Case Report

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Prosthodontic Rehabilitation of an Edentulous Patient with Resorbed Mandibular Ridge Using Neutral Zone Technique and Flabby Maxillary Ridge Using Open Window Technique: A Clinical Report

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ABSTRACT

Background: Restoring patient's normal function, contour, esthetics, speech and health is the ultimate aim of prosthodontic rehabilitation. Achieving optimum denture stability in conventional complete dentures is not easy, especially in case of resorbed mandibular ridges and flabby ridges. In each patient there exists a specific area within the denture space where the musculature function will not unseat the denture and the forces exerted by the tongue are neutralized by the forces exerted by the lips and cheeks this is the neutral zone of patient. Also, the displaceable denture bearing tissues or flabby ridges is a common finding in edentulous patients. Unless managed appropriately, such 'flabby ridges' adversely affect the support, retention and stability of complete dentures. This paper presents a case report wherein the maxillary flabby tissues have been recorded as per Zafrulla Khan (Open Window technique) and mandibular atrophied ridge using neutral zone technique to improve retention and stability of the dentures.

Keywords: Rehabilitation, eutral zone, open window, Zafrulla Khan technique, flabby ridge.

INTRODUCTION

If the teeth are lost despite all efforts to save them, a re-establishment should be made in such a manner as to function efficiently and comfortably in harmony with the stomatognathic system.[1] The lower denture commonly presents the most difficulties with pain and looseness being the most common complaint.[2] The neutral zone technique is most effective for patients who have had numerous unstable, irretentive lower complete dentures.[3] Historically, different terminology have been loosely associated with this concept, including dead zone[4] , stable zone[5] , zone of minimal conflict[6] , zone of equilibrium[7] , zone of least interference[8] , biometric denture space[9] , denture space[10] , and potential denture space[11]. Beresin and Schiesser have suggested that the denture teeth should be arranged in the neutral zone, where during function the forces of the tongue pressing outward are neutralized by the forces of cheek and lips pressing inward.[12]

Another very common finding, mainly in the upper anterior region of long-term denture wearers is the replacement of alveolar bone with hyperplastic soft tissues. This area of soft tissue which can effect

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either of maxillary or mandibular alveolar ridge is known as “fibrous” or “flabby ridge”[13]

Due to Masticatory forces this mobile denture-bearing tissue can be displaced, which can lead to altered denture positioning and loss of peripheral seal.[14] A variety of impression techniques have been described for overcoming the problem of the flabby ridge. Liddlelow[15] described a technique whereby two separate impression materials are used in a customtray (using ‘plaster of Paris’ over the flabby tissues,and zinc oxide and eugenol over the ‘normal’ tissues). Osborne described a technique where two separate impression trays and materials are used to separately record the ‘flabby’ and ‘normal’ tissues, and then related intra-orally.[16]

This paper describes Zafrullah Khan technique for making impressions of denture bearing areas having flabby maxillary ridge and neutral zone technique for atrophied mandibular arch.

CASE REPORT

A 60 year old male patient reported with the chief complaint of ill-fitting upper and lower denture since 3 years. The patient was a denture wearer for the past 3 years. Medical history was taken according to which there was no underlying systemic disorder. Intraoral examination revealed a flabby maxillary ridge extending from the midline to canine region on right side of ridge and atrophied mandibular ridge. (Figure 1,2)

Fig 1: Intraoral view maxillary.

Fig 2: Intraoral view mandibular.

A treatment plan was formulated to fabricate a complete denture with modification in impression technique i.e. Zafrulla khan technique for the maxillary ridge and neutral zone technique for mandibular ridge to achieve minimum denture displacement during function and maximum retention and stability.

TECHNIQUE

Primary impression was made using irreversible hydrocolloid material with perforated edentulous stock tray and was poured in type III dental stone. (Figure 3,4)

Fig 3: Primary impression Mxillary.

A wax spaced custom tray was fabricated using auto polymerizing acrylic resin. Border moulding was done (Figure 5) and zinc oxide eugenol impression was made for lower arch. (Figure 6).

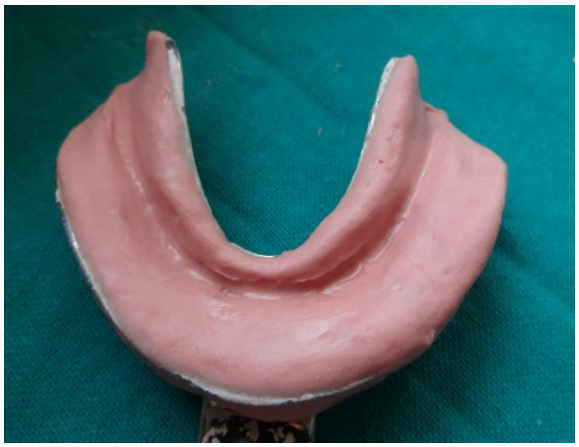


Fig 4: Primary impression mandibular.

Fig 5: Border moulding of upper arch

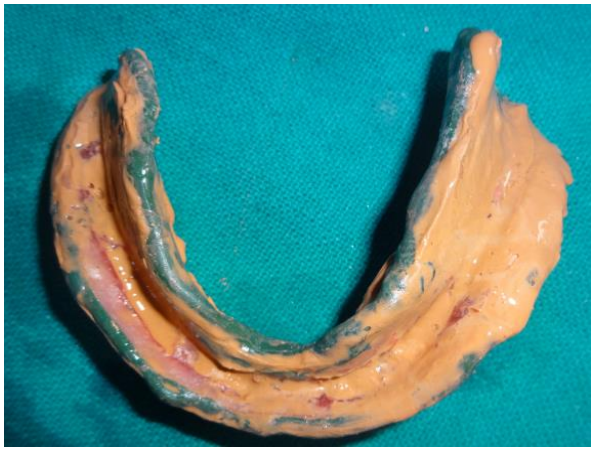


Fig 6: Final impression of lower arch.

Now, extensions of displaceable tissue were marked with indelible pencil on maxillary ridge and were transferred on the maxillary custom tray. A window was cut in the tray following the markings corresponding to the flabby part of the ridge. Figure 7,8.

Fig 7: Open window recorded and cut intraoral view.

Fig 8: Open window recorded and cut, Extraoral view.

Zinc oxide eugenol impression was made. (Figure 9) Excess impression material coming out from the window was trimmed. Impression was reseated and impression plaster was applied over the exposed displaceable tissue with the help of brush or a wax knife. Impression plaster was mixed to form a smooth paste, free of air bubbles and not runny to the extent that it drips. After the setting of impression plaster, impression was taken out carefully (Figure 10) and poured after applying separating media on impression plaster with dental stone.

Mandibular final Impression was made with zinc oxide eugenol earlier and was poured with dental stone, cast was obtained, denture base was formed and rim was prepared. Jaw relations were carried out conventionally and casts were mounted on hanau articulator.

Fig 9: Final Impression.

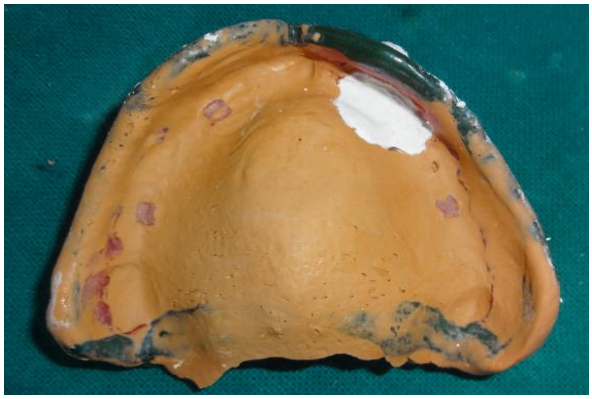


Fig 10: Flabby ridge recorded.

One more rim was made on newly made denture base with combination of Type I impression compound and low fusing compound (green stick) at existing jaw relations. The mandibular compound rim was softened in hot water and was placed in patients mouth was asked to perform a series of actions like swallowing, speaking, pursing of lips and slightly protruding the tongue which stimulated the physiological functioning. During these movements, the rim was moulded on shape of neutral zone. Figure 11.

Fig 11: Neutral zone recorded.

Newly recorded denture base was transferred to the articulator (Figure 12) and indexes of plaster were made from both lingual and labial side. (Figure 13)

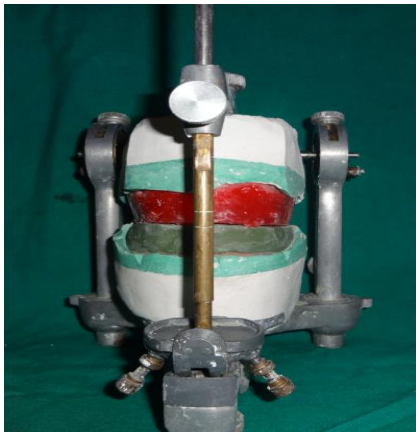


Fig 12: Records transferred to articulator.

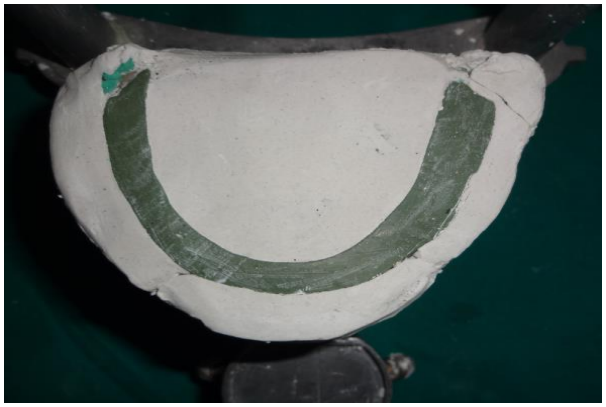
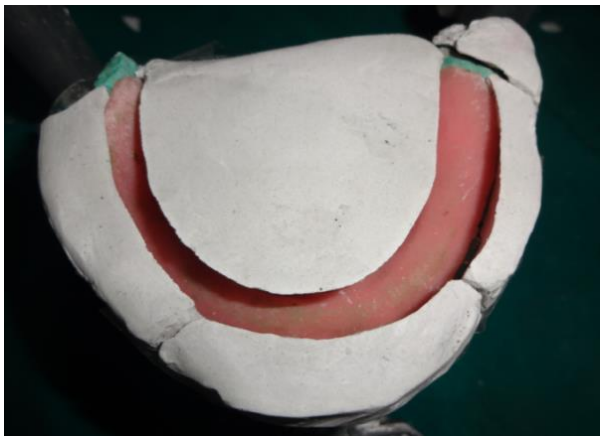


Fig 13: Plaster indexes made.

Then rim which was made up of impression compound and green stick compound was removed and wax was poured into the space giving an exact representation of the neutral zone. (Figure 14,15)



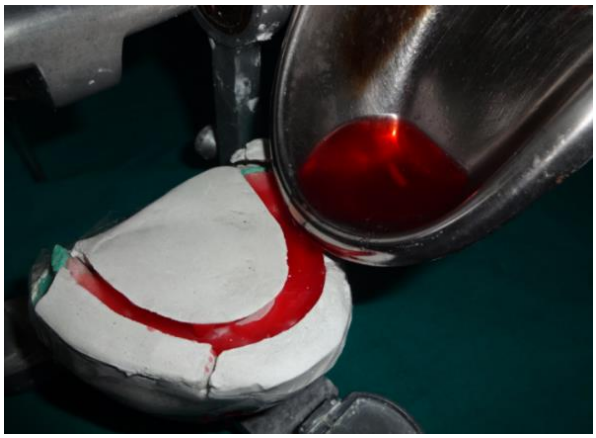


Fig 14,15: Admixed rim transferred to wax rim.

Teeth arrangement was done exactly into the space which represent neutral zone. During the setting of the teeth their position was checked by plaster indices. (Figure 16) Trimming of artificial posterior teeth was done to accommodate it in to the narrow space of neutral zone. Wax try in was done. (Figure 17)

Fig 16: Teeth arranged in neutral zone.

Fig 17: Final try in.

Denture was processed in normal manner. Finishing and polishing was done. Finally polished dentures were delivered to the patient. (Figure 18)

Fig 18: Denture delivered.

DISCUSSION

Managing a completely edentulous patient with a flabby and atrophied ridge can be a challenging problem. In case of flabby ridge standard muco-compressive impression techniques are likely to result in an un-retentive and unstable denture as the denture constructed on a model of the flabby tissue is in a distorted state. The suggested method eliminates the excessive displacement of the soft tissues during secondary impression. Thus a physiologic and anatomic registration of the attached and the unattached tissues of the denture bearing areas were attained. In case of atrophied mandibular ridge the use of neutral zone technique has shown significant benefit. Atwood[17]divided the factors related to the rate of the resorption into the categories of anatomic, metabolic, functional and prosthetic. The neutral zone approach register the neutral zone to determine the proper placement of teeth after resorption has take place. It is opinion of many that the maxillary anterior teeth should be placed close to the position of the natural anterior teeth, Neutral zone registration may dictate that the mandibular anterior teeth be placed lingually by the lower lip. This can be usually accomplished without sacrificing esthetics.

CONCLUSION

The key determinant of stability of lower complete denture is the neuromuscular control of the patient. Neutral zone concept is considered as exceptionally important when considering

treatment options for patients complaining from unstable lower CD particularly and atrophied mandibular arch. Moreover, we cannot overlook the effect that the soft tissues of the denture-supporting area have on the success of complete dentures. These tissues must be considered from the time the patient first appears for diagnosis until the final adjustment is made. Zafarulla Khan technique is an important consideration while recording flabby tissues to enhance stability and retention in complete dentures.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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