

# Sports Medicine Monthly

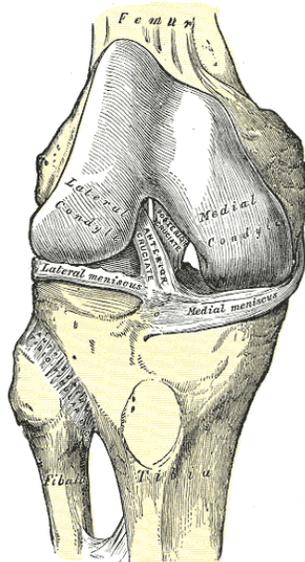
Editor: Darren H. Lunow, M.Ed, ATC, LAT • Certified Athletic Trainer

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## FOCUS ISSUE: THE ACL

### Anatomy and Physiology:

As a brief anatomical review, the ACL is an acronym for the Anterior Cruciate Ligament. It provides a significant amount of support and stability to the knee joint by preventing the lower leg bone (tibia) from shifting forward on the upper leg bone (femur). We call this shifting forward motion anterior translation as it defines a motion of one object translating on another in a anterior or forward direction. As with any ligament, it's integrity directly relates to the stability of the joint where it is located. When a ligament is strong and uninjured, the joint is more likely to be stable. When a ligament is injured or torn, the joint is now highly likely to be unstable.



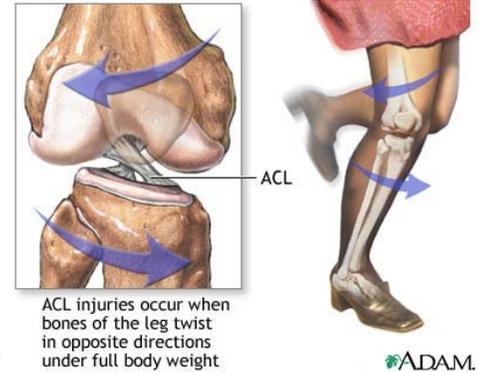
Gray's Anatomy, Image 347

### Injury Rates: Males v. Females

- \*Females are 3 - 7 times more likely to sustain an ACL injury.
- \*After the onset of puberty:
  - Females do not show increases in nerve conduction, muscle strength, and coordination in their glutes and hamstrings like males.
  - Females show decreased reaction times in regards to unanticipated movements
- \*Females show great improvements in these areas after specific training

### Inside the Injury

**How Does this Happen???** On most occasions, the ACL is injured when the knee is placed in a weight bearing, or fixed position, and that same knee is subjected to a hard, fast inward rotation and an anterior shift. From the athlete's or coach's standpoint, the athlete plants hard, their upper body rotates, and they "cut" in a direction away from the knee. More often than not, when this ligament is injured, the individual states that they either heard a pop, felt a pop, and/or both.



**After the Injury:** Immediately after injury, there is massive swelling, usually some pain, and a feeling of "giving way" in the knee. Because of the significant amount of stability provided by the ACL, it is exceedingly rare that someone would continue to compete athletically by simply bracing or taping.

**Recovery:** A torn ACL is not an example of an injury that will just get better with rest and ice. Because the knee has lost a significant amount of its stability, such inadequacies must be addressed before activity can resume.

**What does one do?** A Certified Athletic Trainer or Orthopedic Physician can determine the likelihood of an ACL injury based on a thorough clinical evaluation. In most cases, an MRI is requested to confirm the injury as ligaments do not show up on an x-ray. For a vast majority of athletes who wish to remain active in competitive athletics, surgical repair of the ACL is needed to re-stabilize the joint.



R. Clio Robertson, MD  
Don L. Hawkins, MD  
David R. Hicks, MD  
Michael W. Tanner, MD  
Brian C. Howard, MD  
James D. Cash, MD

David E. Nonweiler, MD  
Randall L. Hendricks, MD  
David K. Wong, MD  
Bryan J. Hawkins, MD  
Perry D. Inhofe, MD  
Thomas G. Craven, MD

Jeffrey R. Morris, DO  
Ronald S. LaButti, DO  
Jeff A. Fox, MD  
Kathleen M. Sisler, MD  
Troy A. Glaser, DO

Tulsa: 918.481.CSOS (2767) • Statewide: 888.269.CSOS (2767) • www.csosortho.com

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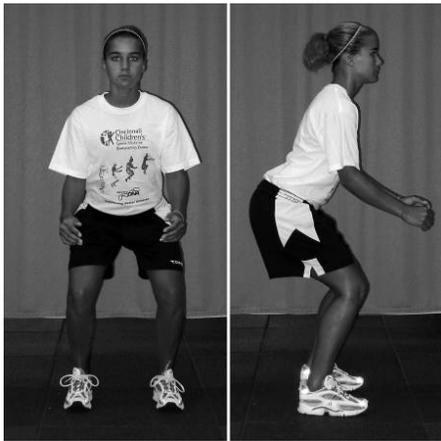
## How Can I Help My Athletes?

### #1. Focus on Landing Mechanics

Teach your athletes to land softly, on the balls of their feet, in the proper position;

#### The Athletic Position:

- \*Feet forward
- \***Knees straight forward and comfortably bent (at least 45 degrees)**
  - \*The knees should not come together or “knock” when an athlete jumps or lands.
- \*Back straight
- \*Head up with eyes facing forward.



Journal of Athletic Training, Myer et al... Oct-Dec, 2004

### #2. Focus on Strength and Conditioning

Basic strengthening routines for the quads, hams, glutes, and abs should be a part of any athletes regular training program.

In general:

- \*The hamstrings strength should be appx. 75% of the quads
- \*The outer hip muscles should be able to resist approximately 40lbs of force.

Proper Strength and Conditioning increase bone density, joint and ligament strength, endurance, and improves overall athletic ability.

### #3. Focus on Balance and Stability

All athletes can improve their overall balance and stability. Greater stability correlates to greater joint control and understanding of a joint's position in space. Athletes should be taught to balance in the Athletic Position and not allow the knees to bend inward.



British Journal of Sports Medicine, Hewett et al... June 2008

### #4. Focus on Agility and Plyometrics

When proper landing mechanics are the main focus of agility and plyometrics (i.e. box jumps, ploy jumps, agility cutting, etc...), and when they are utilized in combination with strength and conditioning, and balance and stability, ACL injury risk tends to be reduced.

## A Note to the Reader.....

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