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Case Report

Internally weighted mandibular denture: Addressing severe resorption for enhanced stability and comfort: A case report

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ABSTRACT

The prosthetic rehabilitation resorbed mandibular ridges presents a clinical dilemma when opting not to proceed with endosteal implants. Over time, mandibular complete dentures supplemented with extra weight have demonstrated efficacy in meeting the requirements of patients with significantly resorbed ridges. The weight of such dentures, crafted from cast metal, has conventionally been calculated by taking into account the weight of the wax and the density of the alloy. This clinical report outlines the case of a 68-year-old woman with a significantly resorbed mandibular ridge, emphasizing the application of a weighted mandibular complete denture.

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1. Introduction

The resorption of the mandibular alveolar ridge plays a considerable role in the instability and discomfort associated with traditional acrylic resin dentures.¹ Alveolar ridge resorption can be addressed through various surgical implantation and vestibuloplasty techniques. In situations where alternative techniques are not doable due to factors like medical contraindications, economic reasons and patient preferences. The fabrication of a stable and functional mandibular denture can be achieved through use of a metal-based denture. The inherent strength, weight and design cater to the patients' needs. It is noteworthy that improper processing technique of incorporating the metal base may cause irritation to the residual alveolar ridge and oral tissues.²

The addition of metal bases has been put to use to address challenges associated with unfavourable residual alveolar ridge and consolidate the foundation of mandibular dentures. Grunewald advocated for gold as the optimal

metal for managing the resorbed mandibular residual ridge. In his research, he juxtaposed the weight of the average gold base against the combined weight of teeth and bone lost due to extraction and extensive resorption. Grunewald recommended a gold base of around 16 dwt (25 g) for an average-sized mandible.³

Belfiglio recommended the utilization of metal bases in the manufacturing of complete dentures, particularly in cases anticipating significant processing changes or requiring additional strength. DeFurio and Gehl emphasized that chrome-cobalt stands out as the most retentive material for the base of maxillary complete dentures.^{4,5}

Page stated that mucostatic impression technique enhanced the stability of the denture base. This technique minimizes unbalanced pressures on compromised residual ridges and reduce resorptive changes in the hard tissue architecture. The cast obtained from a mucostatic impression is employed in the creation of a myostatic denture border. This design incorporates a border that terminates just before reaching muscle attachments, in contrast to utilizing a functionally molded border. Such a denture border is designed to prevent interference with

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muscle attachments, thereby reducing the potential for dislodging forces.^{6,7}

This case report aims to put forward the treatment of a resorbed edentulous mandibular ridge. The approach involves fabrication of mandibular denture incorporated with an internally weighted metal base.

2. Case Report

A 68-year-old female patient presented to the department of prosthodontics and crown & bridge with a concern about ill-fitting dentures. Various fixed and removable treatment options were discussed and according to the economical the fabrication of an internally weighted mandibular complete denture was planned after careful consideration of her concerns.

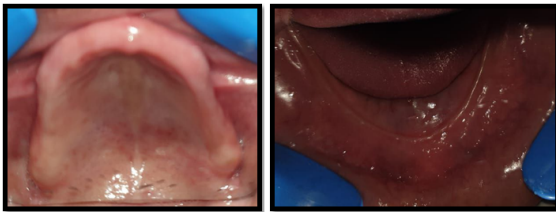


Figure 1: Well rounded maxillary arch and resorbed mandibular arch



Figure 2: Primary impression

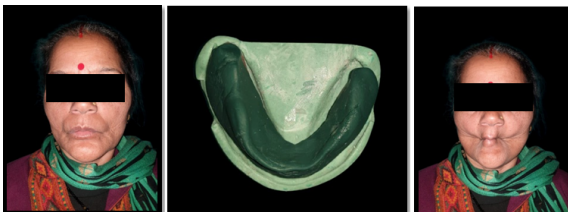


Figure 3: Recording the neutral zone

Completely edentulous maxillary and order 5 edentulous mandibular arch (Figure 1) were examined for any

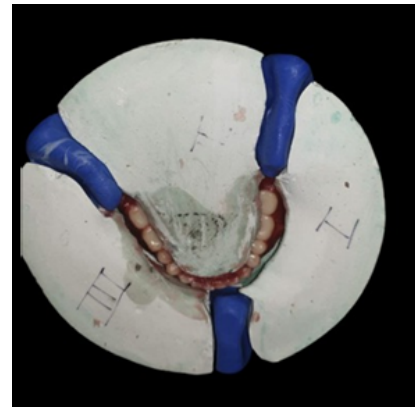


Figure 4: Teeth arrangement in the neutral zone



Figure 5: Wax pattern

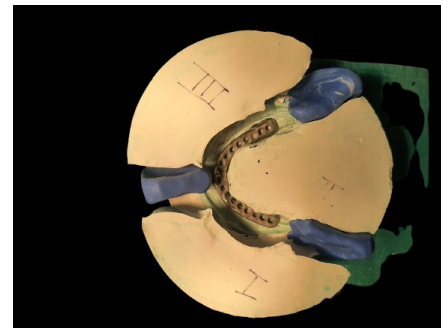


Figure 6: Metal denture base



Figure 7: Final denture with internally weighted denture base

abnormalities and primary impressions were made for completely edentulous maxillary and mandibular arches using reversible thermoplastic impression material and irreversible hydrocolloid impression material respectively (Figure 2). Special trays were fabricated on the obtained preliminary casts. This was followed by border and moulding of maxillary and mandibular arches using low fusing reversible thermoplastic impression material and final impression was made using light body addition silicone (Aquasil Ultra LV; Dentsply Sirona) following the selective pressure technique. The obtained master casts were blocked out to fabricate maxillary and mandibular record bases. Occlusal rims were fabricated and maxillomandibular relationships were recorded.

An additional mandibular record base was fabricated to make a neutral zone record using greenstick compound (\$). Plaster index was made for the neutral zone record and teeth arrangement was done in the obtained neutral zone record (Figure 4). Wax pattern was made in the neutral zone area (Figure 5). A metal base was obtained following the casting of wax pattern using lost wax technique (Figure 6). The metal denture base was weighed at 15 gms and was evaluated intraorally. The occlusion and vertical dimension were evaluated in the trial dentures and necessary adjustments were made. This was followed by processing of dentures. The processed dentures were finished and polished and final denture insertion was done (Figure 7). The assessment of stability, retention, occlusion, phonetics and aesthetics was done. The denture was determined to be satisfactory for delivery. The dentures were reassessed at 24 hours, 3 days, 7 days and 6 months after insertion. The patient was satisfied with the comfort and stability afforded by the weight of the mandibular denture.

3. Discussion

The clinical report authored by Flores F. A. details the treatment approach for a severely resorbed mandibular ridge which involved the fabrication of an internally weighted mandibular denture with selective laser melting (SLM) technology. The metal base was weighed in accordance with the volume of digital file designed for the manufacturing of metal base.⁸

Massad JJ described technique for severely resorbed residual alveolar ridges. A stable denture base is achieved by use of mucostatic impression technique, myostatic denture base design with addition of metal base and implementation of noninterceptive occlusion by using monoplane posterior

teeth. Soft liner was applied to relieved denture base to enhance tissue comfort and compatibility.⁹

4. Conclusion

The present case report showcases a viable treatment of a resorbed residual alveolar ridge by wielding an internally weighted metal base into the denture that effectively appeases the patient experiencing advanced unfavourable residual ridge resorption.

5. Source of Funding

None.

6. Conflict of Interest

None,

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