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TECHNIQUE TO RECORD NEUTRAL ZONE IN SEVERELY RESORBED MANDIBULAR RIDGE IN COMPLETELY EDENTULOUS PATIENT – A CASE REPORT.

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INTRODUCTION

Primary objectives of complete denture therapy include placement of a structural, functional and esthetic dentition substitute, with adequate replacement of supporting structures. Fabrication of a denture with facio-lingual ill suited positioning of denture teeth or physiologically unacceptable denture base shape have been incriminated in poor prosthesis stability and retention,1,2,3 disturbed phoneics,4,5 inadequate facial tissue support,5,6 and hyperactive gagging.7Rehabilitation of patients with severly resorbed ridges poses a challenge for the dentist . various techniques and materials have been employed to provide a patient with a stable and functional dentures. Neutral zone is that area or zone where all the forces created by the tongue and cheeks or lips are nullified There are various terminologies that have been associated with this concept, including zone of minimal conflict ,dead zone, stable zone, zone of equilibrium, biometric denture space and potential denture space.8,9 This technique is most effective for patients who have severely resorbed mandibular ridge and there is difficulty in positioning the teeth to produce a stable mandibular denture.10 The purpose of this case report is to present the use of the neutral zone technique for the fabrication of successful and stable mandibular complete denture to rehabilitate a patient with severely resorbed ridges. The neutral zone technique can be incorporated to provide the patient with a stable and functional denture..

CASE REPORT

A 51-year-old male patient was referred to the Department of Prosthodontics, with the chief complaints of not being able to chew food for the past 2years. On intraoral examination, it was revealed that patient had well formed, rounded, moderately resorbed maxillary ridge and severely resorbed mandibular ridge with class I ridge relation less than normal inter-arch distance, favorable tongue position and soft palate and abnormal lingual frenum attachment. It was decided to provide him a set of complete dentures by utilizing admixed technique for impression and neutral zone record for arrangement of teeth. (As shows in Figure 1a and b).

Figure 1a:Maxillary arch

Figure 1b:Mandibular arch

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PROCEDURE

1.Preliminary Impression

Upper impression made by using impression compound and lower impression was made with admixed technique. In admixed technique Impression compound and low fusing impression compound (green stick) in the ratio of 3:7 parts by weight are placed in a bowl of water at 60°C and kneaded to a homogeneous mass that provides a working time of about 90 s. This homogenous mass is loaded, and impression recorded with minimal trauma (decreased compressibility and better flow characteristics). (As shows in Figure 2)

Figure 2: Preliminary Impression

2.FINAL IMPRESSION

Custom trays were fabricated over primary cast using auto-polymerizing resin (Rapid Repair Powder; Dentsply India, Gurgaon). Then peripheral tracing done by using green stick compound (DPI Pinnacle) and final impression was made with zinc oxide eugenol impression paste (DPI Impression Paste). (As shows in Figure 3)

Figure 3: Final Impression

3.JAW RELATION RECORD

Jaw relation recorded was made using physiological method. (As shows in Figure 4)

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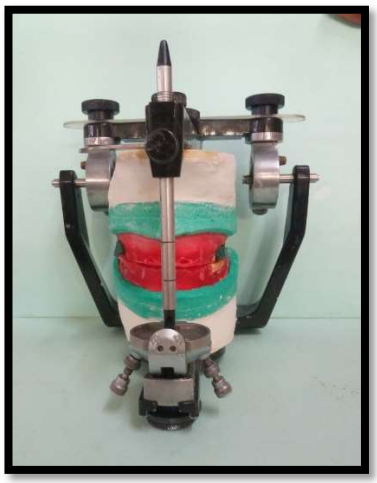

Figure 4: Jaw relation

4.NEUTRAL ZONE RECORDING TECHNIQUE FOR EXCESSIVE RESORB MANDIBULAR RIDGE

After jaw relation mandibular occlusal rim is removed from the base. After that modification done in lower denture base plate by construction of two vertical pillars with respect to premolar region by using Auto polymerizing resin. These vertical pillars had two functions: to provide occlusal stops at the correct vertical dimension at occlusion (OVD) and to provide support and retention for the neutral zone impression material. In between these pillars we added retentive wire as shown in figure 5 to provide retention for the recording material. This denture base was placed in the mouth, checked for stability and ensured that the vertical pillars did not interfere any movements.

Impression compound was taken kneaded thoroughly and adapted to the record base, forming a recording rim. The completed record base and recording rims were placed in a water bath for approximately 2 minutes to prepare for the clinical procedure. Maxillary record base was used during the clinical registration of the mandibular neutral zone to maintains the vertical distance. The base and rim were removed from the water bath and quickly placed in to the patient's mouth and the patient was instructed to sip and swallow water, along with side to side functional movements. These movements were repeated several times. The neutral zone record was removed and inspected for accuracy and completeness as it cooled. (As shows in Figure 5).

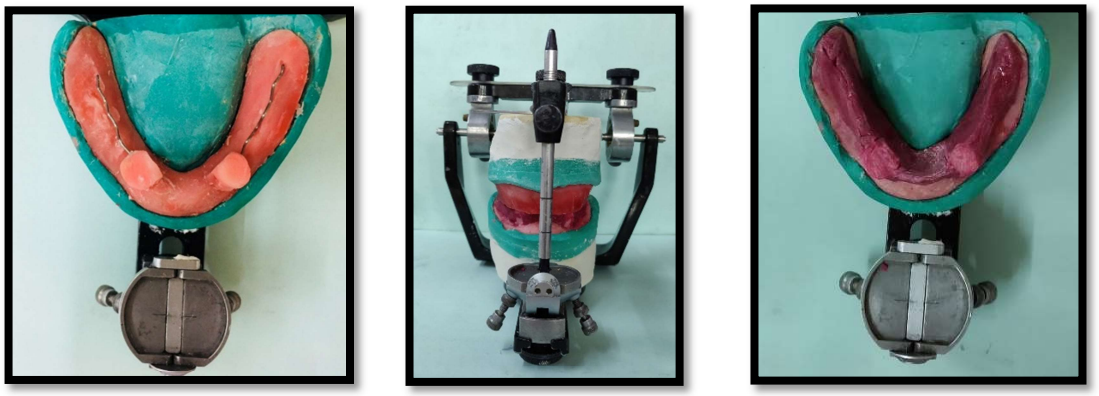

Figure 5: Neutral zone recording by using impression compound

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5.FABRICATION OF MANDIBULAR OCCLUSAL RIM ACCORDING TO NEUTRAL ZONE.

The neutral zone record was seated in the mandibular definitive cast. Index was prepared around the neutral zone record using addition silicone in putty consistency. Then the neutral zone record rim was removed from the denture base along with pillars and retentive wire and then index was replaced. Now modelling wax was then poured into the space generating exact representation of the neutral zone. (As shown in Figure 6).

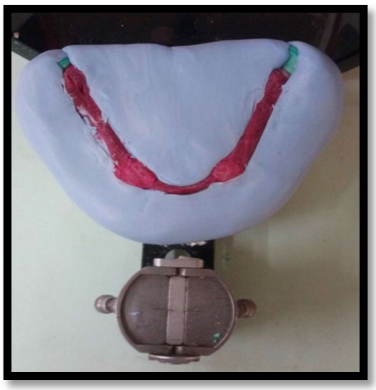

Figure 6: Fabrication of Index

6. TEETH ARRANGEMENT

Teeth arrangement was done following the index. Maxillary anterior teeth and first premolars were arranged in the bilateral balance occlusion. The mandibular anterior teeth were arranged on a new record base so that desired relationship was established with the maxillary anterior teeth and the mandibular teeth fall within the neutral zone as dictated by the facial and lingual indices. The mandibular posterior teeth were arranged so that they contacted the lingual index and also these teeth were made to contact the desired occlusal plane template. (As shows in Figure 7).

Figure 7: Teeth arrangement

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7. DENTURE INSERTION

Conventional procedures of investment, processing, finishing and polishing denture were followed, denture was inserted and checked for retention, stability and support.

DISCUSSION

A technique relying on intra-oral function to develop the position of the neutral zone have been described. Different school of thoughts are mentioned in literature for the facial and lingual positioning of artificial teeth. Weinberg[1] stated that buccal cusps and fossae of the mandibular posterior teeth should be directly over the crest of the ridge. This position would give more stability and less lateral force. Heartwell and Rahn[10] indicated that the posterior teeth should be positioned facia-lingually on the residual alveolar ridge. Murray[9] and Watt[10] stated that artificial teeth should be positioned exact same natural teeth grew.

Arrangement of Artificial teeth within the neutral zone achieve two primary objectives:

(1) artificial prosthetic teeth do not inter- fere with normal muscle activity (2) oral and perioral muscle activity imparts force against the complete dentures that serves to stabilize the prostheses rather than cause denture unstability.[9] Several studies have compared dentures made utilizing neutral zone recording technique to dentures made conventional method.[10] It was shown that neutral zone arranged teeth dentures were more functionally stable than conventional dentures. [10] This technique provides position of the posterior denture teeth slightly facially, when compared to teeth arranged over the crest of the residual ridge from complete denture made by conventional waxing methods. Hand waxed denture base contours typically incorporate concavities along facial prosthetic surfaces.

Many techniques have been suggested utilizing impression compound, soft wax, dimethyl siloxane filled with calcium silicate, silicone, tissue conditioners and resilient lining materials to give shape of the neutral zone in addition with movements such as sucking,[5] grinning, whistling and pursing lips. Further, it emphasized and illustrated the clinical value of recording the physiologic dynamics of oral and perioral muscle function and of using this information to develop complete denture contours and denture tooth positions.

CONCLUSION

Nuetral zone is a zone of minimal conflict where the forces exerted by tongue cheeks and lips are neutralized. Teeth can be arranged in this zone especially in case of resorbed mandibular ridges so as to improve function, comfort and esthetics for the patient. Also, since teeth are placed in neutral zone the dentures become more stable and retentive.

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