The Relationship between Balance and Gait Characteristics in Parkinson Disease: A Cross-Sectional Study

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Introduction[1-4]

Parkinson Disease
- Progressive neurogenerative disease

Disabling motor symptoms
- Bradykinesia, dyskinesia, resting tremor, rigidity, postural instability

Deficits in gait and balance
- How are they interconnected?

Purpose

To examine the potential relationship between measures of balance and spatiotemporal aspects of gait in people with Parkinson Disease (PwPD) using a cross-sectional analysis.

Methods

- **Subjects (N=45):** clinical diagnosis of idiopathic PD

Sex	Female: 17 / Male: 28
H&Y Stage***	I: 8, II: 26, III: 6
Medication dose (mg)*** (mean ± SD)	522.0 ± 429.3
Chronicity of disease (yrs since dx)* (mean ± SD)	12.2 ± 6.1
UPDRS**** (mean ± SD)	24.8 ± 10.3
Weight (kg)** (mean ± SD)	74.1 ± 16.3
Height (in)** (mean ± SD)	67.7 ± 3.6
Age (yr) (mean ± SD)	67.3 ± 10.0

Table 1: *: missing data for 2 participants; **: missing data for 3 participants; ***: missing data for 5 participants; ****: missing data for 8 participants

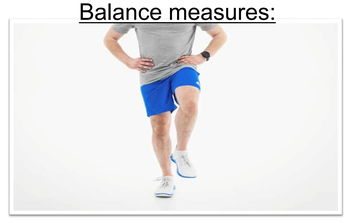
- **Data Collection:**
  - Cross-sectional study of secondary analysis from several published[5-7] and unpublished IRB approved studies

Spatiotemporal measures:

2 passes on Zeno mat

- Comfortable Gait Speed (CGS)
- Step length (SLmin)
- % of Gait in Swing (%Swing)
- % of Gait in Double Limb Support (%DLS)

Balance measures:

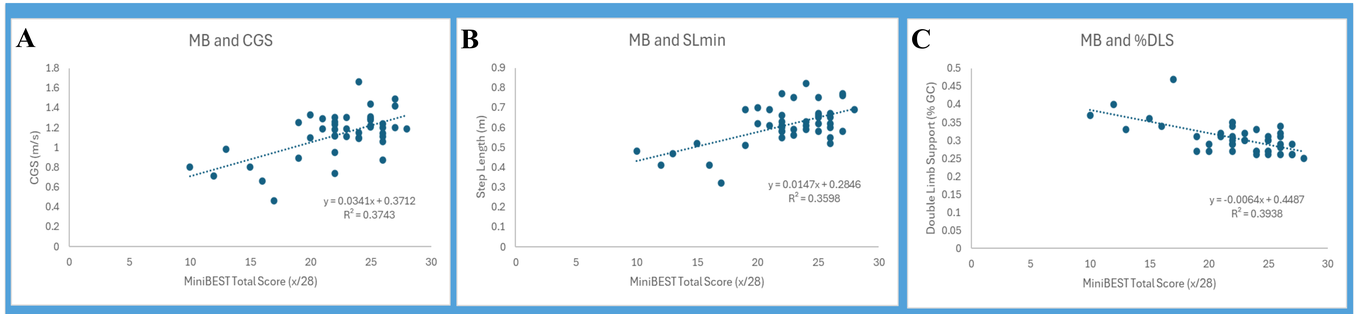


SLS time in Mini-BESTest

- Activities-specific Balance Confidence Scale (ABC)
- Mini-BESTest total score (MB)
- Timed Up and Go (TUG)
- Single leg stance time (SLSmin)

- **Data Analysis:**
  - Used SPSS (version 29, IBM) for Pearson correlation and Spearman's rank correlation
  - Analyzed relationship between gait (CGS, step length, % of double limb support, % of swing) and balance (ABC score, TUG time, Mini-BEST total score, single limb stance time)
  - Significant relationship $p < 0.0125$ (i.e., 0.05/4)

Results



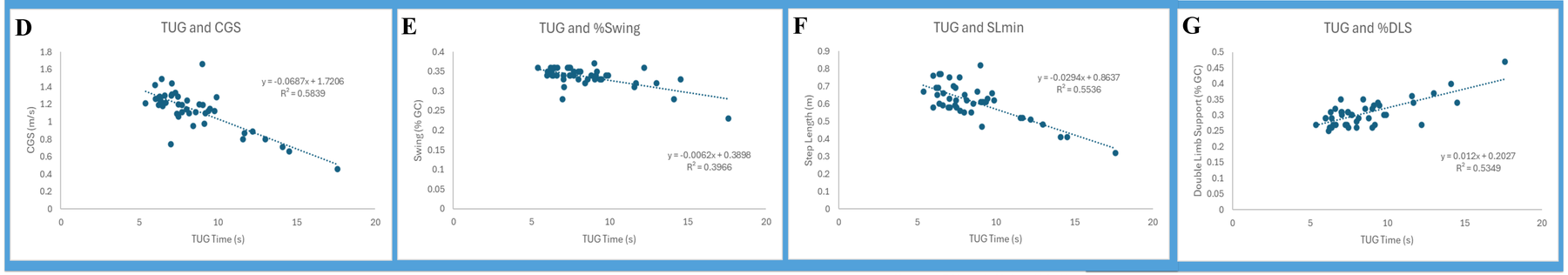


Table 2: Spearman correlations between balance measures and spatiotemporal gait measures

ABC	*CGS*	r = .284; p = .179
	%Swing	r = .347; p = .096
	SLmin	r = .438; p = .032
	%DLS	r = -.313; p = .136
MB	*CGS*	r = .435; p = .004
	%Swing	r = .330; p = .030
	SLmin	r = .420; p = .005
	%DLS	r = -.550; p < .001

Table 3: Pearson correlations between balance measures and spatiotemporal gait measures

TUG	*CGS*	r = -.764; p < .001
	%Swing	r = -.630; p < .001
	SLmin	r = -.744; p < .001
	%DLS	r = .731; p < .001
SLSmin	*CGS*	r = .308; p = .045
	%Swing	r = .326; p = .033
	SLmin	r = .267; p = .083
	%DLS	r = -.375; p = .013

Discussion

- Hypothesis was partially supported as some significant correlations were found between balance and spatiotemporal aspects of gait in PwPD.
- Balance measures (TUG and Mini-BESTest) were broadly related to spatiotemporal measures of gait in PwPD.
- *Performance* measures of balance correlate to spatiotemporal parameters of gait but *perception* of balance (ABC) does not.
- Improving SLS is used as a rehabilitative goal
  - But, not correlated with spatiotemporal aspects of gait.
  - Instead, seek balance measures relevant to gait variable of interest.

References

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