ABSTRACT: Treating the highly resorbed mandibular ridge is a challenging job for prosthodontists. This article presents a case report on neutral zone technique used for treating a completely edentulous patient with resorbed ridges. It emphasizes on using materials available by the chairside to make impressions for resorbed ridges and to locate the neutral zone.

KEYWORDS: Neutral zone, Residual ridge, McCord's technique, Edentulous, Prosthetic.

INTRODUCTION

The basic objectives of Complete Denture Prosthodontics are the restoration of function, facial appearance and the maintenance of patient's health. As the age advances, the supporting bony tissues undergo resorption to a greater or lesser degree, with the potential for constant excessive atrophy due to less efficient osteoblasts, declined estrogen production, and overall reduction of calcium absorption from the intestine. Providing complete denture therapy to patients with atrophic residual ridges is challenging. These patients suffer ongoing diminution of denture foundation.

Modern approaches involve the use of dental implant therapy as a means of improving the denture foundation and supplementing the mechanics of prosthesis support, retention and stability. But there are many systemic conditions that potentially affect implants and the tissues carrying them. Several authors have identified diseases for which dental implants are not recommended, or are at least questionable.

This article tries to present a novel method to gain maximum retention and stability in cases of severely resorbed ridges by simple usage of materials available by the chair side with every dental clinician.

CASE REPORT

A 78 year old male patient (Fig 1) reported to the Department of Prosthodontics and Implantology, Institute of Dental Sciences, Bareilly with a chief complaint of difficulty in mastication and speech. Patient is edentulous since 30 years. Recently he felt increased inefficiency in chewing and speech. Hence, he has came to us for necessary treatment.

On clinical examination, the patient had no gross facial asymmetry. The TMJ, muscles of mastication and facial expression were asymptomatic. On intraoral examination the maxillary and mandibular arches were completely edentulous. No gross abnormalities were detected in the overall soft tissue of the lips, cheeks, tongue and oral mucosa. The maxillary and mandibular arches were severely resorbed (Atwood's class V) with shallow sulcus depth (Fig 2 & 3).

The objective of the treatment was to rehabilitate the patient with complete denture therapy by locating the neutral zone and accordingly arrange the denture teeth and contour the complete denture polished surfaces in order to achieve maximum prosthesis stability, comfort and function.

TREATMENT PROCEDURE:

1) The primary impression of maxillary denture bearing area were made with the impression compound. Custom trays are fabricated in autopolymerizing resin on the primary cast. Border moulding was done with green stick and final impression was made in light-bodied elastomeric impression material (Fig 8).

2) As the mandibular residual alveolar ridges were severely resorbed and the sulcus depth was very shallow, a good primary impression with impression compound was difficult to achieve. To overcome this problem following impression making method was planned.

a) A preliminary impression of the mandibular residual ridges were made with McCord's Technique (3 parts impression compound + 7 parts greenstick) (Fig. 4). The impression is washed and poured with the dental plaster. The cast is retrieved and a double thickness full space is adapted and a custom tray was fabricated (Fig 5).

b) A preliminary impression was made using Addition silicone elastomeric impression material of putty consistency and poured in dental plaster (Fig 6). A special tray was fabricated with a full spacer (Fig 7).

c) The special tray was trimmed and checked in the patient's mouth, border molded with green stick and final impressions were made in addition silicone elastomeric impression material of light-bodied consistency (Fig 8).
On the master casts record bases and wax occlusal rims were fabricated. Maxillo-mandibular relations were recorded and mounted on an articulator. The wax rims were cut at three places at first molar and central incisor regions (Fig 9) and replaced with autopolymerizing resin. These resin pillars will now act as vertical occlusal stops. Now the remaining wax rim is completely removed and is attached with retentive loops made of thin orthodontic wire. (Fig 10)

The record bases are trimmed and checked in the patient’s mouth and ensured that loops and vertical pillars do not interfere with muscle movements during function (Fig 11). Impression compound was placed over the retentive loops and the neutral zone was recorded. During this procedure the patient was asked to make the movements like puckering lips, swallowing, sucking and by producing exaggerated ‘EEE’ and ‘OOO’ sounds to record the neutral zone. Excess material if any will be displaced and should be removed. In case of insufficient material, additions can easily be made using extra material and the process is repeated.

The impression compound rims were relined with zinc oxide eugenol impression paste (Fig 12) and plaster indices were constructed. The compound rim is then removed from the record bases (Fig 13). The indices are rearranged and wax flowed into the space to make an occlusal rim to conform to the patient’s neutral zone (Fig 14).

The teeth were arranged according to these rims and the try-in was performed in the patient’s mouth (Fig 15). Trial denture is now placed on the casts and evaluated with the help of plaster indices to confirm the position of teeth is within the neutral zone (Fig 16).

Following this the dentures were flaked, processed, trimmed and polished using conventional method and denture insertion was done.

DISCUSSION

Treating the highly resorbed mandibular ridges is a challenging job. Here, in this case report, the simple impression procedures have been followed to get the maximum retention and stability of the complete dentures, especially on the mandibular ridges. When the residual alveolar ridges have resorbed significantly, denture stability and retention are more dependent on correct position of teeth and contour of the external surfaces of dentures. Keeping these factors in mind, dentures were fabricated with their contours harmonizing neutral zone.

Neutral zone is defined as that area or position where the forces between the tongue and cheeks or lips are equal. The neutral zone philosophy is based upon the concept that for each patient there exists a potential denture space, i.e., a specific region where forces generated by the tongue are neutralized by the forces generated by lips and cheeks.

Arranging artificial teeth within the neutral zone achieves two important objectives: (1) prosthetic teeth do not interfere with normal muscle function; and (2) normal oral and perioral muscle activity imparts force against the complete dentures that serves to stabilize and retain the prostheses rather than cause denture displacement. The neutral zone method typically locates posterior denture teeth slightly facially, when compared to teeth arranged over the crest of the residual ridge.

Using the neutral zone to arrange posterior teeth takes advantage of the stabilizing potential of existing muscle conditions. The fabrication of denture contours to harmonize with neutral zone dimensions of these compromised patients, results in increased denture stability and improved oral function.

Various materials like tissue conditioners, Polyether impression material, Waxes, Impression plaster have been advocated to record neutral zone which has its own advantages as well as disadvantages. In this case report, the entire procedure was aimed at using the materials that have compatible properties and are available easily by the chair side, therefore, impression compound and ZOE were used as they are easy to manipulate unlike impression plaster which is messy and cumbersome to use, and fractured fragments of plaster can be swallowed by patient while performing functional movements. They have good body and are readily available unlike the tissue conditioners which does not have body, one finds it difficult to use even after supporting it with wire loops. They are less technique sensitive than the waxes and are cheaper than the elastomeric impression materials.

CONCLUSION

This article provides a novel approach in the management of completely edentulous patient with resorbed ridges. The technique described is simple which utilizes the routine materials used for denture fabrication, at the same time minimizing the errors and achieving the treatment goals.

REFERENCES:


Corresponding Address:
Dr. T Mohamed Haroon
Email: drtmharoon@gmail.com
LIST OF PHOTOGRAPHS

Fig 1: Pre-treatment frontal view of patient
Fig 2: Resorbed maxillary residual ridge
Fig 3: Severely resorbed mandibular residual ridge
Fig 4: Impression using McCord's Technique

Fig 5: Custom tray with double thickness full spacer
Fig 6: Primary impression with putty
Fig 7: Primary cast with special tray
Fig 8: Maxillary and mandibular final impressions with light bodied elastomeric impression material

Fig 9: Rims cut from three regions
Fig 10: Record bases with vertical stops and retentive loops
Fig 11: Record base is verified in patient's mouth
Fig 12: Neutral zone is recorded

Fig 13: Record bases with plaster indices
Fig 14: Wax flowed into plaster indices
Fig 15: Try in done
Fig 16: Teeth are arranged within the conforms of neutral zone

Fig 17: Post treatment happy & satisfied patient