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Light Weight Maxillary Denture: An Innovative Technique for Atrophic Ridge- A Case Report

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Abstract: *Rehabilitation of atrophic edentulous ridges poses a clinical challenge, as there is a decreased denture bearing area for support, retention and stability. The resorption occurs at a faster rate in mandibular arch as compared to the maxillary arch. A clinical situation of severely atrophic maxilla with large inter ridge distance often pose a challenge during fabrication of a successful maxillary complete denture. Reducing the weight of the denture by making it hollow, aids in preservation of the existing residual alveolar ridge. This article describes a technique with easy removal of silicone putty from the inner two halves of maxillary denture and thus making the inner area hollow. This ensures that the weight of the maxillary denture is significantly reduced.*

Key words: *Atrophic ridge, hollow maxillary denture, light weight denture, silicone putty.*

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I. Introduction

Excessive resorption of the maxillary denture bearing area may lead to problems with prosthetic rehabilitation which may be due to more constricted residual ridge. As resorption pattern progresses, decreased supporting tissues and a resultant large restorative space between the maxillary and mandibular residual ridge. This may result in a heavy maxillary denture that may further compound the poor denture-bearing ability of the tissues and lead to decreased retention and resistance[1].

Different methods are available to reduce the weight of maxillary dentures. This weight reduction approaches have been achieved using a 3-dimensional spaces, including dental stones[2], cellophane wrapped asbestos[3], silicone putty or modeling clay[4] during laboratory processing to exclude denture base material from the planned hollow cavity of the prosthesis.

It was stated that to decrease the leverage, reduction in the weight of the prosthesis would be beneficial, which improves the cantilever mechanics of suspension and overtaxing of the remaining supporting structures[5]. Reducing the weight of the denture by making it hollow aids in preservation of the existing residual alveolar ridge.

This article presents an innovative technique to remove the silicone putty and to make the maxillary denture into two halves and join it with auto polymerizing acrylic resin.

II. Case Presentation

A 64-year-old female patient reported to Department of Prosthodontics, Inderprastha Dental College and Hospital, Ghaziabad, India with the chief complaint of difficulty in eating and speaking due to teeth loss. Dental history revealed that she had lost her teeth due to periodontal involvement and had been edentulous for seven years. On examination it was found that maxillary and mandibular ridges were severely atrophic (Fig 1).

Fig 1: Pre operative view of maxillary and mandibular arch

A thorough medical and dental history was elicited from the patient followed by clinical and radiographic examination. Treatment options discussed were pre-prosthetic surgery including ridge augmentation followed by conventional complete denture and implant-supported prosthesis. Pros and cons of all the procedures were explained to the patient. Finally she decided in favor of conventional complete denture prosthesis due to the cost involved and the surgical procedure involved in pre-prosthetic surgery and an implant-supported prosthesis. After analyzing each available option, it was decided to fabricate hollow maxillary complete denture to reduce the weight of the maxillary denture.

III. Technique

Primary impressions of the maxillary and mandibular residual ridge were made with modeling plastic impression compound in a metal stock tray (Fig 1). The cast was poured using dental plaster and a custom tray was fabricated.

Fig 1: Primary impression of maxillary and mandibular arch

Border molding of the maxilla and mandible were performed with green stick impression compound and secondary impressions for maxillary arch and mandibular arch were performed with light body addition silicone impression material (Fig2)

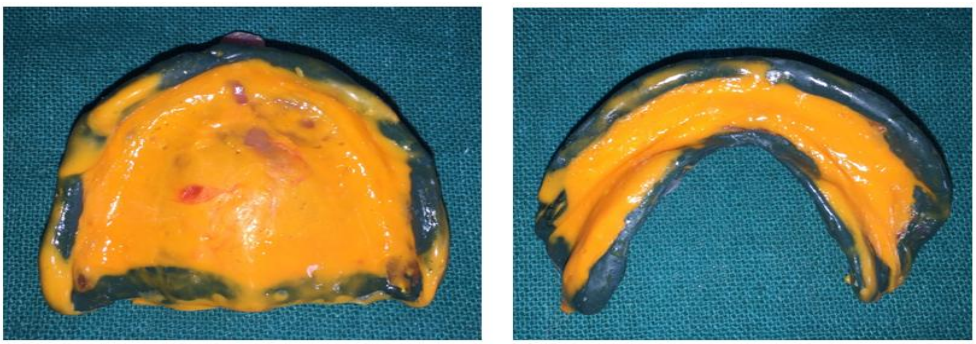

Fig 2: Maxillary and mandibular secondary impression were made with addition silicone impression material

The master casts were poured with dental stone. Acrylic denture bases were made for the master casts and occlusal rims were fabricated. After the recording of maxillomandibular relationship both casts were mounted in an articulator. After teeth arrangement was done, try in procedure was performed.

During fabrication of denture, for making the maxillary denture hollow interchangeable flasks were used. The trial dentures were processed in the standard manner up to the wax elimination stage.

The maxillary trial denture base was sealed (on the definitive cast) with the modeling wax and a second flask was used to invest the modeling wax till the wax elimination stage. The cope (upper half of the flask/cavity side) was packed and processed with heat polymerizing resin. This permanent record base was left undisturbed on the master cast. (Fig 3)

Fig 3: Permanent record base was fabricated using heat cure acrylic resin

Addition silicone putty impression materials were added over the ridge area of denture base (it acted as a spacer). (Fig 4)

Fig 4: Putty impression materials added over the ridge area of the permanent record base

The two halves of the flask were closed and then reopened. Removal of extra putty impression material was done before final closing of the flask. (Fig 5)

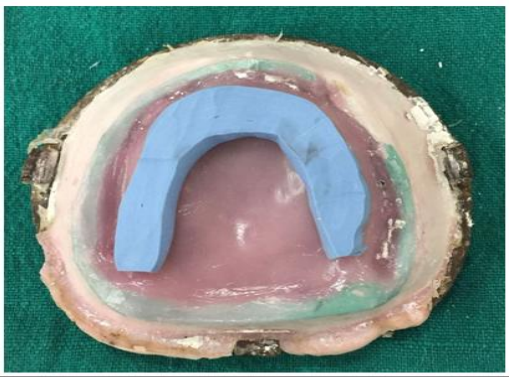

Fig 5: Extra putty impression material was removed before the final closure of the flask

A thread was incorporated over the addition silicone putty impression materials as it helps in easily removal of putty impression materials after the final fabrication process. The heat polymerizing resin was then mixed and bench curing was performed. (Fig 6)

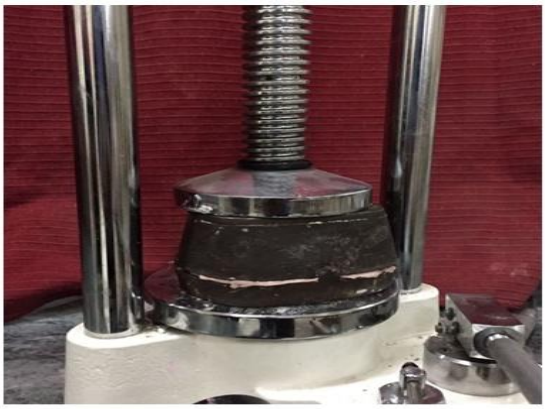

Fig 6: Bench curing was performed

After packing, the denture was processed for 7-8 hours. After processing, lab remounting was done and the processing errors were corrected. Two small openings were made with a bur into the denture base distal to most posterior teeth to remove the putty impression material. The cavity was cleaned and disinfected. Later, these openings were closed with the auto polymerizing resin in dough stage. The dentures were then polished in usual manner. The seal of the cavity was then verified by placing it in water and checked for any bubbles.(Fig 7). Mandibular denture was fabricated with conventional manner.

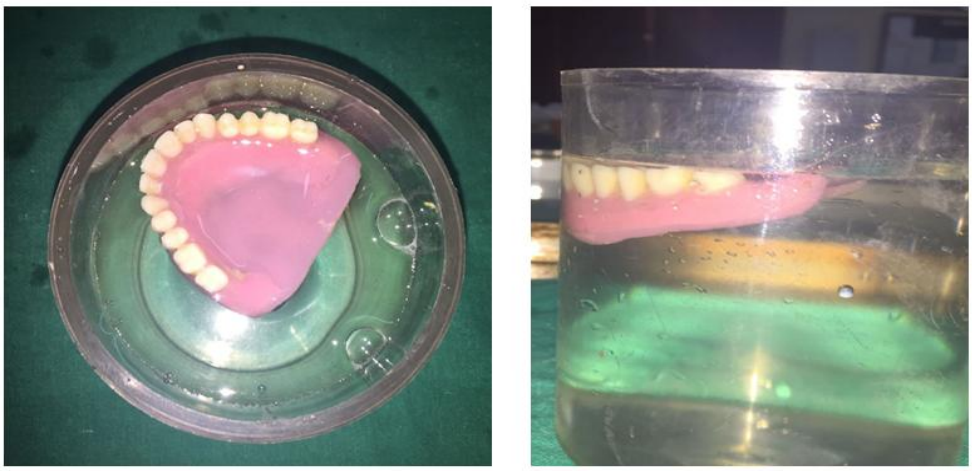

Fig 7: Final hollow denture was verified by placing it in water

IV. Discussion

Many alternative options for rehabilitation of the severely resorbed mandibular ridge, that can be implant supported overdenture, and ridge augmentation. Most of the times the patient who comes with such a problem are geriatric patients with severe systemic illness, poor economic status and for long time treatment procedures and for these cases conventional way of treatment is one of the best choice.

Rather than modifying the impression technique to get maximum denture bearing area, it is best way to modifying the type of denture may also be better accepted by the patient.[6] Several methods are used to increase the retention and stability of heavy prosthesis by utilizing the undercuts, modifying the impression technique, use of magnets, use of implants, etc.[7,8] Previously, a variation of a double flask technique was used for obturator fabrication. In this technique heat polymerizing acrylic resin was added over the definitive cast and processing was done by sing a minimal thickness of acrylic resin around the teeth with a different drag. Both portions of resin were then attached using heat-polymerized resin.[9] Reducing the weight of maxillary prosthesis,

however, has been shown to be beneficial when constructing prosthesis for rehabilitation of edentulous patient. This can be achieved by making the maxillary denture hollow.

V. Conclusion

Light weight maxillary complete denture considerably reduces the weight of the prosthesis which in turn prevents transmission of detrimental forces and helps to preserve underlying tissues and bone. It not only reduces the weight of the denture but also the leverage action of the same and increased retention and stability and up to some extent it is also possible to preserve the existing residual alveolar ridge. This technique is simple to execute and allows control of spacer thickness and helpful for healthy and comfortable living.

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