Oral Health and Healthy Aging

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Oral Health: An Essential Element of Healthy Aging

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Overview of Oral Health in Older Adults

As populations in the United States and around the globe move toward a world in which 25% of people will be 65 years or older, much attention is being paid to the management of chronic diseases and maintenance of activities of daily living. Cardiovascular disease, cancers, Alzheimer disease, and immunologic disorders are among the systemic conditions attracting the attention of researchers, pharmaceutical companies, government agencies, and health care professionals.

Often overlooked is the contribution of a healthy mouth to a person’s overall well-being and its relationship with the disease processes occurring in the rest of the body. Yet the effects of poor oral health are similar to other uncontrolled disease processes. Without a healthy mouth, important aspects of general and health-related quality of life are affected, including nutrition, self-image, willingness to interact socially, mental health, and all too often, physical health.

The 32 adult teeth (including the third molars, or the "wisdom" teeth) and associated tissues serve a wide variety of functions in daily life. The mouth, tongue, and throat interface with the external environment, filter and process microbes and antigens, and send signals to the brain about ingested foods and other substances. The oral cavity is critically important in speech, mastication, swallowing, and digestion of foods as well as to one’s appearance. Deficiencies in any of these functions because of disease or injury can affect a person’s self-image and desire to interact with others, which in turn can lead to social isolation and thereby contribute to depression.

In this issue of the What’s Hot newsletter, published by The Gerontological Society of America (GSA), oral health is considered as an essential element of healthy aging. The topic encompasses the breadth of the human condition, including clinical, scientific, psychosocial, and policy considerations.

Normal/Pathological Aging

In the aging process, tooth loss, gum disease, and other dental problems have historically been considered inevitable outcomes. But like many aspects of “normal” aging, edentulism and poor oral health can be prevented. The outlook for oral health is changing because of shifts toward new ideas in dentistry, including an integrated preventive approach to care and maintenance of the natural teeth and oral tissues whenever possible. Rather than a norm of extracting teeth, followed by tooth replacement, dental professionals today prefer conservative approaches aimed
Oral health and systemic diseases

Associations between oral health and systemic conditions:

- Cardiovascular diseases
- Diabetes mellitus
- Respiratory diseases
- Stroke
- Osteoporosis
- Depression

Effects may be bidirectional
Tooth Loss, Disability, and Mortality

- Tooth loss is strongly and independently associated with onset of disability and mortality in old age.
- Tooth loss may be an early indicator of accelerated aging.
- Direction of causality unclear.

Poul Holm-Pedersen, Schultz-Larsen, Christiansen, & Avlund, 2008. JAGS
Zhang, Wu, & Wu. 2017. Journal of Aging and Health
Lower cognitive function is associated with a higher number of tooth loss and a higher prevalence of periodontitis.

Cognitive Function and Oral Health

Compared to individuals with normal cognition, individuals with mild cognitive impairment have a higher number of decayed teeth, increased plaque index and gingival inflammation, poorer oral hygiene practices, and poorer self-reported oral health.


Level of cognitive function was associated with dental care utilization. Community-dwelling elders with low cognitive function are at risk for less frequent use of dental care.

Our review suggests that while oral problems may reflect incipient cognitive decline or dementia, the dental problem may be attributable to the behavioral characteristics associated with cognitive decline and dementia (i.e. self neglect), and can be avoided with in-home dental care and dental visits.

The findings on the relationship between oral health and cognitive function are inconclusive, but this field is very promising.
Using the 5-wave data of the Health and Retirement Study (2008-2016), we examined the effect of tooth status and dental visit on cognitive function.

Dental visits and being dentate are protective factors for cognitive function at baseline. The effect of dental visits is stronger.

In the three-way interaction models, the results (and the plot) suggest that both dental visits and being dentate are necessary conditions for a slower decline in cognitive function.

Han, Wu, & Burr. Manuscript under review.
Multilevel Model Results

- Two-way Interaction:
  * \textbf{Time} × \textbf{Edentulism}

  ![Graph showing 2-Way Interactions (Time×Edentulism)]

- Two-way Interaction:
  * \textbf{Time} × \textbf{Dental care service use}

  ![Graph showing 2-Way Interactions (Time×DCSU)]

\textit{Notes}. Plots based on estimates from Model 2.
Multilevel Model Results (continued)

- Three-way Interaction: **Time × Edentulism × DCSU-BP**

![Graph showing multilevel model results](image)

*Note:* Plots based on estimates from Model 3.
Oral Health and Diabetes: Age-Period-Cohort Analysis

Study objectives

The study objectives were:

1) to assess the trend of tooth loss and differences in trends of tooth loss for adults with and without diabetes and across racial/ethnic groups

2) to evaluate the trends by age groups, birth cohorts, and survey periods.
Data sources

• Data were obtained from 9 waves of the national survey data: NHANES I (1971–1975), NHANES III (1988–1994), and 7 NHANES continuous surveys from 1999 to 2012.

• 37,609 dentate individuals (with at least 1 permanent tooth) aged 25 or older received an oral examination and were included in the study sample.
We applied the hierarchical age-period-cohort (HAPC) cross-classified random-effects model (CCREM) to assess the trends of tooth loss in adults with and without diabetes.

Data analyses were conducted by using SAS PROC GLIMMIX.

HAPC-CCREM was developed specifically for repeated cross-sectional surveys such as NHANES to deal with the clustering nature of the data by survey periods and birth cohorts.

This model can effectively estimate any random clustering effects at higher level cross-classified units such as survey periods and birth cohorts.
Figure 1. Estimated number of teeth lost by age groups
Figure 2. Estimated number of teeth lost by survey years
Figure 3. Estimated number of teeth lost by birth cohorts
Summary

• The estimated number of teeth lost among non-Hispanic blacks with diabetes increased more with age than that among non-Hispanic whites with diabetes or Mexican Americans with diabetes ($z = 4.38, P < .001$).

• During 1971–2012, there was a significant decreasing trend in the number of teeth lost among non-Hispanic whites with diabetes (slope = $-0.20, P < .001$) and non-Hispanic blacks with diabetes (slope = $-0.37, P < .001$).

• Adults with diabetes experienced about twice the tooth loss as did those without diabetes.
Racial/Ethnic Disparities in Trajectories of Dental Services Use in the U.S.

Zhang, Wu, & Wu. Revision under review
• We used five waves of the Health and Retirement Study (HRS)
• Performed bivariate and multivariate multilevel Poisson regression analyses to estimate the prevalence of dental services utilization using the generalized linear mixed-effects models.
• We also assessed age-by-race/ethnicity interaction effects and visualized the predicted prevalence of dental care utilization over time by nativity and race/ethnicity.
Figure. Predicted prevalence of dental services use from the multivariate interaction model (by race)
Figure. Predicted prevalence of dental services use from the multivariate interaction model (by nativity)
• Racial/ethnic disparities were substantial and persistent as people became older regardless of nativity while adjusting for a wide range of covariates.

• The disparity by nativity was closing as people became older and this was particularly true for Whites and for other minorities.

• These findings suggested that levels of acculturation may play an important role in contributing to the disparity as well as to the narrowing gap over time.
Interprofessional Solutions for Improving Oral Health in Older Adults

Addressing Access Barriers, Creating Oral Health Champions

A white paper based on the forum, Developing an Interprofessional Roadmap to Improving Oral Health in Older Adults. Developed by The Gerontological Society of America. Supported by GlaxoSmithKline Consumer Healthcare.
Potential solutions

- Improve access to dental care
- Define and establish a systematic approach to improving access to care for older adults that addresses barriers of low oral health literacy, poverty, lack of dental insurance, cognitive/functional disability, lack of transportation and caregiver support, and inability to find care
Potential Solutions

- Medicare coverage of oral health services
- On January 3, Senator Ben Cardin from Maryland introduced S.22, the Medicare Dental Benefit Act of 2019—a bill that, if enacted, would allow older adults and persons with disabilities to access their oral healthcare as they do their medical care—through Medicare.
Potential Solutions

- Getting people to care about oral health in older adults
- Drive awareness of the economic and humanistic value of better oral health for older adults through health promotions and public relations campaigns targeting consumer, caregivers, health professionals and other oral health champions and researchers
Putting the “O” in HEENT – The HEENOT Model

- It is important for health professionals to collaborate in providing interprofessional whole-person care
- Old paradigm of practice: Examination of head, ears, eyes, nose, and throat (HEENT)
- New paradigm: Adding examination of oral cavity to the HEENT model (HEENOT)

Meet Future Needs of Older Adults

- **Clinical care**
  - Develop delivery models to meet the diverse needs of increasing number of older adults

- **Research**
  - Examine mechanisms for the connections between systemic conditions and oral disease burdens as people age; develop interventions to promote oral health

- **Education**
  - Train dentists to care for older adults with complex medical and dental needs

- **Policy**
  - Create sustainable programs that provide older adults with prevention of and treatment for oral health condition

-- Lamster & Northridge(editors), 2008.
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