

BACKGROUND

Tandem gait is often used as a variable in outcome tools to test an individual's balance; however, it is rarely performed as a stand-alone test. By studying variables of tandem gait such as speed, lean, and sway, the reliability of tandem gait as an outcome measure can be tested. With healthy individuals and no intervention performed, little variability is expected between values within a 10-week period in order to increase the reliability of tandem gait.



PURPOSE

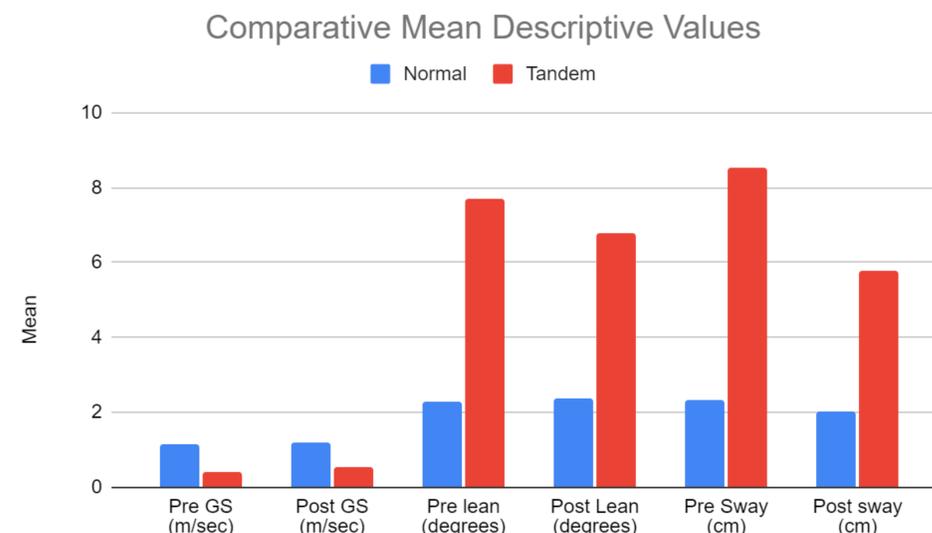
To explore whether variables of tandem gait (speed, lean, and sway) measured with VirtuSense® is reliable as an outcome measure based on data from healthy individuals.

MATERIALS AND METHODS

Thirty healthy individuals from a Midwestern DPT program were recruited. Before and after a 10-week period, participants were asked to walk 12 feet. Participants walked twice in their normal gait pattern, and twice in a tandem gait pattern. A 2" wide piece of tape was placed on the ground through the parallel bars for participants to walk on. Participants were instructed to walk heel to toe for tandem trials. Data recorded through the VirtuSense* in both tasks included gait speed, postural sway (lateral sway), and trunk lean (anterior-posterior).

RESULTS

Paired sample T-Test table is provided. **Normal walking** pre to post mean comparisons were **not significantly different** with small effect sizes indicating similar measures pre to post, whereas **tandem gait** pre to post mean comparisons were **significantly different** and had moderate effect sizes indicating measures were **not consistent over time**. Due to the differences in tandem speed, a post-hoc stepwise regression was done to see if other control parameters contributed to this variance. It was found that the adjusted R² for sway and step length were .59 and .77 respectively for normal and tandem gait speed. This indicates **sway may have had an impact on the variance seen in tandem gait speed** and could be due to the task being staying on the line. Differences in mean variables of normal gait versus tandem gait in shown below:



Paired Samples T-Test

	t	df	p	Cohen's d
Npre GS (m/sec) - Npost GS (m/sec)	-1.086	29	0.286	-0.198
Npre Lean (degrees) - Npost Lean (degrees)	-0.103	29	0.919	-0.019
Npre Sway (cm) - Npost Sway (cm)	1.074	29	0.292	0.196
Tpre GS (m/sec) - Tpost GS (m/sec)	-3.004	29	0.005	-0.549
Tpre Lean (degrees) - Tpost Lean (degrees)	2.879	29	0.007	0.526
Tpre Sway (cm) - Tpost Sway (cm)	4.602	29	<.001	0.840

*VirtuSense® (VirtuSense Technologies, Peoria, IL)
The VirtuSense deploys infrared camera technology in motion capture.

CONCLUSIONS

Speed, sway, and lean did not prove to be entirely reliable variables for the tandem task. The directions given impacted what the individual did to accomplish the task. When told to stay on the line, a more appropriate variable would be number of errors rather than speed, sway, and lean. Ways to improve this methodology in further research might be to state consistently that the participant should go as fast as they can while staying on the line. Additionally, with this study being healthy individuals, further research is needed for the reliability within a population of patients with neurological deficits.

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