

Prosthetic Rehabilitation of a Patient with Atrophic Ridges: A Clinical Report

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ABSTRACT

Extreme resorption of the maxillary and mandibular denture-bearing area may lead to problems with prosthetic rehabilitation. As resorption progresses there is a resultant narrow, more constricted upper residual ridge opposed by a wider lower residual ridge, decreased supporting tissues, that results in a large restorative space between the opposing residual ridges.

This clinical report describes a method for prosthetic rehabilitation of a completely edentulous patient with hollow maxillary denture and a conventional mandibular denture, contours of which are in harmony with the neutral zone.

INTRODUCTION:

India has a large geriatric population of 77 million comprising 7.7% of its total population. In a community based study¹ planned to assess the level of edentulousness, denture need and denture wear, it was found that although level of edentulousness was high, there was a low level of denture wearing. Among the many factors elucidated for poor denture wear, one contributory factor may be the extreme resorption of the edentulous ridges, resulting in dentures functioning as oral acrobatics. Nevertheless, treatment options for prosthodontic rehabilitation of completely edentulous patients include conventional complete dentures and implant supported fixed or removable prosthesis.

Complete dentures are mechanical devices that must function in harmony with the surrounding orofacial musculature. In addition, they must fulfill the basic objectives of Prosthodontics including retention, stability, support, aesthetics and preservation of remaining tissues. However, extreme resorption of the maxillary and mandibular denture-bearing area may lead to problems with prosthetic rehabilitation. As resorption progresses there is a resultant narrow, more constricted upper residual ridge opposed by a wider lower residual ridge, decreased supporting tissues, that results in a large restorative space between the opposing residual ridges. This may result in heavy complete dentures that may compound to the poor denture-bearing ability of the tissues and lead to decreased retention and resistance.

The extensive volume of the denture base material in prostheses provided to patients with severe residual ridge resorption necessitates making the denture base hollow to reduce the prosthesis weight. There are numerous references in the literature that propagate the merits of dentures constructed in harmony with the neuromuscular function as well as describe various materials and methods for fabrication of hollow prostheses.²⁻¹⁸ Although controversial,¹⁹ it has been suggested that gravity and the addition of weight to the mandibular complete denture may aid in prosthesis retention.^{20,21} In addition, the coordination of complete dentures with the neuromuscular function and arrangement of teeth in the neutral zone is highly effective in an atrophic mandible² and is the foundation of a successful, stable denture.

Previously described techniques for weight reduction include using a solid 3-dimensional spacer, including dental stone,³⁻¹³ cellophane wrapped asbestos,¹⁴ silicone putty,^{15,16} or modelling clay^{17,18} during laboratory processing to exclude denture base material from the planned hollow cavity of the prosthesis.

Mahdy³ also presented a double flask technique that allows for the complete fabrication of the obturator from the wax try-in stage to completion of the prosthesis. The primary disadvantage of such techniques is that the long junction between the two previously polymerized portions of the denture that is luted with autopolymerising resin is a potential site for leakage and discolouration. The need for a lightweight, hollow maxillary denture and stable mandibular denture fabricated from a strong, durable material is quite evident.

This clinical report describes a method for prosthetic rehabilitation of a completely edentulous patient with hollow maxillary denture and a conventional mandibular denture, contours of which are in harmony with the neutral zone.

CLINICAL REPORT:

A 69-year-old man, completely edentulous male patient (Fig. 1 & 2) with a history of denture wear for the past 10 years was referred to the Department of Prosthodontics, of this Institution for prosthetic rehabilitation of severely resorbed ridges. Past medical history was noncontributory. Dental history revealed unstable and loose maxillary and mandibular dentures. Intraoral examination revealed severely resorbed ridges with increased interridge space (Fig.3). Various modalities of prosthetic reconstruction were discussed with the patient and the patient indicated a desire for an economical solution. Hence, a heat-polymerized hollow maxillary denture and a weighted mandibular denture with prosthetic teeth arranged in the neutral zone was planned, and the expectations of this prosthesis were explained to the patient.

The traditional sequence of denture construction was followed till the definitive impressions were made and the master casts were constructed and indexed in the land area. Maxillary occlusal rim was constructed with modelling wax (Hindustan Modelling wax; Hindustan dental products, Hyderabad, India) The lower wax rim was constructed on a stabilized record base with low fusing compound (Pinnacle; Dental Products of India Ltd, Mumbai, India) softened at 135°F and shaped similar to a wax occlusal rim. The tray and modelling compound was placed in the mouth and the patient was instructed to swallow and purse the lips. The modelling compound was hardened in the mouth sufficiently to prevent distortion. Jaw relations were recorded and the casts were mounted on a mean value articulator (Fig. 4). The modelling compound was lubricated and encased in a template of vinyl polysiloxane putty (Reprosil; Dentsply Caulk, Milford, Del) which serves as an index for future teeth arrangement (Fig.5). The low fusing compound was replaced with modelling wax, within the confines of the prepared index. Prosthetic teeth arrangement (Premadent; Super Dental Products, Delhi, India) was done and the dentures were fabricated in the conventional manner till the verification appointment. The mandibular denture was then processed in the conventional manner as per the manufacturer's instructions. Two identical flasks were used to fabricate a hollow maxillary denture on lines of a described article.¹³ For this the trial denture was processed in the standard manner through the wax elimination stage. Two layers of baseplate wax was then adapted (Supernal; S.D Dental Corporation, Lucknow, India) to the definitive cast in the drag, conforming to the border extensions (Fig.6, A). A second identical flask was used to invest the baseplate wax and again the wax elimination process was completed. The cope and second drag was packed with heat-polymerized acrylic resin (DPI-heat cure; Dental Products of India Ltd). Similarly a minimal thickness of acrylic resin was processed around the teeth using a different cope (Fig.6, B). The original cope was seated on the original drag and complete closure of the flask was ascertained (Fig. 6, C). A thin feather edge margin was created along the visible junction to minimize the thickness of the autopolymerising

resin. The visible junction between the two previously polymerized portions was luted with autopolymerising acrylic resin (DPI-RR; Dental Products of India Ltd). The whole prosthesis was recovered and the palatal surface was luted in a similar manner. The entire junction was waxed and reprocessed so that the seam that seals the two sections is completely covered with heat-processed acrylic resin minimizing the stain and leakage around the area of the seam and increasing the durability and longevity of the prosthesis. The dentures were deflasked, equilibrated and a hollow maxillary denture and weighted mandibular denture was delivered to the patient (Fig. 7 & Fig. 8). The patient was instructed on home care and prosthesis maintenance.

SUMMARY:

This clinical report describes a method for prosthetic rehabilitation of a completely edentulous patient with resorbed ridges and excessive interarch space with a hollow maxillary denture and a weighted mandibular denture, contours of which are in harmony with the neutral zone. Controlling the thickness of the hollow portion without the use of any three dimensional spacer, and eliminating leakage and discoloration are several advantages of this technique. An additional laboratory step is however required for the final culmination of the prosthesis.

FIGURES:



Fig. 1: Preoperative view of patient.

Fig. 2: Profile of the patient.



Fig. 3: Intraoral view.

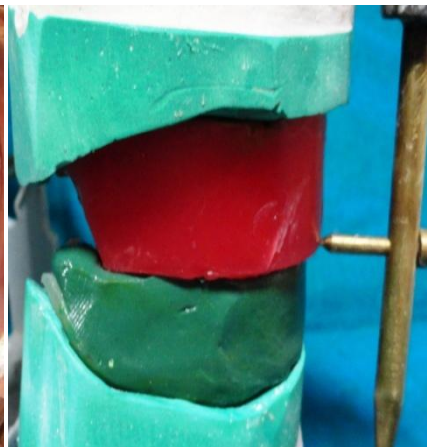


Fig. 4: Maxillomandibular jaw relations recorded



Fig. 5: Putty index for the neutral zone.



Fig.6 A: Adaptation of baseplate wax to the definitive cast.



Fig. 6 B: Acrylic resin processed around denture teeth.



Fig. 6 C: Denture processing using three identical sections of two denture flasks.

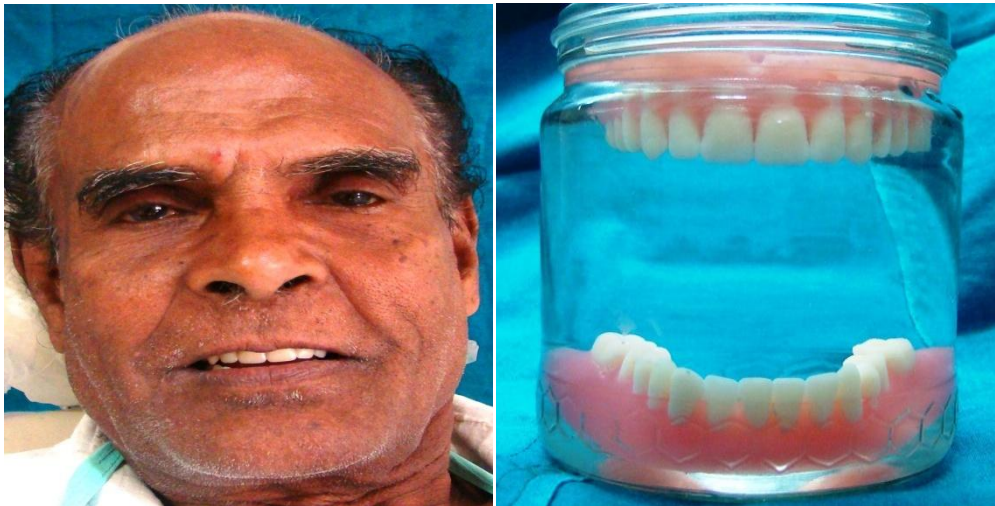


Fig. 7: Post-operative view of the patient.

Fig.8: Hollow maxillary denture and weighted mandibular denture

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