

Protocols for the

DENTAL MANAGEMENT OF MEDICALLY COMPLEX PATIENTS

<u>TOPIC</u>	<u>PAGE</u>
1. Bleeding Issues (including anticoagulants)	2
2. Cardiac Problems (heart murmurs, cardiac defects)	5
3. Cardiovascular Problems (high blood pressure, arrhythmias)	9
4. Central Nervous System Problems (seizures, stroke)	13
5. Diabetes	16
6. Immunosuppression	18
7. Infectious Diseases (tuberculosis, hepatitis, HIV, herpes, flu)	20
8. Kidney Problems	25
9. Liver Problems	26
10. Pregnancy	28
11. Prosthetic Joints	30

Protocols compiled by: Peter L. Jacobsen, Ph.D., D.D.S
Adjunct Professor, Department of Diagnostic Sciences
Director, Oral Medicine Clinic
pgjacobs@pacbell.net

Protocols maintained by: Alan Budenz, MS, DDS, MBA
Professor, Department of Biomedical Sciences and
Vice Chair, Department of Diagnostic Sciences
abudenz@pacific.edu
and
Anders Nattestad, DDS, Ph.D.
Professor, Department of Oral and Maxillofacial Surgery
anattestad@pacific.edu
University of the Pacific, Arthur A. Dugoni School of Dentistry

Please direct all comments, edits and suggestions to Alan Budenz abudenz@pacific.edu or write to:

Alan W. Budenz, DDS
Department of Diagnostic Sciences
University of the Pacific, Arthur A. Dugoni School of Dentistry
155 Fifth Street
San Francisco, CA 94103-2919

Updated August 2020

Bleeding Issues or Patients on Anticoagulants (1 of 11)

Questions to Ask / Necessary Information:

1. How long have you had a bleeding issue or, depending on the situation, how long have you been on anticoagulant medication?
2. Describe your bleeding issue
3. Have you had problems with previous dental appointments?
4. What is the cause of your bleeding issue or why are you on anticoagulants?
5. Are your anticoagulants or bleeding issues due to low platelets?
6. What are your most recent laboratory results relative to your anticoagulation or bleeding issue status?

Diagnostic Tests:

1. Bleeding issues secondary to liver disease:
 - a) INR - international normalized ratios
2. Aspirin and other non-steroidal anti-inflammatory agents.
 - a) Bleeding time.
3. Thrombocytopenia
 - a) CBC with a differential (which will give platelet count)
 - b) Bleeding time
4. Anticoagulant warfarin
 - a) INR
5. Anticoagulant Plavix and newer agents
 - a) There are NO reliable tests

Management During Dental Treatment:

1. No type of dental treatment should be rendered that has the potential for severe bleeding (i.e. extractions, scale/root plane).
 - a) If INR greater than 3.5
 - b) If bleeding time greater than 10 minutes
 - c) If platelet count less than 60,000

Bleeding Issues or Patients on Anticoagulants – continued

2. If the bleeding parameters are greater than above, medical coordination is required. For example, the physician may decrease the anticoagulant dose or provide packed platelets or prescribe supplemental vitamin K until bleeding parameters are brought into line consistent with dental treatment. It is preferred to maintain the patient's anticoagulation therapy without interruption, if at all possible.
3. With Plavix and newer anticoagulants, because there are NO reliable tests for bleeding risk, we are working blind, so it is recommended to proceed very carefully, taking the time to observe the patient's ability to coagulate at each step of the planned procedure and reducing the extent of the procedure if necessary. It is preferred to maintain the patient's anticoagulation therapy without interruption, if at all possible.
4. Pradaxa (dabigatran), Xarelto (rivaroxaban), Eliquis (apixaban), and Savaysa (edoxaban) are all members of a group of new oral anticoagulants that directly inhibit thrombin (factor IIa), thereby blocking the generation of fibrin. After ingestion, plasma concentrations of the drug peak within 2 hours. Nearly 85% of the drug is eliminated in the urine and they have a half-life of 12 – 17 hours in patients with normal renal function. Patients usually take these drugs twice a day to maintain appropriate anticoagulant blood levels.

As with warfarin, these drugs do not need to be and should not be suspended for dental procedures that have a potential for minimum or limited bleeding. Such procedures should include conservative hemostatic measures such as removal of granulation tissue and the use of hemostatic agents such as surgicel or gelfoam, and suturing. Because the half-life of these drugs is so short, it is suggested that consideration be given to performing the surgical procedure as late as possible after the last dose of the drug.

Unless extensive bleeding is expected, there is no need to modify or suspend this anticoagulant therapy. However, if there is a risk of extensive or extended bleeding, then a consultation with the patient's physician is appropriate and consideration should be given to discontinuing the drug for 2 – 3 half-lives before the surgery (24 – 36 hours in patients with normal renal function). Depending on the reason for the need for the anticoagulant, it may be recommended to provide substitution therapy such as with low molecular weight mini-heparins, which should always be done in close collaboration with the physician prescribing the drug.

5. If hemophilic, have physician administer proper replacement factors and run necessary test to insure patient is within safe parameters.
6. During dental procedures minimize physical trauma and pack extraction sites that have the potential to bleed with local pressures and other coagulation procedures, i.e. Gelfoam. Obtain primary closure on any surgical sites, if possible.

Bleeding Issues or Patients on Anticoagulants – continued

7. Establish primary closure and/or put pressure on potential/actual bleeding site.

Be Alert For:

- 1) Easy or prolonged bleeding with minimal trauma (i.e. probing, wedge placed between teeth for amalgam matrix)
- 2) Easy bruising / multiple bruises

Preventative / Precautions:

1. Assure the patient is aware of necessary lab tests that should be done close to the time of dental treatment (within a week, or closer if they have had previous problems). Some bleeding parameters can change quickly.
2. Avoid drugs that may cause drug interaction, such as erythromycin and ketoconazol, which inhibit warfarin metabolism. Also avoid drugs that can prolong bleeding, such as aspirin or other non-steroidal anti-inflammatories.
3. Encourage the patient to keep you informed of any drug changes and their use of any over-the-counter medications and herbal supplements.
4. If the patient calls from home following treatment, instruct them to apply pressure with gauze or cloth to the bleeding site for 10-30 minutes. If bleeding persists, have the patient come into the office immediately or to a medical emergency room.

<https://medlineplus/bleedingdisorders> (U.S. National Library of Medicine)

<https://labtestsonline.org/conditions/bleeding-disorders> (American Academy of Clinical Chemists)

<https://www.wfh.org/en/resources-education/educational-materials> (World Federation of Hemophilia)

Centers for Disease Control and Prevention

Hereditary Blood Disorders Team Internet Address:

<http://www.cdc.gov/ncbddd/blooddisorders/index.html>

HANDI/National Hemophilia Foundation

Phone number: (800) 424-2634 Internet Address: <http://www.hemophilia.org>

Excellent site on anticoagulants: different types, brands, uses, side effects, and dental precautions – <http://medlineplus.gov/druginformation.html> type “anticoagulants” into the Search Box

Comprehensive site on bleeding problems to recommend to your patients:

<http://www.chemocare.com/chemotherapy/side-effects/bleeding-problems.aspx>

Cardiac Problems - heart murmurs, cardiac defects (2 of 11)

Questions to ask / Necessary Information:

1. When was your heart problem first diagnosed?
2. Have you ever been hospitalized because of your heart problem?
3. Did the doctor ever say you needed prophylactic antibiotics prior to dental treatment?
4. Did the doctor ever say you didn't need prophylactic antibiotics prior to dental treatment?

Diagnostic Tests:

Medical consult to identify type of heart problem and whether prophylactic antibiotics are needed, if patient unsure. Please note: the American Heart Association Guidelines for the Prevention of Bacterial Endocarditis was revised in May of 2007. Most of the patients who previously needed prophylactic antibiotics for dental procedures, including those patients with diagnosed murmurs, now no longer need them.

Management During Dental Treatment:

PROPHYLACTIC ANTIBIOTIC COVERAGE FOR PREVENTION OF BACTERIAL ENDOCARDITIS

Current American Heart Association Guidelines
Published May 8, 2007, *Circulation*, Vol 115.

Cardiac Conditions for Which Prophylaxis for Dental Procedures is Recommended*

Prosthetic Cardiac Valve

Previous Infective Endocarditis

Congenital Heart Disease (CHD)

1. Unrepaired cyanotic CHD, including palliative shunts and conduits.
Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first 6 months after the procedure (endothelialization occurs within 6 months of procedure)
2. Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibits endothelialization)

Cardiac Problems - heart murmurs, cardiac defects – continued

3. Cardiac transplant recipients who develop cardiac valvulopathy

If the patient’s physician requests prophylaxis for the dental procedure, but the patient does not meet the ADA/AHA criteria for needing it, then the physician should prescribe the prophylaxis, the patient takes it under their direction, and they come to you for dental procedures.

Except for the cardiac conditions listed above, antibiotic prophylaxis is no longer recommended for any cardiac condition or problem.

1. If the patient needs prophylactic antibiotics, follow the **American Heart Association guidelines** below:

Premedication requirements for patients with valvular heart disease or congenital cardiac defects. If in doubt, have the patient consult their physician as to need.

Standard Regime

Rx	Amoxicillin 500 mg.
Disp	4 tablets Sig take 4 tablets (2.0 g) 30 – 60 minutes before procedure
Note	1) Children 50 mg/Kg. Do not exceed adult dose 2) No second dose is required for adults or children

Standard Regime for Patients Allergic To Amoxicillin/Penicillin

*Rx	Clindamycin 150 mg.
Disp	4 tablets
Sig	Take 4 tablets (600 mg) 30 – 60 minutes before procedure

Or

Rx	Azithromycin 250 mg
Disp	2 tablets
Sig	Take 2 tablets (500 mg) 30 – 60 minutes before procedure

Or

Cardiac Problems - heart murmurs, cardiac defects – continued

Rx	Clarithromycin 250 mg
Disp	2 tablets
Sig	Take 2 tablets (500 mg) 30 – 60 minutes before procedure

Or

*Rx	Cephalexin 500 mg.
Disp	4 tablets
Sig	Take 4 tablets (2 g) 30 – 60 minutes before procedure

Or

*Rx	Cefadroxil 500 mg
Disp	4 tablets
Sig	Take 4 tablets (2 g) 30 – 60 minutes before procedure

* Note: Cephalosporins should not be used in individuals with immediate-type hypersensitivity reaction (urticaria, angioedema, or anaphylaxis) to penicillins.

Note: **Children’s dosage. (Do not exceed adult dose)**

- Clindamycin 20 mg/kg
- Cephalexin 50 mg/kg
- Cefadroxil 50 mg/kg
- Azithromycin 15 mg/kg
- Clarithromycin 15 mg/kg

Patients Unable To Take Oral Medication

Ampicillin	2 g IV or IM within 30 minutes before procedure. Children: 50 mg/kg IV or IM within 30 minutes before procedure.
------------	---

Cardiac Problems - heart murmurs, cardiac defects – continued

For Patients Unable to Take Oral Medication and Allergic to Ampicillin, Amoxicillin, Penicillin

Clindamycin	600 mg IV within 30 minutes before procedure. Children: 20 mg/kg IV within 30 minutes before procedure.
*Cefazolin	1 g IV or IM within 30 minutes before procedure Children: 25 mg/kg IV or IM within 30 minutes before operation.

*Note: Cephalosporins should not be used in individuals with immediate-type hypersensitivity reaction (urticaria, angioedema, or anaphylaxis) to penicillins.

2. If patient states they're unsure whether prophylactic antibiotics are needed and contact with their physician is not possible, then treat with standard guidelines if an emergency, or refer patient for medical consult to establish need or lack of need for antibiotic prophylaxis.
2. Document in the chart the time and dosage of antibiotics taken for prophylaxis.

Be Alert For:

Flu-like symptoms within two days, most commonly within two weeks, rarely within four weeks following dental procedures. Such symptoms can be signs of bacterial endocarditis, even if the patient has been properly prophylaxed. If they have such symptoms they should see their physician.

Preventative / Precautions:

1. Good oral hygiene.
2. Proper teeth cleaning and chlorhexidine rinse prior to extractions to decrease magnitude of possible bacteremias.
3. Gingivitis, and, especially, periodontitis, increases the frequency, intensity, and duration of bacteremias.

Stress to the patient that they should take their prophylactic antibiotic medication within the proper timeframe.

Cardiovascular Problems – high blood pressure, arrhythmias (3 of 11)

(High blood pressure, arrhythmia, congestive heart disease (angina pectoris))

Questions to Ask / Necessary Information:

A. **High blood pressure**

1. How high does your blood pressure get?
2. Do you know what your blood pressure usually is?
3. What is your blood pressure when you are taking medications?
4. Have you had any problems / side effects with your blood pressure medication?
5. Have there been any recent changes in your medications?
6. Have you ever had hypertensive episodes when the high blood pressure could not be controlled?
7. Have you ever had to postpone dental treatment or had any problems with dental care, relative to your blood pressure?
8. Did you take your medication today?

B. **Arrhythmia**

1. What kind of arrhythmia do you have?
2. What triggers the arrhythmia episodes?
3. Do you take your medication for your arrhythmia? If so, what medication, and did you take it today?
4. Is the arrhythmia effectively controlled with medication?

C. **Congestive heart disease**

1. Do you get chest pains on exertion?
2. Can you walk up a flight of stairs without needing to rest to catch your breath or getting chest pains?
3. Do you take medications for your congestive heart failure? If so, did you take them today?

Cardiovascular Problems – high blood pressure, arrhythmias - continued

Diagnostic Tests:

A. **High blood pressure:**

1. Take blood pressure.
2. Depending on situation, take blood pressure at beginning and end of appointment.

B. **Arrhythmia:**

1. Take patient's peripheral (radial, carotid) pulse and feel for arrhythmia

C. **Congestive heart disease:**

1. Stress test by physician

Management During Dental Treatment:

A. **High blood pressure.**

1. Blood pressure is recommended to be measured for all new patients to obtain a baseline reading.
2. Patients with **Normal** (<120 mm Hg systolic and <80 mm Hg diastolic) and **Elevated** (120 – 129 mm Hg systolic *and* ≤80 mm Hg diastolic) blood pressures are good candidates for all dental procedures and can normally receive local anesthesia with epinephrine 1:100,000. Blood pressure should be reassessed at all recall appointments, and for patients with Elevated BP it is recommended to be rechecked prior to administering any local anesthesia injections/invasive treatments.
3. Patients with **Stage 1 Hypertension** (130 – 139 mm Hg systolic *or* 80 – 89 mm Hg diastolic), require an overall assessment depending on the complexity of the planned dental procedure and patient's level of anxiety. Blood pressure should be measured at every appointment.
4. Patients with **Stage 2 Hypertension** (≥140 mm Hg systolic *or* ≥90 mm Hg diastolic) require an overall assessment depending on the complexity of the planned dental procedure and patient's level of anxiety. A medical consultation is highly recommended. NO elective treatment should be rendered until blood pressure is medically confirmed as under control. Some type of sedation such as benzodiazepine (valium) or nitrous oxide may be appropriate before rendering any emergency dental care. Blood pressure must be measured at every appointment.

Cardiovascular Problems – high blood pressure, arrhythmias - continued

5. Patients with blood pressure greater than 180 mm Hg systolic *or* 110 mm Hg diastolic are NOT to receive any routine dental treatment at our dental school and should be referred for consultation with their physician.
6. Blood pressure greater than 180 mm Hg systolic *and/or* 120 mm Hg diastolic is classified as **Hypertensive Urgency, or Crisis**. These patients should be referred to a physician for IMMEDIATE evaluation and medical treatment. No dental treatment should be rendered until blood pressure is medically confirmed as under control.
7. Blood pressure greater than 180 mm Hg systolic with target organ damage *and/or* greater than 120 mm Hg diastolic with target organ damage is a **Hypertensive Emergency. 911 Emergency Protocols should be implemented immediately.**
8. In patients with controlled high blood pressure, using local anesthetic with a vasoconstrictor such as 1:100,000 epinephrine or its equivalent is appropriate. The ADA suggests a maximum of 40 µg (≈2 cartridges of 1:100,000 epi) then wait for at least 10 minutes. If no problems arise, additional cartridges can be administered. For patients with blood pressure above 140/90, epinephrine impregnated retraction cord should be avoided.

B. Arrhythmia or congestive heart failure:

1. If patient's arrhythmia or congestive heart failure is controlled, no special precautions necessary.
2. If patient has an arrhythmic or congestive heart failure (angina pectoris) episode, dental treatment should be delayed. If arrhythmia occurs in the midst of treatment and treatment must be completed, discontinue until heart rhythm stabilized (may require hospitalization for cardioversion), then complete treatment quickly and calmly.
3. If angina pectoris occurs, stop treatment, administer oxygen, minimize stress and wait until the pain resolves. Continue as needed, if necessary, and patient feels capable of completing to a safe stopping point
4. Local anesthetic with vasoconstrictor (1:100,000 epinephrine or equivalent) is appropriate. 1:50,000 concentration of epinephrine or equivalent should be avoided. Epinephrine impregnated retraction cord should not be used.

Cardiovascular Problems – high blood pressure, arrhythmias – continued

Be Alert For:

A. *High blood pressure:*

1. Request patient inform you if they feel as though their blood pressure is increasing or if they are getting a headache. Some patients feel jittery, others feel as though there is increased pressure behind the eyes.
2. Profuse bleeding, beyond what would be expected.

B. *Arrhythmia:*

1. Patient to inform you if they feel an arrhythmia. Sometimes this manifest as a coughing or catching feeling in the chest. Other times it is a feeling of light headedness.

Preventative / Precautions:

Be reassuring with the patient. Under no circumstances should you panic as that will only increase the patient's anxiety which will cause the blood pressure to increase or the arrhythmia to intensify or be prolonged. An alert, concerned, everything is in control, we know what is happening and everything will be fine, professional demure is appropriate.

Central Nervous System – seizures, stroke (4 of 11)

Questions to Ask / Necessary Information:

A. **Stroke:**

1. When did you have your stroke?
2. What loss of function occurred?
3. Have you recovered some function over time?
4. Have you ever had trouble with dental appointments or medical appointments?
5. Is there anything I need to know that will make you more comfortable or make it easier for you to deal with the dental appointment?
6. Are you taking any medication related to the stroke or to prevent another stroke? If so, what medication?

B. **Seizures:**

1. What type of seizure do you have?
2. What stimulates a seizure and do you have an aura prior to the seizure?
3. What is the cause of your seizures? (i.e. head injury, born with problem)
4. How frequently and when (time of day) do they usually occur?
5. What type of medications are you taking to control the seizures?
6. Does the medication work?
7. Do you take the medication regularly or do you discontinued it at times? If you did discontinue, was it your decision or your doctor's and what happened?

Diagnostic Tests:

A. **Stroke:**

1. If patient taking anticoagulant, then assess bleeding status (see Bleeding Problems management protocol)

Central Nervous System – seizures, stroke - continued

B. Seizure:

1. If patient unclear about types of seizure or medications, and seizures are poorly controlled, then medical consultation for the above information will be needed.

Management During Dental Treatment:

A. Stroke:

1. No special treatment considerations are necessary except those that the patient notes could be of value (modifying dental treatment procedures based on the patient's perceived needs has an enormous positive psychological benefit for the patient).
2. Depending on what areas have lost function, especially if the head and neck or oral cavity area are affected, certain types of dental prostheses may or may not be effective, i.e. removable prostheses may not be effectively retained without adequate muscle tone, so fixed prostheses or implant may be needed.

B. Seizures:

1. Schedule patient early morning when they are well rested.
2. Patient should be instructed to take their medication properly for at least the several days prior to the dental appointment.
3. Patient should be questioned at dental appointment whether in fact they have taken the medication correctly.
4. If seizure occurs, it should be allowed to run its course. The primary concern will be protection of the patient so they don't hurt themselves and the protection of the dentist and staff so the patient doesn't hurt them.
5. Following a seizure, the decision to continue or discontinue treatment is based on the patient's condition (does the patient feel like he/she can complete the procedure?) and the treatment needed.

Be Alert For:

A. Stroke:

1. Signs of recurrence of stroke, such as slurred speech, confusion, loss of balance and inability to hold saliva in mouth, and transient ischemic attacks (TIA) manifest as fainting and dizziness, with spontaneous recovery.

Central Nervous System – seizures, stroke - continued

2. Alert patient's guardian to any new stroke signs or symptoms so physician can follow up.
3. If patient taking anticoagulants, review Bleeding Problems protocol for additional alerts.
4. If stroke has effected swallowing, suction frequently.
5. If stroke has effected eyelids, protect/cover eyes as needed.

B. Seizures:

1. Be alert to dental / oral damage secondary to seizure.
2. Be aware of possible gingival hyperplasia secondary to Dilantin.

Preventative / Precautions:

Strokes and seizures:

1. Minimize stress, avoid procedures that may cause spiking of blood pressure, consider pre-procedural anti-anxiety medication such as Valium, if patient is fearful.

Seizures:

2. Good oral hygiene. The better the oral hygiene, the less likely or less severe gingival hyperplasia secondary to Dilantin.

Diabetes (5 of 11)

Questions to Ask / Necessary Information

1. Age first diagnosed?
2. Type of diabetes?
3. Medication being taken?
4. If Insulin is being taken, what is time interval and amount?
5. How often do you check your blood sugar?
6. Have you been hospitalized during the past year for problems related to your diabetes?
7. Is your diabetes well controlled or does it get out of control at times?

Diagnostic Tests:

- *1. Fasting blood sugar (reflects current control, that day). (> 126 mg/dL)
- *2. Random plasma glucose > 200 mg/dL with symptoms (polyuria, polydipsia, unexplained weight loss)
- *3. 2 hour plasma glucose > 200 mg/dL following a 75g glucose load
4. Fructosamine test (reflects average control over last 2-3 weeks).
5. Glycated hemoglobin (HbA1c) (reflects average control over last 6-8 weeks). ($>7\%$ = problem)

* **Official diagnostic tests for diabetes**

Management During Dental Treatment:

1. Patient should have eaten a balanced meal (includes fat and protein as well as carbohydrates) within the last two hours before coming to the dental appointment.
2. Patient should have taken their medications (if they take medications).
3. Food (Power Bar or some other balanced nutritional supplement) should be available if appointment lasts longer than two hours.
4. Early morning appointments.

Diabetes – continued

Be alert for:

1. Periodontal problems.
2. Candidiasis / xerostomia.
3. Poor response to treatment, especially periodontal therapy.
4. Poor healing.
5. Slow healing.
6. Any dental infection should be treated promptly i.e. with antibiotics and appropriate incision and drainage.

Preventative / Precautions:

1. Good home care.
2. Good glucose control.
3. Take medications predictably.

Immunosuppression (6 of 11)

Diseases: HIV, leukemia, primary immunosuppressive diseases

Medications: Cancer chemotherapeutic agents, immunosuppression drugs used in organ transplant patients, corticosteroids to suppress severe auto-immune diseases.

Questions To Ask / Necessary Information (Questions should be designed to evaluate the severity of the immunosuppression and the reason for it. Questions will vary depending on the reason the patient says they are immunosuppressed):

1. Why are you immunosuppressed?
2. How long have you been immunosuppressed?
3. Have you been hospitalized because of problems resulting from your immunosuppression, i.e. infections?
4. Are you taking any prophylactic medication to prevent infections because of your immunosuppression?
5. Has your doctor said that any special precautions should be taken during medical or dental treatment to prevent (prophylax against) possible infections?

Diagnostic Tests:

1. CBC with a differential (especially platelet count, if planning surgery).
2. T-suppressor cell count (HIV patients).
3. Viral load (HIV patients).

Management During Dental Treatment:

1. Depending on severity of immunosuppressants, laboratory tests, primarily CBC with differential, should be done immediately (within 5 days) of major invasive procedure, i.e. extractions, scaling and root planing, periodontal surgery.
2. If white count below 2,000, no elective treatment until white count restored.
3. If platelet count is less than 60,000, no elective treatment. If emergency treatment is needed with the risk of bleeding, then have physician give the patient a packed platelet infusion prior to procedure.

Immunosuppression – continued

4. If patient is severely immunosuppressed and infection is present, consider prophylactic antibiotics prior to oral surgical or periodontal surgical procedures.
5. Institute aggressive treatment of any dental infection, including antibiotics, incision and drainage, and proceed with any necessary endodontic procedure or extraction.
6. Aggressively control any periodontal disease with proper cleaning and supplemental medication such as chlorhexidine rinse.

Be Alert For:

1. Periodontal infections
2. Yeast infections
3. Viral infections
4. Periapical problems, impacted teeth, poorly done endodontic procedures, oral ulcerations.

Preventative / Precautions:

1. Prior to organ transplant or when patient is most immunocompetant, consider aggressive dental therapy to remove / resolve any possible dental problems, i.e. scale / root plane for periodontal disease, extract impacted teeth, complete any needed or expected endodontic procedures. Consider extracting teeth with compromised endodontic prognosis.
2. Good oral hygiene.
3. Prophylaxis for viral and fungal infections.

Patient told to alert dentist or physician at first sign of any infection.

Infectious Diseases (7 of 11)

(Tuberculosis, hepatitis, HIV, herpes, the flu)

Questions To Ask / Necessary Information:

A. Tuberculosis:

1. When were you diagnosed?
2. Are you still having symptoms of active infection, such as coughing? Night sweats?
3. What medications have you taken and for how long?
4. Have you taken them as directed?

B. Hepatitis:

1. What type of hepatitis do you have?
2. Are you actively infected at this time?
3. Have you had any signs or symptoms of your hepatitis?
4. Have you had any change in your liver function tests?
5. Have you taken any medication specifically to treat your hepatitis?
6. If you had hepatitis B, do you know your hepatitis antigen status?

C. HIV:

1. When were you first infected?
2. What is your current CD4 t-cell count?
3. What is your current viral load?
4. Have you had any bleeding problems?
5. Have you had any specific diseases related to HIV infection?
6. Are you taking any specific medications for HIV infection?

D. Herpes / flu: (risk associated with these diseases is transmission to the healthcare provider)

1. Are you actively infected at this time?

Infectious Diseases – continued

Diagnostic Tests:

A. **Tuberculosis:**

1. If tuberculin test is positive, then a chest x-ray should be taken.
2. If the chest x-ray is positive, or if there is obvious active infection, then sputum test for tuberculosis bacillum should be done.

B. **Hepatitis:**

1. Hepatitis antigens and antibodies should be run.
2. If patient has active hepatitis, then liver function should be run or request physician provide information as to liver function and coagulation status.

C. **HIV:**

1. Current laboratory tests including t-cell count, viral load, CBC with a differential to give platelet count and white count should be done (refer to **Pacific Protocols for the Dental Management of Patients with HIV Disease**).

D. **Herpes / flu:**

1. No specific laboratory tests need be run.
2. If patient is interested in which type of herpes they have, type 1 versus type 2, then antibody tests can be run.

Management During Dental Treatment:

A. **Tuberculosis:**

1. No elective treatment rendered until physician says patient is not infectious (sputum negative).
2. If emergency treatment is necessary, patient should be treated in a level 3 infection control facility with hepafilter mask and laminar airflow.
3. In an actively infected patient, the air expelled when coughing is infectious and should be avoided.

Infectious Diseases – continued

B. *Hepatitis:*

1. Since all patients are treated as though they are infectious and universal precautions are applied, no special precautions are necessary when treating a patient actively infected with the hepatitis virus (If patient is having liver problems secondary to hepatitis, then review liver protocol).

C. *HIV:*

1. If patient is HIV infected but has had no medical problems, then no special precautions are needed.
2. Since all patients are treated as though they are infectious, the usual universal precautions are adequate for management.
3. If patient has signs and symptoms of immunosuppression, refer to protocols for patients with immunosuppression.
4. Review the patient's medications and any dental medications that may be used, to insure no drug interaction.

D. *Herpes / flu:*

1. Since all patients are treated as though they are infectious, the normal universal precautions apply and patient is safe for treatment.
2. If patient is feeling so poorly that they don't feel strong enough for dental treatment, they should be re-appointed.
3. If patient having herpes attack, no special precaution is necessary though patient may want to have herpetic ulcer lubricated or even topical anesthetic applied to minimize discomfort associated with manipulation of oral cavity.

Be Alert For:

A. *Tuberculosis:*

1. Oral ulceration or head and neck ulceration, advanced forms of tuberculosis can manifest as what is termed caseating necrosis. Clinically it appears as an ulceration. These ulcers have a high content of tubercular bacilli. Patients with such ulcerations should not receive elective dental treatment until their T.B. infection is resolved.

Infectious Diseases – continued

B. *Hepatitis:*

1. Be alert for signs of jaundice. Follow the protocol for liver dysfunction.

C. *HIV:*

1. Be alert for oral manifestations of immunosuppression such as oral yeast infections, viral infections and periodontal problems. Follow the protocol for Immunosuppression.
2. Be alert for poor healing response and bone sequestration following extractions.

D. *Herpes / flu:*

1. With herpes, avoid traumatizing tissue as it may trigger a herpes attack.
2. If patient knows that herpes attack is precipitated by trauma, consider prophylactic antiviral medication.

Preventative / Precautions:

A. *Tuberculosis:*

1. Faithful taking of medication.
2. Good personal hygiene, hand washing, and not coughing on anybody.
3. Good nutrition and rest.

B. *Hepatitis:*

1. See liver dysfunction protocol.

C. *HIV:*

1. See immunosuppression protocol.

D. *Herpes / flu:*

1. For herpes, keep lesion lubricated.
2. Consider antiviral therapy.

Infectious Diseases – continued

3. Remind patient that herpetic lesion is contagious, especially when blister present and up to two days after it bursts. Encourage them to observe appropriate personal hygiene and avoid mucous membrane contact with other people when active lesion present.
4. For flu, wash hands frequently.
5. Avoid coughing on people or possible contact with nasal secretions.

Kidney Problems (8 of 11)

Questions to Ask / Necessary Information:

1. What kind of kidney problem do you have?
2. Does it interfere with your everyday living?
3. Does it alter the way you eliminate medication?

Diagnostic Tests:

1. BUN (blood, urea, nitrogen)
2. Creatine clearance rate

Management During Dental Treatment:

1. Do not use drugs toxic to the kidney i.e. acetaminophen
2. Use caution and alter dosage form when using drugs eliminated by the kidney i.e. penicillin (often reduced to 500 mg two times per day versus four times per day)
3. If patient on renal dialysis, dental treatment should be done on the day following dialysis.
4. If patient has kidney transplant, see considerations under immunosuppression protocol.

Be Alert For:

1. Drug toxicity because of accumulation.
2. Poor healing and oral ulcerations.

Preventative / Precautions:

1. No special dental precautions needed

Patient should be counseled as to potential toxicity problems from certain prescriptions and over-the-counter drugs, plus alcohol.

Liver Problems – (9 of 11)

Questions to Ask / Necessary Information:

1. How long have you had a liver problem?
2. What type of liver problem is it and how was it caused?
3. Do you feel unwell relative to the liver problem?
4. Have you noticed any problems such as bleeding, difficulty in metabolizing / digesting food, or increased or decreased sensitivity to medication, from the liver problem?
5. Do you ever get jaundice (do the whites of your eyes or your skin turn or look yellow)?
6. Have you ever needed to be hospitalized because of your liver problem?

Diagnostic Tests:

1. SMA20 (specifically SGOT, AST, ALT)
2. PT & PTT
3. INR

Management During Dental Treatment:

1. If bleeding problems, follow bleeding problem protocol.
2. If unable to metabolize drugs, avoid using drugs metabolized in the liver such as erythromycin and ketoconazol. Minimize local anesthetics.
3. If patient having problem with drug interactions, avoid drugs with high potential for drug interaction used in dentistry i.e. erythromycin and ketoconazol.
4. Avoid drugs with potential for liver toxicity, i.e. acetaminophen, Tylenol, and any other over-the-counter / non prescription drugs.

Be Alert For:

1. Easy bleeding
2. Yellow tint to skin, oral mucosa, and the whites of the eye.
3. Poor healing

Liver Problems – continued

4. Oral ulcers

Preventative / Precautions:

1. Good oral hygiene to minimize oral hygiene problems.
2. Avoidance of drugs that are toxic to the liver, i.e. acetaminophen, alcohol.

Pregnancy (10 of 11)

Questions to Ask / Necessary Information:

1. What month of pregnancy are you in?
2. Are you currently seeing a physician for your pre-natal care?
3. Has your physician referred you to a high-risk OB?
4. Do you have any physical limitations, bed rest orders, or changes to daily activities?
5. Have you had complications with prior pregnancies?

Diagnostic Tests:

None. Patient will make the diagnosis.

Management During Dental Treatment:

Comprehensive dental care during pregnancy is now the standard of care.

Prevention, diagnosis, and treatment of oral diseases, including needed dental radiographs and use of local anesthesia, are highly beneficial and can be undertaken during pregnancy with no additional fetal or maternal risk when compared to the risk of not providing care.

However, it is recommended that non-urgent and elective care be postponed, if possible, until postpartum. This would include elective surgical procedures, including asymptomatic wisdom tooth extractions, placement of dental implants, and bone grafting for implant site development.

1. First three months of pregnancy –
 - a) There are no restrictions for delivering any needed dental treatment.
 - b) As with all dental treatment, minimize the amounts of medications. Lidocaine is the safest local anesthetic agent to use. There are NO contraindications for the use of local anesthetics with vasoconstrictors.
 - c) Educate the patient about the value of good oral hygiene and good nutrition.
2. Second trimester and first half of third –
 - a) This is the most ideal time for all dental treatment needed or desired during the pregnancy.
 - b) As always, minimize drug and medication exposure.
 - c) Emphasize proper periodontal care and good nutrition.

Pregnancy – continued

3. Last half of third trimester –
 - a) Minimize dental treatment to necessary and/or emergency treatment.
 - b) As always, minimize drug and medication exposure.
 - c) To aid in preventing postural hypotensive syndrome in a pregnant patient during dental treatment, the *Oral Health During Pregnancy and Early Childhood: Evidence-based Guidelines for Health Professionals* recommends the use of a small pillow under the patient's right hip while positioning her in the dental chair. It is also recommended to allow the patient to turn on her side.

Be Alert For:

1. Periodontal problems: Besides the patient's own risk of bone loss, severe periodontal disease has been associated with low birth weight pre-term babies. Good periodontal health is paramount to minimizing this risk.
2. Pyogenic granulomas (pregnancy gingivitis).
3. Minimize all drug use.

Preventative / Precautions:

1. Good home care.
2. Emphasize good nutrition (adequate protein, folic acid supplements), and to eliminate alcohol, tobacco, and recreational drug use.

Prosthetic Joints (11 of 11)

These guidelines have been revised to reflect the revised January 2015 guidelines on The Use of Prophylactic Antibiotics prior to Dental Procedures in Patients with Prosthetic Joints: Evidence-based clinical practice guideline for dental practitioners – a report of the American Dental Association Council on Scientific Affairs [J Am Dent Assoc 2015;146(1):11-16]

Please Note: Non-movable joints / bones (i.e. finger or toe bones), pins, wires, rods, bolts, screws once stabilized (greater than 6 months in place with no problems) are not covered by this protocol and there is no indication prophylactic antibiotic coverage for dental procedures would be valuable.

Questions to Ask / Necessary Information

1. Which joint has been replaced?
2. Why was the replacement done?
3. Do you have diabetes or any medical problems including any inflammatory problems or any immunosuppression problems?

Diagnostic Tests:

No diagnostic tests required.

Management During Dental Treatment:

The American Dental Association and the Council on Scientific Affairs, in January of 2015, provided Clinical Recommendations relative to the Management of Patients with Prosthetic Joints Undergoing Dental Procedures.

The primary recommendation is:

In general, for patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures to prevent prosthetic joint infections.

They go on to note:

For patients with a history of complications with their joint replacement surgery and who are undergoing dental procedures that include gingival manipulation or mucosal incision, prophylactic antibiotics should only be considered after consultation with the patient and their orthopedic surgeon.*

Prosthetic Joints – continued

They advise:

To assess a patient's medical status, review of a complete health history is always recommended when making final decisions regarding the need for antibiotic prophylaxis.

There are no specific recommendations as to an antibiotic regime to be used, if the clinician feels it is needed. Instead they suggest to the clinician:

***In cases where antibiotics are deemed necessary, it is most appropriate that the orthopedic surgeon recommend the appropriate antibiotic regime, and, when reasonable, write the prescription.**

They provide the clinical reasoning behind the recommendations:

1. There is evidence that dental infections are not associated with prosthetic joint infections.
2. There is evidence that antibiotics provided before oral care do not prevent prosthetic joint implant infections.
3. There are potential harms of antibiotics including risks of anaphylaxis, development of antibiotic resistance, and opportunistic infections like *Clostridium difficile*.
4. The benefits of antibiotic prophylaxis may not exceed the harm for most patients.
5. The individual patients circumstances and preferences should be considered when deciding whether to prescribe prophylactic antibiotics prior to dental procedures.

You should realize, as stated in the recommendation:

This report is intended to assist practitioners in making decisions about the prophylactic use of antibiotics to prevent prosthetic joint infections. The recommendations in this document are not intended to define a standard of care, and rather should be integrated with the practitioners professional judgment and the patient's needs and preferences.

In situations where the patient is medically compromised and may be prone to infections, such as uncontrolled diabetes, chronic steroid use, immunosuppressed for any reason, undergoing cancer chemotherapy, the joint has been infected or shown signs consistent with an infection before or it has been recently placed (less than 2 years), then the decision by the clinician or the patient to use prophylactic antibiotics may be prudent and the patient's orthopedic surgeon may not be available. In that case, if the clinician elects to

Prosthetic Joints – continued

prophylax the patient, it is reasonable to suggest using the medications in the 2003 AAOS/ADA guideline and in the current AHA guideline. These antibiotics would be the ones most effective against organisms most commonly found in a bacteremia associated with a dental procedure:

Amoxicillin, 2 g, 60 minutes before the appointment.

If allergic to penicillins, clindamycin 600 mg or azythromylin 500 mg, 60 minutes before the appointment.

There are those that feel that the prophylactic antibiotic of choice should be one directed at the most common infecting organisms found in prosthetic joint infections, which are staphylococcal organisms (which are uncommon in the oral cavity). Based on this rationale, the appropriate antibiotic would be a cephalosporin:

Cephalexin, 2 g, 60 minutes before the appointment.

If allergic to penicillins, clindamycin 600 mg, 60 minutes before the appointment.

60 minutes before the appointment is suggested because prosthetic joint infections and endocarditis are not the same diseases and penetration into a prosthetic joint location may take longer than saturating a cardiac location. In reality, no one knows. Hence the note below:

Please note: the above considerations as to an antibiotic regime are our respectful opinion. As noted in the guidelines, a consultation with an orthopedic surgeon would be the ideal way to identify an appropriate antibiotic regime and, as stated in the recommendations, ideally the orthopedic surgeon would write the prescription.

It bears repeating, the ADA 2015 recommendations make it very clear that there is no scientific evidence documenting the value of prophylaxing any dental patient for the intention of preventing a prosthetic joint infection. On the other hand, there is scientific evidence documenting side effects and complications from unnecessary antibiotic use. Essentially, not using antibiotics may be safer than using them. If you decide to use an antibiotic you should have a good reason and it would be prudent to write that reason in the patient's chart.

Again, if a patient has a moveable prosthetic joint replacement, the 2015 guidelines state:

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

Prosthetic Joints – continued

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. As part of the evidence-based approach to care, this clinical recommendation should be integrated with the practitioner's professional judgment and the patient's needs and preferences.”

If a patient has a prosthetic joint plus any of the other medical problems below, their risk of any infection increases and prophylactic antibiotics should be considered.

Patients at Potential Increased Risk of Hematogenous Total Joint Infection

- Immunocompromised/immunosuppressed patients
- Inflammatory arthropathies (e.g. rheumatoid arthritis, systemic lupus erythematosus)
- Drug- induced immunosuppression
- Radiation-induced immunosuppression
- Patients with significant co-morbidities (e.g.: type 1 diabetes, obesity, smoking)
- Previous prosthetic joint infections
- Malnourishment
- Hemophilia
- HIV infection
- Insulin-dependent (Type 1) diabetes
- Malignancy

Suggested Antibiotic Regimes for "At Risk" patients (select one of these antibiotics)

Rx	Amoxicillin 500 mg
	Cephalexin 500 mg
	Cephadrine 500 mg
Disp	4 tablets
Sig	Take 4 tablets (2 grams), 1 hour before procedure.

Prosthetic Joints – continued

Though no official recommendation is made relative to the appropriate antibiotic to use if a patient has an immediate type allergic reaction (urticaria, angioedema, anaphylaxis) to penicillin/amoxicillin (and, therefore, have a potential for a cross reacting allergy to the cephalosporins), a reasonable alternative, given the organisms found in the oral cavity, is clindamycin.

If patient Allergic to Penicillin/Amoxicillin

Rx Clindamycin 150 mg

Disp 4 tablets

Sig Take 4 tablets (600 mg), 1 hour before procedure.

Be alert for:

Pain in the joint following dental procedures. There is no specific time frame; an infection could arise at any time from any source, including a bacteremia secondary to dental procedures. The likelihood of a prosthetic joint infection secondary to dental procedures is rare. The patient should follow up any unusual discomfort within the joint with their physician.

Preventative / Precautions:

The risk of prosthetic joint infection secondary to dental procedures is very rare. It primarily occurs in unusual situations when comorbidities such as immunosuppression or other types of medical problems are present. These medical problems increase the susceptibility of any patient to any type of infection.

In the long run, the best way to minimize any possible seeding of a prosthetic joint, by bacteria in the oral cavity, is to minimize oral cavity problems through good oral hygiene.

There is no evidence to recommend for or against the use of oral antimicrobials such as 0.12% chlorhexidine.