

DENT-2200: LOCAL ANESTHESIA AND PAIN MANAGEMENT

Cuyahoga Community College

Viewing: DENT-2200 : Local Anesthesia and Pain Management

Board of Trustees:

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Academic Term:

Fall 2022

Subject Code

DENT - Dental Hygiene

Course Number:

2200

Title:

Local Anesthesia and Pain Management

Catalog Description:

Study of the anatomy, pharmacological and psychological aspects, systemic complications and medical emergencies related to pain management in the dental environment. Laboratory experience in the administration of local anesthesia and nitrous oxide.

Credit Hour(s):

2

Lecture Hour(s):

1

Lab Hour(s):

2

Requisites

Prerequisite and Corequisite

DENT-1431 Head and Neck Anatomy, or departmental approval.

Outcomes

Course Outcome(s):

Explain the pharmacology of the two categories of vasoconstrictors used in the United States.

Objective(s):

1. List the two vasoconstrictors used in local anesthetics in the United States.
2. Describe the systemic effects of vasoconstrictors on the cardiovascular system, blood pressure, respiratory system, genitourinary system and skeletal muscle.
3. List the six main reasons that vasoconstrictors are added to local anesthetics.
4. List the three concentrations of epinephrine added to vasoconstrictors and their relationship to each other.
5. List the absolute and relative contraindications to the use of vasoconstrictors.
6. Describe the factors to consider when choosing whether or not to use a vasoconstrictor in clinical practice.
7. Describe the effectiveness of vasoconstrictors in the presence of inflammation and the relationship to pH.

Course Outcome(s):

Explain the steps involved in the process of pharmacokinetics and how local anesthetic agents are involved in each step of the process.

Objective(s):

1. Differentiate between absorption, distribution, metabolism and excretion.
 2. Name the specific organs of the body responsible for absorption, distribution, metabolism and excretion.
 3. Identify the different routes of administration for medications.
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Course Outcome(s):

Describe the process by which local anesthetics affect both the cardiovascular and central nervous systems.

Objective(s):

1. Identify the systemic actions that occur in each system when local anesthetic agents are administered.
2. Differentiate between mild, moderate and high (toxic) overdose levels of local anesthetic agents on both the CNS and the CVS.
3. Distinguish the difference between an absolute and a relative contraindication.
4. Define the terms lipid solubility, protein binding, half-life and efficacy and their relationship to local anesthetic agents.

Course Outcome(s):

Explain the pharmacology of five generic categories of local anesthetics used in the United States.

Objective(s):

1. List the five generic categories of local anesthetics.
2. Identify the percentages, specific indications for use and contraindications for use for each generic category of local anesthetic.
3. Name some of the distinguishing features for each type of anesthetic used
4. List the different preparations for each generic type of anesthetic available for use in the U.S, their proprietary name and duration of action (procedure specific).
5. Identify the short, intermediate and long acting local anesthetic agents.
6. List the absolute and relative contraindications for the use of local anesthetic agents.
- 7 List the factors to consider when choosing a local anesthetic agent specific to both the patient and the procedure being performed.

Course Outcome(s):

Describe the concept of neurophysiology and its specific role in the function of local anesthesia.

Objective(s):

1. Explain the primary action of local anesthetics in blocking nerve conduction.
2. Describe the fundamentals of nerve transmission related to local anesthetic agents.
3. Explain the difference between a polarized and a non-polarized nerve cell and the events that occur during the processes of depolarization and repolarization.
4. Define the specific receptor theory.
5. Describe the fundamentals of nerve transmission related to local anesthetic agents.

Course Outcome(s):

Explain the theory of pain control, the psychological aspects of pain control and how it relates to the administration of local anesthesia.

Objective(s):

1. Differentiate between pain perception and pain reaction.
2. Define pain reaction threshold and list the factors that influence it.
3. Define psychogenic pain.
4. Describe the two most common psychogenic reactions to the administration of local anesthetic agents.
5. Identify the site where local anesthetics exert their pharmacological action.

Course Outcome(s):

Explain the process involved in performing both a psychological and physical pre-anesthetic assessment of a patient prior to local anesthesia administration.

Objective(s):

1. Identify the components of a pre-anesthetic assessment as part of a medical history, specific to administration of local anesthetic agents.
2. Develop follow-up questions to ask a patient during the medical history interview.
3. Define the current guidelines for antibiotic premedication.
4. Describe the current ASA (American Society of Anesthesiologists) Classifications as they related to local anesthesia administration.
5. Obtain current vital signs and be aware of the guidelines for normal and abnormal readings of pulse, respiration and blood pressure based on the American Heart Association and the American Stroke Association.

Course Outcome(s):

Evaluate the systemic complications that may occur based upon medical conditions when local anesthetics are administered.

Objective(s):

1. Communicate the concerns of the use of local anesthetics for patients with cardiovascular disease (absolute and relative contraindications).
2. Communicate the concerns of the use of local anesthetics for patients with respiratory disease (absolute and relative contraindications).
3. Discuss the absolute and relative contraindications of the use of local anesthesia for patients with hypothyroidism and hyperthyroidism.
4. Discuss the absolute and relative contraindications of the use of local anesthesia for patients with diabetes.
5. Define atypical plasma cholinesterase, methemoglobinemia and malignant hyperthermia and identify the concerns with the use of local anesthesia.
6. Discuss the absolute and relative contraindications of the use of local anesthesia for pregnancy.
7. Discuss the absolute and relative contraindications of the use of local anesthesia for kidney and liver disease.
8. Review the concerns with allergies and the use of local anesthetic agents.
9. State the concern with the use of local anesthetic agents in patients with glaucoma.
10. Define the drug-drug interactions with local anesthetic agents and other medications.
11. List the factors that predispose a patient to overdose and techniques used to prevent an overdose.
12. Describe the steps in management of both a local anesthetic overdose and a vasoconstrictor overdose.
13. Differentiate between overdose, allergic and idiosyncratic reactions to local anesthetic agents.

Course Outcome(s):

Identify the pharmacological and physiological effects of Nitrous Oxide.

Objective(s):

1. Describe the effect of Nitrous Oxide on the cardiovascular system, central nervous system, gastrointestinal system, respiratory system and on allergies.
2. List the desirable characteristics of Nitrous Oxide on the body systems.

Course Outcome(s):

Explain the specific procedures included in a pre-anesthetic medical assessment of a patient prior to the administration of Nitrous Oxide

Objective(s):

1. List the items to include in a medical history specific to Nitrous Oxide administration.
2. Identify the criteria utilized by the American Heart Association and the American Stroke Association regarding blood pressure criteria.
3. Explain the pre-procedural Fasting Guidelines as outlined by the American Society of Anesthesiologists (ASA).

Course Outcome(s):

Explain the specific use of each component contained within the armamentarium used in the administration of Nitrous Oxide sedation.

Objective(s):

1. List and explain the use of each part of the Nitrous Oxide unit.
2. List and explain the use of equipment placed on the patient during Nitrous oxide administration, specifically the nasal hood, nasal canula and pulseoximeter.
3. Explain the steps involved in sterilization of each piece of equipment used.

Course Outcome(s):

Explain the processes involved in initiation, adjustment, monitoring and termination of Nitrous Oxide.

Objective(s):

1. List the steps included in the fail-safe test performed before each use.
2. Describe the process of titration of gases used during administration.
3. Define diffusion hypoxia and list the process involved in prevention and resolution.
4. List the specific steps that should be followed during the administration of Nitrous Oxide.
5. Identify the tidal flow volumes that should be used during administration of oxygen for an adult and child.
6. Explain the steps involved in the recovery process once Nitrous Oxide has been administered.
7. Identify the signs and symptoms of adequate sedation and oversedation.
8. List the advantages of the use of Nitrous Oxide and indications for use.
9. Identify the contraindications to the use of Nitrous Oxide.

Course Outcome(s):

Explain the ethical and legal considerations that must be adhered to when administering Nitrous Oxide.

Objective(s):

1. Identify the rules located in the Ohio State Dental Practice Act for the administration of Nitrous Oxide to a patient by a Registered Dental Hygienist.
2. List the two types of informed consent that may be used.
3. Identify the type of supervision that must be adhered to based upon state regulations.
4. Describe the ethical principles and core values found in the American Dental Hygienists' Code of Ethics that must be followed.
5. Explain the ethical responsibilities that the practitioner when utilizing Nitrous Oxide in a dental practice.
6. List the components necessary for proper documentation in the patient record.

Course Outcome(s):

Identify the management of medical emergencies and complications that may occur during Nitrous Oxide administration.

Objective(s):

1. List the specific type of equipment that must be present in the office for the management of medical emergencies.
2. Identify the safe operating procedures of the equipment.
3. Explain the proper use of an automatic electronic defibrillator (AED).
4. Participate in annual basic life support training and maintain current CPR certification.
5. List the components of a medical emergency kit.

Course Outcome(s):

Identify the concerns associated with occupational exposure to Nitrous Oxide.

Objective(s):

1. List the medical concerns that result from Nitrous Oxide abuse.
2. Describe the profile of a Nitrous Oxide abuser.

Course Outcome(s):

Evaluate the local complications that may occur during local anesthesia administration and identify ways to prevent.

Objective(s):

1. Explain the situations that increase the probability of needle breakage.
2. Discuss the cause and prevention of prolonged anesthesia or paresthesia.
3. Define facial nerve paralysis and its cause.
4. List the steps to prevent trismus and identify ways to treat.
5. List the factors that contribute to hematomas and identify ways to treat.
6. Identify the cause of soft tissue injury, precautions and ways to treat.
7. Identify the cause of both pain and burning on injection and identify ways to prevent.
8. List ways to prevent and manage both sloughing of tissues and postanesthetic intraoral lesions.

Course Outcome(s):

Identify potential medical emergencies that may occur due to situations related to the administration of local anesthetics.

Objective(s):

1. Discuss the role of anxiety during administration of local anesthetics.
2. Identify common medical emergencies that occur.
3. List specific medical conditions that might predispose a patient to an emergency.
4. List the components required in a medical emergency kit.

Course Outcome(s):

Explain the anatomy of the Trigeminal Nerve as it relates to local anesthesia.

Objective(s):

1. List the three divisions of the Trigeminal Nerve (Cranial Nerve V), whether they are sensory or motor and the area where they exit the cranium (foramen).
2. List the three main nerves in the Ophthalmic Division (V1) and the areas that they innervate.
3. List the nerves in the Maxillary Division (V2) that are pertinent to local anesthesia and the areas that they innervate.
4. List the nerves in the Mandibular Division (V3) that are pertinent to local anesthesia and the areas that they innervate.

Course Outcome(s):

Identify the specific parts of the armamentarium and explain their use when performing a dental injection.

Objective(s):

1. List the three main components that comprise the armamentarium for the administration of local anesthesia.
2. Identify the different types of syringes used in dentistry and the characteristics of each type of syringe.
3. Identify the parts of the syringe and explain the use of each part.
4. Explain the sequence of steps involved in proper syringe assembly and disassembly.
5. Identify the parts of a dental needle.
6. Differentiate between different sizes of needle gauges and lengths of needles available in the United States.
7. Identify the parts of a local anesthetic cartridge and list the contents found within a cartridge.
8. Explain common problems found with local anesthetic cartridges.
9. Explain the correct steps that should be taken to properly prepare the armamentarium.

Course Outcome(s):

Explain the specific technique for the administration of each of the maxillary injections performed in the course; Posterior Superior Alveolar (PSA), Middle Superior Alveolar (MSA), Anterior Superior Alveolar (ASA), Greater Palatine (GP) and Nasopalatine (NP).

Objective(s):

1. List the nerves anesthetized and structures innervated for each injection.
2. Identify the anatomic landmarks identified prior to each injection.
3. Describe the path and depth of insertion for each injection.
4. State the approximate amount of solution deposited for each injection.
5. List the possible complications and specific tips for success for each injection.

Course Outcome(s):

Explain the specific technique for the administration of each of the mandibular injections performed in the course; Inferior Alveolar (IA), Buccal, Mental Incisive.

Objective(s):

1. List the nerves anesthetized and structures innervated for each injection.
2. Identify the anatomic landmarks identified prior to each injection.
3. Describe the path and depth of insertion for each injection.
4. State the approximate amount of solution deposited for each injection.
5. List the possible complications and specific tips for success for each injection.

Course Outcome(s):

Describe proper methods of infection control that must be followed during the administration of local anesthesia and proper handling of the equipment before, during and after use.

Objective(s):

1. Explain the proper use of a one-handed scoop technique or needle-recapping device.
2. Describe the qualifications of a sharps container and the items that should be placed within.
3. Practice and explain the use of an aseptic technique during a dental injection.
4. Describe the protocol for disposal of contaminated needles and cartridges of anesthetic after use.
5. Explain the post-exposure protocol in the event of an injury.
6. Differentiate between appropriate engineering controls and work practice controls.
7. Describe the proper protocol for the handling of sharps.
8. List the various types of personal protective equipment (PPE) that should be worn when performing a dental injection.
9. List the types of handwashing methods that should be followed during the administration of local anesthesia.

Course Outcome(s):

Describe the history, philosophy and psychology involved in the administration of Nitrous Oxide.

Objective(s):

1. Name the two scientists responsible for discovering Nitrous Oxide.
2. Identify the individual that first used Nitrous Oxide in dentistry and the year it was introduced.

Course Outcome(s):

Differentiate between the physiological and the psychological aspects of pain and anxiety.

Objective(s):

1. Identify the different sites that pain originates from within the body.
 2. Describe the various durations of pain.
 3. List the physiological symptoms that occur when an individual experiences pain.
 4. Identify the psychological reactions that occur when an individual experiences pain.
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Course Outcome(s):

Identify strategies utilized to manage pain and anxiety.

Objective(s):

1. List the various pharmacological and non-pharmacological strategies used to manage pain and anxiety.
 2. Distinguish between the different levels of sedation (drug induced central nervous system depression) as outlined by the American Society of Anesthesiologists.
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Course Outcome(s):

Explain the parts of the anatomy associated with the process of respiration and the physiology of respiration.

Objective(s):

1. Explain the design and function of the respiratory system.
 2. List the specific anatomical parts involved in the process of respiration of the upper airway, lower airway and the respiratory zone.
 3. Describe the physiology of the respiratory mechanism and how the process of breathing occurs.
 4. Describe how the administration of Nitrous Oxide affects respiration.
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Course Outcome(s):

Describe additional products available to enhance the comfort of delivery of local anesthetic agents as well as the effectiveness of onset and duration.

Objective(s):

1. Identify techniques of distraction that facilitate more comfortable delivery strategies of local anesthesia, including the Dental Vibe® and the Vibraject®.
 2. Describe techniques for use of Onpharma® and Anutra®, approved for buffering local anesthetic agents.
 3. Identify the active ingredients, indications, contraindications, adverse reactions and safety information associated with both Onpharma® and Anutra®.
 4. Describe the techniques for use of the reversal agent Oraverse®, used post-dental procedures.
 5. Identify the active ingredients, indications, contraindications, adverse reactions and safety information associated with Oraverse®.
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Course Outcome(s):

Describe the use of Kovanaze, nasal spray anesthesia, used for dental purposes.

Objective(s):

1. List the teeth that are anesthetized when Kovanaze® is used for dental anesthesia.
 2. Identify the indications and contraindications for use of Kovanaze®.
 3. List the active ingredients in Kovanaze®.
 4. Explain possible drug interactions and adverse reactions with the use of Kovanaze®.
 5. Describe the specific techniques for using Kovanaze® including the specific mechanics of the injection technique.
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Methods of Evaluation:

- A.Quizzes/Examinations
- B.Laboratory exercises
- C.Clinical Exercises
- D.Participation and attendance

Course Content Outline:

1. Pain Control
 - a. Pain Perception
 - b. Pain Reaction

- i. Emotional state
 - ii. Fatigue
 - iii. Age
 - iv. Gender
 - v. Fear
 - vi. Anxiety
 - c. Psychogenic pain
 - i. Vasopressor syncope
 - ii. Hyperventilation
 - d. Site of Action
 - i. Nerve cell membrane
- 2. Neurophysiology
 - a. Nerve conduction
 - i. Sodium
 - ii. Potassium
 - iii. Polarization
 - iv. Depolarization
 - b. Specific Receptor Theory
 - i. Nerve cell receptors
 - ii. Altering of cell membrane permeability
 - iii. Blocking of nerve impulses
 - iv. Sodium
- 3. Pharmacokinetics
 - a. Absorption
 - i. Small intestine
 - ii. Oral
 - iii. Topical
 - iv. Injection
 - b. Distribution
 - i. Highly vascular organs
 - ii. All body tissues
 - c. Metabolism
 - i. Esters
 - 1. Blood plasma
 - ii. Amides
 - 1. Liver
 - d. Excretion
 - i. Kidneys
- 4. Cardiovascular and Central Nervous Systems
 - a. Therapeutic levels
 - i. Depression
 - b. Mild overdose levels
 - c. Moderate overdose levels
 - d. High or Toxic overdose levels
 - e. Absolute Contraindication
 - i. No indication for use
 - f. Relative Contraindication
 - i. Potential for use after weighing risks
 - g. Lipid Solubility
 - i. Diffusion across membranes
 - h. Protein Binding
 - i. Duration
 - ii. Release
 - iii. Sodium Channels
 - i. Half-Life
 - i. Elimination
 - ii. One through Six
 - j. Efficacy
 - i. Quality
- 5. Pharmacology of Local Anesthetics

- a. Categories
 - i. Articaine
 - ii. Lidocaine
 - iii. Mepivacaine
 - iv. Prilocaine
 - v. Bupivacaine
- b. Percentages
 - i. Articaine
 - 1. 4% 1:100,000 epinephrine
 - 2. 4% 1:200,000 epinephrine
 - ii. Lidocaine
 - 1. 2% 1:100,000 epinephrine
 - 2. 2% 1:50,000 epinephrine
 - iii. Mepivacaine
 - 1. 3% plain
 - 2. 2% 1:20,000 levonordephrin
 - iv. Prilocaine
 - 1. 4% plain
 - 2. 4% 1:200,000 epinephrine
 - v. Bupivacaine
 - 1. 0.5% 1:200,000 epinephrine
- c. Indications and Distinguishing Features
 - i. Articaine
 - 1. Pulpal and soft tissue anesthesia
 - 2. Short elimination half-life
 - 3. Better diffusibility
 - 4. Increased risk of paresthesia with mandibular block
 - ii. Lidocaine
 - 1. Gold Standard
 - 2. Pulpal and soft tissue anesthesia
 - 3. Rapid onset
 - 4. Topical use
 - 5. Adverse reactions are rare
 - iii. Mepivacaine
 - 1. Vasoconstrictor free availability
 - 2. Sulfite-free availability
 - 3. Pulpal and soft tissue anesthesia
 - 4. Long duration
 - 5. Metabolized in lungs and liver
 - iv. Bupivacaine
 - 1. Pulpal and soft tissue anesthesia
 - 2. Lengthy dental procedure use
 - 3. Management of postoperative pain
 - 4. Not indicated for use in children
 - v. Proprietary Names
 - vi. Short-Acting Agents
 - vii. Intermediate-Acting Agents
 - viii. Long-Acting Agents
 - ix. Absolute Contraindications
 - x. Relative Contraindications
- 6. Pharmacology of Vasoconstrictors
 - a. Types
 - i. Epinephrine
 - ii. Levonordephrin
 - b. Systemic effects
 - c. Concentrations

- i. Epinephrine
 - 1. 50,000
 - 2. 100,000
 - 3. 200,000
 - ii. Levonordephrin
 - 1. 20,000
 - d. Absolute Contraindications
 - e. Relative Contraindications
 - f. Factors to consider for usage
 - i. Duration
 - ii. Medical history
 - iii. Hemostasis
 - iv. Infection
 - g. Inflammation and pH
- 7. Pre-Anesthetic Patient Assessment
 - a. Medical History
 - b. Follow-up Questions
 - c. Vital Signs
 - i. Pulse
 - ii. Respiration
 - iii. Blood Pressure
 - 1. Normal
 - 2. Pre-hypertension
 - 3. Hypertension Stage 1
 - 4. Hypertension Stage 2
 - iv. Premedication Guidelines
 - 1. American Dental Association
 - 2. American Heart Association
 - 3. American Academy of Orthopedic Surgeons
 - v. American Society of Anesthesiologists Classifications
 - 1. I
 - 2. II
 - 3. III
 - 4. IV
 - 5. V
 - 6. VI
- 8. Systemic Complications
 - a. Cardiovascular disease
 - b. Respiratory disease
 - c. Hypothyroidism
 - d. Hyperthyroidism
 - e. Diabetes
 - f. Atypical plasma cholinesterase
 - g. Methemoglobinemia
 - h. Malignant hyperthermia
 - i. Pregnancy
 - j. Kidney disease
 - k. Liver disease
 - l. Glaucoma
- m. Drug-Drug Interactions with Local Anesthetic Agents and Vasoconstrictors
- n. Allergies
 - i. Sulfite
 - ii. Sodium Bisulfite
 - iii. Local anesthetics
 - iv. Epinephrine
 - v. Latex
 - vi. Topical anesthetics
- o. Factors that predispose to overdose

- i. Age
 - ii. Weight
 - iii. Medications
 - iv. Presence of disease
 - v. Genetics
 - vi. Mental attitude
 - vii. Environment
 - p. Management of a Local Anesthetic Overdose
 - q. Management of a Vasoconstrictor Overdose
 - r. Overdose, Allergic and Idiosyncratic Reactions
 - i. Allergies
 - 1. Not dose related
 - 2. Hives
 - 3. Anaphylaxis
 - ii. Overdose
 - iii. Idiosyncratic
 - 1. Undetected until administration
9. Local Complications
- a. Needle Breakage
 - b. Paresthesia
 - c. Facial Nerve Paralysis
 - d. Trismus
 - e. Soft-Tissue Injury
 - f. Hematoma
 - g. Pain on Injection
 - h. Burning on Injection
 - i. Infection
 - j. Sloughing of Tissues
 - k. Postanesthetic Intraoral Lesions
10. Medical Emergencies
- a. Apprehension from administration
 - b. Syncope
 - c. Hyperventilation
 - d. Medical Complications
 - i. Epilepsy
 - ii. Asthma
 - iii. Coronary Artery Disease
 - iv. Diabetes
 - v. Liver
 - vi. Kidney
 - vii. Pregnancy
 - viii. Drug usage
 - e. Medical Emergency Kit
 - i. Epinephrine
 - ii. Antihistamine
 - iii. Oxygen
 - iv. Bronchodilator
 - v. Vasodilator
 - vi. Carbohydrate
 - vii. Low dose aspirin
11. Anatomy
- a. Trigeminal Nerve Divisions
 - i. Ophthalmic division (V1) Sensory
 - 1. Nasociliary
 - 2. Frontal
 - 3. Lacrimal
 - ii. Maxillary division (V2) Sensory

1. Greater palatine nerve
 2. Nasopalatine nerve
 3. Posterior Superior Alveolar Nerve
 4. Middle Superior Alveolar Nerve
 5. Anterior Superior Alveolar Nerve
 - iii. Mandibular division (V3) Sensory and Motor
 1. Buccal Nerve
 2. Inferior Alveolar Nerve
 3. Lingual Nerve
 4. Mylohyoid Nerve
 5. Mental Nerve
 6. Incisive Nerve
 - iv. Exit location from the cranium
 1. Ophthalmic (V1)
 2. Maxillary (V3)
 3. Mandibular (V3)
12. The Armamentarium
 - a. Syringe components
 - i. Needle adaptor
 - ii. Piston with harpoon
 - iii. Finger grip
 - iv. Syringe barrel
 - v. Thumb ring
 - b. Types of Syringes
 - i. Non-disposable
 1. Aspirating
 2. Self-Aspirating
 - ii. Safety Syringe
 - iii. Computer Controlled Delivery System
 - iv. Pressure Syringes
 - c. Syringe Assembly & Disassembly
 - d. Parts of the Needle
 - i. Bevel
 - ii. Needle shaft
 - iii. Cartridge penetrating end
 - iv. Hub
 - v. Needle adaptor
 - e. Size and Gauge of Needles
 - f. Parts of the Cartridge
 - g. Problems with Cartridges
 - h. Preparation of the Armamentarium
 - i. Inspection
 - ii. Tray set-up
13. Maxillary Injection Techniques (Blocks)
 - a. Injections Performed
 - i. Posterior Superior Alveolar (PSA)
 - ii. Middle Superior Alveolar (MSA)
 - iii. Anterior Superior Alveolar (ASA)
 - iv. Greater Palatine (GP)
 - v. Nasopalatine (NP)
 - b. Injection Information
 - i. Nerves anesthetized
 - ii. Structures innervated
 - iii. Landmarks palpated
 - iv. Target area
 - v. Injection site
 - vi. Path of insertion
 - vii. Depth of insertion

- viii. Needle gauge and length
 - ix. Amount deposited
 - x. Clinician and patient positioning
 - xi. Tips for success
 - xii. Complications
14. Mandibular Injection Techniques (Blocks)
- a. Injections
 - i. Inferior Alveolar (IA)
 - ii. Buccal (B)
 - iii. Mental/Incisive (M/I)
 - b. Injection information
 - i. Nerves anesthetized
 - ii. Structures innervated
 - iii. Landmarks palpated
 - iv. Target area
 - v. Injection site
 - vi. Path of insertion
 - vii. Depth of insertion
 - viii. Needle gauge and length
 - ix. Amount deposited
 - x. Clinician and patient positioning
 - xi. Tips for success
 - xii. Complications
15. Infection Control Protocol
- a. Needle Safety
 - b. Sharps container characteristics
 - c. Items placed in sharps container
 - d. Engineering Controls
 - e. Work-Practice Controls
 - f. Protocol for handling sharps
 - g. Personal Protective Equipment (PPE)
 - i. Gown
 - ii. Mask
 - iii. Safety glasses
 - iv. Gloves
 - h. Handwashing Methods
 - i. Antiseptic Handwash
 - ii. Routine Handwash
 - iii. Antiseptic Handrub
16. History of Nitrous Oxide
- a. Scientists Credited for Discovery
 - i. Sir Humphrey Davy
 - ii. Joseph Priestley
 - b. Use in Dentistry
 - i. Horace Wells
17. Physiological and Psychological Aspects of Pain and Anxiety
- a. Origin of pain in body
 - i. Somatic
 - ii. Visceral
 - iii. Neuropathic
 - b. Duration of Pain
 - i. Acute
 - ii. Chronic
 - iii. Chronic inflammatory
 - iv. Chronic neuropathic
 - c. Physiological Aspects
 - d. Psychological Aspects
18. Pain Management Strategies

- a. Noninvasive, non-pharmacological approach
 - b. Invasive, pharmacological approach
 - i. Conscious
 - ii. Unconscious
 - c. Sedation Levels
 - i. Minimal
 - ii. Moderate
 - iii. Deep
 - iv. General Anesthesia
19. Anatomy and Physiology of Respiration
- a. Design and function of respiratory system
 - b. Upper airway anatomy
 - i. Nose
 - ii. Pharynx
 - 1. Nasopharynx
 - 2. Oropharynx
 - 3. Laryngopharynx
 - c. Lower Airway anatomy
 - i. Larynx
 - ii. Trachea
 - iii. Bronchi
 - iv. Bronchioles
 - d. Respiratory Zone Anatomy
 - i. Alveolar ducts
 - ii. Alveolar sacs
 - iii. Alveoli
 - e. Physiology of Respiration
 - i. Minute ventilation
 - ii. Alveolar ventilation
 - iii. Gas exchange
 - iv. Administration of Nitrous Oxide
 - v. Termination of Nitrous Oxide
20. Pharmacological and Physiological Effects of Nitrous Oxide
- a. Cardiovascular system
 - b. Central Nervous system
 - c. Gastrointestinal system
 - d. Respiratory system
 - e. Allergies
21. Desirable Characteristics of Nitrous Oxide
- a. Analgesic properties
 - b. Amnestic properties
 - c. Anxiolytic properties
 - d. Onset of action
 - e. Titration
 - f. Recovery
 - g. Elimination
 - h. Acceptance
22. Pre-anesthetic Medical Assessment
- a. Medical History specific to sedation
 - b. Identification of ASA Status
 - i. I
 - ii. II
 - iii. III
 - iv. IV
 - v. V
 - vi. VI
 - c. Vital Signs

- i. Blood Pressure
 - 1. Normal
 - 2. Pre-hypertension
 - 3. Stage-1 hypertension
 - 4. Stage-2 hypertension
 - ii. Pulse
 - iii. Respiration
 - d. Pre-procedural fasting guidelines
 - e. Informed Consent
 - f. Pulse Oximetry Reading
- 23. Armamentarium and Use
 - a. Flow meter
 - b. Oxygen flush
 - c. Nitrous gauge
 - d. Oxygen gauge
 - e. Wrench
 - f. Scavenger Circuit
 - g. Vacuum Tube
 - h. Reservoir bag
 - i. Nasal hood
 - j. Oxygen cylinder
 - k. Nitrous cylinder
 - l. Pulse Oximeter
 - m. Sterilization of Equipment
 - i. Heavy duty bags
 - ii. Cleaning agents
 - iii. Disinfecting agents
- 24. Administration Process
 - a. Initiation, Adjustment, Monitory and Termination
 - i. Pre-operative vital signs and pulse oximetry reading
 - ii. Fail-safe test
 - iii. Oxygen administration
 - iv. Nitrous administration
 - v. Titration
 - vi. Diffusion Hypoxia
 - vii. Tidal Flow
 - 1. Adult Child
 - viii. Signs & Symptoms of adequate and oversedation
 - ix. Recovery
 - 1. Patient Assessment post-sedation
 - 2. Dismissal procedure
 - b. Advantages and Indications for Use
 - c. Contraindications for Use
- 25. Ethical and Legal Considerations
 - a. State Dental Practice Act
 - i. Rules and regulations
 - b. Informed Consent
 - i. Verbal
 - ii. Written
 - c. Level of Supervision Required
 - d. Documentation
 - e. Ethical Core Values
 - i. Autonomy
 - ii. Beneficence
 - iii. Nonmaleficence
 - iv. Veracity
 - f. Proper use and operation of equipment
 - i. Disinfection
 - ii. Storage

- iii. Equipment check and maintenance
 - iv. Titration
 - v. State-of-the-art equipment
 - vi. Third party presence
 - vii. Malpractice insurance
 - viii. Standard of care maintenance
26. Medical Emergency Management
- a. CPR/BLS Certification
 - b. Automatic Electronic Defibrillator (AED) present
 - c. Medical Emergency Kit
 - d. Fail safe mechanism
 - e. Scavenging system
27. Occupational Exposure Concerns
- a. Signs and Symptoms of abuse
 - b. Average Profile
28. Additional Products in the Local Anesthesia Armamentarium
- 1. Techniques of Distraction
 - a. Dental Vibe®
 - i. Techniques for use
 - b. Vibraject®
 - i. Techniques for use
 - b. Buffering Agents
 - 1. Onpharma®
 - i. Techniques for use
 - ii. Active ingredient(s)
 - iii. Adverse reactions
 - iv.. Safety informataion
 - v. Contraindications
 - vi. Indications for use
 - vii. Warnings & Precautions
 - viii. Drug interactions
 - 2. Anutra®
 - i. Techniques for use
 - ii. Active ingredient(s)
 - iii. Adverse reactions
 - iv.. Safety informataion
 - v. Contraindications
 - vi. Indications for use
 - vii. Warnings & Precautions
 - viii. Drug interactions
 - c. Dental Anesthesia Nose Spray
 - 1. Kovanaze®
 - i. Techniques for use
 - ii. Active ingredient(s)
 - iii. Adverse reactions
 - iv.. Safety informataion
 - v. Contraindications
 - vi. Indications for use
 - vii. Warnings & Precautions
 - viii. Drug interactions
 - d. Reversal agents
 - 1. Oraverse®
 - i. Techniques for use
 - ii. Active ingredient(s)

- iii. Adverse reactions
- iv.. Safety informataion
- v. Contraindications
- vi. Indications for use
- vii. Warnings & Precautions
- viii. Drug interactions

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