



Prosthetic Management of Geriatric Patient in All Aspects: A Review

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ABSTRACT

This review explores the challenges and strategies involved in prosthetic management for geriatric patients. Key considerations include physiological, psychological, and pathological changes associated with aging, as well as the impact on oral health and treatment options. The review highlights the importance of a comprehensive approach that addresses the individual needs of each patient, including their medical history, functional abilities, and psychological well-being. Various treatment options, such as complete dentures, overdentures, and implant-supported prostheses, are discussed, along with their advantages and limitations in the geriatric population. Additionally, the significance of nutritional considerations and the role of digital dentistry in improving treatment outcomes are emphasized. By understanding the unique challenges faced by elderly patients and implementing appropriate strategies, clinicians can provide effective prosthetic care that enhances both function and quality of life.

Keywords: Geriatric Prosthodontics, Elderly Patients, Dental Care, Complete Dentures, Overdentures, Implant Therapy, Oral Health

Introduction

Prosthetic management of geriatric patients involves a comprehensive approach that addresses their distinct medical, psychological, and social needs. Given that elderly individuals often have complex health concerns, thorough assessment and personalized treatment plans are crucial for achieving successful outcomes.¹ With the world's aging population steadily increasing, the need for age-specific dental care has grown significantly. Aging introduces numerous changes to both oral health and overall health, affecting dental care requirements and prosthetic planning.² Elderly patients often face challenges such as tooth loss, bone density reduction, dry mouth (xerostomia), and systemic conditions that can complicate traditional prosthetic treatments. Aging is frequently associated with both physical and mental decline.³ These psychological shifts, combined with declining physical health and the accumulation of life changes, contribute to emotional disturbances in many elderly individuals.⁴ Behavioral changes in aging may arise from physiological or social adjustments. Elderly individuals commonly experience psychiatric complications linked to medical conditions.⁵ Approximately 15-20% exhibit depressive symptoms, while 10-20% have anxiety disorders, particularly phobias in women over 65. Dementia prevalence rises with age, affecting over 40% of those 85 and older. Alzheimer's disease, a form of non-reversible dementia, showcases memory loss, personality changes, and cognitive decline. Delirium and schizophrenia also impact the elderly population.^{6,7} This review offers an overview of the key considerations and strategies involved in prosthetic management for geriatric patients.

Classification

Based on psychological responses to aging, geriatric patients can be grouped into three categories. The realistic group consists of individuals who adapt to aging pragmatically, accepting physical changes and planning around their limitations. The resentment group includes those who struggle with aging, often feeling frustrated or resentful about physical and social changes. The resigned group comprises individuals who passively accept aging, with little motivation to maintain health or engage in preventive care.⁸ Functionally, Ettinger and Beck (1984) classified the elderly based on their independence levels. The functionally independent elderly can maintain their daily activities without assistance and generally present fewer challenges in dental care, as they are able to manage oral hygiene and visit dental clinics independently. The frail elderly require some level of support due to limited mobility, chronic illnesses, or mild cognitive impairments; they may need adjustments in treatment and assistance with dental care. The functionally dependent elderly rely fully on caregivers for daily activities and dental needs, often necessitating home or institutional care. Winkler's classification further segments elderly patients into three groups.⁹ The hardy elderly are those who maintain robust physical and mental health, showing minimal impact from the aging process and often displaying resilience in facing age-related challenges. Those with senile aged syndromes experience significant physical and

cognitive decline, impacting their overall health and complicating dental care. In-between groups represent a range of conditions between these extremes, with mixed health statuses that may require variable levels of support. Aging itself can be viewed across three primary aspects: physiologic, psychologic, and pathologic.¹⁰

Psychological and Physiologic Considerations in Prosthodontic Management of Geriatric Patients

Aging introduces a range of physiological and social changes that significantly impact prosthodontic care for elderly patients. When restoring lost natural teeth with prosthetics, dentists must recognize the patient's desire for an aesthetic result that aligns with their personal image.¹¹ Women, especially those who were previously admired for their looks, may have specific cosmetic expectations for artificial teeth during and after menopause, sometimes even attributing the loss of their natural teeth to prior dental work. Psychological declines due to sensory losses, like reduced vision, hearing, and taste, can lead to social isolation, personality shifts, and resentment.¹² In a society that values youth and vitality, aging individuals often face frustration over unmet ambitions and goals, compounded by the fact that they require essential medical and dental services when they are least able to afford or tolerate them. In the prosthodontic setting, these psychological factors uniquely influence treatment, as geriatric patients may seek solace in the dentist's chair as they battle aging and illness. Dentists who are receptive and empathetic, willing to engage in active listening, can foster trust and encourage positive outlooks, contributing significantly to treatment success, particularly during critical moments like denture fittings.¹³

Pathologic and Intraoral Changes in Geriatric Prosthodontic Patients

Aging leads to several intraoral changes, including enamel erosion, tooth wear, reduced pulp chamber size, and diminished sensitivity due to secondary dentin formation and dentinal sclerosis. Worn teeth may lack space for prosthetics, and poor periodontal health, compounded by systemic illness or limited oral hygiene, can make plaque control challenging. Tooth loss, decreased taste sensation, and thinning mucosal layers increase the risk of malnutrition and oral diseases. Changes in the tongue, such as enlargement and depapillation, further reduce taste sensation. Residual ridge resorption occurs after tooth extractions, and aging salivary glands reduce flow, causing xerostomia and affecting denture comfort. Ill-fitting dentures may lead to inflammatory conditions, and continuous use increases inflammation risks. Other oral signs of aging include swelling in the hard palate, purple tongue discoloration (riboflavin deficiency), and cyanosis (cardiovascular issues). Xerostomia and diminished salivary function also raise the risk of candidiasis, making proper management crucial in geriatric dental care.^{14,15,16}

Challenges in Prosthodontic Management of the Elderly Patient

In elderly patients, early tooth loss can cause dental arch disruption over time, with drifting, tipping, and supraeruption creating challenges in prosthodontic treatment, such as hygiene issues, periodontal complications, and difficulties with nonparallel abutments and food traps. Treatment planning must prioritize the integrity of individual teeth and their contribution to the masticatory system, accounting for potential restorative, occlusal, and functional challenges. Removable prostheses for complete or partial edentulism should ensure precise occlusal, dental, and esthetic alignments developed over a lifetime, while the limitations of traditional removable dentures—such as impaired function—can often be addressed with implant-supported prostheses that provide better stability and retention.¹⁷ The increasing awareness and demand for implant solutions among the elderly reflect various factors, including tooth loss, poor ridge anatomy, inadequate removable denture performance, patient psychological needs, and predictable long-term outcomes of implants. Fixed prosthodontics aims to stabilize tooth position, enhance structural integrity, and create an aesthetically harmonious restoration, though contraindications include pulpal stenosis, extensive tooth restoration, and compromised hygiene skills.^{18,19}

Nutritional Considerations for Geriatric Patients

Nutrition plays a crucial role in geriatric care, as aging affects dietary needs and the ability to absorb nutrients. Energy requirements decrease with age due to lower metabolism and activity levels, with women aged 65-74 needing about 1,300 kcal/day and men 1,800 kcal/day. Protein intake becomes more important to prevent muscle loss and support denture wearers, with sources like dairy, poultry, and legumes being ideal. Carbohydrates should make up 50-60% of total calories, and fiber from vegetables aids digestion, though high-fiber foods may cause issues for those with chewing difficulties. Hydration is vital, with at least 30 ml/kg body weight recommended to prevent dehydration. Micronutrients, such as vitamin A for eye and mucosal health, B vitamins for energy and skin health, vitamin C for gum health, and vitamin D for calcium absorption, are critical. Calcium intake helps prevent osteoporosis and ridge resorption in denture wearers. A revised food pyramid for older adults focuses on nutrient-dense foods to support aging-related changes in digestion and nutrient absorption.^{13,14,15}

Strategies for Effective Prosthetic Treatment in Geriatric Dentistry

Determining the individual oral functional capacity (OFC) of geriatric patients is crucial for preventing overtreatment. Prosthetic treatments in this demographic should adhere to the g-3-S principle—simple, stable, and solid. Removable dental prostheses (RDPs) should be easy for both patients and their caregivers to handle, ensuring a user-friendly experience. Their design must prioritize stability to minimize the risk of fractures, especially if accidentally dropped. Moreover, cleanliness is essential, as RDPs can harbor bacteria and plaque, leading to conditions like caries, periodontitis, or stomatitis. Therefore, they should be polished and crafted without complex anatomical imitations that encourage plaque buildup. While the impact of

Candida albicans on denture stomatitis is well-documented, the link between respiratory pathogens and pneumonia, a leading cause of death among institutionalized elderly, warrants further attention. Elderly patients, especially those with cognitive or motor impairments, require regular guidance on maintaining oral hygiene, which should also involve training for their caregivers. Practical strategies, such as incorporating buttons or grooves into RDPs for improved handling, and labeling them for institutionalized patients, can further assist in effective care and management.^{20,21}

Overdentures: An Effective Solution for Dental Rehabilitation in Elderly Patients

Overdentures supported by natural tooth roots offer significant advantages for patients with few remaining teeth, substantial periodontal attachment loss, or unfavorable tooth distribution. These overdentures provide essential support for prostheses, ensuring the stability of abutment teeth and allowing for easy modifications if any abutments are lost. Overdentures have shown success, particularly in the mandible, where bone resorption can severely impact denture stability. As oral health improves among older adults, there may be a shift in the perception that tooth loss is a natural part of aging. Overdentures can be beneficial in cases where constructing partial dentures proves difficult due to unsuitable abutment teeth or conflicting paths of insertion.²² They can also be effective in managing cases of hypodontia, cleft palate, or surgical defects. Moreover, insufficient acrylic thickness over abutment teeth can make the prosthesis prone to fracture. In cases where retention is compromised, clinicians might consider using precision attachments to improve denture retention. These attachments consist of interlocking components, with one fixed to an abutment and the other integrated into the denture. Precision attachments can be particularly advantageous for elderly patients receiving complete dentures for the first time or those with poor muscular control, such as individuals with Parkinson's disease or following a cerebrovascular accident.^{23,24}

Challenges and Innovations in Complete Denture Provision for Elderly Patients

Despite decreasing rates of edentulousness, many elderly individuals still require complete prosthodontic replacements for their missing natural teeth. Successfully providing complete dentures can be challenging. Patients with successful existing complete dentures may be candidates for copy dentures, allowing successful features to be incorporated into new prostheses.²⁴ Older patients often face difficulties adapting to new complete dentures due to cognitive and motor impairments. In such cases, creating duplicate dentures can be beneficial, as they can preserve important characteristics from the existing dentures, including occlusal dimensions, phonetics, and aesthetics. Traditionally, duplicate dentures were created using impression techniques, but advancements in digital dentistry now allow for the digitalization of existing dentures and the use of CAD/CAM technology for fabrication, potentially reducing laboratory costs. Digitally fabricated dentures offer enhanced material quality, reducing biofilm accumulation, and facilitating easy replication in cases of loss or damage. For patients with dementia, it may be advisable to simplify the denture fabrication process by producing low-cost duplicates from basic materials, which can serve as backups if the removable dentures are lost.^{25,26}

Implant Therapy for Geriatric Patients

Osseointegrated implants are a viable option for older adults, with research indicating that osseointegration can be preserved even in the face of age-related physical and medical challenges. Implant therapy serves three primary purposes: enhancing chewing ability, protecting existing tooth structure, and replacing critical abutments.²⁷ Post-treatment, maintaining the health and functionality of the masticatory system without excessive interventions is crucial. Regular recall visits for oral hygiene education and preventive care are essential, ideally scheduled every 6 to 12 months. The maintenance plan should be tailored based on the patient's oral hygiene, gingival health, caries activity, and residual ridge condition.²⁸ Despite an increase in the number of implants placed in elderly patients, many remain hesitant about implant dentistry, often due to high costs and surgical fears. Careful consideration of existing health conditions and medications is necessary to optimize surgical protocols, favoring minimally invasive techniques. Clinical studies indicate MDIs improve bite force and chewing efficiency while demonstrating promising survival rates. However, MDIs have shown lower failure rates in the mandible compared to the maxilla, and the fixed superstructure design may pose challenges for geriatric patients who may struggle to manage discomfort from uncovered components.^{29,30}

Conclusion

The introduction of digital dentistry offers a range of therapeutic options tailored for patients in their later years. Digital solutions, especially for those with edentulous jaws, enhance patient experience by streamlining the treatment process and potentially reducing the number of appointments needed. For elderly patients who struggle to adapt to new prostheses, digital workflows allow for the duplication of existing dentures, providing a familiar foundation for new sets. In cases of lost dentures, they can be quickly and easily reproduced with minimal effort. Promoting regular dental check-ups and educating patients about denture care can enhance treatment acceptance and improve outcomes. While the primary goal is to elevate the quality of life for geriatric patients through effective prosthodontic care, it is crucial to acknowledge the challenges posed by their medical complexities and societal attitudes, which can significantly influence their overall treatment experience.

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