Introduction

• Falls by older adults are a concern
• The most serious and debilitating injuries that result from falling are hip fractures
• Most hip fractures in older adults are the result of falling sideways (Hayes et al., 1993)
• Because most falls occur when people are walking (Menz et al., 2003), we need to know what increases the risk of falling sideways while walking
• A growing population of adults aged 65 and older in upcoming years will make the incidence and problems surrounding falls increase (U.S. Census Bureau, 2004)
• Identifying the causes of falls can lead to more successful fall prevention strategies

Purpose

• To investigate whether the risk of different types of falls in older adults may be related to how they walk and hip abductor strength.

Methods

• Participants
  – Healthy adults, aged 65 years and older, with different fall histories over the past 12 months: Sideways fallers (n=18) Forward/backward fallers (n=18) Non-fallers (n=24)
  – Participants were required to meet certain health criteria, including being able to perform a 3-maximal-effort trials pushing thigh outward against a hand dynamometer

• Procedures
  – Verify eligibility
  – Health and falls history questionnaire
  – Mini-Mental State Exam
  – Walking trials
    – Motion capture and force plate data collection (Figures 1 and 2)
    – 7 walking trials along a straight and level path at normal walking speed
    – 1 step per force plate
    – Isometric hip abductor strength
    – Lay supine on padded table
    – 3 maximal-effort trials pushing thigh outward against a hand dynamometer

Data Analysis

• Compute:
  – Mediolateral Safety Margin (Figure 3)
  – Center of Mass (COM) range of mediolateral motion
  – Step width
  – Range of trunk mediolateral sway
  – Peak hip abduction torque during walking
  – Peak isometric hip abduction torque
• Compare variables between the three groups
• Determine which variables best predict the Mediolateral Safety Margin

Results

• Data collection is not complete
• Data collected to date:
  – Sideways fallers (n=4)
  – Forward/backward fallers (n=14)
  – Non-fallers (n=24)

Discussion

• Expected results:
  – Sideways fallers will have:
    • Smaller mediolateral safety margins
    • Larger COM range of mediolateral motion
    • Smaller step width
    • Greater trunk sway
    • Larger peak hip abduction torque during walking
  – Smaller hip abductor peak isometric torques.
  • The information gained from this study may help to identify older adults who are at risk of different types of falls and fall-related injuries based upon how they walk and their hip abductor muscle strength.

• Addressing these risk factors may then help to prevent older adults from falling.
• The next steps are to find additional healthy sideways fallers to complete the study and, based on the results, create interventions aimed at decreasing sideways falling in older adults.

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References