

**Inflammation and bacteria associated with periodontal disease have been linked to 6 out of the 7 leading causes of death in the United States:** Heart Disease, Cancer, Chronic Lower Respiratory Disease (including Asthma), Stroke, Alzheimer's Disease, Diabetes. **THE BIG THREE** of Oral-Systemic associations are **HEART DISEASE, STROKE AND DIABETES**

### ***350+ MEDICATIONS AND DRUGS THAT CAUSE XEROSTOMIA***

Major Categories are drugs used/prescribed for: Depression & Anxiety, Antihistamines, Decongestants & Bronchodilators

Diseases associated with Dry Mouth Syndrome include: Diabetes, Anemia, HIV/AIDS, Sjogren's Syndrome, Rheumatoid Arthritis, Alzheimer's

**15 of the top 20** most common prescribed drugs in the USA are associated with **xerostomia**

1. Hydrocodone & Acetaminophen (VICODEN, NORCO, LORCET)
2. Lisinopril (PRINIVIL, ZESTRIL)
3. Simvastatin (ZOCOR)
4. Amlodipine (NORVASC)
5. Alprazolam (XANAX)
6. Hydrochlorothiazide
7. Omeprazole (PRILOSEC)
8. Atorvastatin Calcium (LIPITOR)
9. Furosemide (LASIX)
10. Metoprolol (LOPRESSOR, TOPROL)
11. Sertaline (ZOLOFT)
12. Zolpidem (AMBIEN)
13. Oxycodone & Acetaminophen (PERCOCET)
14. Citalopram (CELEXA)
15. Fluoxetine (PROZAC)

## MEDICAL HISTORY

- Evaluation begins with a thorough review of your patient's medical history, Medical Model: Interview patient and record narrative, Questionnaire: Discuss patient responses.
- DRUGS! All medications the patient is taking (or supposed to be taking)
- cursory examination of signs/symptoms of disease.
- Collection of vital signs
- Obtain medical consult when necessary with patient's supervising physician.

## CARDIOVASCULAR DISEASE

Untreated or symptomatic heart failure patients are higher risk for MI, arrhythmias, ACUTE heart failure (sudden death) and may not be good candidates for elective dental procedures.

**Chair position may influence the ability to breath (some cannot tolerate supine position).**

**Vasoconstrictors may be contraindicated based on other meds (e.g. Digoxin for angina, non-selective beta blockers for hypertension).**

## HEART ATTACK/MYOCARDIAL INFARCTION

Within very recent past: (6 months), post-pone elective dental care due to increased risk for re-infarctions.

**Look at meds!** Pt may be on anti-anginals, anti-coagulants, adrenergic antagonists (alpha/beta blockers), digitalis, etc. Interactions with vasoconstrictors, higher anxiety/stress. **ASK QUESTIONS!**

## PREMED FOR

- A history of infective endocarditis (regardless of cause)
- Prosthetic cardiac valve or prosthetic material used for cardiac valve repair
- A completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first six months after the procedure.
- The following *CONGENITAL* heart diseases and their treatment:
  - Unrepaired cyanotic congenital heart disease, including palliative shunts and conduits.
  - Any repaired congenital heart defect with residual defect at the site or adjacent to the site of a prosthetic patch or a prosthetic device (that inhibit endothelialization).
  - Joint replacement within 6 months of surgery\*

## DO NOT PREMED FOR

- Mitral Valve Prolapse with or without regurgitation
- Joint replacement in low risk patients *beyond 6 months from surgery*
- Coronary Artery Bypass Graft/Angioplasty
- Cardiac Artery Stents *beyond 6 months of placement*
- Defibrillators

## PREMEDICATION STANDARDS

- ORAL **2G AMOXICILLIN** 30 MIN -1 HOUR PRIOR TO DENTAL TX
- ORAL **600MG CLINDAMYCIN** 30 MIN- 1 HOUR PRIOR TO DENTAL TX
- IV ONLY 600MG CLINDAMYCIN 30 MINS-1 HOUR PRIOR TO DENTAL TX
- IV OR IM 1G CEFAZOLIN OR 2G AMPICILLIN 30 MIN-1 HOUR PRIOR TO DENTAL TX

## HEMATOLOGIC ALTERATION (PT'S TAKING ANTICOAGULANTS)

Prescribed for: Atrial Fibrillation, Coronary artery disease, deep vein thrombosis — can lead to pulmonary embolism, Ischemic stroke, myocardial infarction / heart attack, pulmonary embolism, prevention of restenosis around vascular stents

Monitoring efficacy of the anticoagulant drug therapy: **Coumadin/warfarin**

### *Prothrombin Time Test*

Results can be presented in two ways.

#### **In Seconds:**

- The average time range for blood to clot is about **10 to 14 seconds**. A number higher than that range means it takes blood longer than usual to clot. A number lower than that range means blood clots more quickly than normal.

#### **As INR: International Normalized Ratio**

- This ratio — which allows for easier comparisons of test results from different laboratories — is used if a patient is taking blood-thinning medications (Coumadin)
- In healthy people an INR of 1.1 or below is considered normal. **An INR range of 2.0 to 3.0 is generally an effective therapeutic range for people taking Coumadin/warfarin for disorders such as atrial fibrillation or a blood clot in the leg or lung.** In certain situations, such as having a mechanical heart valve, you might need a slightly higher INR.

- When the INR is higher than the recommended range, it means that your blood clots more slowly than desired, and a lower INR means your blood clots more quickly than desired.

**ANTICOAGULANT DRUGS:** COUMADIN/WARFARIN\* (oral), HEPARIN (injection), XARELTO (oral), PRADAXA (oral), ELIQUIS (ORAL)

**\*\* DO NOT PRESCRIBE METRONIDAZOLE (FLAGYL) OR FLUCONAZOLE (DIFLUCAN) TO PATIENTS TAKING COUMADIN. THESE DRUGS INHIBIT THE CYTOCHROME CYP2C9 NEED TO METABOLIZE COUMADIN. LIFE THREATENING DRUG INTERACTION\*\***

**HERBAL SUPPLEMENTS THAT POTENTIATE BLEEDING:** Birch Bark, Cayenne, Cumin, Evening Primrose Oil, Garlic, Ginger, Ginkgo Biloba, Grapeseed Extract, Milk Thistle, Onion extract, St. John's Wort, Turmeric.

Nutritional supplements: Omega-3 Fatty Acids, Vitamin C & E

## DIABETES

### SEVENTH LEADING CAUSE OF DEATH IN THE UNITED STATES, with no cure

- A group of metabolic diseases characterized by high blood glucose levels & the *inability to produce or use insulin*.
- A deficiency of the pancreatic HORMONE insulin. This results in a failure to adequately metabolize sugars and starch and thus they accumulate in the blood and urine.
- The by-products of fat metabolism (as the body's only alternative energy source since sugar cannot be used) unbalance the acid-base of the blood leading to convulsions, coma and death.
- Type 1: Insulin Dependent Diabetes Mellitus (IDDM)
- Type 2: Non-Insulin Dependent Diabetes Mellitus (NIDDM)
- Prediabetes
- Gestational Diabetes (2-5% of all pregnancies)

TYPE 1: most often early-life onset, referred to as "Juvenile Onset Diabetes"

- Beta cell destruction in pancreas (the insulin producing cells) usually leads to absolute insulin deficiency.
  - Can be immune-mediated: presence of islet cell or insulin antibodies that lead to islet cell destruction
  - Idiopathic: no evidence of auto-immunity

TYPE 2: Most often adult-onset, "Adult Onset Diabetes"

- In healthy people, the liver produces glucose during fasting to maintain normal levels of cell energy production. When food is eaten, the pancreas releases the hormone insulin which is responsible for glucose absorption. When insulin is released, the liver turns down or turns OFF its glucose production.
- *With Type 2 Diabetes though, the liver fails to “sense” the insulin, and will continue to make glucose. THIS IS INSULIN RESISTANCE.*

**INFLAMMATION, NO MATTER FROM WHAT ORIGIN, CAUSES THE SAME SYSTEMIC PROCESS OF RESISTANCE TO INSULIN. THIS RESISTANCE LEADS TO TYPE 2 DIABETES, IT IS THE HALLMARK OF TYPE 2 DIABETES.**

What is an A1C test?  
(HbA1c)

- The A1C test is a blood test that provides information about a person’s average levels of blood glucose, ***over the past 3 months.***
- A1C stands for “*Adult Type Hemoglobin A*” and ‘**1c**’ is the component of hemoglobin to which glucose binds itself.
- The A1C test is the primary test used for diabetes management and diabetes research.
- Does not require fasting, and can be drawn at any time of the day.

How does an A1C test work?

The A1C test is based on the *attachment of glucose to hemoglobin*. In the body, red blood cells are constantly forming and dying, but typically they live for about 3 months. Thus, the A1C test reflects the *average* of a person’s blood glucose levels over the past 3 months. The A1C test *result is reported as a percentage*. The higher the percentage, the higher a person’s blood glucose levels have been.

#### TREATMENT MANAGEMENT OF DIABETIC PATIENTS

- CONTROLLED PATIENTS WITH TYPE 1 OR 2 require little to no special attention unless they develop a significant oral or dental infection that is accompanied by swelling or fever.
- Intravenous sedation that requires fasting prior to the appointment: protocol is HALF the usual insulin dose and then supplementing with IV glucose during the procedure. If patient is well controlled general anesthesia is not contraindicated, however management with local anesthetics is FAR preferable, especially in out-patient settings.
- For MOST diabetic patients epinephrine is well tolerated.
- BUT, be aware that epinephrine has a pharmacologic effect that is OPPOSITE that of insulin, so be aware that blood glucose could RISE with its use.

- For brittle (high insulin doses), under controlled, and patients with hypertension, recent MI or arrhythmia (less than 6 months), be cautious with high delivery of epinephrine containing anesthetics.
- Post-operative infection is *greatest ongoing risk* in diabetic patients.

#### HYPOTHYROIDISM & HASHIMOTO'S DISEASE

Hashimoto's disease is a condition in which the immune system attacks the thyroid gland.

The resulting inflammation from Hashimoto's disease, also known as chronic lymphocytic thyroiditis, often leads to an underactive thyroid gland (hypothyroidism).

Hashimoto's disease is the most common cause of hypothyroidism in the United States. **It primarily affects middle-aged women but also can occur in men and women of any age and in children.**

HYPOTHYroidism, when known, a patient normally is managed with a medication regimen and there are no concerns for dental treatment.

**PALPATE NECK AND THYROID AREAS OF THESE PATIENTS FOR IRREGULAR LUMPS AND NODULES. USE THYROID COLLAR FOR RADIOGRAPHY, ALWAYS.**

- HYPERTHYroidism, when uncontrolled may have a hypersensitive reaction to stress and the effects of adrenergic effects of drugs. Therefore, using vasoconstrictors *could be* contraindicated.
- HYPERTHYroidism: Patients maybe intolerant to heat, easily upset emotionally, may exhibit tremors.
- Untreated or unmanaged HYPERTHYroidism patients may present with exophthalmos: (Bulging eyes)

#### NEUROLOGIC DISORDERS

STROKE: 200,000 a year

- ISCHEMIC 85% of strokes caused by a blood clot
- HEMORRHAGIC
  - *Intracerebral hemorrhage* – most common of HS, artery in brain bursts, flooding surrounding tissue with blood.
  - *Subarachnoid hemorrhage*-bleeding between the arachnoid membrane and the pia mater covering the brain.
- Transient ischemic attack (TIA) “mini-stroke” caused by a temporary clot that is quickly cleared. Usually no longer than 5 minutes.

## EPILEPSY, SEIZURES & CONVULSIONS

- Ask how often they occur? When was last seizure, what kind of seizure? Triggers such as bright light and odors?
- If a patient does have a seizure in the chair or office: 2+ minutes call 911. Monitor vitals for 30 mins, record them, contact patient's physician and send them home with an escort.

## BEHAVIORAL DISORDERS/PSYCHIATRIC TREATMENT

- Knowing this history is helpful to be prepared for unusual behavior during patient treatment.
- The drug LITHIUM is prescribed primarily for Bipolar Disorder to control episodes of mania. It is also prescribed for depression, schizophrenia and eating disorders.

**\*\*DO NOT PRESCRIBE OR RECOMMEND NSAIDs TO PATIENTS TAKING LITHIUM. NSAIDs inhibit the renal excretion of lithium and will cause plasma levels to increase rapidly to toxic levels. LIFE THREATENING DRUG INTERACTION! Very low therapeutic index! (The line between the effective/therapeutic dose and a toxic one is thin).\*\***

## DEMENTIA/ALZHEIMER'S

- Side effect of many drugs used to treat these conditions cause xerostomia.
- Short appointments w/ non-complex procedures if patient is anxious, hostile and uncooperative.
- Any sedation used with physician consult.
- **LEGAL CONSENT**- Is patient capable of informed consent? If questionable, obtain consent from spouse, next-of-kin, guardian.

## LIVER DISEASE

### HEPATITIS (which one?)

- Viral hepatitis is a concern in dentistry because a patient may be asymptomatic carriers of the disease and can transmit it unknowingly to personnel or other patients
- HEPATITIS B,C & D have carrier stages. Lab tests can identify these patients.
- Chronic Hepatitis caused by B or C may lead to cirrhosis.

### CIRRHOSIS

Chronic hepatitis, alcohol-related liver disease most common.

Non-alcoholic fatty liver disease is rising due to increasing rates of obesity.

*Why important? Impairment of liver function may result in prolonged bleeding and less efficient metabolism of drugs including local anesthetics and analgesics.*

#### ALLERGY or ADVERSE REACTION

*ALLERGY: Itching, Urticaria (Hives), Rash, Swelling, Wheezing, Angioedema (Rapid Subcutaneous Swelling), Runny Nose, Tearing Eyes*

*ADVERSE REACTION: Nausea, Vomiting, Heart Palpitations, Fainting*

#### ASTHMA

*What type? When was your last attack? What Drugs? What Triggers? Do you have your inhalers with you now?*

#### HPV Human Papillomavirus

*Over 150 types of HPV have been identified. Some have been found to cause neoplasia and are therefore categorized as “high-risk” types. Other types that cause benign lesions are referred to as “low-risk”. HPV selectively infects skin and mucosa; infection occurs by direct contact.*

- ***At least 40 types of HPV have been identified in the oral mucosa.*** *Of both the high and low risk types, the overall prevalence of HPV in the oral cavity is 6.9%.*
- *HPV is clearly associated with carcinoma of the vaginal cervix. HPV has been identified and associated with SCC that form in the oropharyngeal region, evidence of their role in pathogenesis is emerging, but not yet completely clear.*
- ***Important to note: HPV+ squamous cancers have a higher 5+ year survivability than HPV- cancers.***
- *HPV must infect the basal cells of the epithelium. Usually this requires a break in the surface epithelium.*
  - *Verruca vulgaris (common wart)*
  - *Condyloma acuminatum (venereal wart)*
  - *Multifocal epithelial hyperplasia (Heck disease)*
  - ***VERY ubiquitous, the “common cold” of STD’s***



HHVs: Human herpesviruses, Herpes Simplex: Type 1, Type 2.

#### TREATMENTS (NOT CURES) for HSV1 (LABIAL COLD SORES)

- *Docosanol 10% antiviral cream, brand name **Abreva**. Available OTC.*
- *Acyclovir, antiviral drug, brand name **Zovirax**, Rx only.*
- *Valaciclovir, antiviral drug, brand name **Valtrex**, Rx only.*
- *Acyclovir 5% & Hydrocortisone 1% creme, brand name **Xerese**, Rx only.*
- *Famciclovir, antiviral drug, brand name **Famvir**, Rx only.*

#### MARIJUANA

- *Most commonly used illicit\* drug in the world.*
  - *Tetrahydrocannabinol (THC) is the major psychoactive ingredient in marijuana*
  - *When SMOKED/VAPED, peak effects occur within 20-30 minutes.*
  - *When EATEN, peak effects occur within 2-3 hours.*

#### Patients using Marijuana

- *Using caution with other methods of intake is prudent. REDUCE UNNECESSARY RISK. The acute phase of cannabis intoxication when smoked peaks at around 30 minutes after intake and lasts 2-4 hours.*
- *Irritated airways, spasms, narrowing, sore throat, cough, increased phlegm production.*
- *Peripheral dilation and tachycardia associated with acute marijuana toxicity after anesthetic is given.*

#### PREGNANCY

There are some physiology considerations to be made.

- *Fatigue*
- *Tendency toward syncope*
- *Tendency toward postural hypotension*
- ***SECOND TRIMESTER BEST TIME FOR ELECTIVE DENTAL TX***

## Supine Hypotensive Syndrome

- *Occurs in LATE pregnancy. Patient when in a supine position experiences a rapid drop in blood pressure, bradycardia, sweating, nausea, weakness and air hunger.*
- *This phenomenon occurs when venous return to the heart is impaired resulting from compression of the inferior vena cava by the gravid uterus.*
- Ask patient to roll to her left side, this position will lift the uterus off pressure should rapidly return to normal.

## TREATMENT MANAGEMENT CONSIDERATIONS

- Analgesic of choice is Acetaminophen (Tylenol)
- Local anesthetics with vasoconstrictors are safe (they do cross the placenta, but subtoxic threshold doses have not been shown to cause fetal abnormalities).
- Antibiotics: PCN/AMOX, Erythromycin, Cephalosporin, Metronidazole & clindamycin considered safe.
- Tetracycline & Doxycycline are contraindicated due to their hydroxyapatite bonding causing tooth discoloration, hypoplastic enamel, inhibition of bone growth and other skeletal abnormalities.

## MUSCULOSKELETAL DISEASE

### ARTHRITIS

- OSTEOARTHRITIS
- RHEUMATOID
  - Know patient's drugs (NSAIDs, Steroids, Immunosuppressive)
  - Bleeding and infection response considerations.
  - Chair positions
- PROSTHETIC JOINTS

**Premed** if 6 months or less, OR, if patient has Rheumatoid arthritis, TYPE 1 Diabetes, hemophilia or otherwise immunosuppressed.

### LUPUS ERYTHEMATOSUS: Discoid or Systemic

- Discoid: predominately affects the skin, has very few systemic manifestations and is considered relatively "benign".
- Systemic: affects multiple organ systems
- SLE: involves the skin and many organs and is the much more serious form of LE.

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- Females affected 5 times higher than males, auto-immune, more common and more severe among African Americans and Hispanics than of Caucasians.
- Widespread symptoms, multiple organs and tissues.
- Arthritis VERY common (3 out of 4 cases)
- Butterfly rash across face in about 1/3 of patients with SLE.

Renal abnormalities occur in SLE, consider drug and anesthetic metabolism. NO CURE, treatment is palliative: Reduce sun exposure, NSAIDS, glucosteroids

- Oral lesions of lips and oral mucosa are reported in up to 25% of patients with SLE.
- Lesions are non-specific, may be erythematous with white spots, or radiating peripheral lines, can present as painful ulcerations.
- Lesions often resemble Lichen Planus.
- Additional oral manifestations include xerostomia, dysgeusia (strange or bad taste in mouth) and glossodynia (burning mouth).

#### FUNCTIONAL CAPACITY

Functional Capacity=Normal Physical Activity

Metabolic Equivalents of Tasks (METs): 1 MET= 3.5mL of O<sub>2</sub> per kg of weight at rest

Risk of a serious perioperative cardiovascular event (MI, heart failure) is increased in patients that cannot meet a 4-MET demand during daily activity. \*

***“Can you walk up a flight of stairs without shortness of breath, fatigue or chest pains?”***

**Yes.** That is a **4 METs** task.

**NO?** *This patient MAY be at increased risk for medical complications during treatment especially if this limitation is combined with other risk factors.*

*\*ACC/AHA 2007 Guidelines on perioperative cardiovascular evaluation and care for noncardiac surgery*

A,B,C,D, E&F

A

**Antibiotics:** Will the patient need them either prophylactically or therapeutically? Is the patient already on an antibiotic?

**Analgesics:** Is the patient taking ASA or NSAIDs that may increase bleeding? Will the patient require analgesics after the procedure(s)?

**Anesthesia:** Any potential problems or concerns associated with the use of local anesthetics? Vasoconstrictors?

**Allergies:** Does the patient have any?

**Anxiety:** Will the patient require a sedative or anxiolytic?

B

**Bleeding:** Is abnormal hemostasis a possibility?

**Breathing:** Any difficulties? Abnormally FAST or SLOW breathing?

**Blood Pressure:** Is it well controlled? Is it likely it will increase or decrease during dental treatment?

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C

**Chair Position:** Can the patient tolerate a supine chair position? Will the patient have difficulty with rapid position changes?

D

**Drugs:** Drug interactions, adverse effects associated with the drugs the procedure indicates or drugs the dentist may prescribe?

**Devices:** Any prosthetic or therapeutic devices that require consideration in patient management? i.e. joints, stents, pacemakers, defibrillators, spinal cord stimulators?

E & F

**Equipment:** Any issues with necessary dental equipment? Radiation? Laser or electrocautery, N2O2/O2, ultrasonics. Are devices such as a blood pressure monitor or pulse oximeter indicated and available?

**Emergencies:** Are there any medical urgencies or emergencies that can be anticipated? Can they be prevented by modifying care?

**Follow-up:** What, if any, follow-up care is indicated? Contact at home? Office visit?

## RISK ASSESSMENT

American Society of Anesthesiologists

Physical Classification System ASA I-V

Developed to classify patients according to preoperative risk with general anesthetic.

Has been adapted for outpatient medical and dental use regardless of the type of anesthesia used.

**As the class increases, so does risk**

- **ASA I:** Normal healthy patient
  - **ASA II:** Mild systemic disease, no significant impact on daily activity
  - **ASA III:** Significant or severe systemic disease that limits daily activity
- 
- ASA IV: Severe systemic disease that is a constant threat to life or requires intensive therapy
  - ASA V: Moribund, not expected to survive the next 24 hours.

## MAX LOCAL ANES AMOUNTS BY MANUFACTURER

(1.7ml cartridges) REMEMBER DRUG DOSES ARE IN MULTIPLES OF 17 per 1%

- LIDOCAINE (Xylocaine) 2%, **34mg x 1cp.**
  - 500mg MAX (3mg per pound MAX)
- MEPIVACAINE (Carbocaine) 3%, **51mg x 1cp.**
  - 400mg MAX (3mg per pound MAX)
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  - 400mg MAX (2.7mg per pound MAX)
- BUPIVACAINE (Marcaine) 0.5%, **8.5mg x 1cp.**
  - 90mg MAX (0.9mg per pound MAX)

## MAX DRUG *at or about* 3mg/lb\*

Lighter patients (<150lbs) cap out before getting to absolute drug maximum.

\*(0.5%: 8.5mg with 90mg MAX/ 0.9mg/lb)

**CETACAINE** topical

**Max 200mg (0.4ml)**

## Mixing drugs

- Systemic effects by combinations of local anesthetics follow the principles of summation.
- Adhere to dosage limits and regard all drugs as additive. **DO NOT MAX ON FIRST DRUG DELIVERED.**
- Reduce MAX dose of SECOND drug by 50%.
- Reduce MAX dose of THIRD drug by 75% (3 drugs not recommended-reschedule the patient if you get into this territory!)

**PRINT OUT LAST PAGE AND KEEP HANDY!**

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