DENT-2332: PHARMACOLOGY AND THERAPEUTICS

Cuyahoga Community College

Viewing: DENT-2332 : Pharmacology and Therapeutics

Board of Trustees:
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Academic Term:
Fall 2022

Subject Code
DENT - Dental Hygiene

Course Number:
2332

Title:
Pharmacology and Therapeutics

Catalog Description:
Discussion of pharmacological effects of drugs and anesthetics, adverse reactions, and their usual indications and contraindications for preoperative and postoperative client care. Overview of agents used specifically for pain management and medical emergencies presented, referencing the health history and dental hygiene assessment for treatment protocols.

Credit Hour(s):
2

Lecture Hour(s):
2

Requisites

Prerequisite and Corequisite
DENT-1400 Preventive Oral Health Services II, and BIO-2500 Microbiology.

Outcomes

Course Outcome(s):
Analyze the history of pharmacology and its relationship to oral health care.

Objective(s):
1. Identify the acts and the regulatory agencies within the federal government that affect the utilization of medications.
2. Review and discuss drug information references available to research information.
3. Define the ways in which medications are named and the significance of each.
4. Identify the format of a prescription and the common abbreviations used.
5. Identify the Schedules of Drugs (I-V), medications within each schedule and the abuse potential of medications within each schedule.

Course Outcome(s):
Evaluate the actions of medications in the body and the methods of drug administration.

Objective(s):
1. Identify factors that may alter the effect of a medication.
2. Differentiate between dose, potency and efficacy in relationship to drug action.
3. Define the basic principles of pharmacokinetics, including absorption, distribution, metabolism and excretion within the body.
4. Explain the various routes of drug administration and list an example of a medication dispensed by each route.
5. List the various dosage forms of medications and give an example of a medication for each form.

Course Outcome(s):
Interpret adverse drug reactions and their clinical manifestations.

Objective(s):

1. Explain the categories of adverse drug reactions.
2. Summarize the clinical manifestations of adverse reactions.
3. Review the toxicologic evaluation of drugs.

Course Outcome(s):

Research the categories of drugs prescribed for use in dentistry and understand their use, pharmacologic effects, adverse reactions, contraindications, drug interactions and dental considerations.

Objective(s):

1. Define the role of the autonomic nervous system.
2. Identify drugs within each category of the autonomic nervous system: parasympathetic and sympathetic.
3. Name the types of analgesic drugs found within each category: non-opioids and opioids.
4. Describe commonly prescribed anti-infective, antifungal and antiviral agents.
5. Recognize the indications for use of anti-infectives in dentistry.
6. Summarize the prophylactic anti-infective regimens of treatment.
7. Summarize the use of general anesthetics and their application to dental treatment.

Course Outcome(s):

Evaluate the categories of drugs taken by dental patients that may require modification to dental treatment and understand their use, pharmacologic effects, adverse reactions, contraindications, drug interactions and dental considerations.

Essential Learning Outcome Mapping:

Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Describe cardiovascular drugs and their significance to dental treatment.
2. Identify antituberculosis agents prescribed for the treatment of tuberculosis.
3. Recognize medications in the psychotherapeutic category and their relationship to dental treatment.
4. Give examples of endocrine, respiratory and gastrointestinal agents.Discuss drugs of abuse and their application to dental treatment.
5. Explain the classifications of antineoplastic medications and their relevance to dental treatment.
6. Identify the use of steroids in dentistry.
7. Describe the use of antihistimines and their effect on dental treatment.

Course Outcome(s):

Evaluate the use of emergency medications and be prepared to respond appropriately to dental office emergencies.

Objective(s):

1. Name and describe several categories of emergencies and provide some common examples within each category: cardiac, respiratory, lost or altered consciousness, and/or drug-related.
2. Summarize the general measures that should be taken in preparation for treatment in the event of a dental office emergency.
3. List the primary support medications that should be included in a dental office emergency kit and several examples of both Level 1, Level 2 and second and third-level optional medications.
4. Identify several pieces of equipment that should be included in an emergency kit.

Course Outcome(s):

Recognize the most common lesions found in the oral cavity and the pharmacologic agents used to treat them.

Objective(s):

1. List lesions seen in the oral cavity that are infectious in nature.
2. Identify oral lesions that result from an altered immune response.
3. Give examples of medication-induced oral side effects.
4. Describe oral lesions that resemble autoimmune-type reactions.

5. Discuss medication-induced oral side effects.
6. Recognize commonly prescribed medications used to treat oral lesions.

Course Outcome(s):

Analyze the main concerns relevant to the administration of medications during pregnancy and breast feeding.

Objective(s):

1. Define teratogenicity.
2. Explain the Food and Drug Administration's categories of medications for pregnancy.
3. Name several types of local anesthetic, anti-infective and antianxiety agents prescribed for use in dentistry and state their indications or contraindications for pregnant or breast feeding women.
4. Explain the intent of the Pregnancy and Lactation Labeling rule and the 3 narrative sections within the rule that explain maternal and fetal risk of each medication.

Course Outcome(s):

Critique herbal supplements and dietary products taken by patients in general and oral health care.

Objective(s):

1. Discuss the reasons that individuals choose herbal products over traditional medicine.
2. Identify federal legislation governing herbal and dietary products.
3. Explain the adverse effects and interactions associated with prescription medications.
4. Recognize the dental hygiene considerations associated with the use of herbal and dietary products.

Methods of Evaluation:

1. Examinations
2. Quizzes
3. Client case study
4. Participation
5. Projects and written assignments

Course Content Outline:

1. History of pharmacology
    a. Federal regulatory agencies
        i. Harrison Narcotic Act
        ii. Food and Drug Administration
        iii. Federal Trade Commission
        iv. Drug Enforcement Administration
        v. Omnibus Budget Reconciliation Act
    b. Drug names
        i. Generic Name
        ii. Trade Name
        iii. Chemical Name
    c. Prescription format
        i. Heading
        ii. Body
        iii. Closing
        iv. Superscription
        v. Inscription
        vi. Subscription
        vii. Transcription
        viii. Common abbreviations
    d. Schedules of controlled substances
        i. Schedule I
        ii. Schedule II
        iii. Schedule III

iv. Schedule IV
v. Schedule V

2. Drug action and handling
   a. Characterization of drug action
      i. Log dose effect curve
      ii. Potency
      iii. Efficacy
      iv. Dose
   b. Pharmacokinetics
      i. Absorption
      ii. Distribution
      iii. Metabolism
      iv. Excretion
   c. Dosage forms
      i. Tablet
      ii. Capsule
      iii. Pill
      iv. Lozenge, troche
      v. Suppository
      vi. Solution
      vii. Elixir
      viii. Syrup
      ix. Tincture
      x. Spirit
      xi. Lotion
      xii. Emulsion
      xiii. Suspension
      xiv. Cream
      xv. Ointment
      xvi. Transdermal patch
      xvii. Aerosol Spray
      xviii. Intradermal Implant
      xix. Micropump
   d. Routes of administration
      i. Oral
      ii. Rectal
      iii. Intravenous
      iv. Intramuscular
      v. Subcutaneous
      vi. Intradermal
      vii. Intrathecal
      viii. Intraperitoneal
      ix. Inhalation
      x. Topical
   e. Factors that alter drug effects
      i. Patient compliance
      ii. Psychologic factors
      iii. Tolerance
      iv. Pathologic state
      v. Time of administration
      vi. Route of administration
      vii. Sex
      viii. Genetics
      ix. Drug interactions
      x. Age and weight
      xi. Environment
3. Adverse reactions

a. Classifications
    i. Toxic reaction
    ii. Side effect
    iii. Idiosyncratic reaction
    iv. Drug allergy
    v. Interference with natural defense mechanism
b. Clinical effects
    i. Exaggerated effect on target tissues
    ii. Effect on nontarget tissues
    iii. Teratogenic effect
    iv. Local effect
    v. Drug interactions
    vi. Allergic reactions
c. Toxicologic evaluation of medications
    i. LD50
    ii. ED50
    iii. Therapeutic Index

4. Medications used in dentistry: therapeutic use, pharmacologic effects, adverse reactions, contraindications, drug interactions and dental hygiene considerations.
    a. Autonomic nervous system agents
        i. Adrenergic agents
        ii. Adrenergic-blocking agents
        iii. Cholinergic agents
        iv. Anti-cholinergic agents
        v. Neurotransmitters
    b. Non-opioid Analgesics
        i. Salicylates
        ii. Non-steroidal Anti-inflammatory agents (NSAID)
        iii. Acetaminophen
        iv. Medications used to treat gout
    c. Opioid analgesics
        i. Chemical structure
        ii. Antagonists
    d. Anti-infectives
        i. Evolution of a dental infection
        ii. Mechanism of action
        iii. Categories
            1. Penicillins
            2. Macrolides
            3. Tetracyclines
            4. Clindamycin
            5. Metronidazole
            6. Cephalosporins
            7. Vancomycin
            8. Aminoglycosides
            9. Sulfonamides
            10. Fluoroquinolones
            11. Anti-tuberculosis agents
            12. Topical anti-infectives
            13. Anti-infective premedications guidelines
    e. Antifungal agents
        i. Nystatin
        ii. Clotrimazole
        iii. Ketoconazole
        iv. Fluconazole
        v. Amphoteracinc B
        vi. Griseofulvin
    f. Antiviral agents

i. Acyclovir
ii. Penciclovir
iii. Nucleoside reverse transciptor inhibitors
iv. Non-nucleoside reverse transcriptor inhibitors
v. Protease Inhibitors

g. General Anesthetic agents
i. Stages and planes of anesthesia
ii. Types
1. Inhalation anesthetics
2. Volatile liquids
3. Intravenous anesthetics
4. Ultrashort-acting barbiturates

h. Anti-anxiety agents
i. Benzodiazepines
ii. Barbiturates
iii. Nonbenzodiazepine-Nonbarbiturate Sedative Hypnotics
iv. Nonbenzodiazepine-Benzodiazepine Receptor Agonists
v. Centrally acting muscle relaxants

5. Medications that may alter dental treatment
a. Cardiovascular agents
i. Cardiac glycosides
ii. Ace inhibitors
iii. Angiotensin receptor nlockers
iv. Anti-arrhythmic agents
v. Anticoagulants
vi. Antiplatelet agents
vii. Beta-adrenergic blockers
viii. Calcium channel blockers
1. Diuretics
2. thiazide
3. Loop
4. Potassium-sparing
ix. HMG-CoA Reductase Inhibitors
x. Vasodilators

b. Anti-tuberculosis agents
c. Psychoterapeutic agents
i. a. Conventional antipsychotics
1. i. High potency
2. ii.Medium potency
3. iii.Low potency
ii. b. Atypical antipsychotics
iii. c. Antidepressants
1. Tricyclics
2. Atypical
3. Monoamine-Oxidase Inhibitors
4. Selective Seratonin Reuptake Inhibitors

d. Endocrine agents
i. Thyroid and anti-thyroid agents
ii. Insulin
iii. Antidiabetic agents
1. Sulfonureas
2. Meglitinide derivatives
3. Biguanides
4. Alpha-glucosidase inhibitors
5. Thiazolidinediones
iv. Sex hormones and contraceptives
1. Estrogens
2. Progestins
3. Anti-estrogens

4. Oral contraceptives
5. Hormone replacement therapy

v. Bisphosphonates
1. Specific agents
2. Risk factors
3. Osteonecrosis of the jaw

e. Respiratory agents
i. Sympathomimetic agents
ii. Metered-dose inhalers
iii. Corticosteroids
iv. Leukotriene-pathway Inhibitors
v. Methylxanthines
vi. Anticholinergics
vii. Nasal decongestants
viii. Expectorants
ix. Mucolytics
x. Antitussives

f. Gastrointestinal agents
i. H2 Receptor Antagonists
ii. Proton Pump Inhibitors
iii. Antacids
iv. Laxatives
v. Anti-diarrheals
vi. Emetics
vii. Anti-emetics

g. Drugs of abuse
i. Definitions
1. Psychological dependence
2. Physical dependence
3. Tolerance
4. Addiction
5. Habituation
6. Withdrawal

ii. Central nervous system depressants
iii. Central nervous system stimulants
iv. Hallucinogens

h. Antineopastic medications
i. Sensitivity of neoplastic disease to chemotherapy
ii. Classification of antineoplastic agents
1. Cell-cycle specific
2. Cell-cycle non-Specific

i. Adrenocorticosteroids
i. Glucocorticoids
ii. Mineralocorticoids

j. Autocoids and Antihistamines

6. Emergency medicine
a. Facility protocol and preparation; basic emergency procedures
b. Primary Support medications
i. Level 1 medications
ii. Level 2 medications

c. Emergency Equipment
i. Level 1 Critical Devices
ii. Level 2 Secondary Devices

d. Emergency cardiac care: procedures and medications
i. Cardiopulmonary resuscitation
ii. Angina pectoris
iii. Acute myocardial infarction
iv. Cardiac Arrest

e. Respiratory emergencies: procedures and medications

        i. Hyperventilation
        ii. Asthma
        iii. Anaphylactic shock
        iv. Acute airway obstruction
    f. Lost or altered consciousness emergencies: procedures and medications
        i. Syncope
        ii. Seizures or convulsions
        iii. Hypoglycemia
        iv. Hyperglycemia
    g. Medication-induced emergencies: procedures and medications
        i. Opioid overdose
        ii. Reaction to local anesthetics
        iii. Reaction to vasoconstrictors
    h. Other emergenices: procedures and medications
        i. Extrapyramidal reactions
        ii. Acute adrenocortical insufficiency
        iii. Thyroid storm
        iv. Malignant hyperthermia
        v. Cerebrovascular accident
        vi. Bleeding
7. Oral Lesions and pharmacologic agents
    a. Infectious lesions
        i. Acute necrotizing ulcerative gingivitis
        ii. Herpes infections
        iii. Candidiasis
        iv. Angular cheilitis
        v. Alveolar osteitis
    b. Immune reactions
        i. Recurrent aphthous stomatitis
        ii. Lichen planus
    c. Miscellaneous oral conditions
        i. Geographic tongue
        ii. Burning mouth or tongue syndrome
        iii. Pericoronitis
        iv. Postirradiation caries
        v. Actinic lip changes
        vi. Stomatitis
    d. Drug-induced oral lesions
        i. Xerostomia
        ii. Sialorrhea
        iii. Hypersensitivity-type reactions
    e. Autoimmune-type oral lesions
        i. Lichenoid-like eruptions
        ii. Lupus-like eruptions
        iii. Stains
        iv. Gingival Enlargement
8. Pregnancy and breast feeding
    a. Medications used in dental treatment of pregnant/nursing patient
        i. Local anesthetic agents
        ii. Vasoconstrictors
        iii. Analgesics
        iv. Anti-infective agents
        v. Antianxiety agents
    b. FDA Risk summary for pregnancy
    c. Pregnancy and Lactation Labeling Rule
9. Herbal products and dietary supplements

a. Federal legislation
    i. Dietary supplement health and education act
    ii. Package labeling
    iii. Good Manufacturing Practice
b. Herbal supplements used in oral health care
    i. Acemannan
    ii. Essential oil mouth rinse
    iii. Oil of cloves (Eugenol)
    iv. Triclosan
    v. Xylitol
c. Other commonly used herbal and dietary supplements
    i. Aloe
    ii. Chamomile
    iii. Echinachea
    iv. Feverfew
    v. Garlic
    vi. Ginger
    vii. Ginko Biloba
    viii. Ginseng
    ix. Kava Kava
    x. Licorice
    xi. St. John's Wort

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Resources

Wynn, Richard L., Meiller, Timothy F., Crossley, Harold L. *Drug Information Handbook for Dentistry*, Hudson:Lexicomp.

Haveles, E. B. (2020) *Pharmacology for Dental Hygiene Practice*, Maryland Heights:MosbyElsevier.

Boyd, Linda D. Mallonee, Lisa F., Wyche, Charlotte J. (2021) *Clinical Practice of the Dental Hygienist*, Burlington, MA, Jones & Bartlett Learnaing.

Langlais, R., Miller, C. & Neild-Gehrig, J. (2017) *Color Atlas of Common Oral Diseases*, Philadelphia: Lippincott, Williams & Wilkins.

Malamed, Stanley F. (2015) *Medical Emergencies in the Dental Office*, St. Louis: Mosby, Inc.

Physicians' Desk Reference.

Resources Other

Online Student Resources:
http://evolve.elsevier.com/Haveles/pharmacology (http://evolve.elsevier.com/Haveles/pharmacology/) Textbook Resource Site
www.medicinenet.com (http://www.medicinenet.com/) Offers general medical info and dictionary
www.rxmed.com (http://www.rxmed.com/) Comprehensive drug database
www.fda.gov/cder/index.html (http://www.fda.gov/cder/) FDA Center for Drug Evaluation and Research
www.druginfonet.com (http://www.druginfonet.com/) Good site for commonly asked questions about meds
www.lexi.com/dentistry (http://www.lexi.com/dentistry/) Lexi-comp Company
http://www.rxlist.com (http://www.rxlist.com/) Rx List (drug internet index)
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