

Internally Weighted Denture for Management of Severely Resorbed Mandibular Ridges : A case report.

Abstract:

Rehabilitation of patients with severely resorbed mandibular ridges can be a clinical challenge where implants could not be a treatment of choice. Weighted mandibular dentures have been one of the treatment modality for the management of severely resorbed mandibular ridges. However in cases where the supporting edentulous alveolar mucosa is not appropriate for loading with a cast metal base, an internally weighted mandibular denture can be used. This article reports a case of severely resorbed mandibular ridge for which an internally weighted mandibular denture was fabricated with a customized weighted metal base using plaster index of the tooth arrangement as a guide. It is one of the non-invasive treatment option which provide stability, retention and function without altering the aesthetics of the denture

Key-words: Resorbed mandibular ridge, internally weighted denture, plaster index.

Introduction:

Bone resorption is a chronic, progressive and irreversible process that occurs in all patients and is one of the main cause of loss of denture stability and retention especially in case of mandible.[1] Rehabilitation of patients with severely resorbed mandibular ridges can be a clinical challenge where implants could not be a treatment of choice.

Modifying the design of denture flanges, occlusal scheme, and improving residual ridge contact are different methods that have been proposed to manage the patient with severe mandibular alveolar ridge resorption.[2] Weighted mandibular dentures have been one of the treatment modality for the management of severely resorbed mandibular residual alveolar ridges.[3] It was described as “the denture made using special heavy materials for denture stability”.[4]

Several metal bases and frame-works have been used to reinforce the mandibular denture. Grunewald introduced gold framework to compensate for the weight loss that occurred after extensive resorption in mandibular residual ridges.[5]

Belfiglio advocated the use of metal bases to reinforce the complete dentures in cases where a high degree of dimensional change is expected during processing or when an increase in strength is needed.[6] Defurio and gehl described the use of chrome-cobalt as one of the most retentive base material for the foundation of maxillary complete dentures.[7]

Co-cr alloys are among the best known base metal alloys in dentistry that have high strength and possess excellent biocompatibility.[8] Additionally, they are more retentive, act as a stable record base, deform less during lateral mandibular function and have more accurate tissue detail.[6]

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Received : 9 May, 2023 **Published :** 15 May, 2024

Access this article online	
Website: www.ujds.in	Quick Response Code 
DOI: https://doi.org/10.21276/ujds.2024.10.1.23	

How to cite this article: Surabhi Thakur, S. T. (2024). Internally weighted denture for management of severely resorbed mandibular ridges : A case report. UNIVERSITY JOURNAL OF DENTAL SCIENCES, 10(1).

In cases where weighted mandibular denture is indicated, but the supporting edentulous alveolar mucosa is not appropriate for loading with a cast metal base, an internally weighted mandibular denture can be used. This treatment modality provides the benefit of the additional weight and avoids direct contact of the metal base with the mucosa. [3] Different authors have described different techniques to position and fabricate the internal metal bases during denture processing. Wormley and brunton described a method of fabricating internally weighted mandibular dentures with metal casting.[9] Hurtado reported a technique where tissue stops were used to position the metal frame in position while fabricating an internally weighted mandibular denture.[3] Kim et al described a method for fabricating an internally weighted mandibular complete denture using a processed denture base and a plaster index of the preliminary tooth arrangement.[10] Balch et al described a recent technique where the vertical posts extending from the framework into the definitive cast were used to maintain space beneath the framework during acrylic resin processing.[11]

This article describes a method for fabricating an internally weighted mandibular complete denture using a cast metal insert in a processed denture base and a plaster index of preliminary tooth arrangement. Optimal esthetic and functional outcome is obtained by customizing the design and position of the metal base which also allow for conventional relined procedures.

Case Report :

A male patient aged 52 years reported to the department of Prosthodontics and Crown & Bridge with a chief complaint of broken lower denture. The patient was a denture wearer from past 3 years. He got his dentures replaced twice both times the reason being midline fracture of the lower dentures. Intraoral examination revealed severe mandibular residual ridge resorption. The patient insisted on making a new set of dentures which won't get fractured. The patient was assessed and it was decided to fabricate the mandibular denture reinforced with a metal framework.

1) A full-coverage preliminary mandibular impression was made using stock impression tray and irreversible hydrocolloid. Maxillary final impression was made using a custom tray and zinc oxide eugenol impression paste and was poured in type 3 dental stone. As the mandibular ridge was severely resorbed, the lower impression was made using McCord's technique. The occlusal vertical dimension was determined using trial bases with wax occlusion rims and casts were mounted with facebow and centric relation record. The trial dentures with denture teeth arranged were placed intraorally and evaluated clinically [Figure 1].



Figure 1: Try in

2) The land area of the mandibular definitive cast was scored to make a plaster index of the mandibular tooth arrangement [Figure 2 and 3].



Figure 2: Plaster index with secured teeth setting



Figure 3: Checking clearance with plaster index on master cast teeth setting

3) Two layers of baseplate wax were adapted, one over the entire edentulous ridge of the cast to create a processed denture base described by Graser [12] and a second layer to incorporate the shape of a subsequent wax insert for the metal base [Figure 4].



Figure 4: Wax up for permanent denture base with slot for metal casting

4) The waxup was processed resulting in denture base with slot for metal casting [Figure 5].



Figure 5: Processed denture base with slot for metal casting

5) This assembly was duplicated and a refractory cast was obtained from it [Figure 6].



Figure 6: Refractory cast of processed denture base

6) A custom wax insert or pattern of metal base and indexed denture teeth was fabricated on the refractory cast to provide optimal base fit and to improve the esthetics. Beads were added to increase base retention [Figure 7].



Figure 7: Beads incorporated in the wax pattern to increase denture base retention

7) The sprues were then fixed [Figure 8] and the pattern was casted in base metal [Figure 9].



Figure 8: Wax pattern for metal denture base



Figure 9: Definitive cast with processed

with sprue former denture base and metal casting in place

8) The cast metal base was placed on the processed denture base and with the aid of a plaster index, denture teeth arrangement was completed and the final waxing on the cast metal base was done [Figure 10].

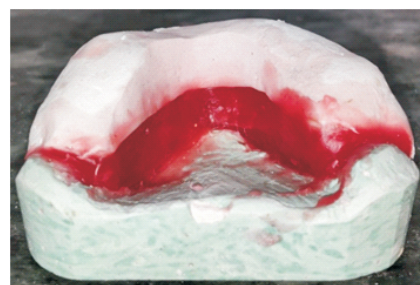


Figure 10: Waxup of assembly including metal casting, processed denture and teeth arrangement secured with plaster index

9) The waxed trial denture base with adapted cast metal insert was processed with high impact heat polymerized acrylic resin.

10) The prosthesis was retrieved and polished for the denture placement [Figure 11,12,13].



Figure 11: Processed metal weighed mandibular denture



Figure 12: Final prosthesis in occlusion



Figure 13: Postoperative frontal view

Discussion:

Severe resorption of the mandibular alveolar ridge contributes to instability of the conventional acrylic resin denture.[13] An internally weighted mandibular denture is one of the non-invasive treatment option which provide stability, retention and function without altering the aesthetics of the denture. It offers the main advantage of a cast metal base along with ease of adjustment and relining. The only disadvantage is increased laboratory steps and cost, but this is negligible when compared with its advantages and worth. Also they are not indicated for the patients with weak labial musculature or those who stoop. In bent position the weight of denture will make it fall out of the mouth.

Conclusion:

This article describes a new fabrication technique for a weighted mandibular denture base. Reinforcement of denture by a customized metal framework well adapted to the ridge is an optimal treatment alternative in case of severely resorbed mandibular ridge. This will help in achieving appropriate contour of the denture base with minimal metal display and may benefit the patient when implant placement or pre-prosthetic surgery is not an option.

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