



BLACK HILLS ORAL SURGERY
& Dental Implant Center

Periodontal Disease & Systemic Health

Monument Health Diabetes Symposium - November 2024
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Periodontal disease

- Periodontal pocketing, recession, tooth mobility, alveolar bone loss, tooth loss, halitosis
- 42% of US dentate adults over age 30 have periodontitis
- 7.8 % severe

Inflammatory destruction of periodontal connective tissue and alveolar bone



Epithelial attachment loss

Correlation with systemic Illness

- Cardiovascular dz
- Type 2 diabetes
- Obesity
- Metabolic syndrome
- Rheumatoid arthritis
- Osteoporosis
- Respiratory infections
- Inflammatory bowel
- Alzheimers
- Non-alcoholic fatty liver
- Specific cancers



Risk factors

- Poor personal hygiene, lack of professional care
- Smoking, smokeless tobacco, methamphetamines
- Immune deficiencies
- Age 65+
- Systemic inflammatory conditions (CKD)
- Diabetes – poor blood sugar control
- Xerostomia / altered saliva chemistry (Sjogrens, Rx)
 - elevated Na, K, phosphate
 - nitrogenous waste products (urea, creatinine)
 - Elevated osmolality, lower pH
- Mexican Americans, non-Hispanic Blacks

Factors that Influence the Composition of the Oral Microbiome

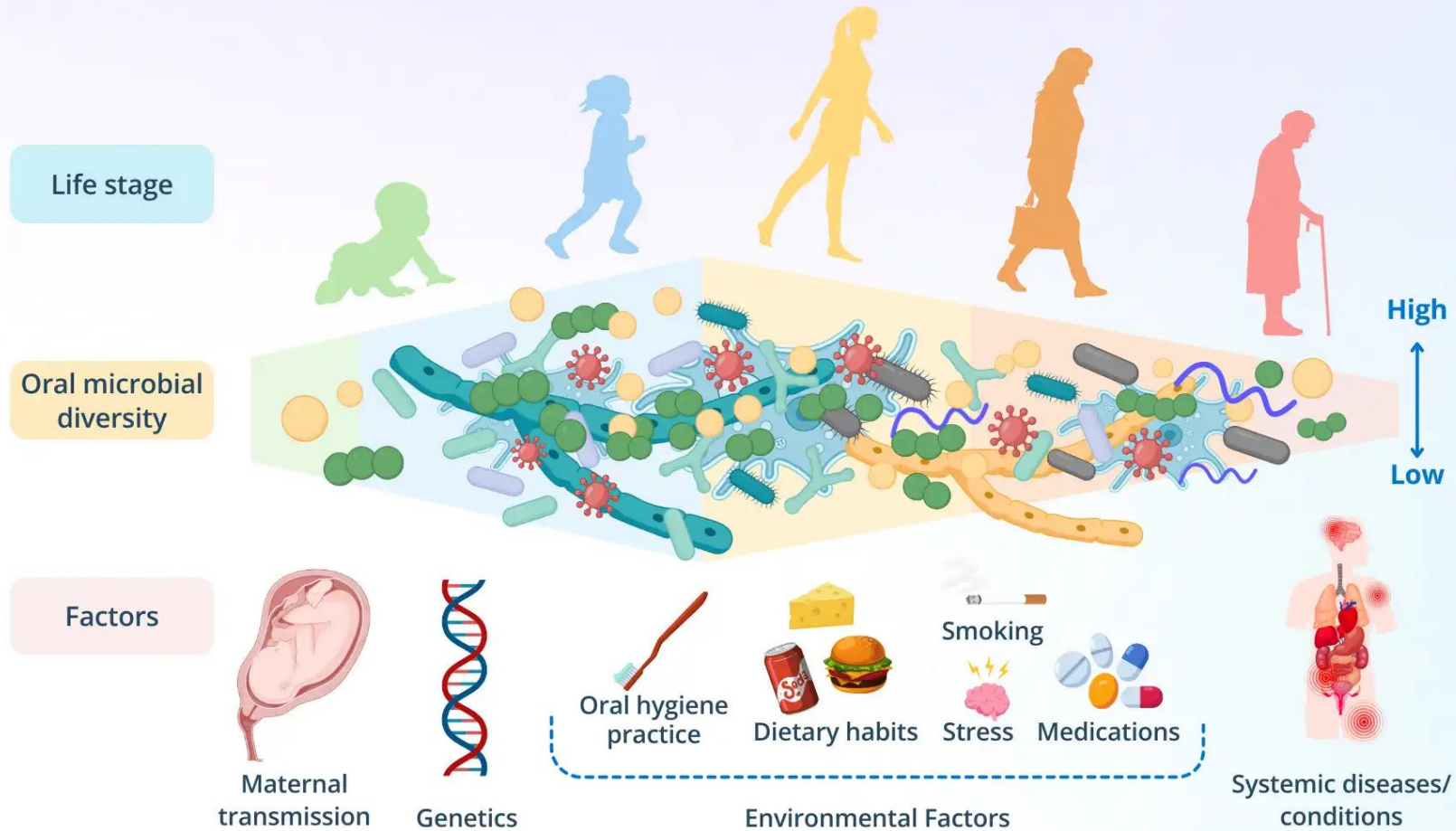


Figure 1. The Oral Microbiome: From First Encounters to Lifelong Encounters

Pathophysiology

of Periodontitis

Dysbiotic ecological changes in the oral microbiome

- Nutrients from gingival inflammatory and breakdown products enrich some bacterial species
- Activation of host-derived proteinases
- Activation of anti-bacterial mechanisms
- Loss of marginal periodontal ligament fibers
- Apical migration of junctional epithelium
- Apical spread of biofilm along root surfaces

Oral flora alterations

- Lower amounts of bacteria linked to oral health
 - Veillonella
 - Streptococcus salivarius
 - Lactobacillus acidophilus
- Selection for periodontal pathogens [gram (-) anaerobes]
 - Porphyromonas gingivalis
 - Fusobacterium nucleatum
 - Aggregatibacter actinomycetemcomitans
 - Treponema denticola
 - Tannerella forsythia

Altered Host Defenses

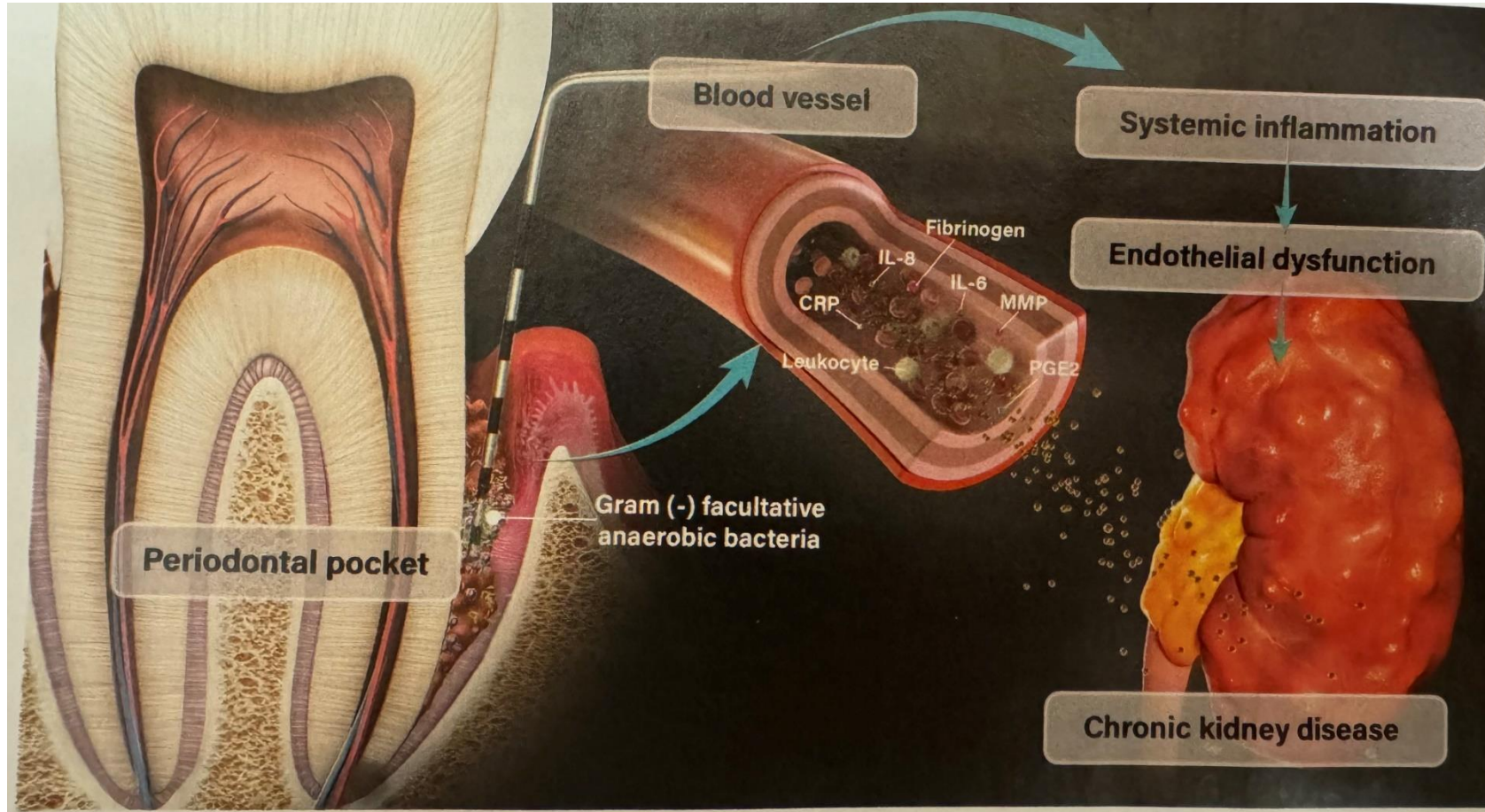
Migration of neutrophils

- Neutrophil activity is crucial in countering bacterial invasion and maintaining gingival health
- Leukocyte adhesion deficiency-1 disease associated with aggressive, early onset periodontal breakdown
- Observed similarities in neutrophil function alterations in pts with CKD & Periodontitis
 - Inhibition of neutrophil recruitment into inflamed tissues due to presence of fibroblast growth factor-23
 - Elevated levels of pro-inflammatory adipokines: leptin, visfatin (in serum and gingival crevicular fluid)

Causation vs Correlation

- Periodontitis contributes to chronic low-grade systemic inflammation
 - Blood stream transfer of periodontal micro-organisms and their by-products (ie, bacteremias, endotoxemias)
 - Release of inflammatory cytokines into bloodstream
- Systemic illnesses may influence the development and disease progression of periodontitis
 - Type II diabetes mellitus CKD can exacerbate periodontitis by increasing local inflammation within periodontal tissues and altering the microbiome
 - Systemic uremia – abnormal neutrophil activity, increased oxidative stress, hindered immune cell development, dysregulated cytokine release, compromised barrier immunity

Cytokines linked to CKD and Periodontitis:
TNF-a, IL-1, IL-6, IL-8, IL-17



- **Smoking**

- Immuno-inflammatory responses to various toxins
- Oral dysbiosis

- **Methamphetamines**

- 83 percent of court admissions for controlled substances in 2019 involved meth, and between 2014 and 2018, the state saw a 200 percent increase in people seeking treatment with the primary diagnosis of meth addiction. “South Dakota's meth crisis is growing and it is alarming.” (NBC, Nov 2019)

Meth high associated with long periods of poor dental hygiene.

While high, users often crave high calorie, carbonated, sugary beverages.

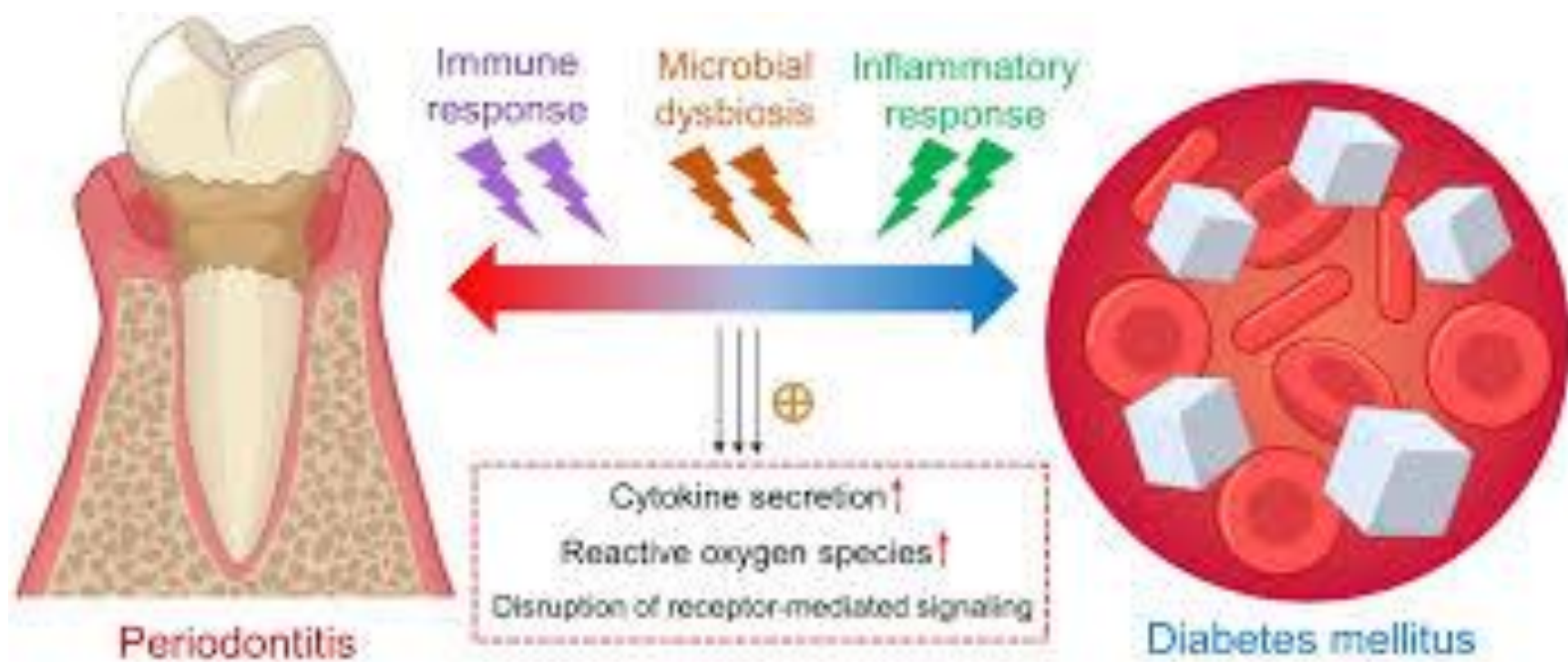


Diabetes and Periodontitis:

What AI has to say

Diabetes and periodontitis have a complex, bidirectional relationship:

- **Diabetes increases the risk of periodontitis**
 - People with diabetes are two to three times more likely to develop periodontitis than people without diabetes. The risk is directly related to how well a person's blood sugar is controlled.
- **Periodontitis can increase the risk of developing diabetes**
 - In people without diabetes, periodontitis is associated with higher blood sugar levels.
 - Severe periodontitis can increase the risk of developing diabetes.
- **Treating periodontitis can improve glycemic control & reduce HbA1c levels**
- **Gum disease can worsen diabetes complications**
 - Gum disease can increase blood sugar levels, which can worsen other complications of diabetes, such as heart, blood vessel, eye, kidney, and nerve problems.



AI - and good professional - advice:

Here are some ways to keep your teeth and gums healthy if you have diabetes:

- Control your blood glucose levels
- Get regular dental checkups
- Tell your dentist about any changes in your diabetes or medications
- Don't have nonemergency dental procedures when your blood sugar is not well controlled
- Don't use tobacco products
- Remove and clean dentures every day
- Eat a healthy, well-balanced diet

