Open WIDE! The Oral – Systemic Connection

Long Term Care Providers Annual Meeting November 10, 2021

Guy Deyton DDS FACD, Director
Office of Dental Health
Missouri Department of Health and Senior Services

Open WIDE! The Oral – Systemic Connection

This Lecture is Dedicated to:

Dr. Walter E. Deyton
“Don’t Bury the Lede.”
Tom Hanks as Washington Post Editor Ben Bradlee in “The Post”

1. Oral and systemic health and disease are closely interconnected.
2. Oral infections make other disease processes worse.
3. Systemic disease very often has cardinal oral signs occurring early in the disease process which is very helpful in diagnosis. (ex: Covid-19)

Open Wide! The Oral – Systemic Connection

Agenda

1. Introduce Myself and ODH.
2. Share several compelling reasons LTCP should regularly incorporate an oral screening. We’ll review selected scientific literature on the relationship of oral infections with commonly occurring co-morbid diseases.
3. Show photos of normal and abnormal to prepare you to look.
4. Outline simple protocols to help LTC residents avoid oral infections
5. Briefly review ODH projects to improve access and oral health.
Who the heck is guy.deyton@health.mo.gov?

John Wesley Deyton MD

Family

Practice & Leadership

A PICTORAL REPRESENTATION OF THE ORAL-SYSTEMIC CONNECTION

Alzheimer's Disease

Diabetes Mellitus

Adverse Pregnancy Outcomes

Atherosclerotic / Coronary Artery Disease

Colorectal Cancer

Respiratory Infections Nursing Home Acquired Pneumonia (NHAP)

**Reason #1: Covid-19 Oral Lesions - Their Incidence and Use in Screening.**

“In this study we found oral lesions in fifty-eight of seventy-four (78%) Covid 19 patients.”

How does 78% incidence of oral lesions compare to other Covid cardinal signs?

<table>
<thead>
<tr>
<th>Signs and Symptoms*</th>
<th>HCWs (n=231), No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cough</td>
<td>59 (26)</td>
</tr>
<tr>
<td>Fever</td>
<td>70 (43)</td>
</tr>
<tr>
<td>Headache</td>
<td>63 (39)</td>
</tr>
<tr>
<td>Muscle aches</td>
<td>60 (34)</td>
</tr>
<tr>
<td>Nasal congestion/ runny nose</td>
<td>58 (33)</td>
</tr>
<tr>
<td>Severe fatigue</td>
<td>44 (25)</td>
</tr>
<tr>
<td>Sore throat</td>
<td>40 (29)</td>
</tr>
<tr>
<td>Loss of smell</td>
<td>26 (22)</td>
</tr>
<tr>
<td>Loss of taste</td>
<td>25 (20)</td>
</tr>
<tr>
<td>Chills</td>
<td>24 (24)</td>
</tr>
<tr>
<td>Difficulty breathing</td>
<td>18 (14)</td>
</tr>
<tr>
<td>Chest tightness/pain</td>
<td>19 (26)</td>
</tr>
<tr>
<td>diarrhoea</td>
<td>13 (11)</td>
</tr>
<tr>
<td>Loss of appetite</td>
<td>9 (10)</td>
</tr>
<tr>
<td>Vomiting</td>
<td>2 (1)</td>
</tr>
</tbody>
</table>


2 Types of Covid-19 Oral Lesions

**Why should LTCP’s say: “Open Wide”?**

Because oral and systemic health & disease are closely interconnected and oral infections make other disease processes worse (sometimes significantly worse).
Since 2000 there have been over 700 articles published in peer-reviewed scientific journals describing the co-morbid relationship of virulent oral infections with

- Atherosclerotic/Cardiovascular Heart Disease
- Adverse Pregnancy Outcomes
- Diabetes
- Stroke

- Rheumatoid Arthritis
- Kidney Disease
- Cancer
- Alzheimer's Disease
Adverse Pregnancy Outcomes

Key Take – Aways from Articles on Oral-Systemic Connection

1. **Oral infections make many other disease processes worse (sometimes significantly worse).**

2. **2 Etiological (disease development) Paths:**
   - Noxious oral pathogens spread readily via blood stream and infect downstream organs.
   - Oral pathogens incite an inflammatory cascade which then spreads and damages other target organs.  (ie: Covid Cytokine Storm)
Oral pathogens incite an inflammatory cascade which then spreads and damages other target organs. (i.e. Covid Cytokine Storm)

Reason #2: Periodontal Infection Adversely Affect Atherosclerotic Heart Disease & Visa-Versa
Periodontal Infection and Atherosclerotic Vascular Disease

Patients with periodontal disease have a 2-3 times higher risk of developing coronary heart disease and experiencing a cardiovascular event like heart attack or stroke.

- Bahekar, A. et al. The prevalence and incidence of coronary heart disease is significantly increased in periodontitis: a meta-analysis. Am Heart J 2007; 154: 830-7

2 Pathways have been suggested to explain the PD - AHD relationship:

- **Blood-borne spread of virulent periodontal pathogens (PP):**
  - virulent gram-negative pathogens: Fusobacterium, P. Gingivalis, A. actinomycetemcomitans (AA) embed in and have been harvested from atherosclerotic plaque. (PP) cause an inflammatory response in artery linings adversely affecting endothelial function.
- **Blood-borne spread of inflammatory mediators is bi-directional:**
  - atherosclerotic artery disease and periodontal disease adversely influence each other via systemic spread of inflammatory mediators such as Interleukins (IL 1-b & IL-6) and Tumor Necrosis Factor Alpha. (TNF-α)
Periodontal Infection and Atherosclerotic Heart Disease

- 22% of Seniors (<65) have Atherosclerotic Heart Disease (AHD). (CDC)
- Seniors (<65) have twice the incidence of strokes vs under 65. (CDC)
- Heart Disease was the leading cause of death in the US (Pre-Covid). (CDC)
- Periodontal disease is considered a contributing/complicating factor to AHD.
- Mandatory clearance from an oral healthcare provider is now required for all non-emergent coronary / cardiovascular surgery patients.
- Tx: Periodontal debridement and maintenance q 3 mo for AHD patients.

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What Do You Do? – “Open Wide”

**Signs**
- Deep Red inflamed gums around teeth
- Gums Bleed Easily

**Risks**
- Progressive Infection may cause Tooth Loss
- Infection may become systemic and may initiate or complicate other diseases

Early Gum Infection

What Do You Look For?

**Signs**
- Localized Swelling
- ‘Pustule’
- Fever (+/-)
- Pain (+/-)

**Risks**
- Aggressive destruction of bone and tissue
- Facial Cellulitis
- Retrograde Encephalitis
- Systemic infection
- Do **NOT** facilitate drainage with pressure

Gum / Tooth Abscess
What Does a Healthy Mouth Look Like?

Normal Teeth & Gums
- Homogenous Color
- No Bleeding or Ulcers
- Smooth, Scalloped Border

What Should You Watch For?
- Uniform White Color
- Normal Size
- No Holes, Fractures
What Does a Healthy Mouth Look Like?

No Spots or Discoloration
No Ulcers
No Bumps, Divots, or Deep Fissures
Pink Homogenous Color
Smooth, Non-Scalloped Lateral Border

Normal Tongue

What Does an Un-Healthy Mouth Look Like?

Signs
Deep curved indentations on lateral border of tongue

Scalloped Tongue

Etiology & Risks
- Most common cause: obstructive sleep apnea
- Tongue subconsciously positioned forward to maintain airway & presses vs inside surface of teeth.
- Refer for sleep study.
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What Does an Un-Healthy Mouth Look Like?

**Signs**
- Deep Red inflamed gums around teeth
- Gums Bleed Easily

**Risks**
- Progressive Infection may cause Tooth Loss
- Infection may become systemic and may initiate or complicate other diseases

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Open Wide! The Oral – Systemic Connection

What Does an Un-Healthy Mouth Look Like?

**Signs**
- Deep Red around teeth
- Tissue Ulcerates & Sloughs Between Teeth
- Gums Painful

**Risks**
- Aggressive infection may become systemic and may initiate or complicate other diseases

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Office of Dental Health DHSS Missouri Department of Health & Senior Services
What Does an Un-Healthy Mouth Look Like?

**Signs**
- ‘Long’ Teeth
- Red, Loose, Withdrawn Gums
- Plaque/Tartar
- Black Gum Triangles

**Late Stage Gum Infection**

**Risks**
- Risk of systemic infection complication of co-morbid diseases is proportional to severity/virulence of oral infections.

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**Reason #3: Oral Infections May be the Leading Cause of Nursing Home Related Pneumonia**
Oral Health Surveillance for Residents in Long Term Care Facilities

There are approximately 56,000 older adults that reside in 1183 licensed long-term care facilities in Missouri. (8/21)

When we examine them, this is what we often see:

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Oral Health Interventional Care for Residents in Long Term Care Facilities

Photos of Actual Long-Term Care Residents

Decay, Broken Teeth, & Biofilm

Plaque, Tartar, & Biofilm May Be Aspirated

Gum Abscesses May Cause Systemic Infection
Open Wide! The Oral – Systemic Connection

Oral Health Interventional Care for Residents in Long Term Care Facilities

Accumulated plaque, tartar, & biofilm can be inhaled and cause aspirational pneumonia, a leading cause of death in nursing home residents.

It is estimated that inhaled oral infections in Long-term care residents is responsible for more than 50% of the aspirational pneumonia cases in that population.

Germs from Plaque, Tartar, & Biofilm Can Be Aspirated and Get into the Lungs

Singer et al. A systematic review of preventive effect of oral hygiene on pneumonia and respiratory infections in elderly

Reason #4: Periodontal/Oral Infection Adversely Affect Diabetes and Visa-Versa
Periodontal / Oral Infection and Diabetes

There is a strong bidirectional association between diabetes and periodontal disease. Periodontal inflammation makes glycemic control very difficult. Diabetes increases the risk for periodontitis.


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Periodontal Disease (PD) and Diabetes (DM)

2 Pathways have been suggested to explain the PD - AHD relationship:

- **Blood-borne spread of virulent periodontal pathogens (PP):**
  virulent gram-negative pathogens: Fusobacterium, P. Gingivalis, A. actinomycetemcomitans (AA) embed in and have been harvested from atherosclerotic plaque. (PP) cause an inflammatory response in artery linings adversely affecting endothelial function.

- **Blood-borne spread of inflammatory mediators is bi-directional:**
  atherosclerotic artery disease and periodontal disease adversely influence each other via systemic spread of inflammatory mediators such as Interleukins (IL 1-b & IL-6) and Tumor Necrosis Factor Alpha (TNF-α).
Periodontal Disease (PD) and Diabetes (DM)

• Approximately 26.8% or 14.3 million Senior Citizens (<65) in the US population have some form of diabetes. (American Diabetes Assn - www.diabetes.org)

• Diabetes mellitus is a chronic metabolic disorder characterized by hyperglycemia due to a defect in insulin production by pancreatic b cells (type 1 diabetes), a decrease in insulin sensitivity (type 2 diabetes), or a combination of both.

• Periodontal disease is now considered a contributing/complicating factor to both Type 1 and Type 2 Diabetes.

Periodontal Disease (PD) and Diabetes (DM)

• Diabetics are approximately 22% more likely to have PD than non-diabetics. (De Miguel-Infante et al. Periodontal disease in Adults with diabetes. Int J Clin Practice, 2018, Nov 16)

• It is virtually impossible for Type 1 diabetics to maintain glycemic control if they have unresolved periodontal disease. Diabetic patients with severe periodontitis are 6 times more likely to have poor glycemic control than patients with healthy periodontium. (Costa, F et al. Progression of Periodontitis & tooth loss associated with glycemic control. J Perio. 2013, May: 595-605)
Periodontal Disease (PD) and Diabetes (DM)

- **Treatment for PD reduces serum levels of inflammatory mediators known to exacerbate DM.** (Artise et al. *PLoS One.* 2015;10(5))


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Diabetics are approximately 24% more likely to have PD than non-diabetics.

It is virtually impossible for Type 1 diabetics to maintain glycemic control if they have unresolved periodontal disease. **Diabetic patients with severe periodontitis are 6 times more likely to have poor glycemic control than patients with healthy periodontium.** (Costa, F et al.)

- **Treatment for PD reduces serum levels of inflammatory mediators known to exacerbate DM.** (Artise et al)

Reason #5: Periodontal Infection Adversely Affect Rheumatoid Arthritis

There is a strong association between periodontal infections and the development of RA in patients who are susceptible.


Periodontal Infection and Rheumatoid Arthritis

Rheumatoid arthritis is a chronic inflammatory disorder that is activated in susceptible hosts is by autoantibodies. Research shows a periodontal pathogen AA, (aggregatibacter actinomycetemcomitans) can trigger the formation of autoantibodies to initiate or accelerate RA episodes.

Periodontal Infection and Rheumatoid Arthritis

Treatment of periodontal disease in patients with RA has led to reductions in some markers of disease activity in RA patients (ESR, TNF-α titers, and disease activity scores).


Reason #6: Compromised Immune System

Multiple Etiologies:
- **↓ Immune System**
- Dysbiotic Balance (Yeast)
- Epstein Barr
- Tx: Fluconazole / Nystatin oral suspension; follow with anti-viral (Famvir). Resolve in 3 wks or refer.

‘Hairy’ Leukoplakia

White Non-Painful Coating on Tongue, Cheeks, inside lips

Usually Raised, Irregular Surface

(Cade, J. Burgess, J. Hairy Leukoplakia: Pathophysiology, Presentation, & Treatment. Medscape, June 11, 2021)
Reason #7: Oral Cancer

**Etiology:**
- Chronic Insult
- EtOH
- Tobacco

**Appearance / Symptoms:**
- Red or White
- Usually Asymptomatic

Probable Squamous Cell Carcinoma in Patient with hx of ↑ EtOH Intake

Reason #7 Motivation

Chewing Tobacco and Oral Cancer
Gruen Von Behrens: Dx Oral Ca. age 17, Died Age 38. Anti-Smokeless Tobacco Activist
Reason #8: Oral Signs May Be the Easiest Way to Screen for Obstructive Sleep Apnea

It is estimated that 56% of Seniors (<65) may suffer from obstructive sleep apnea. (N=1052)

Bradley, T. et al. Recognition and Diagnosis of Obstructive Sleep Apnea in Older Americans. J Am Geriatric Soc. (66) 7, Jul, 2018;1296-1302

Incidence

OSA is a risk factor for:

- Resistant Hypertension
- Cardiac Arrhythmias
- Heart Failure
- Heart Attacks
- Cognitive Disorders

Tietjens, J. et al. Obstructive sleep apnea and cardiovascular disease. J Am Heart Assn. (8) 1, Jan, 2018;1296-1302
Sleep Apnea and Cognitive Dysfunction in Seniors Over 65

Fractionated sleep in N3 stage causes short term memory loss, but improves w/tx.  

Intermittent hypoxia causes irreversible brain change


Open Wide! The Oral – Systemic Connection

Why should LTCP’s say: “Open Wide”?  

1. Because oral and systemic health & disease are closely interconnected and **oral infections make other disease processes worse** (sometimes significantly worse).

2. **Systemic diseases** very **often has cardinal oral signs** occurring early in the disease process and that’s very useful in diagnosis. (ex: Covid-19)
How Can You Help Long Term Care Residents Avoid Oral Infections?

1. **Look!** If it doesn’t look right, refer!
How Can You Help Long Term Care Residents Avoid Oral Infections?

1. **Look!** If it doesn’t look right, refer!

2. If you see food, plaque, & tartar: **Make Oral Hygiene Easier!**
   (A quick review of hygiene aides)
How Can You Help Long Term Care Residents Avoid Oral Infections?


If dentures look like this:

Don’t put it in their mouth without cleaning!

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How Can You Help Long Term Care Residents Avoid Oral Infections?

4. Arrange for Annual Screening Exams, even denture wearers.

- **Oral Cancer**: Seniors (>55) account for about 80% of 54,000 mouth/throat cancers dx each year and 8000 deaths. Avg age = 63.

  [Link to cancer statistics]

- **Gum disease**: A high percentage of older adults have gum disease: 2 in 3 (68%) seniors (>65) have gum disease.

How Can You Help Long Term Care Residents Avoid Oral Infections?

4. Arrange for Annual Screening Exams, even denture wearers.

• **Oral-Systemic Disease Connection:** Oral infections make systemic disease worse.
  

How Can You Help Long Term Care Residents Avoid Oral Infections?

5. Treat Dry Mouth: It’s the precursor to decay & infections.

3 Leading Causes:

  • Medications
  • Aging
  • Radiation of head & neck

[https://www.mayoclinic.org/diseases-conditions/dry-mouth/]
How Can You Help Long Term Care Residents Avoid Oral Infections?

5. **Treat Dry Mouth: It’s the precursor to decay & infections.**

Saliva helps prevent tooth decay by:

- neutralizing acids,
- limiting bacterial growth, and
- encapsulating bacteria.


How Can You Help Long Term Care Residents Avoid Oral Infections?

1. Look! If it doesn’t look right, refer!
2. If you see food, plaque, & tartar: consider making oral hygiene easier! (A quick review of hygiene aides)
5. Treat dry mouth: precursor to decay & other infections.
ODH Projects & Grant Proposals

1. **Interventional Oral Health Care for LTCF Residents**
2. **Community Water Fluoridation**: reduces everyone’s decay by 30% for a lifetime.
3. **WIC Preventative Services Program**: Reduces risk of decay and periodontal infections in WIC mothers & children.
4. **School Based Preventative Services Program**: Reduces decay in high-risk children.

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Accumulated plaque, tartar, & biofilm can be inhaled and cause aspirational pneumonia, a leading cause of death in nursing home residents.

It is estimated that inhaled oral infections in Long-term care residents is responsible for more than 50% of the aspirational pneumonia cases in that population.

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Germs from Plaque, Tartar, & Biofilm Can Be Aspirated and Get into the Lungs


Office of Dental Health DHSS Missouri Department of Health & Senior Services
We are always looking for ways to collaborate.

We are available for:

In-service workshops to help clinical staff become comfortable with oral surveillance

Consultation on setting up oral health exam rooms in LPHA facilities

Collaboration on grants to integrate oral health into LPHA service protocols

Thank You!

guy.deyton@health.mo.gov
Again, from my family and many others:

Thank you for your dedication!

Thank you for your care!

Thank you for your support!

Walt Says:

Remember to Say ‘Open Wide & Stick Your Tongue Out’!

Dr. Walter E. Deyton