a look at the link between periodontal disease and diabetes, cardiovascular disease, Alzheimer’s, pregnancy complications, and oral sleep apnea.
Diabetics with periodontal infection have high levels of TNFα in response to periodontal bacteria as compared to non-diabetics. They have decreased immune cell function, inhibiting adequate defense against periodontal bacteria.

Diabetics with periodontal infection have a 6-fold worsening of glycemic control. Infection causes the release of stress hormones. This worsens insulin resistance causing a bigger rise in glucose levels and impairing the body's ability to use the glucose for energy.

Inflamed periodontal tissues produce significant amounts of proinflammatory cytokines: interleukin 1-beta (IL-1β), IL-6, prostaglandin E2, and tumor necrosis factor-alpha (TNFα). This systemic inflammatory burden has damaging effects on the host.

Systemic inflammation is the root cause of disease. Inflammatory factors like periodontal disease accumulate, and this inflammatory burden leads to a diseased state.
THE GOOD NEWS

1% reduction in levels of HbA1c
is associated with:

- 21% reduction of deaths related to diabetes
- 21% reduction of risk for diabetes related illness
- 14% reduction in myocardial infection
- 37% reduction of microvascular infection

PERIODONTAL DISEASE TREATMENT CAN RESULT IN A...

0.4% reduction in levels of HbA1c

TREATMENT OPTIONS

- scaling & root planing
  - scaling and root planing is a non-surgical deep cleaning of the root surfaces to remove plaque and tartar from deep periodontal pockets to allow the body to heal from the infection.

- periodontal trays
  - devices used by the patient at home that administer medication to prevent the recolonization of the periodontal bacteria and infection and allow the body to heal itself.

HbA1c defined

HbA1c is a lab test that shows the average level of blood sugar (glucose) over the previous 3 months. It shows how well you are controlling your diabetes.

Inflammatory mediators defined

Cytokines (or protein) that regulates various inflammatory responses such as TNFα, IL-1β, and IL-6

AGEs defined

Advanced Glycogen End products are proteins or lipids that become glycated after exposure to sugars

CRPs defined

C-Reactive Protein tests measure levels of inflammation in the body.

References

ALZHEIMER’S & periodontal disease

Alzheimer’s Disease (AD) is the most common cause of dementia among older people.

DEMENTIA:
The loss of cognitive function—thinking, remembering, and reasoning—and behavioral abilities, to such an extent that it interferes with a person’s daily life and activities.

SPIROCHETES:
Spirochetes form plaque, tangles, and curly fiberlike lesions in the brain. Their number progressively increases in patients with mild, moderate, and severe AD. Spirochetes escape destruction of the host immune response and establish chronic infection and sustained inflammation.

PATHOGENIC ORAL BACTERIA CALLED SPIROCHETES MAY CAUSE AD.

INSIDE THE AD BRAIN
AD brain lesions are infiltrated with oral spirochetes.
Association of oral invasive periodontal Treponema (T.) spirochetes with Alzheimer's disease

The presence and frequency of spirochetes are significantly higher in the brains of Alzheimer’s patients compared to controls.

SALIVARY DIAGNOSTICS

Salivary Diagnostics
Salivary genetic test to detect type and number of oral pathogens including spirochetes.

Periodontal Treatment
Proper periodontal treatment eliminates oral spirochete infection.

References
Preterm Birth & periodontal disease

FIFTEEN million babies are born preterm

3/4 of newborn deaths could be prevented with current, cost effective interventions, even without intensive care facilities.

infection accounts for 10-25% of stillbirths

25%

Fusobacterium Nucleatum

A gram negative anaerobic bacteria frequently found in periodontal infection. F. nucleatum translocates from the oral flora of the mother’s mouth to the uterus.

F. nucleatum is one of the most prevalent species in intrauterine infection, predominantly identified in cases of preterm birth.

F. nucleatum is a gram negative anaerobic bacteria frequently found in periodontal infection. It translocates from the oral flora of the mother’s mouth to the uterus, where it can cause infection, leading to preterm birth. Approximately 3/4 of newborn deaths could be prevented with current, cost effective interventions, even without intensive care facilities. Periodontal disease, which can be caused by bacteria such as F. nucleatum, accounts for 10-25% of stillbirths.
Prenatal care + prevention

Periodontal disease is treatable & preventable. It may be a causative factor for preterm birth and low birth weight and should therefore be an integral component of prenatal care for expectant mothers.

Pregnancy is a time of change, including changes in the mouth.

- Protect yourself and your baby using preventive measures like refraining from sharing utensils and toothbrushes.
- See your dentist early for a complete oral wellness evaluation, and to eliminate oral infections that endanger your pregnancy.

Fusobacterium Nucleatum

Bacteria are passed through the endothelium of the gingival sulcus into the bloodstream, crossing the placental barrier, thereby spreading infection and inflammation to fetal membranes, amniotic fluid, and fetus, stimulating preterm birth.

F. nucleatum bacteria in the mouth enter the bloodstream and cross the placental barrier spreading infection and inflammation to the fetus.

References
**CARDIOVASCULAR DISEASE and periodontal disease**

**GUM DISEASE**

83.6 million American adults (>1:3) have one or more types of CVD.

**CARDIOVASCULAR DISEASE**
There are 22 types of cardiovascular disease, including:
- hypertensive heart disease
- rheumatic heart disease
- ischemic heart disease
- cerebrovascular heart disease
- inflammatory heart disease
- atherosclerosis

**THE CONNECTION:**
how destructive PD damages blood vessels

- Periodontal bacteria travel from the oral cavity into the bloodstream, causing systemic inflammation.
- The presence of dangerous oral bacteria is a root cause that drives systemic inflammation and damages the blood vessel lining: the first step toward heart attack and stroke.
- Proinflammatory mediators are released in response to periodontal disease driving insulin resistance, which causes arterial damage and CVD.
- Periodontal disease is the only known disease to increase LpPla2 which increases plaque vulnerability and plays a direct role in CVD progression.
Prevention: lifestyle habits

The key to reducing your risk...

Stress management
Excess stress may be detrimental to your health. The stress response initiates hormones that increase your heart rate, blood pressure, and muscle tension. Long-term exposure to stress can disrupt nearly every organ in your body, increasing your risk for serious health complications such as heart attack and stroke.

Food & diet
Eating a healthy balanced diet lowers your risk for many chronic conditions including obesity, heart disease, stroke, some cancers, diabetes, and depression.

Exercise
Regular exercise is important for total body health. Exercise improves heart health by helping your heart and cardiovascular system work more efficiently. It can help control blood pressure, improve blood lipids, and reduce systemic inflammation.

Healthy sleep
Proper sleep is important for general health. Lack of sleep enhances pro-inflammatory activity and reduces proper immune function, impacting your safety, vitality, and longevity.

References
OBSTRUCTIVE SLEEP APNEA

about 60 million American adults have sleep or wakefulness disorder.

& twenty two million suffer from sleep apnea.

sleep apnea IS ASSOCIATED WITH

- diabetes
- asthma
- acid reflux
- weight gain
- heart failure
- car accidents
- high blood pressure
Obstructive Sleep Apnea is the cessation of airflow into the lungs for at least 10 seconds, while hypopnea is a decrease in airflow that occurs during sleeping.

### Obstructive Sleep Apnea Screenings

**Epworth Sleepiness Scale**

- **0** - would never doze
- **1** - slight chance of dozing
- **2** - moderate chance of dozing
- **3** - high chance of dozing

**STOP-BANG Questionnaire**

- **S** - snoring loudly?
- **B** - BMI > 35?
- **T** - tired daytime sleepiness?
- **A** - age over 50?
- **O** - has anyone observed you stop breathing while you are asleep?
- **N** - neck circumference > 15.75 in?
- **P** - treated for high blood pressure?
- **G** - gender male?

### Treatment

- **ORAL MANIFESTATIONS**
  - bruxism
  - worn, chipped, cracked teeth
  - scalloped or large tongue
  - narrow palate
  - enlarged uvula
  - dry mouth

Oral appliances help prevent the collapse of the tongue and soft tissues in the back of the throat, keeping the airway open during sleep and promoting adequate air intake. CPAP, or continuous positive airway pressure, is a treatment that uses mild air pressure to keep the airways open.

### References


THE ORAL SYSTEMIC CONNECTION
and Physician Collaboration for Positive Patient Outcomes

Gender Male
Age 57
Weight 192
Height 6'0"

Medical history Mild Hypothyroidism, otherwise unremarkable
Medications Synthroid
Family history Father DMT2, both parents positive for death from stroke

Complaint Tiredness and right arm weakness

Physical Exam Carotid bruit detected over Right SCA

Test Results & Diagnosis Various diagnostic scans showed abnormal upper arterial evaluation with 75% stenosis of subclavian artery involving the proximal segment. Stress echocardiogram was normal.

Etiology: Unknown, no evidence of arteriosclerosis elsewhere in body.

Treatment May, 2013
Surgery performed to remove blockage and repair artery.
Blockage was determined to be an atheroma.
Patient monitored on statin medication, instructed to optimize diet for weight loss and achieved 30 lb weight loss.
Referred to Shoreline Dental Care for Oral Systemic Evaluation.

Dental Exam Sept, 2013
Radiographs revealed two abscessed teeth in addition to extensive caries and moderate to advanced periodontal disease with above threshold pathogenic bacteria (Pg,AA) as indicated by bacterial testing. These bacteria are implicated in endothelial dysfunction and contributory to elevated LpPla2 and atherosclerosis. All infection was asymptomatic.
Dental Treatment Patient underwent three months of Advanced Periodontal Protocols including antimicrobial therapy and the use of Periodontal Gel Trays. Tooth #5 and #15 were extracted and an apicectomy was performed on tooth #13. Restorative phase of treatment was completed by the following April of 2014.

Pre-Test for Bacterial Burden

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>High Risk Pathogens</th>
<th>Moderate Risk Pathogens</th>
<th>Low Risk Pathogens</th>
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</thead>
<tbody>
<tr>
<td>Peptostreptococcus (Micromonas)</td>
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<tr>
<td>*Additional Labs all in range</td>
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</table>

Post-Test for Bacterial Burden

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<tbody>
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<tr>
<td>*Additional Labs all in range</td>
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</tbody>
</table>

PreTreatment Blood Work

Total Cholesterol: 227H  
HDL 58  
Triglycerides 111  
LDL Cholesterol 147  
Glucose 87  
LpPla2 226  
hsCRP 0.2  
Hemoglobin A1c 5.1  
*Additional Labs all in range

Post Treatment Blood Work

Total Cholesterol 127  
HDL 39  
Triglycerides 97  
LDL Cholesterol 69  
Glucose 87  
LpPla2 117.60  
hsCRP 0.1  
Hemoglobin A1C 5.1  
*Additional labs all in range