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American Journal of Sports Medicine

"Can Biomechanical Testing After ACLR Identify Athletes at Risk for Subsequent ACL Injury to the Contralateral Uninjured Limb?" and "Biomechanical but Not Strength or Performance Measures Differentiate Male Athletes Who Experience ACL Reinjury on Return to Level 1 Sports": Response

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We appreciate Dr. Hewett's interest in our recent publications in *AJSM* evaluating the biomechanical analysis of ipsilateral[4] and contralateral[5] second anterior cruciate ligament (ACL) injuries.

The papers were purposefully designed as separate studies and published consecutively to examine the influence of biomechanical and performance measures on second contralateral and ipsilateral ACL injury. Given the extensive literature from Dr. Hewett and others regarding the biomechanical differences between male and female athletes, the focus was on male athletes (who comprise a majority of ACL injuries worldwide) to enhance homogeneity within the analysis. We examined ipsilateral and contralateral injuries separately because there are established factors relating to reinjury of the ipsilateral knee that do not directly relate to contralateral ACL injury risk, including graft selection and time required for graft maturation.[2,6] Furthermore, there is a higher subsequent injury rate in contralateral limbs after ACL reconstruction (ACLR).[8] As the research clearly demonstrates that the factors influencing secondary injury rates are different for contralateral and ipsilateral injury, examining them as a single cohort would be expected to mask injury-related factors and reduce our ability to identify biomechanical variables that are related to the risk of injury to each limb.

Isolating ipsilateral reinjury and secondary contralateral ACL injury added significance to our statement in the Results sections of each paper that differences identified in the double-legged drop jump (DLDJ) could identify contralateral ACL injury risk; however, this was not the case with ipsilateral ACL injury, perhaps owing to the influence of the nonbiomechanical factors. These statements do not contradict each other but clearly highlight the difference in predictive ability of the DLDJ specific to ipsilateral reinjury and contralateral injury.

The female cohort was not included within this analysis as female athletes have been reported to have a higher ACL injury rate than male athletes,[1] differing mechanics during DLDJ,[9] and differing ACL injury mechanisms.[7] As the purpose of the study was to evaluate risk factors specific to male athletes, the inclusion of female athletes would hence add variation and influence the interpretation of the biomechanical findings (similar to the grouping of ipsilateral and contralateral ACL injuries), potentially increasing the risk of both alpha and beta errors in the reporting of the results. It is not clear how focusing on a large homogeneous cohort of male athletes matched for potential nonbiomechanical risk factors

would be at risk of increased alpha or beta error, especially compared to the smaller and more heterogeneous cohorts published previously.[3,10] The female cohort data are currently being analysed separately to minimize the influence of sex-based confounders and allow for a more robust focus on the biomechanical factors of interest.

In each paper, the authors gave very clear and transparent reasons for the cohorts selected and the selection process within the papers, which was fully appreciated by the editors and peer reviewers of these papers. The differing interpretation of the predictive value and variables within the 2 papers re-enforces the importance and appropriateness of isolating ipsilateral reinjury and secondary contralateral injury cohorts after ACLR. We look forward to the publication of future work by others with even larger sample sizes that avoid multiple comparisons and adequately powers for integrated male and female statistical models to prevent the proposed concern with alpha or beta error for elucidation of more robust identification of specific risk factors for ipsilateral reinjury and secondary contralateral injury after ACLR.

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References

1. Beynnon, BD, Vacek, PM, Newell, MK, et al. The effects of level of competition, sport, and sex on the incidence of first-time noncontact anterior cruciate ligament injury. Am J Sports Med. 2014;42(8):1806-1812.

2. Claes, S, Verdonk, P, Forsyth, R, Bellemans, J. The “ligamentization” process in anterior cruciate ligament reconstruction: what happens to the human graft? A systematic review of the literature. Am J Sports Med. 2011;39(11):2476-2483.

3. 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.

4. King, E, Richter, C, Daniels, KAJ, et al. Biomechanical but not strength or performance measures differentiate male athletes who experience ACL reinjury on return to level 1 sports. Am J Sports Med. 2021;49(4):918-927.

5. King, E, Richter, C, Daniels, KAJ, et al. Can biomechanical testing after anterior cruciate ligament reconstruction identify athletes at risk for subsequent ACL Injury to the

contralateral uninjured limb? Am J Sports Med. 2021;49(3):609-619.

6. King, E, Richter, C, Jackson, M, et al. Factors influencing return to play and second anterior cruciate ligament injury rates in level 1 athletes after primary anterior cruciate ligament reconstruction: 2-year follow-up on 1432 reconstructions at a single center. Am J Sports Med. 2020;48(4):812-824.

7. Krosshaug, T, Nakamae, A, Boden, BP, et al. Mechanisms of anterior cruciate ligament injury in basketball: video analysis of 39 cases. Am J Sports Med. 2007;35(3):359-367.

8. Paterno, MV, Rauh, MJ, Schmitt, LC, Ford, KR, Hewett, TE. Incidence of contralateral and ipsilateral anterior cruciate ligament (ACL) injury after primary ACL reconstruction and return to sport. Clin J Sport Med. 2012;22(2):116-121.

9. Paterno, MV, Schmitt, LC, Ford, KR, Rauh, MJ, Myer, GD, Hewett, TE. Effects of sex on compensatory landing strategies upon return to sport after anterior cruciate ligament reconstruction. J Orthop Sports Phys Ther. 2011;41(8):553-559.

10. Paterno, MV, Schmitt, LC, Ford, KR, et al. Biomechanical measures during landing and postural stability predict second anterior cruciate ligament injury after anterior cruciate ligament reconstruction and return to sport. Am J Sports Med. 2010;38(10):1968-1978.