Exploring the Relationship Between General Health and Oral Health

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Overview of Program

Biologic Plausibility For Oral Health - Systemic Health Link

Nurses’ Actions With Patients to Promote Health

Health Conditions Associated with Oral/Systemic Health Link

Periodontal (Gum) Health

Healthy
- Pink tissue tightly bound to teeth that does not bleed
- Protects body via fragile epithelial layer, as thin as a few cells

Periodontal (Gum) Infections Vary In Severity

Periodontitis

Gingival Sulcus and Crevicular Fluid
Periodontal Diseases

Combination of Risk Factors

- Systemic
- Host Factors
- Local Factors & Bacteria
- Environment

Step 1: Bacteria Initiates Inflammatory Response

- Gram negative anerobes collect in gingival crevical fluid and invade the soft tissue
- Bacteria release toxic products – endotoxins, chemotactic peptides, organic acids and protein toxins
- Inflammation begins in crevicular space provoking bleeding, redness and swelling

Step 2: Response Depends on Host

- Host activates immune response, most notably from monocytes which are tissue macrophages
- Production of cytokines sustains inflammatory response and destruction
- Examples of these pro-inflammatory cytokines are interleukin-1, interleukin-6, tumor necrosis factor-alpha and prostaglandin E2

Step 3: Inflammatory Process Turns Destructive

- Cytokines influence recruitment and chemotaxis of neutrophils
- Permeability of gingival blood vessels increases
- Bone begins to resorb
- Risk for clotting increases
- Hepatocytes produce C-reactive protein, amyloid A and fibrinogen

Periodontal Disease Model

- Infectious Burden
- Susceptible Host
- Antigens & LPS
- Acute Inflammation
- Chronic Inflammation

Innate, Environmental & Acquired Risk Factors

- Gender, Race, Congenital Disorders
- Oral Hygiene, Specific Bacteria, Medications, Stress, Nutrition
- Tobacco Use, Diabetes, HIV/AIDS
- Role of Saliva
Diabetes: A Two Way Street
- Periodontal Disease is 6th Complication of Diabetes
- Risk For All Infections Greater for Diabetics, and Increased Periodontal Disease Has Been Documented For Both Type I and Type II
- Evidence That Controlling Periodontal Disease Leads to Better Blood Glucose Control

Host Response Abnormalities in Diabetics Increase Perio Risks
- Vascular Abnormalities
- Altered Collagen Metabolism
- Altered Monocyte Response
- Changes in Crevicular Fluid

Oral Complications in Diabetics
- Increased Gingivitis and Periodontitis
- Thrush, Xerostomia, Enlarged Parotid Gland
- Caries, Tooth Loss
- Taste Dysfunction, Burning Mouth

Metabolic Syndrome
- A complex collection of components that are thought to arise from a visceral fat-type obesity involving hypertension and abnormal glucose and lipid metabolism.
- Presence of periodontal pockets were associated with a positive conversion of metabolic syndrome components

Nurses’ Actions
- Ask Last Dental Visit & Reinforce Frequent Care
- Emphasize Frequent Cleaning Appointments
- Emphasize Frequent Thorough Oral Hygiene
  - Power toothbrush with antimicrobial toothpaste
  - Dental floss and/or proximal cleaning
  - Antimicrobial rinses
- Recommend Salivary Substitutes
Respiratory Diseases

- Direct aspiration of oral bacteria and respiratory pathogens from plaque biofilm increases risks for pneumonia & other nosocomial lung infections
- Cytokines alter bronchial cell wall and increase risk of infection
- Association with chronic obstructive pulmonary disease

Critical to Remove Oral Bacteria

- Plaque bacteria biofilm
- Host immune response mediation
- Acute inflammation
- Chronic inflammation

Nurses’ Actions

- Insist on daily oral hygiene for all patients
- Use antimicrobial toothpaste (Colgate Total or Crest ProHealth) to increase effectiveness
- Use a power toothbrush for conscious patients, emphasizing independence when possible
- Use a soft toothbrush or oral swabs with 2% chlorhexidine gel to reduce bacterial load for tube fed or unconscious patients

Cardiovascular Diseases

- Direct pathway: bacteria, byproducts and inflammatory mediators reach sites
- Periodontal bacteria found in atheromas
- Inflammatory changes in vessel walls increase atheroma and may cause thrombosis to disrupt
- Thickness of carotid artery wall correlates with presence of 5 periodontal pathogens
- Association with ischemic stroke & heart attack
**Cardiovascular Diseases**
- Indirect Pathway: Elevated C-Reactive Proteins (CRP) are Associated with Cardiac Pathology
- Elevated (CRP) Levels in Periodontal Disease
- Following treatment, CRP levels increase temporarily for three months, then decrease
- Shared Risk Factors: Smoking, Diabetes, Elevated CRP Levels

**Nurses’ Actions**
- Ask Last Dental Visit & Reinforce Frequent Care
- Emphasize Frequent Cleaning Appointments
- Emphasize Frequent Thorough Oral Hygiene
  - Power toothbrush with antimicrobial toothpaste
  - Dental floss and/or proximal cleaning
  - Antimicrobial rinses
- Recommend Salivary Substitutes since most cardiac medications cause dry mouth

**Tobacco Use as Shared Risk Factors**
- More than 50% of adult periodontal cases are attributable to cigarette smoking
- In current smokers 75% of cases may be caused by smoking

**Adverse Pregnancy Outcomes**
- Normal Prostaglandins (PGE) Stimulate Uterine Contractions; Increased PGE and Other Pro-Inflammatory Markers (CRP) in Periodontal Disease May Promote Early Labor
- Bacteremia from Periodontal Infection May Stimulate Labor
- Conflicting Results from Multiple Studies Regarding Both Association & Intervention

**Nurses’ Actions**
- Ask Last Dental Visit & Reinforce Frequent Care
- Emphasize Frequent Cleaning Appointments
- Emphasize Frequent Thorough Oral Hygiene
- Recommend Dental Care, especially in second trimester
**Periodontal-Systemic Relationship**

**Rheumatoid Arthritis**
- Rheumatoid arthritis and periodontal disease have similar pathobiology.
- Chronic LPS exposure secreted from periodontal pathogens could serve as a source of super-antigens inciting the inflammatory cascade seen in rheumatoid arthritis.

**Rheumatoid Arthritis**
- Immune dysregulation in rheumatoid arthritis causes increases the production of pro-inflammatory cytokines, IL-1, IL-6 and TNF-α.
- Combination of local environment and the presence of periodontal pathogens increases risk for periodontal disease.
- Current research points to potential association with periodontal disease, with more research needed.

**Chronic Kidney Disease**
- Current research regarding association with periodontal disease is inconclusive.
- Plausible link between chronic infection and inflammatory process.
- More research needed.

**Oral Health-General Health Connection**
- Adverse Pregnancy Outcomes
- Aging
- Alzheimer Disease
- Cardiovascular Diseases, Stroke
- Diabetes
- Developmental Disorders
- HIV
- Nutrition
- Obesity
- Osteoporosis
- Osteoarthritis, Rheumatoid Arthritis
- Respiratory Diseases
- Stress
- Tobacco Use

**Periodontitis is NOT a Local Infection!**

- Significant Systemic Exposure to Oral Bacteria Occurs Due to Considerable Surface Area of Periodontal Pockets.
- Increase in Pro-Inflammatory Markers, such as Cytokines, C reactive protein, modulates periodontal destruction.

**State of Science is Promising, Yet Incomplete**

- Emphasis on Integrating Dental Care with Health Care, Especially In Health Promotion Activities.