Exercise for falls prevention: putting evidence into practice.

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Introduction.

- My role:
  - Physiotherapist- Caulfield CRC
  - Falls Clinic- Physiotherapist and Co-ordinator.

- Key researchers in Australia:
  - Professor Keith Hill: Latrobe University, Melbourne.
  - Professor Stephen Lord: Prince of Wales Medical Research Institute (NSW).
  - Key falls statistics in this talk are taken from and referenced in Lord et al (2007)

Objectives.

- Falling- how much of a problem is it?
- Why do older people fall?
- What's available for falls prevention in Victoria?
- What role can exercise play in falls prevention?

- Practical:
  - Exercise prescription for falls- what we do in CRC.

Falls rates.

- 1 in 3 older people (65+) will fall once or more in any given year, about half of these will fall more than once.
- Previous falls are one of the most important predictors of falls risk- twice the normal risk (57%) for those who have fallen in the previous year.
- Higher rates in specific groups:
  - Parkinson's Disease- 60-80% risk.
  - Age 85+ close to 50% risk.

Consequences of falls

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- 2-6% of falls cause a fracture.
- 0.2-1.5% of falls result in hip fracture.
- Hip fracture often results in a slow and incomplete recovery- frequently reduced mobility and / or increased care needs.
- Review of 120 cases:
  - Independent mobility: pre-fracture- 75% , 6 months post-fracture-15%.
  - Able to climb stairs: pre- 63%, post- 8%

“The Long Lie”

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- 47% of non-injured fallers not able to get themselves up independently.
- Being stuck on the floor following a fall (“the long lie”) is an important additional cause of injury and disability.
- More than one hour spent on the floor following a fall is associated with dehydration, hypothermia, pressure sores, pneumonia, muscle damage and increased fear of falling.

Fear of Falling

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- Older people often develop a “fear of falling” after a fall. This can lead to loss of confidence and fear avoidance, resulting in a vicious cycle of further decline in balance, mobility and independence.
- We also sometimes see the opposite problem- lack of insight and continued risk-taking behaviour, causing an increased risk of further falls and injury.

Economics of falling

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- A review of 578 injury-causing falls- average cost per fall (Lord et al, 2007):
  - no hospital contact required- $205
  - visit to ED required- $1040
  - admitted to hospital- $12300

- Australian health statistics 2003-4: more than twice as many hospital admissions for falls related injuries than traffic related, with longer average length of stay (6.2 vs 4.5 days).

Future Economics

- In Australia in 2001- estimated health cost of falls-related injuries was $498m.

- In 2051 (with projected ageing population):
  - Nearly three times the cost ($1375m).
  - 2500 extra hospital beds.
  - 3200 extra nursing home places.

Defining falls

- “An unexpected event in which the participant comes to rest on the ground, floor or lower level”
- It is important to have a definition, because older people often have different views on their falls (ie “it wasn’t a fall, I didn’t hurt myself”).
- If this is the case they are unlikely to tell anyone and an opportunity to prevent future injury could be missed.

Keeping balanced

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- Keeping your balance= maintaining your centre of gravity (COG) within your base of support (BOS).
- Balance reactions:
  - ankle, hip and stepping strategies.
- Balance is activity and situation dependent- eg:
  - Young person- normal activities vs gymnastics?
  - Frail older person- walking indoors vs walking outdoors or catching a tram?

Why do older people fall?

- Commonly heard- “It was the council’s fault- they don’t maintain the footpaths”.
- Campbell et al (2006), cited in Gillespie et al (2009)
  - 15% result from an external event that would cause most people to fall.
  - 15% have a single identifiable cause (eg a faint, or the effects of Parkinson’s Disease.
  - 70%- result from multiple interacting risk factors.

Physiological decline

- “Regardless of the task being performed, maintaining postural stability requires complex integration of sensory information regarding the position of the body relative to the surroundings, and the ability to generate forces to control body movement” (Lord et al, 2007)

Physiological decline

- Inputs: vision, vestibular, peripheral sensation.
- Central processing of input: reaction time, dual tasking, decision-making.
- Output (motor response / balance reaction): requires adequate strength, co-ordination, endurance, flexibility.
- Age-related changes in all of these systems- combination of moderate effects= major effect.
- Frequently- additional negative effect of illness on these systems also.

Why do older people fall?

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- Poorly maintained footpaths?
- Or combination of:
  - Reduced vision or wearing bifocals- didn't see the raised edge.
  - Shuffling gait- tripped on the edge.
  - Reduced leg sensation- delay in sensing the trip had occurred.
  - Reduced balance reactions- couldn't recover balance after starting to trip.

Falls Prevention Services

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- Falls Clinics
- Community Rehabilitation Centres
- Community Health Services.

- Similar basic set-up across Victoria, with local differences.
- Access to services is usually via GP (who should be the first port of call for these issues).

Caulfield Falls Clinic

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- Specialist falls assessment service within the Caulfield Community Rehab Centre.
- For people having frequent falls where the cause is unknown.
- One-off assessment (2-3 hours) with doctor, physiotherapist, occupational therapist.
- Identifying falls risk factors and providing recommendations to the client and GP (by letter). Other referrals as needed.

Interventions/ recommendations

- Priority is to identify the main risk factors and provide interventions or recommendations for these to reduce the risk.
- Also screening for and management of other risk factors- to reduce overall falls risk.
- Harm minimisation / injury prevention:
  - osteoporosis prevention / management, personal alarms, hip protectors.

Risk factors

- Medical issues / medications.
- Cognitive issues / depression / anxiety.
- Impaired vision / multifocal glasses.
- Environmental hazards / increased care needs
- Reduced strength / sensation.
- Inadequate physical activity levels.
- Balance or gait impairment.
- Unhelpful footwear.

Evidence

- Cochrane Review (Gillespie et al, 2009)- good quality evidence for positive effect on falls prevention:
  - Multifactorial intervention (eg Falls Clinic)
  - Appropriate exercise intervention.
  - Cataract extraction.
  - Psychotropic medication withdrawal.
  - Occupational Therapy- home safety assessment.
  - Vitamin D supplementation (if low levels)

Caulfield Community Rehab Centre

- Time-limited outpatient rehab service (8 week program), home-based and centre-based services.
- Allied Health management of falls- either following on from Falls Clinic assessment, or starting with initial assessment.
- Goal-focussed, must have rehab goals to be eligible.

Physiotherapy follow-up in CRC.

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- Based on comprehensive assessment.
- Mostly exercise based- individual and/or group sessions, with home exercise program where possible.
- Always aiming to refer for ongoing exercise group if possible- to get maximum gains and to maintain / continue improvement.
- Also gait aids- prescription and training.
- Working closely with Occupational Therapist, Social Worker and Dietitian as needed.

The Healthy Living Centre

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- Ongoing physical activity options run by the Caulfield Community Health Service.
- COTA endorsed.
- High and low level group options.
- Close links with CCRC:
  - We can make direct referrals into groups.
  - Joint project (2008)- increasing balance exercise component in the groups.

Evidence for exercise

- Recent systematic review (Sherrington et al, 2008):
  - Reviewed 44 randomised controlled trials (RCTs) about exercise and falls prevention.
  - Concluded that appropriate exercise programs are effective in reducing falls rates.
  - Greater effect on falls rates if balance component included in the program- 17% vs 10% reduction.
  - Also greater effect when more than 50 hours exercise undertaken in the program.

Evidence for exercise

- Recommendations from study- to be effective, programs should include components of:
  - Balance exercise
  - Functional strength activities (eg stairs, sit to stand).
  - Moderate intensity resistance training
  - Endurance for general fitness.

Evidence for exercise

- Other characteristics of effective programs:
  - Progressive, specific and tailored to clients' needs.
  - 60 minute sessions three times per week for a minimum of six weeks (ongoing if possible)
  - Designed by a trained professional.
  - Delivered by trained instructors- so it is challenging enough but also safe.
- Other benefits of a group program:
  - Social interaction, peer support.

Evidence for exercise

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- Recent Cochrane Review (Gillespie et al,2009)- reviewed 111 trials involving 55,303 subjects.
- Concluded that three different kinds of program are effective in reducing falls rates and falls risk:
  - Multi-component group exercise.
  - Multi-component home exercise program (individually prescribed).
  - Tai Chi in a group setting.

COTA programs.

- Already fulfilling many of the program aspects recommended above?
- How much of a balance component is there already?
- Able to encourage other beneficial activities? eg sports, Tai Chi, aerobics, dance.

Practical

- Safety & risk management.
- Demonstration of some common assessment techniques.
- Examples of some exercises we do in CRC.

Safety- risk management.

- Safety is very important- it's obviously counterproductive to cause falls while trying to improve balance / prevent falls.
- Inherent element of risk with balance exercise- needs to be managed effectively (and can be).

- Within your programs, the risk management element would need to be worked out properly before introducing balance exercise into the program.

Safety- exercise prescription.

- Need to find a balance between prescribing exercises that challenge balance but can be done safely.
- This depends on:
  - The client's level of balance impairment.
  - How well the client is able to follow instructions and monitor their own safety.
  - The amount of supervision and what equipment is available.
- All of these factors would need to be considered in risk management.

Physio assessment of balance

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- Balance specific assessment- testing different balance systems and activities.
- Some standardised tests- able to compare with norms for age.
- Guides treatment / exercise prescription.
- One part of the overall physiotherapy and falls assessment.

Exercise prescription for balance.

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- Exercises and activities that challenge balance in specific ways- aiming to stimulate improvement.
- It's thought that improvement in balance occurs through the process of "motor learning" in repetition of specific movements.
- This is achieved through practise of the movement with high repetitions, high frequency and usually low load, and needs to be progressive.
- This theory is based on expert opinion (Haines, 2011) and is similar to specific skills training for sports (eg practising your tennis serve).

Exercises.

- Challenging balance:
- Progressing exercises:
- Static exercises:
- Dynamic exercises:

Resources

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- Victorian Department of Health website- falls prevention section: http://www.health.vic.gov.au/agedcare/maintaining/falls_dev/index.htm
- National Ageing Research Institute (NARI) website- falls research section: http://www.mednwh.unimelb.edu.au/research/falls.htm
- Queensland Health falls prevention resources: http://www.health.qld.gov.au/stayonyourfeet/resources.asp
- Monash University NoFalls Exercise Program:
- http://www.monash.edu.au/muarc/projects/nofalls

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