**COURSE TITLE:** Commonly Prescribed Medications and Managing the Oral Side Effects of Medication Use

**COURSE INSTRUCTOR:** Ann Eshenaur Spolarich, RDH, PhD

**COURSE CREDITS:** 3 Hours

**COURSE DATE:** April 18, 2015

**COURSE DESCRIPTION:**

The purpose of this course is to review the 20 most commonly prescribed medications taken by clients treated in the oral health care environment. In addition, drug interactions, popular drugs in the media and new drugs in dentistry will be discussed. A comprehensive review of drugs and dental care products used to manage the oral side effects of medications will be presented.

**LEARNING OBJECTIVES:**

Upon completion of this continuing education course, the participant will be able to:

1. Identify and discuss commonly prescribed medications taken by clients treated in the oral health care setting.

2. Identify common drug interactions of significance to dental professionals.

3. List several new dental drugs and discuss their indications for use in practice.

4. Discuss the management of oral side effects caused by medications.

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TOP 20 MOST COMMONLY PRESCRIBED MEDICATIONS
2013 (CANADA)

1. levothyroxine (Synthroid)
2. atorvastatin (Apo-Atorvastatin)
3. furosemide (Apo-Furosemide)
4. perindopril erbumine (Coversyl)
5. escitalopram oxalate (Cipralex)
6. warfarin (Taro-Warfarin)
7. hydrochlorothiazide (Apo-Hydro)
8. amitryptyline (Elavil)
9. venlafaxine (Teva-Venlafaxine)
10. vitamin D3 (D-Tabs)
11. lorazepam (Ativan)
12. rosvastatin (Teva-Rosuvastatin)
13. pantoprazole (Tecta)
14. celecoxib (Celebrex)
15. bisoprolol (Sandoz-Bisoprolol)
16. levothyroxine (Eltroxin)
17. amoxicillin (Teva-Amoxicillin)
18. salbutamol (APO-Salvent CFC free)
19. rosvastatin (APO-Rosuvastatin)
20. allopurinol (Zyloprim)

2013 (UNITED STATES)

1. levothyroxine (Synthroid)
2. hydrocodone/APAP (generic)
3. amoxicillin (generic)
4. lisinopril (Prinivil)
5. esomeprazole (Nexium)
6. atorvastatin (Lipitor)
7. simvastatin (Zocor)
8. clopidogrel (Plavix)
9. montelukast (Singulair)
10. rosvastatin (Crestor)
11. metoprolol (Lopressor)
12. escitalopram (Lexapro; Canadian: Cipralex)
13. azithromycin (Zithromax)
14. albuterol (ProAir HFA; Canadian: Salbutamol)
15. hydrochlorothiazide (generic)
16. metformin (Glucophage)
17. sertraline (Zoloft)
18. ibuprofen (Advil, Motrin)
19. zolpidem (Ambien)
20. furosemide (Lasix)

http://www.pharmacy-tech-test.com/top-200-drugs.html

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PAIN RELIEVERS

U.S. BRAND NAME: Co-Gesic, hycet, Lorcet, Lortab, Margesic, Maxidone, Norco, Stagesic, Vicodin, Xodol, Zamicet, Zydone
CANADIAN BRAND NAME: N/A
GENERIC NAME: HYCD/APAP (hydrocodone with acetaminophen)
THERAPEUTIC CATEGORY: opioid analgesic
USE: post-operative pain control
ORAL COMPLICATIONS: xerostomia (rare)
DRUG INTERACTIONS: Concurrent use of hydrocodone with MAO inhibitors (Nardil, Parnate, Marplan), tricyclic antidepressants (Elavil) and general anesthetics potentiates the effects of the hydrocodone, and increases the risk for toxicity. Dextroamphetamine enhances the analgesic effect of the hydrocodone. Additive CNS effects may occur when taking hydrocodone with other narcotics, antipsychotics, antianxiety agents, general anesthetics and other CNS depressants (eg. alcohol). Phentothiazines (eg. Thorazine) may decrease the analgesic effect of hydrocodone. Acetaminophen taken with alcohol, barbiturates or carbamazepine (Tegretol) increases the risk for liver toxicity. Chronic use of acetaminophen may significantly enhance the anticoagulation effects of warfarin (Coumadin).

U.S. BRAND NAME: Advil, Caldolor, Ibu, Motrin
CANADIAN BRAND NAME: Advil, Calodor, Europrofen, Jamp-Ibuprofen, Motrin, Novo-Profen
GENERIC NAME: ibuprofen
THERAPEUTIC CATEGORY: NSAID
USE: management of mild to moderate pain; inflammatory diseases and rheumatoid disorders, fever, dysmenorrhea
ORAL COMPLICATIONS: none
DRUG INTERACTIONS: Ibuprofen and other non-selective NSAIDS can interfere with the antiplatelet and cardioprotective effects of aspirin: follow appropriate timing of dosing. Avoid use in aspirin-allergic patients. Ibuprofen may increase the levels of anticoagulants, antiplatelet drugs, bisphosphonates, cyclosporine, digoxin, haloperidol, lithium, methotrexate, NSAIDS, potassium-sparing diuretics, quinolone antibiotics, salicylates, thrombolytic agents, vancomycin and vitamin K antagonists. Levels of ibuprofen may be increased by ACE inhibitors, angiotensin II receptor blockers, antidepressants (tricyclic, tertiary amine), systemic corticosteroids, glucosamine, herbs that have anticoagulant or antiplatelet properties, NSAIDS, probenecid, SSRIs, serotonin/norepinephrine reuptake inhibitors. Ibuprofen may decrease the levels of ACE inhibitors, angiotensin II receptor blockers, antiplatelet agents, beta blockers, loop diuretics, potassium-sparing diuretics, salicylates and thiazide diuretics. Levels of ibuprofen may be decreased by bile acid sequestrants, NSAIDS and salicylates. Avoid alcohol.

HYPERCHOLESTEROLEMIA

U.S. BRAND NAME: Lipitor
CANADIAN BRAND NAME: Lipitor; many others
GENERIC NAME: atorvastatin
THERAPEUTIC CATEGORY: HMG-CoA reductase inhibitor
USE: hypercholesterolemia
ORAL COMPLICATIONS: none
DRUG INTERACTIONS: The risk for myopathy/rhabdomyolysis is increased with concurrent use of the macrolide antibiotics clarithromycin and erythromycin, and the azole antifungal agents fluconazole (Diflucan), itraconazole (Sporanox) and ketoconazole (Nizoral). Risk for rhabdomyolysis also may be increased with concurrent use of other lipid lowering agents, cyclosporine, certain calcium channel blockers (diltiazem (Cardizem), verapamil (Calan)) and protease inhibitors. Atorvastatin may also increase the effect of levothyroxine (Synthroid).
U.S. BRAND NAME: Zocor
CANADIAN BRAND NAME: Zocor; many others
GENERIC NAME: simvastatin
THERAPEUTIC CATEGORY: HMG-CoA reductase inhibitor
USE: hypercholesterolemia
ORAL COMPLICATIONS: taste alteration
DRUG INTERACTIONS: The risk for myopathy/rhabdomyolysis is increased with concurrent use of the macrolide antibiotics clarithromycin and erythromycin, and the azole antifungal agents fluconazole, itraconazole and ketoconazole. Risk for rhabdomyolysis also may be increased with concurrent use of other lipid lowering agents, cyclosporine, certain calcium channel blockers and protease inhibitors. The anticoagulant effect of warfarin may be increased by simvastatin.

U.S. BRAND NAME: Crestor
CANADIAN BRAND NAME: Crestor; many others
GENERIC NAME: rosvastatin calcium
THERAPEUTIC CATEGORY: HMG-CoA reductase inhibitor
USE: used with dietary therapy for hyperlipidemias to reduce elevated total cholesterol, LDL-C, apolipoprotein B and triglycerides in patients with hypercholesterolemia and for treatment of familial hypercholesterolemia
ORAL COMPLICATIONS: none
DRUG INTERACTIONS: The anticoagulant effects of warfarin may be increased by rosvastatin: monitor carefully. Rosuvastatin increases the serum concentrations of the hormonal contraceptives ethinyl estradiol and norgestrel. Concurrent administration of other cholesterol lowering medications (gemfibrozil, clofibrate, fenofibrate or niacin) may increase the risk for myopathy and rhabdomyolysis. Metal containing antacids may decrease the plasma concentrations of rosvastatin: administer antacids at least 2 hours after dosing. Bile acid sequestrants may reduce the absorption of rosvastatin.

HYPERTENSION

U.S. BRAND NAME: Microzide
GENERIC NAME: hydrochlorothiazide
THERAPEUTIC CATEGORY: thiazide diuretic
USE: mild to moderate hypertension; edema with congestive heart failure and nephrotic syndrome
ORAL COMPLICATIONS: xerostomia, lichenoid reaction; photosensitivity
DRUG INTERACTIONS: NSAIDs decrease the antihypertensive effects of HCTZ. HCTZ may decrease the effects of oral hypoglycemic agents. Absorption of HCTZ is decreased with the concurrent use of the bile acid sequestrants (cholesterol lowering agents). Increased effect of HCTZ with concomitant use of loop diuretics. Hypotension may occur when used with ACE inhibitors. Beta blockers increase hyperglycemic effects of thiazides in Type 2 diabetics. Potential for toxicity reactions when HCTZ is used with cyclosporine (renal toxicity), digoxin (digoxin toxicity) or lithium (lithium toxicity). Thiazides prolong the duration of action of neuromuscular blocking agents.

U.S. BRAND NAME: Lasix
CANADIAN BRAND NAME: Lasix, Novo-Semide, many others
GENERIC NAME: furosemide
THERAPEUTIC CATEGORY: loop diuretic
USE: management of edema associated with congestive heart failure and/or hepatic/renal disease, hypertension
ORAL COMPLICATIONS: vomiting, oral irritation, xerostomia, lichenoid drug reaction
DRUG INTERACTIONS: Avoid use in patients with hypersensitivity to sulfonamides. Ototoxicity is associated with rapid IV administration, renal impairment, excessive doses and concurrent use of other ototoxins (aminoglycosides, cis-
platinum). Concurrent use of corticosteroids may increase electrolyte imbalance. Hypotensive effects and adverse renal effects of ACE inhibitors and NSAIDS are potentiated by furosemide-induced hypovolemia. Increased risk for arrhythmias with some quinolone antibiotics. Furosemide increases the risk of toxicity from lithium and high dose salicylates. NSAIDS, aspirin, phenobarbital, phenytoin, bile acid sequestrants and sucralfate reduce the effects of furosemide. Glucose tolerance may be decreased by furosemide. Metformin decreases furosemide concentrations.

U.S. BRAND NAME: Prinivil, Zestril  
CANADIAN BRAND NAME: Prinivil, Zestril, many others  
GENERIC NAME: lisinopril  
THERAPEUTIC CATEGORY: ACE inhibitor  
USE: hypertension, adjunctive therapy for congestive heart failure, post-MI if hemodynamically stable  
ORAL COMPLICATIONS: xerostomia, dry cough, angioedema  
DRUG INTERACTIONS: Increased risk for hypotension with alcohol, phenothiazines (antipsychotics) and probenecid. ACE inhibitors increase serum concentrations of digoxin, lithium and sulfonylureas (oral hypoglycemics). Increased risk for toxicity with potassium or potassium-sparing diuretics. Diuretics have additive hypotensive effects when used with ACE inhibitors. Caution when using NSAIDS in patients with compromised renal function who are taking ACE inhibitors. NSAIDS, including high dose aspirin, may decrease the antihypertensive effects of ACE inhibitors. Antacids decrease the bioavailability of ACE inhibitors.

U.S. BRAND NAME: Lopressor, Toprol-XL  
CANADIAN BRAND NAME: Betaloc; Lopresor; many others  
GENERIC NAME: metoprolol succinate  
THERAPEUTIC CATEGORY: cardioselective beta blocker  
USE: hypertension, angina, prevention of MI, atrial fibrillation; investigational for ventricular arrhythmias, migraines, essential tremors, aggressive behavior  
ORAL COMPLICATIONS: xerostomia  
DRUG INTERACTIONS: Metoprolol may increase the effects of other drugs that slow AV conduction, alpha-blockers and alpha-adrenergic stimulants (eg. epinephrine). Epinephrine is safe to use in patients taking cardioselective beta blockers (lowest dose, least concentration). NSAIDS (ibuprofen, indomethacin) used for greater than 3 weeks can decrease the antihypertensive effects of the drug. The effects of beta blockers are decreased with aluminum salts, calcium salts, barbituates, bile acid sequestrants (cholesterol-lowering drugs), NSAIDS, penicillins, rifampin and salicylates. Beta blockers may decrease the effects of sulfonylureas (oral hypoglycemics), and may slow the metabolism of lidocaine. Increased hypotension and bradycardia may be observed with concurrent use of inhaled anesthetics and fentanyl derivatives.

ANTIPLATELET EFFECT

U.S. BRAND NAME: Plavix  
CANADIAN BRAND NAME: Plavix, many others  
GENERIC NAME: clopidogrel  
THERAPEUTIC CATEGORY: antiplatelet agent  
USE: reduce risk of atherosclerotic events in patients with history of recent MI, stroke, or established peripheral arterial disease; acute coronary syndrome (unstable angina)  
ORAL COMPLICATIONS: none  
DRUG INTERACTIONS: Clopidogrel interfere with the metabolism of many medications, including oral hypoglycemics, phenytoin and some NSAIDS, increasing risk for toxicity. Concurrent use of clopidogrel with naproxen increases risk for GI bleeding. Anticoagulant medications taken with antiplatelet medications increases risk for bleeding. Atorvastatin (Lipitor) and macrolide antibiotics (clarithromycin, erythromycin) decrease the effects of clopidogrel. Many herbs interact with Plavix and increase risk for bleeding: discontinue 14 days prior to surgery.
ENDOCRINE DISORDERS

U.S. BRAND NAME: Synthroid, Levothroid, levoxyl, Tirosint, Unithroid
CANADIAN BRAND NAME: Eltroxin, Euthyrox, Synthroid
GENERIC NAME: levothyroxine
THERAPEUTIC CATEGORY: hormone
USE: hypothyroidism
ORAL COMPLICATIONS: none
DRUG INTERACTIONS: Levothyroxine increases the effects of oral anticoagulants (Coumadin), causing an increased risk of bleeding. When taken together, toxicity may occur for both levothyroxine and tricyclic antidepressants (Elavil). Antacids containing aluminum and magnesium, iron, bile acid sequestrants (colestipol, cholestyramine), and the ulcer medication sucralfate (Carafate) decrease the absorption of levothyroxine. Certain seizure medications (phenytoin, phenobarbital and carbamazepine) and the TB medication rifampin (Rifadin) decrease levothyroxine levels. Levothyroxine may decrease the effect of oral sulfonylureas.

ANTIBIOTICS

U.S. BRAND NAME: Moxatag
CANADIAN BRAND NAME: Apo-Amoxi, Mylan-Amoxicillin, Novamoxin, NTP-Amoxicillin, Nu-Amoxi, PHL-Amoxicillin, PMS-Amoxicillin, Pro-Amox-250; Pro-Amox-500
GENERIC NAME: amoxicillin
THERAPEUTIC CATEGORY: antibiotic
USE: infections of ear, skin, respiratory and urinary tracts; premedication
ORAL COMPLICATIONS: oral candidiasis and black hairy tongue
DRUG INTERACTIONS: Concomitant use of amoxicillin and erythromycin or amoxicillin and tetracycline is contraindicated. Amoxicillin may decrease the efficacy of oral contraceptives; therefore, patients should be instructed to use an alternative form of birth control while taking this antibiotic. Disulfiram (Antabuse), used to treat alcoholism, and the uric acid lowering agent probenecid (Benemid) cause increased levels of amoxicillin. The effects of warfarin may be increased.

U.S. BRAND NAME: AzaSite, Zithromax, Zmax
CANADIAN BRAND NAME: Zithromax, Zmax, many others
GENERIC NAME: azithromycin
THERAPEUTIC CATEGORY: macrolide antibiotic
USE: orofacial and respiratory tract infections; middle ear infections, pharyngitis, strep throat, tonsillitis, pneumonia; premedication
ORAL COMPLICATIONS: none
DRUG INTERACTIONS: Antacids containing aluminum or magnesium (Maalox, Mylanta) should not be taken with azithromycin, as antacids decrease serum levels of the drug. Two hours should lapse prior to taking azithromycin following the use of an antacid. As with erythromycin, azithromycin interacts with many drugs, and may increase the levels of some antihistamines (Hismanal), cyclosporine (Sandimmune), carbamazepine (Tegretol), digoxin (Lanoxin), phenytoin (Dilantin), triazolam (Halcion), warfarin (Coumadin) and antiasthmatic drugs containing theophylline. Concomitant use of the macrolide antibiotics with the HMG Co-A reductase inhibitors increases the risk for rhabdomyolysis. Antibiotics decrease the effectiveness of oral contraceptives.
**ANTIDEPRESSANTS**

U.S. BRAND NAME: Lexapro  
CANADIAN BRAND NAME: Cipralex  
**GENERIC NAME:** escitalopram  
**THERAPEUTIC CATEGORY:** selective serotonin reuptake inhibitor  
**USE:** major depressive disorder; generalized anxiety disorders (GAD)  
**ORAL COMPLICATIONS:** xerostomia, toothache, vomiting

**DRUG INTERACTIONS:** Do not take this drug with MAOIs: fatal reactions have been reported. Combined use of this drug with other SSRIs and/or other classes of antidepressants increases risk for serotonin syndrome. Use of this drug with aspirin, NSAIDS and other drugs that alter coagulation increases risk for bleeding. Systemic azole antifungals, ciprofloxacin, clarithromycin, diclofenac, doxycycline, erythromycin, and other CYP3A4 inhibitors may increase the levels and/or effects of escitalopram. Avoid drinking alcohol with this medication. Combined use of SSRIs with sumatriptan (Imitrex) or other serotonin agonists may result in toxicity. CYP3A4 inducers may decrease the levels/effects of escitalopram, including cabamazepine, nafcillin, phenobarbital and phenytoin.

U.S. BRAND NAME: Zoloft  
CANADIAN BRAND NAME: Zoloft, many others  
**GENERIC NAME:** sertraline  
**THERAPEUTIC CATEGORY:** selective serotonin reuptake inhibitors  
**USE:** antidepressant; obsessive-compulsive disorder, panic attacks, post-traumatic stress syndrome, premenstrual dysphoric disorder, social anxiety disorder  
**ORAL COMPLICATIONS:** xerostomia, bruxism

**DRUG INTERACTIONS:** SSRIs decrease the liver metabolism of many drugs due to their inhibition of the cytochrome P450 enzyme system. Sertraline is contraindicated with MAO inhibitors (Marplan, Nardil, Parnate). Risk for serotonin syndrome increases when SSRIs are combined with many drugs, including amphetamines, serotonin agonists, sympathomimetics, meperidine (Demerol) and other SSRIs. Use sertraline with caution with NSAIDS, ASA or other drugs that affect coagulation (e.g. clopidogrel). Sertraline increases the effects of anticoagulants, antidepressants, antiplatelet agents, aspirin, beta-blockers, lithium, methadone, NSAIDS, tamoxifen, thrombolytic agents and vitamin K antagonists. Opioid analgesics, macrolide antibiotics, tramadol, glucosamine and herbs increase the levels and effects of sertraline.

**GERD OR HYPERSECRETORY DISEASE**

U.S. BRAND NAME: Nexium  
CANADIAN BRAND NAME: Apo-Esomeprazole, Mylan-Esomeprazole, Nexium  
**GENERIC NAME:** esomeprazole  
**THERAPEUTIC CATEGORY:** proton pump inhibitor  
**USE:** short-term treatment of erosive esophagitis; symptomatic gastroesophageal reflux disease (GERD)  
**ORAL COMPLICATIONS:** xerostomia

**DRUG INTERACTIONS:** Esomeprazole may increase the levels of carbamazepine, statin drugs, and some benzodiazepines (diazepam, midazolam, triazolam). Drugs in this class may decrease the absorption of antiretroviral medications, iron, and systemic antifungal medications (itraconazole, ketoconazole). Esomeprazole may decrease the levels of phenytoin. Drug absorption is significantly decreased (43%-53%) when taken with food; take at least 1 hour before meals.
RESPIRATORY DISEASE

U.S. BRAND NAME: Singulair
CANADIAN BRAND NAME: Singulair, many others
GENERIC NAME: montelukast
THERAPEUTIC CATEGORY: leukotriene-receptor antagonist
USE: prophylaxis and chronic treatment of asthma; seasonal allergies; perennial allergic rhinitis
ORAL COMPLICATIONS: none
DRUG INTERACTIONS: Phenylketonuric patients should be informed that the chewable tablets contain phenylalanine. Carbamazepine, phenobarbital, phenytoin, rifampin, and nafcillin may decrease the levels of montelukast. St. John’s wort may also decrease the levels of montelukast.

U.S. BRAND NAME: AccuNeb, ProAir HFA, Proventil HFA, Ventolin HFA, VoSpire ER
CANADIAN BRAND NAME: Airomir, Apo-Salvent, Ventolin Diskus, Ventolin HFA, many others
GENERIC NAME: albuterol/salbutamol
THERAPEUTIC CATEGORY: beta 2-adrenergic agonist
USE: asthma, chronic obstructive pulmonary disorder (COPD)
ORAL COMPLICATIONS: xerostomia, altered taste, vomiting, tooth discoloration
DRUG INTERACTIONS: Increased toxicity (cardiovascular effects) is noted when albuterol is used with any of the following drugs: MAO inhibitors (Marplan, Nardil, Parnate), tricyclic antidepressants (Elavil), sympathomimetic agents (amphetamine, dopamine) and inhaled anesthetics (malignant arrhythmias). The effect of albuterol is decreased when used with nonselective beta blockers. When used with inhaled ipratropium (Atrovent), an increase in the duration of bronchodilation may occur.

ANTIDIABETIC AGENT

U.S. BRAND NAME: Fortamet, Glucophage, Glucophage XR, Glumetza, Riomet
CANADIAN BRAND NAME: Glucophage, Glumetza, Glycon, many others
GENERIC NAME: metformin
THERAPEUTIC CATEGORY: oral hypoglycemic, biguanide
USE: management of non-insulin dependent diabetes mellitus (type II)
ORAL COMPLICATIONS: vomiting, taste alteration
DRUG INTERACTIONS: Multiple drug interactions: drugs that decrease the effects of metformin include diuretics, corticosteroids, phenothiazines, thyroid medications, estrogens, oral contraceptives, phenytoin (Dilantin), nicotinic acid, sympathomimetics, calcium channel blockers and isoniazid (antitubercular agent); these drugs produce hyperglycemia and lead to loss of glucose control. Furosemide (Lasix) and cimetidine (Tagamet) increase metformin serum concentrations. Increased metformin levels are seen with the diuretics amiloride (Midamor) and triamterene (Dyrenium); digoxin (Lanoxin), morphine, the antiarrhythmics procainamide (Procanbid) and quinidine (Cardioquin); the muscle relaxant quinine (Legatrin); ranitidine (Zantac), and the antibiotics trimethoprim (Trimpex) and vancomycin. Avoid or limit alcohol.

HYPNOTICS NONBENZODIAZEPINE

U.S. BRAND NAME: Ambien, Ambien CR, Edluar, Intermezzo, Zolpidist
CANADIAN BRAND NAME: Sublinox
GENERIC NAME: zolpidem
THERAPEUTIC CATEGORY: hypnotic, nonbenzodiazepine
USE: short-term treatment of insomnia
ORAL COMPLICATIONS: xerostomia
DRUG INTERACTIONS: Concurrent use with other centrally-acting drugs may produce an additive CNS depression, including alcohol. Increased drug effects seen with azole antifungals, ciprofloxacin, clarithromycin, diclofenac, doxycycline, erythromycin, imatinib (antineoplastic agent), isoniazid, nefazadone (Serzone), nicardipine, propofol (general anesthetic), protease inhibitors, quinidine, verapamil. Decreased drug effect seen with aminoglutethimide (anti-adrenal), carbamazepine, nafcillin, nevirapine (antiretroviral), phenobarbital, phenytoin.

REFERENCES FOR TOP 20 MEDICATIONS


AGENTS RELATED TO LOCAL ANESTHESIA

Local Anesthetic Induction Agent: Onset® by Onpharma (*US Drug only)

Sodium bicarbonate, injection, 8.4%

Indications:
- hastens the onset of analgesia
- reduces injection pain by adjusting lidocaine with epinephrine anesthetic solution to a more physiologic pH immediately prior to injection

Local Anesthetic Reversal Agent: OraVerse® by Septodont

- Phentolamine mesylate is a vasodilator (alpha adrenergic antagonist) used in medical indications since 1952
- OraVerse™ is indicated for reversal of soft-tissue anesthesia, i.e., anesthesia of the lip and tongue, and the associated functional deficits resulting from an intraoral submucosal injection of a local anesthetic containing a vasoconstrictor
- OraVerse™ is not recommended for use in children less than 6 years of age or weighing less than 15 kg (33 lbs)
- There are no contraindications with OraVerse™
PROPHYLACTIC ANTIBIOTICS AND PROSTHETIC JOINTS

Prosthetic Joint Infection
- By 2030, 4 million total hip or total knee replacements per year will be performed in U.S.
- **Infection is second most common cause of prosthetic joint failure**
  - Aseptic loosening is primary cause
- Treatment is expensive = >$50,000/case
- *reason why investigators want to identify preventable risk factors*


AAOS/ADA GUIDELINES 2012
3 recommendations:
1. The practitioner **might consider discontinuing the practice of routinely prescribing prophylactic antibiotics** for patients with hip and knee prosthetic implants undergoing dental procedures.
   - Strength of evidence: limited
2. The work group was **unable to recommend for or against the use of topical oral antimicrobials** in patients with prosthetic joint implants or other orthopedic implants undergoing dental procedures.
   - Strength of evidence: inconclusive
3. In the absence of reliable evidence linking poor oral health to prosthetic joint infection, **it is the opinion of the work group** that patients with prosthetic joint implants or other orthopedic implants **maintain appropriate oral hygiene**.
   - Strength of evidence: consensus


ADA Council on Scientific Affairs convened a panel of experts (2014 Panel) to provide clinicians with more specific and practical set of guidelines

Addressed the following clinical question: **“For patients with prosthetic joints, is there an association between dental procedures and PJI, and, therefore, should systemic antibiotics be prescribed before patients with prosthetic joint implants undergo dental procedures?”**

Process:
- reviewed data from the 2012 report and updated literature search
- included additional evidence (3 additional case-control studies)

Findings:
- 3 of 4 case-control studies failed to show association between dental procedures and PJI
- 1 study suggested that dental procedures may provide a protective effect against PJI
- Assumption made that data about hip/knee joints can be extrapolated to all joints
- When there is moderate certainty of no association = strength of recommendation is **against** (not implementing intervention or discontinuing ineffective procedures)
Clinical Recommendation from the 2014 Panel:
“In general, for patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures to prevent prosthetic joint infection. The practitioner and patient should consider possible clinical circumstances that may suggest the presence of a significant medical risk in providing dental care without antibiotic prophylaxis, as well as the known risks of frequent or widespread antibiotic use.”


Skaar DD, O’Connor H, Hodges JS, Michalowicz BS. Dental procedures and subsequent prosthetic joint infections: findings from the Medicare Current Beneficiary Survey. JADA 2011;142(12):1343-1351.


Risk Factors for PJI Independent of Dental Procedures
*Wound drainage or wound hematoma after arthroplasty
*Postoperative urinary tract infection
Prior operation/arthroplasty on index joint
Diabetes mellitus
Immunocompromised (RA, steroids, immunosuppressants, diabetes mellitus, malignancy, CKD disease)


Other Considerations
Antibiotic resistance
Adverse drug reactions
Opportunistic infections (Candida, Clostridium difficile)
Cost = estimates are that annual cost of amoxicillin given for premed to patients with knee/hip prostheses before dental procedures in the U.S. may exceed $50 million

ADA Brochure About Antibiotic Premedication for Your Patients
“Antibiotics and Dental Treatment” is available in the ADA product catalog: ADA Product Code W307

MANAGEMENT OF ORAL SIDE EFFECTS CAUSED BY MEDICATIONS

AGENTS FOR MUCOSITIS

Mucosal Coating Agents: Gelclair (gel), Episil, MuGard (liquid), Orafate, Pro Thelial (paste), Mucotrol (wafer) (*US Drugs only)
Supersaturated Calcium Phosphate rinses = indicated for mucositis and xerostomia
Caphosol® - sodium phosphate, calcium chloride, sodium chloride (2 ampules: mix together)
NeutraSal® - sodium phosphate, calcium chloride, sodium chloride, sodium bicarbonate (mixed with water) (*US Drug)

SALIVARY REPLACEMENT THERAPY

OTC Artificial Saliva Preparations:
Entertainer’s Secret® (KLI Corp.)
Moi-Stir® (Kingswood Laboratories, Inc.)
Mouthkote® (Parnell Pharmaceuticals)
Salivart® (Gebauer Company)
Oral Balance® spray or gel – Biotene (GlaxoSmithKline)
Orajel® Dry Mouth Relief or Moisturizing Gel (Del Pharmaceuticals, Inc.)
Oasis® rinse (Oasis Consumer Healthcare)
GC Dry Mouth gel (GC America)
Salese lozenges (Nuvora)
MighTeaFlow® gum, lozenges (Camellix)
SalivaSure® (Scandinavian Formulas)
Numoisyn™ liquid, lozenge (Align Pharmaceuticals) - prescription

Two prescription drugs now available to stimulate salivary flow:
pilocarpine hydrochloride (Salagen)
- cholinergic agonist that stimulates muscarinic acetylcholine receptors in the salivary glands to increase serous salivary flow.
- need to take the drug for a minimum of 90 days to see optimum effects
- contraindicated if known hypersensitivity to the drug, uncontrolled asthma or narrow-angle glaucoma
- drug interactions associated with pilocarpine include anticholinergic medications (eg. antiparkinsonion drugs, carbamazepine, digoxin, sedative antihistamines, tricyclic antidepressants), cholinergic medications (eg. antiglaucoma drugs) and beta-adrenergic blocking drugs
- indicated for radiation therapy patients and Sjögren’s syndrome
  - dosage: for radiation therapy patients:
    - 5 mg tid (15-30 mg per day); 12 weeks of therapy
  - dosage: for Sjögren’s patients:
    - 5 mg qid; efficacy has been established after 6 weeks of use

cevimeline (Evoxac) *US drug
- cholinergic agonist used to treat xerostomia in patients with Sjögren’s syndrome
- dosage: 30 mg tid
- contraindications: hypersensitivity to drug or any of its components, uncontrolled asthma, narrow-angle glaucoma, acute iritis, conditions where miosis is undesirable
- use with caution in patients with CV disease, asthma, COPD, decreased visual acuity, the elderly, or in those with kidney problems

ANTIFUNGALS
- fungal infections occur as a result of alterations in oral flora, immunosuppression and underlying systemic disease (diabetes, xerostomia, anemia, chemo, inhaled steroids)
- opportunistic infections
- clinical presentation:
- pseudomembranous appearance (bright red with overlying white pseudomembrane); atrophic appearance (tongue); hyperkeratotic appearance (denture stomatitis); symptomatic geographic tongue; angular cheilitis

- **drug therapy** includes topical and systemic medications depending upon the extent and severity of the infection.
- **azole antifungals** are used to treat chronic, extensive mucocutaneous candidiasis
- **polyenes** are used to treat local candidiasis (**topicals**) 
- antifungals are being **used in combination with corticosteroids**, such as nystatin and triamcinolone, to treat both the fungal infection and the inflammation of angular cheilitis
- medications must be **used for a minimum of 48 hours after the disappearance of clinical signs and symptoms; re-evaluate condition 14 days after therapy has been completed**
- efficacy of topical drugs is dependent upon contact with the lesions
- some topical preparations contain sugar - may choose to prescribe vaginal preparation
- in addition to antifungals, **consider chlorhexidine or essential oil mouthrinses** for long term prevention
- prescription antifungals for systemic use if patient is refractory to topicals:
  *cautions: liver function and multiple drug interactions

### Topical Antifungal Medications:

<table>
<thead>
<tr>
<th>Medication</th>
<th>Applicaiton/Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>nystatin ointment</td>
<td>apply thin coat to affected area (or inner surface of denture) 4-5 times per day</td>
</tr>
<tr>
<td>Mycelex® 10 mg troches ( clotrimazole )</td>
<td>disp: 70 troches; dissolve 1 troche in mouth 5 times per day until gone; leave any prosthesis out during treatment and soak prosthesis in nystatin liquid suspension overnight</td>
</tr>
<tr>
<td>iodoquinol and hydrocortisone cream</td>
<td>apply locally to affected area 3-4 times per day for 10 days to 2 weeks, then re-evaluate</td>
</tr>
<tr>
<td>nystatin and triamcinolone acetonide ointment</td>
<td>apply locally to affected area 4 times per day for 10 days to 3 weeks and then re-evaluate</td>
</tr>
</tbody>
</table>

****NOTE THAT KETOCONAZOLE IS NO LONGER APPROVED FOR TREATMENT OF CANDIDIASIS (FDA July 23, 2013): FDA limits use due to potential for liver injury, adrenal insufficiency, serious drug interactions

### Topical nystatin:
- is well-tolerated, non-sensitizing
- soak dentures in nystatin suspension overnight
- nystatin ointment can be placed in denture and worn during day (like an adhesive)

### Systemic Azole Antifungal Medications: CAUTION WITH DRUG INTERACTIONS

- fluconazole (Diflucan®) 100 mg tablets; Take 2 tablets on day 1, then 1 tablet daily for 14 days until gone; *a shorter course may be adequate; extensive infection may require second course of treatment

### ANTIVIRALS
- viral infections: **acute onset** of symptoms
- **vesicular eruption** of soft tissues
- rupture of vesicles leaves ulcerations
- ulcerations are generally small in size
- if left untreated, ulcerations coalesce to form large lesions
- **primary infection can present as: gingivostomatitis, recurrent lip lesions** (herpes labialis), **intraoral ulcers** (recurrent intraoral herpes) that involve oral/perioral tissues
- **primary infection is systemic** that leads to acute gingivostomatitis involving multiple tissues: buccal mucosa, lips, tongue, floor of mouth, gingiva

- **management of viral infections is generally palliative** (although acyclovir is now used for prevention of primary infections)

- treatment of primary infections includes **combination therapy**:
  - acyclovir
  - **topical anesthetic rinses** (eg. Benadryl, Xylocaine viscous, OTC benzocaine products)
  - **fluids, vitamins and mineral supplements and rest**

**Antiviral Medications for Herpes Simplex:**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Active Ingredient(s)</th>
<th>Usage Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zovirax® 200 mg tablets</td>
<td>acyclovir</td>
<td>take 1 capsule 5 times per day for 10 days or 2 capsules 3 times per day for 10 days</td>
</tr>
<tr>
<td>Zovirax® ointment 5%</td>
<td>acyclovir</td>
<td>apply q 3 hours (6 times/day) for 7 days</td>
</tr>
<tr>
<td>Denavir® cream 10mg/g (1%) *US drug only</td>
<td>penciclovir</td>
<td>apply every 2 hours (lips and face only) for 4 days</td>
</tr>
<tr>
<td>Valtrex® 500 mg</td>
<td>valacyclovir</td>
<td>2 grams twice daily for 1 day at prodrome (separate doses by 12 hours)</td>
</tr>
<tr>
<td>Abreva (OTC)</td>
<td>docosanol 10%</td>
<td>apply locally as directed 5 times per day; start at prodrome and continue for 4 days; do not apply directly to inside of mouth or around eyes</td>
</tr>
<tr>
<td>Viroxyn® (OTC)</td>
<td>alcohol/benzalkonium chloride</td>
<td>single dose applicator/vial; at prodrome, rub medication into lesion until medication is gone (10 seconds)</td>
</tr>
</tbody>
</table>

**ORAL ULCERATIONS (NON-VIRAL) AND PAIN CONTROL**

- **Recurrent Aphthous Stomatitis:**
  - patients with recurrent aphthous should be evaluated for iron, folic acid and/or vitamin B12 deficiency
  - severe recurrent aphthous may be treated with an oral suspension of tetracycline
  - regular use of Listerine has been shown to reduce the frequency, duration and severity of lesions; chlorhexidine has been shown to reduce duration of lesions

- **localized ulcerations:**
  - OTC topical anesthetic agents containing benzocaine in protective preparations
  - Benzocaine and tetracaine (Viractin) are ester anesthetics; therefore, caution must be used when recommending these OTC products to clients with reported allergies to anesthetics or to PABA
  - Debacterol (sulfonated phenolics in aqueous solution) – therapeutic cauterization
    - dry ulcer, apply directly to lesion, keep in contact for 5-10 seconds; (larger lesions may need up to 2 minutes); rinse immediately, and expectorate with water

- **generalized oral pain:**
  - OTC agent such as Chloraseptic® spray
  - prescription mouthrinse Xylocaine ® 2% (viscous lidocaine)
  - diphenhydramine elixir/cough syrup

- **severe pain**, such as that associated with mucositis:
- anesthetic agents may be mixed with OTC coating agents to provide lubrication and relief from pain
- Benadryl® elixir added in equal amounts to Maalox®, Mylanta® or Kaopectate®
- sucralfate (Carafate®), the prescription medication used to treat duodenal ulcers, may be prepared as a 1 gm/15 mL suspension for use in this population as well. (A pharmacist should be consulted to assist with the preparation of oral suspensions.)

-dry, cracked lips: topical water-based product; Oral Balance®

### Topical prescription agents for aphthous lesions:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Brand Name</th>
<th>Application Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>amlexanox oral paste 5%</td>
<td>Apthasol®</td>
<td>apply 4 times per day (after meals and at bedtime) until area heals</td>
</tr>
<tr>
<td>triamcinolone acetonide</td>
<td>Oralone®0.1%; Kenalog in Orabase® 0.1%</td>
<td>apply after each meal and at bedtime</td>
</tr>
<tr>
<td>Dental Paste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>chlorhexidine oral rinse</td>
<td>Peridex®, PerioGard®</td>
<td>rinse with 20 ml for 30 sec tid</td>
</tr>
<tr>
<td>flucinonide 0.05% (used for oral inflammatory lesions that do not respond to Kenalog in Orabase®)</td>
<td>Lidex® ointment mixed 50/50 with Orabase (30 grams total)</td>
<td>apply thin layer to oral lesions 4 times per day</td>
</tr>
<tr>
<td>clobetasol propionate 0.05%</td>
<td>Temovate®</td>
<td>apply small quantity with a cotton tip applicator to affected area 3-4 times daily</td>
</tr>
<tr>
<td>betamethasone 0.1% ointment</td>
<td></td>
<td>apply small quantity with a cotton tip applicator to affected area 3-4 times daily</td>
</tr>
<tr>
<td>dexamethasone elixir 0.5 mg/5 mL</td>
<td>Decadron®</td>
<td>rinse with 1 teaspoon for 2 minutes 4 times per day and expectorate</td>
</tr>
</tbody>
</table>

### Topical OTC agents for aphthous/pain control:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Brand Name</th>
<th>Application Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>benzyl alcohol</td>
<td>Zilactin® Gel</td>
<td>apply q 3-4 hours</td>
</tr>
<tr>
<td>benzocaine 10%</td>
<td>Zilactin® B</td>
<td>apply q 3-4 hours</td>
</tr>
<tr>
<td>lidocaine 2.5%</td>
<td>Zilactin L</td>
<td>apply q 3-4 hours</td>
</tr>
<tr>
<td>diphenhydramine</td>
<td>Benadryl® Elixir</td>
<td>swish with 1 tsp for 2 min before each meal (can be used as a swish and swallow)</td>
</tr>
<tr>
<td>benzocaine, gelatin, pectin and sodium carboxymethylcellulose</td>
<td>Orabase® with Benzocaine</td>
<td>apply 3-4 times/day</td>
</tr>
<tr>
<td>tetracaine hydrochloride 1%</td>
<td>Viractin®</td>
<td>apply 3-4 times/day up to 7 days</td>
</tr>
</tbody>
</table>

### SUGARLESS CHEWING GUM
- sugarless chewing gum = neutralizes plaque acids; stimulates salivary flow
  - xylitol and other sugar alcohols
  - Recaldent = found in Trident products
    - casein phosphopeptide-amorphous calcium phosphate
    - derived from milk protein: do not use if allergic to milk
    - remineralization of demineralized areas
REFERENCES


