

Therapeutic Medications in Athletic Training

CORRESPONDENCE EDUCATION PROGRAM #159

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LEARNING OBJECTIVES:

Therapeutic Medications in Athletic Training

After completing this course participants will be able to:

1. Understand the principles of pharmacodynamics, including isomers, dosing, potency, and drug interactions.
2. Gain a basic knowledge of how adverse drug interactions occur.
3. Understand the basic principles of pharmacokinetics such as absorption, routes of drug administration, effectiveness, distribution, metabolism, and elimination.
4. Know the guidelines for working with an athlete on medications, including the four Cs for preventing legal action (compassion, communication, competence, and charting).
5. Learn the indications and usage, routes of administration, general dosing protocols, side effects, adverse reactions, and contraindications for Aspirin and NSAIDs.
6. Learn the combination aspirin products, as well as the various types of NSAIDs and their duration of action.
7. Understand the guidelines for an athletic trainer when recommending NSAIDs and aspirin to an athlete.
8. Understand the chemical nature and endogenous production of steroid hormones.
9. Learn the indications and uses, routes of administration, side effects and adverse reactions, and considerations before use of corticosteroids.
10. Understand the guidelines for athletic trainers working with athletes using corticosteroids.
11. Be able to categorize the types of non-anti-inflammatory systemic analgesics.
12. Learn the indications and use, routes of administration, dosing protocols, side effects and adverse reactions, and considerations before use for Acetaminophen, opiate agonists (narcotics), Tramadol, and muscle relaxants.

13. Learn guidelines for athletic trainers to follow when working with athletes taking over the counter Tylenol, excessive caffeine, alcohol, and narcotic pain relievers.
14. Learn the local anesthetics and topical agents used on athletes for minor pain.
15. Define counterirritants.
16. Learn the indications and uses of injectable local anesthetics and topical medications, as well as their side effects and possible adverse reactions.
17. Understand the guidelines for an athletic trainer for use of local anesthetics and topical medications.
18. Learn the indications and uses, distinguishing features, routes of administration, side effects and adverse reactions of antibiotic, antifungal, and antiviral medications.
19. Understand the athletic trainer's role in both monitoring for signs of infection as well as side effects of medications that may impact athletic performance.
20. Understand the basis for topical preparations used to treat or prevent infections.
21. Know the indications and uses, dosing protocol, side effects, and distinguishing features of antiseptics, topical antibiotics, antifungals, and antiviral medication.
22. Know the cause of Athlete's foot, Jock itch, Ringworm, and Candidiasis.
23. Learn the guidelines for athletic trainers for prevention and treatment of minor skin injuries and infections.
24. Understand the impact of respiratory infections on athletic populations, as well as the pathophysiology of asthma.
25. Understand the implications of Exercise-induced bronchospasm.
26. Learn the indications and uses, distinguishing features, side effects and adverse reactions, and banned substance status for Asthma medications, Allergic Rhinitis medications, and Upper-Respiratory Infection medications.
27. Learn the Athletic Trainer guidelines for working with athletes on respiratory medications.
28. Understand the various gastrointestinal problems that may impact athletic populations, such as peptic ulcer disease, gastroesophageal reflux disease, intestinal gas, constipation, and nausea and vomiting.
29. Learn the types of medications, indications and uses, and side effects and adverse reactions for the medications used for treatment of gastrointestinal illnesses.

30. Understand the role of the athletic trainer in the management of athletes with these concerns, and understand the embarrassment that may interfere with an athlete asking for help.
31. Be able to differentiate between the pathology of type I and type II Diabetes.
32. Understand how exercise affects diabetes management, and know the exercise guidelines for type I diabetics.
33. Learn the various types of insulin used to treat diabetes.
34. Learn the types of oral hypoglycemic medications, their mechanism of action, side effects and adverse reactions, and routes of administration.
35. Know the Diabetes guidelines for an athletic trainer working with diabetic athletes.
36. Understand the pathology of hypertension and arrhythmias.
37. Know the types of medications, indications and uses, and side effects and adverse reactions for antihypertensive and antiarrhythmia medications.
38. Understand the role of the athletic trainer in assisting athletes with the management of hypertension or arrhythmias.
39. Understand the types of medications, indications and uses, and side effects and adverse reactions for antiepileptics, antidepressants, and ADHD medications.
40. Understand the role of the athletic trainer and guidelines in assisting athletes with neurological disorders.



CEC/CEU Test for Therapeutic Medications in Athletic Training
Please choose the BEST answer for each question

- 1. In order for a drug to exert its intended effect, it must:**
 - A. Be broken down to a naturally occurring substance in the body.
 - B. Pass the blood-brain barrier.
 - C. Bind to a receptor
 - D. Shut down cellular metabolism

- 2. What is the term used to describe drug molecules that have two mirror-image forms?**
 - A. Isomers
 - B. Polymers
 - C. Nucleotides
 - D. Binary compounds

- 3. Which of the following is not considered when determining pediatric dosing of medications?**
 - A. Age
 - B. Height
 - C. Weight
 - D. Body surface area

- 4. Which of the following terms relates to the strength of a drug?**
 - A. Isomers
 - B. Dosage
 - C. Potency
 - D. Half life

- 5. Which of the following drugs is more potent than aspirin for relief of pain and fever?**
- A. Ibuprofen
 - B. Diphenhydramine
 - C. Fluconazole
 - D. Cipro
- 6. Which of the following is not a factor in determining drug interactions?**
- A. Genetic makeup
 - B. Esophageal function
 - C. Kidney function
 - D. Age
- 7. An individual who takes two or more depressants can experience all of the following symptoms except:**
- A. Insomnia
 - B. Excessive drowsiness
 - C. Dizziness
 - D. Loss of muscle coordination
- 8. Combining stimulants like appetite suppressants and caffeine can cause all of the following symptoms except:**
- A. Heart palpitations
 - B. Tachycardia
 - C. Insomnia
 - D. Dangerous decrease in blood pressure
- 9. What life-threatening condition can result from combining alcohol with aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs) or corticosteroids?**
- A. Esophageal cancer
 - B. Seizures
 - C. Gastrointestinal bleeding
 - D. Liver damage

- 10. Which type of food may have a negative impact on the effectiveness of tetracyclines?**
- A. Dairy products
 - B. Fruits
 - C. Vegetables
 - D. Salmon
- 11. What delayed adverse reaction can be associated with long-term use of corticosteroids?**
- A. Liver failure
 - B. Osteoporosis
 - C. Gastrointestinal bleeding
 - D. Heart arrhythmias
- 12. What is the study of how drugs are handled in the body?**
- A. Pharmacology
 - B. Pharmacokinetics
 - C. Metabolic ketoacidosis
 - D. Rhabdomyolysis
- 13. Which of the following is not one of the kinetic phases of pharmacokinetics?**
- A. Absorption
 - B. Distribution
 - C. Metabolism
 - D. Storage
- 14. Which route of drug administration involves the absorption of the drug in the gastrointestinal system?**
- A. Parenteral administration
 - B. Intranasal administration
 - C. Enteral administration
 - D. Oral inhalation

- 15. Which of the following sites would not be used for local administration of a medication?**
- A. Oral
 - B. Eye
 - C. Ear
 - D. Skin
- 16. Which organ usually handles the metabolism of medications?**
- A. Small intestine
 - B. Large intestine
 - C. Stomach
 - D. Liver
- 17. Which of the following is the slowest method for drug metabolism?**
- A. Injection
 - B. Swallowing
 - C. Inhalation
 - D. Sublingual
- 18. Which of the following would not be considered a street drug?**
- A. LSD
 - B. Zolpidem
 - C. Mescaline
 - D. Heroin
- 19. Which of the following would not make a medication a Schedule I controlled substance?**
- A. High potential for abuse
 - B. Acceptable medical use
 - C. No accepted medical use
 - D. Lack of safety for use of the medication under medical supervision

20. Which of the following medications is an example of a Schedule IV medication?

- A. Ritalin
- B. Demerol
- C. Hydrocodone
- D. Valium

21. What is the generic name of Motrin?

- A. Acetaminophen
- B. Diazepam
- C. Ibuprofen
- D. Naproxen

22. As an athletic trainer, which of the following would not be the minimum requirements for medication storage and dispensing?

- A. Formulation date for each medication
- B. Expiration date for each medication
- C. Record of dispensed medication
- D. Locked cabinet for storage of medication

23. In general, how long do tablets and capsules retain their effectiveness?

- A. 14 days
- B. 2 to 3 months
- C. 6 to 8 months
- D. 1 to 2 years

24. Which of the following will not appear on a prescription medication label?

- A. Patient name
- B. Prescriber name
- C. Physician address
- D. Dosage instructions

- 25. Which of the following will not be on the label of an over the counter (OTC) medication?**
- A. Active ingredient
 - B. Prescribing physician
 - C. Warnings
 - D. Expiration date
- 26. How is all drug testing for athletes currently done?**
- A. Urine test
 - B. Hair follicle test
 - C. Blood test
 - D. Fat biopsy
- 27. Which of the following is not one of the required elements of negligence needed for a judgment of malpractice?**
- A. Knowledge
 - B. Duty
 - C. Breach
 - D. Damages
- 28. What is the legal term used for negligence on the part of the victim?**
- A. Malpractice
 - B. Oppositional negligence
 - C. Intentional negligence
 - D. Contributory negligence
- 29. What is the first rule of medicine?**
- A. Assume the worst
 - B. Prescribe appropriate medications
 - C. Do no harm
 - D. Always have lab results to back up a diagnosis
- 30. Which of the following is not one of the four Cs for preventing legal action?**
- A. Compensation
 - B. Compassion
 - C. Communication
 - D. Competence

- 31. What is aspirin a derivative of?**
- A. Ibuprofen
 - B. Salicylic acid
 - C. Hydrocodone
 - D. Naproxen
- 32. Which of the following is not a side effect or adverse reaction seen with aspirin use?**
- A. Gastrointestinal bleeding
 - B. Gastritis
 - C. Kidney damage
 - D. Blood clots
- 33. Which of the following is not a contraindication for taking aspirin?**
- A. Pregnancy
 - B. Previous history of deep vein thrombosis
 - C. History of peptic ulcer disease
 - D. Asthma
- 34. What is often combined with aspirin to improve its efficacy, especially for the treatment of headaches?**
- A. Glucose
 - B. Acetaminophen
 - C. Phenergan
 - D. Caffeine
- 35. Which of the following is a long acting NSAID?**
- A. Celecoxib
 - B. Diclofenac
 - C. Etodolac
 - D. Ibuprofen
- 36. What is the most potent NSAID?**
- A. Ibuprofen
 - B. Naproxen sodium
 - C. Ketoprofen
 - D. Tolmetin

- 37. NSAIDs should not be combined with all of the following types of medication except:**
- A. Corticosteroids
 - B. Anticoagulant medications
 - C. Aspirin
 - D. Caffeine
- 38. Which of the following regarding steroid hormones is incorrect?**
- A. They are lipid soluble.
 - B. They are water-soluble.
 - C. Their chemical structure has similarities to cholesterol.
 - D. They are produced in the adrenal cortex.
- 39. Which of the following is not one of the four types of corticosteroids produced by the adrenal cortex?**
- A. Anabolic steroids
 - B. Mineralocorticoids
 - C. Glucocorticoids
 - D. Androgens
- 40. Corticosteroids are commonly prescribed for which of the following conditions?**
- A. Asthma
 - B. High blood pressure
 - C. Fungal infections
 - D. Bacterial infections
- 41. Which of the following is not an inhaled corticosteroid?**
- A. Beclomethasone
 - B. Methylprednisolone
 - C. Budesonide
 - D. Flunisolide

42. Which of the following is not one of the more serious side effects of corticosteroid use?

- A. Loss of vision
- B. Stomach pain
- C. Swelling of feet and legs
- D. Peripheral neuropathy

43. Which of the following is a delayed type of side effect for corticosteroids?

- A. Coughing
- B. Local irritation
- C. Tendon rupture
- D. Pain in the joint after injection

44. Which of the following is the most widely used non-anti-inflammatory systemic analgesic?

- A. Meperidine
- B. Tylenol
- C. Morphine
- D. Tramadol

45. What will an overdose of acetaminophen (Tylenol) cause?

- A. Liver failure
- B. Kidney failure
- C. Gastrointestinal bleeding
- D. Heart failure

46. Opiate agonists medications (narcotics) can be medically administered in all of the following ways except:

- A. Orally
- B. Intravenously
- C. Intramuscular injection
- D. Inhalation

- 47. How quickly does an acetaminophen overdose need to be treated to prevent permanent liver damage?**
- A. Within 1 hour
 - B. Within 4 hours
 - C. Within 8 hours
 - D. Within 24 hours
- 48. Which of the following street drugs is an opiate agonists?**
- A. Cocaine
 - B. Crack
 - C. Heroin
 - D. Marijuana
- 49. Which of the following is a dangerous possible side effect of Tramadol?**
- A. Cerebral bleed
 - B. Seizures
 - C. Bronchospasm
 - D. Gastrointestinal bleeding
- 50. Which of the following is not a type of prescribed muscle relaxant?**
- A. Diphenhydramine
 - B. Carisoprodol
 - C. Chlorzoxazone
 - D. Metaxalone
- 51. In the average person, what would be the caffeine intake necessary to test positive on a NCAA or IOC drug screen?**
- A. 325 grams
 - B. 750 grams
 - C. 1000 grams
 - D. 1500 grams

- 52. Topical anesthetics and analgesics can relieve all of the following except:**
- A. Simple backaches.
 - B. Strains.
 - C. Bruises.
 - D. Headaches.
- 53. Team physicians may use injectable anesthetics for which of the following conditions?**
- A. Bee sting
 - B. Turf toe
 - C. Heat exhaustion
 - D. Exercise-induced asthma
- 54. How long will pain relief last after one dose of benzocaine is applied to the skin?**
- A. 1 to 2 hours
 - B. 4 to 6 hours
 - C. 8 to 10 hours
 - D. 24 hours
- 55. Which of the following topical medications does not have the systemic effects of the "caine" family, but may cause mucous membrane irritation?**
- A. Pramoxine
 - B. Benzocaine
 - C. Dibucaine
 - D. Lidocaine
- 56. Which topical anesthetic temporarily freezes the skin?**
- A. Lidocaine
 - B. Ethyl chloride
 - C. Pramoxine
 - D. Tetracaine

- 57. Which counterirritant is derived from cayenne peppers?**
- A. Trolamine salicylate
 - B. Dichlorofluoromethane
 - C. Capsaicin
 - D. Menthol
- 58. Which of the following is not a combination of menthol and methyl salicylate?**
- A. Ben-Gay
 - B. Flexall Pain Relieving Gel
 - C. Icy Hot
 - D. AeroFreeze
- 59. Which of the following is not an inappropriate time to use methyl salicylate?**
- A. In cold weather
 - B. In hot, humid weather
 - C. In combination with heating pads
 - D. In combination with a tightly bound dressing
- 60. What will likely be the most common medical problem after musculoskeletal injuries in athletes?**
- A. Endocarditis
 - B. Deep venous thrombosis
 - C. Exercise-induced asthma
 - D. Infectious diseases
- 61. What are antibiotics used to treat?**
- A. Viruses
 - B. Bacteria
 - C. Protozoa
 - D. Fungal infections
- 62. Which type of antibiotic is commonly used for the treatment of acne?**
- A. Tetracyclines
 - B. Penicillin
 - C. Cephalosporins
 - D. Macrolides

- 63. How does methicillin-resistant Staphylococcus aureus (MRSA) present clinically?**
- A. Stuffy nose and cough
 - B. Nausea and vomiting
 - C. Cellulitis and skin boils
 - D. Urinary tract infections
- 64. Which type of antibiotic is effective against most strains of MRSA?**
- A. Penicillin
 - B. Sulfonamides
 - C. Tetracyclines
 - D. Macrolides
- 65. Which type of antibiotics is associated with a cutaneous reaction called "Stevens-Johnson Syndrome"?**
- A. Cephalosporins
 - B. Aminoglycosides
 - C. Sulfonamides
 - D. Fluoroquinolones
- 66. Which antifungal medication is used for treating fungal infections involving the scalp?**
- A. Griseofulvin
 - B. Fluconazole
 - C. Itraconazole
 - D. Ketoconazole
- 67. Which antiviral medication has been associated with bronchospasm in those with preexisting asthma?**
- A. Valacyclovir
 - B. Acyclovir
 - C. Famciclovir
 - D. Zanamivir

- 68. Which sport is at the highest risk for contagious skin conditions?**
- A. Gymnastics
 - B. Football
 - C. Wrestling
 - D. Soccer**
- 69. Topical antiseptics and antibiotics are indicated to prevent infection in all of the following except:**
- A. Minor cuts
 - B. Open fractures
 - C. Minor wounds
 - D. Abrasions**
- 70. What is used in the treatment of Swimmer's ear?**
- A. Acetic acid
 - B. Sulfuric acid
 - C. Alcohols
 - D. Hydrogen peroxide**
- 71. Which of the following is used for the treatment of fungal and yeast infections?**
- A. Hydrogen peroxide
 - B. Iodine
 - C. Bacitracin zinc
 - D. Miconazole nitrate**
- 72. Which of the following topical antibiotics does not have a risk of nephrotoxicity if used in large amounts?**
- A. Bacitracin zinc
 - B. Neomycin
 - C. Miconazole
 - D. Polymyxin B sulfate**

- 73. Which of the following is not a risk factor for Candidiasis infection?**
- A. Heart disease
 - B. Diabetes
 - C. Pregnancy
 - D. Obesity
- 74. What is the most common medical issue among athletes?**
- A. Heat Exhaustion
 - B. Respiratory infections
 - C. Skin allergies
 - D. Tachycardia
- 75. Which of the following is not a symptom of asthma?**
- A. Tightness in the chest
 - B. Hyperventilation
 - C. Coughing
 - D. Wheezing
- 76. What percentage of athletes suffers from Exercise-induced bronchospasm?**
- A. 1 to 2 %
 - B. 3 to 11%
 - C. 15 to 18%
 - D. 21 to 25%
- 77. Which type of asthma medication results in bronchodilation from relaxation of smooth muscle in the bronchioles?**
- A. Antihistamines
 - B. Beta blockers
 - C. Beta-2 agonists
 - D. Corticosteroids
- 78. Which type of asthma medication prevents mast cell degranulation?**
- A. Beta-2 agonists
 - B. Corticosteroids
 - C. Leukotriene modifiers
 - D. Cromolyn and Nedocromil

79. Which of the following is not a side effect of beta-2 agonists?

- A. Sinus bradycardia
- B. Muscle tremors
- C. Jitteriness
- D. Irritability

80. Which type of cough medicine causes thinning of mucous secretions?

- A. Decongestants
- B. Antihistamines
- C. Expectorants
- D. Antitussives

81. Which gastrointestinal disorder is associated with backward movement of gastric contents from the stomach into the esophagus?

- A. Gastritis
- B. Peptic ulcer disease
- C. Gastroesophageal reflux disease (GERD)
- D. Constipation

82. What is the strict definition of constipation?

- A. Less than 2 stools per day
- B. Less than 1 stool per day
- C. Less than 6 stools per week
- D. Less than 3 stools per week

83. Which of the following is not a common reason for vomiting?

- A. Viral gastrointestinal infection
- B. Kidney disease
- C. Gastritis
- D. Head injury

- 84. Which of the following is a proton pump inhibitor used for Gastroesophageal Reflux Disease?**
- A. Tagamet
 - B. Prilosec
 - C. Zantac
 - D. Pepcid
- 85. Which of the following medications forms a protective barrier over damaged intestinal mucosa and is used for the treatment of duodenal ulcers?**
- A. H2 receptor antagonists
 - B. Proton pump inhibitors
 - C. Antacids
 - D. Sucralfate
- 86. Which of the following is not a medication commonly used for the treatment of nausea and vomiting?**
- A. Simethicone
 - B. Compazine
 - C. Phenergan
 - D. Zofran
- 87. What is the fasting blood glucose level on subsequent days required for a diagnosis of Diabetes mellitus?**
- A. Greater than 100mg/dL
 - B. Greater than 125mg/dL
 - C. Greater than 150mg/dL
 - D. Greater than 200mg/dL
- 88. Type 2 diabetes can result from all of the following except:**
- A. Diminishing insulin production.
 - B. Disordered glucose production in the liver.
 - C. Autoimmune destruction of pancreatic beta cells.
 - D. Insulin resistance in peripheral tissues.

89. Which of the following is not an accepted guideline for working with athletes with Type I Diabetes?

- A. Do not eat for 1 to 3 hours prior to exercise
- B. Inject insulin 1 hour prior to exercise
- C. Eat a snack if pre-exercise blood sugar is less than 100 mg/dL
- D. Postpone exercise if blood glucose is greater than 250 mg/dL

90. Which of the following is a rapid-acting form of insulin?

- A. Humalog
- B. Humulin R
- C. Lente
- D. Ultralente

91. What of the following is a Biguanides oral hypoglycemic medication?

- A. Dymelor
- B. Diabinese
- C. Tolinase
- D. Metformin

92. Which type of oral hypoglycemic medication targets small intestine enzymes and inhibits the breakdown of complex carbohydrates?

- A. Sulfonylureas
- B. Alpha-Glucosidase inhibitors
- C. Meglitinides
- D. Thiazolidinediones

93. What is the incidence of hypertension in people between the ages of 20 and 30 years old?

- A. 5 to 10%
- B. 15 to 25%
- C. 25 to 30%
- D. Greater than 35%

- 94. Hypertension increases the risk of all of the following except:**
- A. Cardiovascular disease
 - B. Renal disease
 - C. Liver disease
 - D. Stroke
- 95. Which of the following is not a factor that influences blood pressure in the cardiovascular system?**
- A. Blood volume
 - B. Blood oxygen saturation
 - C. Peripheral vascular system
 - D. Myocardial action
- 96. Which type of medication for hypertension will decrease heart rate?**
- A. Alpha-blockers
 - B. Calcium channel blockers
 - C. Beta-blockers
 - D. ACE inhibitors
- 97. Which type of hypertension medication decreases plasma volume by increasing urinary output?**
- A. Calcium channel blockers
 - B. ACE inhibitors
 - C. Angiotensin II receptor antagonists
 - D. Diuretics
- 98. Which type of medication is used for the treatment of seizures?**
- A. Antiepileptics
 - B. Antidepressants
 - C. Mood stabilizers
 - D. Antipsychotics
- 99. Which of the following is not one of the three types of generalized seizures?**
- A. Absence seizures
 - B. Myoclonic seizures
 - C. Partial seizures
 - D. Tonic-clonic seizures

100. Which of the following medications used to treat seizures is a GABA receptor inhibitor?

- A. Phenytoin
- B. Phenobarbital
- C. Carbamazepine
- D. Oxcarbazepine

101. Which of the following medications is a tricyclic antidepressant?

- A. Celexa
- B. Lexapro
- C. Prozac
- D. Amitriptyline

102. What percentage of children in the United States is affected by ADHD?

- A. 3 to 5%
- B. 5 to 10%
- C. 15 to 25%
- D. 25 to 35%