

## ORIGINAL RESEARCH

## LOWER EXTREMITY HYPERMOBILITY, BUT NOT CORE MUSCLE ENDURANCE INFLUENCES BALANCE IN FEMALE COLLEGIATE DANCERS

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## ABSTRACT

**Background:** Dance is a physically demanding activity, with almost 70% of all injuries in dancers occurring in the lower extremity (LE). Prior researchers report that muscle function (e.g. muscle endurance) and anatomical factors (e.g. hypermobility) affect physical performance (e.g. balance) and can subsequently influence LE injury risk. Specifically, lesser core muscle endurance, balance deficits, and greater hypermobility are related to increased LE injury risk. However, the potentials interrelationships among these factors in dancers remain unclear.

**Purpose:** The purposes of this study were to examine the relationships among core muscle endurance, balance, and LE hypermobility, and determine the relative contributions of core muscle endurance and LE hypermobility as predictors of balance in female collegiate dancers.

**Study Design:** Cross-sectional

**Methods:** Core muscle endurance was evaluated using the combined average anterior, left, and right lateral plank test time scores(s). LE hypermobility was measured using the LE-specific Beighton hypermobility measure, defining hypermobility if both legs had greater than 10° knee hyperextension. Balance was measured via the composite anterior, posterolateral, and posteromedial Star Excursion Balance Test (SEBT) reach distances (normalized to leg length) in 15 female healthy collegiate dancers (18.3±0.5yrs, 165.5±6.9cm, 63.7±12.1kg). Point-biserial-correlation-coefficients examined relationships and a linear regression examined whether core endurance and hypermobility predicted balance ( $p \leq .05$ ).

**Results:** LE hypermobility (Yes;  $n = 3$ , No;  $n = 12$ ) and balance (87.2±8.3% leg length) were positively correlated  $r(14) = .67$ , ( $p = .01$ ). However, core endurance (103.9±50.6 s) and balance were not correlated  $r(14) = .32$ , ( $p = .26$ ). LE hypermobility status predicted 36.9% of the variance in balance scores ( $p = .01$ ).

**Conclusion:** LE hypermobility, but not core muscle endurance may be related to balance in female collegiate dancers. While LE hypermobility status influenced balance in the female collegiate dancers, how this LE hypermobility status affects their longitudinal injury risk as their careers progress needs further study. Overall, the current findings suggest that rather than using isolated core endurance-centric training, clinicians may encourage dancers to use training programs that incorporate multiple muscles - in order to improve their balance, and possibly reduce their LE injury risk.

**Level of Evidence:** 2b

**Key Words:** Beighton Score, lower body, plank tests, Star Excursion Balance Test

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