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Spatiotemporal Gait Parameter Consistency Across Two Days of Treadmill Walking in Stroke Survivors

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Introduction

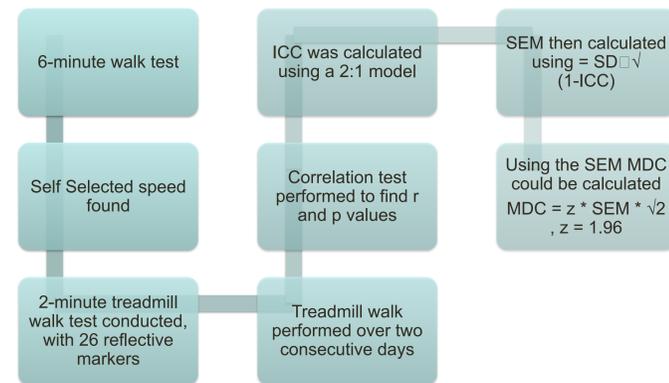
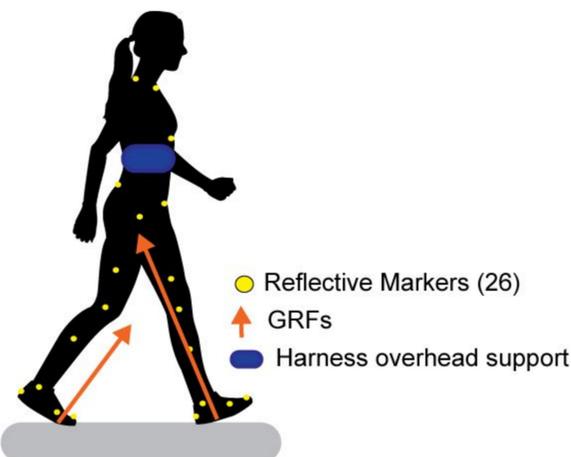
Context: Gait analysis how walking behavior are evaluated [1]. However it can be inconsistent due to changes in marker placing, and variations within and between post-stroke participants [2,3,4].

Objective: We aim to find **test-retest consistency of spatiotemporal variables** over two consecutive days of treadmill walking in post-stroke individuals and compare the minimal detectable change (MDC) values of our lab to previous studies.

Implication: Our findings carry practical implications for both our lab's work with post-stroke participants and similar studies elsewhere. They aid in **distinguishing intervention-induced changes from measurement errors**, enhancing research accuracy. Additionally, other labs utilizing the GRAIL system stand to benefit when working with post-stroke participants.

Hypothesis: We expected similar results to a previous study [5] and expected to see consistency between two days as we use the same equipment across both days

Methods



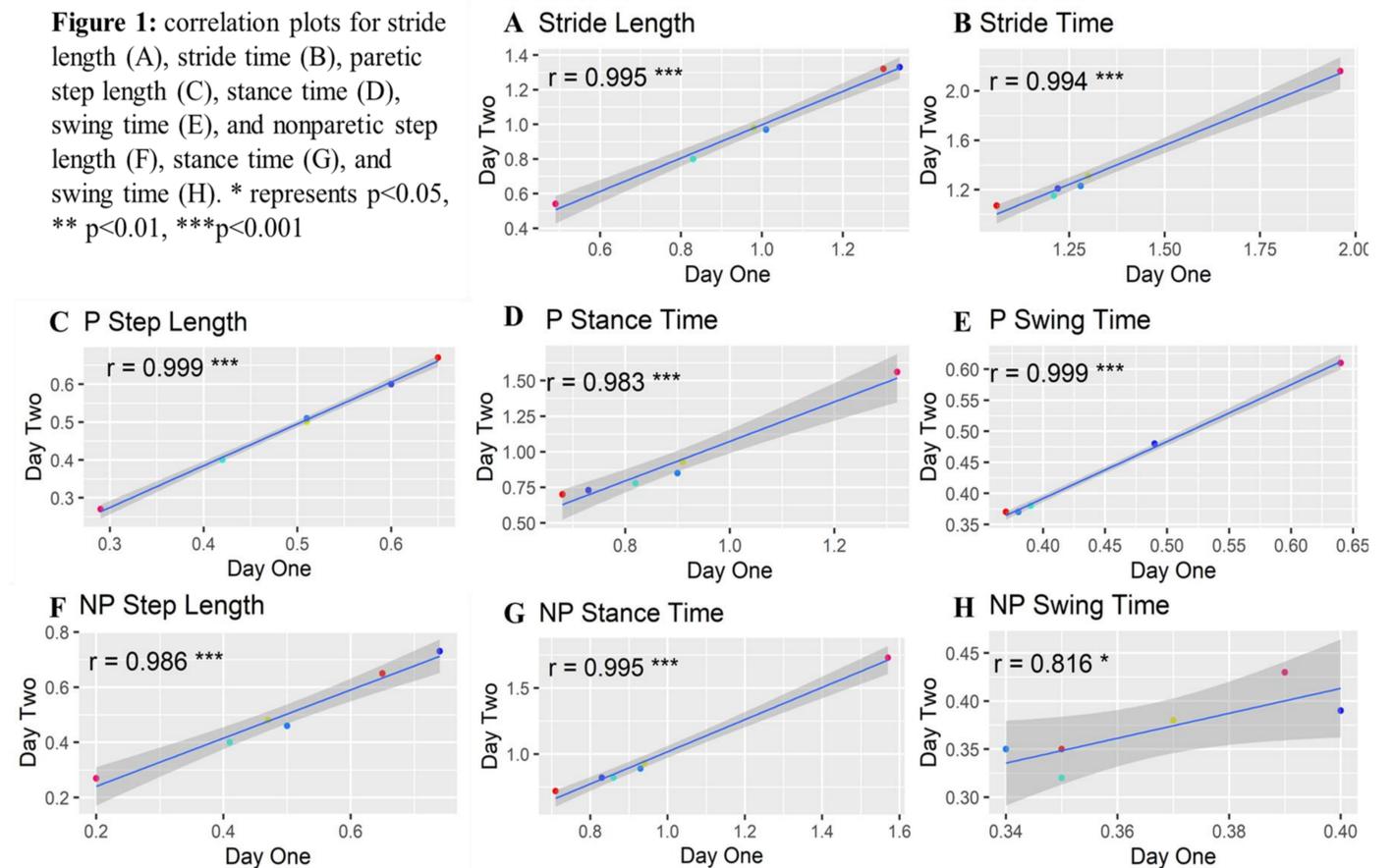
Subjects	Age	Sex	Fugl-Meyer	Paretic
6	24-64	2M/4F	25±4	2L/4R

Results

	R	p-value	ICC	MDC
Stride Length (cm)	0.995	<0.001	0.995	5.9
Stride Time (s)	0.994	<0.001	0.970	0.17
Step Length (cm)	0.999	<0.001	0.994	2.9
Stance Time (s)	0.983	<0.001	0.933	0.20
Swing Time (s)	0.999	<0.001	0.990	0.03
Step Length (cm)	0.986	<0.001	0.982	6.6
Stance Time (s)	0.995	<0.001	0.979	0.14
Swing Time (s)	0.816	<0.05	0.765	0.04

Results cont.

Figure 1: correlation plots for stride length (A), stride time (B), paretic step length (C), stance time (D), swing time (E), and nonparetic step length (F), stance time (G), and swing time (H). * represents p<0.05, ** p<0.01, ***p<0.001



Discussion

- ❖ All variables had **excellent consistency**, indicated by the ICC values > 0.75
 - Paretic step lengths were more consistent between days than non-paretic step lengths
 - Non-paretic swing time had the highest test-retest variation
- ❖ Kesar et al. [5] observed MDC for paretic step length of 6.75 cm and for non-paretic step length of 5.46 cm
 - Our findings smaller MDC for paretic step length
 - ICC values for temporal parameters similar
 - Differences can be explained by difference in participant impairment, as shown by Fugl-Meyer lower extremity score of 19±4
- ❖ Future work will increase sample size for analysis and obtain temporal values as percentage of gait cycle

Acknowledgements

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References

- [1] Baker, JNER, 2006. [2] Capozzo et al., Clinical Biomechanics, 1995. [3] Davis et al, Human Movement Science, 1991. [4] Olney, Richards Gait and Posture 1996. [5] Kesar et al. Gait and Posture, 2011. [6] van den Bogert et al., Med Biol Eng Comput, 2013. [7] Shrout, Fleiss Physc Bull 1979.