Actigraphy & Sleep

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Objectives

1. Review the measures of actigraphy and the clinical implications to use actigraphy.
2. Discuss the advantages and disadvantages of actigraphy.
3. Review actigraphy data
4. Discuss the pros and cons of different actigraph watches.
Actigraphy

What is Measures:

- Small wristwatch-like device that uses an accelerometer to detect body movement.

- Data are downloaded and analyzed using algorithms programmed in the computer software.

- Software converts body movement counts into sleep and wake.
Clinical Implications for Actigraphy

- Prolonged sleep latency
- Prolonged or multiple night awakenings
- Excessive daytime sleepiness
- Delayed sleep phase syndrome
Advantages

• More objective than parent report and/or sleep diaries.

• Assessment of sleep-wake patterns for days to weeks.

• Assess sleep-wake patterns in the “natural” environment.

• Less expensive and less intrusive than overnight polysomnography.
Disadvantages

• Does not provide data on sleep stage or cardio-respiratory events.

• Can not be used to diagnose sleep disorders (e.g., sleep disordered breathing, periodic limb movement disorder, narcolepsy).

• Lost data (patient adherence, technical problems, equipment failure)
Actigraphy

Inactive JIA

Active JIA
Bland Altman Plots for TST: Low & High Thresholds

Ward et al., J Sleep Research (2011)
Bland Altman Plots for WASO: Low & High Thresholds

Ward et al., J Sleep Research (2011)
Types of Devices

**ACTIWATCH 64**
- You change the battery
- Epoch lengths 30 sec or 1 min
- Battery life 3 months
- Water proof
- Event marker
- Phillips no longer supports this device.

**ACTIWATCH 2 (AW2)**
- Rechargeable battery
- Need to mail the watch back to the manufacturer to change the battery.
- Epoch length 15 sec, 30 sec, 1 min, 2 min or 5 min
- Battery life 30 days @ 1 min epochs
- Event marker
- White light sensitivity

http://www.healthcare.philips.com/main/homehealth/sleep/actiwatch/default.wpd
Types of Devices

Actiwatch Spectrum Classic, Plus & PRO

• Rechargeable Battery ~ within 2 hours
• Battery life ~ 8 months — depends on epochs
• Epoch lengths 15 sec, 30 sec, 1 min, 2 min, 5 min
• Water proof
• Event marker
• Measures white, red, green, & blue light
• Audible off wrist detection sensor Galvanic skin response (GSR)

http://www.healthcare.philips.com/main/homehealth/sleep/actiwatch/default.wpd
Ambulatory Monitoring Inc. (AMI)

Motionlogger

http://www.ambulatory-monitoring.com/motionlogger.html
Interested in Using Actigraphy

- Consult colleagues who have experience with actigraphy.
  - lessons learned
  - many brands, but not all are validated and reliable
  - different algorithms are used to score sleep-wake.

- Use in conjunction with a sleep diary (paper or electronic).

- Peer reviewed literature.
- Manufacturer (Phillips or AMI)


Validating the Children's **Sleep** Habits Questionnaire Against Polysomnography and **Actigraphy** in School-Aged Children. Markovich AN, Gendron MA, Corkum PV. Front Psychiatry. 2015 Jan 6;5:188.

