Naproxen
Tablets (OTC): 220 mg (Naproxen Sodium)
Tablets: 250 mg, 375 mg, 500 mg • Liquid: 25 mg/mL

### Oral Conditions
- Dental pain management

### Sample Prescription
- Take 1 tablet (500 mg) 2 times a day for 4 days as needed (8 tablets)
  *maximum 1,250 mg/day*

### Suggested Directions
- Take 2 tablets (2x 220 mg) to start then 1 tablet (220 mg) every 8 to 12 hours for 4 days as needed (10-14 tablets)
  *maximum 3 tablets/day*

### Black Box Warning
- Cardiovascular thrombotic events such as myocardial infarction and stroke.
- Gastrointestinal risk such as bleeding, ulceration, and perforation of the stomach or intestines.

### Contraindications
- Hypersensitivity to NSAIDs or aspirin
- Patients with history of peptic ulcer, or GI bleeding
- Patient undergoing a coronary artery bypass graft (CABG) surgery

### Cautions
- Patients with high blood pressure, heart disease
- Patients with kidney disease, liver cirrhosis
- Patients with uncontrolled diabetes, asthma, glaucoma
- Patients with enlarged prostate, urinary incontinence

### Major & Severe Drug Interactions
- This drug ↓ the effect of the following:
  - Antihypertensive diuretics such as furosemide and thiazides
  - Antihypertensive ACE inhibitors such as Lisinopril, and captopril
  - Effect on platelets, including low dose aspirin
- The following medications ↑ the adverse side effects of the drug:
  - Anticoagulants and antiplatelet such as warfarin, and aspirin
  - Antidepressant SSRIs such as fluoxetine, sertraline, citalopram

### Adverse Drug Reactions
- Common reactions:
  - Edema
  - Ecchymosis, pruritus, rash
  - Abdominal pain, constipation, heartburn, nausea
  - Dizziness, headache, somnolence
  - Ototoxicity, tinnitus
  - Dyspnea
- Less common reactions:
  - Angioedema
  - Acute renal failure
  - Hypertension
  - Bronchospasm
  - Hematologic effects

### Patient Considerations
- Pregnancy Category C; avoid during late pregnancy
- Lactation: enters breast milk, avoid if not necessary
- Pediatric: safety and effectiveness in patients <2 years old has not been established
- Elderly patients: use with caution and start at lower doses
- Avoid in patients with moderate to advanced renal disease
- Take with food, dairy products or products containing calcium

### Drug Considerations
- Bioavailability of naproxen is unaffected by food or time-of-day dosing
- Peak serum time (naproxen sodium): 1 to 2 hours
- Peak serum time (naproxen): 2 to 4 hours
- Half-life: 12 to 17 hours
- Excretion: approximately 95% of the naproxen from any dose is excreted in the urine, primarily as naproxen and metabolites
### Table 1. Superficial Oral Fungal Infections

**Pseudomembranous Candidiasis (Thrush)**

#### Clinical Picture
- Most commonly seen form of oral fungal infection caused by *Candida* (35%)
- Clinical predictor of HIV disease progression
- Presents with a white, “cottage cheese” appearance that often, when scraped off, typically leaves a raw, erythematous surface that can bleed easily
- Can present with oral burning sensation and/or sense of taste abnormalities

#### Affected Populations
- The very young and the very old (populations having immune system deficiencies)
- People who are immunocompromised, often as resulting from disease or certain medications such as:
  - Broad-spectrum antibiotics
  - Prednisone
  - Inhaled corticosteroids
  - Drugs that cause dry mouth

#### Drugs of Choice*
- **Clotrimazole troche**
  - Disp: 70 troches
  - Sig: Dissolve 1 troche in the mouth 5 times/day until gone
  - Advise the patient to allow the troche 15-30 minutes to dissolve in the mouth
  - Troches contain sucrose and can increase caries risk with prolonged use (> 3 months) and dry mouth conditions
- **Nystatin tablets**
  - Disp: 30 tablets
  - Sig: Dissolve 1 tablet in the mouth, 4 times/day
- **Nystatin suspension**
  - Disp: 300 mL
  - Sig: Swish with 1 tsp 4 times/day and expectorate
  - Suspension vehicle contains 50% sucrose and can increase caries risk with prolonged use (>3 months) and/or dry mouth conditions
- **Fluconazole** – to be used only if infection does not respond to the Clotrimazole or Nystatin
  - Disp: 16 tablets
  - Sig: Take 2 tablets on day one and 1 tablet/day thereafter until resolved
  - Take for 14 days

* Also, see the drug monograph for Clotrimazole, Nystatin, and Fluconazole at the end of the chapter.
### Table 1. Comparison of Benzodiazepines (BZDs) Used for Dental Anxiety*

<table>
<thead>
<tr>
<th>Benzodiazepine</th>
<th>Adult Oral Dose (mg)</th>
<th>Onset of Action</th>
<th>Peak Onset (hrs)</th>
<th>Half-life of Parent Drug (hrs)</th>
<th>Active Metabolite</th>
<th>Half-life of Active Metabolite (hrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Long Acting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diazepam</td>
<td>5</td>
<td>Rapid</td>
<td>1-1.5 (oral)</td>
<td>20-70</td>
<td>Yes</td>
<td>3-100</td>
</tr>
<tr>
<td><strong>Intermediate Acting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alprazolam</td>
<td>0.5</td>
<td>Intermediate</td>
<td>0.7-1.6</td>
<td>12-18</td>
<td>No</td>
<td>NA</td>
</tr>
<tr>
<td>Clonazepam</td>
<td>0.25</td>
<td>Intermediate</td>
<td>1-4</td>
<td>20-40</td>
<td>No</td>
<td>NA</td>
</tr>
<tr>
<td>Lorazepam</td>
<td>1</td>
<td>Intermediate</td>
<td>1-1.5 (oral)</td>
<td>10-20</td>
<td>No</td>
<td>NA</td>
</tr>
<tr>
<td>Oxazepam</td>
<td>15</td>
<td>Slow</td>
<td>2-3</td>
<td>3-18</td>
<td>No</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Short Acting</strong></td>
<td></td>
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</tr>
<tr>
<td>Triazolam</td>
<td>0.125-0.25</td>
<td>Intermediate</td>
<td>0.75-2</td>
<td>1-1.5</td>
<td>No</td>
<td>NA</td>
</tr>
</tbody>
</table>

* Do NOT prescribe BZDs in patients taking the following: alcohol, anti-depressants, and opioids. Also, see the drug monograph at the end of the chapter for more information.
3 | Adverse Reactions Associated with Local Anesthetics

Methemoglobinemia
There are two local anesthetic agents used in dentistry that reportedly induce methemoglobinemia. The first agent is the topical local anesthetic benzocaine and the second agent is the injectable (and topical) local anesthetic prilocaine. The mechanism of action is that both of these anesthetics oxidize hemoglobin to methemoglobin. As the level of methemoglobin continues to increase in the blood, cyanosis develops and additional symptoms appear with the potential for progression to unconsciousness and death. This phenomena invariably occurs with excessive dose of either agent. Fortunately, methemoglobinemia treatments using methylene blue are generally effective.

Systemic Toxicity Reactions Due to Excessive Local Anesthetic
When excessive doses of any of these local anesthetics are administered, excitatory central nervous system (CNS) reactions, such as tremors, muscle twitching, shivering and clonic-tonic convulsions have been reported. These initial excitatory reactions are thought to be due to a selective blockade of small inhibitory neurons within the limbic system of the CNS. Whether this initial excitatory reaction is apparent or not, a generalized CNS depression with symptoms of sedation, drowsiness, lethargy and life-threatening respiratory depression follows if blood concentrations of the local anesthetic agent continue to rise. Severe bradycardia may also occur due to the ability of local anesthetics to block sodium channels in the heart. Compliance with local anesthetic dosing guidelines is the first and most important strategy for preventing this adverse event. Dosing calculations used to avoid systemic reactions to local anesthetics are dependent on the agent administered and the patient’s body weight (Table 2).

Toxicity Reactions Due to Excessive Vasoconstrictors
Epinephrine and levonordefrin are the two vasoconstrictors formulated with local anesthetic agents in dental cartridges. The use of a vasoconstrictor can improve the safety of the formulation by slowing the systemic absorption of the local anesthetic and decrease the peak blood levels of the anesthetic. There is minimal stimulation of the cardiovascular system following submucosal injection of one or two cartridges of anesthetic containing epinephrine or levonordefrin. However, when excessive amounts of these vasoconstrictors are administered, or when inadvertently administered intravascularly, cardiovascular stimulation, with clinically significant increases in blood pressure and heart rate, can occur. Using anesthetic formulations containing no or limited amounts of vasoconstrictors, using a slow injection technique, and aspirating carefully and repeatedly are common recommendations to prevent rapid systemic absorption of epinephrine and levonordefrin.

Although vasoconstrictors are rarely contraindicated, the potential stimulation of the cardiovascular system following intravascular injections should guide the dental practitioners to avoid vasoconstrictor-containing formulations in cardiovascally compromised populations if possible. A common recommendation, when a vasoconstrictor is required for a dental treatment and when there is a medical history that suggests a need for caution, is to limit the dose of epinephrine to 0.04 mg (See Section 2 for information specific to children). This can be achieved by limiting the total anesthetics used to: one cartridge of an anesthetic containing 1:50,000 epinephrine, two cartridges of an anesthetic containing 1:100,000 epinephrine, or four cartridges of an anesthetic containing 1:200,000 epinephrine.
Dexamethasone
Tablets 0.5 mg, 0.75 mg, 1 mg, 1.5 mg, 4 mg, 6 mg
Liquid: 0.5 mg/5 mL, 1 mg/1 mL

ORAL CONDITIONS
- Prevention of swelling and edema from oral surgery

SAMPLE PRESCRIPTION
- Take 2 tablets (2x 4 mg) before surgery then take 1 tablet (4 mg) the day of surgery (3 tablets)

CONTRAINDICATIONS
- Hypersensitivity to steroids
- Cerebral malaria
- Systemic fungal infection
- Patients planning to receive live or attenuated vaccines while on corticosteroids therapy

CAUTIONS
- Diabetes
- Congestive heart failure
- Epilepsy and other seizure disorders
- Glaucoma
- Hypertension
- Hypothyroidism
- Liver failure
- Osteoporosis
- Peptic ulceration
- Previous steroid myopathy
- Recent myocardial infarction
- Renal insufficiency/failure
- Tuberculosis
- Steroid-induced psychoses
- Systemic infections

MAJOR & SEVERE DRUG INTERACTIONS
- This drug ↑ the concentration of NSAIDs and increases the risk of GI ulceration (peptic)
- This drug ↓ effect of:
  - Live vaccines such as BCG, cholera, typhoid
  - Inactivated vaccines
  - Cholesterol lowering drugs such as Statins
  - Antidiabetic including insulin
  - GERD drugs such as proton pump inhibitors
  - Anticoagulants and antiplatelet such as warfarin and aspirin
- The following family of medications ↓ the effect of this drug:
  - Antacids decrease dexamethasone absorption
  - CYP450 inducers such as phenytoin, rifampicin, St John’s wort
- The following family of medications ↑ the effect of this drug:
  - CYP450 inhibitors such as clarithromycin, azithromycin, erythromycin, ketoconazole
  - Estrogen replacement therapies

ADVERSE DRUG REACTIONS
Large doses taken for four weeks or less are likely to result in:

Common reactions:
- Insomnia and sleep disturbances which can result in tiredness
- Food craving and increased appetite resulting in transient weight gain
- Mood swings and changes in energy levels

Less common reactions:
- Severe infection
- Psychosis, confusion, delirium and depression
- Cardiovascular problems
- Gastrointestinal pain and peptic ulceration
- Changes in glucose levels

PATIENT CONSIDERATIONS
- Pregnancy Category C
- Lactation: excreted in milk
- Patients with renal insufficiency: consult with PCP
- Patients with liver failure; consult with PCP
- Need to limit blood pressure-raising foods including salt, licorice etc.
- Take with food and during the day, preferably prior to midday as this drug interferes with sleep
- Delays male puberty; disrupts reproductive functions via hypothalamic-pituitary-gonadal axis alterations when taken in high doses and for a long period of time

DRUG CONSIDERATIONS
- Peak plasma concentrations: 1 hr
- Plasma protein binding is less than for others corticosteroids
- Penetrates tissue and cerebrospinal fluid
- Half-life: approx. 190 minutes
- Elimination: metabolism and renal excretion
# Chapter 11  Supplemental Drugs

## Table 1. Acute Allergy Management

| Perform Primary Assessment | • Remove allergen  
|                           | • Perform ABCDE assessment  
|                           | – Airway: swelling, airway stridor, check for obstruction  
|                           | – Breathing: rapid respiratory rate, cyanosis  
|                           | – Circulation: low blood pressure, pallor  
|                           | – Disability: reduced consciousness, dilated pupils, drowsiness  
|                           | – Exposure: adequate skin exposure for examination  
|                           | • Call 911  
| Diagnosis                  | Major – Life Threatening  
|                           | • airway compromised  
|                           | • wheezing  
|                           | • swelling of tongue or throat  

## Treatment

**Epinephrine (IM)**

- Infants/Children <15 kg: exact weight based dose or 0.15 mg if patient rapidly deteriorating  
- Children 15–29 kg: 0.15 mg (0.15 mL of 1 mg/mL solution)  
- Patients 30–50 kg: 0.3 mg (0.3 mL of 1 mg/mL solution)  
- Patients >50 kg: 0.5 mg (0.5 mL of 1 mg/mL solution)  

*(repeat after 5-15 minutes if no response)*

**IV Fluids**

- Adults: 500-1,000 mL  
- Children: crystalloid 20 mL/kg

**Diphenhydramine**

- Adults: 25–50 mg intravenously over 5 minutes, may be repeated up to a maximum dose of 400 mg per 24 hrs  
- Children <50 kg: 1 mg/kg (maximum 50 mg) intravenously over 5 minutes, may be repeated up to a maximum dose of 200 mg per 24 hrs

**Albuterol**

- Via metered inhaler:  
  - Adults: 8 puffs  
  - Children: 4–8 puffs  
- Via nebulized solution:  
  - Adults: 3 mL  
  - Children: 1.5 mL  

*(administer over 20 minutes or continuously as needed)*
3c | Dental Trauma

The benefit of administering a systemic antibiotic after replantation of an avulsed permanent incisor with open or closed apices is still questionable. However, experimental studies have shown promising results with both periodontal and pulpal healing after administering an antibiotic for 7 days. The first drug of choice is tetracycline. However, tetracycline is not recommended for children under the age of 12 due to the risk of intrinsic discoloration of the developing permanent teeth. Prior to age 12, amoxicillin can be given as an alternative medication to avoid the risk of discoloration of the permanent dentition.

Antibiotics are generally not indicated for luxation injuries in the primary or permanent dentitions.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Sample Dosage</th>
<th>Forms</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;40kg:</td>
<td>20–40 mg/kg/day divided every 8h OR 25–45 mg/kg/day divided every 12 hr</td>
<td>Suspension: 125 mg/5 mL, 250 mg/5 mL, 400 mg/5 mL, Chewable Tablet: 125 mg, 250 mg Tablet/Capsule: 250 mg, 500 mg, 875 mg</td>
<td>Drug of choice for &lt;12 years</td>
</tr>
<tr>
<td>&gt;40kg:</td>
<td>250–500 mg every 8 hr OR 500–875 mg every 12 hr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doxycycline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;45 kg:</td>
<td>2.2 mg/kg every 12 hr on day 1, then 2.2 mg/kg daily thereafter; for severe infections use 2.2 mg/kg every 12 hr</td>
<td>Suspension: 25 mg/5 mL, Tablet/Capsule: 20 mg, 50 mg, 75 mg, 100 mg, 150 mg</td>
<td>Drug of choice for &gt;12 years May cause permanent tooth discoloration, enamel hypoplasia in developing dentition</td>
</tr>
<tr>
<td>&gt;45 kg:</td>
<td>100 mg every 12 hr on day 1, then 100 mg daily thereafter, for severe infections use 100 mg every 12 hr</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
According to the ADA Chairside Guide developed by the Center for Evidence-based Dentistry (see Suggested Reading List), “for patients with a history of complications associated with their joint replacement surgery who are undergoing dental procedures that include gingival manipulation or mucosal incision, prophylactic antibiotics should only be considered after consultation with the patient and orthopedic surgeon.” Further, in cases where antibiotics are deemed necessary, it is most appropriate that the orthopedic surgeon recommend the antibiotic regimen and, when reasonable, write the prescription.

2 | Prevention of Infective Endocarditis

With input from the ADA, the American Heart Association (AHA) released guidelines for the prevention of infective endocarditis in 2007, which were approved by the CSA as they relate to dentistry in 2008. In 2017, the AHA and American College of Cardiology (ACC) published a focused update to their 2014 guidelines on the management of valvular heart disease that reinforce the previous recommendations. These current guidelines support infective endocarditis premedication for a relatively small subset of patients. This is based on a review of scientific evidence, which showed that the risk of adverse reactions to antibiotics generally outweigh the benefits of prophylaxis for many patients who would have been considered eligible for prophylaxis in previous versions of the guidelines. Concern about the development of drug-resistant bacteria also was a factor.

Also, the data are inconsistent as to whether prophylactic antibiotics taken before a dental procedure prevent infective endocarditis. The guidelines note that people who are at risk for infective endocarditis are regularly exposed to oral bacteria during basic daily activities such as brushing or flossing.

The valvular disease management guidelines recommend that persons at risk of developing bacterial infective endocarditis (Box 1) establish and maintain the best possible oral health to reduce potential sources of bacterial seeding. They state, “Optimal oral health is maintained through regular professional dental care and the use of appropriate dental products, such as manual, powered, and ultrasonic toothbrushes; dental floss; and other plaque-removal devices.”

3 | Dental Procedures

Prophylaxis is recommended for the patients identified in the previous section for all dental procedures that involve manipulation of gingival tissue or the periapical region of the teeth, or perforation of the oral mucosa. Refer to Antibiotics chapter (Chapter 2) for more information.
Pregnancy and Breastfeeding

Oral health care, including having dental radiographs taken and being given local anesthesia, is safe at any point during pregnancy. Further, the American Dental Association and the American Congress (formerly “College”) of Obstetricians and Gynecologists (ACOG) agree that emergency treatments, such as extractions, root canals or restorations can be safely performed during pregnancy and that delaying treatment may result in more complex problems.

When treating pregnant patients, it might be helpful to reach out to the obstetrician to develop a working relationship should consultation be needed later. Questions you might ask include:

- When is the expected delivery date?
- Is this a high-risk pregnancy? If so, are there any special concerns or contraindications?

Questions about the local anesthetics or antibiotics used in dentistry are common when treating this patient population. According to a 2012 JADA article by Donaldson and Goodchild (see Suggested Reading List), options considered safe for use in these situations include certain local anesthetics (with or without epinephrine), most antibiotics, and some pain relievers (see Table 1).
Table 1. Adverse Drug Reactions (Oral)

<table>
<thead>
<tr>
<th>Oral Manifestations of Drug Reactions</th>
<th>Most Common Prescribed Drugs in 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alprazolam</td>
</tr>
<tr>
<td>Angioedema</td>
<td></td>
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<tr>
<td>Bleeding</td>
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<tr>
<td>Candidiasis</td>
<td></td>
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<tr>
<td>Canker Sores</td>
<td></td>
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<tr>
<td>Cough</td>
<td></td>
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<tr>
<td>Dental Caries</td>
<td></td>
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<tr>
<td>Dry Mouth (Xerostomia)</td>
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<tr>
<td>Facial Paralysis</td>
<td></td>
</tr>
<tr>
<td>Gingival Enlargement</td>
<td></td>
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<tr>
<td>Gingival Inflammation (Gingivitis)</td>
<td></td>
</tr>
<tr>
<td>Herpes Simple</td>
<td></td>
</tr>
<tr>
<td>Hemostasis Impairement</td>
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<tr>
<td>Larynx Inflammation (Laryngitis)</td>
<td></td>
</tr>
<tr>
<td>Lips Inflammation (Cheilitis)</td>
<td></td>
</tr>
<tr>
<td>Mouth Inflammation (Stomatitis)</td>
<td></td>
</tr>
<tr>
<td>Orofacial Pain</td>
<td></td>
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<tr>
<td>Osteonecrosis</td>
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<tr>
<td>Swallowing Difficulty (Dysphagia)</td>
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<tr>
<td>Tardive Dyskinesia</td>
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<tr>
<td>Taste Alteration (Dysgeusia)</td>
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<tr>
<td>Taste Loss (Ageusia)</td>
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<tr>
<td>Throat Soarness (Pharyngitis)</td>
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<tr>
<td>Tongue Disorder</td>
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<td>Tongue Inflammation (Glossitis)</td>
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<tr>
<td>Tooth Discoloration</td>
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