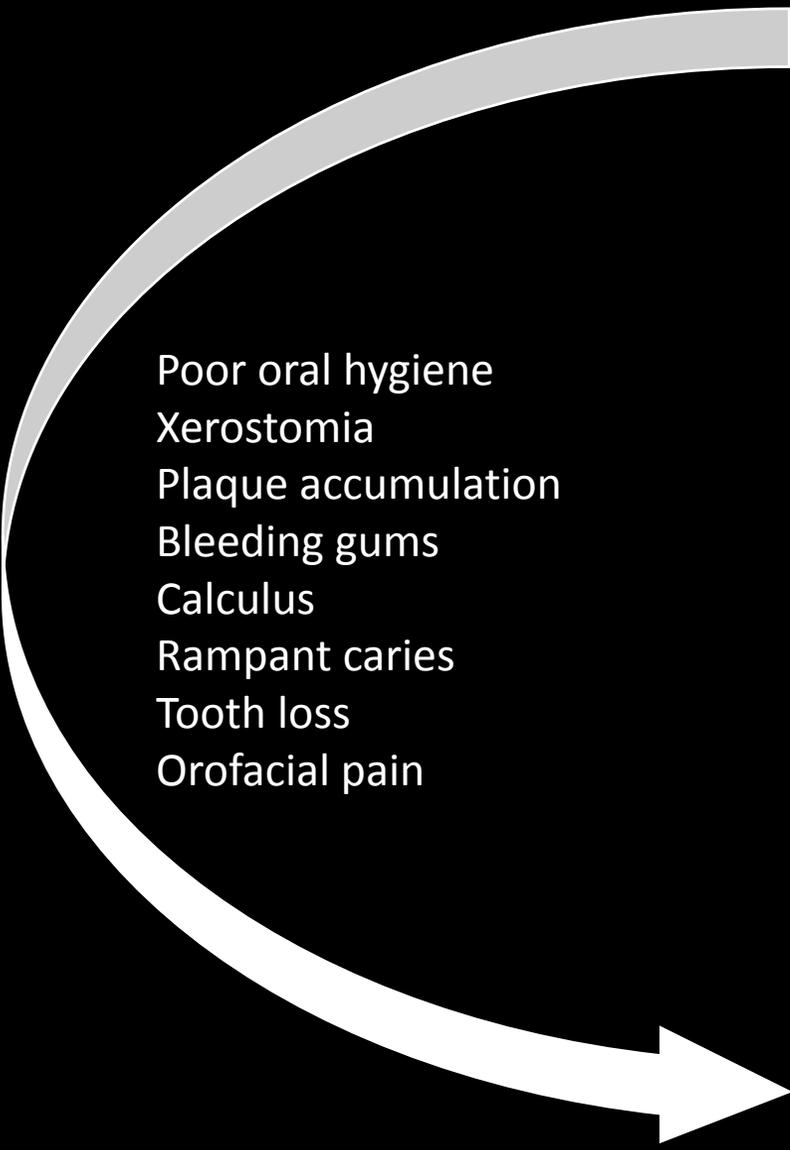
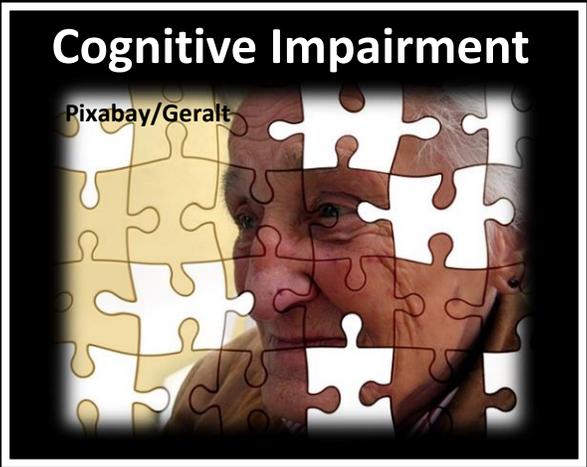


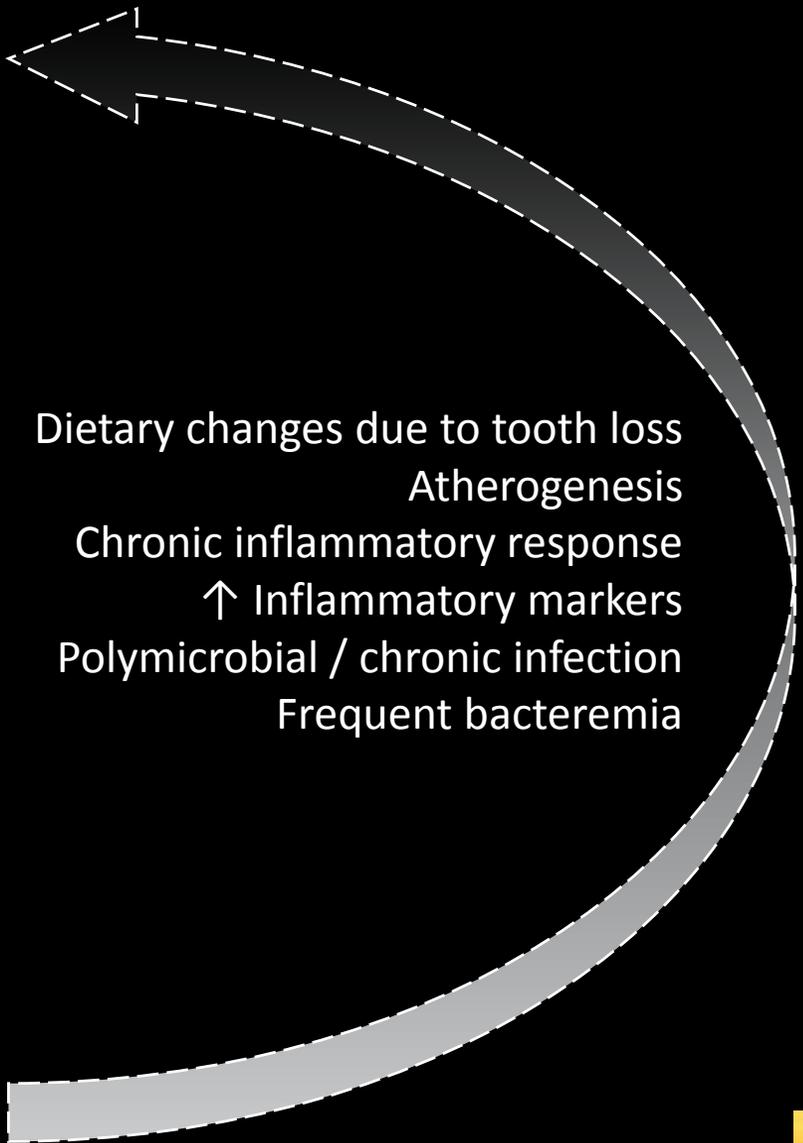
Geriatric Lectures Series:

***Cognitive Impairment
and Oral Health***

Dr. Leo Marchini, DDS, MSD, PhD
Department of Preventive and Community Dentistry
University of Iowa College of Dentistry and Dental Clinics



- Poor oral hygiene
- Xerostomia
- Plaque accumulation
- Bleeding gums
- Calculus
- Rampant caries
- Tooth loss
- Orofacial pain



- Dietary changes due to tooth loss
- Atherogenesis
- Chronic inflammatory response
- ↑ Inflammatory markers
- Polymicrobial / chronic infection
- Frequent bacteremia

Contents

Cognitive Impairment → Oral Health

- ✓ How does it happen?
- ✓ Why bother?
- ✓ How to improve oral health for them?

Oral Health → Cognitive Impairment

- ✓ Current theories and studies



How does cognitive impairment affect oral health?

To answer this question in a proper way, we should understand the **etiology of oral diseases**, and how **cognitive impairment impacts oral diseases** 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?

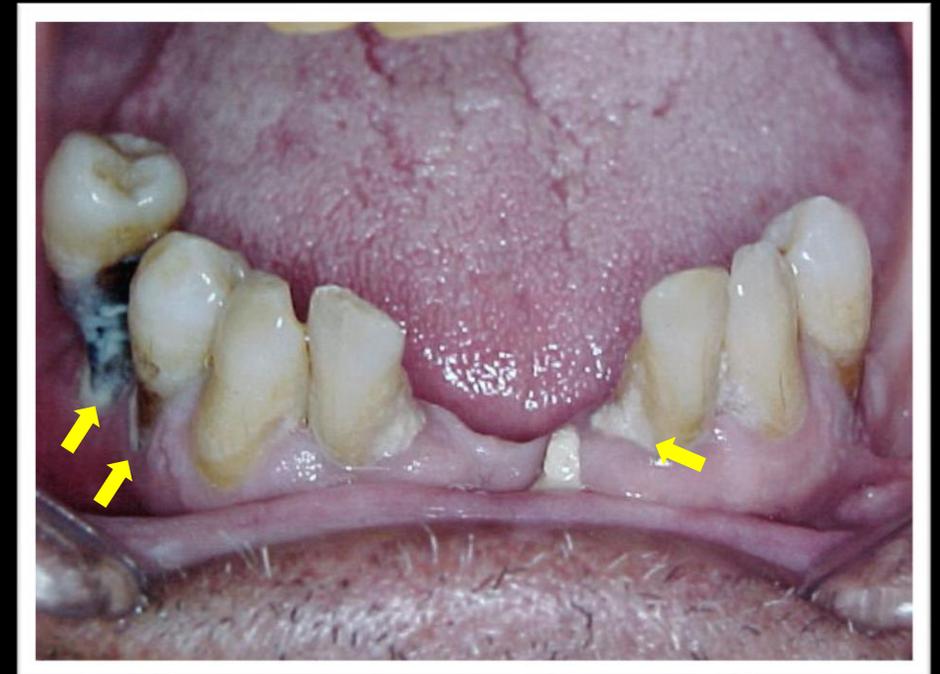
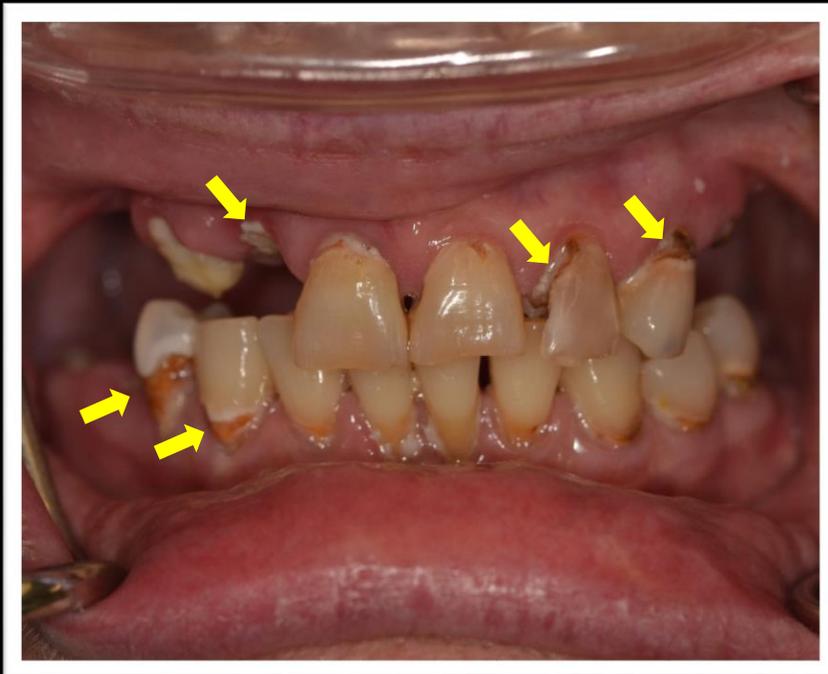
Etiology of oral diseases

The two most common oral diseases among the elderly are

Caries

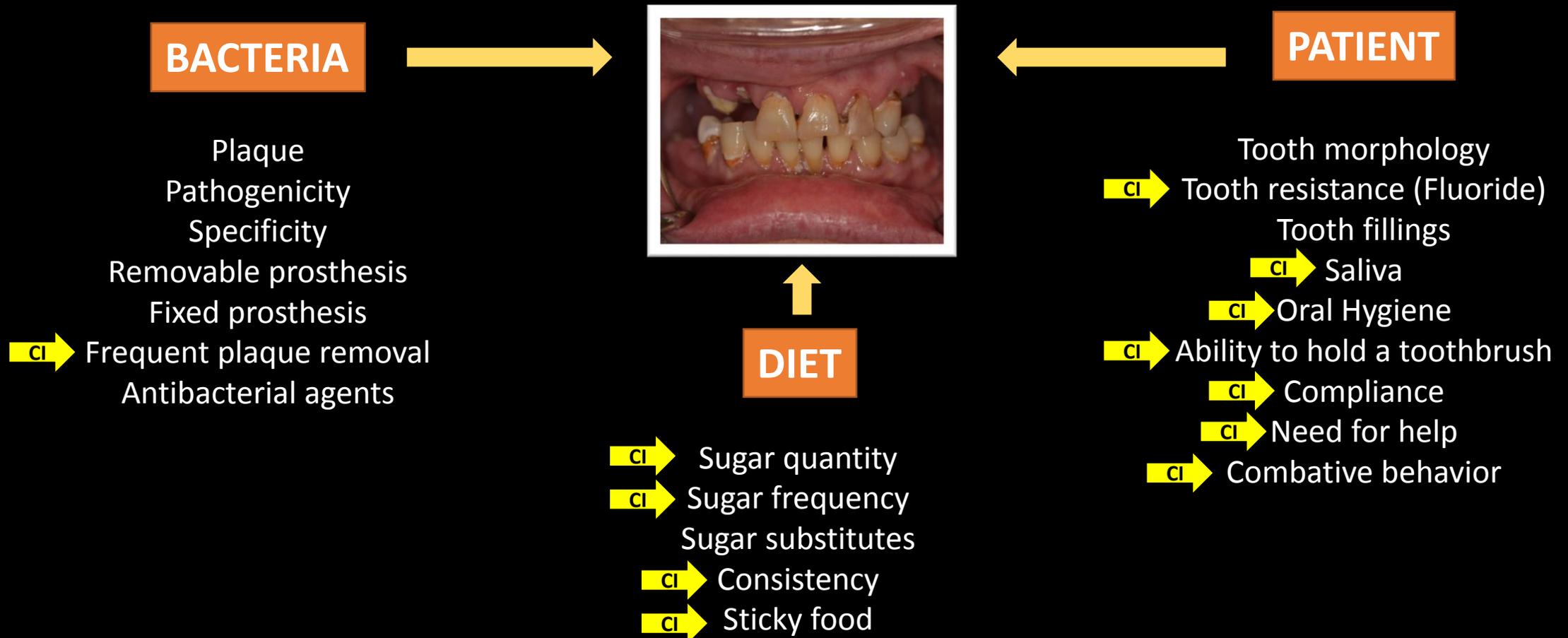
and

Periodontal Disease



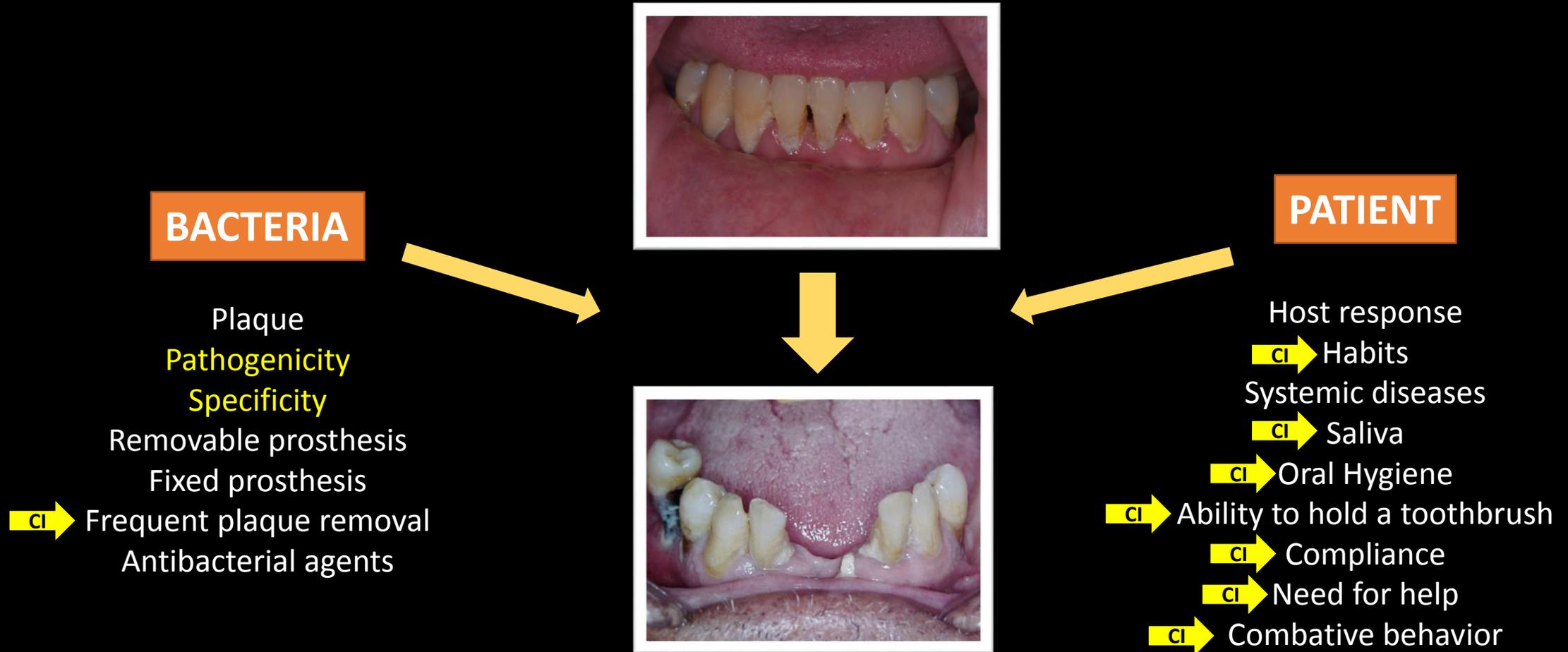
How does cognitive impairment affect oral health?

Etiology of caries



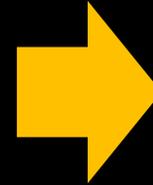
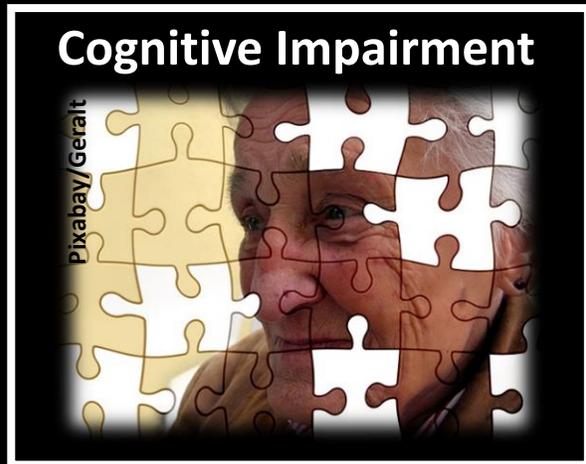
How does cognitive impairment affect oral health?

Etiology of periodontal disease

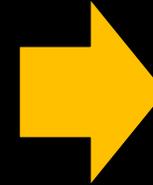


How does cognitive impairment affect oral health?

Impact of cognitive impairment



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



- Poor oral hygiene
- Xerostomia
- Plaque accumulation



How does cognitive impairment affect oral health?

Epidemiology of oral diseases among cognitively impaired patients

Oral health in older adults with dementia living in different environments: a propensity analysis

Xi Chen, DDS, PhD;^{1*} Jennifer J.J. Clark, BS;² Supawadee Naorungroj, DDS³

Spec Care Dentist 33(5): 239-247, 2013

Table 1. Characteristics of the study population.

Patients' characteristics	Community N = 51	Assisted living N = 18	Nursing home N = 501	p Value
Socio-demographic factors				
Age at arrival (Mean, SD)	79.3 (8.0)	80.9 (12.6)	82.6 (9.6)	0.06
Female gender (%)	68.6	50.0	72.8	0.09
Having dental insurance (%)	45.1	72.2	85.0	<0.001
Medical conditions and medications				
Number of medical conditions (Mean, SD)	4.6 (2.3)	7.3 (3.0)	10.5 (4.9)	<0.001
Charlson comorbidity index (Mean, SD)	1.3 (1.3)	1.6 (1.1)	2.0 (1.5)	<0.01
Number of medications (Mean, SD)	4.8 (3.7)	6.6 (4.0)	8.4 (3.6)	<0.001
Cognitive impairment (%)				
None	3.9	0.0	2.8	<0.001
Questionable	2.0	5.6	0.4	
Slight	37.2	61.1	43.7	
Moderate to severe	56.9	33.3	53.1	
Communication problem (%)	42.0	50.0	43.4	0.85
Cooperative to care (%)				
Always cooperative	76.5	82.3	74.6	0.87
Sometimes uncooperative	21.6	11.8	18.5	
Usually uncooperative	2.0	5.9	5.6	
Never cooperative	0	0	1.2	

Table 1. Characteristics of the study population.

Patients' characteristics	Community N = 51	Assisted living N = 18	Nursing home N = 501	p Value
Capacity to perform oral hygiene (%)				
Self sufficient	33.3	27.8	18.0	<0.01
Need supervision or Help	56.9	72.2	78.6	
Patient won't cooperate	9.8	0	3.5	
Oral health conditions				
Percent of edentulism	15.7	16.7	29.3	0.07
Number of teeth among dentate subjects (Mean, SD)	18.2 (7.2)	19.3 (6.8)	17.4 (7.9)	0.56
Number of caries or retained roots among dentate subjects (Mean, SD)	5.5 (5.4)	5.3 (4.1)	6.0 (5.2)	0.76
Number of filled teeth among dentate sub- jects (Mean, SD)	10.4 (6.3)	10.9 (6.0)	8.7 (6.3)	0.12
Calculus/Plaque/Gingival bleeding (%)				
None	0	8.3	0.3	0.12
Small to medium	65.8	66.7	59.2	
High	34.2	25.0	40.5	
Use of prosthesis at arrival (%)	48.0	38.9	47.1	0.78

Improving oral health of institutionalized older people with diagnosed dementia

Andreas Zenthöfer*, Tomas Cabrera, Peter Rammelsberg and Alexander Jochen Hassel

Department of Prosthodontics, Dental School, University of Heidelberg, Heidelberg, Germany

Aging & Mental Health, 2015

<http://dx.doi.org/10.1080/13607863.2015.1008986>

Table 1. Participants' characteristics at baseline ($n = 93$).

	Dementia group ($n = 33$)	Non-dementia group ($n = 60$)	Total cohort
Age, mean (SD) ^a	81.7 (9.0)	83.4 (10.4)	82.8 (9.9)
Gender, frequency (%) ^b			
Female	19 (57.6)	41 (68.3)	60 (64.5)
Male	14 (42.4)	19 (31.7)	23 (35.5)
No. frequently taken drugs, mean (SD) ^a	7.0 (3.4)	7.1 (3.8)	7.1 (3.6)
No. diseases ^a	6.3 (3.6)	6.8 (3.8)	6.6 (3.7)
MMSE score ^a	10.9 (9.5)	17.7 (8.6) ^{***}	15.3 (9.5)
Gingival bleeding (GBI), mean (SD) ^a	52.1 (29.2)	38.1 (20.1) [*]	42.6 (24.1)
Plaque (PCR), mean (SD) ^a	89.3 (12.6)	80.3 (23.0)	83.2 (20.5)
Denture hygiene (DHI), mean (SD) ^a	86.1 (20.1)	84.6 (13.3)	85.1 (15.7)
Community periodontal index of treatment needs (CPITN), mean (SD) ^a	3.3 (0.6)	3.1 (0.6)	3.2 (0.6)
Missing teeth, mean (SD) ^a	20.5 (9.2)	20.5 (8.5)	20.5 (8.7)

Oral health of Alzheimer's patients in São José dos Campos, Brazil

Miriane Carneiro Machado,¹ Grazielle Honório Lopes¹ and Leonardo Marchini^{1,2,3}

Geriatr Gerontol Int 2012; 12: 265–270

Table 1 Answers to the dichotomous questions of the Oral Health Risk Assessment (OHRA) questionnaire

OHRA	No		Yes		P-value
	n	%	n	%	
Does the patient have natural teeth?	37	74%	13	26%	<0.001*
Does the patient wear dentures?	29	58%	21	42%	0.110
Does the patient have any problems (e.g. pain, discomfort, difficulty eating, decaying teeth, denture problems, ulcers, dry mouth, or halitosis)?	32	64%	18	36%	0.005*
Does the patient smoke or have a past history of smoking?+	31	62%	07	14%	<0.001*
Is the patient on any medication?	4	8%	46	92%	<0.001*
Is urgent dental treatment needed?++	46	92%	3	6%	<0.001*
Was the last dental treatment within the past year?+++	35 < 1yr	70%	2 > 1yr	4%	<0.001*
Is patient registered for dental care?	50	100%	0	0%	–

*Statistically significant different (two ratios equality test). +Twelve patients (24%) answered "I don't know." ++One patient (2%) answered "I don't know." +++Thirteen patients (26%) answered "I don't know."



Giuseppe Arcimboldo

Why worrying 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?





Caries



Tooth loss

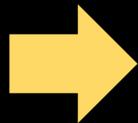


Orofacial pain

- Pain**
- Fever**
- Discomfort**
- Behavior / Delirium**
- Dentures**
- Edentulism**
- Social interactions**
- Eating ability**
- Diet type**
- Nutrition**
- Aspiration pneumonia**

Reduced quality of life

Gingivitis



Periodontal disease

**Aspiration pneumonia
Atherosclerosis
Diabetes control**

**Orofacial pain /
Tooth loss**

**Pain
Fever
Discomfort
Behavior/Delirium
Dentures
Edentulism
Social interactions
Eating ability
Diet type
Nutrition**



**Reduced
quality
of life**

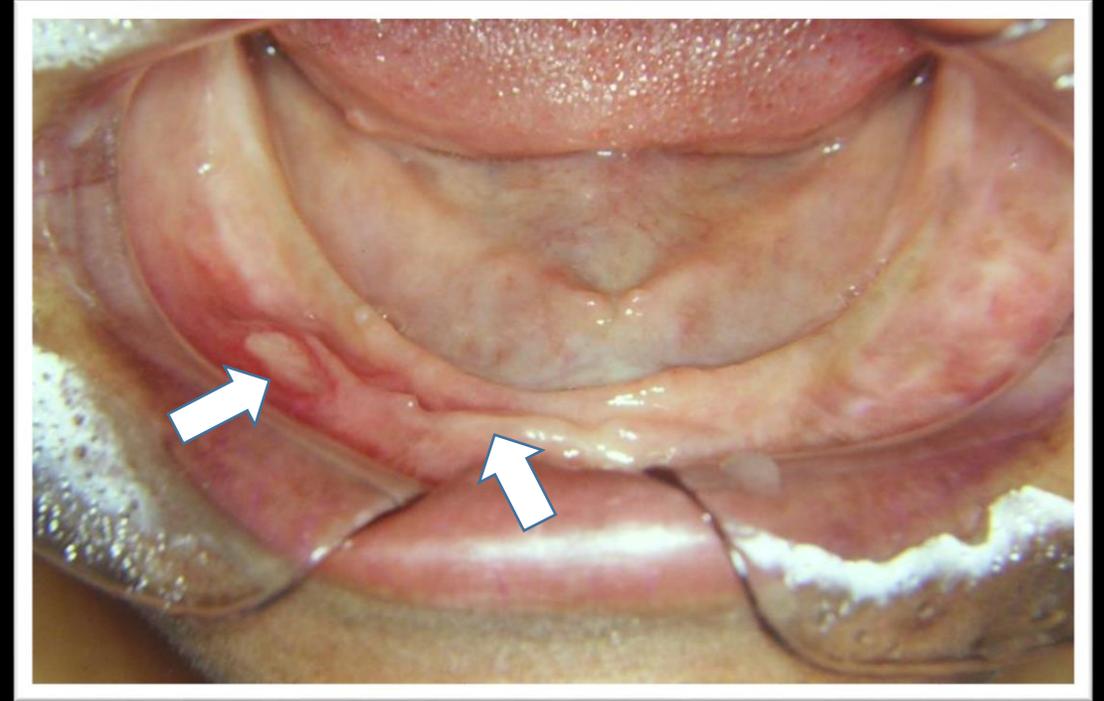
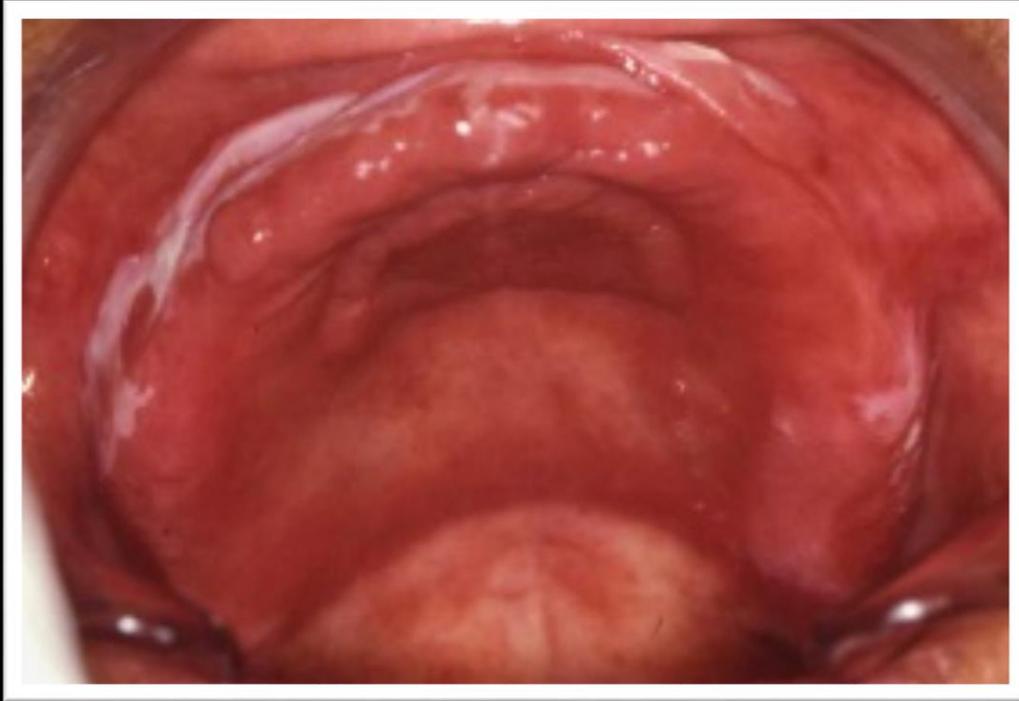
Other important oral health problems

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

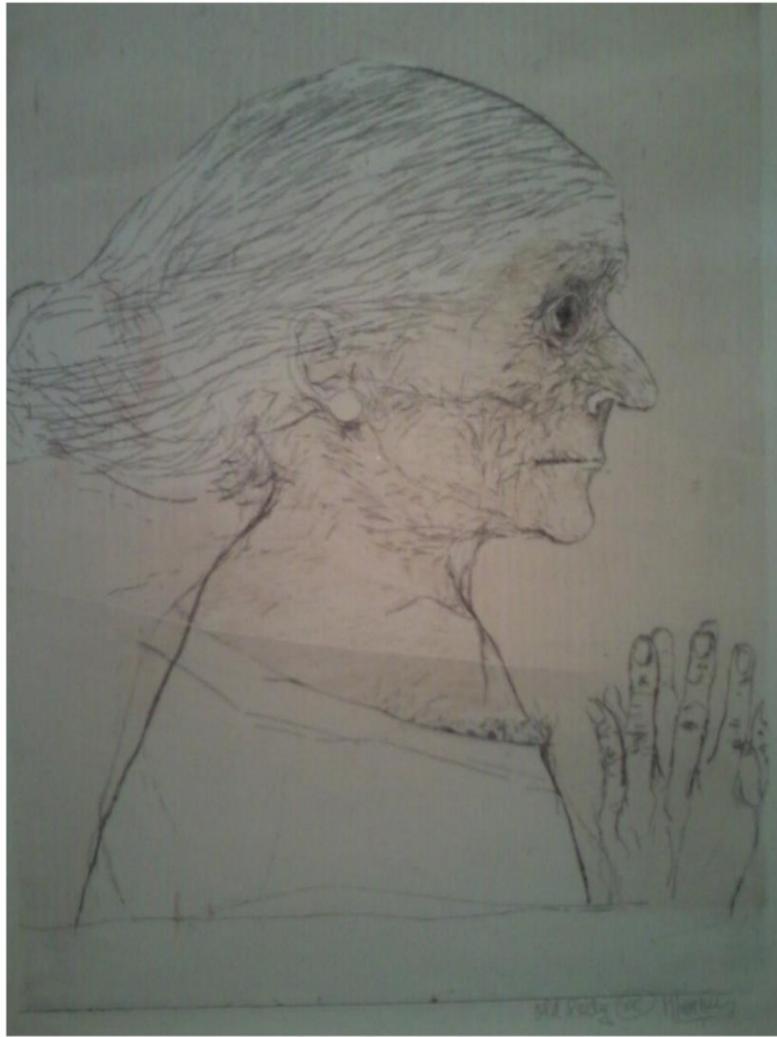
Common oral mucosal lesions among the elderly



Other important oral health problems

Oral cancer

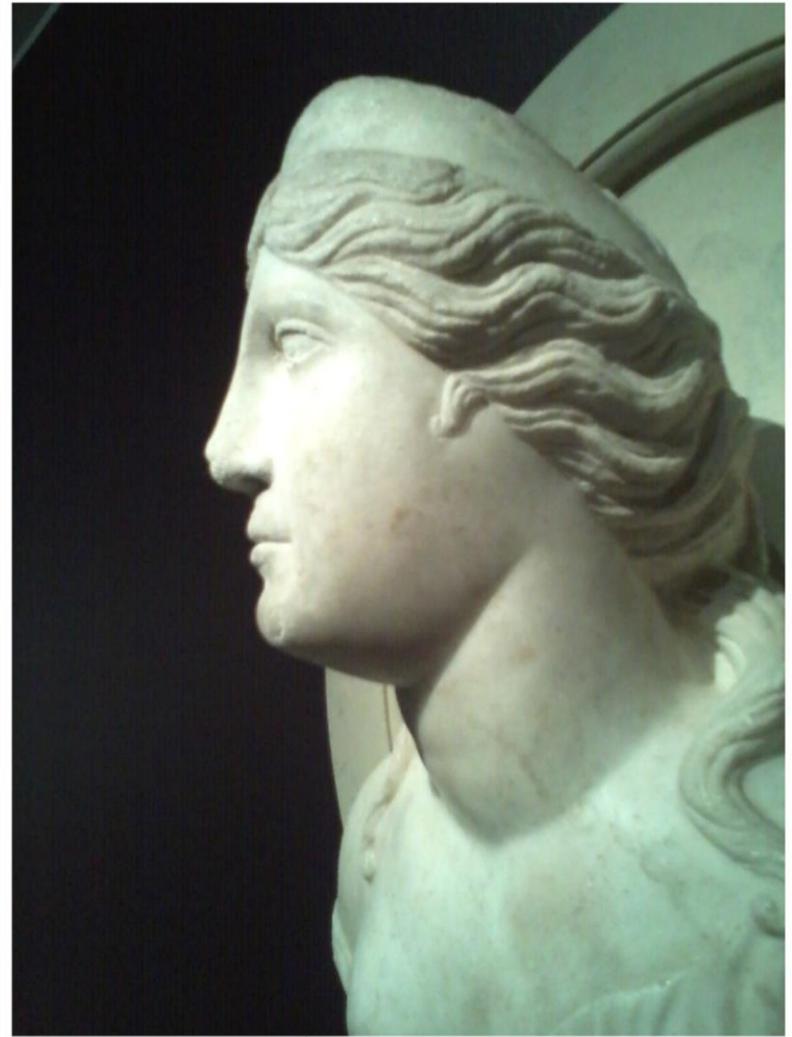




Mauricio Lasansky 1914-2012

Old Lady with Bonnet, 1969

Intaglio print
Gift of Mauricio and Emilia Lasansky and the Lasansky
Corporation
88.2.48



Antonine Woman as Venus, ca. 150 – 160 A.D.

Marble
Cedar Rapids Museum of Art, Gift of Tom and Nan Riley
96.22.11

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 resident: 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

Oral care is important, like feeding and bathing, and must be promoted as an activity central to caring for older adults.

Coleman, 2002



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

Promote oral hygiene at least twice a day to minimize risk of remote infections

Different patients, different oral hygiene procedures



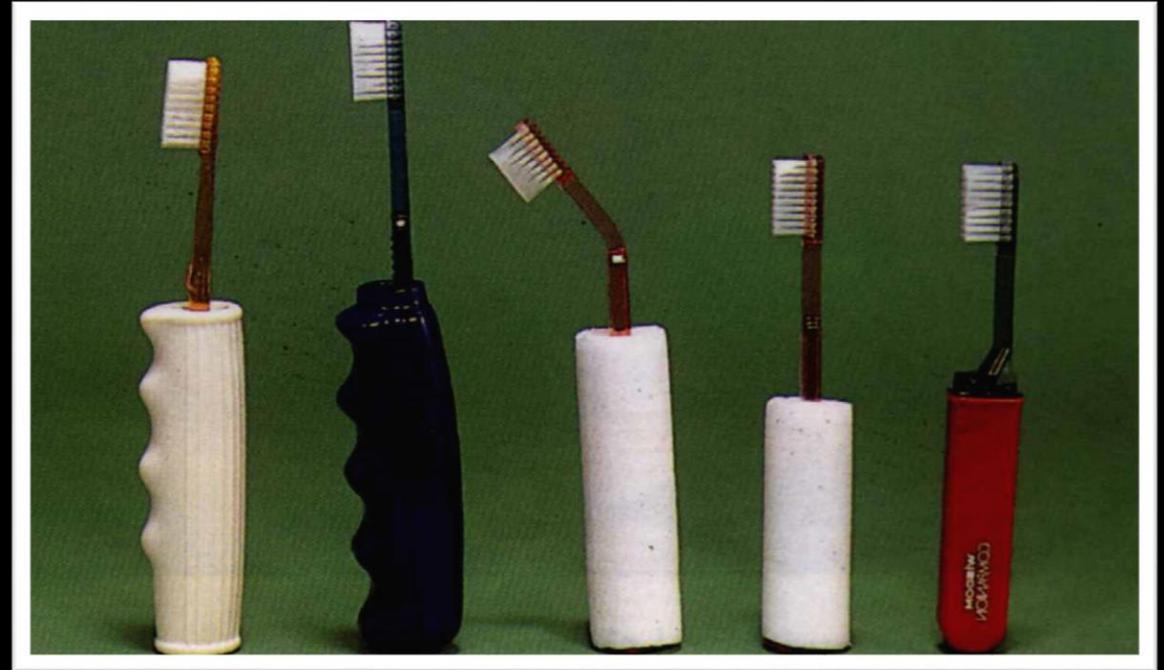
Tooth plaque removal

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

Electric toothbrush



Manual toothbrush handles



Drummond et al

Manual tooth brush adaptations



Government of South Australia
SA Health



Better Oral Health
in Residential Care

Interproximal brush



Floss handles

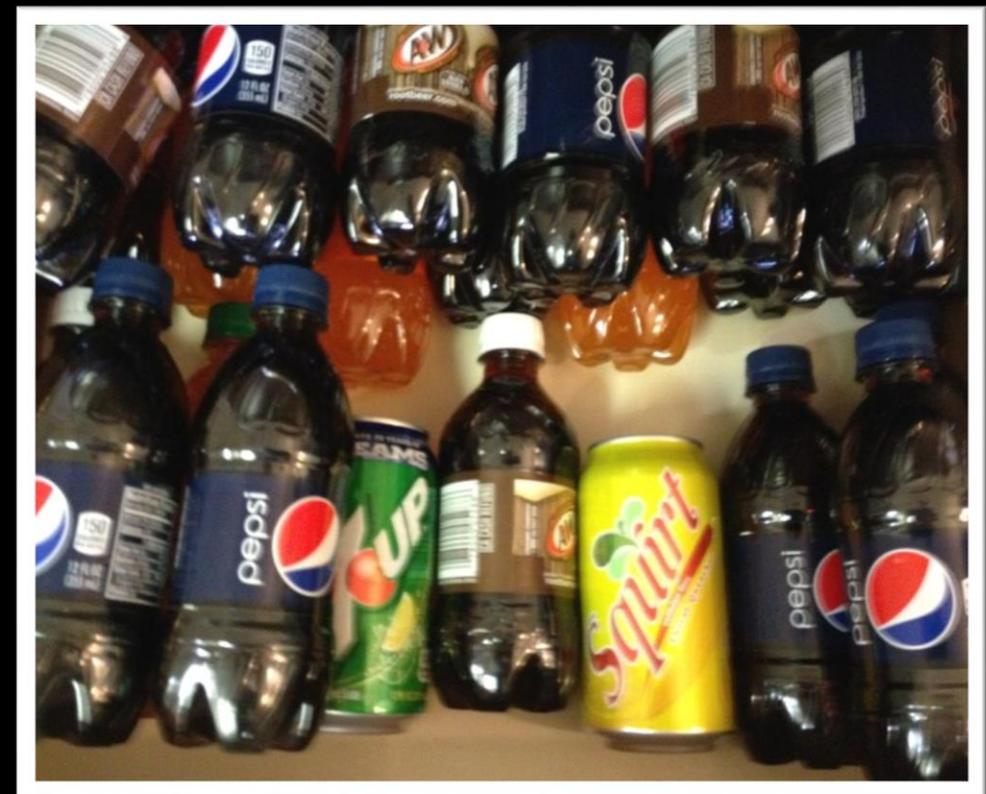


Specific products for caries prevention



Generic

Specific dietary interventions for caries prevention



Specific products for periodontal disease prevention

Can Chemical Mouthwash Agents Achieve Plaque/ Gingivitis Control?

Dent Clin N Am 59 (2015) 799–829

- ✓ Chlorhexidine 0.12%, 15mL, 30-60 seconds
- ✓ Active against G+ and G-, facultative anaerobes, aerobes and yeasts
- ✓ Lasts longer than other mouthwashes
- ✓ Cause 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.



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



However, sometimes it is not that easy...

Coleman, 2002

Table 3. Communication Techniques to Facilitate Oral Hygiene Care for Cognitively Impaired and Behaviorally Difficult Residents

Technique	Description	Example
Rescuing	A second caregiver enters a situation and tells the first caregiver to leave so that he or she can "help" the resident.	The dentist/caregiver is unable to remove the resident's dentures, so a caregiver enters, takes over, and removes the dentures.
Task breakdown	The activity is broken down into short steps that are slowly repeated and demonstrated.	For toothbrushing: "Pick up the toothbrush," "Squeeze out the toothpaste," etc.
Distraction	Singing, playing music, holding items, touching gently, and talking are used to distract the resident from a distressing situation.	A rummage box or busy apron/cushion/board (with a familiar theme) occupies the active hands of a resident during oral care/examination.
Bridging	Improve sensory connection and task focus by having the resident hold the same object as the caregiver while the caregiver carries out an activity.	The resident holds a toothbrush while the caregiver uses a backward-bent toothbrush to assist in breaking perioral muscle spasms to gain access to the oral cavity.
Hand-over-hand	The caregiver's hand is placed over the resident's hand to guide him or her through the activity.	The caregiver places the lower denture in the resident's hand, then places his or her hand over the resident's to guide the lower denture back into the mouth.
Chaining	The caregiver starts the activity, and the resident completes it.	The caregiver places the toothpaste on the toothbrush and places it in the resident's hand, then the resident brushes his or her teeth.

Chalmers J. Behavior management and communication strategies for dental professionals when caring for patients with dementia. *Special Care Dentistry* 2000;20:147-54.

STRATEGIES FOR CAREGIVERS ¹⁹	DETAIL
Approach slowly at eye level	Less of a surprise or threat
Provide a quiet environment	Reducing noise simplifies environment and makes less threatening
Build trust with conversation	Make situation feel safe
Use gentle touch sparingly	Can bring reassurance
Smile while interacting	Reduces care resistant behavior
Speak in low-pitched voice	Presbycusis (difficulty hearing high-pitched sounds) increases in prevalence with age
Talk to the person like an adult	Avoid „Elderspeak“, talking to an older adult as one would to a child.
Use distractions	Singing, talking, or having something to hold.
Priming	Holding a toothbrush or standing in front of a sink recalls early memories of toothbrushing

STRATEGIES FOR CAREGIVERS ¹⁹	DETAIL
Chaining	Caregiver starting procedure encourages resident to complete the task
Hand-Over-Hand	Caregiver places hand over resident brushing and guides them in the act
Cueing	Using polite, one-step commands
Gestures	Pantomiming desired behavior
Mirror-Mirror	With caregiver standing patient brushing their teeth, person can see and memories of brushing return
Rescuing	A second caregiver replaces the first, who may be perceived as a threat by the person with dementia

Zwetchkenbaum, 2015

Denture plaque removal



Denture plaque removal



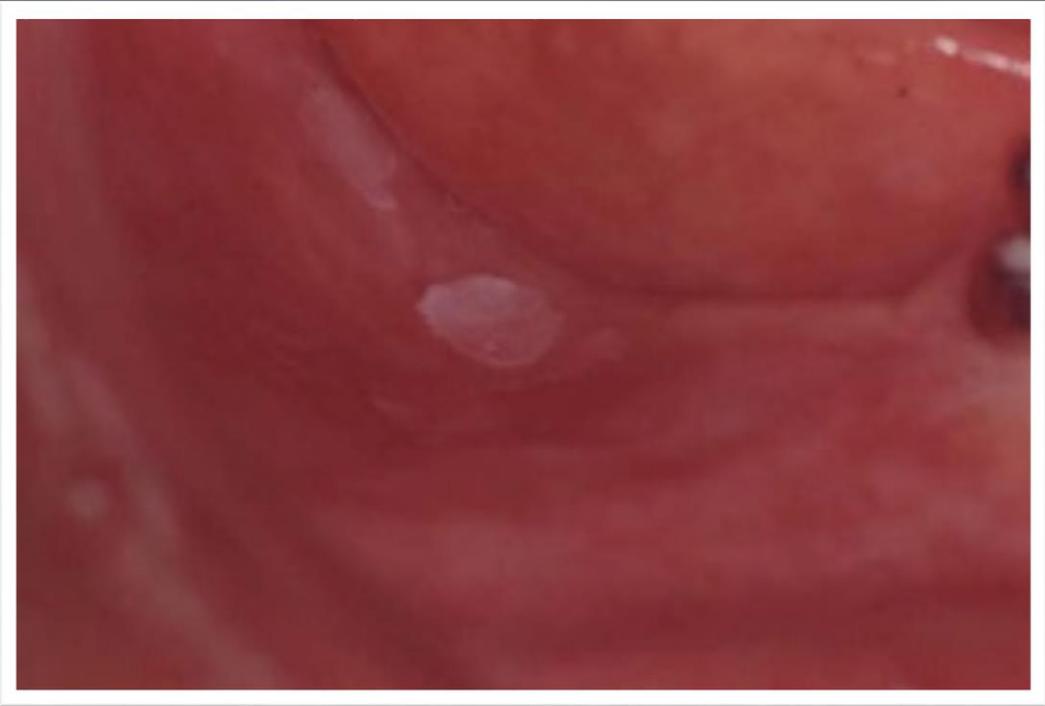
Edentulous mouth cleaning



Provide regular dental appointments for checkups



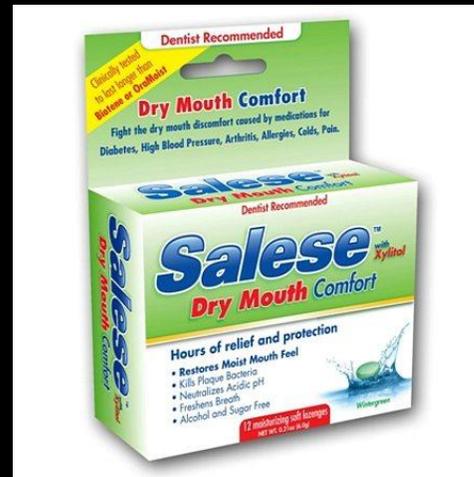
Provide regular dental appointments for checkups



Provide dental appointments when a resident 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**

Provide dental appointments when a resident complains about mouth dryness



Xerostomia management

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

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



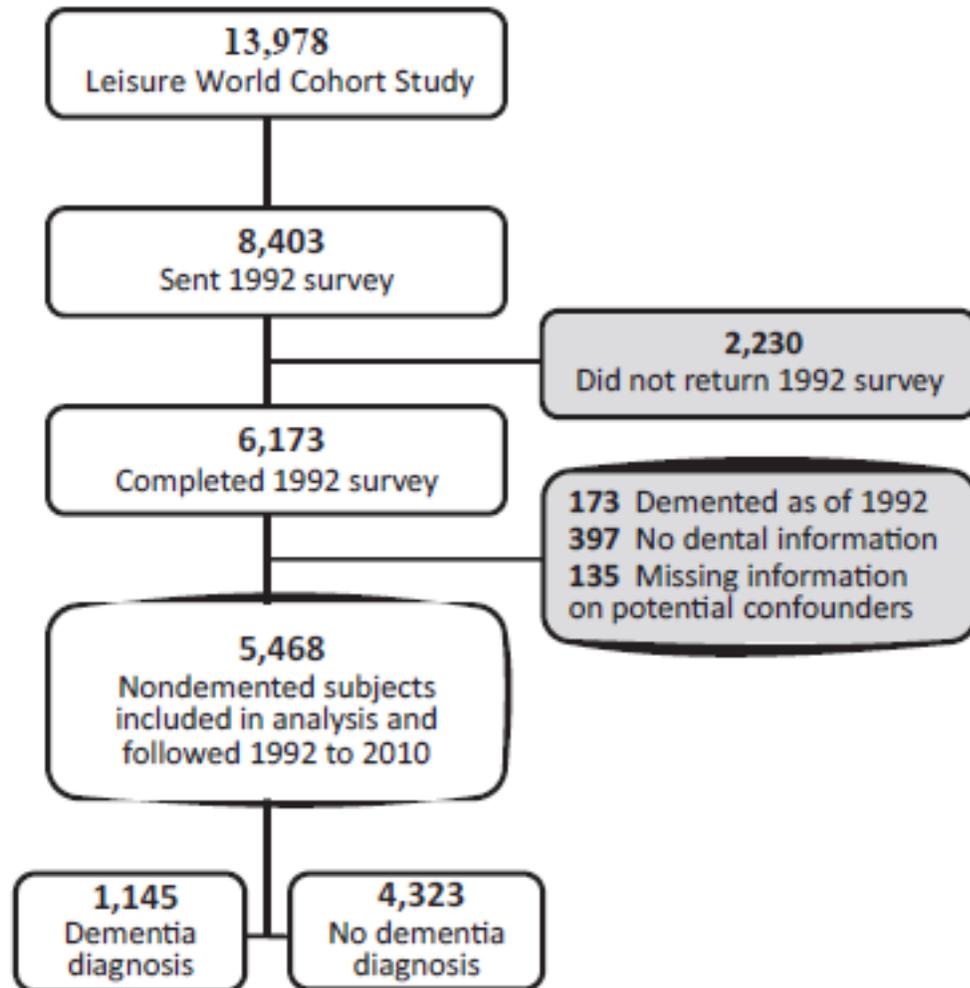
Current theories and studies on how oral health may be a cognitive impairment risk factor

- ✓ **Epidemiological data**
- ✓ **Correlation analysis**
- ✓ **No causal relationship**

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

JAGS 60:1556–1563, 2012

Annalia Paganini-Hill, PhD,*† Stuart C. White, DDS, PhD,‡ and Kathryn A. Atchison, DDS, MPH§



RESULTS: Men with inadequate natural masticatory function who did not wear dentures had a 91% greater risk of dementia than those with adequate natural masticatory function (≥ 10 upper teeth and ≥ 6 lower teeth). This risk was also greater in women but not significantly so. Dentate individuals who reported not brushing their teeth daily had a 22% to 65% greater risk of dementia than those who brushed three times daily.

CONCLUSION: In addition to helping maintain natural, healthy, functional teeth, oral health behaviors are associated with lower risk of dementia in older adults.

Figure 1. Flowchart for participant inclusion.

Periodontitis is associated with cognitive impairment among older adults: analysis of NHANES-III

J M Noble,^{1,2,3} L N Borrell,⁴ P N Papapanou,⁵ M S V Elkind,^{3,6} N Scarmeas,^{1,3}
C B Wright⁷

J Neurol Neurosurg Psychiatry 2009;**80**:1206–1211.

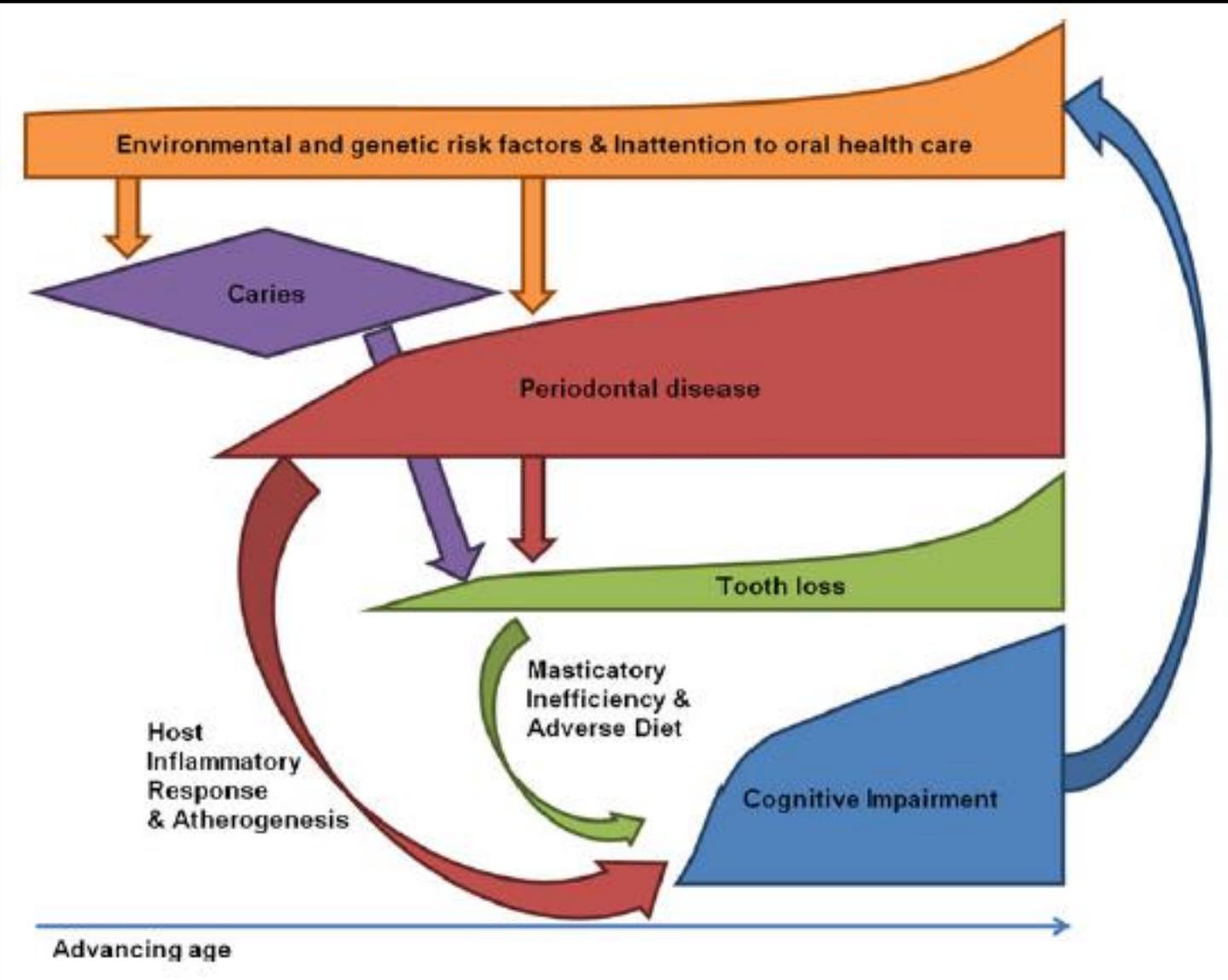
Methods: To assess relationships between systemic exposure to periodontal pathogens and cognitive test outcomes, data were analysed from the Third National Health and Nutrition Examination Survey (NHANES-III), a nationally representative cross sectional observational study among older adults. We included 2355 participants ≥ 60 years who completed measures of cognition and *Poryphyromonas gingivalis* IgG. Using SUDAAN, logistic regression models examined the association of *P gingivalis* IgG with cognitive test performance.

Conclusion: A serological marker of periodontitis is associated with impaired delayed memory and calculation. Further exploration of relationships between oral health and cognition is warranted.

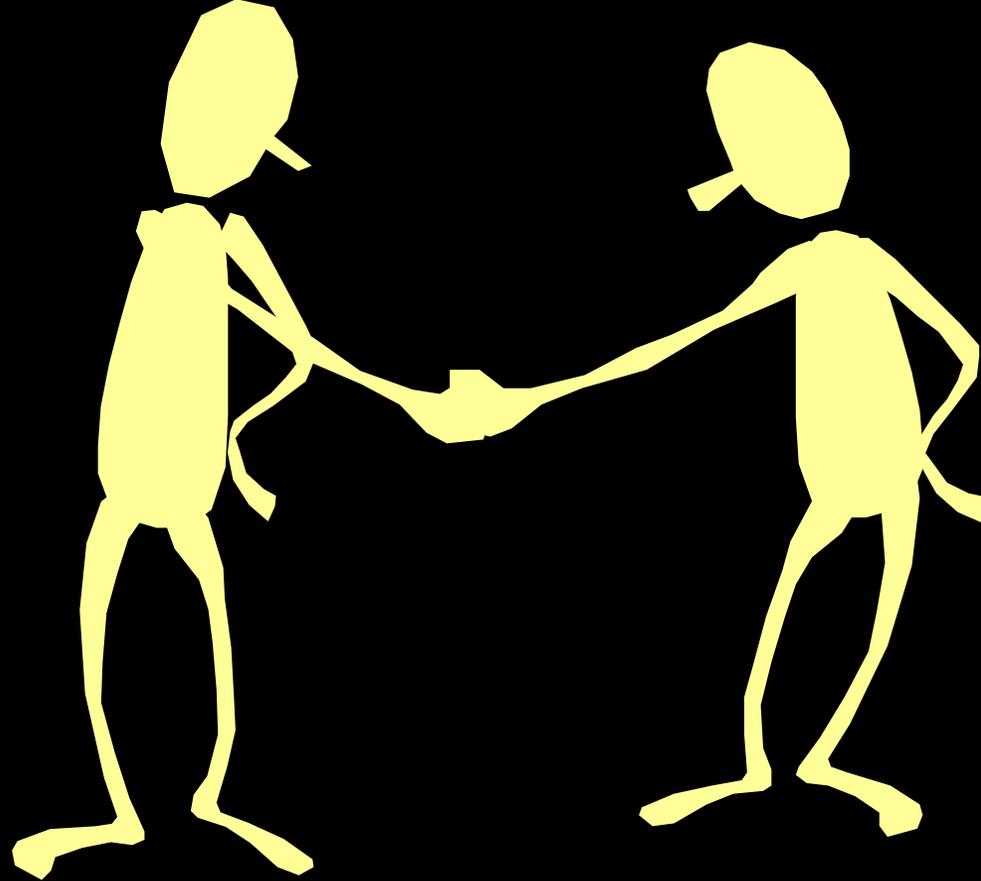
Poor Oral Health as a Chronic, Potentially Modifiable Dementia Risk Factor: Review of the Literature

James M. Noble • Nikolaos Scarmeas • Panos N. Papapanou

Curr Neurol Neurosci Rep (2013) 13:384



Thank you for



your attention!