How to Fall Safely

Texas Woman’s University
DPT Class of 2011
Objectives

- Understand the significance of falls
- List outcomes from falling
- Recognize role fear plays in falling
- Identify risks for falling
- Describe the anatomy of balance systems
- Safe Falling Techniques
- Summarize evidence
Falls in Elderly Population

- Leading cause of mortality & morbidity in elderly\(^1\)
- >1/3 of adults 65+ fall each year in the U.S.\(^2\)
- Most common cause of nonfatal injuries & hospital admissions for trauma\(^2\)
- In 2005:
  - 15,800 people 65+ died from injuries related to falls
  - ~1.8 million people 65+ were treated in EDs for nonfatal injuries from falls\(^2\)
- Rates of fall-related deaths have risen significantly over past decade\(^2\)
Risk For Falls in Older Adults

**Women**
- 67% more likely to have a non-fatal fall
- 2x more likely to have a fracture with a fall
- 72% of persons admitted for hip fractures in 2003
- White > AA

**Men**
- 49% more likely to have a fatal fall
- 75+ years:
  - white men > white women > AA men > AA women > Hispanics

1. Some numbers may need to be updated to reflect more recent data.
Outcomes of Falls

- Most common cause of TBIs
- In 2000, TBI accounted for 46% of fatal falls among older adults
- Cause of most fractures among older adults
  - Spine, hip, forearm, leg, ankle, pelvis, arm, & hand
- In 2000, direct medical cost:
  - $179 million for fatal falls
  - $19 billion for nonfatal fall injuries
- Many develop a fear of falling
Fear of Falling

- A pervasive & debilitating condition
- Can lead to self-imposed activity restriction & physical deterioration
- Results in a loss of independence
- Prevalence of fear of falling among the elderly
- Higher fall rates among those who fear falling...\(^2\)
Anatomy of Balance Systems

- Visual System
- Somatosensory System
- Vestibular System
Sensory Influences on Balance

- **Visual System**
  - Orientation to horizontal & vertical
    - Walls
    - Floors
    - Ceilings
  - Convergence & Divergence
    - Ability of eyes to work together
    - Test: move thumb toward & away from face
  - Does not distinguish between self movement and external movement

\(^3\)
Sensory Influences on Balance

- **Somatosensory System**
  - Proprioception
    - Relationship of body segments & support surface
  - Slow perturbations of balance
  - Tests
    - Joint position sense
    - Inaccurate information provided when standing on compliant or uneven surface\(^3\)
Sensory Influences on Balance

- Vestibular System
  - Position of head relative to gravity
  - Direction and speed of head movement
    - Semicircular Canals
      - Perpendicular relationships
      - Coplanar
      - Push–pull relationship system
      - “Yes” & “No”
    - Otoliths
      - Linear Motion: acceleration & deceleration
      - Antigravity System: tilt, side–bend
      - Utricle: horizontal plane
      - Saccule: vertical plane
VESTIBULAR SYSTEM

Head motion: Angular Acceleration

Head motion: Linear Acceleration

Head position: Gravity

Semicircular Canals

Central Nervous System

Visual, Proprioceptive, Tactile inputs

Forebrain: Perceived orientation

Spinal cord & Cerebellum: Postural control

Oculomotor system: Eye movements
Higher fall rates among those who fear falling.²

Not all falls can be prevented.

So… Let’s learn how to fall safely and eliminate those fears!
Falling Forward

Do:
- Keep your head up.
- Quickly slap ground with palms.
- Breathe out.
- Fold your body
  - Like an accordion!

Do Not:
- Lock joints
  - Elbows
  - Wrists
  - Shoulders
Falling Forward Safely
# Falling Backward

**Do:**
- Tuck chin
- Round back
- Squat
  - Bend hips
  - Bend knees
- Keep arms out to side
- Slap palms on ground

**Do Not:**
- Use extend your arms to break the fall
Falling Backward Safely
Falling Sideways

**Do:**
- Tuck chin
- Grab opposite hip
- Squat
- Roll onto back
- Slap ground with free hand

**Do Not:**
- Extend your arm to break the fall
- Fall directly onto hip
Falling Sideways Safely
Knowing how to fall is only the first step.

You must PRACTICE these techniques to make them natural tendencies.
Quick Summary

- # of falls has increased significantly over past decade in U.S.
- Falls are leading cause of mortality & morbidity in elderly
- Fear of falling = higher risk for falls
- Vestibular, somatosensory, & visual systems play important role in balance
- Environmental factors play role in falls
- Safe falling techniques
References