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Metal Reinforced Single Complete Denture: A Case Report

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ABSTRACT

The single complete denture is a complex prosthesis that requires a complete understanding of the basics of prosthetic rehabilitation of lost natural dentition. Several difficulties are encountered in providing a successful single complete denture treatment, the most common being repeated fracture of the prosthesis. An ideal solution to strengthen the single complete denture bases is to provide metal reinforcement by fabrication of metal based single complete denture. Metals have been using for reinforcing acrylic denture since long times. Metal due to high malleability and higher strength can scaffold the acrylic materials withstanding flexural fatigue and stress concentrationthere by reinforcing the denture.Metal can be added in form of wires, bars, mesh or plates.Metal strengthener had a beneficial effect on the fracture resistance of the poly methyl meth cry late. Another common problem in single complete denture is attrition of denture teeth while opposing natural dentition which can be taken care of by providing metal occlusals in single complete dentures. Metal occlusal surfaces preserve the established occlusion and prevent loss of vertical dimension. This case report describes the clinical management and fabrication of single complete denture with metal mess reinforcement.

Key Words: Single Complete Denture, Metal Mess Reinforcement.

INTRODUCTION

The main objective of any prosthetic treatment should be based on De Van's statement that "Perpetual Preservation Of That What Remains Rather Than Meticulous Replacement Of What Has Been Lost."[1] This is especially true in terms of completely edentulous jaw opposing natural dentition. Treatment planning of single complete dentures needs critical evaluation of various factors. Success of complete denture depends on many variables, but three factors stand out in terms of functional success: retention, stability and support. According to Koper[2]occlusalproblems and denture-base fracture seen in single complete denture are the result of one or all of the following: occlusal stress on maxillary denture and underlying edentulous tissue from teeth and musculature accustomed to opposing natural teeth, the position of the mandibular teeth which may not be properly aligned for the bilateral balance needed for stability and flexure of denture base. The natural teeth which will oppose a complete denture almost always require recontouring to some degree to provide for a harmonious occlusion. The reasons for this are: the inclination of occlusal plane is usually unfavourable, the individual teeth may be malpositioned and may have assumed positions that present excessively steep cuspal inclinations and the buccolingual width of the natural teeth may be too wide. Failure to alter these conditions will often prevent the development of bilateral balance occlusion in eccentric positions.[3]

Heat polymerized dentures are the dominant material for the fabrication of denture bases. These heat polymerized denture base resins present acceptable physical, biologic and esthetic characteristics at moderate expense.[4] However, denture base resins in single complete dentures has been frequently found to fracture under excess masticatory forces. So a single complete denture opposing natural dentition should be reinforced to that extent that it should withstand the huge occlusal forces acting on it. Metal can be added in form of wires, bars, mesh or plates .Metal strengthener had a beneficial effect on the fracture resistance of the poly methyl meth cry late ($P<0.001–0.01$)[5]

CASE REPORT

A 72 year old male patient reported to the Department of Prosthodontics and crown and bridge , PGIDS, with the chief complaint of repeated fracture of maxillary denture and for replacing the missing lower anterior teeth. Past medical history not significant. Past dental history revealed that he had undergone extractions of her lower anterior teeth 6 months back due periodontitis associated with them. Intraoral examination revealed that her maxillary arch was edentulous and mandibular arch had 31,32,35,41,42,46,47 missing teeth. Remaining Mandibular teeth were having good periodontal support with no mobility associated with them. Radiographic evaluation was done. The treatment plan decided for the patient was to provide her with single complete denture for maxillary edentulous arch with metalmess reinforced denture and in lower arch removable partial denture 31,32,35,41,42,46,47. Prior to construction of the denture, it was desirable to complete all rehabilitation procedures in the opposing dental arch.

Classification of single complete denture[2]

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.
Class4 - Patients who present with occlusal discrepancies that require addition to the width of the occlusing surface.
Class5 - Patients who present with combination syndrome.

Preprosthetic Phase

The patient was categorized as Class 1 patient in whom minor, or no, tooth reduction is all that is needed to obtain balance. All restorations, including fixed partial denture were planned. An acceptable level of oral hygiene, which is mandatory, should include maintenance instructions for both the edentulous arch and the remaining natural teeth.

Diagnostic casts were made and examined carefully to identify malposed or supraerupted teeth. All corrections required for improving the alignment of opposing dentition were carried out.

PROCEDURE

At the first visit primary impressions of the maxillary and mandibular arches were made. Maxillary arch impression was made with medium fusing impression compound (Esquire, MDM corp. Link, Delhi) and mandibular arch impression was made with irreversible hydrocolloid impression material (Zhermak, Italy)(Fig.1) After making primary impressions, the impressions were poured in dental plaster and dental stone respectively. Autopolymerizing acrylic resin was mixed and adapted on the casts and modeling wax was also adapted on the temporary record bases. Tentative jaw relation was made and diagnostic mounting was done to check the inter-arch distance.

Fig 1.

At second visit on primary wax spacer was adapted and on that custom tray was fabricated. On this custom tray border molding was done followed by making of the wash impression(Fig.2).

Fig 2.

The master cast was obtained. Jaw relation recorded. Teeth arrangement done..wax try in done. (Fig 3.)During packing of acrylic resin metal mess was incorporated(fig 4).

Fig 3.

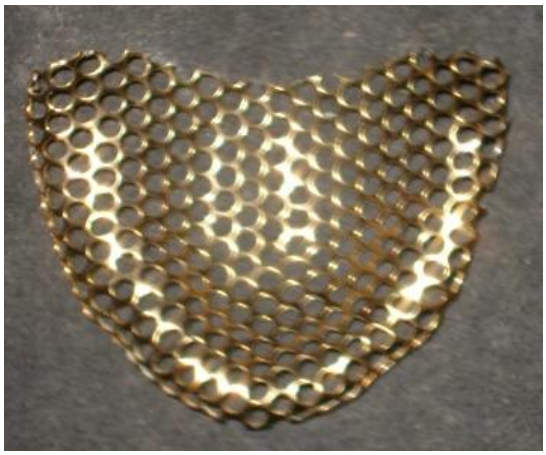

Fig 4.

Acrylization process was completed. Finishing and Polishing done(Fig 5).

Fig 5.

On the next appointment denture insertion is done strictly following the denture insertion protocols as well as post insertion instructions is given to the patient(fig 6a and 6b).

Fig 6A **Fig 6B.**

The patient is reviewed 24 hours post insertion and examined as well as patient opinion is recorded. Recall visit also done after 1 week intervals and the denture is inspected thoroughly for fracture lines. No evidence of craze lines is evident and denture is functioning well under the occlusal loads of opposing natural dentition even after one month recall visits.

DISCUSSION

The conventional methods of incorporating metal meshwork and even aramid fibers were cumbersome and costly. The easy availability of the alginate edentulous trays and affordable price as well as the perforations within the tray helps in mechanical interlocking of the heat cure acrylic material and bonding. All forms of metal reinforcement significantly increased the impact strength and tensile strength and the metal wire reinforcement produced the greatest increasing in impact strength and tensile strength6.In this article the author has presented an economical way of reinforcing denture using edentulous alginate stock trays and a Novel method to get an accurate adaptation of the reinforcing material 3 dimensionally.

SUMMARY

Many patients become edentulous in one arch while retaining some or all of their natural teeth, in the opposing arch. Several difficulties are encountered in providing a successful, single complete denture treatment.

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