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Agile ageing – a modifiable vital sign to mitigate the risk of falls in older adults?

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Abstract

Falls prevention in older adults is a targeted priority because a fall can lead to disability, institutionalisation and presents a significant financial burden. Falls are multifactoral in nature however, impairments in both physical and cognitive functioning have been linked to their occurrence. Currently, testing and exercise training for falls prevention focuses on physical qualities such as balance and strength. Agility is a unique physical quality that couples an individual’s perceptual cognitive ability with the ability to produce a quick and accurate movement. Agility is relatively well understood in a sporting context however, its application to falls prevention has been minimal. Because a fall may occur while an individual is perceiving information from the dynamic environment around them while attempting to execute a rapid and accurate movement it is hypothesised that concepts and methods used to assess and train agility in athlete populations can be used to improve practices related to the screening and training to mitigate the risk of a fall in an older adult.
Background

Falls negatively impact the health of older adults and place significant financial strain on healthcare systems. Approximately 125,000 adults aged 65 and over experienced a fall-related hospitalisation in 2016-17, which has increased over the last 10 years. Furthermore, in 2015-16, health service expenditure on falls was estimated to be $3.8 billion in Australia. Falls can also predispose an individual to encounter additional health-related complications, most commonly fractures and soft tissue injuries. As such, there is a clear need to refine screening methods to identify individuals at risk of falls, and modify interventions to prevent future fall-related events.

Deficits in cognitive and physical functioning can be major predictors of an older adult’s risk of future falls. Improvements in physical qualities such as balance, gait and strength have been associated with a reduction in falls risk. Additionally, even slight deficits in cognitive functioning have shown to significantly influence an older adult’s risk of future falls, particularly impairments in executive function and dual-task performance. Therefore, it is proposed that any tool designed to assess falls risk should simultaneously assess both physical and cognitive function. This multifactorial approach to testing could offer greater prognostic utility in the screening of falls risk than assessments used in current practice.

Although falls risk screening tools are widely used, evidence demonstrating their utility to distinguish individuals at risk of falls is questionable. Questionnaires are commonly used, such as the St. Thomas Risk Assessment Tool in Falling elderly inpatients (STRATIFY), as well as physical tests such as the Timed Up-and-Go (TUG) and the Berg Balance Scale (BBS). Despite their popularity, both the TUG and BBS have limited predictive value in identifying individuals at risk of falls. Research suggests that neither of these tests be used in isolation, as they are limited in their capacity to assess multiple factors of falls risk. These tests solely focus upon physical factors, such as strength, gait and balance, whilst cognitive domains, such as reaction time, executive function and visual scanning, are typically overlooked during an assessment of falls risk. Herein, it is proposed that a test of agility in this population may appropriately fulfil this role as a tool to identify individuals at risk of falls, as it allows both physical and cognitive ability to be assessed.
Hypothesis

In view of the relationship between an individual's physical and cognitive abilities and falls, it is hypothesised that agility is a key physical quality that should be assessed and developed properly when identifying and mitigating falls risk. Drawing from research in the area of sport, agility is defined as 'a rapid whole-body movement with change of velocity or direction in response to a stimulus' \(^{(12)}\). This definition harmonises the interplay between cognitive abilities and physical qualities, and could offer a multifactorial approach in the assessment and management of falls risk in older adults. Research derived from athletic populations has suggested that agility involves not only a physical change-of-direction, but also perceptual-cognitive factors, such as visual scanning, knowledge of situations, pattern recognition, and anticipation \(^{(13)}\). Agility is a vital skill to possess in competitive sport, and it is proposed that it may also be of considerable relevance in the older adult population.

Individuals often encounter situations in everyday tasks that require negotiation of either pre-determined or incidental obstacles (e.g. tripping hazards such as rugs, furniture, pets and surfaces with little friction), thus requiring a degree of agility to react and change direction in order to prevent a fall. Furthermore, both the perceptual-cognitive and physical aspects of agility have been found to be modifiable in sporting populations \(^{(14)}\). It is reasonable to postulate that, with the use of specific training interventions, meaningful improvements are also achievable within the older adult population.

Evaluation of the hypothesis

Agility-based tests may be a useful tool to screen for an older adult’s risk of future fall-related events, offering greater utility than current tests evaluating the performance of pre-determined tasks. Research has previously proposed a novel test of agility \(^{(15)}\), however the test involved changes of direction that occurred in a pre-determined manner without the need to react to unpredictable stimuli, such as cutting manoeuvres around stationary objects. Therefore, this test could be considered an assessment of change-of-direction speed, as opposed to agility \(^{(16)}\). Whilst easy to implement and quantify, the use of time-based measurements around a pre-determined course may also lack face validity, and not reflect the demands of activities that contribute to a fall. More specifically, these assessments do not represent everyday situations in which dynamic negotiation of obstacles is required. Therefore, practitioners and researchers aiming to develop an agility-based screening test for
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falls risk should consider the use of task-specific, observational assessments in an open
environment that requires decision-making.

Conclusion

Falls remain a significant health and economic concern for older adults, and current
falls risk screening tools do not comprehensively capture the multifactorial nature of falls.
Extending beyond its intended purpose in athletic populations, agility has the potential to be
the ‘missing link’ in falls risk identification and management. Due to its physical and
cognitive requirements, a suitable test of agility could offer greater prognostic utility to
screen for falls risk in older adults.

Authors’ contributions

All authors contributed equally to the development of this manuscript; MO, MW and ST
conceptualised the topic of the opinion piece. MO, MW and ST contributed to the writing and
ingoing of the manuscript. All authors have read and approved the final version of the
manuscript.

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