Dementia innovation conference

The Oral Health Revolution

New Frontiers in Dementia Care

Presented by

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CEO

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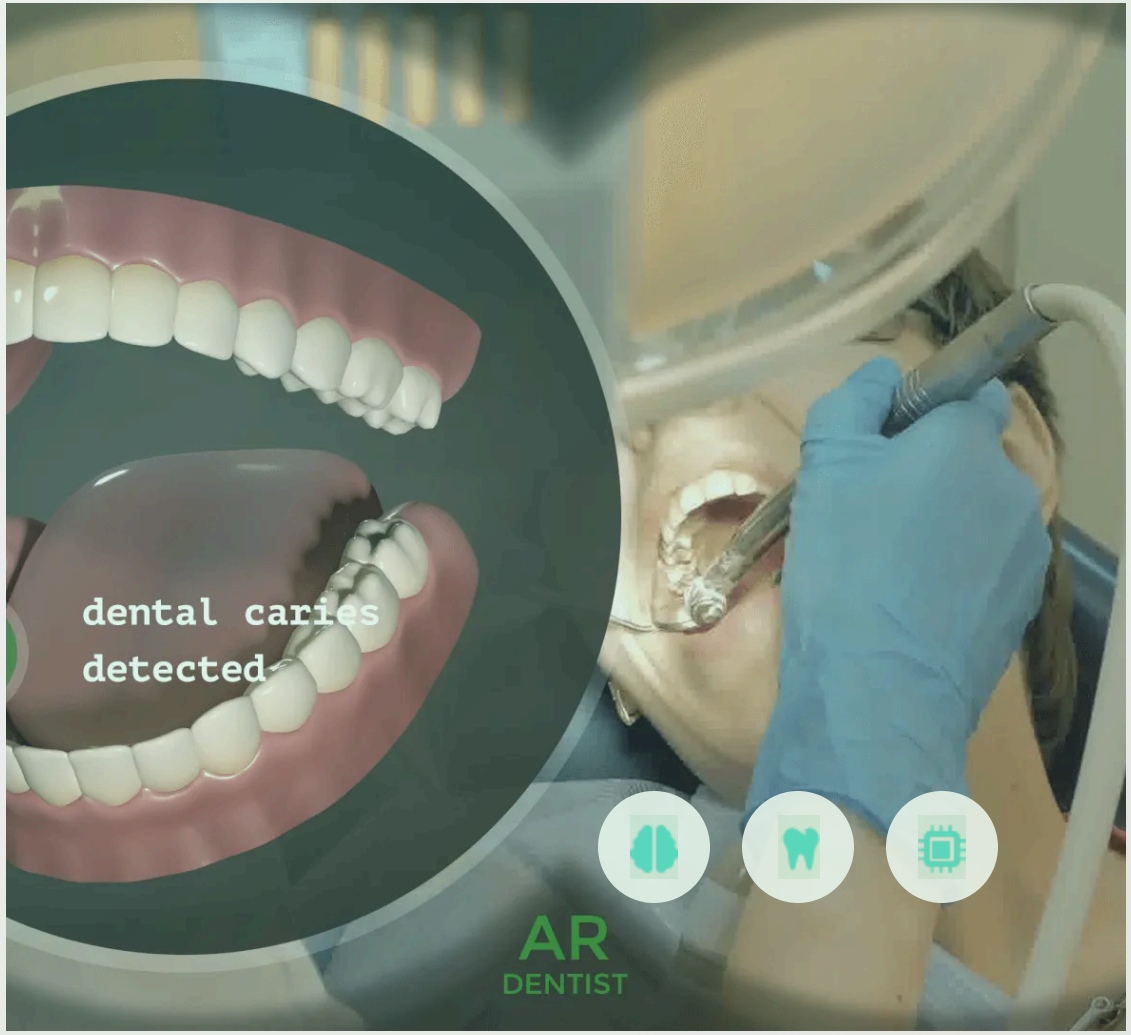


The Silent Epidemic: Understanding the Crisis

Oral health deterioration in dementia patients: the scale of the problem

Periodontal Disease

71.1%

of elderly in care homes show advanced periodontal pockets

Alzheimer's Risk

2.36×

higher risk with poor oral health compared to normal oral health

Tooth Loss Risk

3.19×

highest risk factor for Alzheimer's disease

Cognitive Decline

13.6%

weighted prevalence of SCD in poor oral health vs 7.7% in good health

Orofacial Pain

48.8%

of nursing home residents with dementia experience orofacial pain

Inadequate Care

80%

of nursing home residents don't receive daily oral care

**Data source: CDC.gov, NCBI, Academic.oup.com, Caringfortheages.com*

Impact of Poor Oral Health on Dementia

Evidence-based connections between oral health deterioration and cognitive decline

2.36× Higher Risk

Individuals with poor oral health have a 2.36 times higher risk of developing Alzheimer's disease compared to those with normal oral health

Poor Oral Health

Inflammation, bacteria, periodontal disease

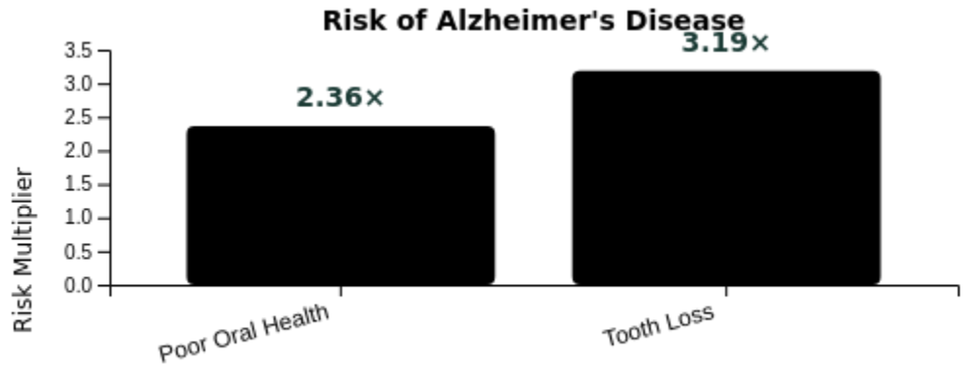
Cognitive Decline

Subjective cognitive decline, memory impairment

Dementia

Alzheimer's disease, related cognitive conditions

Key Risk Factors



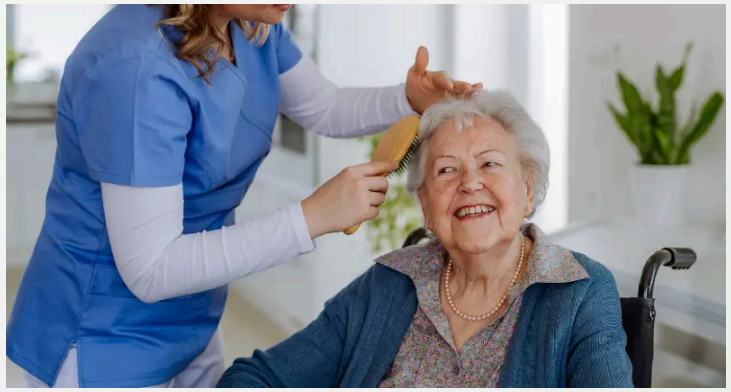
*Data source: PMC.ncbi.nlm.nih.gov

Additional Connections

- **Tooth Loss:** Most significant oral health risk factor, increasing Alzheimer's risk by 3.19 times
- **Cognitive Decline:** Poor oral health (13.6%) shows higher prevalence of subjective cognitive decline compared to good oral health (7.7%)
- **Orofacial Pain:** Nearly half (48.8%) of nursing home residents with dementia experience orofacial pain vs 14.8% without dementia

Unique Care Barriers in Dementia

Challenges specific to oral healthcare for people living with dementia



Systemic Barriers

Dry Mouth (Xerostomia)

Common in elderly and dementia patients, contributing to caries and discomfort

Medication Side Effects

Many medications can impact oral health, including those for dementia

Caregiver Challenges

Physical Limitations

Reduced manual dexterity and motor skills make oral care difficult

Cognitive Impairment

Difficulty understanding care instructions and maintaining oral hygiene

Time Constraints

Limited time for thorough oral care amid other care responsibilities

Training Gaps

Insufficient training on oral care for dementia patients

Patient-Specific Challenges

Behavioral Issues

Agitation, aggression, or confusion during care can hinder oral hygiene

Limited Access

Difficulties in accessing regular dental care due to mobility issues

Visual Impairment

Difficulty seeing or communicating about oral health issues

Preexisting Conditions

Existing oral health issues like periodontal disease or tooth loss

The Innovation Landscape: Three Transformative Approaches

A comprehensive solution for oral health in dementia care

AI-Powered Teledentistry

Smilo.ai

- Virtual dental solution with custom app and desktop software
- Enables remote consultations, bridging geographical gaps
- Automated reminders for oral hygiene routines

Breath-Based Diagnostics

Early Detection Revolution

- Detects VOCs associated with periodontal pathogens
- Identifies early markers of cognitive decline
- Non-invasive monitoring of oral inflammation

Photodynamic Therapy

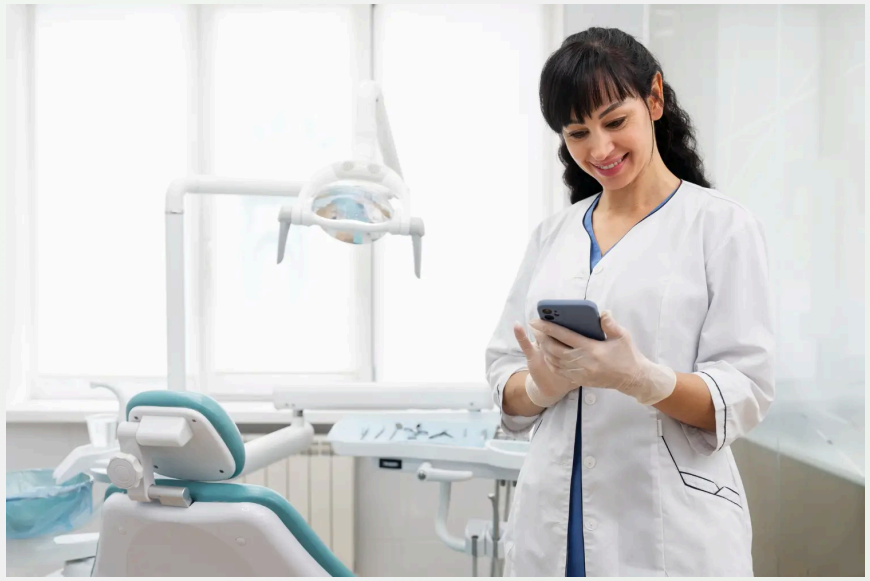
Lumoral

- Dual-light therapy (405 nm blue & 810 nm NIR)
- Reduces periodontal pockets by 92%
- Requires minimal manual dexterity from patients

These three innovations work together to create a holistic oral health pathway for dementia care

AI-Powered Teledentistry: Smilo.ai

Virtual dental solution for dementia care



Company Overview

Founded by: Dr. Padma Gadiyar

Mission: "Reimagine dental practice with AI"

Core belief: "A healthy smile is a start to a healthy mind"

Regulatory: Included in Australian Register of Therapeutic Goods (ARTG)

Key Features for Dementia Care

Virtual Consultations

Remote consultations bridging geographical and mobility gaps for dementia patients who struggle with in-person visits

Treatment Monitoring

Online monitoring of treatment progress through patient updates and chats, ensuring continuity of care

Automated Reminders

Reminders for oral hygiene routines and appointments crucial for individuals with memory impairment

Caregiver Support

Improved communication channels and access to patient records for caregivers, empowering them to assist with oral care

> *"Smilo.ai's virtual dental solution offers dementia patients access to critical oral health care when and where they need it most."*

*Source: Smilo.ai Official Website

Smilo.ai: Clinical Applications in Dementia Care

AI-powered teledentistry transforming oral care for people with dementia

Virtual Consultation Process

Remote Consultation

Bridges geographical and mobility gaps for dementia patients

Treatment Monitoring

Dentists and caregivers monitor treatment progress online

Automated Reminders

Oral hygiene routines and appointments for memory support

Caregiver Support

Improved communication and patient records access

Case Study: Rural Dementia Care

A 75-year-old dementia patient living in a rural community with limited dental access.

- Connected to specialist care via virtual consultation
- Remote monitoring reduced clinical visits by 40%

Case Study: Care Home Integration

A 60-bed care home implementing Smilo.ai for residents with dementia.

- Automated oral hygiene reminders improved compliance
- Virtual specialist consultations for complex cases

Key Benefits for Dementia Care

- Overcomes geographical barriers
- Reduces travel time and stress
- Consistent oral hygiene tracking
- Remote monitoring of conditions

**Registered in the Australian Register of Therapeutic Goods (ARTG) as a Medical Device Included Class 1*

Breath-Based Diagnostics: Early Detection Revolution

A non-invasive approach to detecting oral health issues and cognitive decline

The Breath Analysis Process

1. Breath Collection
2. VOC Detection
3. Analysis & Results

Key Applications

Periodontal Disease

Identifies specific VOCs associated with periodontal pathogens, enabling early intervention

Cognitive Decline

Sensors detect exhaled VOCs associated with mild cognitive impairment

Inflammation

Tracks inflammatory markers linked to cognitive decline

Early Detection

Potential for novel sensors to detect cognitive decline markers before symptoms appear

Advantages for Dementia Care

- Non-invasive approach suitable for dementia patients
- Early detection of oral issues and cognitive decline
- Simple testing without specialized equipment
- Provides objective data for assessment

Companies like Owlstone Medical are at the forefront of this innovative technology

Clinical Evidence: Breath Analysis in Cognitive Assessment

Research findings on breath analysis for early detection of cognitive decline

Key Research Findings

Early Detection of Periodontal Disease

Breath analysis identifies specific VOCs associated with periodontal pathogens, enabling early intervention before conditions worsen.

Cognitive Decline Markers

A 2020 study showed novel sensors can detect exhaled VOCs associated with mild cognitive impairment in early-stage Alzheimer's disease.

Oral Inflammation Tracking

Breath analysis tracks inflammatory markers linked to cognitive decline, providing a non-invasive way to monitor the mouth-brain axis.

Breath Analysis Process

Sample Collection

Exhaled breath is collected using specialized devices like the Halimeter.

VOC Detection

Novel sensors detect volatile organic compounds (VOCs) associated with cognitive decline.

Analysis & Interpretation

Collected data is analyzed to identify patterns associated with early cognitive impairment.

Clinical Applications

- Early screening for cognitive decline in dementia patients
- Non-invasive monitoring of oral inflammation
- Potential diagnostic tool for mild cognitive impairment

Source: Journal of Alzheimer's Disease, 2020; CDC.gov

Photodynamic Therapy: Introducing Lumoral

A novel dual-light approach to oral hygiene

Lumoral is a CE-marked medical device that revolutionizes oral hygiene through dual-light photodynamic therapy, offering a new approach for individuals with dementia.

Dual-Light System

Simultaneous 405nm antibacterial blue light and 810nm near-infrared LED light

Targeted Therapy

Selective antibacterial activity while preserving normal oral flora

Photosensitive Rinse

Lumorinse® with indocyanine green (ICG) binds to dental plaque bacteria

Accessible Design

Mouthguard device requires minimal manual dexterity from patients

Lumoral is particularly suitable for dementia patients due to its reduced manual dexterity requirements and effective plaque reduction capabilities.

CE-marked medical device

**Clinical evidence supports 92% reduction in deep periodontal pockets*

Lumoral: Mechanism of Action

How dual-light photodynamic therapy targets plaque bacteria while preserving oral flora

Photosensitizing Agent

Patient rinses with Lumorinse®, containing indocyanine green (ICG) that adheres to plaque bacteria

Dual-Light Activation

The mouthguard delivers two types of light:

- 405 nm antibacterial blue light
- 810 nm near-infrared light

Targeted Antimicrobial Action

The activated ICG disrupts bacterial cell membranes and produces reactive oxygen species

Selective Preservation

The therapy targets plaque bacteria while preserving normal oral flora

Additional Benefits

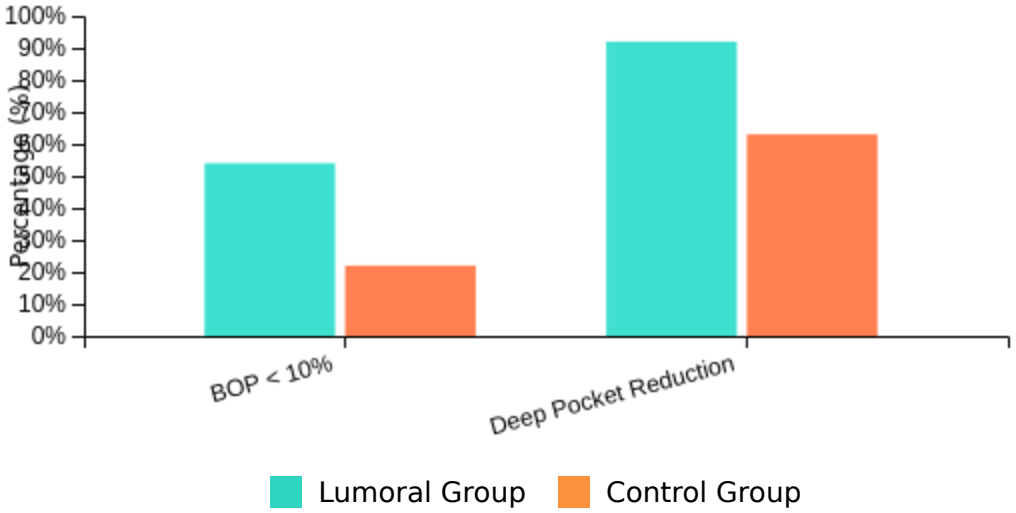
- The heat produced enhances saliva production, addressing dry mouth
- Mouthguard requires minimal manual dexterity, ideal for patients with limitations
- Maintains bacterial diversity while reducing inflammatory markers

Lumoral: Clinical Outcomes in Vulnerable Populations

Efficacy in elderly care settings

Study context: University of Helsinki trial with elderly 24-hour care home residents showed Lumoral to be safe and effective for oral health improvement.

Clinical Trial Results



Key Findings

Bleeding on Probing (BOP)

Median BOP: Lumoral **9.7%** vs Control **14.2%**

p = 0.045

Patients achieving BOP < 10%

Lumoral **54%** vs Control **22%**

p < 0.05

Additional Benefits for Vulnerable Populations

Safety

No adverse events reported

Inflammation

Reduced inflammatory markers

Bacterial Diversity

Preserved while reducing pathogens

*Data source: University of Helsinki Clinical Trial

Benefits for Dementia Patients

How Lumoral's design addresses the specific needs of dementia patients

Reduced Manual Dexterity Requirements

The mouthguard-based system requires less manual dexterity than traditional brushing, making it ideal for individuals with motor skill impairments common in dementia.

Effective Plaque Reduction

Clinical studies show a 92% reduction in deep periodontal pockets and 54% of users achieve a Bleeding on Probing score below 10%.

Improved Salivary Flow

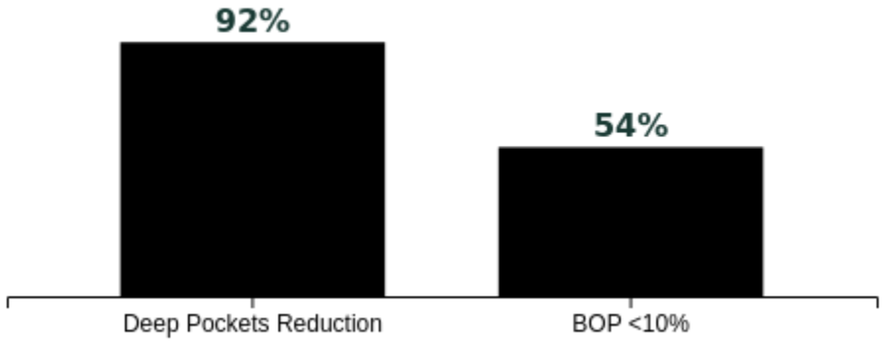
The device's heat enhances saliva production, addressing dry mouth (xerostomia), a common issue in elderly and dementia patients that contributes to caries.

Clinical Evidence in Elderly Care

A clinical trial by the University of Helsinki found Lumoral to be:

- Safe for elderly care home residents
- Significant impact on oral health

Lumoral Clinical Outcomes

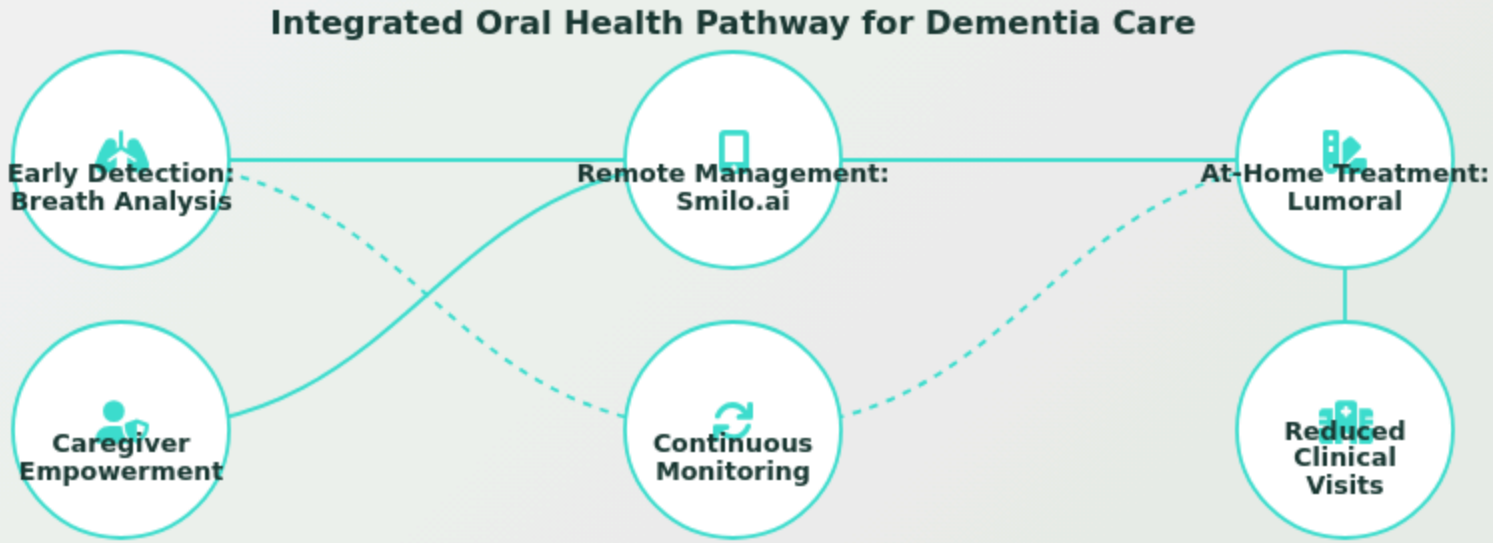


**Based on clinical studies with vulnerable populations*

Integrated Care Model: A Holistic Approach

A comprehensive oral health management system for people with dementia

The convergence of AI-driven teledentistry, advanced diagnostics, and novel photodynamic therapy creates a holistic care pathway that empowers caregivers and improves oral health outcomes.



Patient-Centered

Addresses oral health needs specific to dementia patients

Caregiver Empowerment

Simplifies oral care tasks and provides remote support

Proactive Management

Transforms oral care from reactive to proactive

Caregiver Empowerment Through Technology

Supporting and empowering dementia caregivers through innovative oral health solutions

How Technology Empowers Caregivers

Virtual Consultations

Smilo.ai enables remote consultations, bridging geographical and mobility gaps for dementia patients

Treatment Monitoring

Remote monitoring allows dentists and caregivers to track progress and ensure continuity of care

Automated Reminders

Digital reminders for oral hygiene routines crucial for memory-impaired patients

Benefits for Caregivers

Reduced Clinical Visits

Remote monitoring minimizes need for stressful dental appointments

Improved Oral Hygiene

Lumoral's 92% reduction in deep periodontal pockets

Remote Support

Professional guidance via caregiver portals

Early Detection

Breath analysis identifies issues before clinical symptoms appear

These technologies significantly empower caregivers, reducing their burden and improving confidence in oral care.

Implementation Challenges and Solutions

Overcoming barriers to innovative oral health technologies in dementia care

01 Implementation Challenges

Caregiver Digital Literacy

Many dementia caregivers lack digital literacy skills needed to operate AI and other technological tools effectively

Workflow Disruption

Caregivers already face overwhelming workloads; new technologies may disrupt established care routines

Cost Barriers

High initial investment and maintenance costs may be prohibitive for many care settings

Integration Complexity

Difficulty in integrating new technologies with existing electronic health records and workflows

02 Strategic Solutions

Targeted Training Programs

Develop simplified digital literacy training specific to each technology, with ongoing support

Workflow Integration

Design technologies that complement rather than disrupt existing care routines, with clear documentation

Cost-Effective Implementation

Develop tiered pricing models and secure funding through public-private partnerships

System Integration

Develop standardized APIs for seamless integration with existing electronic health records

A collaborative approach involving technology developers, clinicians, and care providers is essential for success

The Economic Case: Cost-Benefit Analysis

Economic benefits of implementing oral health technologies for dementia patients

Current Costs

- Increased hospitalization rates
- Higher caregiver burden
- Advanced cognitive decline

Technology-Enabled Benefits

- Reduced hospitalization rates
- Decreased caregiver burden
- Early detection of cognitive decline

Reduced Hospitalizations

Early detection and management of oral health conditions can reduce emergency hospitalizations for dementia patients with periodontal disease.

Caregiver Empowerment

Technology-enabled oral care reduces caregiver burden, allowing staff to focus on essential care tasks rather than complex oral hygiene procedures.

Preservation of Oral Health

Preventive technologies like photodynamic therapy can maintain oral health, reducing the need for costly dental interventions in vulnerable populations.

Early Cognitive Detection

Breath-based diagnostics can identify early markers of cognitive decline, enabling earlier intervention.

Collaborative Care Model

Integrated oral health pathway creates efficiency through reduced clinical visits while improving outcomes.

Shifting from reactive, costly care to proactive, dignified oral health management.

Future Directions: Research and Development

Emerging technologies transforming oral health management for dementia patients

Advanced AI Teledentistry

Building on Smilo.ai's foundation, future AI teledentistry platforms will integrate with electronic health records and provide real-time oral health monitoring.

- Remote monitoring
- Automated diagnostics

Advanced Breath Diagnostics

Next-generation breath analysis will detect early periodontal disease and cognitive decline markers, enabling proactive intervention before symptoms worsen.

- Early detection
- Non-invasive screening

Enhanced PDT Devices

Building on Lumoral's dual-light therapy, future PDT devices will incorporate additional wavelengths and delivery methods for targeted oral pathogen reduction.

- Multi-wavelength
- Site-specific treatment

Integrated Digital Health

Future platforms will integrate oral health data with general health records, enabling holistic assessment and personalized care recommendations.

- Interoperability
- Personalized care

Caregiver Empowerment Tools

Next-gen tools will provide real-time oral care guidance and training for caregivers, addressing the current gap in dementia oral care knowledge.

- Digital literacy
- On-demand guidance

Novel Therapeutic Approaches

Emerging research will focus on regenerative approaches and targeted delivery systems that address the unique oral health needs of dementia patients.

- Regenerative medicine
- Targeted delivery

> *"The future lies in integrated, person-centered approaches that transform reactive care into proactive management."*

Call to Action: Collaborative Innovation

Transforming oral health care for people living with dementia

Technological innovation is paramount to addressing the oral health crisis in dementia. By integrating these approaches, we can transform oral care from a reactive challenge into a proactive, dignified process.

Technology Developers

Design AI solutions and diagnostics

Clinicians

Implement and refine new approaches

Researchers

Validate efficacy and safety

Care Providers

Deliver compassionate care

- **Integrate technologies** across care pathways
- **Standardize protocols** for oral care
- **Train caregivers** on new approaches
- **Ensure accessibility** to vulnerable populations

"This future requires robust collaboration to ensure these innovations are accessible to those who need them most."

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Collaboration Opportunities

We welcome partnerships with:

- Technology developers
- Clinical researchers
- Dementia care providers

Thank you for your attention | dementiainnovationconference.com