Physical Activity and Healthy Ageing: Improving clinical outcomes

Professor Dawn Skelton
Presentation Aims

- Benefits of physical activity irrespective of age or medical condition
- Exercise and falls prevention
- Sedentary behaviour and frailty/sarcopenia
- Consistent messages to change behaviour from the whole team!
Ageing affects all of us!

1-2% in functional ability p.a.

- Strength
- Power
- Bone density
- Flexibility
- Endurance
- Balance and co-ordination
- Mobility and transfer skills

Sedentary behaviour accelerates the loss of performance...
Isometric Quadriceps Strength

Knee extension strength (N/kg)

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<tr>
<th>Age (years)</th>
<th>Isometric Quadriceps Strength</th>
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<td>50-54</td>
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Strength to be confident of rising from low chair without using arms

Skelton et al. ADNFS (1999)

N=1318 Nationally representative

Men

Women
Frailty - a loss of physiological reserve

Frailty syndromes (and falls) present in crisis

FUNCTIONAL ABILITIES

Independent

“Minor illness” eg UTI

Dependent

Hyper-acute Frailty syndromes:
- Immobility
- Falls
- Delirium
- Fluctuating disability
- Incontinence

(Clegg, Young, Rockwood Lancet 2013)
3 Dimensions of Human Frailty

HUMAN FRAILTY

TIME

DISEASE

DISUSE

Spirduso, 1995
Physical activity benefits for adults and older adults

**BENEFITS HEALTH**
- Improves Sleep
- Maintains Healthy Weight
- Manages Stress
- Improves Quality of Life

**REDUCES YOUR CHANCE OF**
- Type II Diabetes - 40%
- Cardiovascular Disease - 35%
- Falls, Depression and Dementia - 30%
- Joint and Back Pain - 25%
- Cancers (Colon and Breast) - 20%

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**What should you do?**

For a healthy heart and mind: **Be Active**

To keep your muscles, bones and joints strong: **Sit Less**

To reduce your chance of falls: **Build Strength**

**Improve Balance**
Achieving activity guidelines

Increased benefits

Increased physical activity

Meeting the guidelines

Sedentary

Moving

Moving More Often

Moving regularly and frequently
Physical Activity benefits....

- **Psychological**
  - Reduce Anxiety, depression, fear of falling; Improve sleep

- **Physiological**
  - Maintain bone density, ability to perform everyday activities, reduce breathlessness and stiffness; reduce effects of disease and falls

- **Psychosocial**
  - Reduce Isolation, Increase self efficacy, social contacts, peer support, playing with grandchildren, using the bath

- **Even the very frail**
  - DVT, constipation, transfer skills
Exercise Benefits

• >3 hrs per week targeted exercise
  – Heart Attack - 3 x less likely
  – Osteoporosis - 2 x less likely
  – Hip fracture - 2 x less likely

• CHD and Stroke
• Osteoporosis
• Type II Diabetes
• Hypertension
• Improved sleep
• Depression and anxiety
• Obesity and overweight
• Colon and other cancers
• Reduction in accidental injuries
• Improved cognition

Acute effects of exercise

• 24-48 hr period after exercise
  – Glucose tolerance
  – Insulin sensitivity
  – Circulating growth hormone
  – Reduced cortisol
  – Cerebral circulation and function

• Less likely to be Vit D deficient
It’s never too late for exercise!

- A 12 week Strength Training programme in 90+ year old nursing home residents doubled their leg strength (Fiatarone, 1990)

- Over 75s rejuvenated 20 years of lost strength in 12 weeks of seated strength exercises (Skelton, 1995)

- High Intensity Functional Exercise for Care home residents with dementia (12 wks) improved strength, balance and ADLs (Littbrand, 2011)
“Life in your years”

- requires more than just stamina and energy, requires **strength and balance** to feel confident in all other activities you go on to do.... Its never too late!
Wide range of abilities and needs
Fear of Falling

• Fear and lack of confidence in balance predict
  – Deterioration in physical functioning
  – Decreases in physical activity, indoor and outdoor
  – Increase in fractures
  – Admission to Institutional Care

“It’s the fear that restricts me. In my mind I know that I can’t [walk outside]. The fear of falling and not having the strength to go out, that stops me from going out...”

(Female, 60yrs)

Prevention of falls

• Greatest effects of exercise on fall rates (38% reduction) from interventions including:
  – Highly challenging balance training
  – High dose (50+ hours)
  – Progressive strength training
  – No walking program

• These types of exercise also reduce fear of falling and address frailty through gaining muscle strength and size

Sherrington et al., JAGS 2008, NSWPHB 2011
Kendrick Cochrane Review FoF 2014
Preventing falls and increasing activity?

6 months of FaME in sedentary older adults recruited through GPs

FaME increased moderate to vigorous physical activity by 15 mins/day.
Up to 12 months post intervention.
By 24 months effect discontinued.

FaME reduced falls by 26% (IRR 0.74)
Up to 12 months post intervention.
By 24 months effect discontinued.

MVPA increased by 105 mins per week

Iliffe S et al. Health Technology Assessment 2014
Transitioning onto other exercise opportunities

• Many countries now have short term falls prevention exercise programmes....

• Vital
  – to meet effective dose requirements (>50 hours)

• Important
  – to encourage an active lifestyle beyond rehabilitation
  – to ensure a change in exercise habits and continue to improve social involvement
  – to ensure the opportunities continue to improve strength and balance (eg. not seated!)
Falls prevention must be more than strength and balance

• Some people compensate by being less physically active because they are doing strength and balance exercise

• We have to have the conversation – these exercises have to be in addition to moving more often...

• Sedentary behaviour leads to poor outcomes

Waterman et al. 2016;
Dogra et al. in press, 2016
Support and Encouragement

A programme is more than a series of exercises

• Examples from successful falls and exercise programmes

• A range of strategies that support participants eg.
  – Goal setting and self monitoring
  – Overcoming obstacles and difficulties
  – Educating the participant
  – Highlighting successes
  – Providing individual and group support
Sedentary Behaviour
Active bone and strength loss

• No standing activity leads to active loss of bone and muscle
  • 1 wk bed rest ↓ leg strength by ~ 20%
  • 1 wk bed rest ↓ spine BMD by ~1%
• Sedentary Behaviour linked to low BMD (independent of physical activity).
• Nursing home residents and those in hospital spend 80-90% of their waking day seated or lying down

(Krolner 1983; Tinetti 1988; Skelton 2001; Dallas Bed Rest Studies 1966-present; Chastin et al. 2011; Beyer 2002)
Sedentary behaviour health risks

In **older adults** (>60 years old), sedentary behaviour has been found to be significantly associated with:

- Higher plasma glucose
- Higher BMI and waist:hip ratio
- Higher cholesterol
- Reduced muscle strength
- Reduced bone density

Sedentary behaviour is also linked to musculoskeletal pain and can affect quality of life, social inclusion and engagement

Challenges

• Cultural norm is for older people to sit!
• They sit for 8-12 hours of their day
• We encourage them to sit – everywhere!

• If they attend rehabilitation or exercise they are then sedentary the rest of the day and next day! (fatigue, compensation)

• We need to tackle sedentary behaviour!
Activity restriction in ‘care’ environments

- Hospital admission in past 12 months single most predictive risk for functional decline
- Functional decline after hospital discharge 10% to 50%
- Optimizing physical activity of patients low priority compared to patient safety
- Some felt movement was unsafe without physiotherapy input
- No mobility action plans

Intervening on sitting time

- Two ways of thinking about ‘sitting less’
  - Reduce time spent sitting
  - Break up periods of sitting (‘sitting bouts’)

SOS Study – over 10 weeks, adding 10-15 sit to stands a day improved timed up and go (-3 sec) and 30s chair rise (+2) in sheltered housing residents

Harvey et al. In press.
Consistent Messaging – why balance training?

- If you avoid activities that make you feel ‘wobbly’ you will get more ‘wobbly’
- You can only improve balance if you do things that make you feel ‘wobbly’
  – so that your brain and body practice at keeping you upright
- Emphasise potential life-changing benefits, (eg. maintain independence, play with the grandchildren, live life to the full)
Consistent Messaging – why do we need strength?

• We need strong muscles to
  – Maintain independence
  – Play with our grandchildren
  – Care for someone
  – Fight infection
  – Protect our joints and bones
  – Protect our brains and memory
  – Stay warm

• Pain is NEVER good but muscle discomfort after exercise is ☹

• Need to continue..... Use it or lose it!
Scaling up to reduce frailty and falls?

- Work effectively with those in transition - Frailty and falls
  - Safe and effective exercise for those in transition and those who are frail
  - Qualified trainers who understand tailoring/adaptation for multiple conditions, progression and challenge needed, trained to support motivation to adhere and transition on
- Change cultural ‘norms’! – sit less, move more
- Involve older people in engaging other older people
We need it to be **socially and culturally normal** for older people to move more often.

We all need to **believe that older people benefit** from moving more often.

**Older people (& family/gatekeepers) need to believe** they will benefit from moving more often.

We need to stop **wrapping older people up in cotton wool**.

We need to involve older people who have benefitted from rehabilitation to **help us empower other older people**.
Questions?

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http://www.gcu.ac.uk/seniorsusp/  http://profound.eu.com/