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The Role of Teledentistry in Oral Health Care for Older Adults Living in Long-Term Care Facilities

Jingyi Hu

St Joseph of Cluny, Killiney, Ireland
huroxanna@gmail.com

Abstract. Older adults living in long-term care facilities (LTCFs) frequently have unmet oral health needs because mobility limitations, cognitive impairment, transportation barriers, and shortages of dental professionals restrict access to conventional care. Teledentistry offers a complementary approach through synchronous and asynchronous consultation, remote patient monitoring, and mobile health. This review examines the use of these modalities for oral screening, diagnostic support, triage, preventive guidance, and follow-up in LTCFs. Available evidence suggests that teledentistry may broaden access, facilitate earlier identification of oral problems, and reduce unnecessary travel. However, it cannot replace direct clinical examination or treatment. Its effectiveness is limited by variable image quality, diagnostic constraints, technology acceptance, staff training, data privacy, professional responsibility, and institutional resources. The evidence base is further limited by small samples, heterogeneous methods and service models, and insufficient long-term outcomes. This review evaluates the clinical role and limitations of teledentistry in LTCFs and identifies research and implementation priorities that may support more accessible oral health care for older adults.

Keywords: teledentistry, older adults, long-term care facilities, oral health, health care

1. Introduction

Older adults are at increased risk of oral disease, and tooth loss generally increases with age. The 2024 U.S. Oral Health Surveillance Report found that the mean number of permanent teeth decreased from 23.3 among adults aged 50–64 years to 19.8 among those aged 75 years or older [1]. Tooth loss and lack of functional dentition are also more common among people with chronic conditions such as diabetes, heart disease, and rheumatoid arthritis, which are more prevalent in older populations. Diabetes and heart disease may further complicate oral health management [2]. Consequently, older adults often have substantial oral health care needs. Nevertheless, a Northern Ireland study reported that access to dental services remained limited for many residents of long-term care facilities (LTCFs) [3].

Traditionally, oral health care for older adults in LTCFs has depended mainly on domiciliary care and clinic-based visits. These approaches allow comprehensive clinical examinations, accurate assessment, and necessary dental procedures. However, the current model has limitations at both patient and system levels. Residents may face cognitive impairment, transportation difficulties,

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travel costs, and reduced mobility, while institutions may encounter difficult patient transfers, high accompanying-care costs, and shortages of dental professionals [3-6]. In institutional settings, this model may not provide continuous oral health monitoring, management, and follow-up. Deteriorating oral health can impair nutritional intake and quality of life and may worsen general health and chronic conditions. Improving access to oral health services is therefore important for this vulnerable population.

With the expanding use of telehealth, teledentistry has been introduced into oral health care for older adults in long-term care settings. The American Dental Association (ADA) defines teledentistry as the use of telehealth systems and methodologies in dentistry [7]. Compared with conventional care alone, teledentistry may improve service efficiency and accessibility through remote oral screening, triage, preventive guidance, and follow-up. Its limitations must also be considered, including imperfect diagnostic accuracy, an inability to provide clinical procedures remotely, data privacy concerns, and technical barriers.

A 2024 study indicated that published research on teledentistry in LTCFs remained limited and that its implementation in United Kingdom care homes was uncommon [5]. Despite potential benefits reported in the literature, broader stakeholder participation and rigorous evaluation are needed to clarify appropriate service models, limitations, and acceptability.

Accordingly, this narrative review summarizes the applications and clinical role of teledentistry in the oral health care of older adults living in LTCFs. It examines oral screening, diagnostic support and triage, health education, monitoring, and follow-up; evaluates major clinical, technical, ethical, and institutional limitations; and considers whether teledentistry can improve access to oral health care.

2. Models and applications of teledentistry

Teledentistry is a branch of telemedicine, but its definitions and scope vary across the literature. A mapping review found broad agreement that digital technologies are used to support access to dental care despite variation in terminology [8]. ADA policy describes four principal modalities: synchronous care, asynchronous care, remote patient monitoring, and mobile health (mHealth) [7]. In LTCFs, these modalities support oral screening, remote consultation, diagnostic assistance, treatment triage, oral health education, and follow-up. Teledentistry should form part of a hybrid care model that complements, rather than replaces, face-to-face consultation and clinical procedures [5].

2.1. Asynchronous teledentistry

Asynchronous teledentistry, or "store and forward," is one of the most frequently studied modalities in LTCFs. A study in four French elder-care facilities used two intraoral cameras to collect clinical data, which two dentists assessed independently to compare diagnostic performance [9]. A pilot project in two U.S. LTCFs used a similar model: hygienists collected information and forwarded it to a dentist, who determined whether further assessment was required [10]. Because data do not need to be reviewed immediately, this model may be useful when dental professionals and facility staff are unavailable at the same time.

A French-German study used recorded intraoral videos to evaluate 237 older participants. Sensitivity was 93.8% and specificity was 94.2% for the dental conditions assessed, while mean examination time was 12 minutes for asynchronous assessment and 20 minutes for in-person consultation [11]. However, assessment occurs only after data collection, immediate clarification is

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unavailable, and diagnostic performance depends on image quality, equipment, and operator competence.

2.2. Synchronous teledentistry

Synchronous teledentistry uses real-time video to enable immediate interaction between dental professionals, caregivers, and patients. It may support screening and triage while improving service efficiency and accessibility [5]. As shown in Figure 1, synchronous care in LTCFs can use a laptop and an intraoral camera operated by trained nondental staff under a dentist's remote guidance [6]. This immediate interaction allows the dentist to request additional images or clarify symptoms during the consultation, which may reduce incomplete assessments.

Idaho guidance permits a provider-patient relationship to be established through virtual care when the applicable standard of care is met, although this jurisdiction-specific framework should not be generalized to other settings [12]. Synchronous care enables real-time clarification but depends on scheduling and reliable internet connectivity. Residents with cognitive or communication impairments may also require caregiver assistance or face-to-face assessment.



Figure 1. Mobile synchronous teledentistry setup in an LTCF, including a laptop, protected intraoral camera, and disposable trays [6]

2.3. Remote patient monitoring and mHealth

Remote patient monitoring and mHealth have also been examined, although their methods and service configurations vary. An Egyptian pilot study used smartphone photography for oral screening and triage and reported high specificity for caries detection. As shown in Figure 2, five intraoral photographs were captured and subsequently assessed by dentists at a distance [13]. A rapid review of 16 studies categorized teledentistry interventions for homebound or institutionalized older adults as oral health assessment, health education, oral rehabilitation, and referral or treatment planning [14]. Equipment and outcome measures differed substantially across studies, and no single process represented all models. This heterogeneity limits direct comparison of outcomes.

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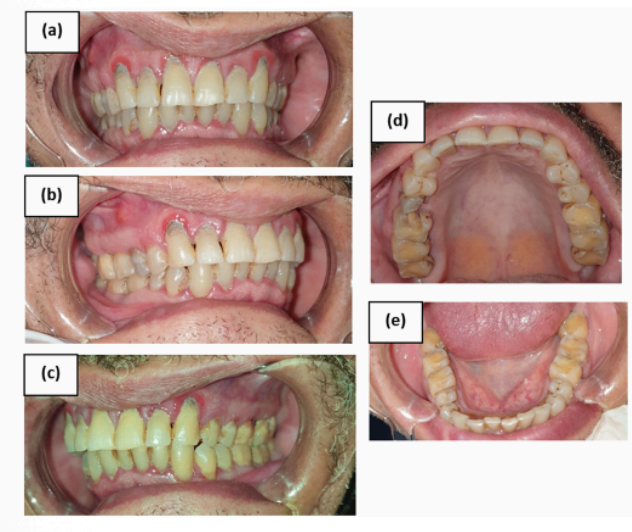


Figure 2. Intraoral photographs used for remote assessment: (a) frontal, (b) right lateral, (c) left lateral, (d) upper occlusal, and (e) lower occlusal views [13]

Overall, teledentistry may improve access to dental services when used alongside conventional care in LTCFs. Synchronous, asynchronous, monitoring, and hybrid approaches offer different advantages, but equipment performance, limited opportunities for clarification, variation among service models, and diagnostic constraints continue to restrict use. Future development should establish minimum data-quality standards while allowing service configurations to reflect local needs and resources.

3. Clinical applications of teledentistry in LTCFs

Remote oral screening is the most frequently studied application in this setting. In a rapid review of 16 studies, oral health assessment, including early disease detection, accounted for 50% of interventions. The Iowa Virtual Dental Home project and the French ONE-1 protocol used remote screening to identify caries, periodontal problems, and previously unrecognized dental needs [9, 10]. Oral rehabilitation interventions were uncommon, accounting for 12.5% of included studies [14]. This finding does not show that remote screening lacks value; rather, it identifies an evidence gap for applications requiring palpation, functional assessment, or direct testing of prostheses.

Several studies have compared remote assessment with face-to-face examination. The Tel-e-dent study reported sensitivity of 93.8% and specificity of 94.2% for the dental conditions assessed [11]. In the Egyptian pilot study, agreement for remote caries detection was high ($\kappa \geq 0.82$), whereas agreement for treatment urgency was moderate ($\kappa = 0.48–0.65$) [13]. In that setting, caries detection was therefore more reliable than urgency assessment, but the result should not be generalized automatically to other conditions or populations. Remote screening should support rather than replace diagnosis, and triage recommendations may require confirmation through face-to-face evaluation.

Oral health education is another developing application. Approximately one-quarter of studies in the rapid review (25%, n = 4) included educational interventions for older adults or caregivers [14]. ADA policy also recognizes patient education as a component of teledentistry [7]. Training may improve oral health knowledge, daily care practices, and the quality of remotely collected

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information, but much of the evidence comes from small studies or reviews. Long-term effects on residents' clinical outcomes require confirmation in rigorous controlled studies.

The French ONE-1 program included a two-month follow-up to determine whether residents with identified oral or periodontal problems received treatment or arranged an appointment [9]. The Iowa project also aimed to reduce transportation for routine preventive consultation through asynchronous teledentistry [10]. These examples demonstrate attempts to support continuity of care, but they do not by themselves establish improvements in long-term oral health outcomes.

In summary, teledentistry may help identify unmet treatment needs and support continuity of care through screening, triage, education, monitoring, and follow-up. However, diagnostic and triage performance varies across oral conditions, and evidence for the clinical effects of preventive education remains limited. Future studies should use clearly defined outcomes and report service configurations in sufficient detail to permit comparison.

4. Limitations and barriers to implementation

Although some studies report high diagnostic agreement, remote assessment remains constrained by image quality, camera angle, the absence of palpation and direct physical examination, and limited clinical information. In the Egyptian pilot study, agreement for treatment urgency was moderate (κ = 0.48–0.65), whereas agreement for caries detection was higher ($\kappa \geq 0.82$) [13]. Teledentistry also cannot provide procedures requiring direct intervention, such as dental cleaning, restorative treatment, or extraction. It should therefore complement rather than replace conventional dental services.

Technology acceptance varies among older adults, and anxiety or unfamiliarity may hinder use. Caregivers often assist with oral assessment and care, and their training may influence the quality of information collected [4]. Accessibility benefits may therefore not be realized without adequate staff support. Challenges may be greater for residents with cognitive, sensory, or communication impairments, for whom remote care depends strongly on caregiver assistance.

ADA policy and Idaho guidance indicate that virtual care must comply with requirements for informed consent, privacy, professional licensure, documentation, and responsibility for care [7, 12]. These issues are particularly relevant in LTCFs because images and health information may be shared among residents, relatives, caregivers, dentists, and other clinicians. Clear governance is needed to reduce uncertainty when remote assessment results in misdiagnosis, delayed referral, or incomplete follow-up.

A qualitative study in Northern Ireland identified uncertainty concerning reimbursement and caregiver training in domiciliary dental care. Although it did not examine teledentistry directly, these contextual barriers may also affect remote services [3]. Insufficient equipment, limited staff capacity, and the inability to perform clinical procedures remotely further restrict routine implementation in LTCFs [5]. Such institutional conditions influence whether a pilot project can become a sustainable service.

Teledentistry may contribute to diagnostic support, triage, and oral health education, but its implementation is limited by equipment requirements, restricted clinical capability, technology barriers, legal uncertainty, institutional resources, and reimbursement. Sustainable development requires trained caregivers, clear governance, appropriate technical support, and viable funding arrangements.

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5. Future development of teledentistry

Teledentistry has the potential to extend conventional dental services. The Iowa project aimed to improve access to routine oral care by reducing transportation requirements [10], while the Tel-e-dent study reported high acceptability and a shorter mean examination time for remote assessment [11]. However, benefits may depend on caregiver training and support. Inadequate assistance may reduce access for residents with mobility limitations or severe cognitive impairment [5]. Greater service availability therefore does not necessarily ensure equitable access for residents with high needs and limited self-care capacity.

ADA policy and the rapid review support minimum standards for data quality, professional responsibility, privacy, and staff training rather than a single universal service model [7, 14]. Training for dentists and LTCF caregivers may improve digital health literacy and the quality of remote assessment. Larger and more representative studies are needed to improve generalizability and evaluate effects on access, clinical outcomes, and costs [13]. Future research should standardize core outcomes and data-quality requirements while allowing models to be adapted to institutional resources and local regulations.

6. Conclusion

Older adults in LTCFs have substantial oral health needs, but limited mobility, transportation difficulties, and shortages of dental professionals can restrict access to conventional services. Teledentistry provides a complementary approach through oral screening, triage, education, and remote monitoring. These applications may reduce unnecessary travel, support earlier identification of oral problems, and improve continuity of care. However, teledentistry should complement rather than replace direct clinical examination and treatment.

Important limitations include restricted diagnostic capability, variable image quality, dependence on trained personnel, data privacy concerns, and unclear professional responsibilities. Limited equipment and staff capacity may further hinder routine implementation. Minimum standards are needed for image collection, staff training, data security, documentation, and referral, while allowing adaptation to local conditions. Because existing studies differ in design, service model, and outcome measurement, firm conclusions about long-term effectiveness and cost-effectiveness cannot yet be drawn. Adequately powered, prospective, multicenter studies with long-term follow-up are needed to provide stronger evidence for the responsible use of teledentistry in LTCFs.

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