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CASE REPORT

Aesthetic rehabilitation with crowns and laminate veneers on maxillary anterior teeth and altered cast impression technique for mandibular metal framework partial denture

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Keywords: Altered cast technique, Crown, Partially edentulous, Removable partial denture, Veneer

ABSTRACT

APartial tooth loss in the mandible can impair masticatory function, phonetics, and occlusal stability, and reduce quality of life. Discoloration and disharmony in the shape of the maxillary anterior teeth also affect smile esthetics and self-confidence. A combination of veneers and crowns on the maxillary anterior teeth with a metal-framework removable partial denture in the mandible is a functional and relatively affordable prosthodontic rehabilitation option. A 46-year-old female patient presented to the Dental and Oral Hospital of Hasanuddin University with a chief complaint of feeling insecure about her appearance due to the shape of her teeth and various teeth in the maxilla. The patient also complained of difficulty chewing due to the loss of several teeth in the mandible. She had never used any dentures before. The patient requested a denture that could improve her appearance and be comfortable so that she could chew food properly. Rehabilitation using a combination of crowns and laminate veneers on the maxillary anterior teeth and a metal-framework removable partial denture (RPD) with the Altered Cast technique in the mandible successfully improved aesthetics, occlusal function, and patient comfort. This approach provides more stable prosthesis adaptation, natural restorative results, and good clinical success. Comprehensive care and periodic control are required to maintain long-term results. (IJP 2025;6(2):125-129)

Introduction

According to data from the Indonesian Ministry of Health, the prevalence of dental caries/cavities in Indonesia based on the 2018 Basic Health Research (Riskesdas) is approximately 45.3% of all dental problems.[1] Teeth have a very important function in a person's life. In addition to aesthetics and phonetics, teeth also play a major role in fulfilling a person's nutritional needs through their masticatory function. A person with neat and healthy teeth presents a more attractive appearance and increases self-confidence in daily activities. If healthy teeth are not properly maintained, they can become damaged and lead to tooth loss.[1]

Research indicates that the pattern of tooth loss in the upper jaw, lower jaw, and both jaws occurs most frequently in the 40-65 year age group, with the highest tooth loss, especially molars.[2] Tooth loss can occur due to the interaction of complex factors such as caries, periodontal disease, and trauma, with the most common cases being caused by caries. Teeth play a very important role in the human digestive process. Tooth loss will certainly greatly affect a person in terms of functional, aesthetic, and social aspects.[2]

On the other hand, increasing aesthetic demands have driven the development of techniques and restorative materials for anterior teeth, including veneers and crowns, which allow for the correction of shape, color, and tooth proportion while preserving as much healthy tooth structure as possible. Porcelain laminate veneers have become one of the popular treatments over the last decade. Porcelain laminate veneers are generally used to restore teeth with defects on the enamel surface, teeth discolored

Figure 1. Patient's facial profile

Figure 2. Intraoral view of maxilla and mandible

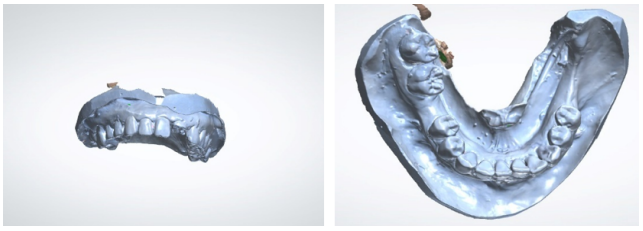

Figure 3. Study models

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due to fluorosis, tetracycline, or devitalization, and malformations.[3]

A crown is a type of fixed restoration that is cemented onto an abutment tooth using cement, making it unlikely for the fixed restoration to detach from its abutment tooth. A full crown is a restoration that completely covers the clinical crown surface of a tooth. This crown can be a stand-alone restoration or act as a retainer for a bridge. Full crowns can be made for anterior or posterior teeth and are made entirely from all-ceramic or acrylic.[3]

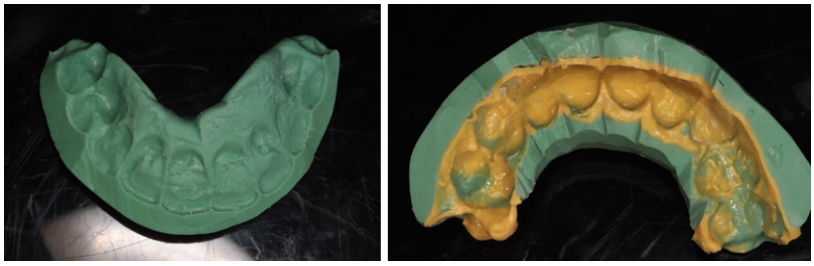

Figure 4. A. Preparation guide, B. Putty index

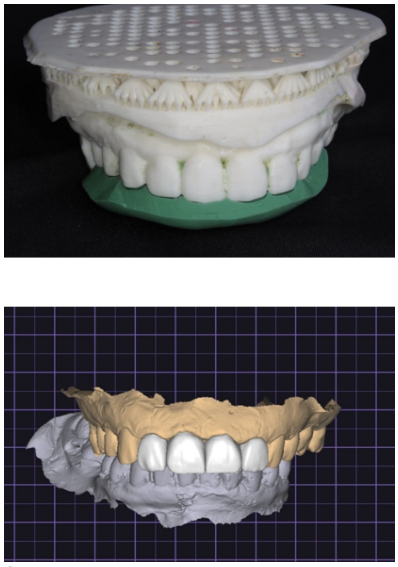

Figure 5. 3D Model of virtual wax-up

Figure 6. Tooth preparations

Figure 7. Temporary veneers and crown

Metal-framework partial dentures (cast partial dentures) remain the primary choice for rehabilitating partial edentulism in patients who have several suitable abutment teeth. Proper design can provide retention, stability, physiological load distribution, and long-term comfort. In cases of partial tooth loss, a removable partial denture is one of the affordable and effective treatment options. The type of removable partial denture that can be used is a metal-framework removable partial denture. A metal-framework partial denture is a prosthesis used to replace several teeth in an arch, whose base is made from a very strong chrome cobalt alloy material.[4]

Partial tooth loss in the mandible can impair masticatory function, phonetics, and occlusal stability, and reduce quality of life. Discoloration and disharmony in the shape of the maxillary anterior teeth also affect smile aesthetics and self-confidence. A combination of veneers and crowns on the maxillary anterior teeth with a metal-framework removable partial denture in the mandible is a functional and relatively affordable prosthodontic rehabilitation option.

This case report describes the management of aesthetic rehabilitation in a patient with various and misshapen maxillary anterior teeth and partial edentulism in the mandible, using a combination of laminate veneers and crowns in the maxilla and a Metal Framework Removable Partial Denture with the Altered Cast Technique in the mandible.

Case Report

A 46-year-old female patient presented to the Dental and Oral Hospital of Hasanuddin University (RSGMP Unhas) with complaints of lacking confidence in her appearance due to the shape of her teeth and cavities in the upper jaw. The patient also complained of difficulty chewing due to the loss of several teeth in the lower jaw. The patient had never used dentures before. The patient wanted dentures that could improve her appearance and comfortable dentures so she could chew food properly.a).

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Figure 8. **Try-in of laminate veneers and crown**

Figure 9. **A. Etching process, B. Etching Process**

Treatment of Maxillary Anterior Teeth: Laminate Veneers (11, 12, 22) and Crown (21). Initial Visit & Diagnostics: Anamnesis, extraoral and intraoral examination, and panoramic radiography were performed. Scaling and light root planing were performed. Oral hygiene instructions were given. Anatomical impressions were taken using stock trays and irreversible hydrocolloid. Study models were poured in Dental Stone Type II. Preparation Guide & Putty Index: A Putty Index and Preparation Guide were created for teeth #11-22. Digital Planning: A virtual wax-up was performed on teeth #11-22 using CAD software. Tooth Preparation: Veneer preparation on teeth #11, #12, #22 and crown preparation on tooth #21 were performed. Temporary Restorations: Temporary veneers and crown were fabricated using the Putty Index. Try-in: Try-in and adjustment of the definitive Laminate Veneers and Crown. Insertion: Tooth surfaces were cleaned. Mylar Matrix Strips were placed. Teeth were etched with 37% phosphoric acid gel. Restorations were etched. Laminate Veneers and Crown were cemented using light-cure adhesive resin cement. Mandibular Rehabilitation: Metal Framework RPD with Altered Cast Technique. Diagnostic Impressions & Design: Diagnostic impressions were made. Study models were surveyed and a metal framework was designed. Abutment Preparation: Rest seats were prepared on teeth #33, #35, #45, and #47. Custom Tray & Border Molding: A Custom Impression Tray (SCI) was used. Border Molding was performed using Green Stick Compound. Framework Fabrication: The metal framework was fabricated. Master Cast Sectioning: The master cast was sectioned distal to the abutments. Altered Cast Impression: Border molding and secondary impression with polyvinyl siloxane were performed with the framework in place. Bite Registration & Articulation: Bite rims were fabricated and models were mounted on an articulator. Vertical Dimension: Bite rim try-in, measurement of rest vertical dimension (RVD) and occlusal vertical dimension (OVD). Framework Try-in & Insertion: The metal framework was tried-in and inserted.

Figure 10. **Etching restorations**

Figure 11. **Cementation**

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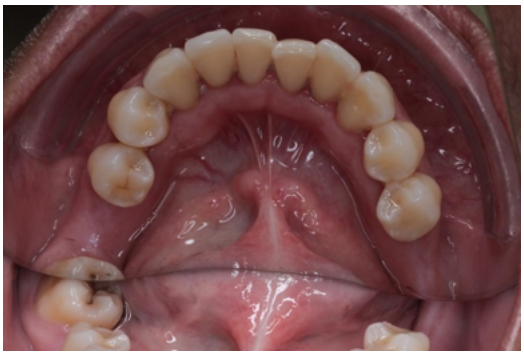

Figure 12. **Abutment preparation**

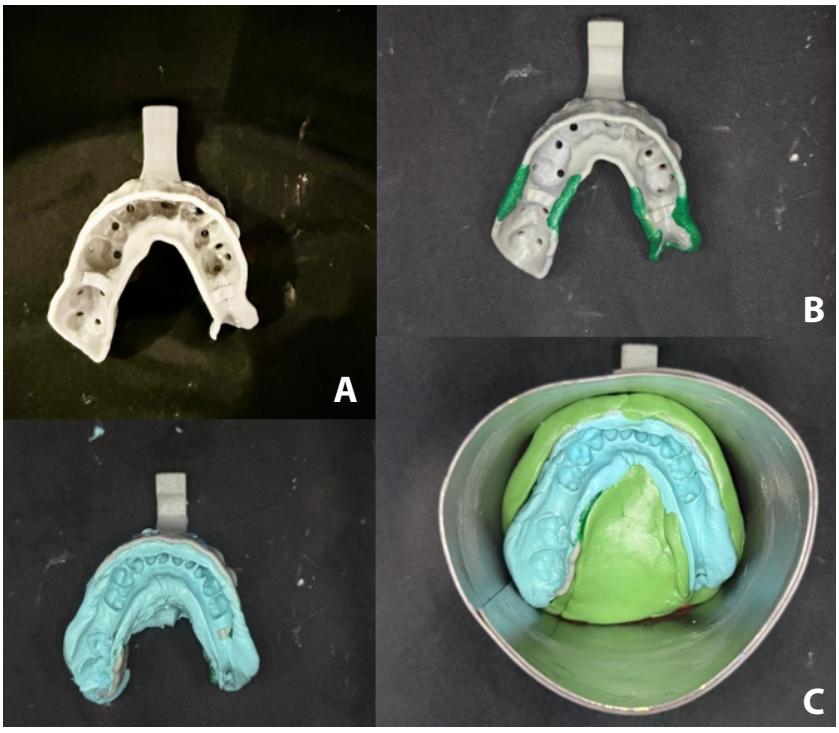

Figure 13. **A. Custom tray, B. Border molding, C. Beading boxing**

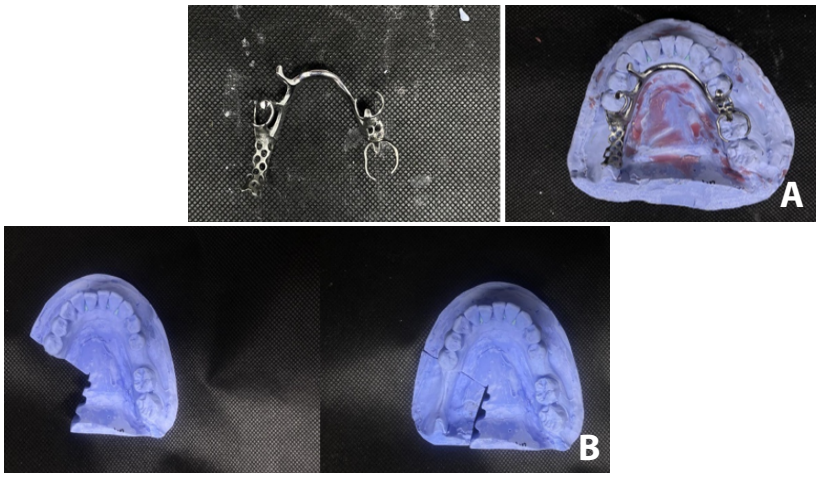

Figure 14. **A. Metal framework, B. Master cast sectioning**

Discussion

In this case, the rehabilitation approach combined fixed restorations in the maxilla with a removable prosthesis in the mandible. Aesthetic rehabilitation in the maxillary anterior region is a clinical challenge because this area significantly affects the patient's appearance, phonetics, and self-confidence.[5]

Laminate veneers are minimally invasive restorations that preserve more tooth structure, primarily used in cases of mild to moderate discoloration, shape changes, or limited enamel defects.[6,7] They provide good aesthetic results and have stable color durability. However, in cases with extensive tooth damage, significant shape changes, or weakened tooth structure, the use of a full crown is more appropriate to provide adequate retention and resistance.[3] In this case, tooth 21 had undergone root canal treatment and required a fiber post for core build-up, making a zirconia crown the restoration of choice due to its strength, aesthetics, and biocompatibility.[8]

For the mandibular rehabilitation, a metal framework removable partial denture (RPD) was chosen. Metal framework RPDs are more ideal than acrylic dentures as they are stronger, thinner, and allow for better design respecting periodontal health.[4,9] The altered cast technique was employed to achieve better adaptation to the movable mucosal ridge, improve stability and retention, and reduce excessive pressure on the mucosal tissue.[10,11] This technique is crucial for free-end saddle cases (Kennedy Class I) to record the supporting tissue in a functional state and ensure optimal support and stability.[9]

Combining fixed anterior restorations with a mandibular RPD requires careful occlusal planning to prevent overload, especially on the veneers. The selection of restorative materials and precise laboratory techniques are vital for long-term success.[12] The use of modern ceramics and the altered cast technique, accompanied by accurate clinical execution, yielded a stable, biocompatible, and durable rehabilitation outcome.

Conclusion

The combination of crowns and laminate veneers on the maxillary anterior teeth and a metal framework RPD with the altered cast technique in the mandible provided a comprehensive rehabilitation solution that successfully restored aesthetics, occlusal function, and patient comfort. This case highlights that a multidisciplinary, planned approach with appropriate material selection and techniques can achieve excellent clinical results in complex cases involving both aesthetic and functional demands. Patient education and periodic recall are essential for maintaining long-term success.

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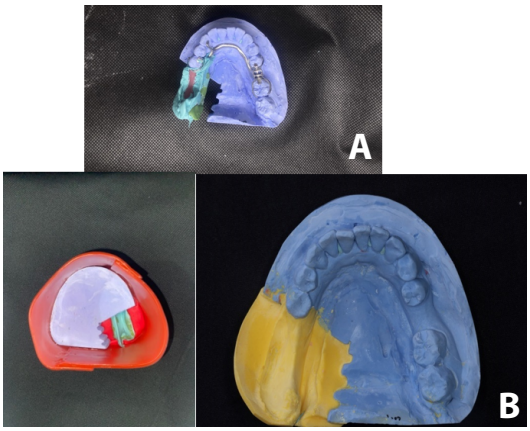

Figure 15. **A. Altered cast impression process, B. Final impression**

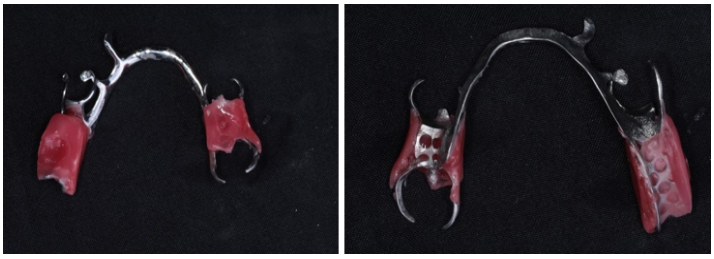

Figure 16. **Bite rim**

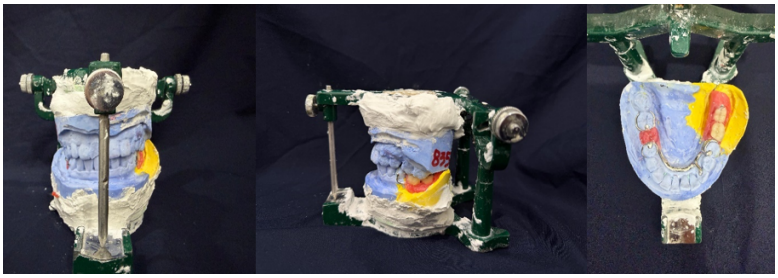

Figure 17. **Mounted models**

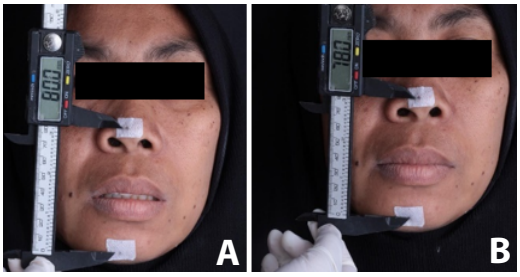

Figure 18. **A. RVD Measurement, B. OVD Measurement**

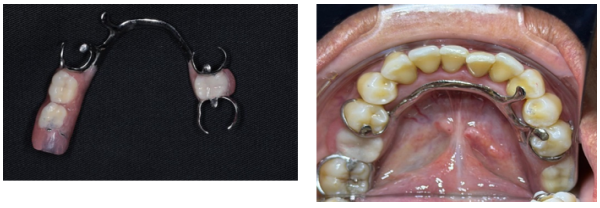

Figure 19. **Framework try-in and insertion**

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