

Appraisal

Critically appraised paper: Group-format dual-task training reduces dual-task interference in simple mobility tasks in people with chronic stroke

Synopsis

Summary of: Pang MYC, Yang L, Ouyang H, Lam FMH, Huang M, Jehu DA. Dual-task exercise reduces cognitive-motor interference in walking and falls after stroke. A randomized controlled study. *Stroke*. 2018;49:2990–2998.

Question: Does a dual-task balance and mobility exercise program improve dual-task interference during walking and reduce fall incidence in people with chronic stroke? **Design:** Randomised controlled trial with concealed allocation and blinded outcome assessment. **Setting:** University research facility in China. **Participants:** Community-dwelling adults aged ≥ 50 years and at least 6 months after stroke, with balance deficits and able to walk at least 10 m and follow three-step commands. Key exclusion criteria were substantial cognitive impairment, and significant aphasia and/or neurological comorbidities. Randomisation of 84 participants allocated 28 to dual-task training, 28 to single-task training, and 28 to an active control group. **Interventions:** Each intervention comprised three 60-minute group training sessions per week for 8 weeks, which were supervised by two physiotherapists. The dual-task group received 30 minutes of cognitive-motor dual-task exercise and 30 minutes of upper and lower limb stretching. The single-task group received the same balance and mobility exercises and cognitive exercises as the dual-task group, except they were performed separately for 30 minutes each. The control group received stretching and upper limb strengthening exercises only for 60 minutes. **Outcome measures:** The primary outcomes were dual-task interference effect (%)

for the time to complete three mobility tasks (forward walking, Timed Up and Go, and obstacle crossing) and correct response rate during two cognitive tasks (serial-3 subtraction and verbal fluency), immediately after intervention and at 8 weeks. Fall incidence was also recorded at the 6-month follow up. **Results:** Seventy-seven participants completed the study. Post-intervention, the dual-task interference effect was significantly reduced only for the dual-task group during forward walking with verbal fluency (mean difference from baseline -9.5% , 95% CI -17.4 to -1.5), forward walking with serial subtraction (-9.6% , 95% CI -18.6 to -0.5), and Timed Up and Go with verbal fluency (-16.8% , 95% CI -27.9 to -5.6). However, only forward walking with serial subtraction remained significantly different from baseline at the 8-week follow up. There were no treatment effects on the dual-task effect on cognitive performance. The dual-task program reduced risk of falls and injurious falls by 25% (95% CI 3 to 47) and 22% (95% CI 6 to 38), respectively, compared with the control group. **Conclusion:** Group-format cognitive-motor dual-task training immediately reduced dual-task interference in simple mobility tasks in chronic stroke, and could reduce fall incidence compared with upper limb stretching and strengthening.

Provenance: Invited. Not peer reviewed.

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Commentary

Dual-task walking impairments are common after stroke and are a compelling target of rehabilitative interventions. People with stroke tend to experience declines in gait speed with many types of cognitive tasks,¹ and this may restrict home and community mobility where concurrent cognitive and motor tasks are common. Dual-task gait speed explains a greater proportion of ambulatory activity than single-task gait speed following stroke.²

This study provides support for group-based dual-task training to improve dual-task walking and reduce falls after stroke. Group-based exercise has potential advantages in terms of increasing social interactions, improving adherence, and reducing costs compared with one-on-one interactions with a therapist. Although group-based interventions may not be appropriate for stroke survivors with more substantial motor or cognitive impairments, this study incorporated a structured approach to group dual-task training that may facilitate translation of dual-task interventions into community-based exercise programs. Monitoring of dual-task performance was not specified in this paper, but therapists who implement dual-task training in a group setting should consider how to best ensure simultaneous performance practice of walking and concurrent tasks across numerous participants.

At post-intervention, reductions in dual-task interference effects were observed only in the group receiving dual-task training. This is

broadly consistent with the findings of a recent meta-analysis examining the effects of exercise or gait training on dual-task walking after stroke.³ However, it is not possible to determine if the observed improvements in dual-task walking are clinically meaningful because absolute measures of walking and cognitive task performance were not provided.

This study contributes to a growing body of work that aims to optimise rehabilitative interventions for dual-task impairments. Given the negative impacts of dual-task walking impairments after stroke, this line of research holds potential to substantially improve participation and reduce adverse outcomes following stroke.

Provenance: Invited. Not peer reviewed.

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References

1. Plummer P, et al. *Arch Phys Med Rehabil*. 2013;94:2565–2574.
2. Feld JA, et al. *Stroke*. 2018;49:1296–1298.
3. Plummer P, Iyigün G. *Arch Phys Med Rehabil*. 2018;99:2548–2560.