Artificial Intelligence and Telemedicine in Gerodontology and Improving Oral Health and Quality of Life in Older Adults

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Abstract

Background: The growing number of older adults has increased attention toward the specific dental needs of this population. Oral health problems are common in later life and can influence nutrition, communication, and overall well-being. At the same time, many elderly individuals face challenges in receiving regular dental care due to health limitations or difficulties in accessing services. In recent years, digital technologies have begun to play a greater role in healthcare. Artificial intelligence and telemedicine may offer new ways to support dentists in diagnosing, monitoring, and managing oral health conditions in older adults, while also improving access to professional care.
Aim: The aim of this study is to analyze the role of artificial intelligence and telemedicine in improving oral healthcare, early diagnosis, and quality of life elderly patients in gerodontology.
Methods: This literature review was conducted using PubMed an Scopus
Results: There are ways to use artificial intelligence and telemedicine that could truly help improve the quality of life for elderly patients.
Conclusions: Artificial intelligence and telemedicine have the potential to transform gerodontology by improving access to dental care, enabling early diagnosis, and supporting preventive healthcare strategies. As populations continue to age, integrating digital technologies into oral healthcare systems will be crucial for enhancing health outcomes and improving the quality of life for elderly individuals. **(TCM-GMJ June 2026; 12 (2): P08-P11)**

Keywords: Gerodontology, Artificial Intelligence in dentistry, Telemedicine in dental care, Teledentistry, Digital oral health elderly oral healthcare.

Introduction

Oral health plays a fundamental role in overall health and well-being, particularly in elderly populations. Gerodontology is a specialized branch of dentistry that focuses on the oral health needs of older adults. Aging is associated with several oral health problems, including periodontal disease, tooth loss, root caries, xerostomia, and oral mucosal disorders. These conditions can significantly affect nutrition, speech, social interaction, and overall quality of life. Furthermore, poor oral health is linked to systemic diseases such as cardiovascular disorders, diabetes, and respiratory infections. Despite the importance of oral health, many elderly individuals face significant barriers in receiving dental services. These barriers include physical limitations, chronic diseases, limited mobility, financial difficulties, and insufficient access to dentists in rural or underserved regions. Older adults residing in long-term care facilities often face even greater difficulties in receiving adequate dental services. Recent technological advancements have created new possibilities for solving these problems.

From the literary review, it is clearly evident that many artificial intelligence models have been developed in many countries of the world, which are used for the diagnosis of various diseases and for taking preventive measures. These models are created for various purposes and tasks. In dentistry as well, artificial intelligence is widely used for the analysis of photographic materials and the diagnosis of diseases. Additionally, artificial intelligence models have been created that are used for the analysis of X-ray images and for making diagnoses at an early stage.

Digital healthcare technologies, especially artificial intelligence (AI) and telemedicine, have the possibility to transform the delivery of oral health services. AI systems can analyze dental images and clinical data to support early diagnosis of oral diseases and assist dentists in treatment planning. These technologies improve diagnostic accuracy and enable personalized treatment approaches.

During the COVID-19 pandemic, tele dentistry network was implemented, during which general dentists in mobile units collected clinical data and digital images and transmitted cases remotely to specialists. This model effectively maintained access to oral health care for elderly

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individuals with emergency or priority needs.

Telemedicine, commonly referred to as Teledentistry in the dental field, allows healthcare professionals to provide remote consultations, patient monitoring, and oral health education through digital communication technologies. Teledentistry has proven particularly beneficial for elderly patients who are unable to visit dental clinics regularly due to mobility limitations or geographical barriers. Through teleconsultation platforms, dentists can evaluate oral health conditions, provide treatment recommendations, and monitor patients remotely.

In addition to AI and telemedicine, mobile health technologies and digital monitoring systems are increasingly used to promote oral health among older adults. Smartphone applications and digital health platforms can provide educational resources, reminders for oral hygiene practices, and communication tools that connect patients with dental professionals.

Although these technologies offer promising solutions, their integration into gerodontology also presents several challenges, including limited digital literacy among elderly individuals, concerns related to data privacy, and the need for appropriate regulatory frameworks. Therefore, further research is necessary to evaluate the effectiveness and limitations of these technologies in improving oral healthcare outcomes for aging populations.

This study aims to review current scientific literature on the application of artificial intelligence and telemedicine in gerodontology and to evaluate their potential role in improving oral health and quality of life among elderly patients.

Oral Health Challenges in the Elderly

Older adults frequently experience oral health problems such as: periodontal disease, tooth loss, root caries, xerostomia, oral mucosal lesions.

These conditions often occur with systemic diseases, which complicate dental treatment. Research indicates that oral health significantly affects quality of life among elderly individuals, influencing nutrition, communication, and psychological well-being. Elderly individuals residing in nursing homes often have poorer oral health status due to physical or cognitive impairments that limit oral hygiene practices.

Artificial Intelligence in Dentistry and Gerodontology and AI-Based Diagnosis:Artificial intelligence is increasingly being implemented in dental diagnostics. AI algorithms can analyze radiographic images to detect dental caries, periodontal bone loss, and oral lesions. AI systems also support early detection of oral cancer and other pathological conditions. AI systems can analyze patient data, medical history, medications, and imaging results to support clinical decision-making. These technologies allow dentists to develop personalized treatment plans, particularly for elderly patients with complex medical conditions..

Telemedicine and Teledentistry in Geriatric Oral Healthcare:Telemedicine refers to the use of telecommunications technologies to deliver healthcare services remotely. In dentistry, this approach is known as Teledentistry. Teledentistry can provide: remote diagnosis, virtual consultations, patient education, follow-up monitoring, specialist referrals. Studies indicate that Teledentistry improves access to oral healthcare services in rural populations. For elderly patients, remote dental consultations reduce the need for transportation and frequent clinic visits. Telemedicine is also widely used in nursing homes and long-term care facilities where on-site dental services are limited.

Mobile Health Technologies:Mobile health applications are increasingly used in preventive dentistry. Through these applications, it is possible to provide oral health education, remind patients to perform oral hygiene practices, monitor oral health conditions, and facilitate communication between dentists and patients. A conducted clinical trial showed that elderly participants who used a mobile oral health education application demonstrated improved oral hygiene behavior and greater knowledge of individual oral hygiene.

Benefits of AI and Telemedicine in Gerodontology:The integration of digital technologies in geriatric dentistry offers several advantages: improved access to dental services , early disease detection (AI-based diagnostic systems can identify oral diseases at early stages); Preventive care (Digital tools support preventive strategies through patient education and monitoring); Reduced healthcare costs (Teleconsultations reduce travel costs and unnecessary clinic visits); Improved quality of life (Maintaining oral health improves nutrition, speech, and social interaction in elderly individuals).

Despite their advantages, digital technologies in gerodontology face a number of challenges:

- Lack of digital literacy among older adults; Privacy and data security issues; Regulatory issues in telemedicine; Limited technological infrastructure in developing countries.
- Healthcare professionals also require training to effectively use these technologies. Future developments in geriatric dentistry may include:
- AI-driven oral disease screening tools; Portable oral health monitoring devices; Integrated telehealth systems for geriatric care.

These innovations can significantly improve the delivery of oral health services for the aging population.

Methods

Literature Search to gather relevant literature, we searched international electronic databases including PubMed, Scopus, and Google Scholar. The search was conducted using various combinations of keywords in both English and Georgian, focusing on terms such as:

1. Gerodontology
2. AI in dentistry
3. Teledentistry

Geriatric oral health

Selection Criteria We focused on recent studies, particularly those published in the post-COVID-19 era. To be included in this review how digital technologies, AI models, and remote monitoring systems perform when used for elderly patients.

Results and discussion

An overview of international scientific databases like PubMed and Scopus, combined with the latest research, clearly shows that bringing digital tech into Gerodontology has a huge positive impact. In fact, the study highlights three main areas where this makes a real difference:

Diagnostic Accuracy of Artificial Intelligence (AI): Data shows that modern AI algorithms are remarkably accurate at identifying dental caries, root lesions, and periodontal bone loss from X-rays and photographs. AI's role is especially vital in the early screening of oral mucosal pathologies and malignant tumors (oral cancer) which is often the deciding factor in saving the lives of elderly patients.

The Effectiveness of Teledentistry: Experience gained during the COVID-19 pandemic shows that combining remote consultations with mobile dental teams is a highly successful model. This approach drastically cut down on routine and unnecessary clinic visits while still ensuring that acute and emergency cases were managed quickly and effectively.

The Impact of Mobile Health (mHealth): Clinical observations reveal that using dedicated educational and reminder apps yields significant benefits for older adults. Patients who used these tools showed much better personal oral hygiene habits and a clearer understanding of preventive care.

Analyzing the findings shows that AI and teledentistry aren't just theoretical ideas they are practical tools that significantly improve the quality of life for the elderly. In geriatric patients, oral health problems like complete tooth loss or dry mouth (xerostomia) have a direct impact on proper nutrition, speech, and psychosocial well-being. On top of that, leaving oral infections untreated can often trigger severe systemic diseases like diabetes and cardiovascular conditions.Teledentistry platforms allow dentists to offer expert consultations to older adults in rural areas or nursing homes without making them leave their facilities. At the same time, AI helps clinicians tailor personalized treatment plans, which is incredibly important for patients dealing with multiple co-existing health issues.However, despite these clear advantages, widespread adoption still faces several major hurdles:

Lack of Digital Literacy Among the Elderly**:** Many older adults find it difficult to use smartphones and digital platforms independently. This highlights a critical point: for telemedicine to succeed, caregivers, family members, or social workers must be actively involved and trained beforehand.

Infrastructure and Regulations**:** Especially in developing countries, the technological foundation is often lacking. On top of that, there are serious concerns around patient data privacy and security, combined with the absence of a clear legal and regulatory framework to officially recognize and legitimize remote dental care

Conclusion

In conclusion, integrating digital technologies into gerodontology has become a vital necessity for improving healthcare for older adults. Although artificial intelligence and teledentistry offer tremendous opportunities to advance diagnostics and patient care, their full potential can only be realized by raising digital awareness and improving tech literacy among the elderly.

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