

# Case Report

## Single Maxillary Complete Denture with Reinforced Metal Denture Base: A Case Report

<sup>1</sup>Shreya Ganpat Raikar, <sup>2</sup>Aswini Kumar Kar, <sup>3</sup>Anjana Raut

<sup>1</sup>Post Graduate Student, <sup>2</sup>Professor, <sup>3</sup>Reader, Department of Prosthodontics, Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Bhubaneswar, India

### ABSTRACT:

Treatment with a single complete denture poses a number of challenges to the clinician and necessitates careful assessment and planning. Despite the fact that heat cure denture base resins are the most commonly used denture base material, they frequently fracture when a single complete denture is placed against the natural dentition. In such situations, using a metal denture base as an alternate treatment option offers numerous benefits. Metal denture base leads to improvement in physical properties of the prosthesis.

**Keywords:** Single Complete Denture, Metal Denture, Impression, Prosthesis.

**Received:** 01 March, 2022

**Accepted:** 13 April, 2022

**Corresponding author:** Shreya Ganpat Raikar, Post Graduate Student, Department of Prosthodontics, Kalinga Institute of Dental Sciences, KIIT Deemed to be University, Bhubaneswar, India

**This article may be cited as:** Raikar SG, Kar AK, Raut A. Single Maxillary Complete Denture with Reinforced Metal Denture Base: A Case Report. J Adv Med Dent Scie Res 2022;10(4):61-64.

### INTRODUCTION

It is not uncommon for the Single Complete denture to oppose all or some of the mandibular natural teeth. Single complete dentures may be opposed by: natural teeth, fixed restorations, a removable partial denture or an existing complete denture.<sup>1</sup> The most common clinical situation involving a single complete denture is that of an upper complete denture and lower natural teeth.<sup>2</sup> When it comes to rehabilitating patients with clinical patterns, the dentist faces numerous challenges. Polymers are the dominant material for the fabrication of denture bases. Materials such as polymethyl methacrylate may be molded and polymerized by use of a variety of techniques. At a low cost, these polymeric bases provide appropriate physical, biologic, and aesthetic properties. However, in some cases, these bases fail due to poor denture base adaption. When fabricating a single complete denture against the natural and permanent teeth, high masticatory pressures can induce failure. Metal alloys have been employed to reinforce the bases and prevent fracture in those conditions.<sup>3</sup> Metal-based dentures have a variety of value. They are more retentive, have a lower fracture rate, have better thermal conductivity, act as a stable record base, cause fewer sore spots, maintain the residual alveolar ridge better, are less

porous, distort less during lateral mandibular function, and provide better tissue detailing accuracy.<sup>4</sup> Thinner metallic denture bases also reduce interferences with phonation. They also do not show sorption related changes as seen in denture base resins. This case report describes the prosthodontic management of a single complete denture reinforced with a metal denture base.

### CASE REPORT

A 38 -year-old female patient reported to the Department of Prosthodontics, Kalinga Institute of Dental Sciences, Bhubaneswar, Odisha, India, with a chief complaint of missing teeth in upper arch and wanted them to be replaced by prosthesis to restore esthetics and speech. A complete case history was recorded (Fig 1). The main reason for missing teeth was generalised periodontitis. Past dental history she got treated with 4 unit fixed prosthesis in the lower arch. Also, a thorough intraoral examination was done. The maxillary arch was completely edentulous supported by a well formed ridge. Mandibular teeth were having good periodontal support without any associated mobility. Patient was also asked to get a full mouth radiograph (OPG) and undergo routine blood investigations in which no significant

abnormality was detected. A treatment plan was formulated and the patient was advised to opt for a single complete denture for maxillary edentulous arch with metal denture base. The patient was educated and motivated regarding the use of removable single complete dentures.

#### TREATMENT PROCEDURE

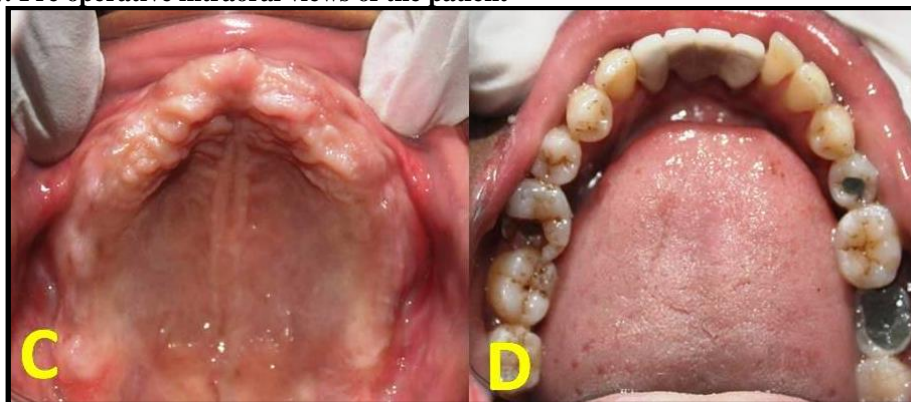
Preliminary impression of the edentulous maxilla was made with impression compound and was poured with plaster of paris for the fabrication of a custom special tray. The peripheral tracing procedures were completed with green stick impression compound and the secondary impression was made with zinc oxide eugenol impression material. Master cast was poured with dental stone type III. (Fig 2) Duplication of master cast was done by using reversible hydrocolloid AGAR impression material and poured with refractory material. Wax pattern was made on refractory cast invested with phosphate-bonded investment material, and casting was done. Metal denture base was fabricated. (Fig 3) Trial denture base and occlusion rim were fabricated. At this stage, jaw relation records were used to mount and verify the

positions of maxillary and mandibular casts. After mounting, tooth arrangement was done according to anatomic, functional, and esthetic guidelines by establishing bilateral balanced occlusion. Adjustments in the artificial teeth were incorporated in preference to making natural teeth. Though a perfect balanced occlusion is impossible to achieve in such cases with involvement of natural teeth and fixed dental prosthesis in opposing arch, a maximum effort was made to get an occlusion that was as close to balanced occlusion. Trial of the denture was done. (Fig 4) Denture fabrication was done with conventional method using heat cure resin poly methyl methacrylate by keeping metal framework at the respective maxillary cast. A butt joint was created palatal to the crest at the junction of acrylic and metal to enhance the strength of metal acrylic junction. This helps in creating a smooth joining of acrylic with metal avoiding any step formation, thus making it comfortable for the patient. Maxillary denture was inserted into the patient's mouth after the occlusal adjustment, and proper care and maintenance of the prosthesis instructions were given to the patient. (Fig 5)

**Fig 1 (A&B): Pre operative extraoral views of the patient**



**Fig 1 (C&D): Pre operative intraoral views of the patient**



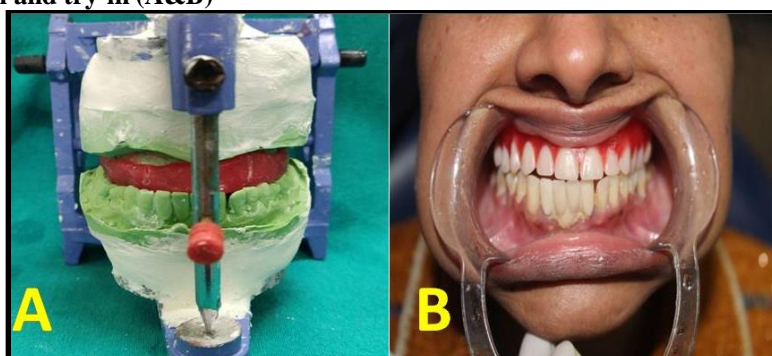
**Fig 2: Impressions and final cast (A,B,C)**



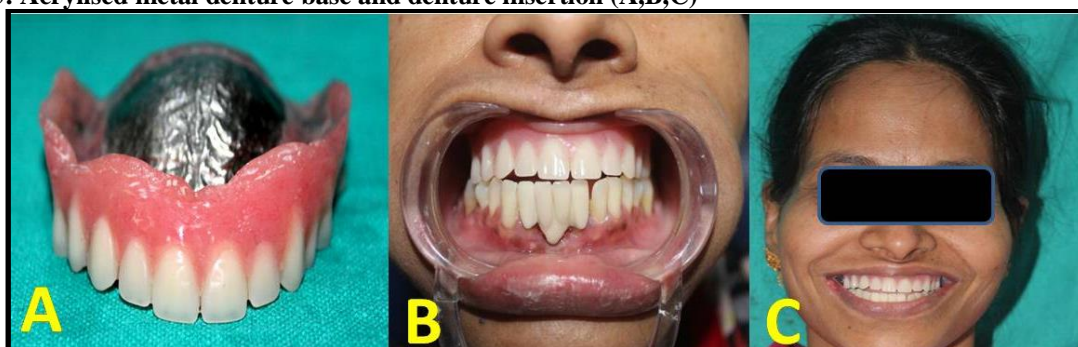
**Fig 3: Metal denture base**



**Fig 4: Jaw relation and try-in (A&B)**



**Fig 5: Acrylised metal denture base and denture insertion (A,B,C)**



## DISCUSSION

Metal bases for complete dentures have been used successfully and provide many advantages over the more commonly used acrylic resin. According to (GPT 9), Metal Base is defined as the metallic portion of a denture base forming a part or the entire basal surface of the denture; it serves as a base for the

attachment of the resin portion of the denture base and the teeth. Major indication of complete denture reinforced metal base where patients with natural dentition or fixed dental prosthesis in opposing arch as presence of unmodified opposing dentition prevents occlusal balance during function, thereby compromising stability and retention and eventually

leading to frequent mechanical failures of the prosthesis. Metal bases for complete dentures are indicated when a high degree of processing change is expected such as with a deep palatal vault or when additional strength is needed. The use is also indicated in overdentures, because the stresses are concentrated over small parts of the dentures or shallow, flat palates, because these anatomic features allow for flexure that can result in fractures; and in patients with compromised neuromuscular coordination who may drop their dentures.<sup>4</sup> There are various ideal requirements of a denture base material that it should be biocompatible. Material should have good abrasion resistance as well as high thermal conductivity. Density and solubility and sorption to oral fluids should be less. Cast metal denture bases have various advantages over acrylic bases.<sup>5</sup> Denture with metal base is not only rigid and fracture resistance, but it also has good strength-to-volume ratio that makes it light weight. It is highly biocompatible. Thermal conductivity is more and enhances tissue health, less interferences with speech,

and better adaptation to soft tissue.<sup>6</sup> The few disadvantages regarding metal denture base include increased cost, increased laboratory working time, difficult relining/rebasing and the possible allergy to metal.

## REFERENCES

1. Zarb GA, Bolender CL, Hickey JC, Carlsson GE. Boucher's prosthetic treatment for edentulous patients. 11th ed St. Louis: CV Mosby, 1990:503.
2. Ellinger CW, Rayson JH, Henderson D. Single complete denture. J Prosthet Dent. 1971;26(1):4-10.
3. Grunewald AH. Gold base lower dentures. J Prosthet Dent 1964;14:432-441.
4. Belfiglio EJ. Using metal bases in making complete dentures. J Prosthet Dent. 1987;58(3):314-7.
5. Lamb DJ, Ellis B, van Noort R. The fracture topography of acrylic dentures broken in service. Biomaterials 1985;6(2):110-112
6. Atwood DA. Final report on the clinical requirement of ideal denture base materials. J Prosthet Dent. 1968;20:101.