Exercise prescriptions for hospital, community and residential aged care

Dr Catherine Sherrington

THE GEORGE INSTITUTE for Global Health

Affiliated with the University of Sydney

Outline

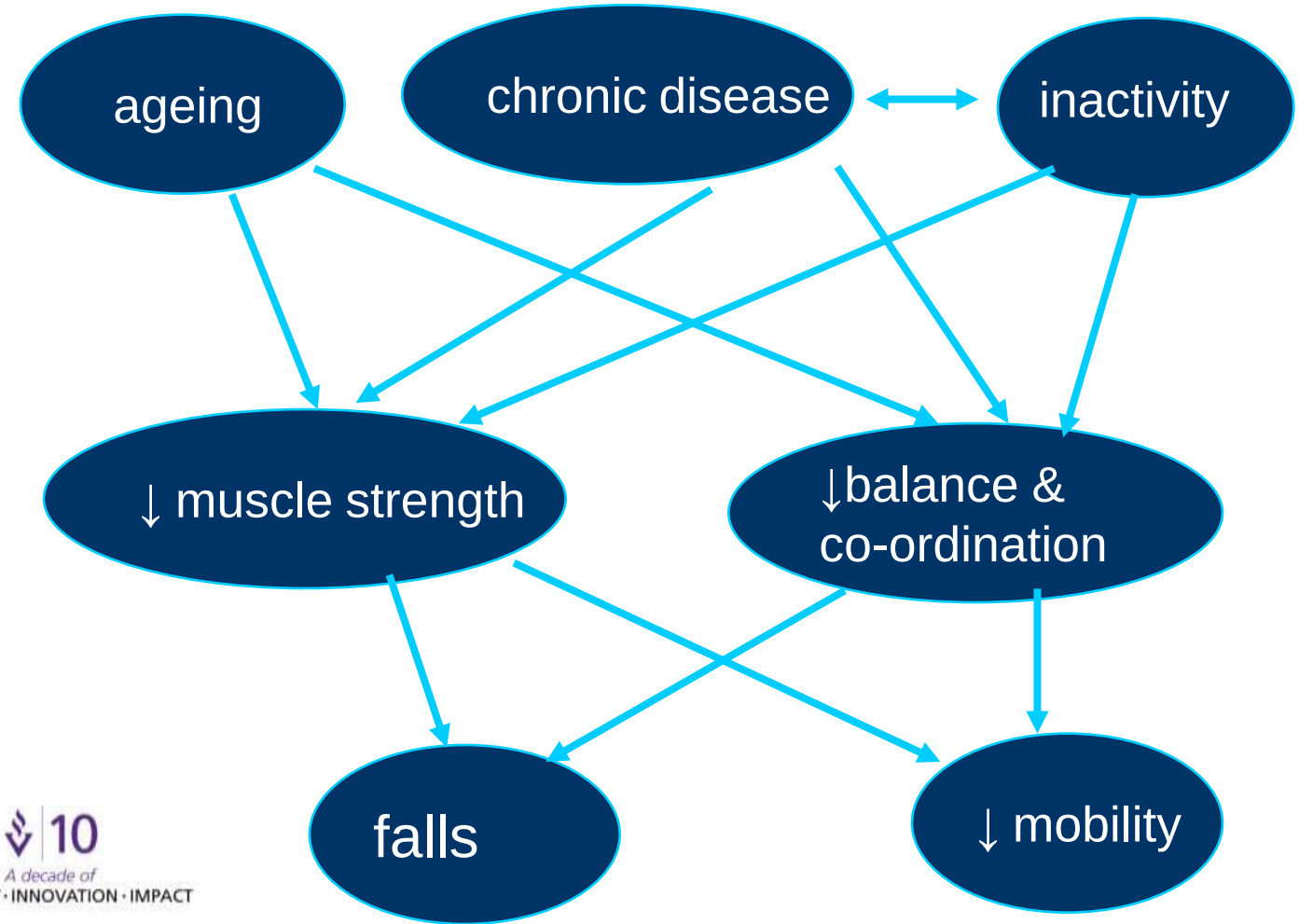
- **Balance and falls**
- **Evidence overview by setting**
- **Recommendations for each setting**

Balance

- “the ability to maintain the projection of the body's centre of mass (CoM) within manageable limits of the base of support, as in standing or sitting, or in transit to a new base of support, as in walking” (from Winter 1995)
- control over movements of the body’s centre of mass
- necessary for safe performance of tasks

Howe et al, Cochrane Library 2007

Balance, strength and falls



Exercise and falls meta-analysis

- 2010 update of our 2008 review[1]
- 54 RCTs comparing exercise with usual care, over 10,000 people
- 16% fewer falls in people randomised to exercise groups
  - RR= 0.84, 95%CI 0.77 to 0.91, p=0.001

[1]Sherrington, Whitney, Lord, Herbert, Cumming, Close. *JAGS* 56:2234–2243 2008 (44 RCTs)

Exercise program components and falls

Feature	Falls reduction with feature, 95% CI	Falls red. without feature, 95% CI	Variability explained
Mod-high balance challenge	22% !4% to 30%, 43 studies	0% 0% to 14%, 17 studies	15%
50 hours+	23% 13% to 32%, 30 studies	7% 0% to 8%, 30 studies	19%
Walking program included	10% 0% to 22%, 30 studies	23% 11% to 32%, 30 studies	8%
Balance training & 50+ hours	28% 19% to 37%, 22 studies		31%

High challenge to balance

- Exercise in standing involving
  - controlled movements of the body
  - feet close together
  - minimal arm support

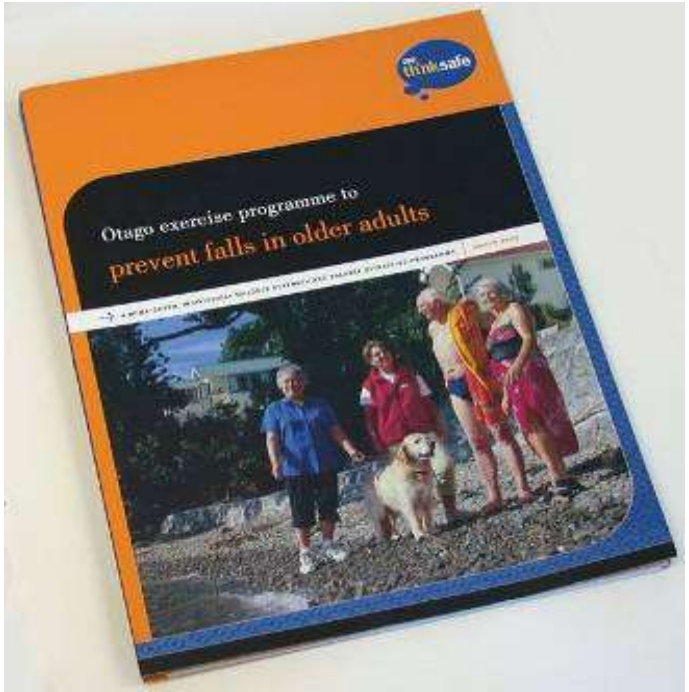
Latest Cochrane review- community setting

- Exercise interventions reduce risk and rate of falls
  - rate ratio 0.78
    95% CI 0.71 to 0.86
    14 trials
  - risk ratio 0.83
    95% CI 0.72 to 0.97
    17 trials
- Exercise may prevent fractures

Gillespie et al, Cochrane Library 2009

Community programs

- Otago home-based balance and strength exercise
  - Campbell 1997, Robertson 2001
  - also 35% reduction in fall-related injuries (Robertson 2002)
- Group-based Tai Chi
  - Li 2005, Voukelatos 2007, Wolf 1996, Woo 2007
- SOME other forms of group exercise
  - Barnett 2003, Korpelainen 2006, Lord 2003, Mandureira 2007, Skelton 2005



Who should a program target?

- **The general population**
  - greater relative effect
    likely future falls prevention
    Korpelainen 2006, Li 2005, Madureira 2007, Voukelatos 2007, Wolf 1996, Woo 2007
- **People at increased risk**
  - more falls prevented in the short term
  - leader training and liaison with health professionals
    Barnett 2003, Campbell 1995, Lord 2003, Robertson 2001, Skelton 2005, nearly Wolf 2003

Community

Chapter 6 Balance and mobility limitations

Recommendations

Intervention

- Deliver exercise programs to prevent falls in older people who live in the community (eg group exercise classes, strength and balance retraining at home, tai chi classes). (Level I)[7]
- Improve the effectiveness of exercise programs for preventing falls by including challenging balance training and frequent exercise. (Level I)[7,40]
- Encourage exercise for falls prevention in all older people in the community, not only those who have an increased risk. (Level I)[7,40]

Balance & mobility in hospital patients

- **Balance and mobility are often poorer when a person is in hospital, compared with their usual mobility**
  - medications (including anaesthetics),
  - acute events (eg stroke or a hip fracture)
  - acute illnesses (eg infections).
  - Inactivity/ deconditioning

Exercise and falls in hospitals- evidence overview

- **Multifaceted programs including additional exercise**
  - can reduce falls in wards where length of stay is 3 weeks+[1]
  - impact on falls in shorter stay wards less clear and hard to evaluate
  - 1 day shorter LOS in medical patients[2]
- **Additional exercise as a single intervention**
  - May reduce falls in rehabilitation settings[1]
- **Rehabilitation ward management leads to**
  - Fewer falls after hip fracture[1]
  - Better outcomes after stroke and hip fracture
- **Common sense suggests that a number of falls prevention aspects should be part of usual care on all wards**

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[1] Cameron, Cochrane Library 2010
[2] de Morton, Cochrane Library 2009

Standard care

- Organise routine physiotherapy review for patients with mobility difficulties, including transfers[37-39]
  - communicate to staff and the patient the limits of the patient's mobility status[4] using written, verbal and visual communication
  - put walking aids on the side of the bed that the patient prefers to get up from[44] and, where possible, assign a bed that allows them to get up from their preferred side
  - supervise or help the patient if required[45,46]
  - make sure that, while mobilising, the patient wears fitted, nonslip footwear[45,46] (discourage the patient from moving about in socks, surgical stockings or slippers)
  - encourage the patient to participate in functional activities and exercise (minimise prolonged bedrest and encourage incidental activity)[46,47]
  - in rehabilitation settings, organise physiotherapist-led exercise sessions to improve balance (eg tai chi and functional activities that are progressive and tailored to individual needs).[39]

Effectiveness of targeted falls prevention programme in subacute hospital setting: randomised controlled trial

Terry P Haines, Kim L Bennell, Richard H Osborne, Keith D Hill

- 626 participants in 3 subacute wards in a metropolitan rehabilitation / aged care hospital
- Falls risk alert card with information brochure, exercise programme, education programme and hip protectors
- 30% fewer falls in intervention than control group
- difference most obvious after 45 days of observation

BMJ 2004 Mar 20;328(7441):676-679

Cluster randomised trial of a targeted multifactorial intervention to prevent falls among older people in hospital

Robert G Cumming, professor of epidemiology and geriatric medicine,[1,2] Catherine Sherrington, research fellow,[1,3,4] Stephen R Lord, senior principal research fellow,[4] Judy M Simpson, professor (biostatistics),[1] Constance Vogler, staff specialist geriatrician,[5] Ian D Cameron, professor of rehabilitation medicine,[6] Vasi Naganathan, senior lecturer geriatric medicine,[2] for the Prevention of Older People's Injury Falls Prevention in Hospitals Research Group

- 3999 patients in 24 Sydney aged care/rehab wards
- No effect on falls of an extra part-time physio and nurse

  - Opportunity for effect (LOS 7 days)?
  - Importance of other risk factors?
  - 3 months in each site not enough to change practice?
  - Not intense enough?

BMJ 2008 Apr 5;336 (7647):758-760

Falls are very common after hospital stays

- 14% of medical patients fell 1 month after discharge (Mahoney 1994)
- 73% of people with stroke fell 6 months (Forster 1995)
- 34% of people discharged from rehab fell 3 months (Sherrington, in press)
- Referral to post-hospital falls prevention initiatives is an important role of hospital staff- community evidence probably applies

Hospital settings

Part C Management strategies for common falls risk factors

Chapter 6 Balance and mobility limitations

Recommendation

Intervention

- Use a multifactorial falls prevention program that includes exercise and assessment of the need for walking aids to prevent falls in subacute hospital settings. (Level II)[39]

Good practice points

- Refer patients with ongoing balance and mobility problems to a post-hospital falls prevention exercise program when they leave hospital. This should include liaison with the patient's general practitioner.

Residential care

- Balance and mobility usually affected
- Other risk factors also common
- Research into effectiveness of intervention has had conflicting findings[1]
- Multidisciplinary intervention can prevent falls but difficult to implement this cheaply
- Some exercise-based intervention strategies promising

[1] Cameron 2010, Cochrane Library

Effectiveness of a Multifaceted Intervention on Falls in Nursing Home Residents

Clemens Becker, MD, Martina Kron, PhD,† Ulrich Lindemann, UMSc,* Elisabeth Sturm, RN,* Barbara Eichner,* Barbara Walter-Jung, MBA,* and Thorsten Nikolaus, MD**

- Exercise: group-based, supervised, progressive balance and resistance exercises delivered by exercise instructors.
- Other: hip protectors, environmental modification, walking aid check, staff and resident education.
- Falls: rate ratio=0.55 (95%CI 0.41 to 0.73)

J Am Geriatr Soc 2003 51:306-313

Fall Prevention in Residential Care: A Cluster, Randomized, Controlled Trial

Ngaire Kerse, MBChB, PhD,[*‡] *Meg Butler, MPH,*[*] *Elizabeth Robinson, MSc,*[†] *and Maree Todd, FRACP, MBChB*[§]

- "Residential care staff, using existing resources, implemented systematic individualized fall-risk management for all residents using a fall-risk assessment tool, high-risk logo, and strategies to address identified risks"

- 103 (43%) residents in the control group and 173 (56%) residents in the intervention group fell in 12 month follow-up

J Am Geriatr Soc 2004 52:524–531

The Effect of Group Exercise on Physical Functioning and Falls in Frail Older People Living in Retirement Villages: A Randomized, Controlled Trial

Stephen R. Lord, PhD, Sally Castell, Dip RG, RT, Joanne Corcoran, BApp Sci, Grad Dip Info Mgmt, Julia Dayhew, BAppl Sci (Occupational Therapy), Beth Matters, BA (Hons), Amelia Shan, BSc, and Philippa Williams, B Appl Sci, MPH

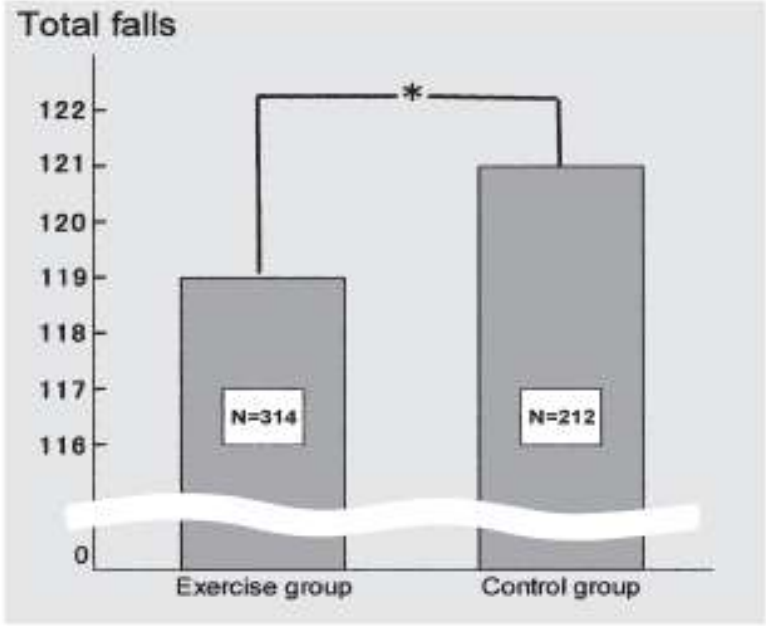
- **Weekly group exercise delivered by exercise instructors:**
  - weight-bearing balance exercises including tandem foot standing, heel–toe walking, line walking, standing on one leg, altering the base of support,
  - weight transfers (from one leg to another), rocking back and forth onto toes and heels, rotating on the spot, lateral movement challenges, reaching and stretching movements
  - muscle strengthening
  - co-ordination
- **22% reduction in falls- incident rate ratio 0.78, 95% CI 0.62–0.99**

J Am Geriatr Soc 51:1685–1692, 2003

Effects of unipedal standing balance exercise on the prevention of falls and hip fracture among clinically defined high-risk elderly individuals: a randomized controlled trial

Keizo Sakamoto[1], Toshitaka Nakamura[2], Hiroshi Hagino[3], Naoto Endo[4], Satoshi Mori[5], Yoshiteru Muto[6], Atsushi Harada[7], Tetsuo Nakano[8], Eiji Itoi[9], Mitsuo Yoshimura[10], Hiromichi Norimatsu[11], Hiroshi Yamamoto[12], and Takahiro Ochi[13]
Committee on Osteoporosis of The Japanese Orthopaedic Association

- 553 residents of special nursing homes for the aged or nursing care facilities who could stand on their own while holding onto a bar, and users of outpatient rehabilitation centers
- single stance practice 2 mins 3 times a day supervised by physiotherapist or similar professional
- A trend to a reduction in falls 0.82 (95% CI 0.64–1.04)



J Orthop Sci 2006 11:467–472

Does an Exercise and Incontinence Intervention Save Healthcare Costs in a Nursing Home Population?

John F. Schnelle, PhD,† Kanika Kapur, PhD,‡ Cathy Alessi, MD,*† Dan Osterweil, MD,† John G. Beck, MD,† Nahla R. Al-Samarrai, MA,† and Joseph G. Ouslander, MD§‖*

- Exercise: individually tailored and supervised by research staff. Walking or wheelchair ambulation, sit-to-stand, upper body resistance training (arm curls or arm raises)
- Incontinence management (toileting every 2 hours) and offering fluids every 2 hours.
- Fall rate in intervention versus control group: 0.62 (95% CI 0.38–0.98)

J Am Geriatr Soc 51:161–168, 2003.

Part C Management strategies for common falls risk factors

Chapter 6 Balance and mobility limitations

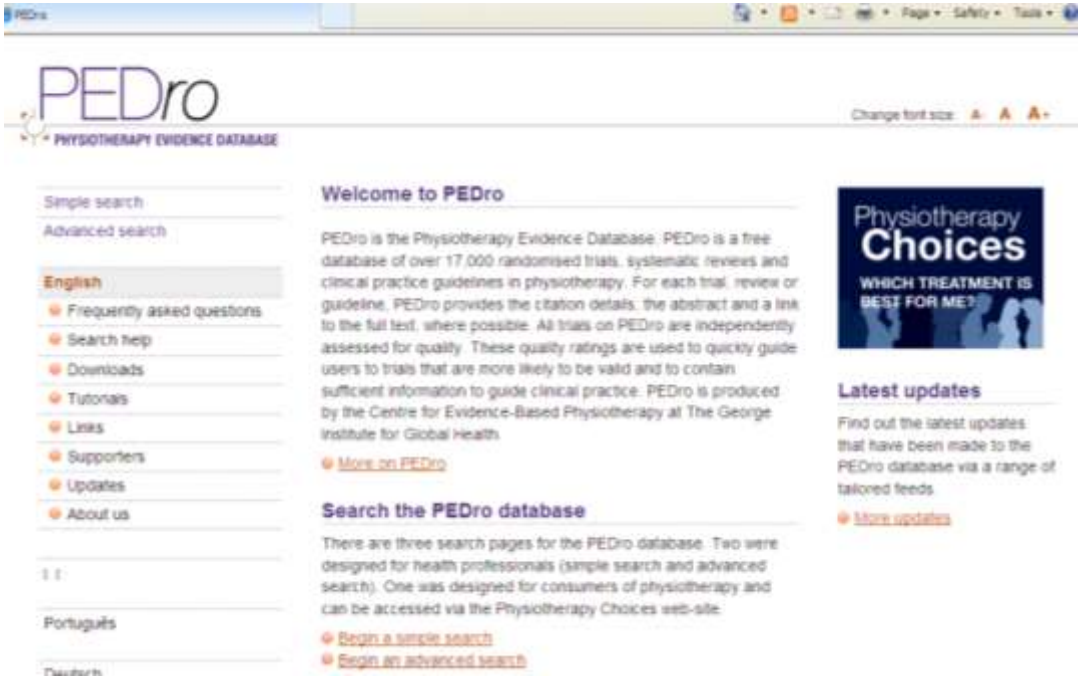
Recommendations

Intervention

- Use supervised and individualised balance and gait exercises as part of a multifactorial intervention to reduce the risk of falls and fractures in residential aged care facility residents. (Level II)[58]
- Consider using gait, balance and functional coordination exercises as single interventions. (Level II)[59,60]

Evidence about exercise: Physiotherapy Evidence Database

- www.pedro.org.au
- **Freely available since 1999**
- **17,500 records**
  - clinical practice guidelines
  - systematic reviews
  - RCTs
- **370 records on falls**



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Maher et al, *Phys Ther* 2008;88:1068-77

Conclusions: exercise for fall prevention

- **Community settings**
  - exercise prevents falls in high risk people and the general older population
  - bigger effects if balance targeted
- **Hospital**
  - multifaceted programs including exercise prevent falls in sub-acute wards
  - common sense suggests use of standard safe mobility strategies in acute wards
- **Residential care**
  - well resourced multidisciplinary intervention incl. exercise prevents falls
  - Promising examples of exercise as a single intervention

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