

BACKGROUND

- Accelerometers are valid objective measures of physical activity (PA) in children¹
- Older versions of accelerometers have become out-dated due to upgrades in technology
- Comparison of different generations of ActiGraph activity monitors have been explored in healthy children and adolescents^{2,3}
- However, comparability of output from original model with newly developed accelerometers has not been studied in youth with multiple sclerosis (MS)
- This can have implications on the interpretation and validity of data, specifically for longitudinal studies that have used two different accelerometer versions

OBJECTIVE(S)

- To determine the level of consistency between minutes spent in sedentary, light, moderate, vigorous and moderate-to-vigorous (MVPA) activity using ActiGraph 7164 and GT3X+ accelerometers in youth with MS

DESIGN / METHODS

- Youth with a diagnosis of MS were recruited at The Hospital for Sick Children in Toronto, Canada
- Youth were directed to wear 7164 and GT3X+ accelerometers on their non-dominant hip simultaneously for 7 days
- As participants varied in total number of valid days they wore both accelerometers, we included in the analysis all valid days in which participants wore both accelerometers for minimum of 10 hours per day
- Average time spent in sedentary, light, moderate, vigorous and MVPA activity was calculated
- Puyau cut-points used to determine activity intensity⁴
 - Sedentary : <799 CPM (e.g. sitting)
 - Light: ≥ 800 CPM (e.g. slow walking)
 - Moderate : ≥ 3200 CPM (e.g. badminton)
 - Vigorous: ≥8200 CPM (e.g. running)
- Consistency between time spent at different intensities were analyzed by intra-class correlation coefficients (ICC) with 95% confidence intervals (CI)
- Mean differences (MD) and limits of agreement (LOA) were used to visualize Bland-Altman plots

RESULTS

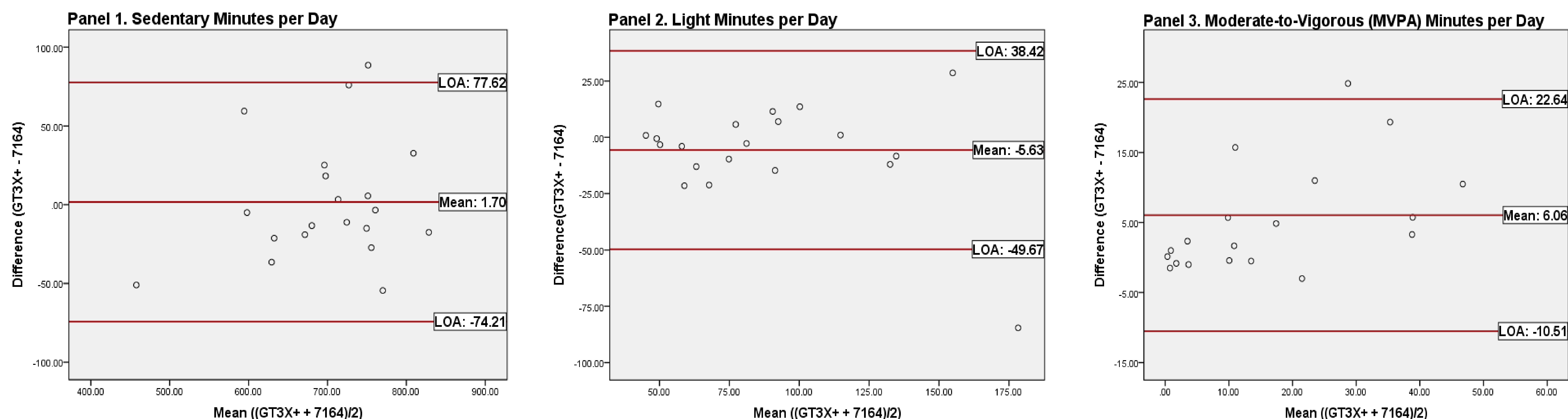
Table 1. Population Demographics and Characteristics

MS	N= 19
Age in years (median (IQR))	16.41 (3.15)
Range	13.3-18.2
Sex (# of females)	F= 12
Valid days	5.15 ±1.95
Range	1.0-7.0
EDSS score (median (IQR))	1.5 (0.5)

Table 2. Intra-class correlation coefficients, 95% confidence intervals and mean differences for time spent at each intensity level

	ICC	95% CI	Mean difference (Minutes per Day)	Limits of Agreement (mean diff ± 2 SD)
Sedentary	0.95	0.86-0.98	1.70	-74.21, 77.61
Light	0.91	0.78-0.97	-5.63	-49.67, 38.42
Moderate	0.94	0.86-0.98	6.00	-9.76, 21.75
Vigorous	0.86	0.65-0.95	0.14	-1.48, 1.76
MVPA	0.94	0.85-0.98	6.06	-10.51, 22.64

Figure 1. Bland-Altman plots for sedentary, light and moderate-to-vigorous activity



CONCLUSIONS

- There is sufficient consistency between ActiGraph 7164 and GT3X+ for time spent in different intensity levels in youth with MS to support the conclusion that the data from these devices can be used in longitudinal analyses

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- Study data were collected and managed using REDCap electronic data capture tools hosted at The Hospital for Sick Children. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.