PATIENT “MEDICAL” CONDITIONS THAT AFFECT DENTAL TREATMENT

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Medical journals that have published articles on periodontal-systemic interrelationships

- American Heart Journal
- American Journal of Kidney Disease
- American Journal of Obstetrics & Gynecology
- Annual Review of Immunology
- Annals of the Rheumatic Diseases
- Archives of Internal Medicine
- Archives of Pediatrics & Adolescent Medicine
- Arthritis & Rheumatism
- Arteriosclerosis, Thrombosis, and Vascular Biology
- British Medical Journal
- Circulation
- Current Opinion in Endocrinology, Diabetes and Obesity
- Diabetes Care
- European Heart Journal
- Journal of the American College of Cardiology
- Journal of the American Medical Association
- Journal of Gynecology & Obstetrics
- Journal of Internal Medicine
- Journal of Pediatric Endocrinology & Metabolism
- Journal of Rheumatology
- Lancet
- New England Journal of Medicine
- Nephrology, Dialysis, Transplantation
- Obstetrics & Gynecology
- Stroke

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QUESTIONS

• What are the “medical” conditions that affect dental treatment?
• What “dental” conditions do dentists treat?
• How / why do “medical” conditions affect dental treatment?
• What is (are) the lesson (s) to be learned?
MEDICAL CONDITIONS THAT AFFECT DENTAL TREATMENT
MEDICAL CONDITIONS AFFECTING DENTAL TREATMENT

- DIABETES
- PREGNANCY
- Total joint replacement
- EATING DISORDERS (BULIMIA, ANOREXIA)
- Leukemia
- Cardiovascular Disease (High Blood Pressure, Stroke, Prosthetic valves, Infective Carditis, Cardiac Transplants with Valvulopathy, Some types of Congenital Heart Disease)
- Anemia
- Hemophilia
- HIV, Hepatitis B and C (Blood Borne Pathogens)
MEDICAL CONDITIONS AFFECTING DENTAL TREATMENT

- Leukemia
- Allergies (latex and others)
- Poor nutrition
- Obesity
- Mouth breathing
- Obstructive Sleep Apnea
- Drug abuse including methamphetamine use.
- Renal Disease
- Cancer
- Medical conditions associated with geriatric pts.
MEDICATIONS / DRUGS

DRUGS, USED TO TREAT THE "MEDICAL" CONDITIONS IN THE PREVIOUS TWO SLIDES
The oral cavity is not separated from the rest of the body, but is rather connected directly and indirectly. The key to comprehensive patient care is interprofessional patient care involving every health care profession.
SELECT CONDITIONS TREATED BY DENTISTS
EXAMPLES OF WHAT DENTISTS TREAT

• Decay (cavities)
• Periodontal disease (gum disease)
• Yeast infections
• Viral infections
• Abscesses
• Loss of teeth
• Oral-pharyngeal cancer
• Non-infectious inflammatory and non-inflammatory disease
CARIES
PERIODONTAL DISEASE

HEALTH

DISEASE
PERIODONTAL DISEASE: BONE LOSS AND INFLAMMATION
AGGRESSIVE PERIODONTICS
(Francis G. Serio; ECU: )
GINGIVAL HYPERPLASIA
PERIAPIICAL ABSCESS
PERIAPICAL ABSCESS
CANDIDA / THRUSH
CAUSE OF MOST ORAL DISEASE

• BIOFILM
  – Composed of bacteria and their products
  – Like any infectious disease, the ability to cause disease is governed by many factors:
    • Host resistance
    • Number of infectious agents
    • Length of time infectious agents are in contact with host
WHAT FAVORS INCREASE OF MICROBES IN THE ORAL CAVITY?

- Patient’s ability to mechanically remove microbes
- Nutrients supplied to microbes for growth
- Host defense mechanisms

SALIVA
DENTAL DISEASE

• Majority of dental diseases are infectious and characterized by an INFLAMMATORY RESPONSE:
  – Same mediators, cytokines, markers as any extraoral inflammatory disease
  – They are localized diseases with systemic consequences!
INFLAMMATION

- Non-specific response
- Immediate response
- Cellular response
- Biochemical response
- Phases: Mast cell response
  Plasma Protein system response
  Release of Plasma Proteins
INFLAMMATORY MARKERS

• Evaluated: 1] serum interleukin 6 (IL-6)  
  2] C-reactive protein  
  3] albuminuria

• Are independent predictors of Congestive Heart Failure (CHF)

• Inflammation may be involved directly or indirectly as a marker of other conditions that lead to CHF

• HbA1c

J Amer Coll Cardiol 2008; 51: 1775-1783
# INFLAMMATORY DISEASES

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HOW DO MEDICAL CONDITIONS AFFECT DENTAL TREATMENT?
DIABETES
DIABETIC PATIENTS

• ORAL COMPLICATIONS
  – Gingivitis
  – Periodontal Disease ("sixth complication diabetes")
  – Tooth mobility
  – Tooth Loss
  – Increased number of denture sore spots (with both partial and full dentures)
  – Xerostomia
  – Increased susceptibility to oral infections (particularly Candida)
  – Caries
  – Periapical abscesses
  – Lichen planus
  – Burning mouth syndrome
PERIODONTAL INFLAMMATION AND THE DIABETIC (1)

- Diabetes:
  - 25 million in US with up to 7 million undiagnosed
    - ~ 75% of those have oral inflammatory conditions.
    - ~ 33% have severe periodontitis
    - Those > 45 years of age 2.9 X more likely to have severe periodontal disease

PERIODONTAL INFLAMMATION AND THE DIABETIC (2)

• In diabetics: is both local and systemic inflammation loss of tissue homeostasis
  – Result: increase in serum proinflammatory cytokines (IL1beta, TNF-alpha) and acute phase proteins (CRP) → reduction of HDL, increase of LDL cholesterol and triglycerides. → reduction of tissue repair → increased susceptibility of periodontal tissues to break down

PERIODONTAL INFLAMMATION AND THE DIABETIC (3)

• Diabetics may not respond to phase I and II periodontal treatment.
  – If they are maintaining good POH, biofilm is controlled and contributing factors (smoking, immunosuppression, diet, systemic disease) they may have diabetes.
  – Refer to MD for evaluation- absent control of diabetes, PD may progress.
  – And vice versa for MD- if blood glucose is not controlled, may be due to PD.  MD refer to Dentist.

DIABETES: EFFECT OF DENTAL VISITS

- Diabetics were 30% less likely to visit an emergency department or be hospitalized for diabetes if they received regular dental care.
- Patients who did not receive dental care were less likely to have good control of HbA1c.
- "Because those with good dental care also had good healthcare??"

*J Am Dent Assoc: 2012; 143: 20-30*
DIABETES AND PERIODONTAL DISEASE

• Medical costs reduced for diabetic patients who have periodontal disease
  – Looked at 1.7 million patients with UC dental and Highmark medical insurance over a 3 year period
  – ~ $1,800 / yr
  – Hospitalizations decreased by 33%
  – Physician visits decreased by 13%
  – Study supported by United Concordia and Highmark Inc.

• United Concordia: “UC-wellness” is developing a policy which will provide addn’l coverage for treatment of periodontal disease for patients with diabetes.

AADR presentation; 2012: Dr. Marjorie Jeffcoat, University of Pennsylvania
DIABETIC PATIENTS

• Oral health affects both the morbidity and mortality of diabetic patients.
• Diabetes affects the oral health of periodontal patients
• Affects ~ 16 million in the US and there are approximately 6 million more that do not know they have it.
BURNING MOUTH SYNDROME

- Chronic condition; normal appearance of oral mucosa
- More common in middle aged to elderly females
- Symptoms of intense pain and a burning sensation most commonly on the tongue
- Noted in some patients who did not know they had diabetes.
  - If patient has BMS refer for medical evaluation
- If “dry mouth”: sialogogues, pilocarpine
- Can have significant impact on Quality of Life
PREGNANCY
Pregnant Patient Exhibiting Periodontal Changes

Image courtesy of Dr. Ira B. Lamster, Columbia University College of Dental Medicine, New York, New York.
PREGNANCY GINGIVITIS
PERIODONTAL DISEASE AND PREGNANCY
(2012)

- Periodontal disease is a sign of more significant process affecting pregnancy
- Likely due to oxidative stress - increased respiratory and metabolic demands.
- Periodontal disease is a "sign" of an oxidative requirement.
- Still no convincing evidence that dentists can improve pregnancy outcomes by scaling and root planing.

www:jada.ada.org/content/143/1/13.1full?etoc
EATING DISORDERS AND NUTRITION
ANOREXIA AND BULIMIA
ANOREXIA AND BULIMIA
CHEWING PROBLEMS

• “Inability to chew food without pain or difficulties”
  – Ill-fitting dentures
  – Neurological problems
  – Tempromandibular joint myofascial dysfunction
  – Painful teeth / gums

• > 25% older adults have oral health problems and edentulism
  – Poor nutrition: decreased intake of fibers, carotene, calcium and proteins; increased intake of fats and cholesterol and carbohydrates
  – Result is weight loss and increased predisposition to CA and CVD
“It is the position of the Academy of Nutrition and Dietetics that nutrition is an integral component of oral health. The Academy supports integration of oral health and nutrition services, education and research. Collaboration between dietetics practitioners and oral health care professionals is recommended for oral health promotion and disease prevention and intervention.”
PATIENTS WITH CANCER

• If on chemotherapy, 30-89% develop nausea.
  – Tx with anti-emetics
  – Patients should rinse with water immediately after throwing up and wait approximately \( \frac{1}{2} \) hour before brushing their teeth.

• DO NOT BRUSH IMMEDIATELY AFTER VOMITING!
CARDIOVASCULAR DISEASE
C-REACTIVE PROTEIN AND CARDIOVASCULAR DISEASE

• Cohort studies: apparently healthy patients having increased CRP have an increased CV risk.

• Elevated CRP: associated with worse PX and recurrences of strokes, peripheral artery disease.

• CRP-is an independent risk factor for Coronary artery disease (indicator of long-term risk)
CORONARY HEART DISEASE AND PERIODONTITIS

- 789 subjects (263 with stable CHD / 526 matched controls no HX of CHD)
- Looked at subgingival biofilm for periodontal pathogens (*A. actinomycetemcomitans* *T. forsythensis*, *P. gingivalis*, *P. intermedia*, *T. denticola*)
- Significant association of CHD with total periodontal pathogen burden
- Significant association between number of *A. actinomycetemcomitans*.

*Arch Intern Med 2006; 166: 554-559*
PERIODONTAL PATHOGENS

- *Tannerella forsythensis*
- *Porphyromonas gingivalis*
- *Actinobacillus actinomycetemcomitans*
- *Prevotella intermedia*
- *Streptococcus sanguis*

*Have all been detected in Atherosclerotic plaques*
FLOSSING AND CRP

• 300 patients in lifestyle modification program
  – Those with CRP > 1.5 mg/L asked to floss every other day

• Results: After six months, the test group had levels of CRP at baseline or below

• Therefore:
  – Flossing can alter levels of CRP
  – May affect CVD

ENDOTHELIAL DYSFUNCTION

• **Brachial artery dilation:**
  - Key step in atherosclerotic lesion development
  - **BRACHIAL ARTERY DILATION** is an indication of endothelial dysfunction
    - Greater the flow-mediated dilation, the more pliable and the less diseased the vessel
    - Lower the flow-mediated dilation, the less pliable and the more diseased the vessel
CRP AND PERIODONTAL DISEASE

- Evaluated brachial artery dilation in matched patients with and without periodontal disease.
- Patients with advanced PD had:
  - Higher levels of CRP
  - Endothelial dysfunction evidenced by lower flow-mediated dilation of the brachial artery

*Arterioscler. Thromb. Vasc. Biol.* 23(7); 1245-1249, 2004
CAROTID IMT (INTIMA-MEDIA THICKNESS)

- Meta analysis of 8 previous studies
- Total of 37,197 patients up to 5.5 years
- After adjustment for age and sex, increased IMT was associated with increased risk of both MI and stroke
- Every .1 mm increase \(\rightarrow\) 10-15\% increased risk for MI and 1-18\% increased risk for stroke.

*Circulation* 2007; 115: 459-467
PERIODONTAL PATHOGENS AND ATHEROSCLEROSIS

• 657 Subjects (55 and >); no HX of MI or Stroke
• 8 subgingival samples from each subject
• Carotid intima-media thickness increased with periodontal pathogen burden
• IMT of .03mm assoc with 15-mm Hg increase in systolic = 2X risk of MI or coronary death

Circulation 2005; 111: 576-582
XEROSTOMIA
XEROSTOMIA

- Typically due to a decrease in amount of saliva
- More common in females than males
- Overall incidence of 10%
- May be due to disease, but most commonly due to medication side-effects
DISEASES WHICH CAN CAUSE XEROSTOMIA

• Diseases:
  – Autoimmune: Sjogren’s Syndrome, rheumatoid arthritis
  – Alzheimer’s Disease
  – HIV/AIDS
  – Diabetes
  – Stroke
  – Anemia
MEDICATIONS / TREATMENTS WHICH CAN CAUSE DRY MOUTH

- Radiation therapy to the head and neck.
- Antihistamines and decongestants
- Antidepressants (Flexaryl, Elavil)
- Antihypertensive agents
- Calcium channel blockers
- Drugs used to treat depression anxiety, allergies, colds, obesity, hypertension,
- Mouth breathing/sleep apnea
- Sedatives
GERIATRIC DENTAL CARE

• XEROSTOMIA
  – Key role of saliva in oral health
    • Buffering action; bathes teeth; some antibacterial properties
    • Helps in chewing and swallowing (nutrition)
    • Dentures rest on a layer of saliva - not on keratinized and non-keratinized oral mucosa
    • Predisposes to “sore spots”
    • Patients remove dentures → poor nutrition → weight loss → compromised wound healing → etc.
GERIATRIC DENTAL CARE

• Consequences of xerostomia:
  – Decreased ability to chew and swallow
  – Increased dental plaque which can result in an increase in decay, periodontal disease and increased susceptibility to yeast infections.
  – Halitosis / bad breath
  – Inability to wear dentures to due increased sore spots.
MENTAL ILLNESS

• Patients with mental illness
  – Three times more likely to have tooth loss
  – Six times more likely to have decayed, filled or missing teeth
  – Antidepressants and mood stabilizers reduce salivary flow
MEDICATIONS
MEDICATIONS USED TO TREAT

• Obesity (appetite suppressants)
• Anxiety
• Epilepsy
• Hypertension
• Depression
• Asthma
• COPD
MEDICATIONS USED TO TREAT

- GI ulcers
- Irritable bowel syndrome, diarrhea,
- Respiratory diseases
- Allergic diseases
- There are over 400 prescription and over-the-counter medications demonstrated to cause “dry mouth”.

MEDICATIONS WHICH CAN AFFECT DENTAL TREATMENT

• Warfarin
• Tricyclic antidepressants can interfere with the action of local anesthesia
• Intravenous bisphosphonates
• Diuretics
BISPHOSPHONATE-RELATED OSTEONECROSIS OF THE JAW
OSTEONECROSIS OF JAW: BISPHOSPHONATE - RELATED
? HOW ?
INFLAMMATION
The Link Between Periodontal Disease & Systemic Inflammatory Diseases: A Risk Continuum

Bacterial Challenge
- Iatrogenic Factors
- Crowded Teeth
- Poor Oral Hygiene

Host Response
- Exaggerated Hyperinflammatory Response

Increased Risk for:
- Atherosclerosis
- Diabetic Complications
- Adverse Pregnancy Outcomes
- Respiratory Diseases
- Neurodegenerative Diseases
- Smoking
- Diabetes
- Genetics
- Obesity
- Stress
- Medications
- Compromised Immunity

Periodontal Disease

Low Grade Chronic Infection/Inflammation

Exacerbates On-Going Inflammation in Distant Organs

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Modern Medicine

“puzzle person”
Modern Medicine

“composite person”
Treating Gum Disease Equals Annual Cost Savings

- Diabetes Cost Savings: $1,477 (Pharmaceutical) + $2,814 (Medical) = $3,291
- Heart Disease Cost Savings: $2,956
- Cerebrovascular Disease (Stroke) Cost Savings: $1,029
- Rheumatoid Arthritis Cost Savings: $3,964
- Pregnancy Cost Savings: $2,430

United Concordia’s landmark Oral Health Study shows that annual cost savings of $3,291, $2,956, $1,029, $3,964 and $2,430 are possible when individuals with diabetes, heart disease, cerebrovascular disease (stroke), rheumatoid arthritis and pregnancy are treated for gum disease.

*3-year average of $1,814 in savings from reduced hospital and office visits begins in the first year of periodontal treatment. Pharmacy savings realized annually after patient receives at least 7 periodontal treatment and/or maintenance visits.*
ORAL HEALTH CARE: KY NURSING HOME

• Pt. in nursing home developed life-threatening gum infection.
  – Staff never knew pt. wore dentures
  – Weren’t removed for 6 months
  – As many as 44% of infections in nursing homes are caused by poor oral care

• Bill passed:
  – Required Cabinet of Health and Family Services to collaborate with SDM’s
  – Develop pilot program to improve daily access to oral health care
ORAL HEALTH CARE: KY NURSING HOME

• Bill
  – Funded by monetary penalties collected from nursing homes
  – Nursing aides hired to provide oral health care.
  – Was a pilot where hygienist helped nurse’s aide become oral health care specialist
  – Previous research suggested that if one nurses assistant is solely responsible, rates of pneumonia significantly decreased in the facility
ORAL HEALTH / SYSTEMIC HEALTH RELATIONSHIPS: CASUAL OR CAUSAL “?”