SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number:	DHYG 302	Department:	Dental Hy	giene	
Course Title:	Pharmacology	Semester:	Spring	Year:	1999

Objectives/Competencies

Course Objective	Competencies
1. Understand the need for a knowledge of pharmacology reference sources for the subject of pharmacology.	 Unit 1: Introduction Define the terms: pharmacology, pharmacodynamics, pharmacotherpeutics. Explain why the dental hygienist should have a knowledge of pharmacology and its general principles. Name the reference publications that are useful for the dental hygienist in looking up drugs. Explain the advantages and disadvantages of these references. Define and give example of following terms, chemical name, trade name, brand name and generic name. List two disadvantages of using trade names, also list advantages of using trade names. Explain the advantages and disadvantages to using trade names of drugs. Name the three regulatory agencies and state the major responsibilities of each. ie. F.D.A., F.T.C., D.E.A.

 Understand the principles of drug action. Unit 2: Principles of Drug Action Define the term drug. Describe how drugs are classified. Define and differentiate between efficacy. Name and describe the two general classifications of drug entry. Discuss the specific routes of Rx entry by the enteral route and list advantages of each. Discuss the specific routes of Rx entry by the pareenteral route and list advantages and disadvantages 	Course Objective	Competencies
 Describe the various forms of drugs for administration (tabs, caps, powder, cream, gel, liquid, etc). What are the dosage forms frequently used in dentistry. Describe the mechanism of drug transfer across biological membranes and physical chemical properties of drugs that influence their passage including the influence of PH in the dissociation process. Describe the characteristics of weak acids and bases and describe the clinical implications of each. Describe the physio-chemical factors that influence the absorption rate of drugs. Explain each of the steps involved in oral absorption, 		 Unit 2: Principles of Drug Action 1. Define the term drug. 2. Describe how drugs are classified. 3. Define and differentiate between efficacy. 4. Name and describe the two general classifications of drug entry. 5. Discuss the specific routes of Rx entry by the enteral route and list advantages and disadvantages of each. 6. Discuss the specific routes of Rx entry by the pareenteral route and list advantages and disadvantages of each. 7. Describe the various forms of drugs for administration (tabs, caps, powder, cream, gel, liquid, etc). 8. What are the dosage forms frequently used in dentistry. 9. Describe the mechanism of drug transfer across biological membranes and physical chemical properties of drugs that influence their passage including the influence of PH in the dissociation process. 10. Describe the clinical implications of each. 11. Describe the physio-chemical factors that influence the absorption rate of drugs.
		 disruption, disintegration, dispersion and dissolution. 13. Explain the effects of food on drug absorption. Name two factors which affect absorption at the injection site. 14. Define tissue transport and tissue distribution and have a general understanding of the molecular mechanisms of

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3. Recognize adverse drug reactions.	 Define the following terms: biologic half life, agonist, antagonist, partial agonist. Describe the importance of the hepatic microsomal enzymes in relationship to drug metabolism. State the nature and route of drug excretion and describe 3 processes by which it occurs. Be able to give examples of the extral renal routes of drug exchange. In considering drug administration, what role has tolerance, pathological state and gain in weight play. Be familiar with the formulas suggested for dose calculations for school and pre-school age children and infants. Be familiar with the body surface area formula for calculations of a child dose. Unit 3: Adverse Drug Reactions Define therapeutic effect, adverse effect, toxic effect and side effect. Name the 4 classifications of adverse drug reactions. Explain the mechanisms by which allergic reactions occur. Define and give an example of the idiosyncratic reactions. Define the formula for the therapeutic index and describe its usefulness. Describe the various stages in testing that a drug must pass before it is marketed to the general public.

Course Objective	Competencies
5. Understand and recognize those agents which affect the	examples of drugs that are in each schedule.
5. Understand and recognize those agents which affect the autonomic nervous system.	Unit 5: Pharmacology of the Autonomic Nervous
	System
	1. Describe the 2 divisions of the autonomic nervous
	system and the functions of each.
	2. Describe the function of neurotransmitors and what
	role norepinephrine and acetycholine play.3. Given the following groups of drugs, describe the
	effects they exert on the autonomic nervous system.
	a. cholinergic agents
	b. anti-cholinergic agents
	c. agenergic agentsd. agenergic of sympathetic blocking agents
6. Understand the impact of general anesthetics.	4. Discuss the use of anticholinergic agents in dentistry.
	 Unit 6: General Anesthetics Discuss the early history of general anesthesia and be
	familiar with the anesthetic agents and the individual
	responsible for its development.
	2. Discuss the theories of anesthetic action and the
	incompleteness of the existing theories.
	3. Describe the 4 basic stages of anesthesia by physiologic response and give the implications of each.
	4. List and describe the 4 planes of general anesthesia.
	5. Explain the methods of administrating gases, volatile
	anesthetics for inhalation.
	6. Discuss the problems and accidents that can occur

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 Understand the importance of sedative/hypnotic drugs. 	 during administration of various agents for surgical anesthesia. 7. Describe the properties, uses, adverse effects, and adverse reactions of the following anesthetic gases: a. nitrous oxide b. cyclopropane c. ethylene 8. Describe the properties, uses, adverse effects, and adverse reactions of the following volatile liquid anesthetics: a. ether b. chloroform c. tetrachloride d. trichloroethelyne e. halothane f. enflurane g. ethane h. chlorine 9. Describe the uses and effects of the following intravenous agents used for general anesthesia: Barbiturates a. thiopental sodium b. methyl hexabarbital sodium Non-barbiturates a. ketamine 10. Describe the rationale for contraindicating certain anesthetic agents in the presence of particular diseases
r	and the importance for identifying the disease agents and the effects.

Course Objective	Competencies
8. Understand the importance of psychotherapeutic drugs.	 Unit 7: Sedative/Hypnotic Drugs 1. Define and differentiate between sedation and hypnosis. 2. Describe the classification of barbiturates by division of action, registration, dosage and preparation of those most commonly used in dentistry. 3. Discuss the properties, uses, effects and adverse reactions of barbiturates and give examples of each. 4. List the number of barbiturates, sedatives, hypnotics and discuss relative advantages and disadvantages over barbiturates. 5. For each of the number of barbiturates, sedatives, hypnotics describe the action, uses, effects and adverse reactions of each. 6. State the rationale for sedative analgesic combinations and describe how this can be accomplished including contraindications, fixed dosage combinations and dual drug effects. 7. What special consideration should the practitioner keep in mind concerning sedative/hypnotic drugs. 1. Differentiate between sedation and hypnosis. 2. Describe the difference between schizophrenic and affective disorders. 3. Discuss drug therapy in treatment of various psychosis and list 3 groups of antipsychotic agents used in therapy. 4. Describe the action of thioxanthenes, the use,

Course Objective	Competencies
 Understand the importance of tranquilizers and centrally acting muscle relaxants. 	 absorption, metabolism, addiction, pharmacolgic effect, drug interactions and drug toxicity. 5. Discuss the butyrophenones as to use, absorption, metabolism, pharmacologic effects and drug interactions and compare butyrophenones to thioxanthanes. 6. Discuss use, administration, adverse reactions and dosage of these agents used in treating depression. (dibenzodiapines, monoamines, oxidase inhibitors, lithium salts) 7. Explain the implications and rationale for use of psychotherapeutic agents in pediatrics and geriatrics including consideration of placebos.
10. Understand the importance of non narcotic drugs and prostaglandins.	 Unit 9: Tranquilizers and Centrally Acting Muscle Relaxants 1. Discuss the use of mild tranquilizers in controlling anxiety and the rationale for use in dentistry. 2. Describe the use, administration, pharmacologic effects, adverse reactions, drug reactions, dosage and preparations for the following anti-anxiety agents. 3. Discuss the indications, the side effects associated with central muscle relaxants.
	 Unit 10: Non Narcotic Drugs Discuss the two components of pain: perception and reaction. Define and be able to differentiate between anesthetic and analgesic effects. Discuss the origin, mechanism of action,

Course Objective	Competencies
11. Understand the importance of non narcotic drugs and prostaglandins.	 pharmacological effect, adverse effects and toxic effects of salicylates. 4. Discuss the administration, absorption, and the metabolism of aspirin and also the dosage and preparation. 5. Describe the combined preparation of aspirin with other drugs and discuss their usefulness in dentistry. 6. Discuss the para-aminophenols as to administration, metabolism, usage, dosage and adverse reactions. 7. Discuss the use of non steroidal and anti-inflammatory agents. 8. Discuss the biologic and pathologic roles of prostoglandins. 9. What is the implication of prostoglandins in periodontal disease. Unit 11: Prostaglandins 1. Discuss the two components of pain: perception and reaction. 2. Define and be able to differentiate between anesthetic and analgesic effects. 3. Discuss the origin, mechanism of action, pharmacological effect, adverse effects and toxic effects of salicylates. 4. Discuss the able in administration, absorption, and the metabolism of aspirin and also the dosage and preparation. 5. Describe the combined preparation of aspirin with other drugs and discuss their usefulness in dentistry.

Course Objective	Competencies
12. Understand the importance of narcotics, analgesics and antagonists.	 Discuss the para-aminophenols as to administration, metabolism, usage, dosage and adverse reactions. Discuss the use of non steroidal and anti-inflammatory agents. Discuss the biologic and pathologic roles of prostoglandins. What is the implication of prostoglandins in periodontal disease. Unit 12: Narcotics, Analgesics and Antagonists What are the clinically important similarities among narcotic/analgesics and how are they classified. Discuss morphine and codeine including their effects on the body systems, analgesic and sedative effects, addiction, toxicity, administration, dosage and preparation and use in the dental office. List and discuss semi synthetic derivatives of morphine
 Recognize drugs which stimulate the central nervous system. 	 including implications for use, effects, dosage and adverse reactions and administration. 4. List and discuss synthetic narcotics, ie. meperodome, alpha prodine, anileridine, ethoheptazine, methadone, propoxyphene as to their effects, use, adverse reactions, absorption, dosage administration as well as implication for use in dental office. 5. List and discuss the semi synthetic derivatives of morphine or codeine and discuss their uses. 6. Not discussed on tape. 7. Discuss the effects and actions of narcotic antagonists (nalorphine, levallorphanaloxone).

Course Objective		Competencies
14.	Understand the use of anticonvulsant drugs.	 Unit 13: Central Nervous System Stimulants 1. Define the term analeptics. 2. Discuss the effects of the central nervous stimulants and the rationale for basic knowledge of these agents in the dental office. 3. Describe the actions and effects of xanthines. 4. Discuss the actions and effects and implications for the use of amphetamines. 5. Discuss the use of amphetamines or their derivatives for the treatment of obesity.
15.	Understand the use of histamines and anti-histamines.	 Unit 14: Anticonvulsant Drugs List and describe the types of epileptic seizures. Discuss the rationale for treatment of epileptic patients in the dental office. Discuss the use of anticonvulsant drugs in the treatment of epilepsy, and discuss the effects, dosage, adverse reactions and implications for handling dental patients in each case.
16.	Understand the role of hormones.	 Unit 15: Histamines and Anti-Histamines 1. Discuss the occurrences and pharmacological actions of histamines. 2. Define and give the classification of antihistamines. 3. Define the pharmacologic effect of anti-histamines, adverse effects, drug interactions and therapeutic uses. Unit 16: Hormones 1. Name the pituitary hormones and describe their

Course Objective	Competencies
17. Understand the importance of hormones.	 primary functions. Identify the pituitary hormones which have been isolated or synthesized for clinical use and discuss the therapeutic effects of each. Explain the origin and functions of each of the sex hormones. Discuss the most common clinical use of the sex hormones and the advantages of the hormone analogs. Describe the significance of the thyroid hormone on growth differentiation, metabolic state and calorigenic effects. Name the natural synthesis and analog derivatives of thyroid hormones and discuss the therapeutic applications of each. Describe the role of parathyroid hormones in maintaining homeostasis of calcium and describe the antagonistic relationship with the thyroid hormone calcitonin. Discuss the ron hormonal factors in chemichemostasis. Discuss the relation of each. Name the pancreatic hormones (insulin and glucagon) and describe the relationship of insulin to various diabetic condition and discuss its use in therapy. State the gastro intestinal hormones and their use. Discuss the function of prostolglandins and the current interest in establishing therapeutic agents in the treatment of allergiens and inflammation.

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18. Understand the importance of anti-neoplastic drugs.	 Unit 17: Adrenocorticoid Steroids Name and describe the effects of the steroids secreted by the adrenocortex. Discuss the abnormalities of adreno-corticoid secretions (addisons disease, cushings disease). List and describe the effects, adverse reactions, therapeutic use and the homeostatic effect of
19. Understand the importance of diuretics and anti- hypertensive drugs.	 adrenocorticoid steroids. 4. Discuss the dental uses of cortico-steroids. Unit 18: Anti Neoplastic Drugs 1. Discuss the classification, use and adverse effect of the antineoplastic agents. 2. Describe the oral considerations with regard to anti-
20. Understand the importance of cardiovascular drugs.	 neoplastic agents. Unit 19: Diuretics and Anti-Hypertensive Drugs 1. Describe the three categories of hypertensive disease. 2. Describe the basic philosophy of drug therapy in treating hypertension. 3. Describe the actions of the major diuretics in controlling hypertension. 4. Discuss other drugs that act either through central or peripheral mechanisms to reduce or manage hypertension and give examples of each. 5. Discuss the dental implications of the patient taking anti-hypertensive medications and their effect on dental treatment.

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	 Unit 20: Cardiovascular Drugs Discuss the physical symptoms manifested by a patient suffering congestive heart failure. Describe the major pharmacological effects associated with digitalis glycosides, digitoxin and digoxin. Describe the major adverse effects associated with glycosides that can be additive with epinephrine. Name another agent which would exacerbate this side effect. Explain the rationale for determining the location of a patient's angina medication before rendering dental treatment. List and describe the use, dosage, effect and adverse reactions by giving examples of anti-anginal agents. Explain the development of arrhythmias by various dysfunctions and effects on the sympathetic and parasympathetic portions of the autonomic nervous system. Discuss the properties, use, effects, adverse reactions to various drugs used to control cardiac arrhythmias. (quinidine, procainamide, lidocaine, delophine, digitalis and other autonomic agents) Relate the clotting mechanism to the action of anticoagulants and discuss the need for the use of these drugs. Explain the procedures that must be followed in treating a patient taking warfarin. Name one drug that
21. Understand the importance of anti microbial agents.	should not be administered to such a patient for pain relief.

10. Name five absorber treatment withou dentist associated 11. Describe the al each of the follow hypotension, zero Unit 21: Anti 1. Discuss and de a. anti mic b. anti infe c. anti bact d. anti vira
e. antibioti f. anti fung 2. Discuss the dif various anti-micr differentiate the f a. spectrum b. resistand c. bacterio d. bacterio e. synergis f. antagoni g. super in 3. Discuss the pri
likelihood of a m 4. Describe the th agents and the pr

Course Objective	Competencies
22. Understand and value the use of locally acting medications.	 Discuss the value of culture and sensitivity tests. Know the current recommendations of the Heart Association for antibiotic coverage of patients with congenital heart disease, rheumatic heart disease or prosthesis. Explain the duration of dosage of antibiotics as it pertains to control of infection and prevention of toxic effects and super infection. Discuss penicillin as to administration including advantages and disadvantages of various routes, absorption, metabolism, anti-bacterial effects as determined by blood levels, spectrum, adverse effects, uses and preparations and dosage. List and describe the type of natural and semi-synthetic penicillins available for clinical use including uses, effects, spectrums, preparation, dosage of systemic and topical and anti fungal agents as well. List and discuss allergies and hypersensitivity reactions regarding penicillin. Discuss action, spectrum of activity, usage and adverse effects. Unit 22: Locally Acting Medications: Anti Microbials, Hemostatics, and Protectives Discuss the primary differences between antiseptics and disinfectants. Discuss primary differences between bacteriastatic and bacteriocidal.

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23. Understand the importance of emergency drugs in the clinical setting.	 Distinguish between sterilization and disinfection. Be familiar with the action of hemostatic agents (sympathomimetics, styptics, and astringents, mechanical agents). Discuss the use of oral protectives. Discuss 5 methods used for sterilization and disinfection in a dental office. List the chemical methods that can result in sterilization. List the advantages and disadvantages of the following: a. gluteraldehyde b. sodium hypochlorite c. provodine iodine d. benzalkonium chloride Describe the best method for sterilization and disinfection of the following: a. chair and counter b. injection sites c. dental instruments d. V.D. and hepatitis patient e. cotton rolls and gauze f. suction tip and saliva ejector List 5 examples of hemostatics and protectives and describe their specific use. Unit 23: Emergency Drugs State the general measure which the dental hygienist should be familiar in order to respond to emergency

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24. Understand and value the impact of systemic diseases on selection of pharmacologic agents in dentistry.	 situations. 2. State the signs, symptoms and treatment for the following emergencies: a. cardiac arrest b. angina pectoris c. acute myocardial infarction d. convulsions e. syncope f. asthma g. anaphylactic shock h. acute adrenal insufficiency i. apnea j. hypoglycemia 3. List the equipment necessary to treat the common emergencies and give the rationale for the inclusion of each item. 4. List the names of the potential emergency drugs needed in an emergency drug kit for a dental office. Unit 24: Pharmacologic Considerations in Patients with Systemic Diseases 1. State the dental implications affecting treatment of patients with specific disease states: Disease - Asthma Dental Consideration Psychological stress of dental treatment may cause an attack. Caution with prescribing any medication as allergies may not have been identified and also frequent side effects of the properly prescribed anti histamine

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	which reduce salivary flow and adversely effect caries rate, periodontal sites, tissue sensitivity and retention of complete dentures.
	Disease - Emphysema Dental Consideration In severe cases daily regimen of tetracycline is prescribed as prophylactic method which tends to impair prothrobin utilization and thereby promotes potential bleeding.
	Disease - Hypertension Dental Consideration Let dental treatment be delayed until medical controls for high blood pressure is demonstrated. Many times sedation may be necessary before a dental appointment when anxiety is a complicating factor.
	Disease - Congestive Heart Failure Dental Consideration Clinical signs are distended neck veins and cyanosis and indicate severity of the disease. Conservative measures, short appointment, upright sitting position and sedation for anxiety are indicated. Oxygen support should be close by. Disease - Myocardial Infarction
	Dental Consideration Effective dental treatment should be delayed for 3 months after the infraction. Same precautions should be

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	applied to the patient as angina. Anti-coagulant therapy may be an additional complicating factor.
	Disease - Anti-Coagulation Therapy Dental Consideration Preventive therapy for excessive bleeding with any procedure that may cause excessive bleeding mostly when at controlled therapeutic level working dental procedures including extractions and curretage may be accomplished without complications. Again consultation with the patient's physician is necessary.
	Disease - Rheumatic Heart Disease Congenital Heart Disease Heart Murmurs Dental Consideration History of these conditions indicate that the primary dental concern is patient susceptibility to sub acute endocarditis. Cardiac status of patient should be evaluated and antibiotic prophylaxis prescribed as necessary.
	Disease - Pacemakers Dental Consideration Precautions mostly implemented are avoiding use of any electronic equipment including vitalometer, cavitron and using prophactic antibiotics regiment is recommended to avoid SBE.

Course Objective	Competencies
	Disease - Prosthetic Heart Valve Dental Consideration Two primary concerns: a. bacteremia b. Excessive bleeding All patients should be covered with the prophylactic antibiotic regiment and a current prothrombin count should be requested as patients are taking anticoagulant medications. Disease - Hepatitis Dental Consideration Clinical signs will be jaundice, fever, malaise acute viral hepatitis. Any elective dental procedures should be delayed until the liver function is back to normal. When necessary to treat high risk patients, face masks, disposable gloves and gowns should be used to protect the staff.
	Disease - Hepatic Failure Dental Consideration Clinical signs which reflect extent of hepatic failure are weakness, fatigue, jaundice and ankle edema. Primary dental concern is impaired coagulation status. Bleeding and prothrombin time should be evaluated before any surgical treatment is initiated. Disease - Mal Absorption Dental Consideration

Course Objective	Competencies
	All signs and symptoms include glossitis, cheiliti and anemia should suggest aml nutrition. Lab tests for iron and vitamin B12 and Foates are necessary. Treatment should be on an emperical bases. Serious underlying seriologic defects may be masked.
	Disease - Renal Defects Dental Consideration Only emergency dental treatment should be done because of multiple systemic complications and a high risk of infection.
	Disease - A. Dialysis Dental Consideration Complications influencing dental management of a patient being treated by intermittent hemodialysis increases susceptibility to infection, bleeding tendencies and possibility of hypertensopsion. Dental treatment best accomplished in morning of the day after dialysis.
	Disease - B. Renal Tran Splantation Dental Consideration Patient host resistance to infection is depressed by immuno suppressive drug therapy. Periodental status of these patients should be closely monitored.
	Disease - Seizure Disorders Dental Consideration

Course Objective	Competencies
	Any anxiety generated by dental treatment or pain that may be caused by an local anesthetic may precipitate a seizure disorder. As a result, patient's appointment should be in the morning or shortly after taking medication.
	Disease - Stroke Dental Consideration All efforts should be directed to keeping patient calm, comfortable and free of pain. Patients should have morning appointment when he is rested and medication for anxiety should be given where indicated and any operations should be performed under sufficient anesthesia.
	Disease - Anemia Dental Consideration A hemoglobin deficiency may be manifested early by loss of papilla from tongue and general pale color of mucous membrane. Patients should be referred to a physician for diagnosis and treatment.
	Disease - Leukemia Dental Consideration All signs and symptoms include swollen gums, bleeding secondary infection. Dental treatment should consist of conservation treatment. Supportive care should be directed to improving oral effect and preventing infection. Oral hygiene is imperative.

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	Disease - Cushing Syndrome Dental Consideration Excessive amounts of adrenal cortical hormones may result in hypertension, edema, thinning of the skin, elevated blood glucose and osteoporosis. All oral disease and periodontal disease may be difficult to control. Cadidasis is more prevalent. Sedation and pain control are prime considerations for dental treatment since there is no steroid reserve to respond to stress.
25. Understand and select pharmacologic agents used primarily to treat common oral diseases.	Disease - Diabetes Dental Consideration Primary dental consideration for the diabetic patient are reduced host resistance response to infection and increased tendency to candidasis. In the adult, it plays unexplained exacerbation of periodontal disease and decreased salivation. Undiagnosed or uncontrolled diabetes should be ruled out. Disease - Dose Radiation Dental Consideration The following adverse sequelae after radiation therapy is the risk of local infection caused by compromised vascular supply and xerostomia dental procedures which may result in bleeding and require extended prophylactic antibiotic coverage. Candidasis is a frequent occurrence in this condition.

Course Objective	Competencies
	Unit 25 Pharmacologic Management of Certain Common Oral Disease Entities 1. Review and relate occurrence, etiology, signs and symptoms and primary treatment for the following diseases. a. herpetic changes to lip b. acute necrotizing ulcerative gingivitis c. primary herpetic gingiva stomatitis d. recurrent herpes labialis e. recurrent apthous ulcers f. candidiasis g. angular cheilitis h. burning tongue i. geographic tongue j. pericoronitis k. alveolar osteitis l. burn sensitivity m.xerostomia n. post radiation caries o. lichenplanus