CASE REPORT

NEUTRAL ZONE APPROACH TO A BALANCED DENTURE FABRICATION

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ABSTRACT

Dentures fabricated using neutral zone technique is considered a better treatment option in subjects with enhanced muscle activity. The neutral-zone technique is based upon the concept that there exists a potential space where forces of the musculature are neutralised and the forces exerted by the tongue and cheek will not displace denture but rather will improve the retention and stability. The technique of balanced denture in neutral zone is not widely practiced due to lack of knowledge and complex procedure involved. This article discusses fabrication of balanced denture using neutral zone technique in a simplified way for day today practice, for stable denture with increased chewing efficiency.

Keywords: Neutral zone, addition silicone, balanced occlusion.

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INTRODUCTION

The role of a dentist for the restoration of lost teeth is still challenging as it demands a denture that functions comfortably and efficiently in harmonious with the musculature of the stomatognathic system with same masticatory efficiency as natural dentition. Selection of occlusal scheme in completely edentulous case depends on the aesthetic concern, maxillomandibular relation, ridge resorption, neuromuscular activity, presense of displacive tissue. A balanced articulation is most appropriate due to contacts observed during parafunctional movements for improved stability of denture. Neutral zone is described as that potential space in which the forces between the musculature including tongue and cheeks or lips are neutralized or equal[1]. Different types of material are used to record neutral zone like tissue conditioners[2], Impression compound[3], Waxes[4], Impression plaster[5]. This article discusses addition silicone as the material of choice for recording neutral zone. Earlier the neutral-zone technique approach to complete denture procedure fabrication was as followed, on the primary cast customised trays are constructed. The trays are adjusted in the mouth so that they are not overextended and should remain stable during mouth opening, speaking and swallowing. Thereafter occlusion rims are fabricated using modeling compound. These occlusal rims made of impression compound are molded by muscle function to locate the patient's neutral zone. Then the tentative vertical jaw relation and horizontal jaw relation is established. Once the tentative relation is done, final impression is recorded with a closed mouth procedure. The vertical dimension and centric relation are determined in compounded rims where there was lacking predictability of esthetics, retention and jaw relation.

CASE HISTORY

In this case report, a new neutral zone approach is combined to produce a balanced dentures which is more stable and esthetically pleasing. A 70 years old female patient came with the chief complaint of loose mandibular complete denture. Intra oral examination revealed well round completely edentulous maxillary and mandibular arch, prominent mentalis and buccinator muscle which on activation led to shortening of labial and buccal vestibule. The muscle attachments were close to the ridge crest. Therefore neutral zone technique to fabricate the denture in accordance with the surrounding musculature. As the patient desired for more efficient chewing denture with improved aesthetics decision was made to provide denture with balanced occlusion.

Stages in neutral zone technique were as followed

1. Maxillary and mandibular denture preliminary impressions are recorded using impression compound. (DPI PINNACLE, Mumbai Burmah Trading Company, Mumbai).
2. Border molding and then the final impression of the custom resin tray was recorded with putty and light body of addition silicone impression material (Coltex, Coltene, Alstätten, Switzerland).
3. Jaw relations were recorded using modelling wax (HIFLEX- Modelling Wax). Then Vertical dimension and centric relation were established.
4. Face bow transfer is carried out (Fig 1) and mandibular cast was articulated in semi adjustable

Fig 1. Facebow transfer

Fig 2. Extraoral tracing

articulator (Hanau Wide-vue). Extraoral tracing (Fig 2) was performed to verify mandibular movements in horizontal plane. Articulator was programmed.

5. Anterior teeth were set for upper denture. Wax try- in of upper anteriors were performed.

6. To determine the neutral zone occlusion rims were made with addition silicone putty elastomer (Aquasil, putty/Regular set, Dentsply DE TREY, Germany). For holding addition silicone on the special tray retentive loops are given with stainless steel wire. A pillar of wax block was kept in the posterior part to maintain vertical dimension. (Fig 3) Adhesive agent was applied. Addition silicone was loaded over the denture base and inserted in the patient mouth. Then the patient was asked to perform all kind of muscle functions like swallowing and sucking movement and to make exaggerated 'OOO' and 'EEE' sounds (Fig 4 & 5). Patient was instructed to pucker the lips forward and smile broadly. Indexing was made on the side and center of the land area of cast to make matrices. Using plaster index, the buccal or the facial matrices and the lingual matrices of this denture space was recorded. Once the plaster matrices gets set it is removed from the cast. Addition silicone material was removed from the base and was replaced with modelling wax using plaster matrices. These plaster index are used to set the teeth (Fig 6).Then using conventional methods

Fig 3. Mandibular denture base with retentive loops and two vertical pillars of wax.

Fig 4. Neutralzone recording with addition silicone.

Fig 5. Recorded neutralzone in the cast.

Fig 6. Teeth setting completed with plaster index

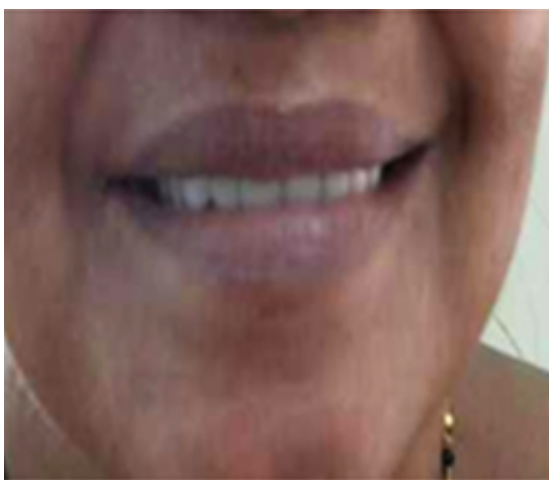

Fig 7. Intraoral view of denture

Flasking, processing, finishing and final polishing of denture was done (Fig 7). Selective grinding was performed to remove any interference.

DISCUSSION

The ultimate purpose of restorative treatment is to revive the aesthetics and masticatory efficiency of the subjects. Dentures are involved in normal physiologic movements like mastication, smiling, swallowing, speech, and swallowing. Denture should be in harmonious with these functions as physiologically unacceptable denture causes poor stability, retention, insufficient tissue support, less tongue space and compromised phonetics[7]. Denture fabricated using neutral zone impression technique will ensure, the musculature help in retention and stabilization of the denture instead of dislodging the denture during function[8,9]. These dentures have other advantages like good aesthetics because of facial support, proper positioning of the teeth in the denture which allows enough tongue space and reduced food lodgement beneath the denture[10].Clinicians must locate and record the functional dynamics of the oral tissues and definitive prosthesis should exist within the stabilizing boundary of the neutral zone.

On an average, a normal individual makes masticatory tooth contact only for 17 minutes in one full day compared to 4 hours of total tooth contacts during other functions. Balanced occlusion is necessary for these 4 hr of tooth contact to maintain denture stability[11]. Bilateral occlusal balance provides an equilibrium on both side of denture due to simultaneous contact of teeth in centric and eccentric contacts. Minimum of three contacts are required, the more the contacts the more assured the balance. This article presented a simplified approach for recording neutral zone using addition silicone impression material. The border molding, jaw relation and neutral zone recording were carried out in separate stages not clubbing with neutral zone resulting in accuracy in each step. However the number of patient visits to the dentist for denture fabrication doesn't differ from conventional fabrication. Balanced occlusion provides a definitive teeth arrangement of teeth contact in harmony with mandibular movement[12]. Arrangement of modified anatomic teeth with face bow transfer, horizontal condylar guidance and anterior guidance, every individual can be provided with customised denture with the highest level of satisfaction.

CONCLUSION

The neutral zone impression technique can be incorporated into fabrication of balanced complete denture for superior stability both under centric and eccentric mandibular movements.

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