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## Letter to the Editor

**Normalization influences knee abduction moment results: Could it influence ACL-injury research, too? A Letter to the Editor**


We read with interest “Normalization influences knee abduction moment results: Could it influence ACL-injury research, too?” by Norcross et al. The stated conclusion of the study was “While it is unlikely the magnitude of the difference in non-normalized KAM identified prospectively in ACL-injured females was attributable solely to anthropometric differences, caution should be exercised when evaluating research findings reporting non-normalized KAM.” The study that was conducted and published in *AJSM* in 2005<sup>1</sup> did calculate and analyze normalized moments as Norcross et al. suggest. However, these normalized moments did not predict subsequent ACL in mixed effects logistic regression models, while absolute value moments did predict subsequent ACL injury. This was and should not be a surprise! Clinicians and researchers alike should be aware that normalized forces and moments do not exist in nature nor do they act upon the bodies of athletes sports and are merely derived calculations. The human body doesn’t experience normalized forces and moments and normalized forces and moments do not rupture ligaments. Actual and real (absolute value) forces and moments that do exist in nature applied to joints at high rates are what actually rupture ligaments and therefore should be expected to be actual predictors of future injury risk. Though it is a good idea to normalize forces and moments to compare between

populations that differ in anthropometric features such as height and weight, these normalized forces and moments are likely invalid for prediction of future injury risk and may “wash out” potentially significant effects.

**Reference**

1. Hewett TE, Myer GD, Ford KR et al. Biomechanical measures of neuromuscular control and valgus loading of the knee predict anterior cruciate ligament injury risk in female athletes: a prospective study. *Am J Sports Med* 2005; 33(4):492–501. <http://dx.doi.org/10.1177/0363546504269591>.

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