

Dual and multitasks in older people: A proposal to measure performance in cognitive and motor tasks

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INTRODUCTION

In elderly people, double or multitasking (cognitive and motor) are severely impaired, associated with reduced cognitive function and loss of automatic capacity of the motor and musculoskeletal system.

In normal circumstances people are able to perform motor and cognitive tasks at the same time, such as walking and talking (Kirk-Sanches & McGough, 2014) but the difficulty increases when tasks are done simultaneously, since it uses the same processing pathway information (Haggard et al, 2000).

In elderly these activities when performed together are shown to be severely impaired, which is explained by the fact that the cognitive capacity decreased with the increasing of age, since it reduces the brain's ability to process information as quickly and by the loss of automatic engine capacity and musculoskeletal system (Bergamin et al, 2014).

The activation of brain areas of cognitive control during the task demonstrates the relationship of cognitive functions with motor function, so that the ability of the dual task has a great impact on the performance of daily activities (Halvarsson, Dohm & Stahle, 2014).

However, there is no consensus on measures to evaluate multiple tasks.

METHODS

An experimental protocol was tested four times over 8 months in a sample of 126 elderly (60-98 years old 78.98 ± 8.34) to evaluate functional performance reported in walking, cognition and coordination in double and multiple tasks, along a path (6m x 0.4m). We test eight different tasks conjugations of a) walking straight, b) counting back, c) coordinating the upper limbs and d) overcoming the obstacle. We also used MMSE, TUG and TUG-Cognitive and an IADL scale. The score of the experimental protocol is done by counting errors.

RESULTS

Time differences between TUG-Cognitive and TUG are used to compare several task conjugations of the protocol.

Statistically significant correlation with the differences between TUG-Cognitive time and TUG and MMSE was found to a dual task (walking and counting back) and to a multiple task (walking in a straight line with coordination of the upper limb and counting).

Statistically significant correlation was found between Instrumental Activities of Daily Life (Lawton and Brody Scale) and number of errors in dual task and in multitasks.

Dual task (motor/cognitive): walking and counting back

	Moment 1	Moment 2	Moment 3	Moment 4
Correlation MMSE and differences between TUGCog-TUG-Norm	-,426**	-,309**	-,282**	-,287**
Correlation with IADL Scale	0,000	0,001	0,002	0,003
	-,300**	-,247**	-,222*	-0,183
	0,001	0,007	0,016	0,059

Multi task (motor/cognitive/motor): walking with coordination of the upper limb and counting

	Moment 1	Moment 2	Moment 3	Moment 4
Correlation MMSE and differences between TUGCog-TUG-Norm	-,484**	-,421**	-,551**	-,449**
Correlation with IADL Scale	0,000	0,000	0,000	0,000
	-,424**	-,551**	-,410**	-,526**
	0,000	0,000	0,000	0,000

Dual-task and Cognition

• Difference between time scores in TUG-Cognitive and TUG-Normal are related with cognitive state (MMSE)

Discussion and Conclusions

Multi-task and IADL's

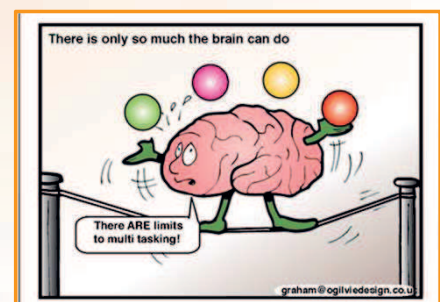
• Difficulty to perform dual and multi-task are related with difficulty in Instrumental activities of daily life.

A new instrument?

• The ability of older people to perform dual and multi-tasks can be measure with a easy protocol including tasks as walking, count backward and upper limb coordination.

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