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The Lumbo-Pelvic-Hip Complex and How It Relates to Strength and Performance

CONFERENCE ABSTRACT

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Abstract

The lumbo-pelvic-hip complex is crucial for generating forces, as well as enhancing movement efficacy. Anatomical variations within the lumbo-pelvic-hip complex could potentially affect both an athlete’s ability to produce strength and perform movements efficiently. The purpose of this study was to examine the relationships between lumbo-pelvic-hip complex anthropometrics (leg length, femur length, and trunk length) and measures of strength and functional movement. It was hypothesized that these structural variables would significantly relate to both force production and movement quality. Thirteen athletes from various collegiate sports completed the assessments. Lower extremity anthropometry and athletic performance was assessed through two separate strength tests: the isometric mid-thigh pull (IMTP) and the isometric mid-shin pull (IMSP). Additionally, all participants completed the Functional Movement Screen (FMS). Leg length demonstrated significant positive correlations with IMTP max ($r = .655$, $p = .015$) and IMSP max ($r = .683$, $p =$

.010), and a significant negative correlation with FMS scores ($r = -.727$, $p = .005$). Femur length was significantly negatively correlated with FMS scores ($r = -.589$, $p = .034$), but showed no significant relationships with strength measures. Trunk length had a significant positive correlation with IMSP max ($r = .589$, $p = .034$) and a significant negative correlation with FMS scores ($r = -.676$, $p = .011$). A very strong positive correlation was found between IMTP max and IMSP max ($r = .982$, $p < .001$). Both IMTP max ($r = -.701$, $p = .008$) and IMSP max ($r = -.776$, $p = .002$) were significantly negatively correlated with FMS scores. In conclusion, this study provides evidence that anthropometric variations of the lumbopelvic-hip complex can affect both an athlete's strength performance and their movement quality. While longer limbs are likely to result in greater force production due to increased mechanical advantage, they may compromise movement quality and increase susceptibility to injury.

Keywords: lumbo-pelvic-hip complex, athletes, human performance