

CASE REPORT

An Innovative Technique for Fabrication of Light Weight Hollow Maxillary Denture – Case Report

Manoj Upadhayay*, Sudhanshu Srivastava**, Pratin Talukdar**, Shivakumar G.C.***

Abstract

The possibility of saving and rehabilitating a deteriorating dentition depends not only on position of teeth within the alveolar process but also on number of remaining teeth and their periodontal status. An unstable condition arises when the balance between forces acting on the teeth and the constraints of periodontal tissues gets disturbed either by extraction of teeth or reduction of the periodontium. Orthodontic forces are unlikely to convert gingivitis into a destructive periodontitis, but poorly executed orthodontic therapy in patients with periodontitis can easily lead to further periodontal breakdown. This article provides an overview of the potential adverse effects of orthodontic tooth movement on gingival and periodontal tissues during fixed appliance therapy.

(Upadhayay M, Srivastava S, Talukdar P, Shivakumar GC. An innovative Technique for Fabrication of Light Weight Hollow Maxillary Denture – Case Report. *www.journalofdentofacialciences.com*, 2014; 3(4): 23-26.)

Key words: hollow denture, resorbed ridge, maxilla, acrylic resin.

Introduction

The severely atrophic maxilla has always been a clinical challenge for

fabrication of a successful complete denture. Since in severely atrophic maxilla there is increased inter-ridge distance which results in a heavy maxillary complete denture it further reduces the retention of the prosthesis. Reducing the weight of a maxillary prosthesis has been shown to be beneficial when constructing an obturator for the restoration of a large

*Reader, **PG Student, ***Professor
***Department of Prosthodontics,
***Department of Oral Medicine & Radiology,
Babu Banarasi Das College of Dental Science,
Lucknow

Address for Correspondence:

*Dr Sudhanshu Srivastava, Department of
Prosthodontics, Babu Banarasi Das University,
Lucknow
e-mail: lovey.srv2002@gmail.com

maxillofacial defect^{1,2}. It has also been proved that weight of the prosthesis can be reduced by making the denture base hollow.

Different approaches like using a solid 3-dimensional spacer, including dental stone³⁻⁷, cellophane wrapped asbestos⁸, silicone putty^{9,10}, or modelling clay have been used during laboratory processing to exclude denture base material from the planned hollow cavity of the prosthesis.

Holt processed a shim of indexed acrylic resin over the residual ridge and used a spacer which was then removed and the two halves luted with auto polymerized acrylic resin.

Fattore used a variation of the double flask technique for obturator fabrication by adding heat polymerized acrylic resin over the definitive cast and processing a minimal thickness of acrylic resin around the teeth. Both portions of resin were attached using a heat polymerized resin.

O'Sullivan¹¹ described a modified method for fabricating a hollow maxillary denture. A clear matrix of the trial denture base was made. The trial denture base was then invested in the conventional manner till the wax elimination. A 2 mm heat polymerized acrylic shim was made on the master cast, using a second flask. Silicone putty was placed over the shim and its thickness was estimated using a clear template. The original flask with the teeth was then placed over the putty and the processing was done. The putty was later removed from the distal end of the denture and the openings were sealed with autopolymerizing resin. The technique was useful in estimation of the spacer thickness, but removal of the putty was found to be difficult especially from the anterior portion of the denture. Moreover, the openings made on the distal end had

to be sufficiently large to retrieve the hard putty.

This clinical report describes a technique for fabrication of a hollow maxillary complete denture in a patient with resorbed maxillary and mandibular ridges and increased interridge distance.

Case Report

A 62 year old female patient reported to the Department of Prosthetics, Babu Banarasi Das Dental College, Lucknow for prosthetic rehabilitation of maxillary and mandibular edentulous ridges. Past medical history was not relevant. Past dental history revealed that patient was a denture wearer since 3-4 years and the maxillary dentures were loose. Intraoral examination revealed severely resorbed maxillary and mandibular edentulous ridges with increased interridge distance (Fig. 1a, b). Hence, hollow maxillary complete denture and conventional mandibular denture was planned for this patient.



Fig 1a.
Resorbed
Edentulous
Maxillary
Ridge

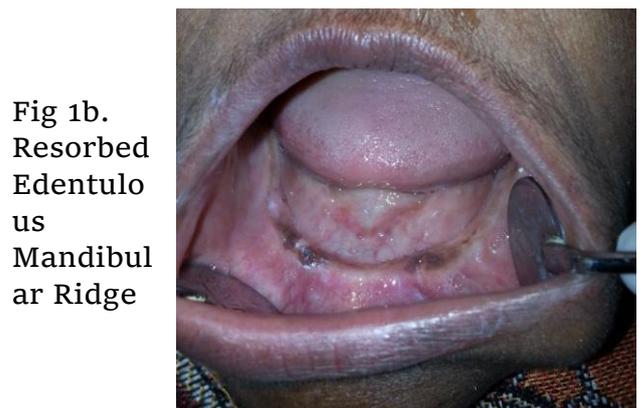


Fig 1b.
Resorbed
Edentulous
Mandibular
Ridge

Technique

The maxillary denture was fabricated up to the trial denture stage in the conventional manner. The trial denture was duplicated in reversible hydrocolloid and poured in dental stone. A template of the duplicated trial denture was made by adapting 0.5-mm thermoplastic sheet on the recovered cast using vacuum heat-pressed machine (Fig 2).



Fig 2. Thermoplastic Template

The trial denture was then processed in the standard manner up to the wax elimination stage. Two layers of baseplate wax were adapted to the definitive cast, conforming to the border extensions. A second flask was used to invest this baseplate wax and processed in conventional manner (Fig 3).



Fig 3. Permanent Denture Base

After deflasking the clear matrix was placed on the definitive cast. An endodontic file with a rubber stop was used to measure the space between the matrix and the processed base. Vinyl polysiloxane putty [Aquasil, Dentsply Corporation, Germany] was mixed and adapted on the base and shaped to the approximate contours of the matrix (Fig 4).



Fig 4. Putty Adapted Over Permanent

Clear matrix was filled with wax leaving just a thin space for a cold cure acrylic shim (Fig 5). The putty was fixed to the base using cyanoacrylate. Then cold cure acrylic resin was packed over putty with clear matrix placed over it (Fig 6). Once the shim has polymerized, silicone putty was removed. The two parts were joined using auto-polymerising acrylic resin and then tested for complete seal by placing it in water. The original counter was resealed on the initial base and verified for complete closure of the flask. Heat cure acrylic resin was packed and processed in the conventional manner. The processed denture was recovered in the usual manner.

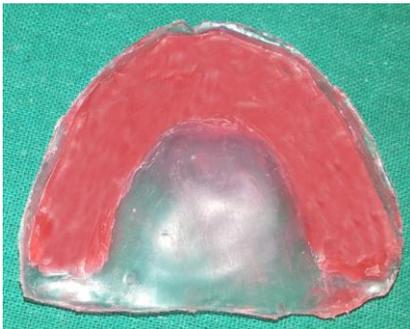


Fig 5.
Thermoplastic Template
Filed With
Wax

Fig 6 .
Making of
Cold Cure
Acrylic
Shim



The denture was polished in the usual manner and the seal was verified by immersing the denture in water (Fig 7) (air bubbles should not be evident after immersing the denture in water).



Fig 7. Hollow Maxillary Denture

Discussion

Greater the amount of resorption in maxillary or mandibular ridge lesser will be the amount denture bearing area which in turn will compromise the retention, stability and support. In general, a heavy denture whether maxillary or

mandibular is likely to cause poor denture bearing ability. The care of severely resorbed ridges is mainly taken care by broad area coverage upto certain functional limits, decreased bucco lingual width of the teeth, avoidance of inclined planes, improved tooth form, adequate interocclusal distance apart from a hollow denture base.

Hollow maxillary complete denture considerably reduces the weight of the prosthesis, and thus prevents the transmission of the detrimental forces, which would otherwise be transmitted from a conventional heavy prosthesis to the underlying tissue and bone. Thus, it helps to preserve underlying tissue and bone.

The clear matrix of the trial denture helps in shaping of putty spacer to ensure the thickness of acrylic to resist deformation and prevent seepage of saliva into the cavity. A simplified technique for fabricating light weight maxillary dentures using putty without compromising denture strength has been described in this article

Conclusion

Rehabilitation of severely resorbed ridges is one of the major challenge a prosthodontist face in his clinical practice. Although a number of treatment options are available like overdenture, implant retained over denture, ridge augmentation etc. but usually the patient that present with such problems are geriatric patients with various systemic illness.

Thus, the best way is to rehabilitate them is with conventional complete dentures. Apart, from modifying the impression technique to get maximum denture bearing area, modifying the type of denture also may be better accepted by

patients. Hence, decreasing the weight of the denture for healthy and comfortable living is a good viable option.

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