CASE REPORT

Metal Reinforced Single Complete Denture - A Case Report

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ABSTRACT

The aim of this case report is to rehabilitate an isolated edentulous maxilla opposed by mandibular dentition with minimum cost and time using metal reinforcement. Total edentulousness in one arch while retaining some or all of their natural teeth, in the opposing arch, is a common observation among patients. Occlusal balance is interrupted by the presence of unmodified opposing dentition, thereby compromising stability and retention and eventually leading to frequent mechanical failures of the prosthesis. The case report describes rehabilitation of a patient with edentulous maxillary arch and partially edentulous mandibular arch with single complete denture in the upper arch and metal reinforced partial denture in the lower arch. It is a novel method to get an accurate adaptation of the reinforcing material three-dimensionally. Metal reinforced denture base has yielded maximum patient satisfaction and is cost effective.

Keywords: Metal reinforced denture, Partial edentulousness, Single complete denture.

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INTRODUCTION

As occlusal force factors are beyond the operator's control, optimum outcome of prosthetic rehabilitation in clinical situations is dependent on accurate prosthetic treatment planning and its precise execution. Similar situation is faced when an isolated edentulous maxilla is opposed by mandibular dentition.[1,2] Occlusal balance is interrupted by the presence of unmodified opposing dentition, thereby compromising stability and retention and eventually leading to frequent mechanical failures of the prosthesis.[3] Any factor that exacerbates the deformation of the base or alters its stress distribution may predispose acrylic resin denture to fracture.[4]

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These functional masticatory forces result in mechanical failure of denture.[5] An ideal solution to attain the original shape and strength of the single complete denture with minimum cost and time is to provide metal reinforcement using metal mesh or wires.[6,7]

CASE REPORT

A male patient, aged 56 years, reported to the Department of Prosthodontics, Bharati Vidyapeeth Dental College and Hospital, Navi Mumbai, with a chief complaint of the replacement of missing teeth. No relevant medical history was recorded. Past dental history revealed that he had undergone extractions of Grade III mobile lower teeth secondary to periodontitis. Intraoral examination showed edentulous maxillary arch and missing incisors and left molar in the mandibular arch. After a thorough case assessment, reinforced single complete denture in the maxillary arch and metal reinforced partial denture in the mandibular arch were finalized as the appropriate treatment option.

Treatment Planning

Pre-prosthetic phase

The patient was categorized as Class 1 patient in whom minor tooth reduction was needed to obtain balance. All restorations, including removable partial denture, were planned. An acceptable level of oral hygiene, which is mandatory, included maintenance instructions for the edentulous arch and 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.

Prosthetic phase

During the first visit, primary impressions of the maxillary and mandibular arches were made. Maxillary arch impression was made with medium fusing impression compound (Y Dents), and mandibular arch impression was made with irreversible hydrocolloid impression material (3M, ESPE). After making primary impressions, the impressions were poured in dental plaster and dental stone, respectively. At second visit, wax spacer (Maarc Shiva Products, Thane, India) was adapted on the primary cast and custom tray was fabricated over

it. Using the custom tray (Asian Special Tray material), border molding was done using greenstick compound diphenyleneiodonium (DPI) followed by making of the wash impression (DPI). The master cast was obtained. Temporary denture base plate (Acrylic-R cold cure) was adapted on the master cast and trimmed appropriately according to the extensions. Occlusal rim was fabricated on the denture base. The maxillary occlusal rim was adjusted in a conventional manner by checking visibility, interpupillary, and ala-tragus line. Orientation jaw relation was recorded using face bow. The face bow record was transferred to the Hanau articulator. Vertical and horizontal jaw relation was recorded. Mounting of the jaw relation record was done on the Hanau articulator. Teeth arrangement was done in Class III relation, and try in was done in patients' mouth clinically to verify fit, function, and esthetics. The lower cast was duplicated with alginate on which vacuum formed clear template (Biostar 1 mm thickness) was adapted using pressure molding machine. Try in of denture was done and the template was checked in the patient's mouth for adaptation. Interferences were checked and grinded in the patient's mouth until the template is seated accurately. After patient's approval for the try in of wax up dentures, the processing of denture was carried out. Flasking and dewaxing were done in conventional manner. The metal mesh made up of stainless steel material with gold plating was then adapted to the master cast after dewaxing. Packing was done with heat cure denture base material (Ivoclar). The flask was tightly clamped, and bench curing was done. Curing of heat cure acrylic resin was done, and raw dentures were finished and polished. Denture insertion was done in patient's mouth, and occlusal corrections were made and recall done after 24 h.

DISCUSSION

Various factors have to be critically evaluated for the treatment planning of single complete denture, but three factors are of utmost importance in terms of functional success - retention, stability, and support. According to Koper, multiple factors contribute to occlusal imbalance in eccentric position of the teeth leading to denture-base fracture.[8,9] The anatomy, cuspal inclination, and alignment of the mandibular teeth could result in occlusal stress on maxillary denture leading to its fracture. Although polymethyl methacrylate (PMMA) denture bases have good mechanical, biological, and esthetic properties, the impact and fatigue strength of PMMA are not entirely satisfactory and thus may fail when there is excessive parafunctional and/or functional forces. Metal strengthener has a beneficial effect on the fracture resistance of the polymethyl methacrylate.[10] This case report describes the clinical management and fabrication of single complete denture with metal mesh reinforcement. Metals have been used for reinforcing acrylic denture since long time.[11,12] Metal due to high malleability and higher strength can scaffold the acrylic materials withstanding flexural fatigue and stress concentration, thereby reinforcing the denture. Metal is added as wires, bars, mesh, or plates. The rationale behind using mesh is that it is easy to process, rigid, stable, high abrasion resistance, less porous than plastic, and hence easy to clean.

In this article, the author as per the requirement of the patient has presented an economical way of reinforcing denture using metal mesh. Metal mesh is made of stainless steel and is gold plated, and hence, it is light weighted and does not increase the bulk of denture base. It is a novel method to get an accurate adaptation of the reinforcing material three-dimensionally. Following treatment, a 24 h follow-up showed that there was mild inflammation on the right buccal mucosa secondary to insufficient relief of buccal freni which was corrected at recall visit. The patient reported complete satisfaction during the subsequent follow-up visit.

CONCLUSION

Total edentulousness in one arch while retaining some or all of their natural teeth, in the opposing arch, is a common observation among patients. Several difficulties are encountered in success of a single complete denture treatment. Metal reinforced complete dentures have been used successfully and provide many advantages over the more commonly used acrylic resin. Metal reinforced dentures have the benefits of being more comfortable, stable, and strong. Apart from few disadvantages such as allergic reaction to the metal which depends on the susceptibility of the patients, unesthetic look of the dentures and difficulty in relining the denture base metal reinforced denture base have yielded maximum patient satisfaction.

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