Oral Health and Disease Management

Our mission is to improve the oral health of all.

Sean G. Boynes, DMD, MS
Director of Interprofessional Practice
National Problem

- **The Health Care System**
  - Is too expensive, threatens the economy
  - Does not achieve the best health for the money
Our mission is to improve the oral health of all.
30% of Health Care Dollars are Wasted

- **2014 Dental** = $113.5B x 30% = **$36B** that could be spent on care
- **2014 Medicaid Dental** = **$10.1B**

2014 CMS 416 Results

- **12a. Total Eligibles Receiving Any Dental Services**: 45.9%
- **12b. Total Eligibles Receiving Preventive Dental Services**: 41.1%
- **12c. Total Eligibles Receiving Dental Treatment Services**: 21.2%
- **12d. Total Eligibles Receiving a Sealant on a Permanent Molar Tooth 6-9**: 15.6%
Life Expectancy by Health Expenditures per Capita, 1970-2008

The data points are years. Health expenditures are total (public and private), in inflation-adjusted PPP-converted US dollars, at t-5. The other countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United States. Data source: OECD

The Triple Aim

- Population Health
- Experience of Care
- Per Capita Cost
TEETH AND GUMS

“90% of systemic diseases have oral manifestations.”

The Academy of General Dentistry, 2002

1 in 5 cases of total tooth loss is linked to diabetes.

40% of those who had chemotherapy have oral symptoms, such as sore gums, cavities, mouth infections and dry mouth.
What Causes Tooth Decay?

Bacteria
Sugar
Tooth
Time

The Stephan Curve

ACID!

Bad Diet Leads to Chronic Disease

Eat Sugar
Produces Acid
Kills Good, Grows Bad

Eat Sugar
Produces A Lot More Acid
Kills Even More Good, Grows Even More Bad
Dental plaque is a microbial biofilm that is resistant to the host's immune system and to the effects of antimicrobial drugs.

The biofilm contributes to both local inflammation and systemic inflammation affecting distant sites.
Opportunities for Disease Management
Proposed Mechanisms of Oral Health’s Systemic Impact

- **Inflammation**
  - Chronic oral infection contributes to systemic inflammation and increases in the plasma concentration of acute-phase proteins, inflammatory cytokines and coagulation factors which increase the potential for cardiovascular disease (persists long after tooth extraction)

- **Infection**
  - Bacterial end products enter the blood stream and result in transient bacteremia

- **Diet and Nutrition**
  - Based on the dysfunctional masticatory system and on the ability to obtain proper nutrition from the diet
Frequency for Periodontal Maintenance

• Many patients presenting with recurrent gingivitis without additional attachment loss after definitive periodontal therapy may be adequately maintained with PM performed semiannually. However, for most patients with a history of periodontitis, numerous clinical studies suggest that PM should be performed at intervals of less than 6 months.

• In general, data suggest that most patients with a previous history of periodontitis should obtain PM at least four times per year, since that interval will result in a decreased likelihood of progressive disease, compared to patients receiving PM on a less frequent basis.

Perio Patients Use of Perio Maintenance

4 out of 5 Perio Patients were NOT Getting the Recommended Care!!
Fluoride Effect

Polarized-light micrograph (in water) of an early enamel subsurface lesion. Blue area is normal enamel and surface zone over lesion. Brown area is the early lesion.
(Image provided by: Dr. James Wefel)
The 8-Step Oral Cancer Screening
Oral Cancer:

Cancerous oral lesions
Mucosa/Intraoral Tissue

- Human Papilloma Virus
Oral Cancer and HPV Infection

- Worldwide, more than half of the 650,000 patients with head and neck cancer each year will die within 12 months
- Recent emphasis placed on the potential links between oral sex, HPV infection, and oral cancer development.
- Established link with HPV and oral cancer
  - Particularly the strains HPV 16 and HPV 18
  - HPV Vaccine at 11-12 years of age

Herrero et al. (2003); Anhang et al. (2004); D’Souza et al. (2007)
Salivary Diagnostic Reports

- OralDNA
  - HPV Risk Analysis

**Result:** POSITIVE - HIGH RISK HPV IDENTIFIED

<table>
<thead>
<tr>
<th>HPV Type(s) Identified</th>
<th>Patient Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mixed Types</td>
<td>High</td>
</tr>
</tbody>
</table>

**Clinical Significance**

- **16:** This HPV Type is classified as being of high risk for the development of cancer.
- **18:** This HPV Type is classified as being of high risk for the development of cancer.
What Impact can we have?
diabetes
• **Engebretson et al. (2013)**
  - At 6 months, mean HbA$_{1c}$ levels in the periodontal therapy group increased 0.17% (SD, 1.0), compared with 0.11% (SD, 1.0) in the control group
  - Conclusion: Nonsurgical periodontal therapy did not improve glycemic control in patients with type 2 diabetes and moderate to advanced chronic periodontitis. These findings do not support the use of nonsurgical periodontal treatment in patients with diabetes for the purpose of lowering levels of HbA$_{1c}$. 
Meta-analysis

- Meta-analyses confirm that reductions in hemoglobin (HbA1c) can follow effective periodontal therapy.
  - Janket et al.: The weighted average decrease in actual HbA1c level was 0.38% for all studies, 0.66% when restricted to type 2 diabetic patients, and 0.71% if antibiotics were given to them.
  - Cochrane Collaboration published a review of studies that investigated the relationship between periodontal disease and the glycemic control: They reported a reduction in HbA1c of 0.40% 3–4 months after conventional periodontal therapy.
Importance of Reductions

• Stratton et al. in 2000 reported that each 1% reduction in HbA1c is associated with 21% reduced risk of any endpoint related to diabetes, 21% for deaths related to diabetes, 14% for myocardial infarction and 37% for microvascular complications.
Dental-Medical Screening

• Analysis of the NHANES revealed that an algorithm using simple periodontal measures, available only in dental settings, and risk factors known by patients may offer an unrealized opportunity to identify undiagnosed individuals.

• Finding supported by two other retrospective studies.

Borrell et al (2007); Li et al (2011); Stauss et al. (2010).
• At least one of the following self-reported risk factors
  • Family history of diabetes
  • Hypertension
  • High cholesterol
  • Overweight/Obesity

• Continue to receive a periodontal examination
  • Simple algorithm composed of two dental parameters
    • Number of missing teeth
    • Percentage of deep periodontal pockets
  • Optimal cut-offs of ≥26% deep pockets and ≥4 missing teeth

• A point of care HbA1C test
  • Fasting – at second appointment
  • The addition of a fingerstick HbA1C with 2 dental parameters are of significant merit (73% to 92% increase in sensitivity)

Lalla E, et al. (2011)
Diabetes Disease Management

"Smile healthy to your diabetes": health coaching-based intervention for oral health and diabetes management.

Cinar AB1, Oktay I, Schou L.

Abstract

OBJECTIVES: This study is the first to our knowledge that aims to evaluate the impact of Health Coaching (HC) compared to Health Education (HE) on oral health and diabetes management among patients with diabetes type II (DM2).

MATERIAL AND METHODS: The study is part of a prospective intervention among randomly selected DM2 patients (n = 186), Istanbul, Turkey. The data analyzed were Community Periodontal Need Index (CPI) and Hba1c (glycated hemoglobin percentage). Data was collected initially and at the end of the intervention. The participants, both attending oral examinations and filing out questionnaires (n = 179), were allocated to HC (n = 77) and HE (n = 102) groups by means of a block table of random numbers.

RESULTS: At baseline, there was no statistical difference between HC and HE groups in terms of CPI and Hba1c (p > 0.05). At postintervention, the HC group had significantly lower CPI and Hba1C than the HE group (p < 0.01). There was a significant reduction at Hba1c (0.8 %) and CPI (74 %) in HC group (p < 0.05). The impact of HE on CPI was less significant (21 % reduction) (p = 0.001), however, it was not significant on Hba1c (p = 0.68). The improvement at CPI from baseline to postintervention had significant impact on reduced Hba1c in the HC group (p < 0.05).

CONCLUSIONS AND CLINICAL RELEVANCE: The present findings imply that HC has a significantly higher impact on better management of diabetes and oral health when compared to formal HE. This calls for the use of HC by dentists, physicians, and diabetes educators in order to improve quality of life of DM2 patients by facilitating better oral health and diabetes self-management.
Blood Pressure Evaluation: Detection

- Dental care is usually the only public health profession/organization to which healthy people consistently come for regular check ups.
- Thus, the dental service might be one of the most suitable health care entities for systematic opportunistic screening of healthy subjects.
- Engstrom et al. found that dental based blood pressure screening was efficient, effective for detecting previously unknown hypertension, and that one out of every 18 subjects screened had confirmed hypertension.

Engstrom et al. (2011); Glick & Greenberg (2005)
## Referral Guidelines for Dentists

<table>
<thead>
<tr>
<th>Diastolic Pressure</th>
<th>Systolic Pressure</th>
<th>100 - 130</th>
<th>131 - 189</th>
<th>≥ 190</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 90</td>
<td>No Action</td>
<td></td>
<td>Advise Patient of Need for Correction (Refer for Primary Care evaluation)</td>
<td>Immediate Action</td>
</tr>
<tr>
<td>91 – 109</td>
<td>Advise Patient of Need for Correction (Refer for Primary Care evaluation)</td>
<td>Advise Patient of Need for Correction(Refer for Primary Care evaluation)</td>
<td>Immediate Action</td>
<td></td>
</tr>
<tr>
<td>≥110</td>
<td>Immediate Action</td>
<td>Immediate Action</td>
<td>Immediate Action</td>
<td>Immediate Action</td>
</tr>
</tbody>
</table>
Impact of Periodontal Therapy on General Health
Evidence from Insurance Data for Five Systemic Conditions

Margorie K. Jeffcoat, DDS, Robert L. Jeffcoat, PhD, Patricia A. Gladowski, RN, MSN, James B. Bramson, DDS, Jerome J. Blum, DDS

Background: Treatment of periodontal (gum) disease may lessen the adverse consequences of some chronic systemic conditions.

Purpose: To estimate the effects of periodontal therapy on medical costs and hospitalizations among individuals with diagnosed type 2 diabetes (T2D); coronary artery disease (CAD); cerebrovascular disease (CVD); rheumatoid arthritis (RA); and pregnancy in a retrospective observational cohort study.

Methods: Insurance claims data from 318,691 individuals with both medical and dental insurance coverage were analyzed in 2011–2013. Inclusion criteria were (1) a diagnosis of at least one of the five specified systemic conditions and (2) evidence of periodontal disease. Subjects were categorized according to whether they had completed treatment for periodontal disease in the baseline year, 2005. Outcomes were (1) total allowed medical costs and (2) number of hospitalizations per subscriber per year, in 2005–2009. Except in the case of pregnancy, outcomes were aggregated without regard to reported cause. Individuals who were treated and untreated for periodontal disease were compared independently for the two outcomes and five systemic conditions using ANCOVA; age, gender, and T2D status were covariates.

Results: Statistically significant reductions in both outcomes (p<0.05) were found for T2D, CVD, CAD, and pregnancy, for which costs were lower by 40.2%, 40.9%, 10.7%, and 73.7%, respectively; results for hospital admissions were comparable. No treatment effect was observed in the RA cohorts.

Conclusions: These cost-based results provide new, independent, and potentially valuable evidence that simple, noninvasive periodontal therapy may improve health outcomes in pregnancy and other systemic conditions.


Introduction

There is a growing body of evidence that periodontal (gum) disease is associated with negative systemic health consequences for individuals with certain diseases and conditions. To the extent that this is true, it is reasonable to expect that successful treatment of periodontal disease might prevent or mitigate at least some adverse effects associated with medical conditions such as type 2 diabetes (T2D); rheumatoid arthritis (RA); cerebrovascular disease (CVD); and adverse pregnancy outcomes.

Direct confirmation of such links generally poses formidable difficulties arising from the long time course of chronic disease, the complex and multifactorial nature of the medical outcomes, and the ethical issues surrounding controlled clinical trials. Nevertheless, the potential preventive value of such a simple and low-risk intervention as dental hygiene in the management of patients with serious medical conditions justifies efforts to determine whether, and to what degree, a causal link exists.

Periodontal disease is a chronic inflammatory disease in which a pathogenic bacterial biofilm develops on the tooth root surface in a susceptible patient. If untreated, it can lead to alveolar bone resorption, infection, and tooth loss. It has been suggested that periodontal disease may also have an impact on systemic health via dissemination...
Nasseh et al. 2016

- **Relationship between periodontal intervention and cost**
  - Medical, dental, and pharmacy commercial claims from Truven MarketScan Research Database

- **Among those newly diagnosed with type 2 diabetes periodontal intervention:**
  - Lower total health care costs (-$1799)
  - Lower total medical costs excluding pharmacy (-$1577)
  - Lower total type 2 diabetes healthcare costs (-$408)

- **Variable with initiation of diabetes prescription drug therapy after diagnosis**
  - Some limitations with the study

Nasseh et al. Health Econ 2016 DOI: 10.1002/hec
DentaQuest Institute ECC Learning Collaborative

- Caries risk assessment
- Caries lesion charting by tooth surface and activity
- Remineralization modalities
- Self-management goals
- Recare intervals based on caries risk
- Effective communication
- Treatment based on patient's clinical needs and caregiver's or patient's desires
### Financial Analysis from Boston Children’s Hospital

<table>
<thead>
<tr>
<th>Length of Evaluation</th>
<th>Baseline Costs</th>
<th>ECC Costs</th>
<th>Net Savings</th>
<th>Additional ECC Costs</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 months</td>
<td>$699</td>
<td>$669</td>
<td>$30</td>
<td>$30.90</td>
<td>$0.99</td>
</tr>
<tr>
<td>6 months</td>
<td>$1,092</td>
<td>$880</td>
<td>$212</td>
<td>$47.30</td>
<td>$4.48</td>
</tr>
<tr>
<td>9 months</td>
<td>$1,660</td>
<td>$1,097</td>
<td>$563</td>
<td>$60.90</td>
<td>$9.23</td>
</tr>
<tr>
<td><strong>12 months</strong></td>
<td><strong>$2,025</strong></td>
<td><strong>$1,262</strong></td>
<td><strong>$763</strong></td>
<td><strong>$70.40</strong></td>
<td><strong>$10.83</strong></td>
</tr>
<tr>
<td>24 months</td>
<td>$2,678</td>
<td>$1,834</td>
<td>$844</td>
<td>$114.30</td>
<td>$7.38</td>
</tr>
</tbody>
</table>

**$810,000 vs. $505,200**

400 Patients X $762 = **$304,800** reduction in cost

Reduced per capita costs by **37%**

$70.40 X 400 = **$28,140**
How Can It Be Accomplished?
Integrating Oral Health into Primary Care

“It focuses on frontline primary care health professionals, specifically nurse practitioners, nurse midwives, physicians and physician assistants. These primary care practitioners are members of the existing delivery system who could incorporate oral health core clinical competencies into their existing scope of practice.”

“HRSA synthesized the following recommendations:

1. Apply oral health core clinical competencies within primary care practices to increase oral health care access for safety net populations in the United States.
2. Develop infrastructure that is interoperable, accessible across clinical settings, and enhances adoption of the oral health core clinical competencies. The defined, essential elements of the oral health core clinical competencies should be used to inform decision-making and measure health outcomes.
3. Modify payment policies to efficiently address costs of implementing oral health competencies and provide incentives to health care systems and practitioners.
4. Execute programs to develop and evaluate implementation strategies of the oral health core clinical competencies into primary care practice.”
DentaQuest Institute Online Learning Center

- Prevention and disease management courseware, best practices, and guidelines for the busy dental office

- The DentaQuest Institute Online Learning Center provides a convenient way to engage clinical staff as leaders in prevention-focused care.

www.dentaquestinstitute.org/learn
More Training and Education

www.smilesforlifeoralhealth.org
What leads to good referral management for oral health in primary care?

• Standard procedures, documentation and processes of preventive care
  • OH risk assessment
  • Oral exam
  • Fluoride varnish application

• Tracking referral status
• Follow-up with specialist treatment/care report
• Patient support
• Good dental referral candidates
Oral Health Integration Models

• Full integration involves the dentist being a full member of an interprofessional group practice at a single location and working collaboratively with the health care team to provide comprehensive care.

• Co-location involves both medical and dental providers under the same roof but operating separately with no coordinated health team. *Incorporates the “warm handoff”*

• Shared financing is a payer model in which medical and dental providers share the financial risk and opportunity for a group of patients. *CCO/ACO model type.*

• Virtual integration involves a common electronic health record system that is visible to both medical and dental providers although they may not be co-located.

• Facilitated referral is considered the least integrated model in which referrals are formalized between providers to enhance tracking and follow-up.
<table>
<thead>
<tr>
<th>Medical Team Tasks</th>
<th>Co-operative Tasks</th>
<th>Dental Team Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PLANNING PHASE:</strong></td>
<td>• Initial providers and staff training</td>
<td>• Complete a readiness assessment</td>
</tr>
<tr>
<td>• Complete a readiness assessment</td>
<td>• Create and finalize business and</td>
<td>• Alteration to practice/site policies and</td>
</tr>
<tr>
<td>• Alteration to practice/site policies and</td>
<td>memorandum agreements that include</td>
<td>procedures to address changes in care</td>
</tr>
<tr>
<td>procedures to address changes in care</td>
<td>documentation of capacity limitations,</td>
<td>• Identify and implement necessary</td>
</tr>
<tr>
<td>• Develop and implement necessary</td>
<td>HIPPA, target population agreement, etc.)</td>
<td>documentation, electronic management</td>
</tr>
<tr>
<td>documentation, electronic management,</td>
<td>• Formalization of leadership or point of</td>
<td>systems, and ancillary changes to</td>
</tr>
<tr>
<td>systems, and ancillary changes to</td>
<td>contact teams.</td>
<td>operation.</td>
</tr>
<tr>
<td>operation.</td>
<td>• Implement a bi-directional cross referral</td>
<td>• Query patients for medical home and</td>
</tr>
<tr>
<td><strong>BASIC LEVEL:</strong></td>
<td>process</td>
<td>last medical visit</td>
</tr>
<tr>
<td>• Oral health screenings completed on</td>
<td>• Use of cross promotional propaganda</td>
<td>• Record body mass index, blood</td>
</tr>
<tr>
<td>target populations</td>
<td>• Appropriate post-care communication</td>
<td>pressure, heart rate, respiratory rate on</td>
</tr>
<tr>
<td>• Query patients for dental home and</td>
<td>• Develop and use an immunization status</td>
<td>all patients with readiness referral for</td>
</tr>
<tr>
<td>last dental visit</td>
<td>registry</td>
<td>intervention</td>
</tr>
<tr>
<td><strong>MODERATE LEVEL:</strong></td>
<td>• Priority populations are receiving care and</td>
<td>• Basic understanding of primary care</td>
</tr>
<tr>
<td>• Oral health primary and secondary</td>
<td>a strategic plan is completed to determine</td>
<td>disease management and applied</td>
</tr>
<tr>
<td>prevention procedures administered to</td>
<td>process for increasing the number of target</td>
<td>intervention methodology</td>
</tr>
<tr>
<td>target populations</td>
<td>populations</td>
<td>[understanding treatment goals]</td>
</tr>
<tr>
<td>• Basic understanding of oral health</td>
<td>• Establish and engage partnerships or</td>
<td>Nearing or achieving appropriate</td>
</tr>
<tr>
<td>disease processes and how they can</td>
<td>affiliations with community entities assist with</td>
<td>phase of meaningful use</td>
</tr>
<tr>
<td>impact well-being</td>
<td>community outreach</td>
<td>• Utilize auxiliary personnel to the</td>
</tr>
<tr>
<td>• Nearing or achieving appropriate phase</td>
<td>• Begin using a depression screening tool when</td>
<td>highest level of their license and scope</td>
</tr>
<tr>
<td>of meaningful use</td>
<td>applicable within the target populations</td>
<td>of practice.</td>
</tr>
</tbody>
</table>
Medical Team Tasks

HIGH LEVEL:
- Implementation and documentation of oral health quality assurance/quality improvement plans and outcomes
- Achieve real-time analysis and access for the sharing of oral health benchmarks

CREATIVE LEVEL:
- A wide-open level that should encourage innovation, allows creativity, and facilitates professional and patient development
- Population-based health planning designed to achieve a geographic distribution of oral health infrastructure
- The use of phase contrast microscopy to identification of poor health as well as the use of salivary diagnostics to assist with periodontal health, general diagnoses, and patient outcome improvement
- Conducting research/analysis/PDSA to design appropriate risk factor measures, encourage changes in insurance coverages as well as marketplace design and improving the standard of care.
- True quality assessment that leads to practice translation and meets identification parameters of the Institute for Healthcare Improvement’s Triple Aim Approach to Healthcare

Co-operative Tasks

- Achieve a high percentage of patients having seen both medical and dental teams each year
- Integration of a behaviorist to assist with high-risk, low-compliance patients in need of behavioral chronic disease management
- High-level medical and dental screenings are completed that result in accuracy with finding undiagnosed disease.
- Regular meeting should take place involving all partners/affiliates/network partners in which updates on care administration and review of performance/quality measurements. Meeting minutes should be completed and disseminated appropriately.

Dental Team Tasks

- Implementation and documentation of primary care specific quality assurance/quality improvement plans and outcomes
- Achieve real-time analysis and access for the sharing of systemic disease treatment benchmarks
- Use of the international statistical classification of diseases and related health problems coding system
Questions?