

Can You Walk and Talk?

Problems multitasking may be an early sign of dementia

Are you a multitasker? Can you juggle two tasks at the same time? Do you work through problems while exercising? It can be more difficult to do these things as we age. But how much of a risk is this in the ability or lack of ability to multitask? How can we tell if we are developing problems?



Abstract

- **Background:** Poor dual-task gait performance is associated with a risk of falls and cognitive decline in adults aged 65 years or older. When and why dual-task gait performance begins to deteriorate is unknown. This study aimed to characterise the relationships between age, dual-task gait, and cognitive function in middle age (ie, aged 40–64 years).
- **Methods:** We conducted a secondary analysis of data from community-dwelling adults aged 40–64 years that took part in the Barcelona Brain Health Initiative (BBHI) study, an ongoing longitudinal cohort study in Barcelona, Spain. Participants were eligible for inclusion if they were able to walk independently without assistance and had completed assessments of both gait and cognition at the time of analysis and ineligible if they could not understand the study protocol, had any clinically diagnosed neurological or psychiatric diseases, were cognitively impaired, or had lower-extremity pain, osteoarthritis, or rheumatoid arthritis that could cause abnormal gait. Stride time and stride time variability were measured under single-task (ie, walking only) and dual-task (ie, walking while performing serial subtractions) conditions. Dual-task cost (DTC; the percentage increase in the gait outcomes from single-task to dual-task conditions) to each gait outcome was calculated and used as the primary measure in analyses. Global cognitive function and composite scores of five cognitive domains were derived from neuropsychological testing. We used locally estimated scatterplot smoothing to characterise the relationship between age and dual-task gait, and structural equation modelling to establish whether cognitive function mediated the association between observed biological age and dual tasks.
- **Findings:** 996 people were recruited to the BBHI study between May 5, 2018, and July 7, 2020, of which 640 participants completed gait and cognitive assessments during this time (mean 24 days [SD 34] between first and second visit) and were included in our analysis (342 men and 298 women). Non-linear associations were observed between age and dual-task performance. Starting at 54 years, the DTC to stride time ($\beta=0.27$ [95% CI 0.11 to 0.36]; $p<0.0001$) and stride time variability (0.24 [0.08 to 0.32]; $p=0.0006$) increased with advancing age. In individuals aged 54 years or older, decreased global cognitive function correlated with increased DTC to stride time ($\beta=-0.27$ [-0.38 to -0.11]; $p=0.0006$) and increased DTC to stride time variability ($\beta=-0.19$ [-0.28 to -0.08]; $p=0.0002$).
- **Interpretation:** Dual-task gait performance begins to deteriorate in the sixth decade of life and, after this point, interindividual variance in cognition explains a substantial portion of dual-task performance.

This study was conducted in Spain as part of an ongoing longitudinal cohort study, the Barcelona Brain Health Initiative. Adults between the ages of 40-64 completed assessments of both gait and cognition at the time of analysis. Subjects were assessed while walking only and while walking and performing serial subtractions (dual-tasking). Findings showed that after age 54, dual-task performance started to deteriorate, and a correlation was noted between decreased cognitive function and decreased ability to dual-task.

Being unable to perform two tasks simultaneously is a sign of cognitive decline. The ability to dual-task while walking starts dropping off in the mid-50s, much earlier than what is considered “old age”. As we age, connections between neurons in the brain decrease and become less efficient, especially in brain regions involved in attention and processing information. The result is diminished brain function resulting in declines in dual-tasking capacity. We focus on the most important task which in this case would be walking over any secondary tasks.

This study doesn’t answer the question of how to prevent cognitive decline and more research is needed in this area. We don’t know when we should intervene to prevent the declines noted in this study. However, it would make sense to

practice dual tasking regardless of age. It is likely most important for people in their 50s and beyond. While walking (or exercising), perform other tasks. Carry on a conversation while walking with a friend or spouse. Work through problems when hiking or biking. It's more than problem-solving, it may be saving your brain connections!

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