

Test-retest reliability of spatial-temporal gait parameters (minute-by-minute) in people with multiple sclerosis during the 6MWT

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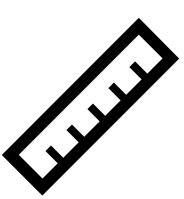
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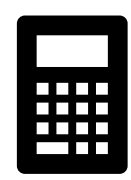
Introduction



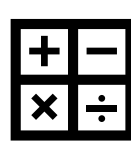
People with multiple sclerosis (pwMS) often present **walking fatigability (WF)**



Walking fatigability is measured through the **6-minute walk test (6MWT)**



In pwMS, Walking fatigability is defined as a **10% decrease** in distance walked from the 6th to the 1st minute



The 10% decrease is calculated using the distance walk index (DWI)

$$DWI = \left(\frac{\text{Distance walked at minute 6} - \text{Distance walked at minute 1}}{\text{Distance walked at minute 1}} \right) \times 100$$

- Variations in spatial-temporal gait parameters during the 6MWT in pwMS
- APDM inertial (OPAL, USA) sensors enables measurement of gait parameters minute-by-minute over the 6MWT
- Few pieces of evidence on the reliability of spatial-temporal gait parameters measured by APDM inertial (OPAL, USA) sensors during the 6MWT in pwMS with WF

Methods

MSWF
N = 20



55.2±6.2 years
DWI = -15±4%
6MWT = 303±134m
EDSS 4.8±1.2

MSNWF
N = 14



57.5±11.3 years
DWI = -2±5%
6MWT = 336±119m
EDSS 5.2±1.2

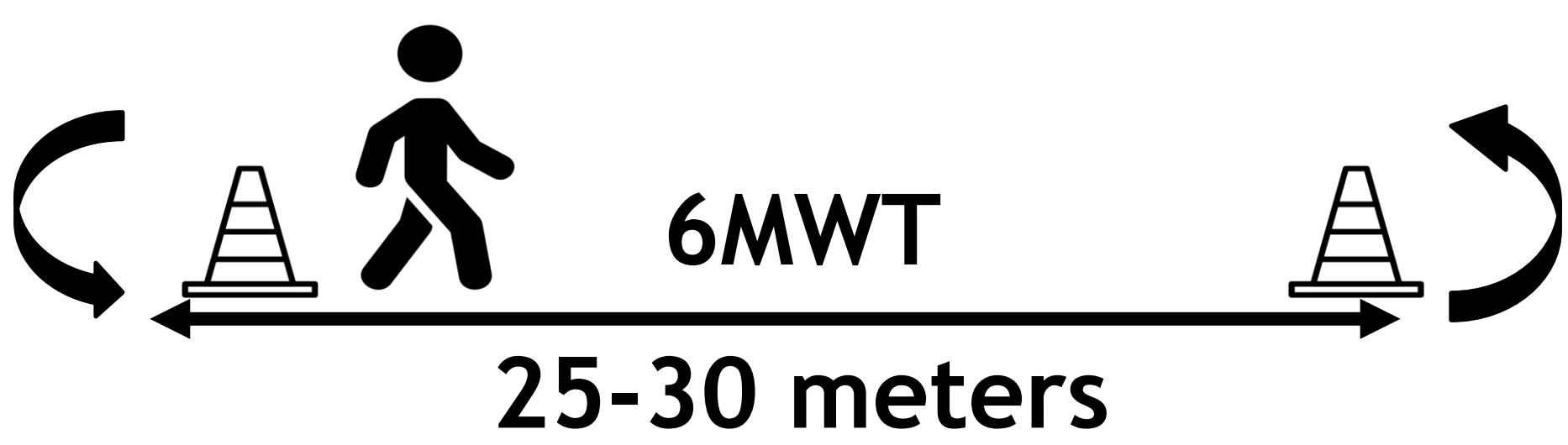
HC
N = 19



51±6 years
DWI = -0.44±5.3%
6MWT = 584±69m

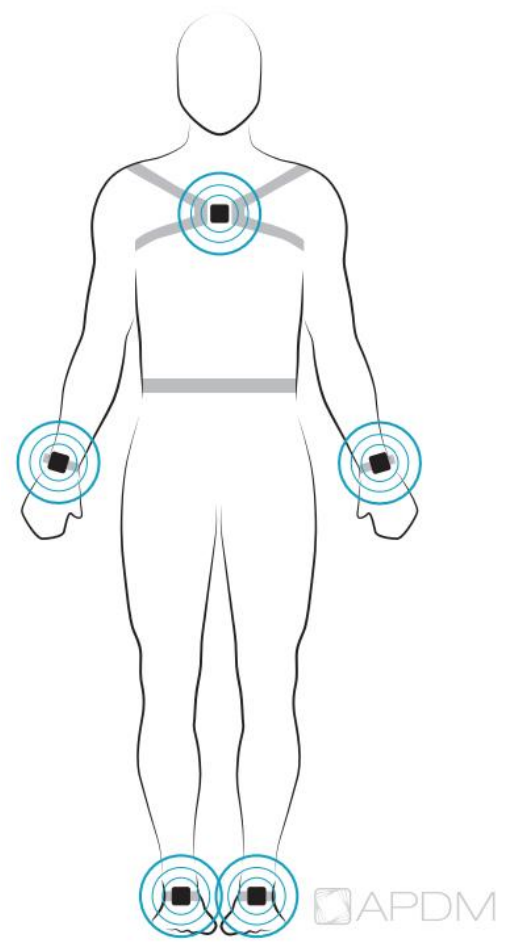


53 participants



6MWT performed twice (5-7 days apart)

Distance minute-by-minute



Spatial-temporal gait parameters were obtained from APDM (OPAL, USA) sensors

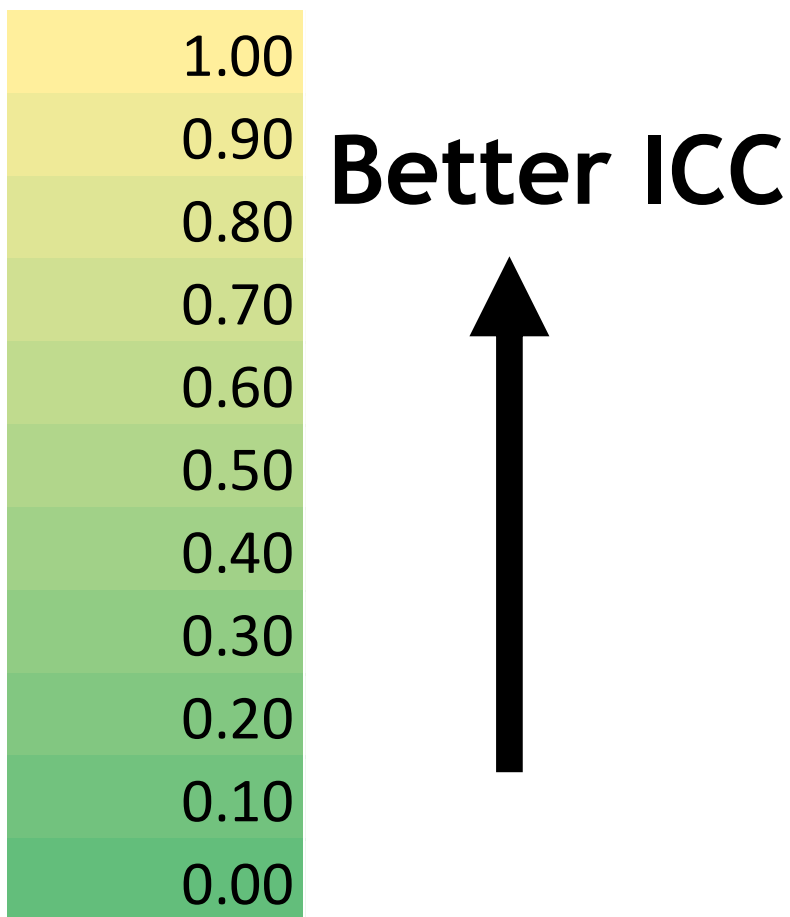
Spatial-temporal gait parameters: Cadence, gait speed, double support, step duration and stride length

To evaluate the test-retest reliability of spatial-temporal gait parameters minute-by-minute in absolute values in pwMS with and without walking fatigability and healthy controls during the 6MWT

Results

Test-retest reliability (intraclass correlation coefficient) of spatial-temporal gait parameters

	Minute 1	Minute 2	Minute 3	Minute 4	Minute 5	Minute 6
MSWF	Cadence	0.99	0.99	0.99	0.99	0.99
	Gait Speed	0.63	0.81	0.89	0.82	0.88
	Double Support	0.98	0.98	0.98	0.98	0.51
	Step Duration	0.58	0.71	0.62	0.71	0.97
	Stride Length	0.97	0.98	0.98	0.97	0.76
MSNWF	Cadence	0.99	0.99	0.99	0.99	0.99
	Gait Speed	0.65	0.62	0.68	0.74	0.79
	Double Support	0.99	0.99	0.99	0.99	0.76
	Step Duration	0.45	0.52	0.74	0.72	0.97
	Stride Length	0.96	0.95	0.96	0.96	0.53
HC	Cadence	0.95	0.95	0.95	0.96	0.97
	Gait Speed	0.69	0.74	0.81	0.85	0.86
	Double Support	0.95	0.97	0.98	0.98	0.97
	Step Duration	0.59	0.59	0.54	0.32	0.89
	Stride Length	0.94	0.95	0.95	0.86	0.83



Discussion

Spatial-temporal gait parameters measured minute-by-minute were **reliable** in pwMS with walking fatigability

Consistencies of the results over the 3 groups



APDM sensors are reliable to quantify spatial-temporal gait patterns of pwMS minute-by-minute in research settings

The results will allow researchers and clinical therapists to investigate gait parameters in pwMS during the 6MWT

Disclosure

Authors MP, FBS, CR, DK and GG have nothing to disclose; LM provides consultancy to MedRhythms and is an editorial board member of Frontiers in Human Neuroscience team, PF provided consultancy to Biogen and Neurocompass, and is an editorial board member of MSJ, NNR, and Frontiers in Rehabilitation Sciences

