Geriatric Lecture Series:
Cognitive Impairment and Oral Health

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Disclosure Statement

I, Leo Marchini, DDS, MSD, PhD do not have any financial interests or relationships with any manufacturers of products or providers of services I might be discussing in my presentation.

I have no financial relationships with any of the companies supporting this educational event.

I will not discuss any pharmaceuticals, medical procedures, or devices that are investigational or unapproved for use by the FDA.

Contents

Cognitive Impairment → Oral Health
✓ How does it happen?
✓ Why bother?
✓ How to improve oral health for these patients?

Oral Health → Cognitive Impairment
✓ Current theories and studies

How does cognitive impairment affect oral health?

To answer this question properly, we should understand the etiology of oral diseases and how cognitive impairment impacts oral disease progression. By doing so, we will be able to figure out why epidemiology of oral diseases among cognitively impaired patients is so concerning.

How does cognitive impairment affect oral health?

Etiology of oral diseases

The two most common oral diseases among the elderly are Caries and Periodontal Disease.
How does cognitive impairment affect oral health?

**Etiology of caries**

- **BACTERIA**
  - Plaque
  - Pathogenicity
  - Specificity
  - Removable prosthesis
  - Fixed prosthesis
  - Frequent plaque removal
  - Antibacterial agents
- **DIET**
  - Sugar quantity
  - Sugar frequency
  - Sugar substitutes
  - Consistency
  - Sticky food

**PATIENT**
- Tooth morphology
- Tooth resistance (Fluoride)
- Tooth fillings
- Saliva
- Oral hygiene
- Ability to hold a toothbrush
- Compliance
- Need for help
- Tooth fillings
- Removable prosthesis
- Fixed prosthesis
- Frequent plaque removal
- Antibacterial agents

How does cognitive impairment affect oral health?

**Etiology of periodontal disease**

- **BACTERIA**
  - Plaque
  - Pathogenicity
  - Specificity
  - Removable prosthesis
  - Fixed prosthesis
  - Frequent plaque removal
  - Antibacterial agents
- **PATIENT**
  - Host response
  - Habits
  - Systemic diseases
  - Saliva
  - Oral hygiene
  - Ability to hold a toothbrush
  - Compliance
  - Need for help
  - Combative behavior

How does cognitive impairment affect oral health?

**Impact of cognitive impairment**

- Cognitive impairment
  - Memory impairment
  - Aphasia
  - Apraxia
  - Agnosia
  - Behavioral problems
  - Medications
  - Dependence
  - Financial restraints

- Poor oral hygiene
- Plaque accumulation

How does cognitive impairment affect oral health?

**Epidemiology of oral diseases among cognitively impaired patients**

**Table 1. Characteristics of the study population**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Current N = 21</th>
<th>Assisted N = 16</th>
<th>Nursing home N = 11</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body mass index</td>
<td>26.4 (4.0)</td>
<td>25.6 (4.0)</td>
<td>27.1 (3.8)</td>
<td>0.06</td>
</tr>
<tr>
<td>Age at dental index, years</td>
<td>70.6 (8.0)</td>
<td>70.1 (8.0)</td>
<td>71.0 (7.9)</td>
<td>0.6</td>
</tr>
<tr>
<td>Dental treatment history</td>
<td>96.2%</td>
<td>93.8%</td>
<td>100.0%</td>
<td>0.08</td>
</tr>
<tr>
<td>Oral hygiene</td>
<td>60.0%</td>
<td>50.0%</td>
<td>40.0%</td>
<td>0.001</td>
</tr>
<tr>
<td>Medications</td>
<td>90.5%</td>
<td>81.3%</td>
<td>81.8%</td>
<td>0.12</td>
</tr>
<tr>
<td>Cognitive impairment status</td>
<td>42.9%</td>
<td>43.8%</td>
<td>45.5%</td>
<td>0.7</td>
</tr>
<tr>
<td>Poor oral hygiene</td>
<td>23.8%</td>
<td>18.8%</td>
<td>18.2%</td>
<td>0.25</td>
</tr>
<tr>
<td>Plaque accumulation</td>
<td>23.8%</td>
<td>18.8%</td>
<td>18.2%</td>
<td>0.25</td>
</tr>
</tbody>
</table>
Why worry about cognitively impaired patients’ oral health?

“Research conducted during the last decades (...) presented poor oral hygiene and increased dental caries experience and more dental problems in older adults with dementia”

Ettinger, 2015

But why bother?
**Other important oral health problems**

Xerostomia

- Among older populations, xerostomia prevalence ranges from 12% to 39% (weighted average of 21%)
- The role of medications
- Important impact on QoL

**Other important oral health problems**

Common oral mucosal lesions among the elderly

**Other important oral health problems**

Oral cancer

**How to improve oral health for my cognitively impaired patients?**

- Provide systematic oral health to improve quality of life
- Promote oral hygiene at least twice a day to minimize risk of remote infections
- Provide regular dental appointments for checkups
- Provide dental appointments when a patient shows or seems to show (non-verbal) signs of oral pain; complains about oral dryness; complains about or shows (non-) denture-related oral soft tissue lesions

**Provide systematic oral health to improve quality of life**

- Daily oral hygiene routines
- Periodic dental appointments
- Emergency dental appointments

Modified from De Visschere et al., 2011
Promote oral hygiene at least twice a day to minimize risk of remote infections

Different patients, different oral hygiene procedures

 Tooth plaque removal

- Electric toothbrush
- Manual toothbrush handles
- Manual tooth brush adaptations
- Interproximal brush
- Floss handles

Electric toothbrush

Manual toothbrush handles

Manual toothbrush adaptations

Interproximal brush
Floss handles

Specific products for caries prevention

Specific dietary interventions for caries prevention

Specific products for periodontal disease prevention

Brushing the teeth is the cheapest and most effective way of maintaining good oral health conditions for dentate patients!!

However, sometimes it is not that easy...

Chlorhexidine 0.12%, 15mL, 30-60 seconds
- Active against G+ and G-, facultative anaerobes, aerobes and yeasts
- Lasts longer than other mouthwashes
- Causes stains (teeth, tongue, gingiva and resin restorations)
- Prolonged use can reduce bitter and salt taste sensations
- Both plaque index and gingival inflammation are reduced significantly

Evidence suggests that a mouthwash containing CHX is the first choice.

**Coleman, 2002**
**Denture plaque removal**

Provide regular dental appointments for checkups

**Edentulous mouth cleaning**

Provide regular dental appointments for checkups
Provide dental appointments when a patient shows or seems to show (non-verbal) signs of oral pain

- Neglecting to eat
- Being disinterested of food
- Chewing of the lip, tongue or hands
- Pulling at the face or mouth
- Not wearing dentures
- Grinding of teeth or dentures
- Aggression
- Alteration in activity level

Chalmers & Pearson, 2005

Xerostomia management

- Symptom relief
- Managing problems with dentures
- Preventing dental caries and soft tissue involvement
- Monitoring the use of medication

Dry mouth and older people

Provide dental appointments when a resident complains about mouth dryness

- Neglecting to eat
- Being disinterested of food
- Chewing of the lip, tongue or hands
- Pulling at the face or mouth
- Not wearing dentures
- Grinding of teeth or dentures
- Aggression
- Alteration in activity level

Chalmers & Pearson, 2005

Provide dental appointments when a patient complains about or shows (non-) denture-related oral soft tissue lesions

- Pulling at the face or mouth
- Not wearing dentures
- Grinding of teeth or dentures
- Aggression
- Alteration in activity level

Chalmers & Pearson, 2005

Current theories and studies on how oral health may be a risk factor for cognitive impairment

- Epidemiological data
- Correlation analysis
- No causal relationship

Dentition, Dental Health Habits, and Dementia: The Leisure World Cohort Study

Dry mouth and older people

Dentition, Dental Health Habits, and Dementia: The Leisure World Cohort Study

- Epidemiological data
- Correlation analysis
- No causal relationship

Dentition, Dental Health Habits, and Dementia: The Leisure World Cohort Study

Figure 4. Flowchart for participant inclusion.

Dentition, Dental Health Habits, and Dementia: The Leisure World Cohort Study

- Epidemiological data
- Correlation analysis
- No causal relationship

Dentition, Dental Health Habits, and Dementia: The Leisure World Cohort Study

Figure 4. Flowchart for participant inclusion.
Periodontitis is associated with cognitive impairment among older adults: analysis of NHAMES-III

Methods: To assess relationships between systemic exposure to periodontal pathogens and cognitive test outcomes, data were analyzed from the Third National Health and Nutrition Examination Survey (NHAMES-III), a nationally representative cross-sectional observational study among older adults. We included 2325 participants (≥65 years) who completed measures of cognitive and (peri)periodontal periodontitis (P. gingivalis, Porphyromonas gingivalis, P. intermedia, T. denticola). Logistic regression models examined the association of P. gingivalis with cognitive test performance.

Conclusion: A longitudinal study of periodontitis is associated with impaired verbal memory and calculation. Further exploration of relationships between oral health and cognition is warranted.

Thank you for your attention!