

CASE REPORT

Prosthodontic management of angle class III malocclusion with a maxillary single complete denture and mandibular partial denture: A case report

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ABSTRACT

Angle Class III malocclusion presents a challenge in prosthodontic rehabilitation, especially when a maxillary single complete denture must oppose a partially dentate mandibular arch. Achieving acceptable esthetics and function requires careful planning of the occlusal scheme, tooth position, and vertical dimension, particularly in patients who refuse or are unsuitable for orthodontic or orthognathic treatment. This case report describes the prosthodontic management of a 63-year-old male patient with Angle Class III malocclusion, presenting with a completely edentulous maxilla and a partially edentulous mandible. The patient's chief complaint was poor esthetics due to reverse overjet, sunken lip support, and disharmonious smile appearance, compounded by functional difficulties in mastication. A maxillary single complete denture and a mandibular removable partial denture were planned to correct anterior esthetics while maintaining a stable and functional occlusion. In patients with Angle Class III malocclusion who decline or are not candidates for orthodontic or surgical correction, careful prosthodontic planning with a maxillary single complete denture opposing a mandibular partial denture can provide satisfactory esthetic and functional outcomes. A case-based, individualized approach is essential to respect the underlying skeletal pattern while optimizing dental and facial esthetics. (IJP 2025;6(2):120-124)

Introduction

A single complete denture (SCD) is defined as a complete denture placed on only one jaw, which can occlude with natural teeth, fixed bridge prostheses, removable partial dentures, or a complete denture on the opposing jaw.¹ An SCD occluding with natural teeth or a mandibular partial denture is a clinically challenging situation, as the position and morphology of the opposing teeth are relatively unchangeable and will greatly determine the occlusal form of the denture.^{1,3}

Inaccurate planning of an SCD, especially in cases where an edentulous maxilla occludes with a mandible having bilateral free-end posterior teeth (Kennedy Class I), can lead to denture instability, base fracture, and resorptive changes of the maxillary ridge known as combination syndrome.^{3,4} Therefore, occlusal design, load distribution, and selection of denture base material require special consideration in such cases.²

Angle Class III malocclusion, characterized by a more mesial anteroposterior relation of the mandible to the maxilla, is often associated with reverse overjet, anterior and/or posterior crossbite, and a concave facial profile.⁵ In adult patients with partial or total tooth loss, rehabilitation often requires a multidisciplinary approach involving orthognathic surgery, orthodontic therapy, and prosthetic rehabilitation.⁵ However, factors such as age, systemic condition, financial limitations, or patient refusal of surgical procedures and long-term treatment may necessitate a solely compensatory prosthodontic approach.⁶⁻⁸

Various case reports have demonstrated that Class III malocclusion in adult patients can be managed with a non-surgical prosthodontic

approach through a combination of increasing the vertical dimension of occlusion, occlusal adjustment, and the use of removable dentures or overlay dentures, favorable functional outcomes when carefully planned.⁶⁻⁸ This case report describes the prosthodontic management of a patient with a completely edentulous maxilla and a partially edentulous mandible with Angle Class III malocclusion, rehabilitated using a maxillary single complete denture and a mandibular removable partial denture. Emphasis is placed on anterior aesthetic correction and establishing a stable occlusal scheme within the limitations of the existing skeletal pattern.

Case Report

This case report describes a 63-year-old male with Angle Class III malocclusion, a completely edentulous maxilla, and a partially edentulous mandible with missing teeth #36, 37, 38, 44, 45, 46, 47, and 48. The patient complained of an unesthetic dental appearance, a sunken facial profile, and difficulty chewing. The patient declined orthodontic or orthognathic surgical treatment, so a prosthodontic approach was chosen, consisting of a maxillary single complete denture and a mandibular removable partial denture. The focus of treatment was anterior aesthetic correction and achieving a stable occlusion within the limitations of the skeletal pattern.

History

A 63-year-old male presented to the Prosthodontic Clinic of the Dental and Oral Hospital (RSGM), Hasanuddin University, with

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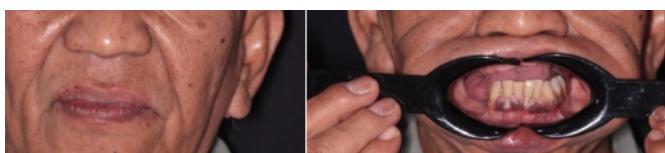


Figure 1. Pre-treatment frontal extraoral photograph with retractor: the lower third facial profile appears reduced, upper lip support is diminished, and the ridge is not adequately visible when the mouth is opened

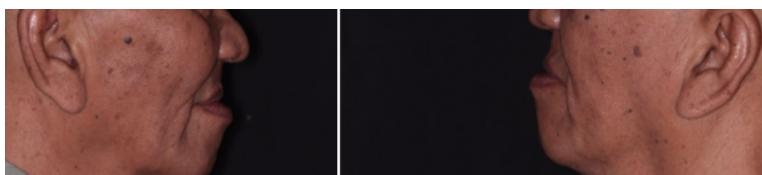


Figure 2. Right and left lateral extraoral pre-treatment photographs: A concave facial profile is observed, with a more prominent mandibular projection and insufficient upper lip support, reflecting a reduction in the vertical dimension of occlusion



Figure 3. Pre-treatment frontal intraoral photograph: shows complete edentulism of the maxilla with moderately resorbed alveolar ridges and healthy-appearing mucosa. The mandible presents remaining anterior teeth with attrition and discoloration, bilateral posterior tooth loss, and physiological pigmentation on the anterior labial gingiva. The jaw relationship indicates a tendency toward an Angle Class III skeletal pattern



Figure 4. Panoramic view

the chief complaints of missing upper teeth, difficulty chewing, and unattractive dental appearance." The patient felt his upper lip appeared "sunken" and the lower jaw appeared more prominent, which affected his appearance when smiling and speaking.

Medical history revealed no significant systemic diseases (e.g., no history of uncontrolled diabetes, severe cardiovascular disease, or head-neck radiation therapy). The patient refused orthognathic surgery or orthodontic treatment due to cost, long treatment duration, and concerns about surgical procedures.

Clinical Examination

Extraoral examination showed a concave facial profile with a more prominent mandibular projection, decreased lower facial height, and inadequate maxillary lip support. At rest position, the incisor teeth were not visible, and the smile line tended to be flat to a reverse smile line, consistent with a Class III malocclusion presentation.⁶

Intraoral examination revealed: Maxilla: Completely edentulous with a relatively flat alveolar ridge and healthy mucosa, without ulceration or signs of severe inflammation. Mandible: Partially edentulous with missing teeth 36, 37, 38, 44, 45, 46, 47, and 48. Remaining teeth were 31, 32, 33, 34, 35, 41, 42, and 43. The pattern of tooth loss indicated bilateral free-end areas, thus classified as Kennedy Class I. Mild to moderate attrition was observed on the mandibular anterior teeth, likely due to long-term compensatory masticatory function. The vertical dimension of occlusion appeared to be decreased, indicated by a widened interocclusal rest space and increased wrinkling at the corners of the mouth.

Radiographic Examination: Panoramic radiograph showed sufficient maxillary alveolar bone height for complete denture retention, without clear pathological radiographic abnormalities. The alveolar bone around the remaining mandibular teeth (31-35 and 41-43) appeared adequate, with periodontal ligaments within normal limits. No pathological radiolucent or radiopaque lesions were observed. The temporomandibular joints showed no significant radiographic abnormalities.

Diagnosis: Based on history and clinical-radiographic examination, the following diagnoses were established: Completely Edentulous Maxilla; Partially Edentulous Mandible with Kennedy Class I classification; Skeletal Angle Class III Malocclusion; Decreased Vertical Dimension of Occlusion; Chief Complaints: Aesthetic disturbance (concave profile, reduced lip support) and masticatory function disturbance.

Treatment Plan: The treatment plan was formulated considering the patient's desire to avoid surgical or orthodontic procedures: Maxillary rehabilitation with a single complete denture (maxillary single complete denture); Mandibular rehabilitation with a metal framework removable partial denture utilizing teeth 31, 32, 33, 34, 35, 41, 42, and 43 as supports and retainers. Determination of the vertical dimension of occlusion using bite rims. Arrangement of anterior teeth to improve facial and smile aesthetics, while creating a stable occlusal relationship within the limitations of the

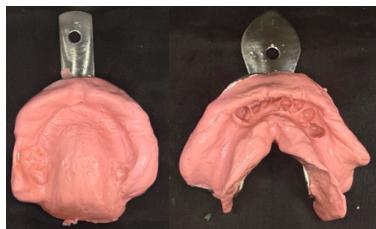


Figure 5. Anatomical impression made using an irreversible hydrocolloid material

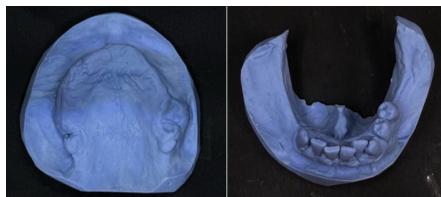


Figure 6. Anatomical model



Figure 7. Diagnostic Wax-up



Figure 8. Determination of the vertical dimension

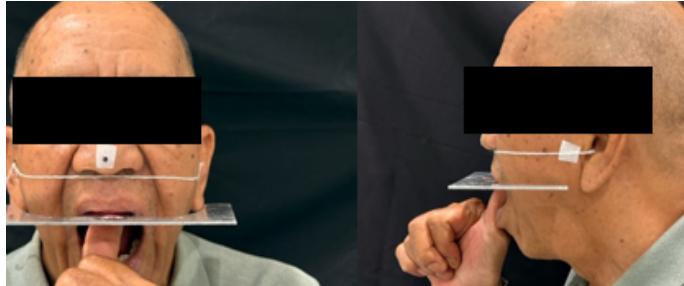


Figure 9. Maxillary alignment determination

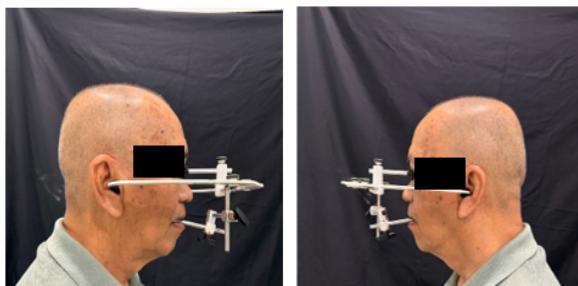


Figure 10. Transfer face Bow

Class III skeletal pattern. Patient education and scheduled periodic follow-up appointments.

Clinical Stages; Preliminary Impressions and Diagnostic Models: Preliminary impressions were made with irreversible hydrocolloid. Facebow transfer and mounting on a semi-adjustable articulator were performed. Evaluation and Diagnostic Wax-up: Occlusal analysis and diagnostic wax-up were performed to simulate tooth placement and assess aesthetic and occlusal corrections. Determination and Verification of Vertical Dimension: Bite rims were used to determine the new vertical dimension based on aesthetics, phonetics, and facial measurements. Design of Mandibular RPD: A metal framework RPD was designed with a lingual plate major connector, occlusal rests, and RPY/RPI clasp systems. Tooth Arrangement and Try-in: Maxillary anterior teeth were set more labially. Occlusion was adjusted for stable function and aesthetics. Try-in was performed for evaluation. Final Insertion and Occlusal Adjustment: The definitive SCD and RPD were inserted. Occlusal adjustments were made for balance and stability. Instructions and Follow-up Visits: The patient received instructions on denture use and hygiene. Follow-up visits were scheduled. The patient reported satisfaction with the outcome.

Discussion

Rehabilitating patients with Angle Class III malocclusion and partial or total tooth loss is a challenge that requires a comprehensive understanding of skeletal relationships, mandibular function patterns, and prosthodontic limitations.⁵⁻⁸ In this case, the patient declined orthodontic and orthognathic surgical treatment, so a realistic approach was compensatory correction through removable dentures utilizing planned increases in vertical dimension and tooth arrangement.

The use of a maxillary single complete denture occluding with mandibular teeth, whether natural or a partial denture, has long been known to carry biomechanical risks such as instability, denture base fracture, and ridge resorptive changes.¹⁻⁴ The occlusal load from natural teeth, which is much greater and more rigid than from denture teeth, demands careful occlusal design, including adjustment of the occlusal plane and, if necessary, modification of the occlusal surfaces of the opposing teeth.¹⁻³

In this case, the diagnostic wax-up proved very helpful in visualizing the potential for aesthetic improvement and occlusal relations before definitive treatment, as also emphasized in various case reports of Class III cases managed prosthodontically.⁶⁻⁸ The wax-up allows the clinician to evaluate the extent to which overjet/overbite correction can be achieved without compromising the stability of the denture base and without causing uncomfortable interincisal relationships for the patient.

The vertical dimension of occlusion is another



Figure 11. Design of mandibular RPD



Figure 12. Teeth arrangement and try-in



Figure 13. Post-treatment frontal intraoral photograph in centric occlusion: showing the maxillary complete denture and mandibular removable partial denture with a harmonious occlusal scheme. The anterior overjet and overbite appear more favorable, posterior contacts appear stable, and the metal clasp of the RPD is visible on the mandibular canine



Figure 14. Post-treatment mandibular occlusal intraoral photograph: showing the metal framework of the RPD with a lingual bar major connector, occlusal rests on the abutment teeth, and bilateral posterior artificial teeth

key parameter. A decreased vertical dimension, besides reducing masticatory efficiency and comfort, also worsens facial appearance and can clinically deepen the Class III pattern.^{5,7} A controlled increase in vertical dimension, as performed in this case, can help correct anterior relationships and provide sufficient prosthetic space for denture tooth arrangement. Previous reports indicate that restoring the vertical dimension height monitored through an interim or temporary phase can provide important information regarding patient tolerance and long-term occlusal stability.^{5,8}

The design of the mandibular RPD must follow the basic principles of partial denture design, but with special attention to load distribution when occluding with a maxillary complete denture. Classic studies on maxillary complete dentures occluding with bilateral free-end mandibular RPDs emphasize the importance of adequate support, retention, and stability to reduce the risk of denture fracture and ridge resorptive changes.^{3,4}

In the context of Class III malocclusion, it is not always possible to achieve an "ideal" occlusal relationship like Class I, especially if orthognathic surgery is not performed. A realistic goal is to achieve a stable occlusion, functionally acceptable, and improved aesthetics within the limitations of the skeletal pattern.⁶⁻⁸ In this case, a more favorable anterior relationship was successfully obtained without sacrificing posterior stability, by relying on increased vertical dimension, careful tooth arrangement, and meticulous occlusal adjustment.

Overall, this case supports previous findings that well-planned prosthodontic management can be a safe and effective alternative for adult patients with Class III who cannot or do not wish to undergo surgical or orthodontic therapy.⁵⁻⁸

Conclusion

Rehabilitating patients with Angle Class III malocclusion using a maxillary single complete denture occluding with a mandibular partial denture is a significant clinical challenge, but can still yield good aesthetic and functional results if preceded by thorough diagnosis, meticulous occlusal planning, and systematic clinical procedures.

A case-based approach tailored to patient needs, including the use of a diagnostic wax-up, evaluation of the vertical dimension of occlusion, and appropriate RPD design, allows for achieving a favorable compromise between skeletal limitations and the aesthetic-functional demands of adult patients with Class III malocclusion.

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Figure 15. Post-treatment frontal extraoral photograph: showing improved upper lip support, a more harmonious smile line, and enhanced anterior tooth display after placement of the maxillary complete denture and mandibular RPD

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