

Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page: www.jamdsr.com

doi: 10.21276/jamdsr

ICV 2018= 82.06

(e) ISSN Online: 2321-9599;

(p) ISSN Print: 2348-6805

Case Report

Metal Reinforced Maxillary Single Denture Opposing a Dentate Mandibular Arch- A Case Report

Ajay Pandey¹, Lily Tiwari²

¹Department of Prosthodontics, Resident doctor, Dental Department, Government Medical college, Bettiah, Bihar, India;

²Department of Orthodontics, Director of smile saver multispeciality dental care, Bettiah, Bihar, India

ABSTRACT:

The edentulous state of the oral cavity is equivalent to the absence of any other body part with specific morphological and psychological sequelae. This case presents a patient with an edentulous maxillary arch opposing a dentate mandibular arch. 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. Metal due to high malleability and higher strength can scaffold the acrylic materials withstanding flexural fatigue and stress concentration there 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 plate reinforcement.

Key Words: Single Complete Denture, Metal Reinforcement Denture base

Received: 22 August, 2019

Revised: 1 October, 2019

Accepted: 2 October, 2019

Corresponding author: Dr. Ajay Pandey, Department of Prosthodontics, Resident doctor, Dental Department, Government Medical College, Bettiah, Bihar, India

This article may be cited as: Pandey A, Tiwari L. Metal Reinforced Maxillary Single Denture Opposing a Dentate Mandibular Arch- A Case Report. J Adv Med Dent Scie Res 2019;7(11):145-148.

INTRODUCTION:

The dentist has a difficult mission in evaluating the biomechanical differences in the supporting tissues for the two arches and applying the appropriate procedures to produce and maintain the conditions necessary for long-term treatment success. This goal is impossible to achieve without understanding the occlusal biomechanics that allows us to obtain a physiological occlusion: acceptable interocclusal distance, stable jaw relationship with bilateral tooth contacts in retruded closure, stable tooth quadrant relationships with axially directed forces, multidirectional freedom of tooth contact throughout a small range (within 2 mm) of

mandibular movements¹. Unfortunately, when only one arch is edentulous, tooth position in the dentate arch may preclude such objectives being reached and the unfavorable force distribution may cause adverse tissue changes that are going to compromise optimum function. It is therefore critical to identify these problems and to correct them as soon as possible: arch relationship or occlusal plane discrepancies, jaw relationship extremes, excessively displaceable denture-bearing tissue².

Because of the pressures exerted by the mandibular remaining teeth, the alveolar maxillary ridge is extremely resilient and mobile (flabby ridge) due to the

replacement of the bone by fibrous tissue. This is a consequence of the excessive load of the edentulous ridge and of the unstable occlusal conditions. This ridge will provide poor support for the future complete denture, but it may still provide some retention due to its resilient state. The opposing arch's condition of an irregular occlusal plane also predisposes the denture to dislodgement. After the loss of the maxillary teeth and in the absence of the prosthetic treatment, the opposing dentition tends to tilt and extrude compared to a normal relationship which results in an unfavorable force distribution. The teeth that are most prominent in the vertical plane will be the subject of the selective grinding in order to ensure that a sufficient number of teeth will be in contact with the artificial ones in the same time³.

According to Koper occlusal problems 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.⁴ 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.⁵ 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 ($P < 0.001-0.01$)⁶

CASE REPORT

A 36 year old male patient reported to our clinic with a chief complaint to inability to chew replace the missing teeth on his maxillary arch. History of present illness reveals that patient is having complains of missing teeth on his upper region from past 6 months and he wants to replace the missing 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. Patient is smoker from past 10 yrs (daily 3 to 4 number) and patient was well co-operative and phylospical in nature. Intraoral examination revealed that her maxillary arch was completely edentulous and mandibular arch had 44,45,46,47 missing teeth.(Figure-1) Remaining Mandibular teeth were having good periodontal support with no mobility associated with them. Saliva was medium in consistency and acceptable oral hygiene. Radiographic evaluation was done. The treatment plan decided for the patient was to provide her with single complete denture for maxillary edentulous arch with metal mess reinforced denture and in lower arch removable partial denture 44,45,46,47. Prior to construction of the denture, it was desirable to complete all rehabilitation procedures in the opposing dental arch.



Figure -1 intraoral maxillary and mandibular view.

Treatment procedure

The patient was categorized as Kennedy Class 3 patient in whom no tooth reduction is all that is needed to obtain balance. All restorations, including lower removable 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.

At the first visit primary impressions of the maxillary and mandibular arches were made. Maxillary arch impression was made with medium fusing impression compound (DPI) and mandibular arch impression was made with irreversible hydrocolloid impression material (Zhermack, Italy). 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.

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. The master cast was obtained with Dental stone type III and the mould of the same will make with reversible hydrocolloid (Agar Agar) A refractory cast will be pour with phosphate bonded investment material (Figure-2). On the refractory cast, the denture base pattern wax can adapt and the sprues will attach and invest.(Figure-3) The denture base will cast with cobalt chromium metal.



Fig-2 master cast with mould make by agar- agar and refractory cast



Fig 3 - pattern wax with sprue attachment and metal denture base



Figure 4: Wax try in done with finishing and polishing done

Once metal form denture base achieved finishing and polishing done and adapt on the master cast (Figure-4). After metal denture base merge with autopolymerizing resin cure material. There should be fabrication of an occlusion rim on the maxillary cast. Jaw relation recorded. Teeth arrangement and wax try in done. During packing of acrylic resin metal was incorporated Acrylization process was completed. Finishing and Polishing done. On the next appointment denture insertion is done strictly following the denture insertion protocols as well as post insertion instructions was given to the patient. The patient was reviewed 24 hours post insertion and examined as well as patient opinion was recorded.

Recall visit also done after 1 week intervals and the denture is inspected thoroughly for fracture lines. No evidence of craze lines was evident and denture is functioning well under the occlusal loads of opposing natural dentition even after one month recall visits.

DISCUSSION

A maxillary complete denture against a mandibular arch with natural dentition poses following changes.

1. Stability of maxillary single denture.
2. Frequent space of midline fracture of the
3. Early wear of artificial teeth.

Dihman RK et al⁷ reported use of cast alloys base in maxillary region to improve fracture resistance against natural dentition. Koper et al⁴ reported denture-base fracture seen in single complete denture. To prevent it the conventional methods of incorporating metal framework denture base made. 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 strength. In this article the author has presented an economical way of reinforcing metal denture base with accurate adaptation of the reinforcing material 3 dimensionally.

CONCLUSION

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. The upper single denture can be functionally successful because of a large denture-bearing area offering stability. The single denture wearer is usually younger and therefore more adaptable than the totally edentulous patient. The tongue can develop habits for even more added stability. If the denture is made following the correct prosthodontic principles and the patient offers a good collaboration [10], the long term success of the treatment is achieved. The most visible adverse sequelae of single denture treatment are wearing the natural teeth and fracture of the denture base. The fracture of the denture base can be prevented by using a casted metal reinforced denture base.

REFERENCES

1. Zarb GA, Bolender CL et al. Prosthodontic Treatment for Edentulous Patient twelfth ed., Mosby 2004:427-437.
2. Kalk W, Schwencke BM, Droulias N, ten Dam KM. Treatment planning in patients with a severe reduced dentition, Ned Tijdschr Tandhelkd nov 2009; 116(11):599-604.
3. Winkler S et al. Essentials of Complete Denture Prosthodontics, second ed., Ishiyaku EuroAmerica Inc. U.S.A. 2000:417-427.
4. Carl F. Driscoll, Radi M. Masri. Single maxillary complete denture. Dent Clin N Am 2004;48:567-583.
5. Patrick A. Mattie and Rodney D. Phoenix. A precise design and fabrication method for metal base maxillary complete dentures. J Prosthet Dent 1996;76:496-9.
6. P. K. VALLITTU, V. P. LASSILA Reinforcement of acrylic resin denture base material with metal or fibre strengtheners Journal of Oral Rehabilitation Volume 19, Issue 3, pages 225-230, May 1992.
7. Dhiman RK, Choudhary SKR, Midline fracture in single complete Acrylic vs Flexible denture
8. The Glossary of prosthetic terms. 6th ed. St. Louis, C V Mosby, 1994.
9. Henderson D, McGivney G P, Castleberry D J. McCracken's removable partial prosthodontics. 7th ed. St. Louis, C V Mosby 1985:131.
10. Applegate O C. Essentials of removable partial denture prosthesis. 2nd ed. Philadelphia, W B Saunders, 1960:140.
11. Charles W. Ellinger, Jack H. Rayson and Davis Henderson. Single complete denture. J Prosthet Dent 1971;26:1:4-10.