

# Study identifies genetic differences in female athletes with ACL injuries

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Female athletes are two-to-eight times more likely to suffer an anterior cruciate ligament (ACL) injury than males. And while there have been reports about possible anatomic, hormonal and neuromuscular factors that may place females at greater risk for these injuries, little research has looked specifically at the role of genetics.

For the first time, a new study, presented today at the 2014 Annual Meeting of the American Academy of Orthopaedic Surgeons (AAOS), identified varied female-to-male expression of several genes leading to proteins maintaining ligament structure.

In "[Gene Expression Differences in Young Male and Female Ruptured Anterior Cruciate Ligaments](#)," researchers obtained a biopsy of normally discarded ruptured ACL tissue during surgery from seven male and seven female young athlete patients. Biopsies were then divided into groups for microscopic (histological) and gene microarray analysis. Thirty-two significantly differentially expressed genes were isolated from male and female tissue, of which 14 were not linked to either X or Y chromosome. The 14 genes were then grouped according to skeletal muscular development, function and cellular growth. In [females](#), compared to males, the microarray analysis showed altered responses in signaling pathways that regulate cartilage and tissue growth.

The study authors believe the findings represent "the tip of the iceberg" in terms of determining the role of genetics in ACL structure and tendency toward increased [ligament injury](#) in female compared to male athletes.

Provided by American Academy of Orthopaedic Surgeons

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