

SINGLE MAXILLARY COMPLETE DENTURE OPPOSING MANDIBULAR NATURAL DENTITION

¹ Pragya Kotnala	¹ Postgraduate Resident
² Tripty Rahangdale	² Reader
³ Syed M Noorani	³ Senior Lecturer
⁴ Nimit Jain	⁴ Senior Lecturer
⁵ Karvika Nayak	⁴ Postgraduate Resident

¹⁻⁵ Department of Prosthodontics, Crown Bridge and Implantology, Mansarovar Dental College, Bhopal, Madhya Pradesh, India.

ABSTRACT:

The fracture of complete dentures constitutes a challenge and remains an unresolved problem. A midline fracture of single maxillary complete denture base especially in patients who have retained their natural mandibular teeth is an inevitable problem. Several factors have been attributed for the midline fracture including flexural fatigue resulting from cyclic deformation and those which exacerbate the deformation of the base or alter its stress. The present case report deals with oral rehabilitation of completely edentulous maxillary arch by incorporating metal denture base in place of the conventional Poly Methyl Methacrylate material to improve the longevity of the prosthetic replacement, at the same time prevent resorption of the underlying residual maxillary ridge.

KEYWORDS: Complete Dentures, Metal base, Polymer resins, Metal denture base, single maxillary denture, Midline fractures.

INTRODUCTION

Denture fracture is a common problem in prosthodontic practice that troubles both patients and prosthodontists. Excessive masticatory forces or denture deformation during use can result in bending forces that contribute to fatigue of the material and subsequent fracture.¹ Darbar et al have shown that the most common type of fracture is debonding/fracture of denture teeth (33%) in both complete and partial dentures followed by the midline fractures of complete dentures (29%) and other types (38%) of denture fracture². Patients who wear complete maxillary denture against mandibular natural teeth or with mandibular partial denture often face the problem of midline fracture in their maxillary dentures³. Several factors have been attributed to be the cause of midline fracture i.e. flexural fatigue resulting from cyclic deformation and factors that exacerbate the deformation of the base or alter its stress distribution may predispose the denture to fracture. Metals and metal alloys used in denture bases display excellent strength-to-volume ratios and may be cast in thin sheets maintaining rigidity and fracture resistance. Thinner metallic denture bases decrease interference with phonation⁴. Metal bases also display desirable dimensional characteristics and may be cast accurately. High thermal conductivity also has been deemed a significant advantage and some practitioners feel that this characteristic is responsible for enhanced health of tissues in contact with metal bases⁵. Metal based dentures⁶

1. Are more retentive due to the intimate molecular contact between the denture base, the salivary interface, and the mucosa.
2. Have less occlusal discrepancy due to reduced processing changes.
3. Cause fewer sore spots.
4. Have a reduced incidence of fracture.
5. Feel better to the patient.
6. Are better thermal conductors.
7. Act as a stable record base.
8. Have a thinner palate that aids speech.
9. Better preserve the residual alveolar ridge,
10. Are less porous.
11. Deform less during lateral mandibular function.
12. Are more accurate in tissue detail. This case report describes a novel technique for the fabrication of maxillary complete dentures that increase fracture resistance due to the forces exerted by the natural dentition.

Case report

A 70 year old male patient reported to the Department of Prosthodontics and crown and bridge, Mansarovar Dental college, Bhopal, with the chief complaint of repeated fracture of the upper denture from the center and wanted a durable denture. Past medical history was not

significant. Past dental history revealed that he had undergone multiple extractions of his upper posterior teeth 2 months back due to periodontitis associated with them. Intraoral examination revealed that his maxillary arch was edentulous with high frenal attachment and heavy masseter activity. Mandibular arch had all teeth present. Mandibular teeth revealed generalised attrition but had good periodontal support with no mobility associated with them and no pulpal involvement. Radiographic evaluation was done. The treatment plan decided for the patient was to provide metal mesh reinforced maxillary denture.

Classification of single complete denture⁵

- Class 1 -** Patients for whom minor, or no, tooth reduction is all that is needed to obtain balance.
- Class 2 -** Patients for whom minor additions to the height of the teeth are needed to obtain balance
- Class 3 -** Patients for whom both reductions and additions to teeth are required to obtain balance. The treatment of these patients usually involves a change in vertical dimension of occlusion.
- Class 4 -** Patients who present with occlusal discrepancies that require addition to the width of the occluding surface.
- Class 5 -** Patients who present with combination syndrome

The patient was categorized as Class 1 patient in whom minor, or no, tooth reduction is all that is needed to obtain balance.

Preliminary impressions of the edentulous maxillary residual alveolar ridge and mandibular arch were made with irreversible hydrocolloid and primary casts were poured (Dentsply) (Fig.1 and Fig.2). The special tray was fabricated and border moulding was done and final impression made with zinc oxide eugenol impression paste (DPI) (Fig.3 and Fig.4). Master cast was made with Type IV die stone (Fig.2) and the master cast was duplicated with reversible hydrocolloid (Agar) and a refractory cast was poured with phosphate bonded investment material and metal mesh was fabricated (Fig.5 and Fig.6). Jaw relation recorded (Fig.7, Fig.8 and Fig.9). Teeth arrangement and try in done using semi anatomic teeth (Acryrock). (Fig.10, Fig.11 and Fig.12). Processing of the denture was done. Packing of denture was done with the metal mesh placed on the cast (Trevlon). (Fig.13, Fig.14, Fig.15 and Fig.16). Finally, the denture was inserted into the patient's mouth. (Fig.17, Fig.18, Fig.19)



Fig.1. Maxillary Primary Impression



Fig.2. Mandibular primary impression



Fig.3. Border Moulding



Fig.4. Final impression



Fig.5. Master cast



Fig.6. Metal denture base over maxillary master cast

Discussion

Fractures in dentures result from two different types of forces, namely, flexural fatigue and impact. Flexural fatigue occurs after repeated flexing of a material and is a mode of fracture whereby a structure eventually fails after being repeatedly subjected to loads that are so small that one application apparently does nothing detrimental to the component. This type of failure can be explained by the development of microscopic cracks in areas of stress concentration. With continued loading, these cracks fuse to an ever growing fissure that insidiously weakens the material. Catastrophic failure results from a final loading cycle that exceeds the mechanical capacity of the remaining sound portion of the material. Midline fracture in a denture is often a result of flexural fatigue. Impact failures usually occur out of the mouth as a result of a sudden blow to the denture or accidental dropping whilst cleaning, coughing or sneezing.⁷ Cobalt chromium bases in maxillary denture reduce functional deformation and thrust to the supporting tissues occurring in the anterior part of the maxilla. Besides fracture resistance and rigidity these have some added advantages like excellent strength to volume ratio, good adaptation to the supporting tissues,



Fig.7

Fig.8

Fig.9

Jaw relations

Fig.10

Fig.11

Fig.12

Try in

enhanced control of denture plaque, enhanced thermal conductivity, high biocompatibility, very little dimensional changes with the sorption of fluids⁸.

The major disadvantages associated with metal denture bases include increased cost, difficulty in fabrication, compromised esthetic qualities, and inability to rebase such prostheses⁹. Nevertheless, in the present case opposing natural dentition and the presence of deep incisal notche act as stress raisers and contribute to midline fracture of the maxillary denture. Metal mesh incorporated single complete denture was indicated as conventional polymethyl methacrylate would have failed to provide acceptable physical properties¹⁰. The fabrication of metal denture bases is not complicated and not cost prohibitive when base metal alloys are used. To minimize weight, maximize strength, and ensure proper palatal contours, the resin-metal junction were carefully positioned and sculpted.

CONCLUSION:

Metal bases for complete dentures have been used successfully and provide many advantages over the more commonly used acrylic resin. It is a promising material for preventing midline fractures in a single maxillary denture. With metal bases for dentures, the patient benefits by having a stronger prosthesis that better resists midline fractures than any other material used. The dentist benefits by reducing postinsertion visits and providing a

restoration that will have better durability and satisfies the patient.

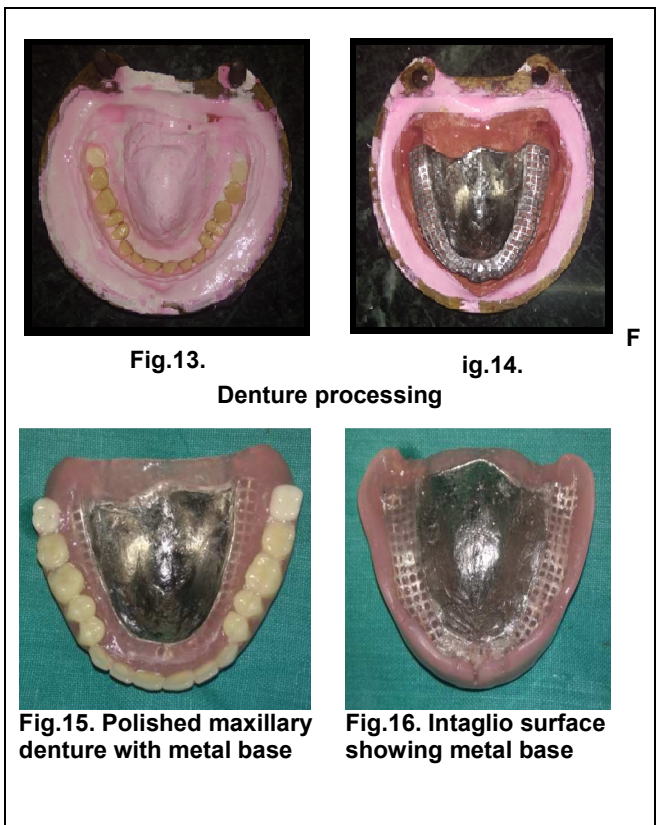


Fig.13.

ig.14.

Denture processing

Fig.15. Polished maxillary denture with metal base

Fig.16. Intaglio surface showing metal base



Fig.17.



Fig.18.



Fig.19.

Denture insertion

8. E. James Belfiglio, D.M.D.* Using metal bases in making complete dentures; Journal of Prost Dent; SEPTEMBER 1987; 58;480
9. French FA; The problem of building satisfactory dentures. J Prosthet Dent, 1954; 4: 769–81.
10. Koper A. The maxillary complete denture opposing natural teeth: problems and some solutions. J Prosthet Dent 1987;57(6):704–7.

Corresponding Author

Dr. **Pragya Kotnala. BDS**
 Post Graduate Resident
 Department of Prosthodontics
 Crown Bridge and Implantology, Mansarovar
 Dental College
 Bhopal, (M.P.) India.
 Email: pragya.kotnala@gmail.com
 Phone No: +91 98982931543

References

1. Patrick A. Mattie, DDS, MS,^a and Rodney D. Phoenix, DDS, MS^b A precise design and fabrication method for metal base maxillary complete dentures; Journal of Prost Dent; 76;496.
2. Darbar UR, Hugget R, Harrison A. Denture fracture — A survey. Br Dent J. 1994;176:342–345.
3. Bruce RW. Complete dentures opposing natural teeth. J Prosthet Dent. 1971;26:448–455
4. Allen LR; Improved phonetics in denture construction. J Prosthet Dent, 1955; 8: 753-763.
5. Craig RG; Restorative dental materials. 9th ed. St Louis: Mosby- Year Book, Inc, 1993; 502-50.
6. Carl F. Driscoll, Radi M. Masri. Single maxillary complete denture. Dent Clin N Am 2004;48:567-583.
7. Jagger DC, Harrison A, Jandt KD. The reinforcement of dentures. J Oral Rehabil 1999; 26: 185-194.