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IP International Journal of Maxillofacial Imaging

Journal homepage: <https://www.ijmi.in/>

## Case Report

# Metal reinforced single complete maxillary overdenture: A case report

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### ARTICLE INFO

#### Article history:

Received 29-07-2024

Accepted 24-08-2024

Available online 03-10-2024

#### Keywords:

Maxillary arch

Metal denture base

### ABSTRACT

Treatment with a single complete denture prosthesis presents the clinician with several challenges that require appropriate assessment and planning. The recommendation of such treatment can be conditioned by a wide variety of conditions that often jeopardize success if the opposing jaw is not treated optimally. Although dentists generally use heat-curing denture base acrylics as the denture base, individual full dentures made of this material often break off in contrast to the natural dentition. In such cases, opting for a metal denture base as an alternative treatment option offers many advantages. This case report describes the step-by-step fabrication of a single complete denture with a metal denture base.

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## 1. Introduction

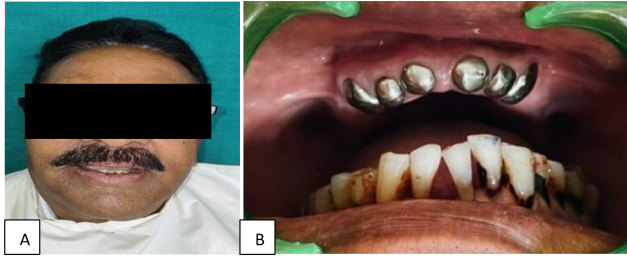
Zarb et al. (1990) found that a single complete denture can be opposed by natural teeth, fixed dentures, a removable partial denture or an existing complete denture.<sup>1</sup> Ellinger et al (1971) found that the most common clinical situation with a single complete denture is an upper complete denture and lower natural teeth.<sup>2</sup> Mattie and Phoenix (1996) stated that thermoset denture base resins are commonly used for denture bases but may fracture under excessive masticatory forces in single complete dentures.<sup>3</sup> Koper mentioned that occlusal problems and fractures of the denture base in single dentures may result from occlusal loading of the maxillary denture and the underlying edentulous tissues by the teeth and musculature accustomed to the opposing natural teeth, as well as from the position of the mandible.<sup>4</sup> Overdenture therapy is essentially a preventive prosthetic concept, as it attempts to preserve the few remaining natural teeth. The tooth must be endodontically treated to allow sufficient reduction of the clinical crown.<sup>5</sup>

Fractures are caused by loading the overdenture in certain anatomical areas, e.g. flat palate areas, and in patients with impaired neuromuscular coordination who may drop their prosthesis. The few disadvantages include the higher costs, the longer working time in the laboratory, the difficult relining and the possible allergy to metal. The step-by-step fabrication of a single complete denture with a metal denture base is described in this case report by Belfiglio (1987).<sup>6</sup> A 59-year-old male patient presented to the Department of Prosthodontics, S B Patil Institute for Dental Sciences and Research, Bidar, Karnataka, India. He complained of missing teeth in the upper dental arch and requested a prosthesis for esthetics and speech. The patient's complete medical history was taken and it was found that he had a history of two broken dentures. Intraoral examination revealed a completely edentulous maxillary arch with a well-developed alveolar ridge. The mandibular teeth had good periodontal support and were not mobile, but periodontal therapy was recommended due to gingival recession. The patient was advised to undergo a full mouth radiograph (OPG) and routine blood tests, which showed no significant abnormalities. A treatment plan was created

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which recommended a single full denture for the edentulous maxillary area. The patient was informed and motivated about the use of removable single prostheses.



**Figure 1:** A): Preoperative patient profile image; B): Intraoral image showing metal copings over prepared abutment teeth in maxilla

1.1. Classification of single complete denture (Driscoll, 2004)<sup>7</sup>

1. Class 1: Balance can be achieved with minor or no tooth reduction for patients.
2. Class 2: Patients for whom minor additions to the height of the teeth are needed to obtain balance.
3. Class 3: Patients for whom both reductions and additions to teeth are required to obtain balance.
4. These patients are usually treated with a change in vertical dimension of occlusion.
5. Class 4: Patients who present with occlusal discrepancies that require addition to the width of the occluding surface are in Class 4.
6. Class 5": Combination syndrome is presented by patients in Class 5.

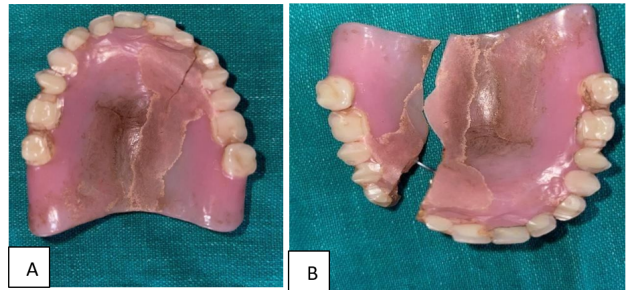
For the primary impression, medium-fusing impression material (DPI, Mumbai) was used for the maxillary arch and irreversible hydrocolloid impression material (Zhermack, Italy) for the mandibular arch. After disinfecting the primary impressions, we poured dental stone and dental plaster into the impressions. Then created a provisional recording base for the maxillary arch with self-polymerizing acrylic resin and an occlusal margin with modeling wax. After checking the distance between the arches with a diagnostic mount, a custom tray was fabricated on the primary model with a wax spacer. At the second visit, the dentist made the marginal impression with the customized tray and made a wash impression with elastomeric impression material.

The attachments used for overdenture can be classified as(A review of literature by Rasmita Kumari Samantaray, Krishna Nanda, Debashish Sahoo):

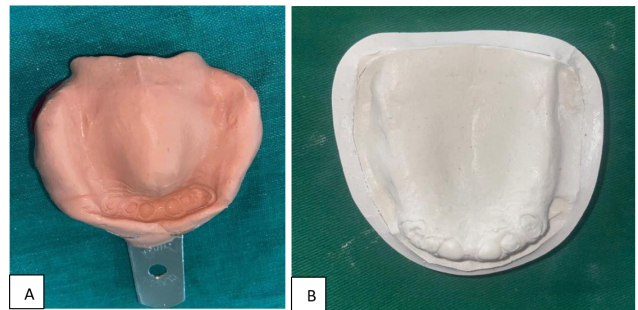
1. Stud attachment
2. Bar attachments
3. Magnetic attachments<sup>8</sup>

1.2. Indications for overdentures

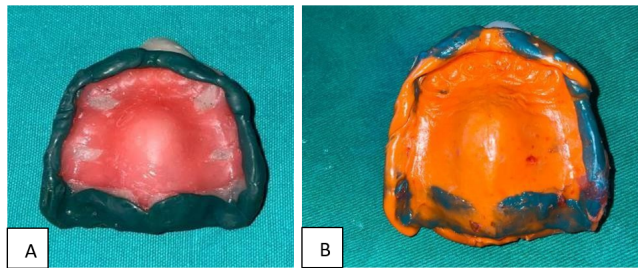
1. Morphologically compromised dental arches are better supported.
2. Cleft palate cases and congenital anomaly cases like microdontia, amelogenesis imperfecta, dentinogenesis imperfecta, and partial anodontia.
3. Dentures patients with maxillofacial trauma.
4. Patients with worn-out dentition.
5. Patients with abnormal jaw size and position where orthognathic surgery is contraindicated.<sup>8</sup>



**Figure 2:** A): Fractured denture at palatal vault area, B): Repeated attempt to repair denture using self cure and metal wire



**Figure 3:** A): Primary impression made with alginate; B): Primary cast



**Figure 4:** A): Border molding using low fusing compound; B): Secondary impression with elastomeric impression material (zhermack, zetaplus)



Disinfected the impression and poured a master cast using dental stone. Duplicated the master cast with agar-agar (reversible hydrocolloid) to create a working cast.(Figure 5)

Design the wax model of the metal framework on the working model of the edentulous maxilla and adapt it. Hold the wax model of the metal base just in front of the posterior palatal seal area to maintain control of the adaptability. Apply lubricant to the duplicated model so that the wax model can be easily removed. Attach 4 mm diameter sprues and a crucible former to the wax pattern and carefully lift it off the model to avoid deformation.(Figure 6) File the cast wax model with Bego investment material. Use a cobalt-chrome alloy (Bego, Germany) as the material for the denture base, as it is inexpensive and has good retention properties. Transfer the metal framework to the master cast and check the fit.

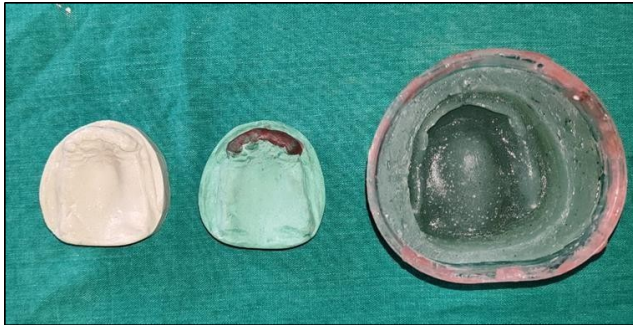


Figure 5: Duplicated master cast using Agar



Figure 6: Wax pattern with sprue attached for base metal casting

The essential border seal in the region was provided by carving out the posterior palatal seal on the master cast.(Figure 7) the maxillary metal denture base with the teeth arrangement was invested and dewaxed using the regular procedure. The denture was packed using the heat cure denture material (Trevalon) and cured in the regular way.

A wax occlusal rim was fabricated on the metal denture base and the upper and lower jaw relation was recorded. The articulator was fitted with master models using the jaw relation protocol. The maxillary teeth were arranged

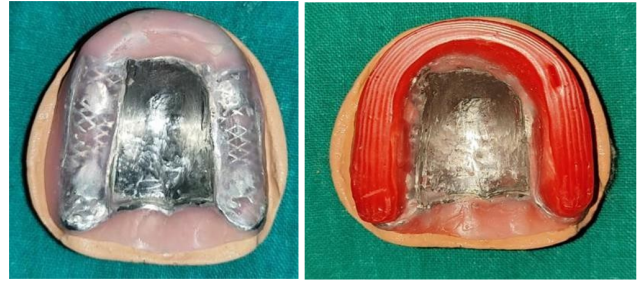


Figure 7:

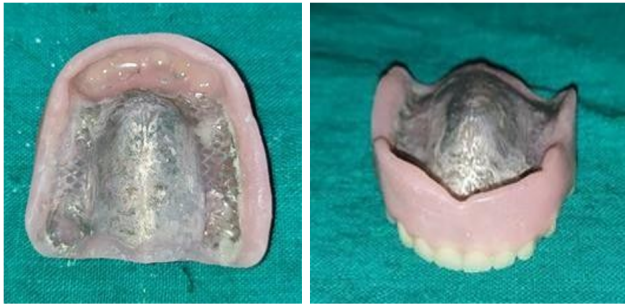
according to the contour of the maxillary occlusal rim and aligned along the occlusal surface. The try-in was attempted at the next appointment.



Figure 8: Facebow transfer made to record anteroposterior and mediolateral spatial positions of the maxillary occlusal rims in relation to the transverse opening and closing of the patient's mandible



Figure 9: Maxillary denture base with teeth arranged as trial denture



**Figure 10:** After bench cooling, the denture was removed, finished, and polished. Insertion was performed, and post-insertion instructions were provided to the patient



**Figure 11:** Postoperative profile image of patient

## 2. Conclusion

‘Achieving a harmonious occlusion is considered to be the most critical aspect of successful treatment with a complete denture. This desirable characteristic is usually more difficult to achieve than the arrangement of artificial teeth for opposing complete dentures. Various oral situations in which a single complete denture is indicated were discussed, and a clinical procedure for the treatment of patients who are edentulous in an arch was described.

## 3. Source of Funding

None.

## 4. Conflict of Interest

None.

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**Cite this article:** Puttaraj T K, Muchandi AC, Siddharth B, Arati H, Begum F. Metal reinforced single complete maxillary overdenture: A case report. *IP Int J Maxillofac Imaging* 2024;10(3):125-128.