

Stumbles and near-falls

Validating tests to identify risk

Nicky Baker¹, Prof Anthony Maeder^{1,2}, A/Prof Niranjan Bidargaddi², Prof Sue Gordon¹

1. College of Nursing and Health Sciences 2. College of Science and Engineering 3. College of Medicine and Public Health

Stumbles or near-falls are momentary losses of balance and are usually disregarded as no injury occurs. However, they are **more common** than falls and usually **pre-empt falls**.

Fall risk and balance screening is established for older adults, after a calamitous event such as stroke or hip fracture, in neurological conditions such as MS or Parkinson's Disease, but not for seemingly healthy middle- and young older-aged adults.

We have no data on stumbles or near-falls. There is an opportunity to identify people at risk, intervene early and prevent near-falls and falls.

Background

Aims

1. Establish balance differences between three groups: **fallers, stumblers** and **non-fallers**
2. Identify between-group differences with an inertial sensor that measures balance speed and direction
3. Investigate opinions and perceptions regarding self-management approach to balance and near-fall prevention
4. Validate in community population aged 40-70 years



Establish

Balance tests distinguish between fallers, stumblers and non-fallers:

- Standing on one leg**
- Turning to face opposite direction**
- Tandem walk heel-to-toe five steps**
- Stepping over a hurdle**
- Forward lunge**

Stumblers are more than twice as likely to fail these tests than non-fallers (OR 2.1-2.9; sensitivity 73%) even though neither group has yet fallen.¹

An inertial sensor will be attached to the low back. The sensor is light, non-intrusive and provides accurate measures of balance sway.

Participants will undertake the balance tests wearing the inertial sensor. Results will inform sway differences between fallers, stumblers and non-fallers. Classification of sway results will inform stumble and fall prevention.

Participants will be invited to discuss their views on self-management approaches for balance and prevention of stumbles or falls.

Identify



Validate

Community dwelling, seemingly healthy adults invited to participate (n=250)

1. Reliability – internal consistency (sensor position, fixation), test-retest (same subject, different times)
2. Discriminant validity – sway differences between groups
3. Healthy population norms for community dwellers aged 40-70 years
4. Facilitators and barriers for self-management approach