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PROSTHODONTIC MANAGEMENT OF EDENTULOUS PATIENTS: COMPARATIVE ANALYSIS OF COMPLETE DENTURES, OVERDENTURES, AND IMPLANT-SUPPORTED PROSTHESES

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Annotation: This article presents a comprehensive examination of prosthodontic management strategies for edentulous patients, focusing on complete dentures, overdentures, and implant-supported prostheses. Edentulism significantly impacts masticatory function, facial esthetics, speech, and overall quality of life. Traditional complete dentures, while widely used, are limited by issues of retention, stability, and alveolar bone resorption. Overdentures, retained on natural roots or implants, offer improved support, proprioception, and function. Implant-supported prostheses represent the most advanced option, providing superior retention, load distribution, and patient satisfaction. The paper critically analyzes clinical outcomes, biomechanical considerations, material properties, and patient-centered factors influencing the choice of prosthetic modality. Evidence-based comparisons reveal how each option addresses functional deficits, esthetic concerns, and long-term oral health maintenance, highlighting the evolving role of implant dentistry in managing edentulism. This study provides an extensive analysis of prosthodontic strategies for managing edentulous patients, focusing on functional, biomechanical, and esthetic outcomes of complete dentures, overdentures, and implant-supported prostheses. Edentulism significantly impacts oral function, facial appearance, and patient quality of life. Conventional complete dentures, while cost-effective and widely available, often suffer from limitations in retention, stability, and masticatory efficiency. Overdentures enhance prosthetic support, improve proprioceptive feedback, and preserve alveolar bone, offering superior function compared to conventional dentures. Implant-supported prostheses represent the most advanced intervention, providing reliable retention, optimal load distribution, and high patient satisfaction. The study synthesizes clinical evidence to highlight the comparative effectiveness of these rehabilitation approaches, emphasizing decision-making based on anatomical conditions, patient expectations, and long-term functional and esthetic success.

Keywords: edentulous patients, complete dentures, overdentures, implant-supported prostheses, prosthodontic rehabilitation, masticatory function, alveolar bone preservation, retention, stability, patient satisfaction.

Introduction:

Edentulism remains a prevalent clinical condition worldwide, often resulting from dental caries, periodontal disease, or trauma. The absence of teeth leads to functional limitations in mastication, impaired speech, and

altered facial aesthetics due to loss of vertical dimension and alveolar bone resorption. Prosthodontic rehabilitation aims to restore oral function, facial morphology, and patient confidence while preventing further deterioration of the supporting structures. Conventional complete dentures have historically been the primary treatment modality; however, their efficacy is limited by lack of retention, stability, and proprioceptive feedback. Overdentures, supported by retained roots or implants, offer improved stability and enhance masticatory efficiency by maintaining alveolar bone and providing sensory input. Implant-supported prostheses represent a significant advancement, enabling fixed or removable restorations with predictable functional and esthetic outcomes. Clinical decision-making in edentulous rehabilitation requires consideration of patient anatomy, systemic health, oral hygiene, functional demands, and economic factors. This article aims to provide a detailed comparison of complete dentures, overdentures, and implant-supported prostheses, evaluating their clinical performance, biomechanical properties, and impact on patient quality of life. Edentulism is a prevalent oral condition resulting from dental caries, periodontal disease, trauma, or congenital anomalies, affecting patients' ability to chew, speak, and maintain facial integrity. The absence of teeth leads to progressive alveolar bone resorption, loss of vertical dimension, altered facial contour, and reduced masticatory efficiency. Prosthodontic rehabilitation aims to restore oral function, aesthetics, and patient confidence while preserving remaining tissues. Conventional complete dentures have historically been the standard treatment, but their reliance on mucosal support often results in instability, decreased bite force, and discomfort, particularly in mandibular arches. Overdentures, supported by retained roots or implants, improve stability, increase sensory feedback, and slow bone resorption, enhancing both function and adaptation. Implant-supported prostheses provide fixed or removable solutions with predictable retention, superior occlusal load distribution, and improved patient satisfaction. Selecting an appropriate prosthetic modality requires careful assessment of oral anatomy, bone quantity and quality, systemic health, functional demands, and patient preferences. This article provides a comparative analysis of complete dentures, overdentures, and implant-supported prostheses, examining biomechanical properties, clinical performance, and patient-reported outcomes to inform evidence-based treatment planning.

Materials and Methods:

This review is based on an extensive evaluation of literature published between 2010 and 2025, sourced from PubMed, Scopus, and ScienceDirect. Keywords used for the search included "edentulous rehabilitation," "complete dentures," "overdentures," "implant-supported prostheses," "prosthodontic outcomes," and "patient satisfaction." Inclusion criteria were clinical trials, longitudinal studies, systematic reviews, and meta-analyses reporting functional outcomes, retention, stability, and patient-reported satisfaction for different prosthodontic options. Exclusion criteria eliminated studies focusing solely on partial edentulism or non-prosthodontic management. Data were organized to compare biomechanical performance, retention mechanisms, esthetic outcomes, alveolar bone preservation, and patient adaptation. Particular emphasis was given to clinical techniques, material selection, occlusal schemes, implant placement protocols, and the influence of opposing dentition on prosthesis success. Analysis included both quantitative data (bite force, masticatory efficiency, marginal bone loss) and qualitative measures (patient-reported comfort, satisfaction, speech, and esthetic perception).

Results:

The results demonstrate clear distinctions in function, patient satisfaction, and clinical outcomes among complete dentures, overdentures, and implant-supported prostheses. Conventional complete dentures provide an accessible and non-invasive solution for edentulous patients but often exhibit limitations in retention and stability, particularly in the mandibular arch, resulting in reduced bite force and impaired mastication. Overdentures supported by natural roots or two or more implants significantly enhance prosthetic stability, reduce alveolar bone resorption, and improve proprioceptive feedback, leading to increased masticatory efficiency and patient satisfaction. Implant-supported fixed prostheses or hybrid

prostheses offer the highest degree of retention, functional load distribution, and esthetic predictability. Studies indicate that implant-supported restorations restore approximately 80–90% of natural masticatory efficiency compared to 40–50% with conventional dentures. Alveolar bone preservation is notably superior with implant-supported prostheses, reducing long-term ridge resorption and maintaining facial contour. Patient-reported outcomes, including comfort, confidence in social interactions, and oral health-related quality of life, consistently favor implant-based solutions. Material selection, including high-density acrylic, zirconia, and titanium frameworks, contributes to prosthesis durability and patient satisfaction. However, implant-supported solutions require sufficient bone volume, surgical competence, and maintenance commitment. The data collectively demonstrate that while all three modalities can restore oral function to varying degrees, implant-supported prostheses provide the most predictable and durable outcomes, particularly for patients with high functional and esthetic demands. Clinical studies reveal marked differences in functional outcomes, stability, and patient satisfaction among prosthetic options. Conventional complete dentures provide adequate esthetics and functional restoration for many patients but often suffer from instability, reduced bite force, and compromised mastication, especially in the mandibular arch. Overdentures supported by two or more implants or retained roots enhance prosthetic stability, preserve alveolar bone, and improve proprioception, resulting in higher masticatory efficiency and patient comfort. Implant-supported prostheses, whether fixed or removable, demonstrate superior retention, occlusal load distribution, and long-term stability. Quantitative analyses indicate that bite force and chewing efficiency with implant-supported prostheses can reach 80–90% of natural dentition, compared to 40–50% with conventional dentures. Patient-reported outcomes consistently favor implant-based solutions, including higher satisfaction with comfort, speech, aesthetics, and overall quality of life. Material selection, such as high-strength acrylic, zirconia, and titanium frameworks, contributes to durability and functional longevity. Long-term evaluations show excellent survival rates for implant-supported prostheses with minimal bone loss, whereas conventional dentures may require periodic relining or replacement due to ongoing alveolar ridge resorption. The comparative analysis emphasizes that while all three prosthetic options can restore oral function, implant-supported rehabilitations provide the most predictable and durable results.

Discussion:

Prosthodontic management of edentulous patients requires careful evaluation of anatomical, functional, and patient-specific factors to select an appropriate rehabilitation strategy. Conventional complete dentures remain valuable, especially for patients with medical contraindications or financial limitations, but their success is limited by mucosal support and neuromuscular adaptation. Overdentures, utilizing residual alveolar bone or implant support, represent a transitional or long-term solution that enhances retention and proprioception while minimizing ridge resorption. Implant-supported prostheses, both fixed and removable, provide superior biomechanical stability, even occlusal load distribution, and improved esthetic outcomes. Clinically, implant positioning, number, and distribution are critical determinants of long-term success, with the mandibular arch benefiting most from two-implant overdentures and the maxilla often requiring a minimum of four implants for fixed restorations. Biomechanical studies highlight that implant-supported prostheses reduce stress on supporting bone and soft tissues compared to conventional dentures, thereby increasing prosthetic longevity. Digital planning, guided surgery, and CAD/CAM fabrication have further enhanced precision, reducing complications such as implant misalignment or prosthetic misfit. Patient satisfaction is consistently higher with implant-supported options, encompassing functional efficiency, comfort, esthetics, and confidence in social contexts. Nevertheless, cost, surgical risk, and maintenance requirements remain significant considerations. Ultimately, selection of the prosthetic modality must balance clinical feasibility, patient expectations, anatomical conditions, and long-term prognosis, with interdisciplinary collaboration optimizing outcomes. Prosthodontic rehabilitation of edentulous patients must integrate anatomical, functional, and patient-centered considerations. Conventional dentures remain a

practical solution for patients with medical limitations or financial constraints but are limited by mucosal reliance and reduced proprioception. Overdentures, supported by natural roots or implants, offer improved retention, sensory feedback, and alveolar bone preservation, providing functional advantages over conventional dentures. Implant-supported prostheses provide optimal biomechanical stability, even occlusal force distribution, and excellent esthetic outcomes. Implant placement, number, and angulation are critical for long-term success, with mandibular arches generally benefiting from two-implant overdentures and maxillary arches requiring four or more implants for fixed restorations. Biomechanical studies indicate that implant-supported prostheses reduce stress on alveolar bone and soft tissues, enhancing prosthesis longevity. Digital planning and CAD/CAM fabrication have improved precision, fit, and predictability, reducing clinical adjustments. Patient adaptation, oral hygiene maintenance, and regular follow-up are essential for sustaining long-term function. Interdisciplinary collaboration with periodontists, oral surgeons, and restorative specialists ensures optimal outcomes. While implant-supported prostheses provide superior functional and aesthetic results, conventional and overdenture options remain valuable when patient-specific limitations exist. Evidence consistently demonstrates that careful treatment planning, adherence to biomechanical principles, and consideration of patient expectations are essential to achieving satisfactory and sustainable outcomes in edentulous rehabilitation.

Conclusion:

Edentulous rehabilitation in prosthodontics encompasses a spectrum of options, from conventional complete dentures to overdentures and implant-supported prostheses, each offering distinct functional, esthetic, and biomechanical advantages. Conventional dentures remain a practical solution for many patients but are limited by retention, stability, and reduced masticatory efficiency. Overdentures improve support, proprioception, and bone preservation, enhancing overall function and comfort. Implant-supported prostheses provide the most predictable and durable outcomes, restoring near-normal mastication, facial contour, and patient satisfaction. Clinical success depends on accurate diagnosis, careful treatment planning, appropriate material selection, and patient-specific considerations. Integration of digital workflows and evidence-based protocols further enhances precision and long-term performance. Ultimately, the choice of prosthodontic modality should be individualized, aiming to maximize functional restoration, esthetic harmony, and oral health-related quality of life while ensuring sustainable maintenance and patient-centered care. Effective management of edentulous patients requires a comprehensive understanding of prosthodontic options, including complete dentures, overdentures, and implant-supported prostheses. Conventional dentures remain accessible and non-invasive but are limited by retention and functional efficiency. Overdentures improve stability, proprioception, and bone preservation, providing enhanced function and patient satisfaction. Implant-supported prostheses offer the highest predictability in retention, occlusal load distribution, esthetics, and long-term outcomes. Successful rehabilitation depends on accurate diagnosis, careful treatment planning, selection of appropriate prosthetic materials, and consideration of patient-specific factors. Integration of digital workflows, guided implant placement, and CAD/CAM fabrication further enhances precision and clinical success. Long-term maintenance, regular follow-up, and patient education are critical for sustaining prosthetic function and preserving oral health. Ultimately, prosthodontic rehabilitation of edentulous patients aims to restore masticatory efficiency, facial aesthetics, comfort, and quality of life through individualized, evidence-based treatment strategies.

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