Periodontal Disease and Systemic Disease: Is there a link?

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  – Professor and Former Dean, University of Pennsylvania School of Dental Medicine
  – Figures Courtesy of I-C. Wang D.M.D.
Diabetes

• Type I Diabetes
  – Auto immune destruction of insulin producing B cells in pancreas
  – < 30 years old
  – Hyperglycemia
  – Treatment : Insulin

• Type II
  – 90 %
  – Onset midlife
  – Insulin tolerance
  – Hyperglycemia
  – Treatment: Diet, exercise, oral meds, insulin

• Gestational Diabetes
Diabetes and Periodontal Disease

• Pima Indians studies
  Subjects with Type II DM have 3 times higher incidence of periodontal disease
• Periodontitis progresses more rapidly in patients with uncontrolled diabetes
• Poorly controlled and long duration of diabetes are in highest risk group
Diabetes and Periodontal Disease

• Patients with severe periodontal disease demonstrated worse glycemic control than subjects with minimum destruction

• Mechanical and systemic anti-microbial therapy may improve glycemic control
Measures of diabetes

• Blood glucose is an momentary measure of glycemic control

• Hemoglobin a1c is a measure of glycemic control over the last three months

• There are point of service finger stick tests to measure both
Diabetes Classic complications

• Retinopathy  Blindness
• Nephropathy  Renal failure
• Neuropathy
• Macrovascular disease
  – Cardiovascular, Stroke
  – Peripheral
• Altered wound healing
For more information

National Diabetes Information Clearinghouse

niddk.nih.gov/health/diabetes/pubs/dmsats/dmstats/htm#comp
Medical Costs in Diabetics

![Bar chart showing medical costs in diabetics with and without prior treatment.](chart.png)
Cardiovascular disease

• 58 million Americans
• 22% of US population
• 40% of all deaths
Epidemiological Studies

• DeStafano 1993: NHANES
• Population of over 20,000 people
• Median of 14 years
Subjects with severe periodontal disease were at significantly greater risk of developing
  – Atherosclerosis
  – Myocardial infarction and stroke
• Even when controlled for
  – body mass, age, exercise, serum triglyceride, blood pressure, cholesterol level
Prospective study (Beck)

• Periodontitis significant risk factor for cardiovascular disease morbidity and mortality.
• Fatal coronary heart disease odds 1.6 increased
• Fatal stroke odds 2.1 increased
• controlling for all the traditional cardiovascular risk factors.
What defines a preterm baby?

• A baby...
  – born during or before the 36th week of gestation (one week before full term)
    and
  – weighing less than 2,500 grams (5 pounds, 8 ounces)
What causes low birth weight?

• Some of the known causes include:
  – Cigarette smoking
  – Alcohol
  – Multi fetal pregnancies
  – Mother’s medical problems
  – An abnormal placenta, uterus or cervix
How can preterm low birth weight be prevented?

- All pregnant women should:
  - Get early, regular prenatal care
  - Consume 0.4 milligrams of folic acid daily
  - Eat a balanced diet
  - Gain enough weight
  - Avoid smoking, alcohol, illicit drug
Facts about preterm low birth weight

• In the United States, 13% of newborns are low birth weight
• 25% of preterm low birth weight cases occur without any known risk factors
• Low birth weight is related to 60% of infant deaths
Pregnancy Gingivitis

• Generalized marginal gingival enlargement
• Incidence: up to 90%
• Altered inflammatory response to plaque
Why is preterm delivery important

• Major cause of neonatal death
• Causes nearly half of long-term neurologic morbidity
What causes low birth weight?

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How can preterm low birth weight be prevented?

- All pregnant women should:
  - Get early, regular prenatal care
  - Consume 0.4 milligrams of folic acid daily (before and during early pregnancy)
  - Eat a balance diet
  - Gain enough weight
  - Avoid smoking
  - Avoid drinking alcohol / using illicit drugs / prescriptions or over-the-counter drugs not prescribed
How does low birth weight affect a baby?

- Low birth weight babies may face serious health problems such as:
  - Respiratory distress syndrome (RDS)
  - Anemia
  - Jaundice
  - Mental retardation
  - Cerebral palsy
  - Impaired lung function, sight and hearing
  - Intracranial hemorrhage
  - Malnutrition
  - Congestive heart failure
Note

• Of 3,000 pregnant women were studied by our group
• Women with periodontal disease were 3-8x more likely to have spontaneous preterm birth
• Of 28 women who delivered at less than 32 weeks gestations, 24 had periodontal disease
Intervention Studies

• Can demonstrate that treating periodontitis reduces the risk of preterm birth
Incidence of Preterm Births at Less Than 37 Weeks

- Reference group with periodontitis: 13.7%
- Prophy + Placebo: 8.9%
- Scaling and root planing + Placebo: 4.0%
An alternative to anesthetic injections for scaling and root planing

ORAQUIX
Efficacy of Dental Gel

- Multicenter Study
- Patients who require scaling and root planning
- Assess efficacy by Digital Analog Scale
Why the differences in published studies?

- Very different prevalence of more severe periodontal disease
- Very different proportions of African American women in different studies
- How much PD matters?
- Sample size
The success of treatment matters!

The odds of having a preterm birth was 19.8 times higher in patients whose periodontal treatment was not successful v.s. the patients who were successfully treated (p<0.01).

Successful treatment

Unsuccessful treatment
Use of alcohol free antibacterial mouth-rinse is associated with a decreased incidence of PTB
A novel technology
Crest Pro-Health Rinse

• 0.07% high bioavailable CPC
• Alcohol-free
• Antiplaque
• Antigingivitis
• Fights breath malodor
• 12-hour protection
GESTATIONAL AGE
AND TREATMENT GROUP (p<0.011)
Birth Weight and Treatment Group (p<0.001)
Oral Health Care During Pregnancy

A Summary of a Consensus Development Expert Workgroup Meeting
### Analgesics in Pregnancy

highlighted from the report

<table>
<thead>
<tr>
<th>Analgesics</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetaminophen</td>
<td>May be used during pregnancy.</td>
</tr>
<tr>
<td>Acetaminophen with Codeine, Hydrocodone, or Oxycodone</td>
<td></td>
</tr>
<tr>
<td>Codeine</td>
<td></td>
</tr>
<tr>
<td>Meperidine</td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td></td>
</tr>
<tr>
<td>Aspirin</td>
<td>May be used in short duration during pregnancy. Avoid in 3rd trimester.</td>
</tr>
<tr>
<td>Ibuprofen</td>
<td>May be used in short duration during pregnancy; do not use for &gt;48–72 hours. Avoid in 3rd trimester.</td>
</tr>
<tr>
<td>Naproxen</td>
<td></td>
</tr>
</tbody>
</table>
Antibiotics in Pregnancy highlighted from the report

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>Amoxicillin</td>
<td>May be used during pregnancy.</td>
</tr>
<tr>
<td>Cephalosporins</td>
<td></td>
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<tr>
<td>Clindamycin</td>
<td></td>
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<tr>
<td>Metronidazole</td>
<td></td>
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<tr>
<td>Penicillin</td>
<td></td>
</tr>
<tr>
<td>Avelox</td>
<td>Avoid during pregnancy.</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td></td>
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<tr>
<td>Clarithromycin</td>
<td></td>
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<tr>
<td>Levofloxacin</td>
<td></td>
</tr>
<tr>
<td>Tetracycline</td>
<td>Never use during pregnancy.</td>
</tr>
</tbody>
</table>
Anesthetics and OTC Drugs in Pregnancy - highlighted from the report

<table>
<thead>
<tr>
<th>Anesthetics</th>
<th>Consult with a prenatal care health professional if using anesthesia other than a local with epinephrine block or infiltration (e.g., intravenous sedation or general anesthesia).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local anesthetics (Bupivacaine, Lidocaine, Mepivacaine)</td>
<td>May be used during pregnancy.</td>
</tr>
<tr>
<td>Nitrous oxide (30%)</td>
<td>May be used during pregnancy when topical or local anesthetics are inadequate. Pregnant women require lower levels of nitrous oxide to achieve sedation; consult with prenatal care health professional.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Over-the-Counter Antimicrobials</th>
<th>May be used during pregnancy.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cetylpyridinium chloride mouth rinse</td>
<td></td>
</tr>
<tr>
<td>Chlorhexidine mouth rinse</td>
<td></td>
</tr>
<tr>
<td>Xylitol</td>
<td></td>
</tr>
</tbody>
</table>
Report on Dental Treatment in Pregnancy

• Webpage:
  http://www.mchoralhealth.org/materials/consensus_statement.html

• PDF:
Osteoporosis

• Loss of bone density
• Propensity to fracture
  – Especially,
    • Hips
    • Wrist
    • Spine
• May result in widows hump
Risk factors for Osteoporosis

• Low peak bone mineral density
• Low body mass index
• Diet: insufficient calcium 1000-1500mg/day
• Women
• Postmenopausal
• Lack of Estrogen
• Smoking
Risk factors for Osteoporosis

• Drugs
  – Corticosteroids
    • Possible to lose 10% of bone mineral in one year
  – Cytotoxic Drugs
  – Estrogen antagonists

• Lack of exercise

• Propensity to fall
Periodontitis and Osteoporosis

• There is an association between basal bone density and
• Bone mineral density at the hip
• Sites with osteoporosis and periodontitis have the highest rate of bone loss
What to do?

• Prevention, prevention, prevention
  – Include questions on osteoporosis in the medical history
  – Educate about diet, exercise, etc.
  – Refer for treatment

• Prevent and treat periodontal disease
Prevention of osteoporosis

• Education
• Attain sufficient peak bone mass
  – Calcium and milk
  – Avoid soda
  – Avoid smoking
• Attain sufficient bone mass
• Exercise
• Appropriate drug treatment
Pharmacologic approaches

• Estrogens
• Nasal calcitonin
• Bisphosphonates
  – E.g. alendronate, risendronate
• Designer estrogens
• PTH (daily injections)
• Prolia
Do oral bisphosphonates cause implant failure?

• 100 consecutive patients taking bisphosphonates for at least three years prior to implant placement for osteoporosis
• 100 controls not taking bisphosphonates
• Tracked for at least 5 years
• Looked for evidence of
  – implant loss, loss of >2mm bone
  – mobility
  – ONJ

• **NO EVIDENCE OF BONE LOSS OR ONJ**