

**MODULE**

**PEDIATRIC SLEEP**

# Recording Criteria

Polysomnogram is still the “gold standard” for sleep disorders and sleep-related breathing disorders.

# Polysomnography used to:

- Aid in the diagnosis of sleep apnea
- Obstructive Hypoventilation
- GERD
- Nocturnal Seizures
- Movement Disorders
- Nocturnal Asthma

Based infants up to 6 months of age.

# Qualified Staff

For Sleep-Related Breathing Disorders:

- An experienced Respiratory Therapist with experience in polysomnography would be helpful.

# Staff Ratio

One-to-one is generally recommended especially for infants or toddlers with special needs.

Oftentimes, the problem is dealing with the parent that is accompanying the child.

# Testing Facility

Make it “child friendly”

- Colorful paint
- Pediatric posters/cartoons/wall paper
- Toys, stuffed animals, video-games
- Cartoon bedsheets/bedspreads/comforters
- Staff should wear colorful scrubs
- All testing equipment should be “concealed” or hidden from view

# Testing Facility (continued)

- Rooms should be sound-proofed
- Rooms should be large enough to accommodate one of the parents to sleep in the same bedroom (but different bed or a recliner)
- Rocking chairs are helpful for parents with infants
- Beds/Cribs with bed-rails

# Testing Facility (continued)

- All electrical outlets should have “cover-plates” on them
- All equipment should be concealed or secured
- Hazardous materials should be stored and placed in locked cabinets

# Baby Supplies

- Diapers
- Pajamas
- Snacks/Drinks
- Baby Formula

# Bed-time Rituals/Routine

- Techs should allow extra time for hook-up procedures and testing equipment
- Allow time for bed-time stories, quiet/down-time.

# Parent/Caretaker

- Serve as active participant in the hook-up process
- Should be able to assist the technician whenever possible.

# Set-up Procedures

- Infants can be placed in the caretaker's arms during hook-up procedures
- Toddlers/Children may be allowed to watch a movie while being hooked-up
  - Have child decide which sensor should be placed on next

# Application Process

- Baby lotion/oils may affect impedance readings
- Gently scrub sites for electrode application
- Hypoallergenic tape is suggestive for sensitive skin and for ease of removing in the morning
- Secure head electrodes with Coban tape
- Arms/hands can be applied with “no-no’s” or mittens

# CPAP and me

- Mask fittings should take place prior to hook-up
- Allow child to play around with the mask: placing it on their face, their caretaker or their doll
- The patient and caretaker can try experimenting with the CPAP mask and pressure (various pressures) several days prior to the actual CPAP titration study

# Recording Parameters

- EEG
- EOG
- Chin, Leg and Intercostal EMGs
- EKG
- Respiratory Efforts
- End Tidal CO<sub>2</sub>
- SaO<sub>2</sub>
- Pes
- Ph

# Audio-Visual Parameters

- All night video recording (ideally with pan and tilt as well as zoom-in and zoom out features) for any unusual activity during sleep as well as body position, body rocking, or head-banging
- Audio recording for any snoring/snorting sounds, sleep talking, or screaming due to night terrors, etc.

# Physiologic Cals

- Eyes Open/Eyes Closed
- Growling/Grinning
- Singing aloud (to simulate counting)
- Holding breath
- Wiggle toes

# Technical Observations

- Eyes Open/Eyes Closed
- Unusual body movements
- Crying
- Teeth grinding

# Sleep Hygiene

- Parents sleeping with the infant (encouraged only up to sleep onset)
- Infants should be sleeping in cribs and not beds
- Parents who are restless sleepers may wake the infant (and vice-versa)

# Infant Scoring

- Performed before 1 year of age
- Spindles generally start to appear at 6 months of age
- High voltage bursts
- Low voltage mixed frequency waves with sharp transients; seen during Quiet Sleep is known as *Trace Alternant* (seen between 40-44 weeks)

# Infant Scoring

Around 40 weeks conceptual age is when the following can be scored:

Quiet

Active

Indeterminant

# Quiet

- High voltage EEG & EOG activity; typically  $> 75 \mu V$
- EMG may remain tonic

# Active

- EEG will show Low Voltage, Mixed Frequency Activity
- EOG may show phasic activity
- EMG may NOT necessarily be diminished due to activity such as sucking, cooing, girgling, etc. Hence, the chin is extremely active during this stage of sleep.

# Indeterminant Sleep

- Scored when sleep stage criteria cannot be classified/differentiated between Quiet and Active sleep.

# Sleep Architecture

- Quiet (50%)
- Active (50%)

# Sleep Distribution

- Periodicity of Active is approximately every 50-60 minutes after sleep onset.
- Sleep onset Active Sleep is common until about 3 months of age.

# Technical Comments

- Important in documenting activity occurring such as “eyes open”, “sucking”, “cooing”, girgling, etc.

# Respiratory Scoring

- Respiratory scoring varies from lab-to-lab with respect to duration.
- Obstructive Apneas: >50% reduction in airflow with continuous respiratory effort. Respiratory effort may be paradoxical.
- No associated arousals or desaturations are required.

# Respiratory Scoring

- Mixed Apneas: combination between a central and an obstructive event.
- No associated arousals or desaturations are required.

# Respiratory Scoring

- Periodic Breathing:  $\geq 3$  central apneas  $>3$  seconds duration; followed by 3-4 normal breaths.

# Types of Sleep Disorders

- Sleep Related Breathing Disorders
- Parasomnias:
  - Night Terrors
  - Nightmares
  - Sleep-walking
  - Bed-wetting
  - Head Banging
  - Body Rocking

## Reference

- AASM Manual for Scoring Sleep, 2007