

## **An Analysis of Musculoskeletal Variables, Comparative to Team Norms, Leading to an ACL Rupture.**

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The identification of sport and gender specific, prospective, and modifiable risk factors contributing to non-contact, anterior cruciate ligament (ACL) injury is limited. This lack of information leaves clinicians at a loss in practicing evidence-based, injury prevention.

**PURPOSE:** The purpose of this study is to describe the methods by which a female soccer player suffering from a non-contact ACL injury was compared to the rest of her team to identify modifiable strength and flexibility deficits possibly contributing to the injury. **METHODS:** 22 Subjects were recruited from a Division I, female soccer team (Age=19.3±1.2). All testing was completed two months or less prior to competitive play. A hand-held dynamometer was used to assess strength for ankle inversion/eversion and dorsiflexion (AIS/AES, ADS), knee flexion/extension (KFS/KES), hip abduction/adduction (HABS/HADS), and hip internal/external rotation (HIS/HES). All strength variables are expressed as a percentage of body weight and agonist/antagonist ratios were calculated. A standard goniometer and digital inclinometer were used to assess flexibility for active ankle dorsiflexion (DF), weight-bearing ankle dorsiflexion mobility, hamstring flexibility with passive hip flexion (PHF), and active knee extension. The ACL case's strength and flexibility variables were compared to team averages for the dominant leg (affected side) using one-sample t-tests and Wilcoxon signed-rank tests. Statistical significance was set *a priori* at  $\alpha < .05$  **RESULTS:** The ACL case's injury was the result of a planting and cutting motion. The ACL case displayed significantly lower ADS (-7.84% of body weight), AIS (-7.41%), AES (-6.58%), KFS (-5.39%), HABS (-3.14%), HES (-2.84%), and a significantly lower HABS to HADS ratio (-.12). The ACL case also displayed significantly lower PHF (-16.89°) and higher DF (+1.85°). **CONCLUSION:** Several plausible strength and flexibility deficits were identified that could have played a role in the ACL case's injury. Further, the methods and instrumentation used to identify these deficits are relatively inexpensive and field friendly. The significance of these findings, lies in providing a rationale and set of methods by which a clinician can track and assess their athletes for modifiable variables that may predict future injury.

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