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CASE REPORT

Metal Reinforced Complete Denture: A Case Report

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***ABSTRACT*:**
The fracture of acrylic resin denture is an unresolved problem in removable prosthodontics despite numerous attempts to determine causes. Midline fracture is the most common problem. This is more evident in patient with heavy masticatory loads and those with Para functional habits. A metal based denture due to its superior mechanical properties in this respect is a good alternative to acrylic dentures. This article discusses a case report of successful oral rehabilitation of a completely edentulous maxillary and mandibular arch with resorbed ridge and heavy occlusal stresses.

Key words: Acrylic resin denture, Metal Reinforced Complete Denture.

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INTRODUCTION

Metal bases and framework have been known for their use in reinforcing the mandibular denture base while managing unfavourable resorbed ridges. Fracture of an acrylic resin denture base can be a problem in prosthodontics.[1- 3] The material most commonly used for fabrication of denture is the acrylic resin, polymethyl methacrylate.[4, 5] This material is not ideal in every respect and it is the combination of properties rather than one single desirable property that accounts for its popularity and usage. Causes of fractures include occlusal disharmony, flexure and fatigue of the denture base as a result of alveolar resorption and impact as a result of dropping the denture.[5- 7] Midline fracture was the most common type of fracture during the period of study 1958 (61%). The midline fracture in a denture is often a result of flexural fatigue. There are many different approaches to solve the problem of repeated denture fracture.[6] To minimize the possibility of fracture different method like use of metal reinforced denture bases, acrylic resin base reinforced with wire netting , carbon fibre, E glass fibre reinforced, PMMA, lucitone 199, trevelon high , paladin ultra and visible light polymerized resin are practiced. Out of all these methods metal reinforced dentures were the first to be used as an alternative to conventional acrylic denture base and is still one of the most promising alternatives.[8- 10]

INDICATIONS OF METAL DENTURE BASE

1) Patient with atrophied ridges.
2) Patient with compromised neuromuscular coordination who drop their denture.
3) Patient with increased rate of residual ridge resorption a) like postmenopausal women b) Diabetic Patient.
4) Patient who are with history of denture fracture.[9]

ADVANTAGE OF METAL DENTURE BASE

1) They have excellent strength to volume ratio and may be cast in thin sheets maintaining rigidity and fracture resistance.

2) Thinner metallic denture base decrease interference with phonation.
3) They display desirable dimensional characteristics and may be cast accurately.
4) More retentive.
5) Deform less during lateral mandibular movement.
6) High thermal significant conductors.[9]

DISADVANTAGES OF METAL DENTURE BASE

1) Increased cost, difficult in fabrication, difficult to rebase.
2) Time consuming and added steps needed.
3) Weight of the denture may be inconvenient initially.[9]

MATERIAL USED FOR METAL DENTURE BASE

Cr-Co- most retentive, Ni- Cr, Titanium etc.

The purpose of this article is to explain a simple technique of fabricating a metal reinforced complete denture in an edentulous patient for an optimal esthetic and functional outcome.[10- 13]

CASEREPORT

A 63 Year old male patient reported to the department of prosthodontics Chandra dental college and hospital with the chief complaint of repeated fracture of mandibular denture (Fig. 1). He had been wearing denture since 7 years and his denture was repaired several times with autopolymerizing acrylic resin. Detailed history revealed that he had the habit of grinding his teeth not only during night but also during day. Denture examination revealed flattened occlusal surface with loss of vertical dimension at occlusion. After thorough examination, a cast metal based mandibular complete denture was planned for this patient.

CLINICAL PROCEDURE

1. Preliminary impression for maxillary and mandibular arches was made using patient's old denture with irreversible hydrocolloid (alginate- DPI dust free) impression material and it was poured in type II Gypsum product (fig. 3).
2. The preliminary casts were obtained and custom trays were fabricated with T- SHAPE SPACER on maxillary cast with tin foil adaptation with autopolymerizing acrylic resin (fig.4) .
3. Selective pressure impression technique was used for secondary impression. First border molding was carried out conventionally using low fusing impression compound (ROLEX tracing sticks) and then final impression was recorded with zinc oxide eugenol (DPI) impression paste (fig.5).
4. Beading and boxing of the impression was done and it was poured in type III gypsum. Master cast was obtained and the mould of the same was made with reversible hydrocolloid (agar agar) impression material. A refractory cast was poured with ethyl silica bonded investment material (fig.6).
5. On the refractory cast, denture base pattern wax was adapted (fig.7) and then investing and casting procedures were carried out. Metal framework was finished and polished with electrolytic polishing in an electrolytic polishing device.
6. The metal framework so obtained was tried in patient's mouth and was checked for stability and extensions. In mandibular arch the framework ended just before the retro molar pad area (fig. 8).
7. The temporary denture bases were fabricated on these denture bases. Maxillo-mandibular relations were recorded and evaluated properly for aesthetics and phonetics.
8. Articulation was done followed by teeth arrangement and try in was done in patient's mouth.
9. After trial, the regular protocol of flasking and dewaxing procedure was carried out. Before packing the metal framework was placed on their respective mandibular cast and the acrylization procedure was completed (fig. 9&10).
10. The prosthesis was then finished, polished and delivered (fig.11,12&13).

Figure (1) Maxillary & Mandibular Old denture- with fracture line seen in mandibular denture.

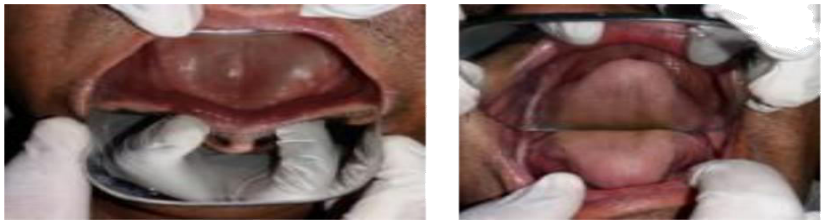

Figure no. (2) Intra- oral view- maxillary & mandibular edentulous arches.

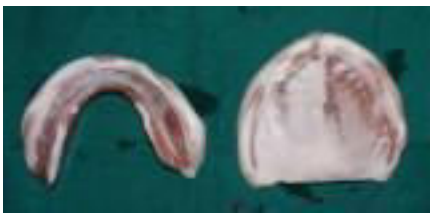

Figure no.(3) Preliminary impression (alginate) with the help of olddenture .

Figure no.(4) Custom tray with T- Shaped spacer adapted in maxillary arch.

Figure no.(5) Secondary Impression of Maxillary and Mandibular arch (Zinc oxide eugenol paste).

Figure no.(6) Refractory cast poured with ethyl silica bonded investment material.

Figure no.(7) Wax pattern and Spruing.

Figure no.(8)Try-in denture in patients mouth.

Figure no.(9)) Curing with metal denture base.

Figure no.(10) Final Denture (a) Cameo surface .(b) Intagilo Surface showing metallic denture base.

Figure no.(11) Denture in patient's mouth anterior view. (b) Posterior view (right and left side).

Figure no.(12) Pre-operative extraoral view

Figure no.13) Post-operative extra oral view

DISCUSSION

Complete denture made in conventional manner proves to be satisfactory in most of the patients, but in compromised patients, conventional methods have certain disadvantages. Polymethylmethacrylate denture bases have good mechanical, biological and aesthetic properties, their impact and fatigue strength however is not satisfactory in clinical situations that include heavy masticatory forces like those seen in bruxism and clenching. Severe resorption of the mandibular alveolar ridge may sometimes bring the need to construct a mandibular denture that is strong, stable and functional which can met by a denture reinforced with a metal framework. One study demonstrated that mandibular complete denture fracture decreased following internal metal reinforcement as long as adequate bulk of acrylic resin was present. If sections of the denture above the internally suspended framework are too thin for adequate thickness of acrylic resin, then the mandibular complete denture's cameo surface can be modified and finished in metal so that strength is not compromised. The internally suspended framework is also indicated when edentulous ridge contours are irregular or significantly compromised, because all denture base adjustments remain in acrylic resin rather than metal.[14- 17]

Conclusion

The problems involved in providing comfort, function, proper esthetics and retention is a vigorous challenge for practicing dentist. In case of severely resorbed anterior mandibular ridge, the reinforcement of the denture by customized metal framework well adapted to the ridge is optimal treatment alternative. This reinforcement will aid in resisting fracture of resulting denture. The fabrication technique described in this article will help in achieving appropriate contour of the denture base with minimal metal display and may benefit the patient when implant placement or preprosthetic surgery is not an option.

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