Pharmacology and Therapeutics, Local Anesthesia, Medical Emergencies

National Dental Examining Board of Canada (NDEB) Virtual OSCE and Assessment of Fundamental Knowledge (AFK)

About 14% of the AFK · 5 topics · 2026 blueprint

Pharmacology and Therapeutics, Local Anesthesia and Medical Emergencies covers the drugs dentists prescribe and the drugs patients bring with them, local anesthetic agents and dose limits, and the recognition and first management of emergencies in the dental office. It is about 14% of the AFK in NDEB's 2026 blueprint. Its questions test exact doses and calculations, drug interactions and the correct first action in an emergency.

You should be able to: A patient with stable angina receives lidocaine 2% with epinephrine 1:100,000. What is the usual epinephrine limit and how many 1.8 mL cartridges does it allow?

Every topic: the key point and the trap

PT-1 Analgesics and anti-inflammatories

Nonsteroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen inhibit cyclooxygenase, reducing prostaglandins; they are first-line for most dental pain.

Trap: Prescribing codeine to a young child or an opioid first when an NSAID and acetaminophen combination would work better.

PT-2 Antimicrobials and drug interactions

Antibiotics are indicated for odontogenic infection with systemic signs (fever, malaise, spreading cellulitis, lymphadenopathy) or in medically compromised patients, not for irreversible pulpitis or a localized abscess that can be drained.

Trap: Choosing clindamycin for endocarditis prophylaxis; it is no longer recommended for that purpose.

PT-3 Local anesthetic pharmacology

Local anesthetics block voltage-gated sodium channels from inside the nerve; only the uncharged base crosses the membrane, so a lower pKa (closer to tissue pH) gives faster onset.

Trap: Forgetting that 2% means 20 mg/mL, or ignoring the epinephrine limit, which can be lower than the anesthetic limit.

PT-4 Local anesthetic complications and special cases

Systemic toxicity from local anesthetic starts with central nervous system excitation (talkativeness, tremor, tinnitus, circumoral numbness) and can progress to seizures, then depression of the central nervous system and cardiovascular system.

Trap: Using the adult cartridge count for a small child.

PT-5 Medical emergencies in the dental office

Vasovagal syncope is the most common emergency; position the patient supine with legs slightly raised, maintain the airway, give oxygen if needed and monitor vital signs.

Trap: Giving an antihistamine first or using the 0.1 mg/mL (1:10,000) solution intramuscularly; intramuscular epinephrine 1 mg/mL is the first drug.

Key terms

pKa: pH at which half of a drug is ionized; for local anesthetics, a pKa closer to tissue pH gives faster onset.

Maximum recommended dose: Highest total dose of a local anesthetic per appointment, usually given in mg/kg with an absolute ceiling.

1:100,000 epinephrine: 1 g in 100,000 mL, which equals 0.01 mg/mL.

Methemoglobinemia: Oxidation of hemoglobin iron that reduces oxygen delivery, linked to prilocaine and to a lesser extent articaine.

CYP2D6: Liver enzyme that converts codeine to morphine; activity varies between people.

CYP3A4 inhibitor: Drug such as clarithromycin that slows the breakdown of many other drugs and raises their levels.

Disulfiram-like reaction: Flushing, nausea and vomiting when alcohol is taken with drugs such as metronidazole.

Anaphylaxis: Severe, rapid, systemic type I allergic reaction involving the airway, breathing or circulation.

Vasovagal syncope: Fainting from a sudden drop in heart rate and blood pressure triggered by stress or pain.

Source control: Removing the cause of an infection by drainage, extraction or pulp removal, the main treatment for odontogenic infection.

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