

Can We Prevent ACL Injuries?

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The Situation

- ❖ Female athletes are injuring knees at an alarming rate:
 - ❖ 1/100 high school athletes will have a significant knee injury; 1/10 college athletes will have a significant knee injury
 - ❖ Females are statistically 4-8x more likely to suffer a significant knee injury than males
- ❖ We have been aware of the ACL issue for close to 20 years but have yet to make a big dent in the injury rate.
- ❖ Lack of “coach friendly” assessment tools in the field that could be used to potentially identify “at risk” athletes.
- ❖ Haven’t implemented a wide scale program for training female athletes to reduce ACL injury rate.

Why is this happening: The Etiological (Cause) Theories

❖ **Anatomical**

- Q-angle
- Narrow Inter-condylar Notch
- Thigh Length

❖ **Hormonal**

- Collagen Strength
- Joint Laxity

❖ **Neuromuscular**

- Ligament Dominance
- Quadriceps Dominance
- Leg Dominance
- Trunk Dominance “Core” Dysfunction

Neuromuscular Issues

- ❖ **Ligament Dominance**
 - Imbalance between neuromuscular and ligamentous control of dynamic knee stability (lack of shock absorption)
- ❖ **Quadriceps Dominance**
 - Imbalance between quad and hamstring strength, recruitment and coordination
- ❖ **Leg Dominance**
 - Imbalance between the two legs with respect to strength, coordination and control (many times from previous injury)
- ❖ **Trunk Dominance “Core” Dysfunction**
 - Imbalance between the inertial demands of the trunk and control and coordination to resist it.

Our knee is a *dumb joint* stuck in the middle between the hip and ankle!
 (“It’s not my fault!”)

The Future

ACL Prevention Program Must-Haves

- ❖ Prevention efforts should be included in overall performance enhancement training program
- ❖ Prevention efforts should be “user/coach friendly” and easily implemented within daily regimens
- ❖ All athletes should complete functional injury risk assessments
- ❖ “At Risk” athletes may need medical intervention followed by corrective exercise program

The Future

How Can We Impact ACL Injury Rates?

- ❖ Provide Education and Awareness efforts for parents, athletes, and coaches
- ❖ Appreciate the significance of previous ankle sprains, knee and back pain, and muscle injuries
- ❖ Realize that athletes can't "power-through" skeletal or muscular dysfunction
 - Piling training on a dysfunction creates bigger injury risk
 - Athletes can create dysfunction with poor training

Research Worth Reading

- ❖ Decrease in Neuromuscular Control with Pubertal Growth Spurt (Hewett et al, JBJS 2004)
- ❖ Core Stability Measures as Risk Factors for Lower Extremity Injury in Athletes (Leetun et al, MSSE 2004)
- ❖ Deficits in Neuromuscular Control of the Trunk Predict Knee Injury Risk (Zazulak et al, AJSM 2007)
- ❖ The Drop-Jump Video Screening Test: Retention of Improvement in Neuromuscular Control in Female Volleyball Players (Barber-Westin et al, JSCR 2010)
- ❖ A Training Program to Improve Neuromuscular Indices in Female High School Volleyball Players (Noyes et al, JSCR 2011)

Risk Assessment Research Worth Reading

- ❖ Biomechanical Measures Predict ACL Risk in Female Athletes (Hewett et al, AJSM 2005)
- ❖ Two Dimensional Analysis Screening and Evaluation Tool (McLean et al, BJSM 2005)
- ❖ Correlation Between two-dimensional Video Analysis and Subjective Assessment in Evaluating Knee Control Among Elite Female Team Handball Players (Stensrud et al, BJSM 2010)
- ❖ Real-Time Assessment and Neuromuscular Training Feedback Techniques to Prevent Anterior Cruciate Ligament Injury in Female Athletes (Myer et al, Strength and Conditioning Journal 2011)