

Virginia Western Community College

DNH 216

Pharmacology

Prerequisites:

Successful completion of all first semester DHN Courses.

Course Description:

Studies the chemical and therapeutic agents used in dentistry, including their preparation, effectiveness, and specific application.

Semester Credits: 2**Lecture Hours: 2****Lab/Clinical/Internship Hours: 0****Required Materials****Textbook:**

Applied Pharmacology for the Dental Hygienist. Haveles. 7th Edition. Mosby. ISBN: 9780323171113

Drug Information Handbook for Dentistry. Wynn, et al. 20th Edition. Lexicomp. ISBN: 9781591953340

Clinical Practice of the Dental Hygienist. 11th Edition. Esther M. Wilkins. LWW.
ISBN: 9781608317189

Virginia Western Community College. Dental Hygiene Student Guidelines and Procedures Manual.
Fall 2015-Spring 2016

Course Outcomes

At the completion of this course, the student should be able to:

- Apply knowledge from the previous semester to the concepts of pharmacology presented in this course.
- Utilize the information presented to augment your current knowledge in treatment planning and treatment modifications for clinical situations.
- Gain an understanding of the significance and impact of Pharmacotherapeutic agents on the overall health status of the clients in your clinical caseload.

- Recognize the impact of interaction of the prescription and OTC drugs taken by the client with drugs used in dental treatment.
- Recognize the impact of research and release of new drugs on the study of pharmacology as a science.
- Recognize the need for ongoing education in this area due to the advent of new drugs and manifestations of diseases.

Topical Description

Unit 1: Information Sources, Regulatory Agencies, Drug Legislation and Prescription Writing

- History
- Natural/Herbal Products and Dietary Supplements
- Pregnancy and Breast Feeding
- Characterization of Drug Action
- Adverse Reactions
- Drug Abuse

Unit 2: Autonomic Drugs, Adrenergic and Adrenergic Blocking Agents

- Anatomy
- Parasympathetic Autonomic Nervous System
- Sympathetic Autonomic Nervous System
- Functional Organization
- Neurotransmitters
- Drug Groups

Unit 3: Monopiods, Opioids and Antagonists, Local and General Anesthetics

- Define Pain
- Nonopioids
- Opioid (Narcotic) Analgesics and Antagonists
- Local Anesthetics
- General Anesthetics

Unit 4: Anti-Infective Agents, Antifungal/Antiviral Agents, Antianxiety Agents, Drugs for the Treatment of Seizure and CNS Disorders

- Dental Infection "Evolution"
- Antifungal Agents
- Antiviral Agents
- Antianxiety
- Epilepsy
- Psychiatric Disorders

Unit 5: Drugs for the Treatment of Cardiovascular Disease, GI Disorders, Diabetes Mellitus, Respiratory Disorders, Allergic Rhinitis and Antineoplastic

- Dental Implications of Cardiovascular Disease
- Gastrointestinal Drugs
- Pancreatic Hormones
- Adrenocorticosteroids
- Endocrine Disorders
- Respiratory Disorders
- Allergic Rhinitis
- Antineoplastics

Course Objectives

Chapter 1: Information Sources, Regulatory Agencies, Drug Legislation and Prescription Writing

- Discuss the history of pharmacology and its relationship to the dental hygienist.
- List where detailed and updated information on medications can be found.
- Define the ways in which drugs are named and the significance of each.
- Define generic equivalence and how it is related to drug substitution.
- Describe the acts and agencies within the federal government designed to regulate drugs.
- Identify the four phases of clinical evaluation involved in drug approval and the five schedules of drugs.
- Discuss the history of drug legislation

Chapter 27: Natural/Herbal Products and Dietary Supplements

- Discuss why people choose herbal products over traditional medicine.
- Discuss the federal legislation governing herbal and dietary products.
- Discuss the safety of herbal and nutritional products and explain the adverse effects associated with their use and their impact on oral health care.
- Explain the drug interactions associated with herbal products and their impact on oral health care.
- Discuss the standardization of herbal products and the Good Manufacturing Practice standard introduced by the FDA.
- Discuss the herbal supplements that are used in oral health care.

Chapter 25: Pregnancy and Breastfeeding

- List the two main concerns in the administration of drugs during pregnancy.
- Describe the pregnancy trimesters in relation to dental treatment, define teratogenicity, outline the Food and Drug Administration's pregnancy categories for drugs, and discuss how breastfeeding affects dental drug use.
- Name several types of local anesthetic, anti-infective, and antianxiety agents and state their indications or contraindications for pregnant women.

Chapter 2: Drug Action and Handling

- Differentiate dose, potency, and efficacy in the context of the actions of drugs.
- Explain the pharmacologic effect of a drug.
- Discuss the major steps of pharmacokinetics: absorption, distribution, metabolism, and excretion.
- Explain how altering absorption, distribution, metabolism, and excretion can affect clinical pharmacokinetics.
- Explain how half-life relates to clinical pharmacokinetics.
- Provide example of factors that may alter the effect of a drug.
- Summarize the various routes of drug administration and the common dose forms used

Chapter 3: Adverse Reactions

- Define an adverse drug reaction and name five categories of reaction.
- Discuss the risk-to-benefit ratio of the use of a drug for therapeutic effect and its potential adverse reactions.
- Explain how the toxic effects of drugs are evaluated.
- Discuss the importance of recognizing adverse drug effects.

Chapter 26: Drug Abuse

- Define abuse and misuse and be familiar with the terms relating to drug abuse
- Name several types of central nervous system depressants that are commonly abused. Outline the typical pattern of abuse, treatment, and adverse reactions, management of overdose and withdrawal, and dental treatment implications of each.
- Identify several types of central nervous system stimulants that are commonly abused.
- Describe the pattern of abuse, as well as the withdrawal and treatment options associated with tobacco use, and summarize the role of the dental hygienist in tobacco cessation.
- Discuss several psychedelic hallucinogens and recognize symptoms produced by their use.
- Discuss ways in which the dental hygienist can identify patients or colleagues who may be abusing drugs.

Chapter 4: Autonomic Nervous System; Adrenergic and Adrenergic Blocking Agents

- Identify the major components and functional organization of the autonomic nervous system.
- Discuss the pharmacologic effects, adverse reactions, contraindications, and dental considerations of cholinergic agents, which are part of the parasympathetic autonomic nervous system.
- Discuss the pharmacologic effects, adverse reactions, contraindications, and dental considerations of anticholinergic agents, which are part of the parasympathetic autonomic nervous system.
- Discuss the major neurotransmitters in the sympathetic autonomic nervous system and the importance of receptors

- Discuss the pharmacologic effects, adverse reactions, contraindications, and dental considerations of adrenergic agents and list several specific adrenergic agents.
- Explain the workings of adrenergic blocking agents and neuromuscular blocking agents.

Chapter 5: Analgesic Agents & Aspirin; Nonsteroidal Anti-inflammatory Drugs (NSAIDs), Acetaminophen and Agents used to Treat Gout

- Describe pain and its purpose and main components.
- Discuss the classification of analgesic agents and the chemistry, pharmacokinetics, pharmacologic effects, adverse reactions, toxicity, drug interactions, and uses of aspirin.
- Define the term nonsteroidal anti-inflammatory drug and discuss the chemistry, pharmacokinetics, pharmacologic effects, adverse reactions, toxicity, drug interactions, uses, and several examples of these drugs.
- Discuss the properties, pharmacologic effects, adverse reactions, drug interactions, uses, and dosing of acetaminophen.
- Explain the disease known as gout and summarize the drugs used to treat it.

Chapter 6: Opioid (Narcotic) Analgesics and Antagonists

- Explain the classification, mechanism of action, and pharmacokinetics of opioids.
- List and describe the pharmacologic effects and potential adverse reactions of opioids.
- Discuss the addiction potential of opioids, including treatment.
- Name and explain the analgesic actions of the most common opioid agonists.
- Discuss the actions of and provide examples of the mixed opioids.
- Summarize the mechanism of action and adverse reactions of tramadol.
- Apply the use of opioids to dentistry.

Chapter 9: History and Purpose of Anesthetics

- Discuss the history and reasons for the use of local anesthetics in dentistry, including:
- List the properties an ideal local anesthetic would possess.
- Describe the importance of understanding the chemistry involved in local anesthetic agents.
- Explain the mechanism of action, pharmacokinetics, pharmacologic effects, and adverse reactions of local anesthetics.
- Describe the composition of each of the drugs used in local anesthetic solutions and summarize the factors involved in the choice of a local anesthetic.
- Briefly discuss the use, types, and doses of topical anesthetics used in dentistry.

Chapter 10: General Anesthetics

- Summarize the history of general anesthesia in dentistry.
- Describe how general anesthesia works and the stages and planes involved, as well as possible adverse reactions associated with its use.
- Compare and contrast the classifications of general anesthesia.
- Discuss the use of nitrous oxide in dentistry, including how it works, the pharmacologic effects, adverse reactions, and contraindications.
- Name and describe several types of halogenated hydrocarbons.
- List the goals of surgical anesthesia and the importance of using balanced general anesthesia.

Chapter 7: Purpose and Use of Anti-infective Agents

- Outline the history and basic principles of infection and its relevance to dentistry, including:
- Define the terms pertinent to a discussion about infection.
- Identify the factors that determine the likelihood of an infection.
- Describe the importance of cultures and sensitivity in relation to infections.
- Discuss the reasons an understanding of “resistance” is important with regard to infections.
- Summarize the principal indications for the use of antimicrobial agents.
- Name and describe the major adverse reactions and disadvantages associated with the use of anti-infective agents.
- Discuss penicillins, macrolides, tetracyclines, cephalosporins—their chemical makeup, properties, mechanisms of action, uses, and potential adverse reactions—and name several specific types of each.
- Name and describe two other types of antibiotics and anti-infective, including their chemical makeup, properties, and mechanisms of action, potential adverse reactions, and uses.
- Discuss the rationale for the use of anti-infective agents in dentistry.
- Discuss antimicrobial agents for nondental uses including their pharmacokinetics, mechanism of action, adverse reactions, and spectrum of use.
- Describe the drugs used to treat tuberculosis and the difficulties this disease presents.
- Discuss the use of topical antibiotics in dentistry.
- Summarize the concept and practice of antibiotic prophylaxis in dentistry

Chapter 8: Antifungal and Antiviral Agents

- Name several types of antifungal agents and discuss their indications in dentistry and potential adverse reactions.
- Discuss the use of antiviral agents in the treatment of herpes simplex.
- Describe the various drugs and drug combinations used to treat acquired immunodeficiency syndrome.
- Describe the various drugs used to treat chronic hepatitis

Chapter 11: Antianxiety Agents

- Discuss the value of patient relaxation in dentistry.
- Describe the pharmacokinetics, mechanism of action, pharmacologic effects, adverse reactions, drug interactions, medical uses and dental relevance of the benzodiazepines and barbiturates.
- Name and briefly describe the mechanism of action of the nonbenzodiazepine-nonbarbiturate sedative-hypnotics and the nonbenzodiazepine-nonbarbiturate receptor agonists.
- Name a melatonin receptor agonist and summarize its actions.
- Explain the workings of the centrally acting muscle relaxants and how they are used.
- Name and briefly describe a few of the miscellaneous muscle relaxant agents that can be used.
- Discuss some general precautions about which the dental practitioner should be aware with the use of antianxiety agents.

Chapter 16: Drugs for the Treatment of Seizure Disorders

- Define epilepsy and briefly summarize the various types of seizures.
- Discuss drug therapy of patients with epilepsy and describe the general adverse reactions to antiepileptic agents.
- Summarize the pharmacologic effects, adverse reactions, and drug interactions of the main antiepileptic's—valproate, lamotrigine, levetiracetam, oxcarbazepine, carbamazepine, and phenytoin.
- Discuss ethosuximide and benzodiazepines (two miscellaneous antiepileptics) and describe the workings of each.
- Provide several examples of new types of antiepileptic's, including the mechanism of action, indications, and adverse reactions of each.
- Outline the dental treatment of patients with epilepsy

Chapter 17: Drugs for the Treatment of Central Nervous System Disorders

- Name and describe the three categories of functional disorders discussed in this chapter.
- Outline some basic precautions that the dental health care professional should keep in mind when treating patients with psychiatric disorders.
- Discuss antipsychotic agents and their mechanism of action as well as the following:
- Identify first generation antipsychotics and their adverse reactions.
- Identify second-generation antipsychotics, their adverse effects, drug interactions, uses and dental implications.
- Discuss antidepressant agents, including:
- Describe the mechanism of action and adverse reactions of selective serotonin reuptake inhibitors.
- Describe the mechanism of action and adverse effects of serotonin norepinephrine reuptake inhibitors.
- Describe the mechanism of action, adverse reactions, and drug interactions of the tricyclic antidepressants.
- Name several other types of antidepressants and their possible adverse reactions and dental implications.
- List several drugs used to treat bipolar disorder.

Chapter 14: Cardiovascular Agents

- Identify the dental implications of cardiovascular disease including the contraindications to treatment, vasoconstrictor use and its relationship to periodontal disease.
- Describe heart failure and identify drugs commonly used to treat it, including the mechanisms of action, pharmacologic effects, and adverse reactions.
- Discuss the use of digoxin and the management of dental patients taking it.
- Define arrhythmia and dysrhythmia and describe how the heart maintains its normal rhythm.
- Describe the classifications, mechanisms of action, adverse reactions, and uses of antiarrhythmic agents and identify the issues to consider in dental treatment.
- Define angina pectoris and describe the types of drugs used to treat it; identify the dental implications of these drugs.
- Define hypertension, describe the categories it is divided into and identify its treatment with the various types of antihypertensive agents, including:
 - Describe the mechanisms of action, pharmacologic effects, adverse reactions, and uses of the various antihypertensive agents.
 - Identify potential drug interactions and the dental implications of these drugs.
 - Discuss the management of dental patients taking these drugs.
- Define hyperlipidemia and hypolipoproteinemia and summarize the types of drugs used to restore cholesterol homeostasis in the body including the dental implications of their use.
- Describe the role of warfarin in blood coagulation and the potential adverse reactions and interactions associated with its use.
- Identify several other drugs that affect blood coagulation.

Chapter 15: Drugs for the Treatment of Gastrointestinal Disorders

- Summarize the most common types of gastrointestinal diseases and their impact on oral health care.
- Name and describe the types of drugs used to treat gastrointestinal diseases, their uses, adverse reactions, drug interactions and any implications to dentistry, including,
- Discuss the role of H₂-receptor blockers in the treatment of peptic ulcer disease and gastroesophageal reflux disease.
- Discuss the role of proton pump inhibitors and antibiotics in the treatment of peptic ulcer disease and gastroesophageal reflux disease.
- Describe the role of antacids in the treatment of peptic ulcer disease and gastroesophageal reflux disease.
- Discuss several miscellaneous gastrointestinal drugs that can be used and their possible side effects.
- List the different types of laxatives and know the advantages and disadvantages of each.
- List the medications used to treat diarrhea.
- Define the term antiemetic and give examples of drugs used to treat vomiting and nausea.
- Discuss the medications used to manage chronic inflammatory bowel disease (IBD).

Chapter 21: Drugs for the Treatment of Diabetes Mellitus

- Define diabetes mellitus.
- List and describe the two types of this disease, its complications, and issues involving dentistry as well as cautions and contraindications in the treatment of patients with diabetes.
- List and describe the effects of drugs on the complications of diabetes.
- Name and describe the types of drugs used to treat diabetes.
- Discuss the dental concerns associated with antidiabetic therapy

Chapter 18: Adrenocorticosteroids

- Define Adrenocorticosteroids and describe how the body releases them.
- Summarize the classification, administration, mechanism of action, and pharmacologic effects of Adrenocorticosteroids.
- Describe the various adverse reactions and uses of Adrenocorticosteroids, including their application to dentistry.
- List several examples of corticosteroid products and describe the ways in which they are differentiated.
- List several dental implications to the use of steroids

Chapter 22: Drugs for the Treatment of Other Endocrine Disorders

- Discuss pituitary hormones, the functions of the anterior and posterior pituitary glands and describe the negative feedback mechanism that takes place in endocrine glands.
- Provide an overview of the thyroid hormones, conditions known as hypothyroidism and hyperthyroidism and antithyroid drugs.
- Summarize the major female and male sex hormones and describe several types of hormonal contraceptives.
- Discuss other agents that affect sex hormone systems.

Chapter 19: Drugs for the Treatment of Respiratory Disorders

- Summarize the two groups of respiratory diseases.
- Name and describe the mechanisms of action of several types of drugs used to treat respiratory diseases.
- Discuss the types of drugs used to treat respiratory infections, including the implications to dentistry

Chapter 20: Drugs for the Treatment of Allergic Rhinitis

- Define allergic rhinitis and describe the dental implications, pharmacologic effects, adverse reactions, and toxicity of antihistamines.
- Describe the dental implications, pharmacologic effects, and adverse reactions of the intranasal corticosteroids.
- Discuss montelukast, cromolyn sodium, and ipratropium bromide and describe their role in treating allergic rhinitis. Also, describe the adverse reactions of ipratropium bromide.
- Describe the use of decongestants, including:
- Discuss the pharmacologic effects, adverse reactions and uses in treating allergies.
- Discuss the use of intranasal decongestants as an alternative to oral decongestants

Chapter 23: Antineoplastic Drugs

- Discuss antineoplastic agents and summarize their use, mechanisms of action, and classification.
- Describe several adverse drug effects associated with antineoplastic agents.
- Discuss the dental implications of patients planning to take or actively taking antineoplastic drugs.

Note to Instructors