Standing Balance and Walking Time among Older Adults with Hypermobility: The Johnston County Osteoarthritis Project

Author Block:

Background/Purpose: Physical function and balance often decline in older adults, and general joint hypermobility, a lifelong condition in which joint range of motion is greater than normal, may be related to impaired physical function and balance. This cross-sectional study examined the association of joint hypermobility with measures of lower body function: standing balance and walking time in a community-based cohort of older adults.

Methods: Data were collected during 2003-2010 from Johnston County Osteoarthritis Project participants. General joint hypermobility (GJH) was defined as a Beighton score ≥4 (range 0-9). Using the Beighton criteria, knee hypermobility was defined as hyperextension of at least one knee, and trunk hypermobility was defined as the ability to place ones palms on floor during forward trunk flexion with knees extended. Physical function outcomes were: 8-foot walk (unable and ≥3.5 seconds [s] vs. <3.5 s), standing balance (full tandem unable or <10 s vs. 10+ s), and functional reach test (<28.0 cm vs. ≥28.0 cm). Separate logistic regression models were used to estimate associations between joint hypermobility and physical function, adjusting for age, body mass index (BMI), sex, race, self-reported physical activity, and symptomatic osteoarthritis (sxOA) of the knee or hip.

Results: Complete data for analyses were available for 1695 participants (mean age 68.6 years, mean BMI 31.5 kg/m^2, 67.5% women, 31.2% African American, 38% self-report achieving ≥150 minutes of moderate physical activity per week, 23.2% knee sxOA, 11.7% hip sxOA, 6.5% with GJH). In unadjusted analyses, GJH was associated with a better tandem stance time and 8-foot walk time, but associations were no longer statistically significant in adjusted models (adjusted odds ratio [aOR] 1.51, 95% confidence interval [CI] 0.90, 2.53; aOR 1.36, 95% CI 0.86, 2.17, respectively). In unadjusted and adjusted analyses, there were no statistically significant differences in physical function measures between individuals with and without knee hypermobility. In unadjusted analyses, trunk hypermobility was associated with better functional reach and 8-foot walk time, but results were not statistically significant after controlling for covariates (aOR 1.50, 95% CI 0.78, 2.90; aOR 1.43, 95% CI 0.86, 2.38, respectively).

Conclusions: Older adults with joint hypermobility do not have significantly better standing balance or 8-foot walk time than those without joint hypermobility when accounting for covariates. Trunk hypermobility (signifying increased hamstring flexibility) may be a marker of better lower body physical function and balance. Prospective studies may determine how the presence or absence of joint hypermobility relates to physical function and balance over time.

Table. Associations of Physical Function Measure and Joint Hypermobility.

	General Joint Hypermobility		Knee Hypermobility		Trunk Hypermobility	
Physical Function Measure	**OR (95% CI)**	**aOR* (95% CI)**	**OR (95% CI)**	**aOR* (95% CI)**	**OR (95% CI)**	**aOR* (95% CI)**
Functional Reach Test	1.53 (0.94, 2.51)	1.07 (0.63, 1.82)	0.99 (0.53, 1.85)	0.78 (0.40, 1.52)	**1.83 (1.00, 3.34)**	1.50 (0.78, 2.90)
Tandem Stance time	**1.80 (1.13, 2.86)**	1.51 (0.90, 2.53)	1.05 (0.60, 1.82)	0.91 (0.50, 1.68)	1.56 (0.96, 2.55)	1.18 (0.67, 2.02)
8-foot walk time	**1.62 (1.09, 2.41)**	1.36 (0.86, 2.17)	0.88 (0.53, 1.48)	0.76 (0.43, 1.40)	**1.73 (1.12, 2.68)**	1.43 (0.86, 2.38)

odds ratio = OR (> 1.0 indicates better physical function), adjusted odds ratio = aOR, 95% confidence interval = 95% CI

*adjusted for age, BMI, sex, race, self-reported physical activity, symptomatic knee or hip osteoarthritis