



Validation of a new Actigraph MotionWatch versus Polysomnography on 70 healthy and suspected sleep disordered subjects

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BACKGROUND

Actigraphy is commonly used to assist sleep specialists in the diagnosis of sleep disorders. In this study, a **new actigraph** MotionWatch including new digital accelerometer and allowing tri-axial recording has been tested. The MotionWatch is a small, low energy, light-weight, waterproof device and direct USB connected.



STUDY OBJECTIVES

Comparison of sleep parameters values : Total Sleep Time (**TST**), Sleep Latency (**SL**), Sleep efficiency (**SE**), Wake After Sleep Onset (**WASO**), Awakenings (**AW**) obtained by all-night polysomnography (PSG) and actigraphy (ACT) MotionWatch (MW8, CamNtech Ltd.)

POPULATION

Clinical 54 consecutive adults (33 ♀, 21 ♂, mean age of 53 +/- 16 years) with suspected sleep disorders (22 Sleep Apnea Syndrome, 20 Insomnia, 8 had Hypersomnia, 4 Ehlers Danlos Syndrome) addressed to the Hotel Dieu Sleep Center and 19 consecutive healthy volunteers participants (9 ♂, 10 ♀, mean age of 28 +/- 5 years).

METHODS

One night of recording with **simultaneously** :

- PSG: Brainnet (BR-MEDATEC), Brainnet analysis software
- ACT : MotionWatch- (MW-CamNtech),

Acquisition leads

EEG: F4-M1, C4-M1, O2-M1
EOG: E1-M2, E2-M1
Respiratory effort (RIP Belts)
Respiratory Flow
EKG-Lead placement
Chin EMG- 3rd lead
2 Legs
EMG-lead placement

Actigraph sensitivity thresholds

- High: activity value ≥ 20 = wake
- Medium: activity value ≥ 40 = wake
- Low: activity value ≥ 80 = wake

Sleep stages analysis

Double blind visual scoring of sleep stages according to the AASM rules - Stage W, N1, N2, N3 & R.

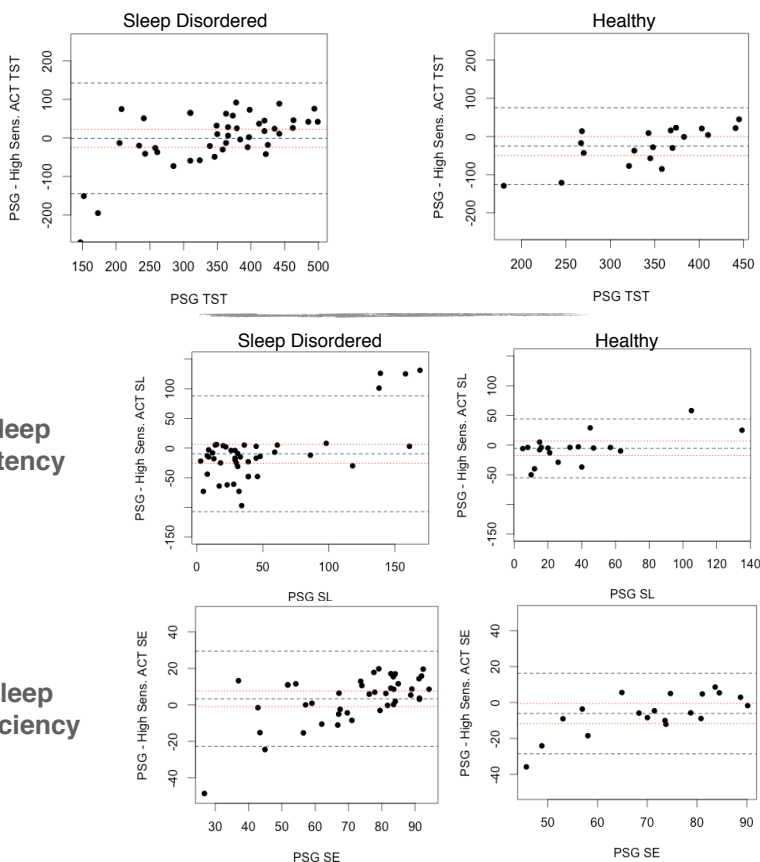
Data analysis

Spearman correlation
Bland and Altman

RESULTS

Total Sleep Time

Sleep. Dis. TST (min)	Mean (SD)	Mean diff.	Correlation
PSG	340 +/- 69.0	Paired t test	Spearman
Auto Sens.	403 +/- 39.0	39 +/- 82 (p < 0.05)	0.51 (p < 0.05)
Low Sens.	400 +/- 38.4	36 +/- 81 (p < 0.05)	0.56 (p < 0.05)
Medium Sens.	381 +/- 41.81	20 +/- 76	0.65 (p < 0.05)
High Sens.	365 +/- 48.5	1 +/- 71	0.69 (p < 0.05)



CONCLUSION

This new actigraph MW8 show a good accuracy and our study validate it for measuring TST, SE and SL comparing to PSG. However, sleep parameters like WASO and AW measurements show no clear agreement and are still to be improved. Epoch by epoch comparison will be done to complete our validation.

References :

Kushida et al., Sleep Medicine (2001)
Avi Sadeh, Sleep Medicine Reviews (2011)