

# To What Extent Does The Cognitive Task Influence Gait?

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## Introduction

- Dual task(DT) is the ability to divide attention and perform two distinct tasks concurrently (1) e.g. walking and performing a cognitive task
- Ageing and neurodegenerative diseases e.g. Parkinson's disease (PD) leads to increased attentional demand for walking (3). Thus, under DT conditions further gait deficits emerge
- The impact on gait remains unclear as to whether a tailored DT to a participants cognitive reserve (e.g. repeating maximum digit span) differs to a standard DT (serial 3's or 7's)

The aim of this project was to observe the degree of gait interference in both older adults and PD participants under different DT conditions.

## Methods

17 Idiopathic PD, 16 age matched controls were recruited as part of ICICLE PD study. Participants were instructed to walk at a comfortable pace for 2 minutes round 25m oval circuit containing a Gaitrite mat(7m\*0.6m) (Figure 1). Gait was measured under 3 conditions; i) DT(walking+ maximum forward digit span ii) DT+1 (walking +maximum forward digit span +1) iii) DT serial 7's( walking+ serially subtracting 7). PD participants were tested 'on' medication. Dual task interference (DTI- Dual task- single task) was calculated for each task. Repeated measures ANOVA was used to compare DTI of the tasks.

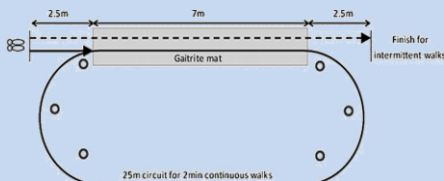


Figure 1- Gait circuit containing Gaitrite mat

Variable	Dual Task Interference					
	Control			PD		
	DT <sub>v</sub> DT +1	DT <sub>v</sub> S7	DT+1 <sub>v</sub> S7	DT <sub>v</sub> DT +1	DT <sub>v</sub> S7	DT+1 <sub>v</sub> S7
Step Velocity	1.000	1.000	1.000	1.000	0.060	<b>0.001</b>
Step Length	<b>0.000</b>	1.000	<b>0.000</b>	<b>0.000</b>	0.275	<b>0.000</b>
Step Width sd	<b>0.000</b>	0.990	<b>0.000</b>	<b>0.000</b>	0.515	<b>0.000</b>
Step Time	1.000	1.000	1.000	1.000	0.025	<b>0.005</b>

Table 1-Results from Repeated Measures ANOVA testing for main effects of Dual Tasks. Significant correlation P(<0.05)

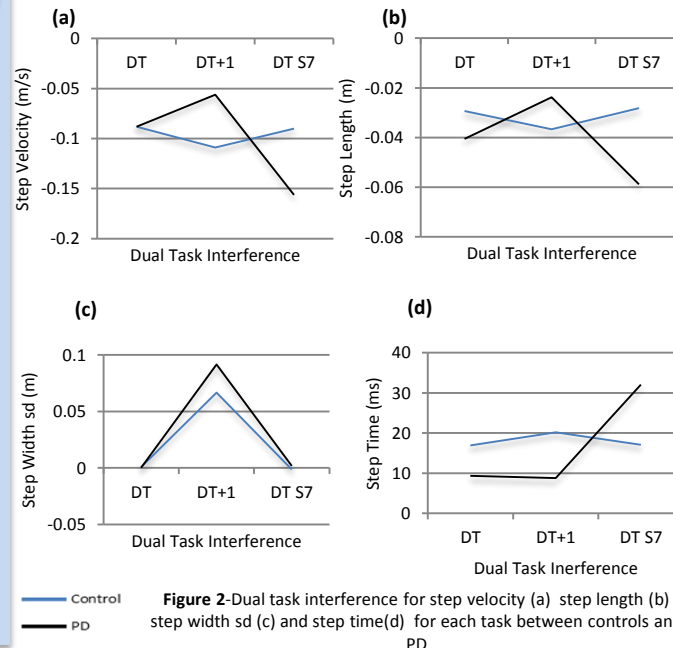


Figure 2-Dual task interference for step velocity (a) step length (b) step width sd (c) and step time(d) for each task between controls and PD

## Results

Gait variables that were significantly different under DT conditions are shown in Table 1. Overall the greatest gait impairments occurred under DT +1 conditions in control participants and DT S7's in PD participants (Figure 2). Both groups showed similar results in their step width variability, with DT+1 being their worst task.

## Conclusions

- The type of Dual task performed influenced the level of gait interference
- PD affects the brain causing a greater DTI to be observed under S7 conditions
- Our results might reflect the different mechanisms underpinning these cognitive tasks. As DT S7's uses the pre-frontal cortex, which is known to be disrupted in PD (3)
- Even though dual tasks like S7 subtractions overloads cognitive capacity to demonstrate 'automatic' gait. It still remains unclear as to whether this research is truly reflective of the dual tasks encountered in our everyday environment

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## References

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