Evaluation of the Integrated Dental Medicine Care Model

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Integrated Dental Medicine

• Is based in the fact that oral health is a vital aspect to overall systemic well being
• A partnership between all health care providers that identifies and creates a care structure with the areas of overlap that can improve the patient experience
• Sets goals to improve both oral and systemic outcomes
• Build off of ICD 9 Coding
Systemic Treatment with Dental Medicine

- Expectant Mother and Primary Pediatric Care
- Diabetes

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- Cardiovascular Disease
- Stroke Intervention
- HIV/AIDS
- Behavior Health
- GI - GERD

Levels of Integration
- Low (basic/simple)
- Moderate
- High
- Creative
Expectant Mother & Primary Pediatric Care
Fluoride application at Child Well Visits

- Children with 4 or more treatments had 15.5 dmfs (95%CI 10.8–20.4) versus children with no fluoride varnish treatments who had 23.6 dmfs (95%CI 19.5–25.8) for a 35% decrease in overall caries.
- Fluoride varnish applied at well child care visits can reduce early childhood caries in American Indian children.

Operational Strategies

• Educational Program
  ▫ Expectant mother oral health
  ▫ WIC programs/OBGYN/Women’s Health Clinics
  ▫ Development of an oral health education program for expectant mothers

• Epidemiology Goals
  • Pre- and Post- dental knowledge scores (improvement of 30-50%)
  • Increase in dental utilization by 30%
  • Maintain enrollment in program 20 months
  • Treatment plans completed
    • Type of care needed
    • Complications
    • Variable with care administration
  • Concludes / hopeful outcome is to see child at 1 year dental visit with Fluoride application
  • Child Well Visit – is the parent talking with the pediatrician about fluoride application? / is the process occurring?
Poor Glycemic Control

- Expanding body of literature implicating severe periodontitis as a risk for poor glycemic control
- Periodontal treatment in individuals with diabetes can improve glycemic control
  - Leading to a reduction of the effects of diabetes

Poor Glycemic Control
Remove all the teeth?!?!?!

- [Edentulous] Periodontal disease and subsequent tooth loss significantly impact overall health by compromising a patient’s ability to maintain a healthy diet and proper glycemic control.
  - Edentulous participants consumed fewer vegetables, less fiber and carotene, and more cholesterol, saturated fat and calories than participants with 25 or more teeth.

Poor Glycemic Control

• Landmark Study – Pima Indian Tribe (Az)
  ▫ Effective treatment of periodontal infection and reduction of periodontal inflammation is associated with a reduction in level of glycated hemoglobin.
  ▫ In addition, at 3 months, significant reductions \( (P \leq 0.04) \) in mean HbA\(_{1c}\) reaching nearly 10% from the pretreatment value.
  ▫ Control of periodontal infections should thus be an important part of the overall management of diabetes mellitus patients.
Poor Glycemic Control

• Stewart et al. – statistical review of study suggests that periodontal therapy was associated with improved glycemic control in persons with type 2 DM.
  ▫ During the nine-month observation period, there was a 6.7% improvement in glycemic control in the control group when compared to a 17.1% improvement in the treatment group, a statistically significant difference.

CSC Oral Health Diabetes Clinic

Year Two

A1C

Number of Medications

Year Two
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$_{1c}$.

Engebretson et al. The effect of nonsurgical periodontal therapy on HA1C levels in persons with type 2 Diabetes and chronic periodontitis. JAMA 2013; 310:2523-2532.
Meta analysis

- Meta-analyses confirm that reductions in glycated 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.

Summary?

- Different messages; communication to patients differs
  - Reduction in A1C does occur according to meta-analysis
  - Periodontal therapy alone will not significantly reduce glycemic levels in patient
  - Fight against edentulous outcomes (Symptomatic vs. Asymptomatic)
  - Pre screen successes reported
  - More than a year / three month intervals
Integration with Diabetes

- Bissett et al.
  - A substantial body of evidence exists that links diabetes and periodontitis; it appears to have had a limited impact on the work of health professionals
  - The divisions that exist between the medical and dental professions negatively impact patient care
  - A potential need is discovered for professional collaboration to develop an oral health educational initiative that provide clear and effective advice to people with diabetes

Diabetes and Severe Tooth Pain
New hypothesis being examined

• Chronic severe oral pain may effect A1Cs / Daily BG
  ▫ Lack of appropriate diet with same medicinal management
• Possible increase risk with cardiovascular issues
  ▫ Patients with A1Cs lower than 6% have increased cardiovascular issues/events
• Dietary changes may occur: a diet in higher saturated fat and “bad calories” (convenience food)

Dental Role
Periodontal disease as a predictor

- Conflicting data; HOWEVER,
- Studies have demonstrated that it is an early complication of diabetes
- Pre-existing periodontitis predicts poor cardiovascular and renal outcomes

1. At least one of the following self-reported risk factors
   - Family history of diabetes
   - Hypertension
   - High cholesterol
   - Overweight/Obesity

2. 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

3. 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)

Integrated Model (Cost Reduction)

• Cost Effective
  ▫ Jeffcoat et al. found that $10,672 was spent for medical care for patients with diabetes who did not have periodontal treatment.
  ▫ Revealed an average reduction of approx. $2,500 (23%) in cost per year of those with periodontal treatment
    • Dental care estimated cost of standard fees (CSC)
      • $463.00
Integrated Dental Medicine

Medical Role
- Oral examination
- Oral health education
- Appropriate referral for care
Caries/Cavities
Caries/Cavities
Cardiovascular Disease
Lockhart et al.
American Heart Association, April 18, 2012.

- Available data indicate a general trend toward a periodontal treatment–induced suppression of systemic inflammation and improvement of noninvasive markers of ASVD and endothelial function.

- HOWEVER, The effects of PD therapy on specific inflammatory markers are not consistent across studies, and their sustainability over time has not been established convincingly.
Lockhart et al. (AHA)

- HOWEVER, This review highlights significant gaps in our scientific understanding of the interaction of oral health and ASVD.
- HOWEVER, Identification of clinically relevant aspects of their association or therapeutic strategies that might improve the recognition or therapy of ASVD in patients with PD would require further study in well-designed controlled interventional studies.
Cardiovascular Disease

- Where are we looking now?
  - Association between number of missing teeth and cardiovascular disease
- “The knowledge gaps included limited understanding of the relationship of the number of missing teeth and cardiovascular disease.”

Association with cardiovascular disease and missing teeth

- Biological mechanisms proposed for an association of the number of missing teeth and cardiovascular disease include:
  - (1) 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)
  - (2) infection,
    - Bacterial end products enter the blood stream and result in transient bacteremias
  - (3) diet and nutrition
    - Based on the dysfunctional masticatory system and on the ability to obtain proper nutrition from the diet
Connection of CVD and Missing Teeth

- Limited large quantity studies, so
- New study: 275,424 subjects
- Older adults with 1 to 5 missing teeth and greater than 6 missing teeth, but not all teeth missing, were more likely to report presence of cardiovascular disease as compared with older adults who had no missing teeth.
- Observed that adults who visited the dentist were less likely to report cardiovascular disease compared to those who did not visit dentists in the past year.
Oral Health and Stroke
Periodontal Disease and Stroke

• In a combined analysis of two prospective studies, periodontal disease was found to increase the risk of incident stroke nearly three fold.

• Proposed mechanisms include inflammation mediated pro-coagulant state, atherosclerosis mediated by direct microbial invasion of blood vessel wall, and interaction with recognized vascular risk factors.

Behavioral Health
• Late-life depression initially occurs after age 65 and is a major public health concern because elderly people who are at high risk constitute an ever-expanding segment of the population.
  ▫ Individuals under treatment for LLD and those whose illness has not been diagnosed or treated often present to the dentist with significant oral disease.

Dementia and Oral Health

• The Leisure World Cohort Study
  ▫ Men with inadequate natural masticatory function had a 91% greater risk of dementia than those with adequate natural masticatory function (≥10 upper teeth and ≥6 lower teeth).
  ▫ This risk was also greater in women but not significantly so.
  ▫ Dentate individuals who reported not brushing their teeth daily had a 22% to 65% greater risk of dementia than those who brushed three times daily.

Medical Referral to Dental
Evaluating the Medical Referral Process

- Quality Study to evaluate pilot program of medical referrals into dental program
- Questionnaire to patients consisting of a series of care related questions
Patient Questionnaire (Likert)

- 8 questions used the Likert scale to determine agreement with statement
  - 1- Strongly agree
  - 2- Agree
  - 3- Neither agree or disagree
  - 4- Disagree
  - 5- Strongly disagree
Patient Questionnaire (Likert)

- I found it unusual that my doctor/physician referred me directly to a dentist for care.
  - 1.16 ±1.69 (Strongly Agree)
- My teeth have a very important impact on my overall health.
  - 1.82 ±1.02 (Agree)
- It is absolutely necessary for the dentist to have knowledge of my own personal medical history or doctor treatment.
  - 1.74 ±0.99 (Agree)
Patient Questionnaire (Likert)

- Because the dentist only treats the teeth, it really is not necessary for him/her to know all of the medicine I take.
  - 3.02 ±1.62 (Neither)

- The dentist does not really need to know my entire medical history because I am being seen for an emergency/urgent care appointment.
  - 3.50 ±1.13 (Neither -to- Disagree)

- I feel it is very important for my doctor to talk with my dentist to help coordinate my complete health care.
  - 1.56 ±0.77 (Agree -to- Strongly Agree)
Patient Questionnaire (Likert)

- I prefer and enjoyed this process of my dentist and doctor/physician talking to each other during my appointments with them both.
  - 1.70 ±0.76 (Agree)

- I do not feel comfortable talking with the dentist about my medical history.
  - 4.02 ±0.98 (Disagree)
Questions!!!!