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Title of presentation: Falls and head impact: A biomechanical analysis of upper limb fall arrest strategies used by older adults during forward falls

Abstract

Falls cause 83% of traumatic brain injuries (TBI) in older adults aged 65+ (Harvey, 2012). Furthermore, forward falls create the highest risk for head impact in residents of long-term care (LTC), despite common attempts to brace (or arrest) the fall with the upper-limbs (Schonnop, 2013). We analyzed videos of 99 real-life forward falls in LTC to determine how upper-limb fall arrest characteristics associate with odds of head impact. The odds for head impact were reduced 6-fold (odds ratio=0.17; 95% confidence interval=0.07-0.41, by Chi-square) by rotating to impact the pelvis laterally. In falls without rotation (n=61), odds for head impact were reduced 3-fold by positioning both hands near the vertical projections of the shoulders mediolaterally (0.26; 0.08-0.81), and superior to the shoulders superior-inferiorly (0.32; 0.10-0.99). For older adults, the characteristics of fall arrest strategies greatly influence odds for head impact and TBI. These results may inform exercise-based programs to enhance fall protective responses.