Measuring and understanding falls risk in people with MS

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Research shows that up to 60% of people with MS will have experienced a fall in the previous six months and more than 30% are 'frequent fallers' who experience three or more falls per year. Many falls result in injury requiring medical attention, but importantly, the fear of falling can severely limit the confidence and activities of people with MS, reducing their quality of life.

Many of the symptoms typical of MS, such as poor balance, muscle weakness, visual impairments, altered sensation and impaired thinking can contribute to the risk of falling. But the key to preventing falls is increasing our understanding of which combinations of symptoms pose the greatest risk.

In 2012, MS Research Australia funded a two year research project led by Professor Stephen Lord, and his collaborator Dr Phu Hoang, at Neuroscience Research Australia to investigate the key risk factors for falls in people with MS and develop targeted interventions to reduce falls. Dr Hoang was subsequently awarded a prestigious MS Research Australia Fellowship.
This productive research team have already published a number of highly informative papers (see earlier articles here and here), revealing the key combinations of risk factors that increase the risk of falling in people with MS. Now they have published two more papers that further define falls risk in people with MS and define how best to measure falls risk in people with MS. Their results show that these measures can be used in clinical trials to test the effectiveness of falls interventions programs.
Professor Lord has previously designed a Physiological Profile Assessment (PPA) tool for identifying the profile of falls risk factors in individuals, including lower limb strength, sensation, balance, vision, hand reaction time and mental information processing speed. The tool is now used around the world, particularly to assess falls risk in the elderly.

In a study published in the *Multiple Sclerosis Journal – Experimental, Translational and Clinical* in March, the team successfully showed that the PPA can also be accurately used to test and predict falls risk in people with MS.
The team evaluated the PPA in a group of 416 people with MS and compared them to 352 age matched people without MS. The study showed that the PPA can accurately distinguish between people with MS who are 'non fallers' and those who are 'fallers' and was further able to differentiate people with MS who were frequent fallers and non-frequent fallers.

The test shows that falls risk in people with MS is driven by different factors than those seen in ageing. While sensing lower limb position and lower limb strength are important risk factors for falls in the elderly, visual contrast sensitivity, reaction time and postural sway are, on average, stronger risk factors for falls in people with MS.

In a second study, Dr Hoang and Professor Lord, working with colleagues Dr Tijsma and Dr Vister from the Netherlands, tested a very simple tool called the Choice Stepping Reaction Time (CSRT) test for measuring falls risk in people with MS. The results were published in the journal Disability and Rehabilitation in March.
This 'low-tech' method uses a rubber mat and a stop watch to measure the time it takes to complete 20 steps onto four targets on the mat.

The test reaction times did indeed show that CSRT can be used to accurately predict falls risk in people with MS and, like the PPA, can also discriminate between those who are frequent or non-frequent fallers.

Together, these studies show that these simple, accurate tests of falls risk can be used clinically to identify people with MS who are at increased risk of falls, and will also be invaluable in clinical trials of falls intervention programs to ensure that fall reduction programs work and are beneficial in managing falls risk in people with MS.

Dr Hoang has already pilot-tested a falls intervention step training program and shown that it can improve balance and reaction time in people with MS. He is now preparing to roll out a full-scale clinical trial of the step training program to test whether it is effective in reducing falls in people with MS.