The common problem faced by the edentulous patient is loose and unstable lower denture. One of the methods to solve this problem is by fabricating the complete denture using neutral zone technique. This article describes management of severely resorbed ridges using neutral zone technique using low fusing impression compound.

Key words: Neutral zone, Denture stability, Resorbed ridges, Low fusing impression compound

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INTRODUCTION

The goal of modern dentistry is to restore the form, function and esthetics of the completely and partially edentulous patients. In edentulous patients, ridge resorption continues with advancing age. The greater the ridge resorption, the smaller the denture base area, that leads to reduced stability and retention of the denture. To overcome this problem, dentures are fabricated with their contours harmonizing neutral zone.

According to GPT- 9, "The 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" [1]. Russel who termed it as "Reciprocal space", Robert called it the "Potential space", Heath as "Denture space" Bates as "Reciprocal zone", Mathew as "Zone of minimum conflict" and Fenn termed it "Zone of neutral muscular forces".

Many materials have been suggested for shaping the neutral zone namely modeling plastic impression compound [2,3], soft wax [4], impression plaster [5], a polymer of dimethyl siloxane filled with calcium silicate [6], silicone [7], tissue conditioners and resilient lining materials [8,9].

Many techniques have also been suggested using the materials in conjunction with movements including sucking and pursing the lips along with phonetics & swallowing [10]. In this case report, low fusing impression compound was used to record neutral zone.

Indications

- ✓ Severely atrophic mandibular ridge (Atwood's class V and VI resorption).
- ✓ Prominent and highly attached mentalist muscle.
- ✓ Lateral spreading of tongue as a result of poor transition from dentulous to edentulous state [11].
- ✓ Patients with atypical shape or consistency of oral and perioral structures, e.g., marginal or segmental mandibulectomy and partial glossectomy [12].
- ✓ A surgical stent fabricated in Neutral zone helps placement of implants in optimal position for implant supported over dentures, which enhances the overall
- ✓ Outcome of treatment [13].
- ✓ Patients with poor neuromuscular control, such as history of stroke, Parkinson's disease, and impaired motor innervation to oral and facial muscles as a result
- ✓ of brain surgery [14].

Advantages of neutral zone

- ✓ Improved stability.
- ✓ Better retention.
- ✓ Posterior teeth will be correctly positioned allowing sufficient tongue space.
- ✓ Enhanced aesthetics due to facial support.
- ✓ Improved masticatory function.
- ✓ Better comfort.
- ✓ Improved speech.

CASE REPORT

A 78 year old female patient reported to the Department of Prosthodontics, Crown and Bridge and Implantology at Swargiya Dadasaheb Kalmegh Smruti Dental College and Hospital with a chief complaint of difficulty in mastication and loosening of denture and as a result poor esthetics (Figure 1). On intraoral examination, it was found that both the maxillary and mandibular arches were completely edentulous and severely resorbed (Figure 2A and 2B). Patient was a denture wearer since 12 years. It was planned to prepare a new denture for the patient with the help of neutral zone technique.

Primary impression for the maxillary and mandibular arch (Figure 3) was made with impression compound with no perforated stock metal trays using mucocompressive impression technique. Primary cast were poured (Figure 4) and custom trays were fabricated with autopolymerising acrylic resin. Border molding was done with low fusing impression compound and secondary impressions were made with zinc oxide eugenol impression paste.

Figure 1: Preoperative photograph.

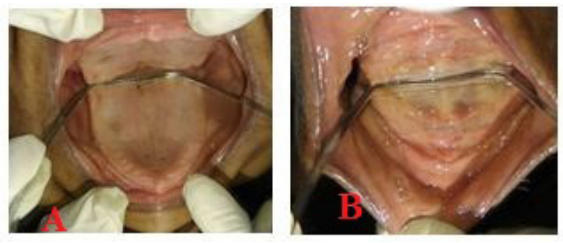

Figure 2A and 2B: Intraoral photograph.

Master cast was then poured with dental stone (Figure 5). On this master cast record bases were fabricated for maxillary and mandibular arch. These record bases were checked for proper extension, retention and stability in the patient mouth. On mandibular cast another record base was fabricated on which orthodontic wire was bent to form loops, these spurs were used so that the admixed impression material will adhere to it (Figure 6).

Wax occlusal rims were then made over the record bases for maxillary and mandibular cast and jaw relation were recorded using tentative method. An admix ratio of which 7 parts of impression compound and 3 parts of

Figure 3: Primary impression.

Figure 4: Primary cast.

Figure 5: Master cast.

Figure 6: Mandibular cast with spurs.

green stick compound were used to record the neutral zone. The impression material was then moulded in water bath of temperature 650C, it is then loaded onto the record base with spurs and then placed it into the patient's mouth. The neutral zone was then recorded by swallowing method to perform pursing, smiling, opening the mouth wide, wetting the lips, whistling, and speaking and pronouncing the word like E and O. A soft liner is then added to the moulds impression on the labial, buccal and lingual side and again the patient had instructed to perform various movements (Figure 7).

The plaster index was then made (Figure 8) and the admixed material was then removed from the record base and teeth arrangement was then made taking the plaster index as guide (Figure 9). Try-in of trial denture was done, which confirmed arrangement of teeth within neutral zone, aesthetics, phonetics, and occlusion (Figure 10A and Figure 10B). Flasking, dewaxing, packing,

Figure 7: Recording of neutral zone with soft liner.

Figure 8: Plaster index.

Figure 9: Teeth arrangement using plaster index as guide.

Figure 10A: Try-in.

Figure 10B: Try-in.

Figure 11 A and 11 B: Denture insertion.

Figure 11C: Denture insertion.

acrylization, finishing, and polishing were performed in the conventional manner. Denture insertion was done after corrections of overextending borders and occlusal corrections (Figure 11A, Figure 11B and Figure 11c).

DISCUSSION AND CONCLUSION

Neutral zone is one of the best impression techniques for fabricating dentures for highly resorbed ridges. This procedure can be performed with other procedures also to improve stability of the denture which increase the patient satisfaction and improvise the treatment outcome.

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