Balance, Agility and Fall Prevention
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What is Balance??

Nothing unto itself

Multiple systems working together

Description of the effects of those systems working properly together
Balance, Agility and Fall Prevention

Types:

Static Balance: even distribution of weight enabling someone to remain upright and steady.
Dynamic Balance: ability to maintain postural stability through movement
Balance, Agility and Fall Prevention

Primary systems that make up Balance

- **Balance**: Primary system that makes use of sensory information from the inner ear (Vestibular) and the somatosensory system. Vision also contributes to balance, providing information about the surroundings and our position and speed relative to it.

- **Agility**: Involves the ability to move quickly and efficiently, potentially facilitated by the primary systems mentioned above.

- **Fall Prevention**: Critical for maintaining balance and reducing the risk of falls, which can be supported by exercises that enhance stability and coordination.
Balance, Agility and Fall Prevention

Importance of Maintaining, Developing Balance and Fall Prevention

Over 800,000 adults over 65 are hospitalized for falls annually adjusted for inflation direct medical cost of $31 Billion a year.

Falling once doubles your chances of falling again.

75% of all deaths due to falls occur in 13% of US population. (65+)
What About Agility?

Ability to move and/or change direction quickly or easily

Reaction time, power, ROM, sedentary (lack of exposure)

Needed to recover from potential falls and move quickly when necessary.
Falling isn’t an inevitable fact of aging

Associated with breakdowns in the big 3 systems

Environmental conditions

Postural changes

Muscle Weakness especially lower body.

In fact Single Most Potent Risk Factor for falls. 4 x increase!
SYSTEM ONE: VISION

Our Vision does change with age.

Increases risk of falls by 2.5 times.

Include cataracts, glaucoma, and macular degeneration.

Important to get exam annually, adjust prescription as needed.
Balance, Agility and Fall Prevention

System Two: Vestibular

After 40 Vestibular neurons decrease in number and size

Increases risk of impairment and dizziness

Difficult to study age-related changes in isolation due to its integration with other sensory systems
System Three: Somatosensory

Skin sensitivity reduced with age

Leads to impaired input from pressure, touch, and vibration receptors.

Difficult to stand or detect changes in heel to toe shifts in body weight.
Non Exercise Solutions

**Medications**- dizziness, fainting, confusion, etc...

**Clutter**

**Lose rugs**- pick feet up don’t shuffle

**Poor Lighting**

**Rushing and not being mindful of surroundings**

**Footwear**- causes foot pain, bad support

**Vision and Hearing checkups once per year**
Balance, Agility and Fall Prevention

The Secret Key to Preventing Falls? COG over BOS
# Balance and Agility Assessment

Functional Fitness Standards for Older Adults

<table>
<thead>
<tr>
<th>Test</th>
<th>AGE GROUPS</th>
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<tr>
<td></td>
<td>60-64</td>
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<tr>
<td>Chair stand (# in 30 sec)</td>
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<tr>
<td>Women</td>
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</tr>
<tr>
<td>Men</td>
<td>17</td>
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<tr>
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<tr>
<td>Men</td>
<td>680</td>
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<tr>
<td>2-minute step (# of steps)</td>
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<tr>
<td>Women</td>
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</tr>
<tr>
<td>Men</td>
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</table>

The functional fitness standards for each age group are the fitness scores needed to maintain functional mobility and physical fitness until late in life despite normal age-related declines, as described in previously published research (Rikli & Jones, 2012).
Balance, Agility and Fall Prevention

How Does Exercise Help with Fall Prevention? [8-10] Improves strength, balance and gait impairment in healthy and impaired adults [11-12].

Practice functional activities that give greater confidence. Exposure to harder tasks so daily life feels easier.

Repetition and GPO builds competence and removes fear.
Balance and Agility Guidelines

ACSM Exercise Rx:

1. Progressively difficult postures that gradually reduce base.
2. Dynamic movements that challenge the center of gravity.
3. Stress the muscles responsible for postural support.

Ball toss and catch, gentle shoves, sports and dancing.

Two Legged - Semi Tandem - Tandem - Single Leg
Tandem walking (model walk), circular turns.

Feet Together  Semi Tandem  Full Tandem
Balance and Agility Improvement

Don’t just do balance exercises alone

Dept. Health and Human Services: 90min week of balance AND moderate muscle strengthening.
Best exercises variety of tasks with varying sensory and cognitive challenges.

Balance is multifaceted
Balance, Agility and Fall Prevention [1]
Study of estrogen-depleted postmenopausal women
Impact of resistance training on Balance
Two days per week of Dynamic Resistance Training for 12 months
Improvement in Strength, Muscle Mass, Bone Mass and Dynamic Balance
Balance and Agility Improvement

Examples

More simple:
- Calf raises, single leg balancing, weight shift, tandem stance

More complex:
- Balance with eyes closed, head movement, unstable surface, eyes tracking
- Walking change speeds and direction, crossover, step outs
- Ball toss and catch, gentle shoves, sports and dancing
- Walk and toss and catch ball, turn head
Falls are leading cause of injury. But not all falls result in hip fracture.

Falls to the side with impact to hips higher incident of fracture

Nine months of training with squats, lunges, rising from chair & jumping. Encouraged development hip abductors and leg extensors related to lateral stability. Improved lateral postural stability along with strength, power & mass.

[2]
**Importance of Lateral Stability**

Abductors both Abduct and Stabilize, train both
Crossed leg sitting tightens adductors and weakens abductors, BALANCE
Can also overwork QL muscle

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Importance of Lateral Stability

Ways to strengthen

Isometric

Side abduction, Clam Shell, Band walk
How to get up off the floor

All about angles.

Log roll to side.

Get on all fours.

Move to solid object if nearby.

Lift up your strongest leg in front with a 90-degree bend in the knee.

If you can tuck the toe of the other leg under and grip the ground, with one hand on front leg push through front heel and back toe propelling yourself forward and up.
REFERENCES


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