CASE REPORT

Prosthesis on prosthesis: three-fourth metal crowns—a novel approach for metallic occlusion

Nivedita Pachore, Jayanti R Patel, Rajesh Sethuraman, Paranjay Prajapati

Department of Prosthodontics,
KM Shah Dental College &
Hospital, Sumandeep
Vidyapeeth, Vadodara, Gujarat,
India

Correspondence to
Professor Jayanti R Patel,
drjrpatel33@yahoo.com

SUMMARY

Single complete denture is a common occurrence which needs special attention in treatment. Denture reinforcement with metallic occlusion is recommended to prevent fracture of denture and wearing of artificial teeth. Various methods have been reported in the literature for metallic occlusion, which either compromise on aesthetics of the premolar teeth or need repeated procedures. This case reports the use of three-fourths metal crowns to achieve metallic occlusions in single complete denture.

BACKGROUND

Single complete denture opposing natural dentition is a common occurrence in clinical practice. When designing a complete denture, the dentist has complete control over the articulation of teeth, but this is rarely the case with a single complete denture. This article reports the case of a single complete denture with three-fourths metal occlusal in posterior teeth and reinforcement with a metal meshwork in the palatal area. Three-fourths metal occlusals were given for aesthetics, function and longevity.

CASE PRESENTATION

The patient aged 60 years, businessman by occupation, residing in Ahmedabad, reported to the department of prosthodontics, KM Shah Dental College and Hospital with the chief symptom of frequent fracture of maxillary complete denture at midline region and early wearing out of artificial teeth. He had a history of being edentulous for 5 years and the loss of teeth was due to periodontal reasons. He has been wearing his previous denture for 7 months with cracks in the midline of the denture. On examination, he has a completely edentulous upper arch. The teeth present are 33, 34, 43, 44, 45, metal ceramic fixed prosthesis from 36 to 47. The treatment option given to the patient was implant-supported complete denture or a conventional denture. The patient opted for a conventional complete denture. So we planned to give an upper single complete denture with metal occlusals and reinforcement of denture base.

TREATMENT

Primary impressions were made with irreversible hydrocolloid impression material (Alginex), and using perforated metal stock tray, primary cast was poured in dental plaster. The final impression was made using a custom tray made of auto-polymerising resin (Asian acrylates), border moulding was performed with low-fusing compound

Figure 1 Wax trial denture.

(Dental Product of India; DPI) and the wash impression made with zinc oxide eugenol (DPI). The final cast was poured in dental stone and the denture base was constructed using auto-polymerising resin (DPI) over which a wax rim (DPI) was made and the jaw relation was recorded. The record was transferred onto the semi-adjustable articulator. Selection of artificial teeth was made according to gender, personality and age (SPA) factors (acryrock); the arrangement was completed and wax trial denture (figure 1) was approved by the patient and his relative. Then, three-fourths preparations were done on the posterior teeth of the trial denture (figure 2). The wax pattern (figure 3) was fabricated, which was casted into metal. These metal occlusals were cemented (figure 4) with auto-polymerising resin (pyrex). To reinforce the denture base, metal mesh was incorporated in the palatal region during packing of the denture. The denture was then finished by polishing. (figure 5). During denture delivery, selective grinding was performed to remove the interferences (figure 6). The patient was given post-insertion instructions for maintenance of the denture.

Figure 2 Preparation on denture posterior teeth to receive three-fourths crown.

To cite: Pachore N, Patel JR, Sethuraman R, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-200576

Figure 3 Wax up for three-fourths crown on denture teeth.

Figure 5 Final denture with mesh reinforcement and metallic occlusion.

Figure 4 Cemented three-fourth crown on denture teeth.

OUTCOME AND FOLLOW-UP

The patient was recalled after 24 h and then after 1 week for follow-up. After 1 year of follow-up, the patient is satisfied with the aesthetics, the chewing efficiency and the speech-enabling capacity of the prosthesis.

DISCUSSION

Single complete denture is defined as a complete denture that occludes against some or all of the natural teeth, a fixed restoration or a previously constructed removable partial denture or a complete denture.¹

Loss of teeth has always been associated with ageing and is considered as one of the signs of aging. The single complete denture opposing all or some of the natural dentition is not an uncommon occurrence. The incidence of tooth loss is more in the maxillary arch compared to the mandibular arch. When designing a complete denture, the dentist has complete control

Figure 6 Blissful patient after denture insertion.

over the articulation of teeth with the availability of various type of artificial teeth and occlusal concepts, but this is rarely the case with a single complete denture.² Malposed, tipped or supra-erupted teeth or incorrect occlusal plane in already present fixed partial denture in the opposing arch is a problem in achieving a harmonious balanced occlusion in patients with a single complete denture.³ Balanced occlusion is defined as a bilateral, simultaneous, anterior and posterior occlusal contact of teeth in centric and eccentric positions.¹ It is developed for stability of denture bases in relation to supporting structures during functional and para-functional movements. Lack of occlusal balance may lead to denture instability, mucosal soreness, tissue changes and accelerated ridge resorption. Another problem with the single complete denture is attrition wear of denture teeth if resin teeth are used and attrition of natural teeth if porcelain is used. In this situation, gold occlusals, interpenetrating polymer network and resin teeth with amalgam stops or resin teeth with metal occlusals have been tried as occlusal posterior tooth forms.³ Metal occlusals wear less and cause less wear of opposing natural teeth. There are certain drawbacks like frequent prosthesis fracture, dislodgement, difficulty in obtaining occlusal balance and achieving satisfactory aesthetics (due to fixed position of the natural teeth).⁴

The major disadvantage of acrylic teeth used in single complete denture opposing natural dentition is rapid wear of occlusal surfaces. This affects the vertical dimension of occlusion and tooth relationships, and results in increased horizontal stresses and their associated sequelae. The rate of wear also depends on the patient's functional and para-functional habits. Giving metal occlusals slows down and controls this wear.³ In conditions where a single complete denture opposes natural teeth, the occlusal forces exerted on the denture are always very high and there will always be a fracture of acrylic denture base if it is processed in the resin. Hence, it is always advantageous to use the

metal denture base or any reinforcement as it has a good fracture toughness.⁵

Learning points

- Reinforcement of single complete denture is required for prevention of fracture.
- Metallic occlusion is recommended to minimise teeth wear.
- Three-fourths crown for metal occlusion is a novel approach which reproduces same anatomy of metallic crown as was of acrylic teeth.
- This method has aesthetic and functional advantages over other available methods.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Academy of Prosthodontics. The glossary of prosthodontic terms. Mosby Journal Reprint Dept, 2008.
- 2 Winkler S. *Essentials of complete denture prosthodontics*. 2nd edn. St Louis: Ishiyaku Euroamerica, 1994.
- 3 Patil PG, Parkhedkar RD. Functionally generated amalgam stops for single complete denture: a case report. *Dent Res J* 2009;6:51–4.
- 4 Upadhyay SR, Singh SV, Bhalla G, *et al*. Modified functionally generated path technique for single complete denture against non-modified natural dentition. *J Oral Biol Craniofac Res* 2012;1:67–71.
- 5 Yadav VV, Reddy VV, Vamsikrishna DV, *et al*. Single complete denture boon or bane: a case report. *Ann Essences Dent* 2012;4:77–9.

Copyright 2013 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow