

COURSE TITLE: Managing the Medicated Patient: Practice Considerations for Oral Health Care Professionals

COURSE INSTRUCTOR: Ann Eshenaur Spolarich, RDH, PhD

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COURSE DESCRIPTION: All dental professionals encounter patients taking medications for both acute and chronic conditions. Most patients take multiple medications, many of which have oral complications and drug interactions of significance to dentistry. The purpose of this course is to review commonly prescribed medications from several major drug classes and their indications for use. Oral side effects, drug interactions and dental practice management considerations will be discussed. Medications used to treat respiratory and cardiovascular conditions, and diabetes are highlighted in this program. Recommendations for treatment modifications and oral hygiene self-care programs will be provided.

LEARNING OBJECTIVES:

Upon completion of this continuing education program, course participants will be able to:

1. Identify examples of medications from each of the major drug classes used to manage respiratory and cardiovascular disorders, and diabetes.
2. Discuss the oral side effects and other adverse events associated with each of these classes of medications.
3. Identify modifications necessary to safely treat patients taking these medications.
4. Recommend appropriate oral hygiene strategies for each of these patient populations.

RESPIRATORY SYSTEM DISORDERS

I. Sinusitis

- acute or chronic in nature
- symptoms: nasal obstruction, fever, chills, mid-face pain, referred pain to teeth
- drugs of choice:
 - **pseudoephedrine** - use vasoconstrictors with caution when using this drug
 - **antihistamines**
 - **analgesics**
 - **antibiotics** (broad spectrum) for secondary infections

II. Medications Used to Treat Asthma

DRUG CLASS/ACTION	GENERIC NAME	BRAND NAME
beta 2 adrenergic agonists (bronchodilators)	albuterol (short-acting, rescue drug for acute asthma attack)	Proventil, Ventolin
	salmeterol (long-acting asthma control)	Serevent, Serevent Diskus
xanthines (bronchodilators) *maintain bronchodilation of airways **many adverse drug interactions = old asthma drug	theophylline aminophylline	Elixophyllin, Quibron-T, Theo-24, Theochron, Theolair, T-Phyl, Uniphyll, Theo-Dur Truphylline
leukotriene-altering agents (leukotriene receptor antagonists) *prevents adverse effects of leukotrienes that act like histamine	montelukast zafirlukast	Singulair Accolate
leukotriene-altering agents (5 lipoxygenase inhibitor) *prevents adverse effects of leukotrienes that act like histamine	zileuton	Zyflo
corticosteroids (anti-inflammatory drugs) *decrease inflammation and helps to maintain broncho-dilation of airways	beclomethasone budesonide flunisolide fluticasone mometasone furoate triamcinolone	Beconase, Vancenase, Vancenase Pockethaler, Vanceril Pulmicort AeroBid, AeroBid-M, Nasalide, Nasarel Flovent, Flonase Nasonex Azmacort, Nasacort
combination drugs (antiinflammatory/ bronchodilator)	salmeterol and fluticasone	Advair Diskus
mast cell stabilizers *used to prevent asthma attacks	cromolyn	Intal, Nasalcrom
anticholinergics (decrease mucosal secretions) *drug of choice for emphysema	ipratropium	Atrovent

III.

Dental Treatment Considerations for Asthmatics

- avoid known triggers (stress, allergens, chemical irritants)
- advise patient to continue taking usual medications
- advise patient to bring inhalers to appointment
- avoid elective treatments during upper respiratory infections when symptoms are poorly controlled
- avoid use of aspirin and NSAIDS
- watch sulfiting agents in LA with vasoconstrictor = bronchoconstriction
- avoid erythromycin with theophylline = toxicity reaction
- supplemental adrenal therapy with extreme stress in long-term steroid users

IV. Medications Used for Treatment of Chronic Bronchitis

- **adrenergic agonists** for congestion/bronchoconstriction
- **antihistamines** to reduce secretions
- **expectorants** to thin sputum
- **antitussives** to control coughing
- **antibiotics** for upper respiratory infections

V. Medications Used to Treat Emphysema

- **ipratropium** (Atrovent) - drug of choice = bronchodilation
- **beta adrenergic agonists** (bronchodilation); **xanthines** (bronchodilation)

VI. Dental Treatment Considerations for Patients with COPD

- promote smoking cessation
- watch for wheezing, orthopnea while recumbent
- activate EMS for acute respiratory distress
- avoid sedatives
- if severe COPD, risk for developing pulmonary hypertension, increasing risk for cardiac arrhythmias = avoid stress
- adrenal supplementation may be necessary for patients taking long term steroids if procedure is likely to produce severe stress
- oxygen (versus CO₂) becomes drive for ventilation: if given too much oxygen, may induce apnea/acute respiratory failure
- limit oxygen to less than 3L/minute, or deliver by nasal cannula during stressful/painful dental procedures
- promote vaccination against influenza

VII. Treatment Planning Considerations for Patients with Obstructive Diseases

- nitrous oxide = avoid; if necessary, use with caution
- spray topical anesthetics = avoid
- longterm steroid therapy associated with osteoporosis
- longterm steroid therapy associated with increased susceptibility to infections
- mouthbreathing = gingivitis, increased bleeding, xerostomia, caries
- oral candidiasis associated with inhaled steroids, chronic xerostomia
- recommend use of daily antimicrobial therapy, power-assisted devices, fluorides
- emergency management - oxygen, albuterol (staff training)

VIII. Smoking

A. Smoking Cessation

- 70% of women who smoke want to quit
- average number of attempts to quit: 8-11
- women/girls prefer cessation programs that offer social support
- smokers are 50% more likely to quit with social support
- Ask, Advise, Refer program

Important Resources for Dental Professionals:

http://www.askadviserefer.org
http://www.smokefree.gov
http://www.quitnet.com
National NCI Quitline 1-877-44U-QUIT
ADA Code 1320 - Tobacco Counseling for the Control and Prevention of Oral Disease

B. Drugs Used for Cessation Therapy

- Nicotine
- patients should be advised to completely stop smoking upon initiation of therapy
- contraindications:
 - hypersensitivity to nicotine or any component of formulation
 - smokers following post-MI
 - patients with life-threatening arrhythmias
 - severe or worsening angina
 - active TMD (chewing gum products)
 - pregnancy
 - non-smokers
- remember that there are multiple patient populations who should not use these products (consult drug reference guide before prescribing)
 - safety and efficacy have not been established in children

Chewing Gum	Nicorette (OTC)	max 30 pieces/day (average use: 10-12 pieces/day)
Oral Inhalation System	Nicotrol Inhaler	6-16 cartridges per day; duration of treatment = 3 months; gradual daily dose reduction over 6-12 weeks
Lozenge *contains phenylalanine	Commit (OTC)	2 mg and 4 mg strengths; max 20 lozenges/day; use at least 9 lozenges/day during first 6 wks to improve likelihood of quitting; gradual daily dose reduction over 3 months
Patch	NicoDerm CQ (OTC) Nicotrol (OTC)	new patch q 24 hrs; rotate sites (upper body/upper arm); 1 patch daily for 6 weeks
Intranasal Spray	Nicotrol NS	1-2 sprays/hr; max 5 doses (10 sprays) per hour; each dose (2 sprays) contains 1 mg of nicotine; 40 mg dose can be fatal

- **buPROPion (Zyban)**

- can cause hypertensive episodes; caution with vasoconstrictor
- causes significant xerostomia
- initiate with 150 mg/day for 3 days; increase to 150 mg twice daily
- treatment continues for 7-12 weeks
- avoid alcohol: may lower seizure threshold and increase CNS depression
- drug interactions:
 - treatment emergent hypertension may occur in patients treated with buPROPion and nicotine patch
 - risk of seizures increases with concurrent use: antipsychotics, antidepressants, theophylline, abrupt discontinuation of benzodiazepines, systemic steroids
 - may alter warfarin

- **varenicline (Chantix)**

- a new smoking cessation drug that directly stimulates dopamine activity, but to a lesser extent than nicotine
- prevents nicotine from stimulating the release of dopamine by occupying the nicotine receptor sites in the brain
- reduces cravings and withdrawal symptoms.
- safety and efficacy of varenicline have not been established in children, or with concurrent use of other cessation therapy drugs
- increased side effects are observed when varenicline is used with nicotine replacement therapy
- oral side effects include xerostomia and taste alteration
- general side effects include insomnia, headache, abnormal dreams and nausea.
- varenicline is dispensed in 0.5 mg tablets, and is used for up to 12 weeks. Patients may begin taking the medication 1 week prior to their quit date.
- the patient takes 0.5 mg once daily for the first 3 days, then 0.5 mg twice daily for days 4 through 7; The patient is maintained on 1 mg twice daily for weeks 2 through 12. If the patient successfully quits smoking during the 12 weeks, an additional 12 weeks of drug treatment can be used to help maintain success. If the patient does not quit during the initial 12 weeks of treatment, the medication should be discontinued, and factors leading to failure should be re-evaluated.

DIABETES (Hyperglycemia)

a. Diabetes and Heart Disease

- diabetics have higher incidence of coronary artery disease (CAD), worse outcomes, higher mortality rates
- accelerated atherosclerosis in diabetes is multifactorial and begins years/decades prior to the diagnosis of Type 2 diabetes
- Insulin resistance/Syndrome X/ Metabolic syndrome = clustering of risk factors associated with atherosclerosis and coronary heart disease:

- abdominal obesity
- triglycerides
- HDL cholesterol
- blood pressure
- fasting glucose
- pathophysiology of syndrome is controversial = causal relationship between insulin resistance and visceral adiposity
- small increases in fasting or postprandial glucose (impaired glucose tolerance, impaired fasting glucose) increase risk for cardiovascular morbidity and mortality

b. Measures for Diabetes Assessment

- US recommendations rely on measurement of fasting plasma glucose for the detection of diabetes = assumption is that fasting hyperglycemia is an early abnormality in glucose tolerance common to individuals with impaired fasting glucose, those who will develop impaired glucose tolerance, and who will ultimately develop Type 2 diabetes
- fasting blood glucose is 70-110 mg/dL
- blood sugar levels ranging from 70-120 mg/dL are considered to be normal
- glycosylated hemoglobin (glycol-hemoglobin) is new “gold standard” to measure glycemic control in diabetics
- glyco-hemoglobin forms when glucose reacts with hemoglobin A; provides an overview of the level of glucose in the life span of the RBC population; therefore, measures overall glycemic control for the previous 6-12 weeks
- glycosylated hemoglobin values are expressed as a percentage of the total hemoglobin in the RBC population = normal value is <6%
- goal for diabetics is <7%; caution when >8% (intervention)

c. Oral Complications Associated With Diabetes

- **increased caries risk** = diet related, xerostomia
- **xerostomia** = dry, cracked mucosa, ulcerations, painful mucosa, opportunistic infections, poor lubrication and cleansing, acidic pH, loss of salivary antimicrobial effects, increased infections
- **periodontal disease** = acceleration of rate of periodontal destruction, microangiopathy of tissues, thickening of capillary basement membranes, altered PMNs, enhanced collagenase activity

DRUG CLASS	DRUG ACTION	GENERIC/BRAND NAME
Sulfonylureas	stimulate beta cell production of insulin, increase glucose utilization, normalize glucose metabolism in the liver, increase sensitivity of target tissues to insulin	acetohexamide (Dymelor) chlorpropamide (Diabinese) tolazamide (Tolinase) tolbutamide (Orinase, Tol-Tab) glyburide (DiaBeta, Micronase, Glynase PresTab) glipizide (Glucotrol, Glucotrol XL) glimepiride (Amaryl)

Biguanides	decrease hepatic glucose production, decrease intestinal absorption of glucose, improves insulin sensitivity (increases peripheral glucose uptake and utilization)	metformin (Glucophage, Glucophage XR)
combination sulfonylurea/biguanide	stimulates insulin release from beta cells, decreases glucose output from liver, increases insulin sensitivity at peripheral target sites, decrease hepatic glucose production, decrease intestinal absorption of glucose	glyburide and metformin (Glucovance) glipizide and metformin (Metaglip)
alpha-glucosidase inhibitors	slows breakdown of ingested fat; inhibits GI enzymes resulting in delayed glucose absorption, reducing postprandial hyperglycemia	acarbose (Precose) miglitol (Glyset)
Miscellaneous	stimulates insulin secretion from beta cells by binding to sites on beta cells	repaglinide (Prandin) nateglinide (Starlix)
Thiazolidinedione	lowers blood glucose by improving target cell response to insulin, without increasing pancreatic insulin secretion; mechanism of action is dependent on presence of insulin	rosiglitazone (Avandia)
Insulin	principle hormone required for proper glucose utilization in normal metabolic processes	Humalog, Humalog Mix 75/25, Humulin, Humulin 50/50, Humulin 70/30, Humulin L, Humulin N, Humulin R, Humulin R U-500, Lantus, Lente Iletin II, Novolin 70/30, Novolin L, Novolin N, Novolin R, NovoLog, NovoLog Mix 70/30, NPH Iletin II, Regular Iletin II, Velosulin BR
combination biguanide and thiazolidinedione	combined actions of both classes of drugs (see above)	rosiglitazone and metformin (Avandamet)

d. Dental Treatment Planning Considerations for Diabetic Patients

- appointments should not interfere with meals: after breakfast/first appointment of the day; avoid late in the day when patient has not eaten
- surgical procedures should be performed approximately 2 hours after the patient has eaten breakfast and taken medications; eat afterwards
- if general anesthesia and NPO, then patients should be advised to take half of their usual dose of insulin, and supplement with IV D5W (50% glucose in distilled water)
- fragile blood vessels, delayed wound healing and increased risk to develop infections must be considered before any invasive procedure: minimize risk with good sterile environment
- preprocedural rinsing: reduce risk for infection
- antibiotic premedication ONLY for brittle/unstable/uncontrolled diabetes

- use aggressive antibiotic therapy if infection occurs
- epinephrine, glucocorticoids and opioid analgesics should be used with caution: alter insulin requirements (OK to use if well-controlled)
- large doses of salicylates may produce hypoglycemia
- recommend daily antimicrobial therapy, fluorides, salivary replacement therapy, power-assisted devices

CARDIOVASCULAR DISEASES

New Blood Pressure Guidelines (JNC 7)

CLASSIFICATION	SYSTOLIC	and	DIASTOLIC
Normal	<120		<80
Prehypertension	120-139	or	80-89
Stage 1 Hypertension	140-159	or	90-99
Stage 2 Hypertension	160+		100+

Source: The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure
National Heart, Lung and Blood Institute, 2003

New Cholesterol and Triglyceride Guidelines

LDL Cholesterol	<100	Optimal
	100-129	Near optimal
	130-159	Borderline high
	160-189	High
	190	Very high
Total Cholesterol	<200	Desirable
	200-239	Borderline high
	240	High
HDL Cholesterol	<40	Low
	60	High
Triglycerides	<150	Normal
	150-199	Borderline high
	200-499	High
	500	Very high

Source: ATP III Guidelines At-A-Glance Quick Desk Reference, National Cholesterol Education Program, National Heart, Lung and Blood Institute, 2003

Medications for Cardiovascular Disease

-Diuretics

- initial therapy for uncomplicated HTN
- block kidney reabsorption of sodium, which is excreted with accompanied volume of water
- reduce blood pressure by decreasing blood volume and ECF volume
- reduced volume decreases cardiac output
- classified by mechanism and site of action:
 - thiazides - preferred if normal renal function
 - potassium-sparing agents
 - loop diuretics - used if impaired renal function
- well-tolerated and inexpensive
- drugs of choice for treatment of isolated systolic HTN in elderly

-Beta Blockers

- first line agents in all acute coronary syndromes
- drugs of choice in patients with CAD or supraventricular arrhythmias
- indicated for hypertension and ischemic heart disease
- more effective in Caucasians than African Americans
- NOT first choice in elderly with uncomplicated HTN
- decrease the workload of the heart by decreasing arterial pressure, which decreases venous return, decreases preload and decreases oxygen demand
- decreased cardiac oxygen demand decreases symptoms of angina
- decrease mortality after MI
- cardioselective and noncardioselective agents**
 - nonselective (block beta 1 and beta 2 receptors)**
 - decrease cardiac output, decrease rate and force of contraction
 - blocking B2 receptors in lungs causes contraction of bronchiolar smooth muscle
 - precipitates respiratory crisis in patients with COPD and asthma; therefore, **nonselective beta blockers are contraindicated in asthmatics**
 - decreasing BP decreases renal perfusion, resulting in increased sodium retention and plasma volume which can elevate BP; therefore, **beta blockers are often combined with a diuretic to prevent sodium retention**
 - nonselective beta blockade decreases glycogenolysis and glucagon secretion, so pronounced hypoglycemia may occur after insulin injection; therefore, **cardioselective beta blockers are preferred for insulin-dependent diabetics**
 - in the presence of a beta blocker, epinephrine no longer lowers diastolic BP nor stimulates the heart, but its vasoconstrictive action (mediated by alpha receptors) remains unimpaired**
- cardioselective agents preferentially block B1 receptors to eliminate unwanted bronchoconstrictor effects of B2 receptors**

- antagonize B1 receptors at doses that are 50-100 times less than those required to block B2 receptors
- cardioselectivity is most pronounced at low doses and is lost at high doses
- cardioselective beta blockers are useful in patients with hypertension who also have impaired pulmonary function or are insulin-dependent diabetics**

Oral Care Considerations with Beta Blockers

- noncardioselective agents enhance pressor response to epinephrine, which results in HTN and reflex bradycardia
- OK to use epinephrine with cardioselective agents
- NSAIDS may reduce the hypotensive effect of beta blockers if used for 3 weeks or longer (short-term use of NSAIDS OK)

Alpha 1 Adrenergic Blockers

- can be used as initial therapy
- beneficial if co-existing hyperlipidemia
- decrease peripheral vascular resistance and systemic BP
- relieve symptoms of benign prostatic hyperplasia (BPH)

-ACE Inhibitors

- preferred drugs in patients with co-existing heart failure
- initial therapy in HTN patients with kidney damage; diabetics with proteinuria; Caucasians
- well-tolerated in young, physically active patients and elderly
- block conversion of angiotensin I to angiotensin II, a potent vasoconstrictor, which results in vasodilation
- by decreasing angiotensin II, there is a decrease in the secretion of aldosterone, which results in decreased sodium and water retention by the kidneys
- decreased sodium and water retention decreases blood volume
- vasodilation and decreased blood volume reduce blood pressure
- lower peripheral resistance and decrease workload
- often used in combination with diuretics
- produce chronic, dry cough

-Angiotensin II Receptor Blockers

- similar to ACE inhibitors while avoiding dry cough
- lower BP by antagonizing vasoconstriction, aldosterone release, catecholamine release, arginine vasopressin release, water intake
- more efficient blockade of CV effects of angiotensin II and fewer side effects than ACE inhibitors
- can be used as initial therapy

-Calcium Channel Blockers

- indicated for angina, hypertension and rate control of arrhythmias
- initial therapy for Caucasians and African Americans
- well-tolerated by the elderly
- fewer side effects than beta blockers
- cause relaxation of vascular smooth muscle which vasodilates coronary and peripheral arterioles
- increase bloodflow by decreasing vascular resistance
- relieve coronary artery spasm in patients with variant angina

Oral Care Considerations with Antihypertensive Medications

- diuretics and centrally-acting adrenergic inhibitors have been associated with xerostomia and mouth soreness
- thiazide diuretics and quinidine have been associated with lichenoid drug reaction
- calcium channel blockers cause gingival hyperplasia and lupus-like face rashes
- 4 calcium channel blockers have been associated with xerostomia:
 bepridil, felodipine, isradipine, nicardipine
- gingival hyperplasia associated with calcium channel blockers
 (nifedipine, verapamil, diltiazem and amlodipine)
- concomitant use of NSAIDS (indomethacin) may reduce the effects of thiazide diuretics, ACE inhibitors and beta blockers

Medications for CAD

-Nitrates

- antianginal agents
- produce vasodilation in large veins resulting in venous blood pooling: result is decreased venous return to the heart (decreased preload); therefore, decreases work of the heart
- decreased work decreases myocardial oxygen demand
- dilates coronary vasculature, increasing blood supply to the myocardium
- sublingual, topical, transdermal and oral dosing
- rapid onset
- rapid tolerance: daily nitrate-free interval to restore sensitivity to drug (6-8 hours)
 - patches are worn for 12 hours, off for 12 hours

-also use aspirin, beta blockers and calcium channel blockers for CAD

Oral Care Considerations with Antianginals

- limit extent of procedures per visit
- limit epinephrine (1:100,000) in local anesthesia to 2 carpules
- consider local anesthetics without epinephrine

Medications for High Cholesterol

-Bile Acid Sequestrants

- reduce cholesterol by binding bile acids in gut
- increase fecal loss of bile salt bound LDL cholesterol

-Nicotinic Acid (Niacin)

- decreases liver triacylglycerol synthesis necessary for VLDL production
- decreased VLDLs decreases plasma LDLs
- can reverse some of the endothelial cell dysfunction leading to thrombosis caused by hypercholesterolemia and atherosclerosis

-Fibric Acids

- decrease plasma triglycerides by stimulating lipoprotein lipase, which hydrolyzes triacylglycerols in chylomicrons and VLDLs, hastening their removal from plasma
- increases HDLs (mechanism unknown)
- inhibit cholesterol synthesis in liver

-HMG CoA Reductase Inhibitors (“statins”)

- inhibit the enzyme that catalyzes the rate-limiting step in cholesterol synthesis
- lower cholesterol by 2 methods: decreasing synthesis, increasing LDL breakdown
- cannot take if liver disease; avoid use of other hepatotoxic drugs
- side effects: myalgias, elevated liver enzymes

- ezetimibe (Zetia)

- acts at the brush border of the small intestine and inhibits the absorption of cholesterol, leading to a decrease in the delivery of intestinal cholesterol to the liver
- this action reduces hepatic cholesterol stores and increases cholesterol clearance from the blood; mechanism is complementary to that of HMG-CoA Reductase Inhibitors
- Zetia + Zocor = Vytorin**

Oral Care Considerations with Lipid Lowering Agents

- use of statins with azole antifungals and macrolide antibiotics increases the risk for muscle weakness and rhabdomyolysis
- use of statins with warfarin (Coumadin) increases the effect of warfarin
- Bile Acid Sequestrants decrease the efficacy of NSAIDs and warfarin
- Fibric Acids increase the effect of anticoagulants = increased bleeding
- clofibrate and gemfibrozil increase the effect of oral sulfonylureas (oral antidiabetic agents) which may produce hypoglycemia (potential medical emergency)

Antiplatelet Agents

- aspirin** = antiplatelet drug
- blocks cyclo-oxygenase, an enzyme associated with clot formation
- inhibits platelet aggregation
- prevents thrombus formation on atherosclerotic plaques
- lowers risk of MI in those with increased risk for atherosclerosis/thrombogenesis
- lowers risk of MI in those with previous history of MI, unstable angina, post-coronary artery bypass grafting
- one enteric coated 325 mg tablet of aspirin daily or 81 mg low dose aspirin

other anti-platelet medications:

aspirin and dipyridamole (Aggrenox)

cilostazole (Pletal)

clopidogrel (Plavix)

dipyridamole (Persantine)

- ticlopidine (Ticlid)** -associated with life-threatening hematologic disorders
- reserved for patients who are intolerant to aspirin or for whom aspirin therapy has failed
 - adjunctive therapy with aspirin following successful coronary stent implantation
 - blocks ADP-mediated platelet aggregation

platelet glycoprotein IIb/IIIa receptor antagonists (fibrinogen receptor inhibitors):

- used in combination with aspirin and heparin to treat unstable angina
- decrease the incidence of death and MI
- inhibit final common pathway involved in adhesion, activation, aggregation

abciximab (ReoPro)

eptifibatide (Integrilin)

tirofiban (Aggrastat)

Anticoagulant Medications

- warfarin (Coumadin)** - oral anticoagulant; most common long-term anticoagulant
- interferes with liver synthesis of Vitamin K-dependent clotting factors

Antithrombins

- antithrombin III (Thrombate III)** = antithrombin III deficiency; thromboembolism
- heparin (Hep-Lock)** - unfractionated heparin with aspirin = unstable angina
 - given by IV only (indirect thrombin inhibitor)

Direct Antithrombins (Thrombin Inhibitors)

- prevent or reduce ischemia complications associated with unstable angina
- prevent deep vein thrombosis (DVT) following elective hip replacement surgery
- prevention and treatment of thromboembolism
- treatment of heparin-induced thrombocytopenia

danaparoid (Orgaran)

argatroban (no brand name) - IV medication

lepirudin (Refludan)

LowMolecular Weight Heparins

- more predictable pharmacokinetic profile than heparin
- administered subcutaneously
- used for prevention and treatment of DVT

dalteparin (Fragmin)

enoxaparin (Lovenox)

tinzaparin (Innohep)

Oral Care Considerations with Anticoagulants

- warfarin use is associated with increased gingival bleeding/mouth ulcers
- anticoagulant therapy may need to be altered prior to invasive dental procedures = requires physician consultation
- consideration is given to bleeding risk vs. clotting risk
- verify safe prothrombin time prior to invasive procedures: may now be reported as the INR (International Normalized Ratio):

INR = $PT(\text{patient}) / PT(\text{control})$

INR 2.0-3.0 = therapeutic range for venous thrombosis, pulmonary embolism, systemic embolism (MI, valvular, atrial fibrillation)

INR 2.5-3.5 = therapeutic range for mechanical prosthetic heart valves

Bleeding Time Test = 1-6 minutes (test rarely used anymore)

Prothrombin Time (PT) = 10-13 seconds (measures extrinsic pathway)

Activated Partial Thromboplastin Time (aPTT) = 25-35 seconds

-measures intrinsic pathway

-used to assess effects of heparin: prolongs aPTT to 50-70 seconds

Thiazide Diuretics

bendroflumethiazide (Naturetin)
chlorothiazide (Diuril)
chlorthalidone (Thalitone)
hydrochlorothiazide (Aquazide H, Microzide, Oretic)
indapamide (Lozol)
methyclothiazide (Aquatensen, Enduron)
metolazone (Mykrox, Zaroxolyn)
polythiazide (Renese)
trichlormethiazide (Naqua)

Loop Diuretics

bumetanide (Bumex)
ethacrynic acid (Edecrin)
furosemide (Lasix)
torsemide (Demadex)

Potassium Sparing Diuretics

amiloride (Midamor)
spironolactone (Aldactone)
triamterene (Dyrenium)

Potassium Sparing Diuretic Combinations

hydrochlorothiazide and spironolactone (Aldactazide)
hydrochlorothiazide and triamterene (Dyazide, Maxzide, Maxzide 25)

Beta Blockers (Cardioselective)

atenolol (Tenormin)
betaxolol (Betoptic, Kerlone)
bisoprolol (Zebeta)
esmolol (Brevibloc)
levobetaxolol (Betaxon) – ophthalmic
metoprolol (Lopressor, Topol XL)

Beta Blockers (Noncardioselective)

levobunolol (Betagan Liquifilm) ophthalmic
metipranolol (OptiPranolol) - ophthalmic
nadolol (Corgard)
oxprenolol (Trasicor, Slow-Trasicor)
propranolol (Inderal, Propranolol Intensol)
sotalol (Betapace, Betapace AF, Sorine)
timolol (Timoptic, Blocadren, Betimol)

Beta Blocker with Alpha Blocking Activity (nonselective)

carvedilol (Coreg)
labetalol (Normodyne, Trandate)

Beta Blocker with Intrinsic Sympathomimetic Activity

acebutolol (Sectral)
carteolol (Cartrol, Ocupress)
penbutolol (Levatol)
pindolol (Visken)

Beta Blocker with Thiazide Diuretic

atenolol with chlorthalidone (Tenoretic)
bisoprolol with HCTZ (Ziac)
propranolol with HCTZ (Inderide)

Angiotensin-Converting Enzyme Inhibitors (ACE inhibitors)

benazepril (Lotensin)
captopril (Capoten)
cilazapril (Inhibace)
enalapril (Vasotec)
fosinopril (Monopril)
lisinopril (Prinivil, Zestril)
moexipril (Univasc)
quinapril (Accupril)
perindopril erbumine (Aceon)
ramipril (Altace)
trandolapril (Mavik)

ACE Inhibitor Combinations

benazepril and HCTZ (Lotensin HCT)
captopril and HCTZ (Capozide)
enalapril and HCTZ (Vaseretic)
fosinopril and HCTZ (Monopril HCT)
lisinopril and HCTZ (Prinzide, Zestoretic)
moexipril and HCTZ (Uniretic)
quinapril and HCTZ (Accuretic)

Angiotensin II Receptor Blockers

candesartan (Atacand)
eprosartan (Teveten)
irbesartan (Avapro)
losartan (Cozaar)
olmesartan (Benicar)
telmisartan (Micardis)
valsartan (Diovan)

Calcium Channel Blockers

amlodipine (Norvasc)
bepridil (Vascor)
diltiazem (Cardizem, Cartia XT,
Dilacor XR, Diltia XT, Tiazac)
felodipine (Plendil)
isradipine (DynaCirc, DynaCirc CR)
nicardipine (Cardene, Cardene SR)
nifedipine (Adalat, Nifedical XL,
Procardia, Procardia XL)
nimodipine (Nimotop)
nisoldipine (Sular)
verapamil (Calan, Calan SR, Covera HS,
Isoptin SR, Verelan, Verelan PM)

Bile Acid Sequestrants

cholestyramine resin (Prevalite, Questran, Questran Light, LoCholest, LoCholest Light)
colesevelan (WelChol)
colestipol (Colestid)

Niacin (Nicotinic Acid) - Niacor, Niaspan, Nicotinex, Slo-Niacin

Fibric Acids

clofibrate (Atromid S)
fenofibrate (Tricor)
gemfibrozil (Lopid)

HMG CoA Reductase Inhibitors

atorvastatin (Lipitor)
fluvastatin (Leschol, Leschol XL)
lovastatin (Mevacor, Altacor)
pravastatin (Pravachol)
rosuvastatin (Crestor)
simvastatin (Zocor)

Angiotensin II Receptor Blocker Combinations

candesartan and HCTZ (Atacand HCT)
irbesartan and HCTZ (Avalide)
losartan and HCTZ (Hyzaar)
telmisartan and HCTZ (Micardis HCT)
valsartan and HCTZ (Diovan HCT)

ACE Inhibitor +Calcium Channel Blocker

amlodipine and benazepril (Lotrel)
enalapril and felodipine (Lexxel)
trandolapril and verapamil (Tarka)

Nitrates

amyl nitrate
isosorbide dinitrate (Dilatrate SR, Isordil)
isosorbide mononitrate (Imdur, Monoket, Ismo)
nitroglycerin (Deponit, Minitran, Nitrek,
Nitro-Bid, Nitro-Dur, Nitrogard, Nitrolingual,
Nitrol, NitroQuick, Nitrostat, Nitro-Tab, NitroTime)

Alpha 1 Blockers

doxazosin (Cardura)
phenoxybenzamine (Dibenzyline)
phentolamine (Regitine, Rogitine)
prazosin (Minipress)
terazosin (Hytrin)

Alpha 2 Agonists

clonidine (Catapres, Catapres-TTS-1,-2,-3;
Duraclon)
guanabenz (Wytensin)
guanfacine (Tenex)

Combination Statin with Niacin

niacin and lovastatin (Advicor)

Adapted from: Wynn RL, Meiller TF and Crossley HL.
Drug Information Handbook for Dentistry. 14th ed.
Hudson:Lexi-Comp, Inc. 2008.