



ORIGINAL RESEARCH PAPER

Dental Science

Management of severe maxillary labial undercut and resorbed mandibular ridge- A case report

KEY WORDS: Flangeless, Complete Denture, Prosthodontics, resorbed ridge, Neutral zone

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ABSTRACT

Fabrication of complete denture becomes challenging when the intraoral conditions turn out to be less than ideal. This case report patient reported with deep maxillary labial undercut and resorbed mandibular ridge, which was managed by means of non-surgical procedures. Prosthetic rehabilitation was done by giving patient modified complete dentures as flangeless maxillary denture and mandibular denture fabricated using neutral zone technique.

INTRODUCTION

Dentist may come across patients with different ridge contours in daily routine clinical practices. These different ridge forms may vary from severely resorbed to extensively bulky ridges¹. An excessively prominent ridge is more commonly seen in maxilla than mandible². The dimension of bone is under the influence of numerous systemic and local factors, amongst these local factors are of direct concern to prosthodontists in the design of both complete dentures.

Many elderly patients present with severe alveolar resorption and their oral tissues may demonstrate severe age changes¹². In edentulous patients, support to the lips and the cheeks is no longer available and they tend to collapse into the oral cavity. the tongue will try to expand into the space. When all natural teeth have been lost, there exists within the oral cavity a void which is the potential denture space. A neutral zone is that area in the potential denture space where the forces of the tongue pressing outward are neutralized by the forces of the cheeks and lips pressing inward⁶.

Preprosthetic surgery can of course be a corrective option for such cases, though a major criterion of it includes patient consent. The patient's mental attitude and health might not always permit the thought of a surgery. Hence, in such clinical conditions, when the patient is not very keen in undergoing surgery for a prominent or resorbed ridge, the prosthodontist may need to modify the art of a conventional denture.

In this case report, patient was having prominent pre-maxilla and resorbed mandibular ridge which was managed with maxillary flangeless denture and mandibular denture fabricated with neutral zone technique respectively.

Case Report

A 55 years old patient reported to the dental hospital with a chief complaint of difficulty in chewing food due to missing teeth and unsatisfactory previous complete denture. The history revealed that dentures were not fulfilling her functional as well as esthetic demand and made her mouth to appear fuller. On examination, it was observed that patient have round-face form, average lip length, reduced facial third height and a good neuromuscular coordination. (figure 1 and 2) Intra oral examination revealed, completely edentulous maxillary and mandibular arch, U shaped maxillary and mandibular arches with rounded crest. Pre-maxilla was prominent with presence of deep labial undercut and resorption was present with mandibular ridge. (figure 3 and 4) After complete examination, alveoloplasty was planned for prominent premaxilla followed by

fabrication of a set of complete denture, but patient showed unwillingness for the surgical procedure hence that treatment option was ruled out. So, considering some modifications Unconventional prosthetic treatment was planned as maxillary flangeless denture and mandibular denture with neutral zone technique.



Figure 1 pre operative extraoral frontal view



Figure 2 pre operative extraoral lateral view



Figure 3 maxillary arch occlusal view

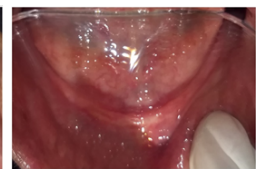


Figure 4 mandibular arch occlusal view

Procedure

Maxillary and mandibular preliminary impressions were made with impression compound and admixed material. Admixed material consisting of medium fusing impression compound and low fusing impression compound in the ratio of 3:7. (figure 5) Then impressions were poured to obtain a cast. (figure 6)

Special trays were fabricated using autopolymerizing resin on the primary casts after careful blockout of the undercut area keeping them 2 mm short of the sulcus. Border molding and secondary impression for the mandible was done in the conventional manner followed by secondary impression using regular consistency polyvinyl siloxane rubber base impression material (figure 7) and the master casts were obtained. (figure 8) The labial undercut was again observed on maxillary master cast. (figure 9)



Figure 5 preliminary impression

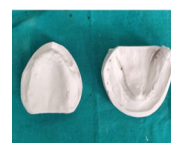


Figure 6 preliminary casts

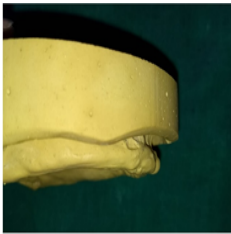


Figure 9 maxillary cast showing deep labial undercut



Figure 10 modified maxillary provisional denture base



Figure 11 one conventional and one modified mandibular provisional denture base



Figure 12 neutral zone record transferred to articulator

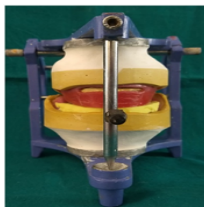


Figure 13 three plaster indices made around neutral zone record

Provisional Denture bases were fabricated by sprinkle on technique on the master casts after blocking out the undercut area. The maxillary base plate was modified from the labial flange area from canine to canine leaving two wings extending approximately upto the mid of the central incisor region. This was done for the easy insertion and removal of the denture base. It also helped in maintaining the already existing labial fullness. The thickness of the wings was adjusted according to the patient's esthetic requirement. (figure 10)

Two sets of provisional mandibular denture bases were fabricated, one record base for conventional maxillomandibular relationship and one for neutral zone record.(figure 11) Occlusal rims were made and Maxillomandibular relation was obtained using Niswonger method and interocclusal check bite record for vertical jaw relation and centric jaw relation respectively. Alluwax was used as bite registration material with first record base.

Then to record mandibular neutral zone second record base was modified. Orthodontic wire was molded into zig-zag manner and approximately measured from one side of second molar upto another. Then two small stumps were made on second molar region to approximate the wire, by taking into consideration that it will not interfere with jaw relation procedures .This second provisional denture base was modified by providing mechanical retention to insure the stability of putty material while recording neutral zone as it may displace due to non adherence. Then polyvinyl siloxane rubber base impression material in putty consistency was kneaded as per manufacturer's instruction and placed following rim shape on second record base. After placing, the patient was asked to perform actions like swallowing and speaking to induce sufficient muscle contraction. All the actions were performed clearly and vigorously. Then, the neutral zone records were transferred to mounted master cast and adjusted over articulator. (figure 12) Plaster indices were made around the recorded neutral zone , and wax rims were prepared corresponding to the indices and the neutral zone was marked.(figure 13)

The mandibular teeth were set in the neutral zone (figure 14) followed by complete teeth arrangement, and wax try-in was done. (figure 15) After the wax try-in was found satisfactory, polished surfaces of the mandibular trial denture was recorded using regular consistency polyvinyl siloxane rubber base impression material. The material was placed on the lingual surface of the lower trial denture base with a liberal amount in the anterior region. Often, a definite shelf was created in this region which provided a resting place for the tongue and aids considerably in retention. The trial denture was placed in the mouth and the patient was instructed to perform swallowing movement. The material was allowed to set and then more of the paste was placed on the buccal and labial surfaces to record their contour. The patient was instructed to place the tongue against the roof of the mouth, to push, and then to swallow. The excess material was trimmed away from the teeth. (figure 16)



Figure 14 teeth arrangement in neutral zone



Figure 15 try in of wax up denture



Figure 16 polish surface recording of wax up denture

After completing the wax-up denture try in and polished surface recording, trial waxed up dentures were sealed to casts. Mandibular waxed up denture was flaked conventionally.

While, a novel flasking technique was used for maxillary waxed up denture. In anterior land area of the master cast, V- shaped sharp grooves were made. Then polyvinyl siloxane rubber base impression material in putty consistency was mixed following manufacturer's instruction and was adapted over the anterior section of the master cast from the sulcus to the incisal edge of the anterior teeth (i.e. canine to canine). This was made in order to preserve the modified labial wings of the labial flange. The putty was indexed with three grooves on its outer side to orient it properly with the plaster during counter-flasking. (figure 17) Rest of the laboratory procedure was carried out in a conventional way. (figure 18 and 19)

After processing, Scalloping was done on the remaining labial flange area according to the gingival shape of the anterior teeth to maintain esthetics and a slight bevel was given on the scalloped border. (figure 20) This was done so that the denture and gingiva would appear to be merging. Then both the denture were finished and polished.



Figure 17 putty adaptation on waxed up denture for flasking



Figure 18 putty index in position after de-waxing



Figure 19 putty index after deflasking



Figure 20 maxillary flangeless denture



Figure 21 intraoral view of complete denture in occlusion



Figure 22 post operative extraoral frontal view



Figure 23 post operative extraoral lateral view

During denture insertion, it was found that the retention of the maxillary denture was maintained due to wings and also the insertion and removal of the denture was easy even in presence of deep labial undercut.(figure 21) Since, in the area of prominence, lips and perioral tissues were in direct contact with the ridge, aesthetics was also maintained. Also, Mandibular denture was found to be more stable and retentive. (figure 22 and 23) Follow up was done.

During follow up visits , it was noted that patients satisfaction level is greater than that of the previous conventional complete dentures.

DISCUSSION

In order to construct dentures that function properly not only in chewing but also in speaking and swallowing, we must develop the fit and contour of the external surface of denture just as accurately and meticulously as the fit and contour of the impression surface and the occlusal surface⁸. Functional integrity along with esthetics is an ultimate demand with any prosthesis. But, all requirements are difficult to achieve in conditions where field of play is restricted by some abnormal morphology.As in this case report, Surveying of the cast helped in deciding the correct path of insertion and removal of the prosthesis . So, an unconventional denture design with modified labial flange had proved its magnitude., thus enhancing its life and prevented the tissue from undue trauma during placement and removal. Development of prongs to engage the canine eminence assisted in creating the esthetics along with the maintaining the denture retention and stability¹³. Also, Modified flasking technique with polyvinyl siloxane putty preserved the design of labial flange and facilitated the easy removal of denture during deflasking, finishing and polishing. Many authors have referred to this as “gum fit dentures” and “ridge grip esthetic prosthesis”¹⁴. Some have alluded to this as "wing denture" in which the labial flange is segmented in the labial frenum area and two wings show up from either side to permit space for the labial frenum¹⁴.

As patient age, the lip instead of being averted as in young individuals becomes thinner and inclines backward into the mouth. So, It is obvious that when we do not determine the neutral zone, the teeth and flanges will not properly positioned and contoured, the force exerted from the lower lip may constantly unseat the mandibular denture⁹. In this case report, patient had history of unstable mandibular denture, so neutral zone was recorded and its position was preserved with the help of indexing material like plaster. Other materials like silicone, stone or modeling plastic impression compound can also be used for indexing. These indices help to preserve the neutral zone while teeth arrangement procedures. Secondly in this case report, three plaster indices were prepared one covering the lingual aspect and another two each covering buccal aspect upto midline which helped in easy removal and placement¹⁰. The patient reported had resorbed mandibular ridge with good neuromuscular coordination, so anatomic teeth were selected for teeth arrangements. Both the modifications in conventional technique involves additional laboratory aspects. But, these unconventional prosthetic skills provided patient functionally stable and esthetic denture.

CONCLUSION

Rehabilitating an edentulous patient by giving modified labial flange design of maxillary and mandibular dentures had justified its importance by providing a satisfactory smile on the patients face. This article provides an approach in the management of completely edentulous patient with resorbed ridges. The neutral zone technique for denture fabrication has an advantage that it stabilizes the denture with the surrounding tissues, instead of being dislodged by them. The technique described in this case report is simple and utilizes the routine materials used for denture fabrication with few additional laboratory steps.

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