

Special Considerations In Fabrication Of Single Complete Denture In Maxillary Arch - A Case Report

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ABSTRACT: Controlling resorption and reducing discomfort is a major challenge in construction of a single complete denture (SCD). It is not a simple process; it requires complete understanding of necessary alterations needed in successful fabrication of tissue supported prosthesis against bone embedded natural dentition. Achieving harmonious occlusal contacts and harmonious natural occlusal plane in opposing natural teeth is primary objective of this restorative procedure to facilitate stability of single complete denture and thereby facilitate ease of mastication. Several other problems are also encountered during function and serviceability of denture while opposing natural teeth like, repeated fracture of denture base, fast wear of denture teeth etc. Reinforcement of denture base and denture teeth are also important considerations in this type of prosthetic rehabilitation procedure. This article discusses standard protocols and describes step by step fabrication process of maxillary single complete denture against partially edentulous mandibular jaw restored by fixed partial denture.

Key Words: Single CD, occlusal plane template, reinforcements of denture.

INTRODUCTION:

Edentulous maxilla opposing mandibular dentition in such situation unmodified mandibular dentition prevents occlusal balance during function leading to repeated denture fractures causing functional insufficiency, compromised esthetic and financial burden on its users for its repair or refabrication^{1,13}. Dentures opposing natural teeth leads to abrasion of the artificial teeth.² Recurrent Midline fracture is most common in both the upper and lower dentures (more than 60%) and loss of vertical dimension.¹³ Lower natural teeth many times have unfavorable tooth inclinations due to supraeruption, rotation, abrasion, fracture of teeth that will show undesirable directions of force on the upper denture will result in the inflammatory reactions or resorption of the

bone.⁵ If no attempt is made to modify the occlusal morphology of the natural teeth by planned alteration for achieving occlusal harmony then denture will receive forces that may exceed the physiologic tolerance of the maxillary residual ridge tissues^{3,4}. When the opposing natural dentition is not in a normal plane of occlusion George Monsoon proposed that mandibular teeth should be arranged to close around a sphere of 4-inch radius.^{6,7} Curve of Monsoon helps to achieve ideal curve of occlusion in which each cusp and incisal edge moves along the surface of a imaginary sphere with eight inch diameter having its center at the region of the glabella. Various tools and methods that have been described to evaluate and correct the occlusal plane namely Broderick's occlusal plane analyzer, Yurkstas metal

occlusal template and custom made occlusal plane template⁶ Reinforced dentures with metal bases are occasionally used in rehabilitation of edentulous patients most commonly in cases where there is more risk of fracture.⁸

DIAGNOSIS AND TREATMENT PLANNING:

CASE REPORT:

- A 68 years old male patient reported to Navodaya dental college dept Of prosthodontics with the chief complaint of broken maxillary denture and desired for new denture. Patient lost maxillary teeth since 2yrs and wearing denture since then. The present denture broken twice during this period. He has been on anti-hypertensives since a year. Old maxillary denture revealed multiple midline fractures with repairs having stained and worn out teeth.



Fig.1

- The denture was having dark brown stains and shiny tissue surfaces indicating vigorous brushing while cleaning his dentures with dentifrices. Intraoral examination

revealed edentulous maxillary arch and dentulous mandibular arch with anterior canine to canine porcelain fused to metal bridge, the remaining teeth were irregularly worn out, tipped with general gingival recession.



Fig.2

- Various treatment options including dental implants was explained to the patient and implant option was ruled out because of financial constraints and consent.
- Treatment plan was derived to fabricate a new metal base maxillary single complete denture after modifying lower irregular occlusal surfaces of natural teeth on cast by using occlusal template and transferring the corrected surface anatomy intraorally with clear acrylic splint and pressure indicating paste. Amalgam plugged on occlusal surface to increase the teeth wear resistance.

CLINICAL AND LAB PROCEDURES

- Primary impressions of maxillary and mandibular arch were made using impression compound and alginate

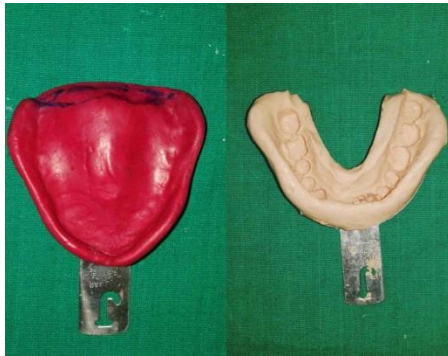


Fig.3

- and casts were obtained. Upper arch border molding & final impression was made



Fig.4

- to fabricate working cast record base and wax rim was fabricated on this cast and tentative jaw relation recording done. Upper working cast was mounted on semi adjustable

articulator using face bow with orbital pointer



Fig.5

- lower diagnostic cast related to the upper cast by interocclusal record medium zinc oxide eugenol at established vertical dimension and lower cast mounted
- Buccal and lingual position of lower teeth evaluated and decision to articulate central fossa of the denture tooth to buccal cusp of natural tooth was made

Occlusal plane correction of natural teeth using occlusal plane template (OPT-transparent acrylic plate having uniform convex lower surface) mounted on the articulator upper jaw member by replacing maxillary cast and OPT lowered till it touches the occlusal surface of lower teeth. The interfering cusps were reduced using sharp carver until uniform contact of OPT is achieved.



Fig.6

On the modified occlusal surface clear acrylic template was fabricated as per Bruce's technique.



Fig.7

Intra oral occlusal modifications done using clear acrylic template coated with pressure indicating paste as a guide.



Fig.8

Modified lower natural teeth impression was made with irreversible hydrocolloid and die stone working cast obtained. Against the lower working cast teeth arrangement was done in centric relation. Protrusive and lateral interocclusal records made at wax denture try in, which were used to program the articulator and upper posterior teeth were balanced. In the present case enough, horizontal overlap allowed freedom to balance in eccentric excursion and still maintain esthetics.



Fig.9

at wax denture try in stage maxillary metal denture base try in was done to confirm the adaptation and extensions.

Then final denture fabricated using compression molding technique, In the finished denture occlusal surface cavities were prepared for high copper amalgam. Two color centric and excursive articulating paper tracings marked and amalgam cavity outline prepared to include all tracing with minimum 5mm depth.

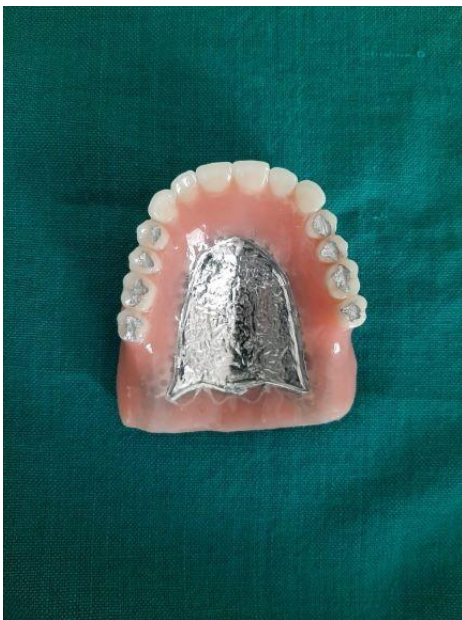
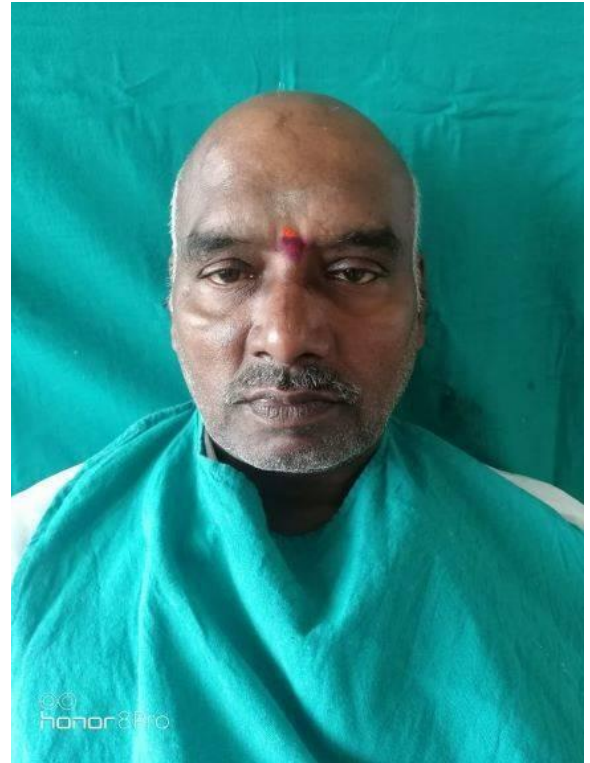


Fig.10

Once the condensed amalgam is in plastic state intraorally lower teeth closed in centric and eccentric movements carried out thus centric holding area and some excursions are engraved in amalgam functionally.



Pre-Treatment

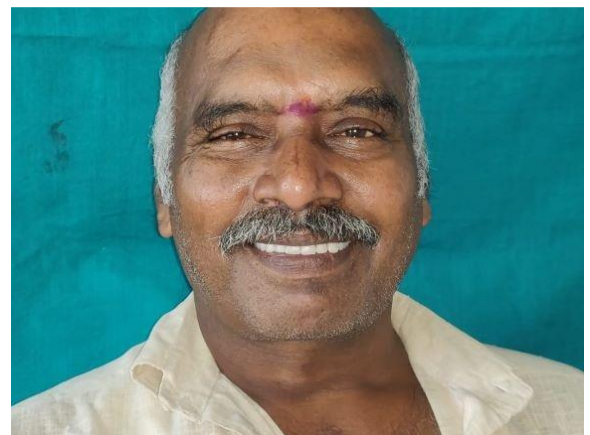


Fig no.11 post treatment

Post insertion instructions for proper hygiene maintenance is given to the patient and periodic recall was scheduled.

DISCUSSION

In spite of advancement in implant supported treatment options PMMA based single maxillary complete denture is first choice of treatment for many restorative dentists who treats such patients in Indian scenario.¹⁴

Age, general health compromises, lack of awareness of oral condition, additional time required, poor economic status, and fear of additional surgical procedures preclude patients from giving consent for implant supported treatment. This patient despite desiring for solution to present problems could not be taken up for implant supported prosthesis due to financial constraints, Considering the time and inconvenience involved along with money spent in frequent visit for denture repair option of providing reinforce to denture base was considered. many reinforcement techniques for denture bases like incorporating poly ethylene fiber, carbon fiber, rayon fiber, or addition of nano particles are reported in literature⁸ Metal base was chosen in this case which has following advantages over other materials like

1. Superior adaptation to tissues with low volume change
2. Ease of

3. Bacteriostatic surface – as ionization and oxidation surface no adhesion salivary mucin and bacterial enzymes
4. Stimulation to underlying tissues – temperature of food beverages and breathing air interchanges to underlying tissues.
5. More acceptable – can be cast in thinner sections with adequate strength unlike with resin base so increase more weight of metal can be neutralize by thin sections⁸

Disadvantage of unaesthetic appearance and non-adjustability was taken care by providing acrylic at borders and pps area. Although preferred occlusal materials are metal but are expensive and time consuming, less chair side time consuming, economical amalgam inserts chosen to reduce occlusal wear rate in the present case after acrylic teeth have been modified and balanced as in Fig.10 and the only disadvantage using amalgam stops is their esthetic unacceptance.^{3,9}

CONCLUSION:

The present case deals with oral rehabilitation of maxillary arch

- Reinforced denture base with cast metal frame incorporating metal plate and improve longevity of the prosthetic replacement at the same time prevent resorption of the underlying residual ridge

- Occlusal corrections of natural opposing arch using OPT Transferring jig using pressure indicating paste.
- Reinforcement modifications in occlusal surface material with amalgam plugs is been made to reduce the occlusal wear.

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