



Women athletes in sports such as soccer, basketball and volleyball are up to eight times more likely than men to suffer ACL injuries.

# Preventing ACL Injuries in Women Athletes

Valuable advice for reducing the risk of incurring this devastating injury

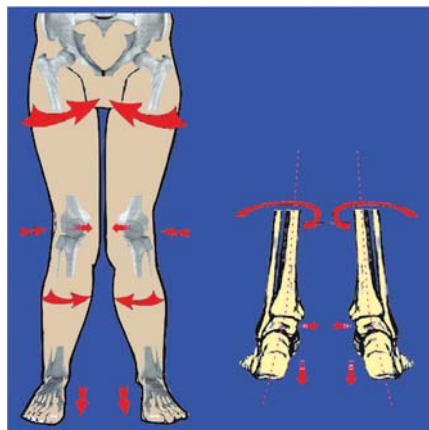
BY **KIM GOSS**

**A**lthough virtually all the barriers to women playing sports have been broken, a belief persists that women athletes are seemingly fragile creatures who have to be treated special. This is nonsense. But there is one area of vulnerability that bears a closer look: the ACL.

The ACL is a knee ligament that connects the lower and upper leg bones. It prevents the shins from moving excessively forward, and prevents excessive rotation and angulation of the knee. The ACL can be injured

when the knee is twisted, bent sideways or bent backward – and the risk

of injury is higher if two or more of these actions occur at the same time.



**FIGURE 1.** A valgus foot causes the knee to buckle inward, a condition that could easily cause a tear to the ACL.



FIGURE 2: Besides increasing the risk of ACL injuries, structural problems with the feet such as valgus feet also result in postural problems that can affect performance and increase the risk of many other injuries. However, the use of postural insoles can often resolve these problems quickly, as shown here by these before and after photos taken one and two weeks apart. Also, it should be noted that besides improving this athlete's posture, reforming the arch also increased this athlete's vertical jump by two inches in just two weeks!

Interestingly, about 70 percent of ACL injuries are from non-contact activities.

Men and women are both susceptible to ACL injuries, and injured athletes can find themselves unable to practice or play for the entire season. However, in sports such as volleyball, basketball and soccer, it has been estimated that, compared to men, women can be up to eight times as likely as men to injure the ACL. The American Orthopedic Society for Sports Medicine reports that each year more than 20,000 high school girls suffer serious knee injuries, most involving the ACL. One of the theories as to why women seem more prone to ACL injuries is that a woman's wider pelvis changes the alignment of her lower extremities so that the upper thighs angle inward more than a man's and therefore make it weaker. Other theories take into consideration a woman's hormonal makeup, such as higher levels of estrogen, and possibly poor jumping ability (such as landing on straight knees) and poor running technique due to inferior coaching. And as I'll explain later, the higher incidence of ACL injuries may be partially attributed to a failure of some coaches to train women athletes as effectively as male athletes with ACL-strengthening exercises.

Although a complete, detailed discussion of all the ways to prevent ACL injuries is beyond the scope of this article, there are two methods that can significantly reduce the risk of suffering from this injury. The first is attention to proper posture, and the second is a properly designed strength training program.

### The Posture Factor

Paul Gagné is a posturologist who is considered one of Canada's most accomplished strength coaches; he works with hundreds of professional athletes in sports such as football and hockey that involve a high risk of knee injuries. Gagné and his associate Jay Kiss operate a sports medicine clinic in Canada and have developed a reputation for keeping athletes healthy.

"One of the keys to preventing ACL injuries is to look at what is going on with the feet," says Gagné. "If the arches are fallen, a condition we call *valgus*, that will cause an unnatural internal rotation of the foot, ankle, knee and hips

that increases tension on the ACL.” Shown in Figure 1 is an athlete who displays valgus feet; as a result, her knees buckle inward, a condition that could easily cause a tear to the ACL. Regarding the BFS Six Absolutes, this athlete will find it difficult to adhere to the principles of *knees aligned* and *toes aligned*.

To correct this condition, along with other major postural problems, Gagné says his first task is to see if the feet can be corrected with postural insoles. The design of these insoles is based upon the work of J. P. Roll, a neuroscientist who twice won the highest award given in his field. Although some cases may require referral to a podiatrist for custom orthotics, often all that is needed is a pair of these simple insoles, which consist of a quarter-sized battery placed inside a thin insole. “By stimulating the nerves of the feet, which often become desensitized from the wearing of shoes, the batteries encourage the body to return to a more natural posture,” says Gagné. “So, in addition to aligning the lower limbs so that there is less likelihood of an ACL tear, the upper body posture is also improved.”

Figure 2 shows the significant changes in posture from wearing insoles for two weeks. Consider that

this is a Level 10 gymnast who trains approximately 25 hours a week.

“Performing the popular core conditioning protocols used in the States would obviously have little effect on improving her posture because she already had exceptional levels of flexibility, balance and abdominal strength,” says Gagné. “But when I gave her the insoles to correct the structural problems with her feet, her posture improved quickly and dramatically.” In fact, Gagné notes that within the first two weeks of using the insoles, the changes that occurred in this athlete’s arches caused her vertical jump to improve two inches!

Although postural insoles are the fastest way to improve posture, Gagné says that there are many simple exercises that can also help improve the structure of the foot. Check out the archives section of the BFS website for articles about these exercises: Use the keywords “ankle” and “flat feet” in the search function.

### The Strength Factor

In 25 years of coaching athletes, including eight years as a Division I coach and five years working with elite figure skaters in my private gym in Dallas, I have never had a female athlete suffer an ACL injury, either

in the weightroom or in competition. Perhaps there is some luck involved here, but I believe that I created some of my own luck by training female athletes pretty much the same as male athletes with my focus on full squats, power cleans, and back extension exercises that include the glute-ham raises. Gagné agrees. “If you ask me what the two best strength training exercises are to prevent ACL injuries, I would say full squats and glute-ham raises – but you have to do them correctly.”

“With the squat you must squat low enough or you will create excessive shearing forces on the knee,” says Gagné. “If you don’t squat low enough, you will not effectively work the glutes and the VMO, a quadriceps muscle that crosses the knee joint and plays an important role in stabilizing the knee.” Regarding the wide-stance squats used by many powerlifters, Gagné says this style emphasizes the adductor muscles of the legs and therefore may be considered a valuable auxiliary exercise, but this style does little for improving knee stability.

Asked why he is such a fan of the glute-ham raise, Gagné replies, “The hamstrings assist the functions of the ACL, so it’s especially important for women athletes to perform additional hamstring exercises in their workouts. I like the glute-ham exercise because it involves the knee at the same time as the hip – you might say it is a more *functional* exercise because this is how the lower body works in athletics.”

Although it’s true that women athletes appear to be more susceptible to ACL injuries than men, there are many steps a coach can take to minimize the risk. At the very least, make certain that women athletes are given the same attention in the weightroom as men and that they are encouraged to train not just hard but *smart!* **BFS**



Two key exercises to prevent ACL injuries are squats and glute-ham raises.

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