



Original Research Article

Management of severely resorbed mandibular ridges: A case report

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Abstract

A severely resorbed mandible poses a clinical challenge for the fabrication of a successful complete denture. This article includes a laboratory procedure to make a hollow space between the two halves of the mandibular denture in order to reduce the weight of the prosthesis, which in turn exerted less pressure on the already resorbed mandibular ridge.

Key words: severely resorbed mandibular ridge, hollow mandibular denture, reduced load on the ridge

Introduction

Physiological, aesthetic and functional variables are associated with successful conventional complete denture therapy. Despite the development of dentures supported by osseointegrated implants, rehabilitation of resorbed residual ridges is still a challenge. Conventional restoration of the severely atrophied mandibular ridge has sparked a number of designs to accommodate patients who have difficulty wearing a mandibular denture.

The following two case reports describe two laboratory techniques where hollow complete lower dentures were planned for patients with severe mandibular ridge resorption.

Case reports

Case report 1

A 56 year old female patient reported to the outpatient Department of prosthodontics, Sardar patel post graduate institute of dental and medical sciences, Lucknow, Uttar Pradesh, with the chief complaint of loose upper and lower existing complete dentures. The patient was unable to chew or speak properly as the dentures kept moving out of their position. The patient gave a history of being a denture wearer for the past three years.

Medical history revealed no underlying systemic disorder. On examination the patient presented completely edentulous maxillary and mandibular arches (fig.1), mucosa being healthy, firm and resilient. The mandibular ridge was severely resorbed. Examination of the old dentures revealed that the maxillary denture had adequate stability but lacked retention because of short flanges. The mandibular denture lacked both retention and stability. A conventional maxillary denture and a hollow mandibular complete denture were planned.

Case report 2

A 70 year- old female patient reported to the outpatient Department of Prosthodontics in sardar patel post graduate institute of dental & medical sciences, Lucknow, Uttar Pradesh, with a presenting complaint of ill-fitting denture. The patient gave a history of being a denture wearer for the past 10 years. Within this span her dentures were replaced only once, the dentures were not in proper occlusion. The acrylic teeth were worn out and there was loss of vertical dimension (fig.2). The patient was unable to chew or speak properly as the dentures kept moving out of their position. Intraoral examination (fig.3) revealed a severely resorbed mandibular ridge. The patient was assessed with a view of providing her with an implant retained complete mandibular denture in order to minimize the rate of resorption. But the patient was reluctant to be subjected to the surgical procedures, so as an alternative the patient was treated with a hollow complete lower denture.



Fig1



fig 2



fig 3

Laboratory procedure:-

The primary impressions, final impressions, master casts were made by using standard techniques for both maxillary and mandibular arches. A single layer of modelling wax was adapted on the mandibular master cast. Five notches were made along the border of the wax (fig.4). Using the conventional laboratory procedures, a processed record base of heat cure acrylic resin was made on the mandibular final cast (fig.5). Then, adequate thickness of putty was applied on the processed record base leaving at least 2 mm of border area for the fusion of two halves of the denture. The thickness of the applied putty provided the hollow space present between the two halves of the hollow mandibular denture (fig.6). separating media was applied over the putty and a denture base of self-cure acrylic resin was made over it on which occlusal rims were fabricated(fig.7). Conventional trial denture base with occlusal rims was fabricated for the mandibular arch (fig.8). Jaw relation record were made and transferred to a semi-adjustable articulator.



Fig 4



fig 5



fig 6



Fig 7



fig 8



fig 9

Double Helix Research

After trial, the waxed maxillary and mandibular dentures were invested in the flask with dental plaster. After dewaxing, the two halves of the flask were separated and the trial denture bases were removed for both maxillary and mandibular arches. The upper half of the flask contained the mandibular teeth embedded in plaster and the lower half contained final cast, along with the heat processed record base and adapted putty along with self cure acrylic resin denture base. The trial denture base made up of cold cure acrylic resin removed.

Two different techniques were used from here onwards, in the first technique the putty was used to create the hollow space and in the, second, salt is used to create the hollow space.

Technique 1: with the putty in place over the mandibular heat processed record base, a sheet of cellophane were applied (as separating media) and packing done (fig.10). Trial closure was done and the denture was cured following the conventional short curing cycle compression moulding technique. After completion of curing, the denture was removed in two halves; the upper containing the teeth and the lower record base. Putty was removed from the lower half, and the two halves were sealed with auto polymerising acrylic resin.

Technique 2:-after trial closure, the putty was removed and the space was filled with table salt and flask closed (fig.11).both the denture halves were cured together following the conventional short curing cycle compression moulding technique after curing, two holes were made on the lingual slope of the mandibular denture and salt was flushed out with the help of syringe filled with water (fig 12). These holes were closed using self cure acrylic resin (fig.13).

The denture was then tested for complete seal by placing in water (fig.14).the denture was then remounted for occlusal refining followed by finishing and polishing and then delivered. The patientswere put on regular recall appointments for post insertion phase.



Fig 10



fig 11



Fig 12



fig 13



Fig 14

Discussion:-

Patients with severely resorbed mandibular ridges often suffer from problems of insufficient retention and stability with the mandibular denture. They also present with mucosal intolerance to loading, pain, difficulties with eating and speech, loss of soft-tissue support, and altered facial appearance.

A severely resorbed mandibular ridge results in a more constricted residual ridge, decreased supporting tissues and a resultant large restorative inter ridge space. The latter may result in a heavy mandibular complete denture. A number of clinicians^{1,2} recommend “weighted” mandibular dentures for severely resorbed lower ridges. A.H.Grunewal³ (1964) recommended that gold base being heavy, helps in retention of lower denture and has closest adaptation to the underlying tissues. J.L.Wormley⁴ et.al. (1974) also described the advantages of weighted dentures apart from offering the advantages of a cast metal base along with the ease of adjustment and relining. However, studies⁵ have shown that weight may not contribute to the retention and stability of a lower denture. Extra weight may, in fact, cause an accelerated resorption of the residual ridge^{6,7}. This may be due to the continuous pressure exerted on the residual ridge by the heavy denture even at rest. In order to avoid this problem, the presented cases were treated with a hollow mandibular complete denture, which resulted in approximately 25% of reduction in the weight of the denture in comparison with the conventional denture. This may be applicable to situations where there is severe atrophy of the residual alveolar ridges and placement of implants is not a realistic option.

Summary:-

A technique for fabricating a hollow complete mandibular denture has been presented with the objective of emphasizing the need to preserve the remaining alveolar bone by the use of hollow dentures in situations where there is excessive resorption of the residual ridge. The advantage is in the reduction of excessive weight of the acrylic resin that may decrease the load on the compromised residual alveolar ridge.

Differences between the two techniques:

Putty technique	Lost salt technique
1. Final prosthesis in two halves, hence has to be sealed with autopolymerising acrylic resin	1. Final prosthesis in single piece, hence no chance of marginal leakage
2. Chances of marginal leakage, discoloration at junction.	2. Since salt is used, chances of porosity due to inadequate pressure at flask closure
	3. technique sensitive

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