Sleep characteristics of children with motor impairments

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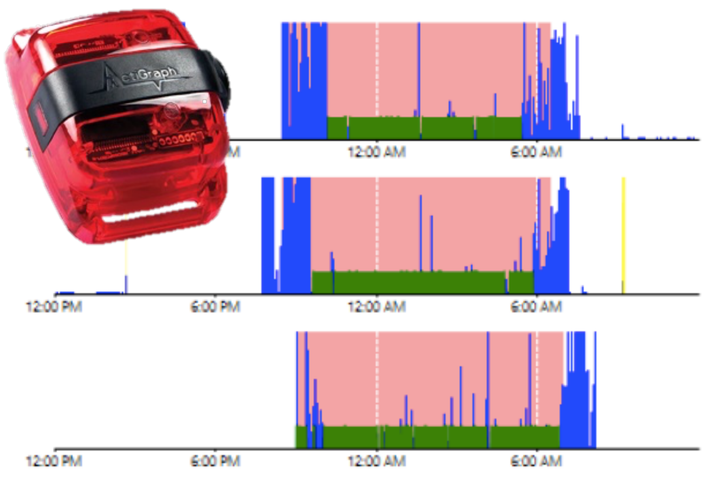
The purpose of this study was to determine the feasibility of objectively measuring the sleep characteristics of children with motor impairments using tri-axial accelerometers.

Sleep has been identified as a key element to the healthy growth and development of children. Disturbances in sleep have been associated with cognitive deficits, poorer academic performance, behavioural problems, mood disturbances and physiological changes such as increased adiposity[1-4]. There has also been emerging evidence that sleep plays a vital role in motor skill learning and memory consolidation[5]. There has been limited research into the sleep characteristics of children with motor impairments.

Preliminary studies suggest children with motor impairments have greater sleep disturbance than typically developing children however, to date, sleep has not been objectively measured in this population[6].



METHODS

Children aged 6-12 years old with were recruited from community based exercise programs in Western Australia.

Children were assessed for motor proficiency using the Movement Assessment Battery for Children-2 (MABC-2), those who fell below the 15th percentile were considered to have low motor proficiency (LMP).

Sleep characteristics were assessed via Actigraph monitors, which were worn on the wrist for a period of 5 days including at least 1 weekend day and 3 week days. Their parent/guardian completed sleep diaries on behalf of their child including bed time, lights out time and wake-up time.

Outcome measures included total sleep time, sleep latency, and sleep efficiency. Additionally, compliance and feasibility with the use of Actigraph monitors was explored through parent report and analysis of Actigraph data.

n=20
**p≤0.05*

	Typically Developing		Low Motor Proficiency		df	F	p
	Mean	Standard Deviation	Mean	Standard Deviation			
Sleep Latency (mins)	14.40	5.46	24.51	14.08	1	4.48	0.05*
Sleep Efficiency (%)	82.09	5.72	76.48	3.87	1	6.60	0.02*
Total Sleep Time (mins)	505.58	40.97	485.34	32.39	1	1.50	0.24

RESULTS

Of the 24 children recruited for this pilot study, 10 were considered LMP on their MABC-2 result (≤ 15th percentile) and results were compared to typically developing peers (>15th percentile). Aside from motor proficiency, no significant differences were seen in group descriptive characteristics including age (mean age = 7.8 SD ± 1.8) and body composition (mean BMI = 16.7 SD ± 2.2). However, the groups were not matched for gender due to the higher prevalence of males in the clinical population (female = 9; male = 11).

Of the 24 children recruited, 20 completed the requirements for sleep analysis, including parent completion of the sleep diaries. Four participants failed to complete the required Actigraph wear time due to the child refusing to wear the watch.

Between groups there was no statistically significant difference between total sleep time, however significant differences were seen across sleep efficiency and latency (Table 1.)

DISCUSSION

This study has demonstrated the feasibility of objective sleep assessment in children with LMP via waist actigraphy. Furthermore, this pilot data has highlighted the possible differences in sleep quality between TD children and those with LMP.

Given the diverse negative impacts of sleep disturbance, which may augment the physiological of psychosocial impacts of low motor proficiency, clinically viable objective assessments are of primary importance.

As a pilot study with a small sample size representative of the clinical population and gender differences between groups, future studies should further assess sleep objectively over a range of motor proficiencies, genders and ages.

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