



## A Radical Approach to Preventing ACL Injuries

### *How to prevent or bounce back from this common knee injury*

Although there is no such thing as a “good” knee injury, one of the most devastating is an injury to the anterior crucial ligament (ACL). In the past this was often a “kiss of death” injury, and those who did recover faced a recovery period that could often take as much as a year. Now, however, athletes are using revolutionary techniques that enable them to completely recover from ACL surgery faster than ever thought possible. Just ask Breaux Greer.

Three weeks before the 2004 Olympic trials in track and field, America’s top javelin thrower tore his ACL. Greer was told his Olympic hopes were over. But not only did he compete and win the Olympic trials, at the Olympic Games he threw 286’ 3”, only 5 inches shy of the American record. Had he been able to repeat that throw in the finals he would have won the gold medal, but even so, his performance was nevertheless amazing.

There are many other seemingly miraculous recoveries, such as hockey player Joe Nieuwendyk, who tore his ACL but went on to win the MVP at the Olympics in 1988. Or Kate Pace, who won the 1993 World Championships after suffering the same injury. In fact, there were nine players on the Canadian Olympic Hockey Team who had torn their ACL and yet went on to win gold in the 2002 Olympics. So, is a torn ACL no longer the kiss of death in sports?

“Oh, for sure, otherwise I wouldn’t have a business,” says Charles Poliquin, the strength coach who was responsible for rehabilitating all these athletes.

And not only can an athlete fully recover from a torn ACL, Poliquin says it no longer takes a year, six months, or even four months, to get them up to full speed. “As soon as the swelling is down from surgery you can start to rehab; and with the athletes I’ve trained, usually within 6 to 8 weeks they can return to their sport.”

#### Are Women’s Knees Fragile?



ACL injuries are a hot topic in sports, especially for those coaches who work with female athletes. In volleyball, basketball and soccer, it’s been estimated that women can be up to eight

times as likely as men to injure the ACL. According to the American Orthopedic Society for Sports Medicine, each year approximately 20,000 high school girls suffer serious knee injuries, most involving the ACL.

Several theories have been proposed to explain why women are at such a high risk. One of the most common theories is that a woman’s wider pelvis changes the alignment of her lower extremities. This structure causes a woman’s thighs to angle inward in

a knock-kneed position and the lower legs and feet to turn outwards, putting the lower extremities in a vulnerable position. Poliquin acknowledges these structural differences, but doesn't believe it's the major cause of the higher rate of knee injuries.

"Anatomy has to do some with this problem, but it's more of a cultural problem in that US women tend not to do as much strength training as men do. When I worked with the Canadian Ski Team I took a non-sexist approach to women and weight training, and the ratio of knee injuries between men and women was one-to-one.

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"I was with the National Ski Team for 10 years, and when I started with the team I was told by their orthopedic consultants that the odds of needing major knee surgery while being on the Canadian Ski Team were 100 percent within five years. So if you started in 1990, then by 1995 for sure you would have surgery. None of the athletes who started with me that first year had to have a knee surgery. In other sports I was involved with in Canada we found the same conclusions—the ratio of male-to-female knee injuries was the same when they followed the same strength training protocols."

Another factor that Poliquin believes is responsible for the higher rate of knee injuries in American female athletes is the use of aerobic training. "Aerobic training increases the odds of getting an ACL tear because your "fast twitch" Type IIb fibers will atrophy, and because most aerobic training is not done through a full range of motion.

## The Real Cause of ACL Injuries

When asked about the belief that poor running and jumping mechanics contribute to torn ACLs, Poliquin replied, "Yes, but often the reason these athletes have bad running and jumping mechanics in the first place is that they are weak!

As for the practice many football teams follow of having their linemen wear knee braces during practice, Poliquin is against this idea. "It's like wearing a bulletproof vest when you're safe, and not wearing one when you're going to war. It's just dumb."



Photo by Andy Lyons/Getty Images

According to Poliquin, the two greatest factors for ACL tears are a weak vastus medialis (a quadriceps muscle that crosses the knee) and a weak hamstring-to-quadriceps ratio. Poliquin is certain that one of the biggest reasons for these problems is that athletes don't squat low enough. In fact, athletes can make themselves more susceptible to an ACL tear, Poliquin says, by doing half squats or by concentrating on the relatively high squats often seen today in many powerlifting competitions.

Regarding the ratio of hamstring strength to quadriceps strength, Poliquin says that one way to determine this ratio is with a fancy testing machine "that costs about \$85,000." Another way is to simply look at the ratio of your back squat to your front squat. "Your front squat should be 85 percent of your best back squat; from our experience this signifies the appropriate ratio between the quads and both the hip extension and knee flexion functions of the hamstrings."



**The Petersen step-up, performed on a BFS Plyo ramp while holding a Hex bar, is one of the best exercises to help prevent and rehabilitate ACL injuries.**

## Getting the Treatment

If an ACL injury occurs and surgery is performed, Poliquin says that the swelling must go down before any rehabilitative exercise can be performed. This usually takes 10-14 days, but Poliquin says that a new technology called frequency-specific micro current along with specific supplements such as fish oils can reduce the recovery time to 2-3 days. "Not only does this technology reduce the swelling, it also reduces the scarring," says Poliquin. "However, it's important to get the first treatment within hours after surgery."

After taking care of the swelling, Poliquin focuses his rehab program on strengthening the VMO and both functions of the hamstrings, knee flexion and hip extension. The best exercises for the VMO after surgery, says Poliquin, are the Petersen step-up and sled dragging.

To perform the Petersen step-up, find a sturdy box or platform about 4-6 inches high. Stand to the side of the platform. Place the leg closest to the box on the platform so that the back of the heel is in

line with the front of the foot of the trailing leg, then turn the front toe slightly out. Now raise the heel of the top foot and pull up the toes of the bottom foot (to prevent from pushing off with that foot). Perform the exercise by straightening the leg of the foot on the platform, pressing the heel down and rocking back until both feet are in alignment. Return to the start and repeat all the repetitions for that set before switching legs.

To increase the difficulty, you can add resistance by holding dumbbells or by placing a barbell behind



Photo: Reg Bradford

**Charles Poliquin coaches Sarah Orbanic on the Petersen step-up. It's important to pull up the toes of the free leg to maximize the effectiveness of this exercise.**

the shoulders. Poliquin says holding a Hex bar is a

better way to add resistance, as people tend to let the dumbbells swing, and it can be difficult balancing with a barbell on the shoulders. "I also like performing the exercise on an incline, such as with the BFS



**Chris Hetherington, a veteran of four NFL teams, demonstrates the backward sled drag. At right, John Rowbotham demonstrates the glute-ham raise. Both exercises are key to preventing and rehabilitating ACL injuries.**

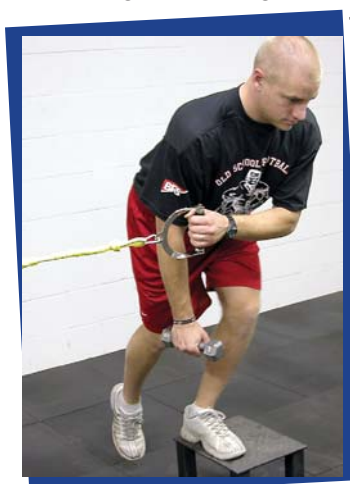
plyo ramp, as it places the bottom foot at the proper angle to emphasize the VMO.”

Another favorite exercise for the VMO is backward sled-dragging, pulling the sled about 25 feet per set. “The key is having the arms extended and relaxed, keeping the legs close together with the feet turned outward 15 degrees, and taking extremely short steps, ‘like a moonwalk,’” says Poliquin. “The most common mistakes are having the feet too wide and not raising the back heel enough.” Progress can often be made quickly in this exercise. When Greer worked with Poliquin after his injury, he was able to use only 220 pounds when he first performed this exercise, but he was able to move up to 374 pounds after two days!

For the hamstrings, Poliquin says the glute-ham raise is ideal because it enables the athlete to work both the knee and hip extensor functions of the hamstrings; unlike the leg curl (which works only knee extension) or the back extension (which works only hip extension). Poliquin adds that athletes eventually will need to start focusing on deeper squats to ensure maximum recovery and protection against further ACL tears.

Another valuable exercise to both rehabilitate torn ACLs and prevent ACL tears in the first place is an exercise Poliquin calls the “Goss Arabesque.” “It works the VMO and the muscles that help rotate the hip,” says Poliquin. “It’s one of the better ones for preventing ACL injuries, especially for athletes who tend to buckle their knees inward.”

The Goss Arabesque involves performing one-legged squats while holding on to a cable attached to a pulley, or to a piece of tubing attached to a sturdy object. With the arm holding the end of the cable handle (or the end of the tubing) crossing the body, the athlete performs one-legged squats without allowing the body to twist. To ensure complete development, the exercise is performed by alternating positions of facing forward and facing backwards.



**Poliquin believes the Goss Arabesque is a great exercise “for athletes who tend to buckle their knees inward.”**

During all rehab exercises Poliquin says it’s usually best if athletes do not use knee wraps. “Use them to protect you when you return to your sport, but not during rehab.” Also, before every strength training session Poliquin often includes 5-10 minutes of “proprioceptive training,” such as balancing on wobble boards or air-filled cushions, “to help potentiate the contractile force during the strength training.”

Although these are just general guidelines to help prevent and rehabilitate ACL injuries (and no athlete should even attempt to self-treat this injury without proper medical help), Poliquin’s success will no doubt influence the way we think about this topic. An ACL injury is still a serious injury, but it doesn’t have to mean extended periods of rehabilitation or, worst of all, the end of a promising athletic career. **BFS**

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