

END-2520: INTERMEDIATE POLYSOMNOGRAPHY I

Cuyahoga Community College

Viewing: END-2520 : Intermediate Polysomnography I

Board of Trustees:

June 2022

Academic Term:

Fall 2022

Subject Code

END - Electroneurodiagnostic

Course Number:

2520

Title:

Intermediate Polysomnography I

Catalog Description:

Discussion of the classification of sleep disorders, and the physiological effects of sleep disorders and ramifications/implications on patient health. Discuss medication effects on sleep stages/patterns. Discussion of various therapies for sleep disordered breathing, and other sleep disorders. Discussion on monitoring of nocturnal seizures, and seizure types. Laboratory section focus on PAP set-up, nocturnal O₂, CO₂ monitoring, as well as administration of nocturnal O₂, and advanced set-ups for nocturnal seizure monitoring.

Credit Hour(s):

3

Lecture Hour(s):

2

Lab Hour(s):

2

Requisites

Prerequisite and Corequisite

END-2510 Principles of Polysomnography, and END-2911 END Directed Practice II, and END-2451 Neonatal/Pediatric Electroencephalography.

Outcomes

Course Outcome(s):

Discuss Sleep Disorders as described in the International Classification of Sleep Disorders (ICSD-3) and implications of sleep disorders on patient health.

Objective(s):

1. Identify and discuss various forms of Sleep Disordered Breathing (SDB).
2. Identify and discuss various Central Disorders of Hypersomnolence and Circadian Rhythm Disorders.
3. Identify and discuss various forms of Movement Disorders and Nocturnal Seizures.

Course Outcome(s):

Discuss therapies for Sleep Disordered Breathing and other sleep disorders.

Objective(s):

1. Discuss and identify different forms of PAP therapy for various forms of Sleep Disordered Breathing (SDB).
 2. Discuss and identify pharmacological therapies for Central Disorders of Hypersomnolence, Movement Disorders, and Nocturnal Seizures.
 3. Discuss behavioral therapies for various forms of sleep disorders.
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Course Outcome(s):

Describe proper function and purpose of various forms of PAP therapy and other monitoring devices used to treat and monitor different forms of Sleep Disordered Breathing.

Objective(s):

1. Differentiate the use of various PAP devices: Continuous Positive Airway Pressure (CPAP), Bi-level Positive Airway Pressure (BiPAP), and Automatic Servo Ventilation (ASV).
 2. Discuss the basic principle of operation related to the pulse oximeter and properties of hemoglobin, reduced hemoglobin, oxyhemoglobin, and its significance in SpO₂.
 3. Discuss function and operation of End Tidal CO₂ (ETCO₂) and Transcutaneous CO₂ (TcCO₂) monitors.
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Methods of Evaluation:

1. Quizzes
2. Exams
3. Comprehensive final, including respiratory pattern analysis on nocturnal polysomnogram
4. Laboratory Competency Tests
 - a. Instruct/educate patients on PAP fitting.
 - b. Acclimate patients to PAP and associated equipment.
 - c. Conduct full 10-20/PSG hook-ups.

Course Content Outline:

1. ICSD-3
 - a. Categories of sleep disorders
 - b. Changes in the ICSD categories
2. Sleep Disordered Breathing (SDB)
 - a. Obstructive Sleep Apnea (OSA)
 - i. Effects on sleep patterns
 - ii. Cardiovascular consequences
 - iii. Cardiopulmonary consequences
 - iv. Metabolic effects and consequences
 - b. Central Sleep Apnea (CSA)
 - i. Mechanics of OSA
 - ii. Effects on sleep patterns
 - iii. Cardiovascular consequences
 - iv. Cardiopulmonary consequences
3. Insomnia
 - a. Causes
 - b. Symptoms
 - c. Implications on health
 - d. Polysomnographic results
 - e. Treatment options
4. Narcolepsy
 - a. Causes
 - b. Symptoms
 - c. Physical and Psychological effects
 - d. Polysomnographic results
 - e. Treatment options
5. Movement disorders
 - a. Recording during overnight polysomnogram
 - b. Effects on patterns of sleep
 - c. Treatment options
6. Nocturnal seizures
 - a. Causes
 - b. Effects on sleep patterns
 - c. Recording during overnight polysomnogram
 - d. Sleep as a trigger of seizures; connection to sleep onset
 - e. Treatment options

7. Parasomnias
 - a. NREM parasomnias
 - b. Effects on sleep patterns
 - i. Effects on sleep patterns of patient
 - ii. Effects on sleep patterns of caregiver
 - c. Treatment options
8. Comprehensive discussion on medications and other substances and the effects on sleep patterns
 - a. Medications most commonly seen in patients undergoing sleep studies
 - b. Effects of various medications on sleep architecture
 - c. Effects of various medications on sleep stages
 - i. NREM
 - ii. REM
9. Sleep curtailment/sleep deprivation
 - a. Sleep curtailment as a result of sleep disorders
 - b. Implications of sleep curtailment on health
 - c. Implications of total sleep deprivation
10. Pulse oximetry
 - a. Technical operation of pulse oximeter
 - b. Hemoglobin
 - i. Properties of hemoglobin
 - ii. Significance in SpO₂
 - iii. Reduced hemoglobin
 - iv. Oxyhemoglobin
 - c. SpO₂ recording during overnight polysomnogram
 - i. Normal SpO₂ levels
 - ii. Abnormal SpO₂ levels
 - iii. Critical values of SpO₂
 - iv. Inaccurate SpO₂ reading
11. Carbon dioxide (CO₂) monitoring
 - a. Normal and abnormal levels
 - b. End tidal CO₂ monitoring (EtCO₂)
 - i. Technical functions and operations
 - ii. Accurate application
 - c. Transcutaneous CO₂ monitoring (TcCO₂)
 - i. Technical functions and operation
 - ii. Accurate application
12. PAP devices for treatment of sleep disordered breathing
 - a. CPAP
 - i. Purpose
 - ii. Function
 - iii. Operation
 - b. BiPAP
 - i. Purpose
 - ii. Function
 - iii. Operation
 - c. ASV
 - i. Purpose
 - ii. Function
 - iii. Operation
 - d. Mask fitting for PAP devices
 - e. Supplemental O₂ addition into PAP circuits

Resources

Spriggs, William. *Essentials of Polysomnography*. 3rd ed. Burlington, MA Jones & Bartlett Learning, 2020.

Ferber, Richard and Kryger Meir, eds. *Principles and Practice of Sleep Medicine in the Child*. 2nd ed. Philadelphia:W.B. Saunders, 2014.

Tyner, Fay, John Knott and Brem Mayer, Jr. *Fundamentals of EEG Technology*. Vol 2. Philadelphia: J.B. Lippincott, 1989.

Butkov, Nic. *Atlas of Clinical Polysomnography*. 2nd ed.; Vol 1 & 2. Ashland, OR: Synapse Media, Inc., 2011.

Chokroverty, Sudhansu, Thomas, Robert, Bhatt, Meeta. *Atlas of Sleep Medicine*. 2nd ed. St. Louis: Elsevier Butterworth, Heinemann, 2014.

West, John. *Pulmonary Pathophysiology*. 10th ed. Philadelphia: Lippincott, Williams & Wilkins, 2021.

American Sleep Disorders Association. *The International Classification of Sleep Disorders: Diagnostic & Coding Manual*. 3rd ed. American Academy of Sleep Medicine; Revised edition, 2014. 2014.

Kryger, Meir, Thomas Roth, and William Dement. *Principles and Practice of Sleep Medicine*. 6th ed. Philadelphia: W.B. Saunders, 2017.

Cynthia Mattice, Rita Brooks, and Teofilo Lee-Chiong. *Fundamentals of Sleep Technology*. 3rd ed. Philadelphia: Lippincott, Williams & Wilkins, 2019.

Hrayr, Attarian, Nidhi, Undevia. *Atlas of Electroencephalography in Sleep Medicine*. 1st. New York: Springer, 2012.

Kryger, Meir. *Atlas of Clinical Sleep Medicine*. 2nd ed. Philadelphia: Saunders Elsevier, 2013.

Jardis, Terry Des. *Cardiopulmonary Anatomy & Physiology, Essentials of Respiratory Care*. 7th ed. Clifton Park, NY Delmar, 2020.

Shrake, Kevin, et al. "AARC Clinical Practice Guideline: Polysomnography"

Resources Other

- A. American Academy of Sleep Medicine, Rochester, MN <http://www.aasmnet.org>
- B. American Electroneurodiagnostic Technologist, Carroll, Iowa <http://www.aset.org>
- C. CD-ROM, Sleep Multimedia, version 7.0, Scarsdale, NY
- D. American Association of Sleep Technologists <http://www.aastweb.org>

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