

# THE LATEST ON ACL INJURIES: ARE YOU AT RISK?

Tina Schwager, PTA, ATC, Editor  
James M. Fox, MD, Medical Editor

Even if you're not sure what it is, just hearing that an athlete has torn their ACL will make you cringe and experience that sick feeling of, "Her career is over." What is so devastating about damaging the ACL? And why all the focus on such a small ligament?

The Anterior Cruciate Ligament or ACL is a major stabilizer of the knee, connecting the femur to the tibia as it passes diagonally from the back outer portion of the thigh bone to the front inner portion of the shin bone. Its main function is to restrict forward movement and inward rotation of the lower leg and control hyperextension (going further than the normal limits of movement) of the knee. The ligament undergoes the most stress during:

- sudden deceleration while cutting or pivoting (while playing soccer, for example)
- twisting when the foot may be fixed (catching an edge while skiing), or
- landing from a jump (like in basketball).

In the "old days," an ACL tear pretty much spelled the end of an athlete's career, not to mention a giant scar. Now, however, superior surgical and rehabilitation techniques can bring players (as well as the average lay-person) back from this potentially devastating injury to return to the sport or activity they love.

Recently there has been quite a buzz in the sports medicine world focusing on the increased incidence of ACL tears among young female athletes involved in jumping and cutting sports. The result – inordinate amounts of research into the possible causes of this phenomenon and strategies for prevention. What, exactly, has been determined? And can these injuries really be prevented?

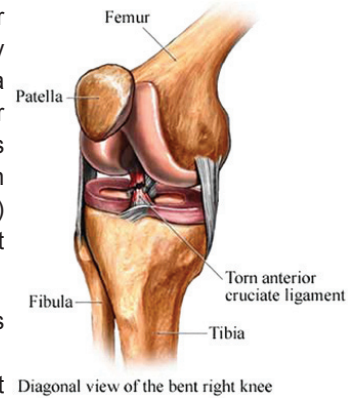
Studies have shown that in fact women are 2-4 times more likely to sustain an ACL tear than their male counterparts in the same sport. (1). The same study found females are 3 times more likely than males to sustain a non-contact ACL injury (while landing or cutting, for example) versus a contact injury (from colliding with another player). The primary non-contact injury mechanism for the ACL is landing from a jump and having the knee buckle inward. One of the determining factors in this is that men and women use different mechanics during landing or stopping. When women land from a jump, they tend to engage their quadriceps muscles (those on the front of the thigh) much more than their hamstrings (in the back), leading to a forward pull on the knee and resultant stress on the ACL.

Protecting the ACL requires a strong hamstring contraction to counteract the force of the quads and equalize stress on the knee, but studies indicate that fatigue actually leads to increased quad use by women during this motion. (3). Bottom line – if the right muscles aren't controlling the action, the ligaments must make up the difference, which puts them at tremendous risk for rupture.

Another factor is the difference in muscle strength between women and men. Since females don't have as much overall muscle mass as males, their overall strength is going to be less, too. Less strength overall means a more profound decrease in that strength in the presence of fatigue (4). Fatigue also affects lower extremity proprioception (positional awareness) and neuromuscular control, which has an adverse affect on protective landing and cutting strategies like those currently being taught by trainers and coaches in an effort to decrease ACL injuries (3). Data shows that injury rates increase in the later periods of games, or the later minutes of a particular period (3), (4). Recent studies by researchers at the Cleveland Clinic show more prevalence towards valgus and internal rotation (where the knees continue to drop inward as the body lands or slows down) in fatigued female athletes versus their male counterparts.

The way in which women utilize their muscles is also an issue. Research into muscle activation strategies between men and women have shown that females exhibit less muscular stability around the pelvis during landing tasks, creating a diminished check mechanism to continued internal rotation of the knee as the body absorbs a landing, again increasing stress on the ACL. (2).

Despite all the best training, things can still go wrong. So does this mean all the sport specific drills, plyometrics and bounding exercises are for naught? Absolutely not! Following a rigorous and comprehensive training regimen is still the way to go. A thorough program like the one designed by your Synergy trainer will help protect your body from injuries to the ACL (as well as other areas)



**Woodland Hills Location:**  
22633 Ventura Blvd.  
Woodland Hills, CA 91364  
Tel: 818.444.5100

**Valencia Location:**  
24515 Town Center  
Valencia, CA 91355  
Tel: 661.799.1900

**Burbank Location:**  
4111 W. Alameda Ave.  
Burbank, CA 91505  
Tel: 818.333.1690

**Beverly Hills Location:**  
8670 Wilshire Blvd., Ste 203  
Beverly Hills, CA 90211  
Tel.: (310) 724-8975

and should include:

- exercises designed to correct any imbalances in strength, flexibility and movement coordination that may exist. These deficits can be determined by one of the qualified members of Synergy's Physical Therapy or professional training staff
- high intensity endurance training to increase overall stamina and reduce the effects of fatigue. Check out Synergy's extensive class schedule for an aerobic workout that suits your personal style, or ask a staff member about the cardio equipment in the gym
- strength training targeted at all the muscles surrounding and supporting the lower kinetic chain (the hip, knee and ankle joints) and core (abs, hips and low back). Use Synergy's full line of weight training equipment to incorporate all these areas into your program
- emphasis on sound sport skills, especially when fatigued, so better split second decisions can be made by the athlete's body during intense game situations
- drills that challenge proprioception (balance and body position awareness), landing technique (proper use of the hips, knees and ankles to absorb ground reaction forces) and deceleration mechanics (slowing down and quick changes of direction). At Synergy, specialty devices are available for this type of training. See a staff member to get proper instruction in their use

If staying in the game is your goal, you've got to take good care of the tools you use to play... namely your muscles and joints. Consult one of Synergy's Health Coaches to get started, and always remember... **The best offense is a strong defense.**

#### REFERENCES

1. Arendt E, Dick R. Knee injury patterns among men and women in collegiate basketball and soccer. NCAA data and review of literature. American Journal Of Sports Medicine. 1995;23:694-701. 2. Barnett C, Riemann B. Differences in Segment Coupling Variability Between Men and Women during the Single Leg Squat. Journal of Athletic Training Supplement. June 2006: S-65. 3. Foster, Jordana Bieze. Research Drives ACL injury investigation. Biomechanics, Sept. 2006:22-30. 4. Padua DA, Arnold BL, Perrin DH, Gansneder BM, Garcia CR, Granata KP. Fatigue, Vertical Leg Stiffness, And Stiffness Control Strategies in Males and Females. Journal of Athletic Training. 2006;41(3):294-304.

#### **Some comments from the Medical Editor James M. Fox MD:**

The increased frequency of ACL injuries seen in the female athlete has *been a major source of consternation to all of us involved in sports medicine and fitness. Some thoughts still being explored relate to hormonal changes, but the major emphasis has returned to the need for further efforts at strength, endurance and agility. Athletic trainers are now working towards specific fitness programs to diminish the risk of ACL injury. For additional information, our new edition of "Save Your Knees, Again" is now available through the internet, or our website [www.jamesmfoxmd.com](http://www.jamesmfoxmd.com)*

## QUICK BITES

### KEEPING THE COMMITMENT

*You've made the decision to do it...you've joined the gym, enrolled in the Be You Again program, loaded your iPod with motivational tunes. This time you're determined to stick with your fitness program. But the fact is many people abandon their exercise programs, despite the best intentions and highest membership fees. Here are some tips to help keep your commitment to Be You Again alive and kicking:*

- 1. Do what you enjoy.** Let's face it if you detest sitting on a bike, forcing yourself to endure spinning classes simply because it's the latest trend is setting yourself up for failure. Whether you choose to utilize the equipment in Synergy's expansive weight room, sample our many exercise classes, or take your workout outdoors, there are multitudes of exercise options to choose from. Pick something you like and know that you can always switch to something else depending on your mood, the weather, whatever. As long as you're doing SOMETHING, and enjoying it, you're more likely to keep it up.
- 2. Work out with a friend or in a group.** Being accountable to someone else does wonders for your commitment. If your workout partner is going to show up at 7:30, you probably will, too. And if you're part of a group, whether it's mind-body yoga or a regular boot camp class, the social element plus the accountability to your group will keep you coming back for more.
- 3. Put your money where your mouth is.** Pay up front for classes, programs or memberships, and the incentive speaks for itself. See the membership staff for payment options that may help your commitment.
- 4. Give yourself a break.** When you're starting an exercise program, nothing spells fitness failure like pushing too hard, too fast. To avoid both injuries and falling short of unrealistic goals, start slow and let your body, and your expectations, adapt gradually. Your Synergy Health Coach will guide you through a safe and sane approach to getting your exercise regimen off the ground.
- 5. Don't discount the weather.** Aspiring to become an avid swimmer is great, but if an outdoor pool is your only option, your success will be limited when the weather turns cold. Be flexible and creative so your fitness routine can change with the seasons, and you're more likely to keep fit year-round.
- 6. Invest in decent footwear.** If there's one thing you should spend your money on when you initiate an exercise program, it's a good pair of shoes. Not only will they help protect you from injury, they'll also make it easier to master any specific skills needed to excel at your selected sport or activity.
- 7. Finally, listen to your body.** If you're sore, stiff or just "out of sorts", you may need to lessen your intensity or change activities. A certain amount of post-exercise discomfort is normal when you're getting started, and Delayed Onset Muscle Soreness (DOMS) will definitely occur anytime you up your weights, add something new, or push beyond your comfort level. But normal DOMS should subside within two days or so, and the soreness should lessen with each successive workout. Should you experience discomfort beyond this, schedule an appointment with one of Synergy's physicians or the Physical Therapy department for an evaluation. If you're constantly tired after your workouts, that's not good either.

It's easy to overdo it when you're enthusiastic and determined, but exercise should energize you, not wear you out. After all, the pursuit of fitness is a lifelong journey, not simply a destination.

### BRACE YOURSELF FOR ACTION

You've seen all types – customized fiberglass, titanium, hinged sleeves, tight-as-a-glove neoprene, and those that appear to be nothing more than a tube sock draped around the joint. There are many kinds of knee braces, but knowing the purpose of each can clarify if, and when, you should consider donning one. In "Rehabilitating The Knee" (WebMD Medical Reference from "The Knee Sourcebook"), Marc Darrow, MD, JD breaks it down:

#### Rehabilitative Braces

Used immediately after injury or surgery, and meant to protect the knee while providing added stability. Long and hinged, they limit motion and are used only for a short time.

#### Functional Braces

These are the custom-made, flashy, and very expensive jobs.

Designed to control rotation and stabilize the knee during activity, either after surgery or in lieu of it, these provide protection for athletes returning to sports. While a variety of designs exist, Dr. Darrow explains their main disadvantage is the tendency to slip out of their initial position during vigorous activity, particularly skiing or basketball. This can lead to decreased mobility, discomfort and, ultimately, compromised performance.

#### Prophylactic Braces

Traditionally used to prevent knee injury, these employ a lateral hinge and straps above and below the joint. The theory – bracing the outside of the knee leads to less stress on the inner aspect. Research, however, actually points to an increased load on the medial structures with this type of brace. That, combined with the false sense of security wearing such a brace creates, can actually lead to injury. Dr. Darrow instead recommends hanging playing surfaces (avoid ground-related

*continued on next page*

## LINKS TO COMPLETE ARTICLES:



### Osteoporosis: The Silent Thief

The long term health of your bones is in your hands, say experts. While aging and the physiological changes that come with it can deplete your bones of substances critical to their strength, exercise provides the perfect stimulus to keep them sturdy. Read this article for some solid pointers about bone health.

[www.spineuniverse.com/displayarticle.php/article81.html](http://www.spineuniverse.com/displayarticle.php/article81.html)

*From James M. Fox, MD, Medical Editor:*

*We will devote additional references in future newsletters to this dangerous disease. Osteoporosis is one of the leading costs of medical care and disability leading to fractures of the wrist, spine, ribs and hips.*

### Keep Golf Injuries From Sending You To The Clubhouse. Orthopedic Surgeons Offer Tips to Minimize Golf-Related Injuries

Golf... a sedentary sport, right? Wrong! The number of golf-related injuries reported annually is surprisingly high. Take an unprepared body and add the golf swing and you open the door to a myriad of physical problems, from the tips of the fingers to the heel of the foot. Learning how to protect your body from this deceptively rigorous activity and getting instruction on proper swing mechanics can mean the difference between a miserable round and a glorious day on the links.

[www6.aaos.org/news/Pemr/press\\_release.cfm?PRNumber=470](http://www6.aaos.org/news/Pemr/press_release.cfm?PRNumber=470)

*From James M. Fox, MD, Medical Editor:*

*Meet with one of our trainers to develop a fitness program designed for your game that will prevent injury, improve balance and control, and lower your handicap.*

### Gym Germs: Why Common Diseases Flourish In Your Gym And What You Can Do To Avoid Them

Gyms are havens for a healthy lifestyle, but they're also a breeding

ground for everything from athlete's foot to methicillin-resistant staphylococcus aureus (MRSA), a version of the common staph bacteria that is difficult to treat and can be potentially fatal. Even in the most upscale, well maintained facilities, awareness and a proactive approach are still the keys to avoiding gym germs.

[www.findarticles.com/p/articles/mi\\_m0675/is\\_6\\_22/ai\\_n7578582/pg\\_1](http://www.findarticles.com/p/articles/mi_m0675/is_6_22/ai_n7578582/pg_1)

### "Energy" Drinks: Help, Harm or Hype?

The slender, brightly colored can grabs your attention, and the energy kick that waits inside keeps you coming back for more. The popularity of energy drinks is undeniable. They're visible in the hands of celebs, who clutch them while partying till the wee hours. You'll find trainers at the gym toting a can as they put their clients through the paces. And teens are guzzling them, drawn to their "insta-boost." But are energy drinks safe? And should they be used in conjunction with exercise? The debate rages on...

[http://www.gssiweb.org/reflib/refs/310/ENERGY\\_DRINKS\\_3-12-02.cfm?pid=55&CFID=4964094&CFTOKEN=72770860](http://www.gssiweb.org/reflib/refs/310/ENERGY_DRINKS_3-12-02.cfm?pid=55&CFID=4964094&CFTOKEN=72770860)

*Reminder from Dr. Fox:*

**hydration= fluids and then some more fluids**

### Core Exercises: Beyond Your Average Abs Routine

A rock-solid mid section used to be exclusive to highly competitive athletes, but not any more. Strengthening the core, or that portion of the body supported by the abdominals, lower back muscles and hips, is becoming an integral part of every training program. These muscles can be targeted through multi-joint movements and body weight exercises. Once you learn how this area functions and which exercises to add to your routine, you'll not only improve your physique but you may just ward off the onset of lower back problems.

[www.mayoclinic.com/health/core-exercises/SM00071](http://www.mayoclinic.com/health/core-exercises/SM00071)

*From James M. Fox, MD, Medical Editor:*

*The term core has become the new "buzz" word in fitness, but the hype is justified – sit down with your Health Coach and discuss ways to build this critical aspect of your fitness program.*

hazards such as holes and step offs) and shoe type (shorter, rubber spikes allow your feet to pivot rather than stay in place while the rest of you moves), and improved sport technique to protect your knees.

#### **Transitional Braces**

These are similar to rehabilitative devices, but less restrictive and quite expensive. The problem with these semi-custom braces is that they don't accommodate for changes in muscle size and strength as you recover from injury or surgery, so they won't fit for long.

#### **Knee Sleeves**

Elastic sleeves can be purchased over the counter, or obtained from a physician. Some have padding and support around the patella (kneecap) to help with tracking and anterior knee pain. Neoprene sleeves generally provide warmth to the joint, which can create a sense of protection, and proprioceptive feedback, which helps your muscles function more effectively as you move. But even an OTC version must fit properly if it's going to do anything for you, whether from an actual functional standpoint or simply as a source of mental comfort.

#### **EXERCISE AND COLON CANCER**

Exercise has long been hailed as instrumental in the fight against cancer, and the news just got better for those suffering from colorectal cancer. Recent studies in the Journal of Clinical Oncology (August, 2006) suggest that patients with stage I, II, or III colorectal cancer who exercise vigorously may actually have a reduced risk of death from "the disease or other causes." Both studies, performed at the Dana-Farber Cancer Institute (Boston, MA), examined self reported physical activity levels in terms of "metabolic equivalent task" (MET) hours, a measure of the energy expenditure required for a particular task or activity. Researchers concluded that those individuals completing at least 18 MET activity hours "were less likely to die than those who completed three or fewer MET activity hours." More data is needed to determine whether or not exercise "prevents progression or recurrence of cancer," what type of activity may be best, and whether "exercise is a safe option for patients who have been given therapy toxic to the heart."

#### **A LEVEL PLAYING FIELD?**

Remember when kids learned the fundamentals of sport movement (i.e., throwing, kicking, hitting and running) outside in the street or at a dusty vacant lot with a bunch of pals? Alas, those days are long gone. The ramifications, however, have become glaring when one looks at high school sports teams. In "Narrowing The Field" (LA TIMES, Health section, 10/2/06) Shari Roan describes how high school teams are dominated by highly skilled, specially trained athletes. While these pseudo-pros are merely 14 or 15 years old, they've been groomed since they were tikes to dominate in their chosen sport. Gone are the days

of Varsity, JV and Frosh level teams, ideal for accommodating all levels of prowess, enabling any kid to feel like part of the team. Gone are the days when you could pick up a sport later in life (say, at the ripe old age of 10 or 11) just because you thought it would be "fun." If a kid hasn't played travel ball, had private lessons, and competed since day one, high school sports and, ultimately, the chance to play in college, no longer exists. The result – a generation that is unmotivated to be active, ambivalent towards sports and lacking the fundamental skills to comfortably shoot hoops in a pick-up game or play outfield in the family softball game. Ultimately, they may even have a sour outlook towards any sort of physical activity thus perpetuating the rising obesity crisis in our country. Finding your passion for a particular sport or activity on the first try is pretty rare, but if your child is lucky enough to have that happen, and can retain that passion, they'll likely have it for life. Otherwise, they may find themselves riding the bench or left out of the game entirely. While there is a place for competition, a simple love of sport and movement must be nurtured. Get out there with your kids, grandkids, nieces, nephews and neighbors, and teach them to play for fun while helping them learn basic skills and movements. Every person, young or old, should have a chance to shine.

#### **DOES EXTRA PROTEIN EQUAL LARGER GAINS IN MUSCLE MASS?**

Hard core athletes and fitness buffs looking to bulk up often follow a similar thought process—pop some protein or amino acid supplements, or down a giant protein shake, and you'll score that something extra to pack on the muscle and get ripped. Current research, however, shows this to be untrue. According to The Gatorade Sports Science Institute, scientific organizations such as the American College of Sports Medicine, the American Dietetic Association and Dietitians of Canada have determined that the protein needs of athletes is only slightly greater than their less active counterparts. Athletes as a whole tend to consume more protein than they actually need in their regular diet anyway, even factoring in a higher requirement (about 15% of an athletes total caloric intake should come from protein compared to 10% for the average person). Plus, protein supplements are often costly and contain far more ingredients than your body can use, which is a waste since whatever your body doesn't use ends up going down the drain (literally, since it ends up in your urine). Scientific consensus seems to be that it's not the quantity of protein, but the timing at which it's consumed that makes the difference. Eating high quality protein foods (from animal and plant sources) within one to two hours of a workout, during what's considered the recovery phase, is most beneficial. This leads to better utilization of amino acids (the "building blocks" that help your body manufacture new cells and tissue, and direct the work of hormones and enzymes), quicker muscle recovery and, ultimately, better gains in strength and size.

**Woodland Hills Location:**  
22633 Ventura Blvd.  
Woodland Hills, CA 91364  
Tel: 818.444.5100

**Valencia Location:**  
24515 Town Center  
Valencia, CA 91355  
Tel: 661.799.1900

**Burbank Location:**  
4111 W. Alameda Ave.  
Burbank, CA 91505  
Tel: 818.333.1690

**Beverly Hills Location:**  
8670 Wilshire Blvd., Ste 203  
Beverly Hills, CA 90211  
Tel.: (310) 724-8975