

Oral-Systemic Links: What do we tell our patients??

Dr. Salme Lavigne PhD, MSDH, RDH

Supplemental Notes

Clarifying the Language

Relationships: Refers to how 2 variables might be somehow related or connected to one another.

Association: Refers to a “**relationship**” between an exposure (or characteristic) and a disease that is *statistically dependent*. (ie. *the presence of one alters the probability of observing the presence of the other*)

It's important to recognize that an association is a necessary condition of causality, BUT not all associations are causal!

If there is no association, then the variables are said to be independent.

Correlations: A relationship in which there is a *Linear association* between 2 continuous or ordinal variables. Measured as a correlation coefficient (-1...0...+1)

Causality: In order for a relationship to be coined as “causal”, actual “*cause and effect*” must be determined through a very rigorous set of criteria

Bradford-Hill's Criteria for Causation

Criteria	Meaning
Strength of Association	A strong association is more likely to have a causal component than is a modest association
Consistency	A relationship is observed repeatedly
Specificity	A factor influences specifically a particular outcome or population
Temporality	The factor must precede the outcome it is assumed to affect

Biological Gradient (Dose-Response)	The outcome increases monotonically with increasing dose of exposure or according to a function predicted by a substantive theory
Plausibility	The observed association can be plausibly explained by substantive matter (ie. biological explanation)
Coherence	A causal conclusion should not fundamentally contradict present substantive knowledge
Experiment	Causation is more likely if evidence is based on randomised experiments
Analogy	For analogous exposures & outcomes an effect has already been shown.

Periodontal Disease & Cardiovascular Disease

What do we tell our patients?

1. Studies have confirmed **there are associations** between periodontal disease and a variety of heart diseases including stroke.
2. The nature of these associations is still **“unclear”**.
3. **No causal relationship** has been shown at this time.
4. Controlling **“inflammation”** in the mouth by maintaining good oral hygiene may help reduce the risk for these diseases.

Evidence

An umbrella review of systematic reviews of the evidence of a causal relationship between periodontal disease and cardiovascular diseases: Position paper from the Canadian Dental Hygienists Association. Salme E Lavigne, PhD, RDH; Jane L Forrest, EdD, RDH | *Can J Dent Hyg* 2020;54(1): 32-41

PDF Available at www.cjdh.ca

Periodontal Disease & Respiratory Diseases

What do we tell our Patients?

1. There is an **Association** between periodontal microbes & respiratory diseases.
2. Daily oral hygiene with or without antimicrobial rinses will reduce both pathogenic oral bacteria and may assist in reducing the risk for pneumonia

3. **No causal relationship** exists between periodontal microbes & respiratory diseases at this time.

Evidence

An Umbrella Review of Systematic Reviews of the Evidence of a causal relationship between periodontal microbes & respiratory diseases.

Lavigne SE & Forrest JL, *Can J Dent Hyg* 2020;54(3):144-155.

PDF Available at www.cjdh.ca

Periodontal Disease and Diabetes Mellitus

What do we tell our Patients?

1. **The association** between periodontal disease & diabetes **is strong** although **NOT Causal**
2. The existence of a **2-way street** has **clearly** been **demonstrated** in past studies
3. **Diabetes** is certainly considered a **risk factor for periodontitis**.
4. The best explanation for the comorbidity of periodontitis & diabetes appears to be through the **inflammatory pathway**

“Eliminating inflammation & controlling dysbiosis is critical”

Evidence

2021 Umbrella Review of Systematic Reviews examining the relationship between T2 diabetes & periodontitis. **Lavigne S & Forrest J. Can J Dent Hyg 2021;55(1):57-67.**

PDF Available at www.cjdh.ca

Periodontal Disease and Adverse Pregnancy Outcomes

What do we Tell our Patients?

1. Some studies have shown there may be an impact of periodontal infection on pregnancy but **relationship unknown**
2. Emphasize **maintenance of good oral health**
3. **Risk** of gingivitis and pyogenic granulomas
4. **Educate** new mothers about the transmissibility of *Streptococcus mutans* & *Fusobacterium nucleatum* and the relationship with caries
5. **Periodontal Therapy is safe during pregnancy**

Evidence

Umbrella Review of Systematic Reviews of Adverse Pregnancy Outcomes

Lavigne S & Forrest J. *Can J Dent Hyg* 2020;54(2):92-100.Feb. 2020

PDF Available at: www.cjdh.ca

Periodontal Disease and Rheumatoid Arthritis

What do we Tell our Patients?

1. Evident that some sort of Association exists between PD & RA
2. However, the nature of this relationship is unclear
3. It would be prudent to carefully & regularly monitor the periodontal status of those living with RA
4. Collaboration between oral health professionals and rheumatologists is paramount to patient care & to maximizing patient outcomes

Evidence

Evolving evidence for relationships between periodontitis and systemic diseases: Position paper from the Canadian Dental Hygienists Association. *Can J Dent Hyg* 2022;56(3):92-155-171. Oct. 2022

PDF Available at: www.cjdh.ca

Periodontal Disease and Alzheimer's/Dementia/Cognitive Decline

What do we Tell our Patients?

1. Evident that some sort of Association exists between PD & AD/Dementia/cognitive decline, especially where those with dementia have compromised oral health
2. But unclear whether PD actually presents a risk for AD/dementia
3. More comprehensive higher-level studies are required to determine the exact nature of the relationship
4. Biological plausibility exists based on the hypothesis of "inflammation"

Evidence

Evolving evidence for relationships between periodontitis and systemic diseases: Position paper from the Canadian Dental Hygienists Association. *Can J Dent Hyg* 2022;56(3):92-155-171. Oct. 2022

PDF Available at: www.cjdh.ca

Periodontal Disease and Inflammatory Cancers

What do we Tell our Patients?

1. Evidence for a link between periodontal disease and a variety of cancers, particularly oro-digestive, appear to be supportive of some sort of association.
2. Both the mechanism and such associations require further investigation.
3. Of interest is the proposed relationship between the digestive cancers and specific periodontal pathogens.

4. Thus, it is paramount that one maintain good oral hygiene to eliminate any potential putative pathogens that may be associated with cancer risk.
5. Once specific pathogens are identified, this could present oral health professionals the opportunity for in-office screening for salivary biomarkers to determine risk for these cancers. (in concert with the concept of precision medicine)

Evidence

Evolving evidence for relationships between periodontitis and systemic diseases: Position paper from the Canadian Dental Hygienists Association. *Can J Dent Hyg* 2022;56(3):92-155-171. Oct. 2022

PDF Available at: www.cjdh.ca

Periodontal Disease and Obesity

What do we Tell our Patients?

1. Clear from the numerous systematic reviews and meta-analyses that a positive association exists between obesity and periodontal disease in all age levels
2. But, determination of a cause-effect relationship at this time is premature as higher quality & more robust prospective studies with larger sample sizes & more homogenous measures, are required to compare responses to NSPT between obese & non-obese individuals and to confirm the exact nature of the association.
3. Increase client awareness of the impact that overweight and obesity may have as a potential risk factor for PD.
4. Make client referrals to dietitians, endocrinologists etc. to assist patients with weight loss.
5. In this age of precision medicine, it would be prudent to include measurement of Body Mass Index (BMI) to assist with educating clients about the complex nature & multi-organ involvement of obesity to monitor their progress.

Evidence

Evolving evidence for relationships between periodontitis and systemic diseases: Position paper from the Canadian Dental Hygienists Association. *Can J Dent Hyg* 2022;56(3):92-155-171. Oct. 2022

PDF Available at: www.cjdh.ca

Periodontal Disease and Chronic Kidney Disease

1. Numerous risk factors for CKD have been identified such as hypertension, smoking, age, poorly managed diabetes and systemic inflammation, some of which are shared with periodontal disease.

2. Systemic inflammation has been proposed to be the mechanism for the association between CKD & PD.
3. Evidence appears to be limited and the majority of the published studies are weak.
4. Although some evidence was found in these reviews of an association between PD & CKD, the nature of the association was not been confirmed.

Evidence

Evolving evidence for relationships between periodontitis and systemic diseases: Position paper from the Canadian Dental Hygienists Association. *Can J Dent Hyg* 2022;56(3):92-155-171. Oct. 2022

PDF Available at: www.cjdh.ca

What do we tell our patients about ALL of these linkages?

1. Educate them about these potential linkages
2. None of these links have been determined to be causal (yet)
3. Periodontal microbes have been found to be associated with these diseases
4. The common feature is **INFLAMMATION!**

THUS!!

5. *Emphasize the importance of good oral hygiene to eliminate inflammation*

Educational Strategies for maintaining Good Periodontal Health

1. Identify and discuss Risk Factors in their personal history
2. Explain the relationship between periodontal health & their specific systemic condition (*if any*)
3. Discuss how poor oral health could potentially affect their systemic condition
4. Discuss how good oral health can maintain a healthy state in their body
5. Customize their specific home care regimens that would best work for them
6. Discuss the importance of a multipronged strategy using both mechanical and chemical means to maintain a symbiotic healthy state in their mouths
7. Focus on Precision Medicine

Mechanical & Chemical Means to control Biofilm Dysbiosis & Inflammation



Summary

- What you tell the patient is very important!
- Avoid using the word “cause” in any of your oral-systemic discussions
- Use a *personalized* approach focusing on the patient’s *specific* medical history
- Emphasize the *Association* between their specific health problem and their periodontal condition & talk about the research findings regarding the link
- Use strategies for home care recommendations based on their periodontal diagnosis/disease classification (*ie. Precision Medicine approach*)
- Stay *up-to-date* with the latest *literature* on these linkages!

Additional Resources & References

European Federation of Periodontology: www.efp.org

Dentalcare.com Resources: Whole Body Health and Scientific American publication
www.dentalcare.com

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- floss: Results from a 12-week trial. The Proctor and Gamble Co. Mason, OH. Data on file, 2020.
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 12. Human Oral Microbiome Database (HOMD) [<http://www.homd.org>]
 13. Slot DE, et al., The efficacy of interdental brushes on plaque & parameters of periodontal inflammation. A systematic review. *Int. J Dent Hyg*, 2008; 6:253-264.
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