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"Simple Clinical Modifications for Improving the Prognosis of Single Maxillary Complete Dentures: An Undergraduate Perspective"

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ABSTRACT

Fabrication of a single maxillary complete denture opposing natural mandibular dentition presents distinct biomechanical and occlusal challenges. Increased occlusal forces, unfavourable contact patterns, and lack of bilateral denture support often compromise retention, stability, and longevity of the prosthesis. Without appropriate modifications, complications such as denture displacement, accelerated ridge resorption, mucosal trauma, and midline fracture are common. This article outlines simple, practical clinical and laboratory modifications that can be readily performed at the undergraduate level to improve the prognosis of single maxillary complete dentures.

Emphasis is placed on impression techniques, jaw relation records, occlusal plane positioning, tooth selection, occlusal scheme, denture base reinforcement, and post-insertion occlusal adjustments. These modifications are evidence-based, cost-effective, and easily reproducible in routine clinical practice. Incorporation of these principles enables undergraduate students and novice clinicians to achieve improved denture stability, patient comfort, and long-term clinical success.

Keywords: Single maxillary complete denture; Natural opposing dentition; Occlusal modification; Denture stability; Undergraduate prosthodontics

Simple Clinical Modifications for Fabrication of a Single Maxillary Complete Denture: A Case Report and Review

INTRODUCTION

A single complete denture refers to a complete denture opposing natural teeth, fixed partial dentures, or implant-supported prostheses. Among these, fabrication of a single maxillary complete denture opposing natural mandibular dentition is considered one of the most challenging clinical situations in prosthodontics[1]. The presence of natural teeth introduces increased occlusal forces, uneven contact patterns, and reduced tolerance for occlusal discrepancies, often resulting in compromised denture retention and stability[2].

Common problems associated with single maxillary complete dentures include denture displacement during function, soreness of supporting tissues, rapid residual ridge resorption, and frequent midline fractures[3]. These complications are primarily attributed to unfavorable occlusal schemes, steep cuspal inclines of opposing natural teeth, inaccurate jaw relation records, and inadequate denture base support[4].

Although advanced treatment options such as occlusal rehabilitation, overdentures, or implant-supported prostheses may improve prognosis, they are not always feasible due to financial, anatomical, or patient-related constraints[5]. Hence, incorporation of simple, cost-effective clinical and laboratory modifications remains the cornerstone for successful management, particularly at the undergraduate level.

This article presents a clinical case report highlighting the fabrication of a single maxillary complete denture with emphasis on simple modifications, followed by a discussion correlating clinical principles with established prosthodontic literature.

Case Report
A 55-year-old male patient reported to the Department of Prosthodontics with the chief complaint of difficulty in mastication and poor esthetics due to missing maxillary teeth. The patient had been edentulous in the maxillary arch for two years and had not worn any prosthesis previously.

Clinical Examination
Intraoral examination revealed a completely edentulous maxillary arch with a well-formed residual ridge and firm mucosa. The mandibular arch exhibited a full complement of natural teeth with mild attrition and acceptable periodontal health. No significant temporomandibular joint abnormalities were detected. Inter-arch space was adequate, and the patient exhibited a Class I maxillomandibular relationship.

Diagnosis
Based on clinical findings, the case was diagnosed as completely edentulous maxillary arch opposing natural mandibular dentition, requiring a single maxillary complete denture.

Treatment Procedure
The treatment plan involved fabrication of a single maxillary complete denture incorporating specific clinical and laboratory modifications to minimize unfavourable occlusal forces and improve denture stability.

1. Primary Impression
A primary impression was made using high fusing impression compound in a custom tray. The impression was poured in dental plaster to obtain a diagnostic cast.

2. Custom Tray Fabrication and Border Molding
A maxillary custom tray was fabricated using autopolymerizing acrylic resin with uniform spacer thickness. Border molding was performed using low-fusing impression compound to accurately record the functional sulcus depth, ensuring adequate extension without overextension.

3. Final Impression
Border molding was done with low fusing impression compound (Green Stick). A selective pressure impression technique was employed using zinc oxide eugenol impression paste. Relief was provided over the incisive papilla and mid-palatal suture to prevent excessive pressure in these stress-sensitive areas[6].

4. Jaw Relation Records
Record bases were fabricated with adequate thickness and stability. Occlusal rims were adjusted to establish appropriate lip support and esthetics. Centric relation was recorded carefully at a slightly reduced vertical dimension to minimize occlusal load[7]. Multiple verifications were carried out to avoid recording errors.

5. Occlusal Plane and Tooth Selection
The occlusal plane was established parallel to the interpupillary line anteriorly and ala-tragus line posteriorly, with slight posterior elevation to reduce tipping forces. Semi-anatomic acrylic teeth with reduced cuspal inclines were selected to minimize lateral stresses from the opposing natural dentition[8].

6. Trial Denture Evaluation
At the wax try-in stage, occlusion was evaluated in centric relation. Deflective contacts were eliminated, and minimal contacts were ensured during eccentric movements. Balanced occlusion was verified intraorally.

7. Denture Processing and Reinforcement
The denture was processed using heat-polymerized acrylic resin. Adequate palatal thickness was maintained, and a metal mesh reinforcement was incorporated in the palatal region to reduce the risk of midline fracture[9].

8. Insertion and Occlusal Adjustment
At insertion, pressure-indicating paste was used to evaluate tissue adaptation. Selective grinding was performed intraorally to eliminate premature contacts. Post-insertion instructions regarding hygiene, gradual adaptation, and follow-up visits were provided.

DISCUSSION

Single maxillary complete dentures are biomechanically disadvantaged due to the absence of a second denture for force distribution and the presence of natural teeth capable of generating high occlusal loads[10]. Without appropriate modifications, these forces tend to destabilize the denture, resulting in discomfort and prosthesis failure.

Accurate impression techniques play a pivotal role in ensuring optimal denture support. The selective pressure technique used in this case allows stress distribution over primary stress-bearing areas while protecting vulnerable tissues such as the mid-palatal suture[6]. This is particularly important in single dentures, where occlusal forces are concentrated.

Recording jaw relations accurately is critical, as even minor discrepancies may result in significant occlusal disharmony when opposing natural teeth[11]. A slightly reduced vertical dimension, as advocated in literature, helps minimize excessive loading of the denture-bearing area[7].

Tooth selection and occlusal scheme significantly influence denture stability. Use of semi-anatomic or non-anatomic teeth with shallow cuspal inclines reduces lateral forces and tipping tendencies[8]. Balanced occlusion, although difficult to achieve against natural dentition, remains desirable to enhance denture stability during functional movements[12].

Midline fracture is a common complication in single maxillary dentures due to cyclic flexural fatigue under heavy occlusal loads[13]. Incorporation of palatal reinforcement and adequate denture base thickness, as performed in this case, has been shown to significantly reduce fracture incidence[9].

Overall, the modifications described are simple, cost-effective, and easily executed by undergraduate students, yet they have a substantial impact on long-term clinical success.

CONCLUSION

Fabrication of a single maxillary complete denture opposing natural mandibular dentition requires meticulous planning and execution. Through simple clinical and laboratory modifications—such as selective pressure impression techniques, accurate jaw relation records, careful occlusal planning, appropriate tooth selection, and denture base reinforcement—many common complications can be effectively minimized. These principles are well within the scope of undergraduate prosthodontic training and can significantly improve patient comfort, denture stability, and prosthesis longevity.

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Author Biography
Aditi Waghmare is a fourth-year undergraduate student in the Department of Prosthodontics, School of Dental Sciences, Karad, with academic interest in complete denture prosthodontics and geriatric oral rehabilitation.

Dr. Ajay Gaikwad contributed to the conceptualization of the case management plan, clinical supervision during diagnosis and treatment procedures, and critical review of the manuscript for intellectual content. He provided guidance throughout the preparation and refinement of the case report and approved the final version for submission.

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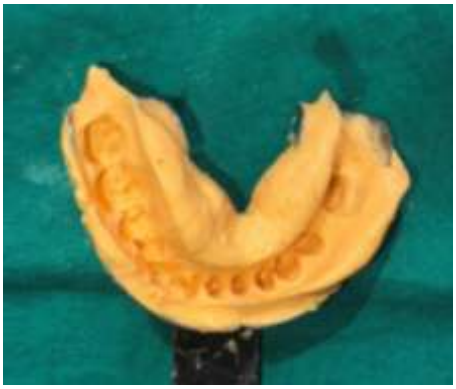
Patient Images:

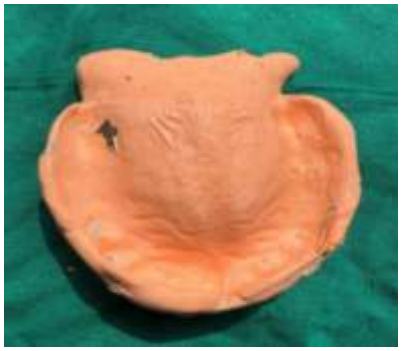
55-Year-Old Patient

Completely Edentulous Maxilla and Dentulous Mandible

Maxillary Impression with Impression Compound

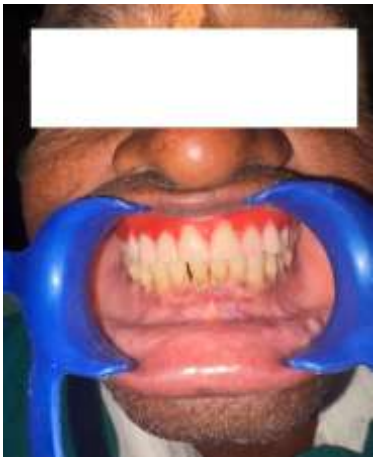


Mandibular Impression with Alginate



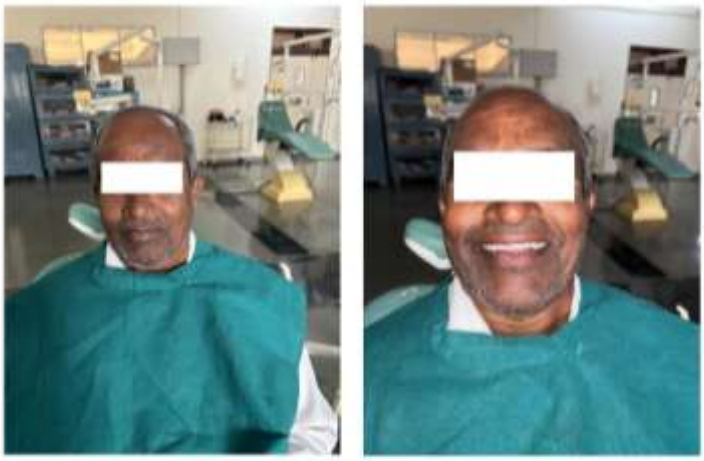
Maxillary Border moulding and Final Impression

Jaw Relationship Recording



Try-In of Waxed-Up Denture

Denture Insertion- Intra-Oral and Extra-Oral



Patient Photos- Before and After Complete Denture Insertion