

## **Female ACL Injuries: Neuromuscular and Biomechanical Factors Contributing to Noncontact Injury**

### **Introduction**

Non-contact ACL injuries continue to be a major medical issue facing female athletes, resulting in severe long term consequences such as arthritis and disability. Since 1995 we have studied neuromuscular and biomechanical characteristics as potential contributors to non-contact ACL. Our early research led to the development of a training program designed to induce adaptations in the modifiable characteristics of female athletes. The purpose of this scientific exhibit is to present the systematic approach we utilized to examine the risk factors and prevention of non-contact ACL injuries in female athletes.

### **Methods**

We comprehensively examined strength, proprioception, muscle activation patterns, postural stability, and landing and cutting biomechanics in female athletes. The results of these studies led to the development and subsequent examination of an 8-week training program designed to address the modifiable neuromuscular and biomechanical characteristics that we identified in our initial studies.

### **Results**

Our systematic examination of female athlete ACL injuries resulted in 10 peer reviewed papers demonstrating strength, proprioception, and muscle activation deficits that lead to inefficient landing kinematics and kinetics in female athletes. Our training program improved strength and enhanced the landing and cutting strategies of female athletes.

### **Discussion and Conclusion**

Our research has demonstrated that female athletes are more susceptible to non-contact ACL injury due to neuromuscular and biomechanical deficits. These deficits are modifiable through a targeted training program that we demonstrated is capable of improving the landing and cutting strategies of females during at risk athletic activities. These improved movement strategies reduce an individual's exposure to vulnerable knee positions that can lead to ACL rupture.