CE Course Handout

It's (Medically) Complicated

Thursday, June 9, 2016
9:30 a.m.-12:30 p.m.
Welcome!
It's (Medically) Complicated!

Thursday, June 9, 2016
ADHA CLL Annual Session, Pittsburgh, PA

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Program Objectives
Pharmacology

• Review the prominent disease states found in the medically-complex patient
• Distinguish between the states of xerostomia and hyposalivation
• Recognize the protective functions of saliva and its role in prevention
• Explain and compare disease-induced and medication-induced xerostomia

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Program Objectives
Hygiene Plan

• Discuss the changing paradigm in caries prevention utilizing risk assessments and consideration with complex polypharmacy patients
• Select effective fluoride therapy using calcium & phosphate in professional and take-home care.
• Integrate critical thinking skills and implement effective patient care strategies considering the most common chronic diseases.

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Case Study

• 57 year-old male
• Last recare visit May 2012
• Generalized advanced chronic periodontal disease
• Significant medical history:
  • BP is 140/88
  • Monitors glucose level
• Patient is diabetic and was a former smoker
• Statins to control cholesterol
• LDL (148); HDL (56)
• Rx dietary changes
  • Reduced high fructose and carbohydrates
• Began walking 3-4 times week for 1-2 miles each day

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Dental History

Radiographic survey

Dental – Periodontal Exam

- Present and missing teeth
- Pathology: caries, lesions, restored teeth, tori, root exposure etc...
- Periodontal exam:
  - Probing 6 sites, mobility, recession, furcation involvement, occlusal assessment...
  - Gingival description
  - Active bleeding, exudate
  - Sensitivity, pain
  - Salivary flow

Patient Education Plan

Discuss and document...

- Nutrition assessment
- Lifestyle patterns
- Patient’s at-home oral care

Clinical Phenotype:

1. Medical & dental information
2. Oral examination & radiographs
   
   What is missing here in your diagnosis and treatment plan?

Pathogenic burden?

Salivary Diagnostic Tests:

- PerioPath® test
- MyPerioProgress® report

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Diagnostics drives treatment

- Scaling & root planing therapy
- Antimicrobial mouthrinses
- Host modifying medicaments:
  - Low dose doxycycline hyclate (Periostat™)
  - Site specific antibiotic (Arestin™, Atridox™)

CAMBRA: Contributory Risk Factors

CAMBRA: General Health Factors

CAMBRA: Clinical Risk Factors:

CAMBRA: updated risks

- Removable partial dentures
- History of extensive prosthodontic or restorative therapy
- Over 60 years of age
- Smoking
- Infectious contact

Dental Hygiene Treatment Plan:

- Recent hospitalization and reason?
- General observation of patient’s appearance, gait and cognitive capabilities
- Take vital signs and record/w date
- List names of drugs/herbal supplements
  - Record the daily dosage and frequency (compliance?)
- Research the drug list:
  - side effects
  - interactions that may alter treatment outcomes


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Drug interaction & oral conditions

Apps available for mobile devices

Dental-Specific Pharmacology, Interactions, and Clinical References

www.AADMD.org/resources/additionalresources

Today’s Review of Disease States

• Cardiovascular disease
• Diabetes
• Respiratory (COPD)
• GERD
• Alzheimer’s
• Parkinson’s
• Chemotherapy & Head and Neck Radiation Patients

Economic Burden

• The mean annual spending on adult dental care peaks between the ages of 55 to 64
del Aguila et al, 2002
dental caries account for about half of this spending

• Americans spent an estimated $108 billion on dental services in 2010
• Projected increase to $180 billion by 2020.
Truffer et al 2010
The function of the cardiovascular system is to supply oxygen via the blood to all areas of the body. This is accomplished through the contraction of the heart and actions of the blood vessels.

Cardiovascular disease refers to disease of the heart and blood vessels that result in this failure. 
- Hypertension
- Coronary Artery Disease
- Cardiac Arrhythmia
- Congestive Heart Failure

Hypertension
- Goal of Treatment: Reduce plasma volume, Dilate blood vessels, Reduce cardiac output (via SANS)
- Drugs Employed: Diuretics, ACEI's, ARB's, CCB's, Alpha-1 Blockers, Beta-1 Blockers, clonidine

Coronary Artery Disease
- Goal of Treatment: Increase coronary artery flow, Reduce oxygen demand, Inhibit progression of disease, Prevent thromboembolism
- Drugs Employed: Nitrates, CCB's, Beta-1 Blockers, Antihyperlipidemic Agents, Antithromboembolic Agents

Congestive Heart Failure
- Goal of Treatment: Reduce plasma volume, Dilate blood vessels, Reduce contraction rate, Increase cardiac contractility, Prevent thromboembolism
- Drugs Employed: Diuretics, ACEI's, ARB's, CCB's, Beta-1 Blockers, Digoxin, Antithromboembolic Agents
The Epinephrine Question

- The benefit of using epinephrine to achieve profound anesthesia may outweigh the risk in patients with controlled cardiovascular disease.
- *Pain-induced stress leads to the release of endogenous epinephrine.*
- This may exacerbate cardiovascular disease.

Classification of Cholesterol levels

**Total Cholesterol**
- Under 200 Desirable
- 200-239 Borderline high
- 240 and above High

**Classification of Cholesterol levels**

**LDL Cholesterol**
- Less than 100 *Optimal*
- 100-129 Near-optimal
- 130-159 Borderline high
- 160-189 High
- 190 and above Very high

**Classification of Cholesterol levels**

**HDL Cholesterol**
- Under 40 Low
- Over 60 High
*Optimal HDL should be >50 for women*

**Triglycerides**
- Under 150 Optimal
- 150-199 Borderline high
- 200 and above High

**Dental Hygiene: Cardiovascular**

- ✔ When is best time to schedule this patient?
- ✔ What should be in your office emergency kit?
- ✔ At visit – Ask if experienced an MI in past 30 days?


**Observation during examination:**
- Face, arms or legs: numbness or weakness mainly on one side of body
- Brain: confusion, trouble speaking, dizziness, loss of balance, bad headaches
- Eyes: trouble seeing from one or both
- Stomach: throwing up or urge to
- Legs/Body: feeling tired and trouble walking

Emergency Protocol*  
Patients with risk factors for coronary heart disease and experience “chest pain”

1. Take & record vital signs (BP over 180/110 contraindicated for treatment that day)
2. Administer 0.4mg tab of nitroglycerin sublingually or 1-2 metered dose of spray (0.3 - 0.6mg)
3. Provide Oxygen – flow rate 4 liters/min. to 6 liters/min. via nasal cannula
4. If pain doesn’t subside in 3 minutes, repeat dose of nitroglycerin 5-15 minutes
5. Chest pain that persists after 3 doses is most likely an MI
6. Pain persists – administer a 325 mg uncoated aspirin and CALL 911
7. Record all events in patient’s record


Dental Hygiene: Cardiovascular

**Therapeutic Treatment:**
- Pain management pre-treatment
- Mechanical removal of biofilm, pathogens
- Altering immune response with selective antibiotics
- Treating hypersensitivity – topical fluoride varnish

**Take-home agents:**
- Antimicrobial dentifrice/rinses
- Supplemental fluoride & calcium/phosphate products
- Power toothbrush, dental floss, proximal brushes

Dental Hygiene: Cardiovascular

*“dry mouth symptoms”*

- Avoid use of petroleum jelly on lips = causes dehydration  
  *Rx: cocoa butter*
- Avoid lemon glycerin swabs or crushing pills in fruit jam to assist in swallowing = dental caries risk
- If hydrogen peroxide mouthrinse used - must be diluted to neutralize acidity

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Diabetes

• Agents used to Treat NIDDM
  – Stimulate insulin production
    • glipizide (Glucotrol, XL)
    • repaglinide (Prandin)
  – Reduce cellular insulin resistance
    • metformin (Glucophage)
    • rosiglitazone (Avandia)
    • pioglitazone (Actos)

Diabetes

A disease of insulin resistance!

Diabetes

• Agents used to Treat NIDDM
  – Inhibit breakdown of ingested carbohydrates
    • acarbose (Precose)
  – Mimic the action of incretin hormones
    – Prolongs the stimulation of insulin production
      • exenatide (Byetta)
      • liraglutide (Victoza)

Diabetes

• Agents used to Treat NIDDM
  – Inhibit the breakdown of incretin hormones
    • sitagliptin (Januvia)
    • saxagliptin (Onglyza)
    • linagliptin (Tradjenta)
    • alogliptin (Nesina)

Diabetes

• Insulin
  – Mechanism of action
    • Replacement of endogenous insulin
  – Adverse effects
    • Hypoglycemia, weight gain
  – Patient care considerations
    • Treat hypoglycemia with glucagon, glucose

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<thead>
<tr>
<th>Short Acting</th>
<th>Intermediate Acting</th>
<th>Long Acting</th>
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<tr>
<td>• Humulin R</td>
<td>• Humulin N</td>
<td>• Humulin U</td>
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<td>• Insulin aspart (Novolog)</td>
<td>• Humulin L</td>
<td>• Insulin detemir (Levemir)</td>
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<td>• Insulin lispro (Humalog)</td>
<td>• Humulin 70/30</td>
<td>• Insulin glargine</td>
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<td>• Insulin glulisine (Apidra)</td>
<td>• Humalog Mix 75/25</td>
<td>(Lantus)**</td>
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<td>**Discard 28 days after 1st use</td>
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Dental Hygiene: Diabetes

– Medical, Dental and Risk Assessments
– Determine Type of Diabetes and A1C test results
– Emergency kit: glucose gel or tablet or orange juice
– New Diabetes PPOD Tool Kit for collaborative care

“Working Together to Manage Diabetes. A Toolkit for Pharmacy, Podiatry, Optometry and Dentistry (PPOD)”

*Available through the National Diabetes Education Program

Dental Hygiene: Diabetes

– Look carefully at oral cancer screening for:
  • Dry mouth, gingival inflammation, poor healing of oral tissues, thrush *(thrives on high glucose level)* and burning of mouth or tongue

– Listen — allow patient to tell their stories since many of these diseases have “silent symptoms” when undiagnosed

– Feel – be empathetic to gain their trust and compliance

Diabetes: Dental Hygiene Care

• Confirm appointment:
  • remind to eat meal
  • check glucose level

• Scheduling in late morning after meal *(glucose high/insulin activity is lower)*

• Pain management for invasive procedures

• Dietary review:
  Balanced meals to include high nutrients and reduce intake of high sugar drinks and alcohol.

• Home care
  • Antimicrobials, stannous fluoride treatment gel
  • Maintenance – 2-3 months

Respiratory

• Asthma
  • Reversible airway obstruction, inflammation
    • Reduction in expiratory airflow
  • Precipitated by
    • allergens, pollution, exercise, stress
    • local anesthetics containing sulfites
  • Symptoms
    • shortness of breath, wheezing

• Chronic Obstructive Pulmonary Disease (COPD)
  • Irreversible airway obstruction
  • Types
    • Emphysema
      • Alveolar destruction, enlargement
      • Airway collapse
  • Chronic Bronchitis
    • Chronic inflammation of airways
    • Excessive sputum production

**Beta-2 Agonists**
- **Mechanism of action**
  - Stimulate beta-2 adrenergic receptors
  - Relax bronchial smooth muscle
- **Uses/Types**
  - Short-acting beta-2 agonists (albuterol)
    - Treatment of acute asthmatic attacks
  - Long-acting beta-2 agonists (salmeterol)
    - Treatment of chronic asthma attacks

**Adverse effects**
- May also stimulate cardiac beta-1 receptors

**Patient care considerations**
- Xerostomia
- Have short-acting beta-2 agonist inhaler available during appointment

**Cholinergic Antagonists**
- **Mechanism of action**
  - Block pulmonary cholinergic receptors
  - Relax bronchial smooth muscle
- **Uses**
  - Chronic management of COPD
- **Types**
  - tiotropium (Spiriva)

**Adverse effects**
- Nausea
- Cough

**Patient care considerations**
- May produce xerostomia, altered taste

**Inhaled Corticosteroids**
- **Mechanism of action**
  - Reduce airway inflammation
- **Uses**
  - Treatment of chronic asthma, COPD
- **Types**
  - fluticasone (Flovent)
  - budesonide (Pulmicort)

**Adverse effects**
- Less than orally administered agents
- Hoarse voice
- Cough

**Patient care considerations**
- Xerostomia
- Oral candidiasis and fungal pharyngitis
Dental Hygiene: Respiratory

• **INHALERS** accessible during care
• **CAMBRA**: focus on salivary function and adverse effects of medications
• NaF Varnish applied – post-prophy
• **Home self-care**:  
  • SnF₂ Gel (970 ppm) delivering ACP  
  • Xylitol products  
  • Saliva stimulants, hydrate  
  • Avoid alcohol-based products

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**Xylitol** (Diabetes, Respiratory)

To promote anti-cariogenic effects:  
6-10 GRAMS /day is key!  
Gum/mints 5-6 per day for 5 minutes each

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**Peptic Ulcer Disease (PUD)**

– Breakdown in the prostaglandin-based protective lining of the stomach

– Leads to:  
  • Erosion  
  • Ulceration  
  • Perforation

– Related to the presence of *Helicobacter pylori* (H. Pylori)

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**Patient management during procedures:**

• Patient should be upright during procedures
• Inhaler or oxygen should be available
• Assess and note salivary flow
• Instrumentation:  
  • Hand instrumentation  
  • Avoid sprays and aerosols  
  • Ultrasonic scaler & prophylaxis

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**Peptic Ulcer Disease (PUD)**

– **Treatment**
  • Lifestyle changes
  • Decrease acid production
  • Coat and protect stomach lining
  • Eradicate *H. Pylori*
  • Dental considerations  
  • Use COX inhibitors with caution
GERD

- Stomach contents "reflux" into esophagus
- Burning in the middle of the chest (heartburn)
- Leads to esophageal tissue damage
- Related to position of stomach and cardiac sphincter
  - Hiatal hernia

Treatment of PUD/GERD

- Histamine-2 Receptor Antagonists
  - Mechanism of action
    - Block histamine-2 receptors in stomach wall
    - Decrease gastric acid production
  - Types
    - cimetidine (Tagamet)
    - famotidine (Pepcid)
    - ranitidine (Zantac)

Treatment of PUD/GERD

- Proton-Pump Inhibitors
  - Mechanism of action
    - Inhibit "proton pump" in stomach wall
  - Types
    - esomeprazole (Nexium)
    - lansoprazole (Prevacid)
    - rabeprazole (Aciphex)
    - omeprazole (Prilosec)

- Treatment
  - Lifestyle changes
    - Change in diet
    - Elevation of head in sleeping position
  - Decrease acid production
  - Dental considerations
    - Semi-supine dental chair position
    - Use COX inhibitors with caution
GERD complicated with ACIDS

Sipping acidic drinks and eating fruit frequently

GERD complicated with ACIDS

GERD & Sjögren's syndrome

Dental Hygiene: GERD

CAMBRA: “extreme high risk for dental caries”
- Dietary, pH neutralization
- Reduce or eliminate acidic fluids/frequency
- Past history experience with fluoride?
- 4-6 months recare based on dental history

Preventive therapy:
(Office) NaF Varnish delivering CA/P ions
(Home) SnF₂ Treatment Gel w/ACP and Bicarbonates for neutralization of saliva

Brushing technique: changing toothbrushes

pH & low abrasive choices
Alzheimer’s Disease

Alzheimer’s disease is neurodegenerative disorder characterized by the loss of memory, language, visuospatial skills, problem-solving ability and abstract reasoning. It is also frequently associated with behavioral abnormalities.

The cause of Alzheimer’s disease is unknown but it appears to involve the loss of cortical and cholinergic neurons. Deposits of beta-amyloid plaques initiate inflammation, neurofibrillary tangles and oxidative damage that result in a decrease of neurotransmitters necessary for normal cognition, memory and behavior.

Patients with Alzheimer’s disease have a greater incidence of xerostomia, oral lesions, candidiasis, periodontal disease, and root caries. In addition, these patients often sustain oral injuries from falls as well as lacerations of the tongue, and cheeks (as a result of impaired mastication) and are at an increased risk for aspiration pneumonia (due to dysphagia).

Alzheimer’s Disease

- NMDA receptor antagonists
  - Mechanism of action
    - Decrease overstimulation of NMDA receptors
- Types
  - Memantine (Namenda)
- Patient care considerations
  - May result in agitation, dizziness and poor coordination

- Cholinesterase inhibitors
  - Mechanism of action
    - Increase acetylcholine activity
  - Types
    - Donepezil (Aricept)
  - Patient care considerations
    - Increased incidence of cardiac abnormalities
    - Possible hypersalivation
10 Warning signs: Alzheimer’s

1. Memory life that disrupts daily life
2. Challenges in planning or solving problems
3. Difficulty completing familiar tasks at home, at work or at leisure
4. Confusion with time & place
5. Trouble understanding visual images and spatial relationships
6. New problems with words in speaking and writing
7. Misplacing things and losing ability to retrace steps
8. Decreased or poor judgment
9. Withdrawal from work or social activities
10. Changes in mood and personality

Hygiene Care Plan

CAMBRA conducted with family member
Typically: high risk for either or both dental caries & periodontal disease
- Plaque assessment is critical to guide care
- At home therapies decided based on patient’s abilities
  - Antimicrobial rinses and treatment gel for home use to minimize oral disease progression
- Supervised dietary schedules
- Printed materials for home guidance
- Simplest interproximal aids

Parkinson’s Disease

Parkinson's disease is associated with the degeneration and loss of dopamine-producing neurons in the nigrostriatal portion of the brain, as well as the formation of destructive lesions and loss of function in the limbic, motor, and autonomic systems.
Parkinson’s Disease

Parkinson’s disease is characterized by the presence of Lewy bodies; structures that are strongly correlated with neuron degeneration and are considered a diagnostic marker for the disease.

The associated neuromuscular and cognitive deficits result in an inability to perform and maintain adequate general and oral hygiene, enhancing the progression of dental disease, impairing home care regimens and encumbering office dental treatments.

Dental Hygiene – Parkinson’s

CAMBRA: xerostomia likely related to meds
- Patient should be well-rested for appointments
- Use of a chairside assistant is recommended
- May have more difficulty with detailed plaque control aids & memory of instructions
- Discuss frequent re-care intervals to monitor prevention strategies
- Fluoride varnish for maximum protection (3-4x yearly)
- Alcohol-free antimicrobial rinses
- Stabilized SnF2 gel with technology to deliver ACP, co-polymers for moisturizing and Spilanthes for mild flavor enhancement

Dental Hygiene: Parkinson’s

3 - 4 month re-care schedules:
- Adequate time – alleviate stress
- Morning appointments if better rested & alert
- Review proper dietary suggestions that reduce plaque and soft food accumulation
- Reduce stress with multiple visits
- Interactive home care technique
Many cancer patients and their families are unaware that cancer treatments may affect the oral tissues and that visiting their dentist is an important part of the overall treatment. Cancer treatments affect dental treatment planning, prioritization, and timing.

While chemotherapy is designed to be toxic to cancer cells, unfortunately, it may also be toxic to normal, rapidly dividing cells, such as those of the gastrointestinal tract and hair follicles.

However, the mouth is also a prime target for the adverse effects of chemotherapy. This leads to an array of oral complications as a result of chemotherapy. Necessary dental treatment and proper oral hygiene prior to, during, and after cancer treatments can reduce the incidence and severity of oral complications.

Oral complications common to both chemotherapy and radiation include oral mucositis and infection. Oral complications specific to chemotherapy include neurotoxicity and bleeding. Oral complications specific to radiation therapy include salivary gland dysfunction, radiation caries, osteoradionecrosis, tissue necrosis, and trismus.
Chemotherapy/Radiation

Finally, oral complications not related to chemotherapy or radiation include osteonecrosis of the jaw (associated with the use of bisphosphonates and other medications). While not as severe, other complications, such as dysphagia, dysgeusia and head and neck pain can lead to secondary complications, such as dehydration and malnutrition.

Hygiene Care: Cancer/Radiation

CAMBRA — “extreme high risk for caries & adverse oral effects”

* Coordinate with Oncology/Radiation team

- Scheduling:
  - Prophylaxis 2-3 weeks prior to oncology therapy
  - NaF Varnish/ACP every 4-6 weeks throughout care
  - Emphasize importance in biofilm control at home
  - Rx: morning & evening application of preventive treatment SnF2 gel without water rinsing
  - Rx: products to treat mucositis or ulcerations if needed

Radiation Patients

Case study with and without fluoride therapies

Images courtesy of A. Papas, Tufts University, Boston MA

Young Radiation Patient

May 28, 2008
Generalized Demineralization occurs with adequate home care

Oct 22, 2008
Post 5 months of radiation therapy compromises tooth structure

Sept 23, 2009
Fluoride therapy improves or halts the demineralization process

Effects of radiation vs. demineralization patterns

Images courtesy of TUSCH

Dry Mouth (xerostomia), Radiation Caries

Source: TUSCH
Prevalence of Xerostomia

• It is estimated that approximately 10% of the general population is affected by xerostomia.

• Prevalence of xerostomia varies by age group
  • Increases to 25% over age 65

Prevalence of xerostomia varies by presence of systemic diseases and medications
  • Increases to over 50% in LTC facilities

Is it Xerostomia?

• Is it “xerostomia” or “hyposalivation”?

• Xerostomia (subjective perception)
  • Self-reported sensation of a “dry mouth”
    • Oral dryness
    • Constant need for mouth moisture

  • Especially dry during sleep/upon awakening
    • Sleep interruptions
    • Must keep liquids at bedside

Is it Xerostomia?

• Hyposalivation (salivary gland dysfunction)

  • Clinically measured decrease in quantity

  • Change in quality of saliva (“ropey”)

  • Palpation of glands reveals enlargement and tenderness

  • Attempts to “milk” the glands produce little or no secretion
    ➢ checking stimulated salivary flow
Is it Xerostomia?

Hyposalivation continued

- Physical changes in appearance of oral mucosa and soft tissues
  - Dry, pale or red
  - Signs of atrophy
- Physical changes in appearance of tongue
  - Fissured, inflamed
  - Loss of papillae
  - Multiple caries on tooth surfaces

Simply Sensational Saliva

- What is “normal” for saliva flow?
  - Resting whole saliva
    - Normal flow is about 0.3 to 0.4ml per minute
  - Reflexive response to various stimuli
    - Mechanical (chewing and speaking)
    - Chemical (taste and smell)

Complications of Xerostomia

- Xerostomia results in a functional decrease in the quantity and quality of saliva
  - Loss of protective mucins
  - Dry, fragile oral mucosa
- Loss of antimicrobial defenses
  - Imbalance of microbial ecosystem

Complications of Xerostomia

- This functional decrease in quantity and quality of saliva leads to oral complications
  - Increased susceptibility to caries
    - Cervical, interproximal, buccal and other “unexpected” surfaces involved
  - Increased susceptibility to periodontal disease or exacerbation of existing disease

Complications of Xerostomia

- Increased susceptibility to opportunistic infection
  - Candidiasis
  - Viral infections
- Increased susceptibility to trauma of tissues
- Increased difficulty in wearing dental appliances and prostheses

Sjogren's patient who stopped Rx prevention after 5 years

5 Years caries-free
despite insufficient salivary production
And on preventive fluoride protocol

1/8/09
Several months after discontinuing preventive regimen

11/20/08
Case from Tufts University Oral Medicine
Immune Diseases

Sjögren’s Syndrome

- 9:1 ratio of women to men
- 1-4 million individuals affected in USA
- Typical diagnosed patient is perimenopausal or postmenopausal female
- Documented pediatric cases exist

Disease-Induced Xerostomia

- Medically complex patients are most at risk for disease-induced xerostomia.
- Multiple organ system diseases and illnesses contribute to the development of xerostomia
- Multiple organ system diseases and illnesses exacerbate the complications of xerostomia

Disease-Induced Xerostomia

- Cardiovascular disease
  - Hypertension
  - Stroke
  - Congestive heart failure
- Respiratory disease
  - Asthma and COPD
  - Mouth-breathing
  - Sleep apnea

Disease-Induced Xerostomia

- Gastrointestinal disease
  - Acid reflux
    - Erosion
    - Damage to nerves, salivary glands
- Diabetes mellitus
  - Neuropathy
  - Polyphagia, polydipsia, polyuria

Disease-Induced Xerostomia

- Cancer:
  - High dose chemotherapy
  - Radiation therapy of head and neck
- CNS:
  - Parkinson’s Disease
  - Alzheimer’s Disease
  - Anxiety
  - Depression
  - Psychoses

Oral Complications of Xerostomia
Xerogenic Medications

- Antispasmodics
- Antiemetics
- Antihistamines
- Antihypertensives
- Anti-acne Agents
- NSAIA's
- Muscle relaxants
- Opioid analgesics
- Bronchodilators
- Decongestants
- Antiparkinsonian Agents
- Psychotherapeutic Agents
- Antianxiety Agents
- Antidepressants
- Anticonvulsants
- Antineoplastic Agents

Popular drugs causing xerostomia

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<tr>
<th>DRUG</th>
<th>BRAND NAME</th>
<th>CONDITION</th>
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<tbody>
<tr>
<td>Albuterol</td>
<td>Proventil, Ventolin</td>
<td>Respiratory problems</td>
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<tr>
<td>Atorvastatin</td>
<td>Lipitor</td>
<td>High cholesterol</td>
</tr>
<tr>
<td>Diazepam</td>
<td>Valium</td>
<td>Anxiety</td>
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<tr>
<td>Diphenhydramine</td>
<td>Benadryl</td>
<td>Allergies</td>
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<td>Hydrochlorothiazide</td>
<td>Esidrix, HCTZ</td>
<td>High blood pressure</td>
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<tr>
<td>Hydrocodone</td>
<td>Lorcet, Lortab, Vicodin</td>
<td>Pain (narcotic)</td>
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<td>Metformin</td>
<td>Fortamet, Glucophage</td>
<td>Diabetes</td>
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<tr>
<td>Phenobarbital</td>
<td>Luminal</td>
<td>Anxiety</td>
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<tr>
<td>Tamoxifen</td>
<td>Nolvadex</td>
<td>Cancer</td>
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Non-Pharmacologic Treatment

- Non-pharmacologic treatment includes maintaining and increasing hydration.
  - Frequent hydration and ice chips
  - Difficult for patients with diabetes/HTN
  - Sugar free candy and gum without citrus flavors (acidic)
  - Xylitol proven activity against S. mutans
  - Use humidifier during sleep, use lip balm

Pharmacologic Treatment

Pharmacologic treatment includes agents to stimulate or simulate saliva and minimize oral and non-oral complications.

- Salivary stimulants
- Saliva substitutes
- Fluorides
- Calcium & Phosphate additives

Pharmacologic Treatment

- Ora Moist Dry Mouth Patch
  - Adheres to roof of mouth or buccal mucosa
  - Extended release (2 to 4 hours)
  - Sugar and alcohol free (contains xylitol)
  - Contains naturally-occurring enzymes
### Technologies delivering calcium, phosphate & fluoride

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<th></th>
<th>ACP</th>
<th>CPP-ACP</th>
<th>CSPS</th>
<th>TCP</th>
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<tbody>
<tr>
<td>ADA license</td>
<td>Amorphous Calcium Phosphate</td>
<td>Casein Phosphopeptide Amorphous Calcium Phosphate (Recaldent®)</td>
<td>Calcium Sodium Phosphosilicate (Novamin®)</td>
<td>Beta Tri-calcium Phosphate (Functionalized TCP)</td>
</tr>
<tr>
<td>Mechanism of Action</td>
<td>Specialized salt compounds. No defined structure or crystalline structure. Highly reactive.</td>
<td>Casein binds to tooth surface until pH is lowered/acidic challenge frees ions.</td>
<td>Silica binds Ca/P until sodium elevates pH to free Ca/P ions.</td>
<td>Blended beta tricalcium phosphate is insoluble crystalline form.</td>
</tr>
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<td>Professional Products</td>
<td>* Enamel Pro: Pro-paste delivers ACP NaF Varnish &amp; Gel/AP ENAMELON/AQP - Day White/Nite White &amp; Fresh &amp; Flavor*</td>
<td>* Mi Paste*&lt;br&gt; Mi Paste Plus&lt;br&gt; Mi Varnish (all w/Recaldent)</td>
<td>NUOVO&lt;br&gt; NuSolutions Prophy paste&lt;br&gt; GSK Sensodyne Repair &amp; Protect</td>
<td>VANISH F varnish with TGP Clinpro 550 Clinpro 5000</td>
</tr>
</tbody>
</table>

### Mechanism of Action
- Specialized salt compounds
- No defined structure or crystalline structure
- Highly reactive

- Casein binds to tooth surface until pH is lowered/acidic challenge frees ions.
- Silica binds Ca/P until sodium elevates pH to free Ca/P ions.
- Blended beta tricalcium phosphate is insoluble crystalline form.

### Solubility and Bioavailability
- Becomes soluble only during lowered pH/acidity.
- Becomes soluble when sodium elevates and buffers pH.
- Low to moderate rate of solubility.

### Professional Products
- * Enamel Pro: Pro-paste delivers ACP NaF Varnish & Gel/AP ENAMELON/AQP - Day White/Nite White & Fresh & Flavor*<br> Mi Paste*<br> Mi Paste Plus<br> Mi Varnish (all w/Recaldent)<br> NuOVO<br> NuSolutions Prophy paste<br> GSK Sensodyne Repair & Protect<br> VANISH F varnish with TGP Clinpro 550 Clinpro 5000

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**Save the Date!**

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**SPECIAL THANKS**

Please visit the Corporate Exhibitors for additional information on evidence-based research related to these therapies