INTRODUCTION

Mobility [1] and cognitive [2] impairments are common in individuals with multiple sclerosis. It is often observed that these impairments tend to be compounded when individuals with MS perform simultaneous cognitive and motor tasks [3]. This phenomenon, cognitive-motor interference, has generally been attributed to greater attentional demands of the motor task [4]. These increased demands cause an overload to the system when paired with the attentional costs of the cognitive task [5]. To date, this theory has not been expressly tested in individuals with MS [3]. The aim of this study was to investigate the association between the attentional costs of movement and dual task performance in individuals with MS.

METHODS

20 individuals with MS and 26 age-matched controls participated in the investigation. Upon consenting participants provided demographic information, competed the FES-I [6] and were instructed on all study procedures. Participants responded to 20 auditory cues during a series of five tasks designed to challenge balance and mobility [7]. Participants were asked to respond by saying ‘Pop’ as quickly as possible after hearing each cue.

In addition to the probe reaction time task, participants also completed a complex dual task scenario (serial 7s), tests of cognition (SDMT [8] and TMT [9]) and the physiological profile assessment [10]. The primary outcomes were average probe reaction times (PRT) for each motor task and changes in walking and cognitive performance for the dual task.

RESULTS

Overall, all participants took significantly longer to respond to the auditory cue during tasks requiring dynamic balance ($F = 33.4, p < 0.001$).

MS participants had significantly greater probe reaction times compared to control subjects.

Examining the correlation between complex DTCs of gait and cognition with PRTs during walking revealed no significant differences between the outcomes (DTC gait: $p = 0.071$, $p = 0.68$, DTC cognition: $p = 0.27$, $p = 0.08$).

Physiological fall risk status and falls self efficacy were significantly correlated with observed PRTs.

CONCLUSIONS

The findings suggest that individuals with MS possibly have reduced movement automaticity and increased attentional costs compared to healthy controls.

The lack of correlation between PRT and complex dual task performance outcomes, however, points to an inadequacy of simple attentional capacity models alone explaining deficits observed during cognitive-motor interference.

REFERENCES