Fall Prevention & Osteoporosis

Dr Dawn Skelton PhD

School of Nursing, Midwifery and Social Work, University of Manchester

Scientific Co-ordinator of Prevention of Falls Network Europe

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
I will cover

- Incidence, consequences & costs of Falls & Osteoporosis
- Current Research
- Policy
- Physical Activity Recommendations for Falls prevention & Osteoporosis

Plus where to find out more!

This presentation will be available on the LLT website (Publications)

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
AGEING AFFECTS ALL OF US

1-2% decrease 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...

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
The same difference in muscle size is seen between a 30 and an 80 yr old

(Adapted from Sipilä & Suominen Muscle Nerve 1993;16:294)
Falls & Fractures in the UK

- 11 million people aged > 65 yrs
- 28,000 women aged > 90 yrs

Fractures costs £1.6 billion pa

- 1 Hip Fracture every 10 mins
  - Cost £12-15 k
- 1 Wrist Fracture every 9 mins
  - Cost £480
- 1 Spine Fracture every 3 mins

- 500 admitted to Hospital every day
- 33 never go home

Annual European Home and Leisure Accident Surveillance Survey (EHLASS) Report UK 2000

*D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006*
Not all falls lead to fractures.....or injuries
Consequences of Falls

- Post fall syndrome & fear
- Injuries include:
  - Cuts and lacerations,
  - Deep bruises,
  - Soft Tissue Injuries,
  - Dislocations,
  - Sprains
  - Increase in joint pain
- 20% of falls result in fractures requiring hospital treatment.

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Fear and avoiding activity

- Present in >50% of fallers & up to 40% non-fallers

- Predicts
  - decreases in physical and social activity
  - deterioration in physical functioning
  - higher risk of falling

- Improves with exercise, as does balance confidence and self efficacy
We need to prevent falls

- In > 75s, falls are the leading cause of death resulting from injury
- 75-80% of falls are not reported
- 10% of all call-outs for UK Ambulance Service are for people aged 65+ who have ‘fallen’ but nearly half are not taken to Hospital.

WHO Health Evidence Network – Preventing Falls Briefing 2004
D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Long-term Institutionalisation

Fall related accidents are predisposing factors in 40% of events leading to long-term institutional care in older people.

[Kennedy et al Dan Med Bull 1987]

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Residential Settings

- 75% fall annually (1.5 falls per bed per year)
- 35% of falls result in serious injury
- up to 8% of falls result in fractures
- Hip fracture incidence higher

SCARE Briefing - http://www.elsc.org.uk/briefings/briefing01/

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Long lies with or without injury

Long lies (> 1-2 hours) lead to an increased risk of:

- dehydration
- hypothermia
- pneumonia
- pressure sores
- kidney failure
- depression
- post fall syndrome
- death

*(Tinetti 1993, 1994)*

*D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006*
Osteoporosis

- Affects 1 in 3 women and 1 in 12 men over 50.
- Osteoporotic fracture every 3 minutes.
- High level of associated morbidity and mortality.
- Osteoporosis increasing by 10% per year.

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006

Gwen Fitzpatrick lost sixteen inches in height due to vertebral fractures; during 30 years of fractures no treatment was provided to prevent further bone loss.
In people who have a hip fracture:

2 out of 10 regain previous mobility

5 out of 10 die or become dependent within a year

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Burden on health care resources

Mean LOS all ages 7.9 days
Mean LOS # femur 25.7 days
Mean LOS falls 9.67 days

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Comparative annual mortality rates for various diseases affecting women.

- Hip fracture
- Breast cancer
- Congestive heart failure
- Ovarian cancer
- Uterine cancer

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
IMPACT - Costs to the NHS

- Hospital spending > £10 billion.
- Local authority, residential care > £3 billion
  - Non-residential care > £2 billion.
  - Half of L.A. social services spent on services for older people
- Formal and informal ‘care’
- Emergency call-outs

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Can exercise prevent fractures?

- Lifetime risk of hip fracture
  - Men 3 in 100
  - Women 15 in 100

- Fractures more common in sedentary people

- It is possible to increase BMD in older people (Welsh 1996; Kohrt 1995; Verschueren 2004)

- It is possible to increase BMD in fallers (Skelton 2005; Liu Ambrose 2004)

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Exercise can increase BMD and alter bone properties.

Exercise can increase muscle strength (padding) and improve reaction times.

Exercise can reduce falls.

---

National Institute for Health, USA 1999

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
National Service Framework For Older People 2001 - Exercise Evidence

Standards

- 3 Intermediate Care
- 5 Stroke
- 6 Falls
- 7 Mental Health
- 8 Promotion of Health and active life in old age

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Current Research on Falls

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Prevention of Falls Network Europe (ProFaNE)

www.profane.eu.org

Network Associates
Discussion Board
Resources
Information
Weekly e-newsletter

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
We are all “trippers”...... When do we become “fallers”? 

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Sensory Input → Stability

Three main sources of input

- Visual information
- Vestibular information
- Proprioceptive information

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Lessons that last a lifetime

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
<table>
<thead>
<tr>
<th>Falls Risk Not modifiable with tailored exercise</th>
<th>Falls Risk modifiable with tailored exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>age</td>
<td>low strength</td>
</tr>
<tr>
<td>social class</td>
<td>low power</td>
</tr>
<tr>
<td>gender</td>
<td>poor mobility</td>
</tr>
<tr>
<td>multiple medications</td>
<td>poor balance</td>
</tr>
<tr>
<td>chronic medical conditions</td>
<td>arthritis</td>
</tr>
<tr>
<td>vision problems</td>
<td>depression</td>
</tr>
<tr>
<td>poor heating and poor housing</td>
<td>fear of falling</td>
</tr>
<tr>
<td>malnutrition</td>
<td>postural hypotension</td>
</tr>
<tr>
<td>poor footwear</td>
<td>urinary urgency</td>
</tr>
</tbody>
</table>

exercise may not have a major effect

exercise is likely to have a major positive effect

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Exercise to Prevent Falls

Exercise **could** help fallers or prevent falls and fractures

- Reducing Falls (or injurious falls)
- Reducing known Risk Factors for Falls
- Reducing Fractures (or changing the site of fracture)

- Increasing Quality of Life & Social Activities
- Reducing Fear
- Reducing Long Lies
- Reducing Institutionalisation

*D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006*
<table>
<thead>
<tr>
<th>Study</th>
<th>Type of Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Province, 1995</td>
<td>Group and individual balance and strength training &gt;65’s</td>
</tr>
<tr>
<td>Wolf, 1996</td>
<td>Group Tai Chi &gt;65’s (NOT &gt;70’s at risk, Wolf 2003)</td>
</tr>
<tr>
<td>Campbell, 1997</td>
<td>Home-based exercise &gt;80’s</td>
</tr>
<tr>
<td>Robertson, 2001</td>
<td>Home-based exercise &gt;65’s and &gt;80’s</td>
</tr>
<tr>
<td>Day, 2002</td>
<td>Group exercise &gt;70’s at risk</td>
</tr>
<tr>
<td>Barnett, 2003</td>
<td>Group exercise &gt;65’s at risk</td>
</tr>
<tr>
<td>Lord, 2003</td>
<td>Group exercise &gt;60’s retirement village</td>
</tr>
<tr>
<td>Skelton, 2004, 2005</td>
<td>Group Exercise &gt;65’s frequent fallers</td>
</tr>
</tbody>
</table>
FaME Group Exercise
Managing frequent fallers

- Women aged 65+ with a history of 3 or more falls in previous year
- **9 months community based intervention**
- Group exercise – individually tailored, trained exercise instructors (PSIs), one class a week (1hr) & 2 x 20 minute home sessions
- Falls risk decreased by **half** – RR 0.46
- Significant improvements in strength, power, functional ability, balance and reaction times

*Skelton et al. Age and Ageing, 2005: 34: 636-639*

*D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006*
FaME - Other Outcomes

- Improvements in quality of life, flexibility, confidence, use of public transport
- Self-reported improvements in
  - Caring skills
  - Playing with grandchildren
  - Bathing instead of showering
  - Using public transport again
  - Reduced anxiety and fear
  - Confidence

- Fallen Angels Club
  - Meet every two months in Starbucks, Oxford Street, London!
Significant difference with time and group for L2-L4 spine and Wards Triangle (F=3.46, p<0.05). Exercisers n=32, Controls n=14.

Time between visit 1 and visit 2 = mean 10.9 (sd 2.7) months

Skelton, Dinan et al. Age & Ageing 2005

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
FaME Group based Exercise

- Falls risk decreased by half – RR 0.46

- Significantly less people in exercise group had died, entered a nursing home or were in hospital after 3 years
  - 10% in exercise group had died, were in Hospital or in a nursing home compared to 33% of those not exercising

Skelton et al. Age and Ageing, 2005: 34: 636-639

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Whole Body Vibration

- 42 residents, Nursing Home, RCT
- Whole Body Vibration (PBV) & Physical Therapy (PT) vs PT only
- 2 x p/w, 6 wks training
- WBV improved
  - gait (Tinetti 2.4 pts)
  - Balance (Tinetti 3.5 pts)
  - Timed Up and Go (11 secs)
  - Quality of Life (SF36 8/9 domains)


_D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006_
Not “ALL” Exercise works to Prevent Falls

| Effective                           | Ineffective to prevent falls but effective on falls risk factors
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnett 2003</td>
<td>Bunout 2005</td>
</tr>
<tr>
<td>Lord 2003</td>
<td>Campbell 1999, 2005</td>
</tr>
<tr>
<td>Morgan 2004</td>
<td>Carter 2002</td>
</tr>
<tr>
<td>Skelton 2005</td>
<td>Ebrahim 1997</td>
</tr>
<tr>
<td>Buchner 1997</td>
<td>Latham 2003</td>
</tr>
<tr>
<td>Campbell 1997</td>
<td>Lord 1995</td>
</tr>
<tr>
<td>Campbell 1999</td>
<td>McMurdo 1997</td>
</tr>
<tr>
<td>Cornillon 2002</td>
<td>Mulrow 1994</td>
</tr>
<tr>
<td>Day 2002</td>
<td>Pereria 1998</td>
</tr>
<tr>
<td>Robertson 2001</td>
<td>Reinsch1992</td>
</tr>
<tr>
<td>Wolf 1996</td>
<td>Schnelle 2003</td>
</tr>
<tr>
<td></td>
<td>Steinberg 2000</td>
</tr>
<tr>
<td></td>
<td>Wolf 2003</td>
</tr>
</tbody>
</table>

Whitney et al. 2006

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
### Insufficient tailoring / specificity

<table>
<thead>
<tr>
<th>Author</th>
<th>Type of Exercise</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ebrahim, 1997</td>
<td>Walking outdoors</td>
<td>Risk of falling higher</td>
</tr>
<tr>
<td>Lord, 1995</td>
<td>General class (1 year)</td>
<td>↑ strength</td>
</tr>
<tr>
<td>Reinsch, 1992</td>
<td>General class (1 year)</td>
<td>No change in fall risk</td>
</tr>
<tr>
<td>Pereira, 1998</td>
<td>Walking outdoors (10 years)</td>
<td>Better health</td>
</tr>
<tr>
<td>Millar, 1999</td>
<td>General class?</td>
<td>Improved postural hypotension</td>
</tr>
<tr>
<td>Kerschan, 1998</td>
<td>Unprogressive home-based exercise (1 year)</td>
<td>No change in fall risk</td>
</tr>
<tr>
<td>Wolf, 2004</td>
<td>Tai Chi (1 year) &gt;65 yr old fallers</td>
<td>No change in fall risk</td>
</tr>
</tbody>
</table>

*D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006*
Nursing Home Residents

Individually tailored GROUP exercise as part of a multifactorial intervention (staff training, environment modification, drug review)


Reduces falls risk factors - *Dyer et al. Age Ageing 2004*
Falls Prevention Approaches

- Individual Approach (high risk patients)
  - Multi-factorial (through A & E, Falls Clinic)
  - Uni-factorial
    - Exercise (in all settings)
    - Vision (cataract removal)
    - Occupational Therapy Home Visits (?)
    - Calcium and Vitamin D (Nursing Homes)
    - Hip protectors (Nursing Homes)

- Population based approach (targeting communities)

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Current Research on Osteoporosis

1 Year Walking Programme did NOT improve bone density at the spine

Spine BMD (% Change)

Cavanaugh & Cann, 1988

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Time Bomb?

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
## Specificity to manage OP 1

### OSTEOPOROSIS MANAGEMENT – PRE AND POST MENOP. WOMEN

<table>
<thead>
<tr>
<th>Study</th>
<th>Duration</th>
<th>Intervention</th>
<th>Change in BMD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bassey et al. 1994</td>
<td>6 mths; daily; Pre Menop. women. High impact jumping supervised once a week, daily at home</td>
<td>▲ 3.4% hip BMD</td>
<td></td>
</tr>
<tr>
<td>Pruitt et al. 1992</td>
<td>1 yr; 3 p/w; Post Menop. women. Weight training machines incl. Back extension and flexion</td>
<td>▲ 1.6% spine BMD</td>
<td></td>
</tr>
<tr>
<td>Nelson et al. 1994</td>
<td>1 yr; 3 p/w; Post Menop. women. Weight training</td>
<td>▲ 1% spine BMD and hip BMD</td>
<td></td>
</tr>
<tr>
<td>Kohrt et al. 1995</td>
<td>1 yr; 3 p/w; Post Menop. women. Impact loading; vigorous walking; jogging; stair-climbing; Stair-climbing / descending; Weight training; free weights; machines; standing</td>
<td>▲ 2.3% spine and 3.3% hip BMD</td>
<td></td>
</tr>
<tr>
<td>Welsh et al. 1996</td>
<td>1 yr; 3 p/w; Post Menop. women. Seniors fitness medium to low impact jumps; step; floor strength and wrist loading; free weights</td>
<td>▲ 1.6% hip BMD; ◄◄ spine BMD</td>
<td></td>
</tr>
</tbody>
</table>
### Specificity to manage OP 2

**OSTEOPOROSIS MANAGEMENT - POST MENOPAUSAL WOMEN**

<table>
<thead>
<tr>
<th>Study</th>
<th>Duration</th>
<th>Intervention</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinaki et al. 1984</td>
<td>1-6 years</td>
<td>Spinal OP and loss of height. Back extension and flexion (in prone and sitting); combined</td>
<td>Extension; ▲ 16% further spinal wedging (fsw) Flexion ▲ 89% fsw Combined ▲ 53% fsw No exercise ▲ 67% fsw</td>
</tr>
<tr>
<td>Ayalon et al. 1987</td>
<td>5 mths 3 p/w</td>
<td>Lumbar spine changes. Limb loading; torsion; tension; hanging; pulling; pushing</td>
<td>▲ 3.8% distal forearm BMD</td>
</tr>
<tr>
<td>Simpkin et al. 1987</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Risky exercises for patients with OP

<table>
<thead>
<tr>
<th>Type of Exercise</th>
<th>Reoccurrence of Fracture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back extension</td>
<td>16%</td>
</tr>
<tr>
<td>Flexion (abd. curls)</td>
<td>89%</td>
</tr>
<tr>
<td>Combined</td>
<td>53%</td>
</tr>
<tr>
<td>No exercise</td>
<td>67%</td>
</tr>
</tbody>
</table>

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006

Sinaki & Mickelson 1982
Brisk Walking may be risky for fallers...

- Women, upper arm fracture
- Intervention: Brisk walking
- Control: exercise of upper arm

- Falls risk (Brisk walking > control) !!
- Fracture risk (Brisk walking > control) !!

Ebrahim et al. (1997)
Whole body Vibration

- RCT, 70 post menopausal women (58-74 yrs)
- Whole Body Vibration vs Resistance Training vs Control
- 35-40Hz
- 3 x p/w, 24 weeks, <20 mins
- WBV – strength 15%, Hip BMD 1%
- Resistance – strength increased but not BMD
- No vibration related side effects


D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Policy on Falls

- NSFOP
- NICE 21: Falls guidelines
- All Party Parliamentary Osteoporosis Group (APPOG): Falling Short
- World Health Organisation Health Evidence Network Document: Falls risks and prevention
- National Service Framework for Older People: Department of Health – Local Initiative Mapping
- RCP Audit of Falls & Osteoporosis Services

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
The NHS, working in partnership with councils, takes action to prevent falls and reduce resultant fractures or other injuries in their populations of older people.

Older people who have fallen receive effective treatment and rehabilitation and, with their carers, receive advice on prevention through a specialised falls service.

(1) Prevention. (2) Diagnosis & management. (3) Rehabilitation and longer term care.

Key Milestone April 2005

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
The evidence for factors which increase the risk of falling

The most effective methods of assessment and identification of older people at risk of falling

The most clinically and cost effective interventions and preventative strategies for the prevention of falls

Older peoples’ views and experiences of falls prevention strategies and programmes.

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
NICE Falls CG: specialist integrated service model

MULTIFACTORIAL FALLS RISK ASSESSMENT
Offer multifactorial falls assessment. This may include:
- falls history
- gait, balance, mobility, muscle weakness
- osteoporosis risk
- perceived functional ability
- fear of falling
- visual impairment
- cognitive impairment
- neurological examination
- continence
- home hazard
- cardiovascular examination
- medication review.

*Refer as necessary

MULTIFACTORIAL INTERVENTIONS
Offer individualised multifactorial intervention to older people at risk including:
- strength and balance training
- home hazard assessment and intervention
- vision assessment and referral
- medication review/withdrawal
After medical treatment for an injurious fall, patients should be offered multidisciplinary assessment and intervention.

STRENGTH AND BALANCE TRAINING
HOME HAZARD INTERVENTION AND FOLLOW-UP
MEDICATION REVIEW/WITHDRAWAL
CARDIAC PACING

The specialist services for falls and for osteoporosis should be operationally linked or dovetailed.

NICE, 2004

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Policy on Osteoporosis

- NICE Secondary Prevention of Osteoporosis, 2005
- APPOG All Party Parliamentary Osteoporosis Group: Falling Short, 2004
- SIGN Osteoporosis Guidelines, 2003
- NSF for Older People, 2001
- Physiotherapy Guidelines for the Management of Osteoporosis (CSP/NOS), 1999

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
PA Recommendations for Falls Prevention

- Type
  - Balance and/or mobility ******
  - Resistance exercise ***
    - Lower limb
    - Most effective in weakest
  - Aerobic / Endurance **
  - Flexibility **
  - Functional Task Training **

- Mix
  - Endurance or resistance training alone does not work

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Tai Chi to prevent future falls

- Tai Chi should be considered as an effective preventative strategy at reducing the risk of having a fall in the first place.
- If a person is already a faller or very frail, Tai Chi may not be the most effective form of exercise.
- If a person is already a faller or very frail, Tai Chi moves will have to be adapted and it may be more effective to pursue other balance training techniques.

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Exercise to prevent falls

To date, effective exercise programs comprise:

- a combination of challenging and progressive balance exercises performed in weight-bearing positions that minimise the use of the upper limbs for support.
- resistance and endurance training combined with the balance exercises.

To date, effective exercise programs have been:

- individualised in intensity
- progressed over time
- targeted to an appropriate population
- conducted by trained personnel
- of a sufficient duration (greater than 15 weeks, preferably 6 months or more)

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Not all physical activity is necessarily safe for fallers!...
Provision of Effective Group Exercise

- Good practice in Hospital Settings
- Community Provision lacking for frailer older patients

Physiotherapist

Postural Stability Instructor

Seniors Exercise Instructor

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
A Continuum of Exercise Provision

REFERRAL

REHABILITATION EDUCATION & EXERCISE GROUP

PREVENTATIVE EXERCISE GROUP

OTAGO HOME EXERCISE

CHAIR BASED EXERCISE GROUP

SENIORS EXERCISE

Dinan & Skelton DOH Falls Prevention Training Manual 2001

Dinan, Tipping the Balance toward active ageing, Loughborough Sept 2006
PA Recommendations for Osteoporosis & Prevention

- **MODE**
  - Weight bearing activities
- **INTENSITY**
  - Moderate to high, in terms of bone loading forces
- **FREQUENCY**
  - Weight bearing endurance activities 3-5 x p/w
  - Resistance Exercise 2-3 x p/w
- **DURATION**
  - 30-60 mins of a combination of weight bearing endurance and resistance exercise targeting all muscle groups

*ACSM Position Stand 2004
Physical Activity and Bone Health*

*D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006*
# Bone health exercise training principles

**Strategy** =

- X3 p/w short periods of site specific, high strain rate in unusual relationships
- X3 p/w specific balance exercises and functional strength and floor activities
- X5 p/w health-related moderate intensity, 30 minutes C-V *and* daily flexibility

<table>
<thead>
<tr>
<th><strong>Weight resisted</strong></th>
<th>weight training/impact/loading</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Site specific</strong></td>
<td>wrist, hip, spine</td>
</tr>
<tr>
<td><strong>Peak Strain</strong></td>
<td>hold the movement</td>
</tr>
<tr>
<td><strong>Fast Strain</strong></td>
<td>effective</td>
</tr>
<tr>
<td><strong>Varied/diverse strain</strong></td>
<td>tennis, fitness class</td>
</tr>
</tbody>
</table>

*D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006*
Integrated Service Provision: Falls and Osteoporosis

Meeting Needs: Evidence Based Training & Provision

**Bone, Falls, Fracture**

Strategy = short periods of site specific, high strain rate, in unusual relationships + balance training - 9 mths (3 p/w)

- Strength & power
- Bone loading
  - Impact (pre-menop)
  - Strain (site, peak, error rich)
- Balance
- Accident Prevention Education

**Health & Function**

Strategy = almost daily, moderate intensity endurance and stretching training

- Endurance (30 mins x 5p/w)
- Flexibility (daily)
- Functional activities (x3 p/w)
- Self monitoring
- Health Education

*D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006*
### Effective Duration of Activity

<table>
<thead>
<tr>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength, Power, Static balance, Gait</td>
<td>8-12 wks</td>
</tr>
<tr>
<td>Dynamic balance, Endurance</td>
<td>12-24 wks</td>
</tr>
<tr>
<td>Transfer skills</td>
<td>24+ wks</td>
</tr>
<tr>
<td>Bone strength (hip, spine and wrist)</td>
<td>36+ wks</td>
</tr>
<tr>
<td>Mood, Depression, anxiety, self-esteem</td>
<td>12+ wks</td>
</tr>
<tr>
<td>Dizziness and Postural Hypotension</td>
<td>24+ wks</td>
</tr>
<tr>
<td>Falls</td>
<td>36+ wks</td>
</tr>
</tbody>
</table>

*D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006*
Trained Provision for Exercise in the UK

Physiotherapist

Postural Stability Instructor

Chair Based Exercise Leader

Seniors Exercise Instructor

Physical Activity Leader

Senior Peer Activity Motivator

Self Led Activity / Exercise

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Falls Exercise Service Evidence – 6 Wk Rehab + 6 months PSI classes

- Average age 82 years (n=124)
- Average attendance 79%
- Improved functional reach & Timed up & go
- Improved quality of life
- Improved confidence
- Improved timed floor rise

*Simey, Skelton, Dinan, Land & Irwin (BMJ letter, 2001)*

“I can walk upstairs now. I haven’t been able to walk upstairs for four years. I do my exercises every day at home. I know it’s doing me good”

*D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006*
But Beware

- Throwing money into non-evidence based interventions
- Watering down evidence based interventions
- Having pockets of expertise not linked to each other
- Short-term thinking

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Where to find out more?

- Exercise Qualifications for people working with those at risk of falls or with Osteoporosis
  - Register for Exercise Professionals
    - www.exerciseregister.org/
  - Later Life Training
    - www.laterlifetraining.co.uk
  - Agile CSP Special Interest Group
    - www.agile-uk.org

- ProFaNE (Prevention of Falls Network Europe)
  - www.profane.eu.org

- National Osteoporosis Society
  - www.nos.org.uk

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Free Falls and Fracture Risk Calculator

- Calculates patients falls and fracture risk
  - 5yr risk of hip fracture based on Dr D Black
  - Falls risk based on Cryer and Feder score
    - (5 questions)
- Make recommendations on
  - Treatment
  - Referral to specialist services
- E:\Falls and Fragility Fracture Toolkit.htm
  - Free calculator email: claire.wyatt@riomed.com
  - Call Claire on 02380 277044

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
CD/DVD BASED TOOLS

- Off His Legs – Kiss of Life Multimedia
- Falls and Bone Health - - " " –

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
EXERCISE VIDEO TOOLS

- Be Strong, Be Steady – Help The Aged

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
EXERCISE VIDEO TOOLS

- Step To The Future – Help The Aged

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
EXERCISE BOOKLETS

- OTAGO/Dunedin home exercise programme – BGS Falls & Bone Health (FREE)

- Strength and balance exercises for healthy ageing – Help The Aged (FREE)

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006
Resources About Falls

Working with older people to prevent falls
This is a dedicated section for further information on falls and healthy ageing, including Help the Aged resources, information leaflets and useful links:

Help the Aged research and reports

Help the Aged exercise materials

Other exercise materials

Information leaflets

Fact sheets

Research and statistics

Guidance

Posters

Presentations

Links to external documents

Help the Aged research and reports

National Falls Awareness Day 2005 Evaluation Report
Following the success of July's campaign this report includes an overview of the objectives of the day, what happened, successes, lessons learnt and what next.

Download a full report (pdf) or a two-page summary (pdf) of the day.

Keeping falls prevention on the agenda
The Help the Aged Preventing Falls team recently consulted with leading falls practitioners and others following the end of the NSF milestones in April. A number of priorities were highlighted which will give direction for the future work of the Preventing Falls programme.

A document showing the results of consultation is available here (pdf)

Minority Ethnic Elders Falls Prevention Year One Progress Report
Why do I need to improve my balance?

We hear a lot about how to keep our heart and lungs healthy, but not so much about how to keep our balance system healthy. Your balance system includes all the senses in your body that tell you how you are moving, the brain which puts this information together, and the muscles that control your movements. This complex system needs plenty of regular ‘practice’. As children we develop good balance by practising balancing activities - walking along walls, jumping, spinning and climbing.

As adults we tend not to give our balance system the practice it needs. Health problems can also weaken the balance system. The result is that our balance becomes less good.

But you don’t have to do handstands to keep your balance system healthy! These pages will explain some easy ways to improve balance by carrying out ‘balance training’.

What is balance training?

There are many different ways to carry out the physical activities that keep your balance system healthy. You just need to practice moving around freely in all directions, and increase the strength in your legs and body.

You can do as much or as little as you want. Just a few minutes once or twice a day can make a big difference, but you may find you want to do more!

Who can benefit from balance training?
“Man does not cease to play because he grows old. Man grows old because he ceases to play”

George Bernard Shaw

D Skelton, Tipping the Balance toward active ageing, Loughborough Sept 2006