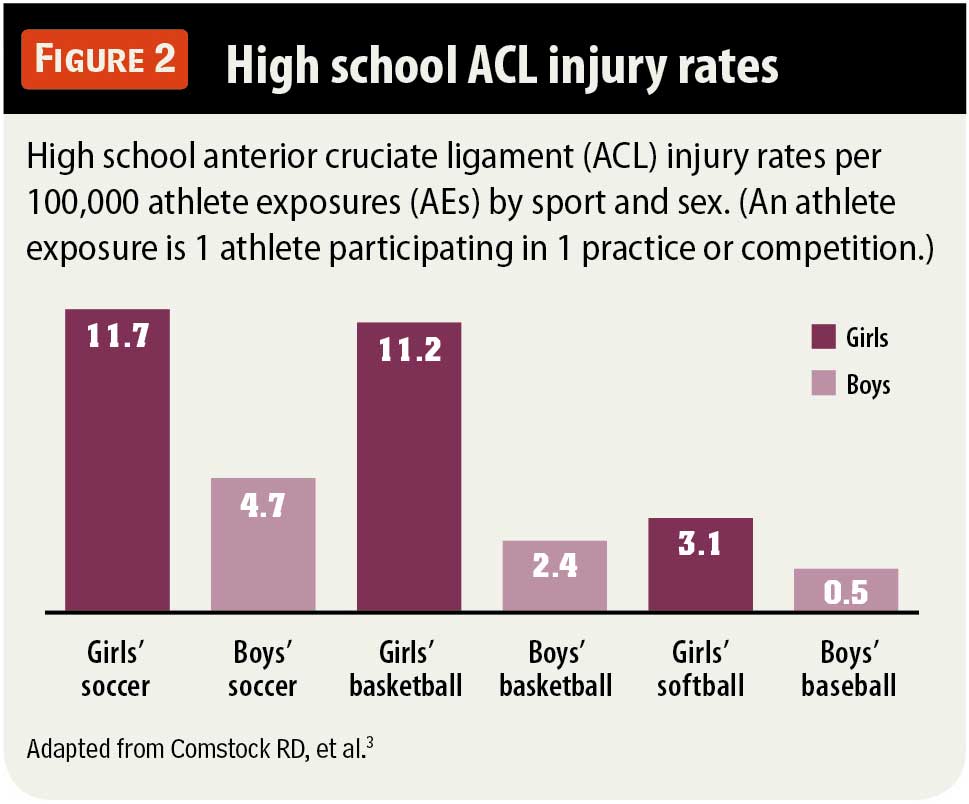
**Injury Prevention for Young Female Athletes: Information Sheet**

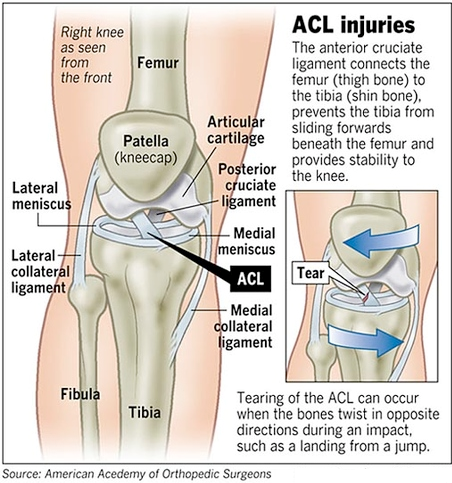
Research has shown that Female athletes who participate in jumping and pivoting sports are **2- 10 times more likely to sustain a knee ligament injury**, such as an anterior cruciate ligament (ACL) injury, than male athletes participating in the same sports1. Approximately 80% of ACL tears occur without any contact with another player, and can occur while the athlete is landing from a jump, decelerating suddenly, or quickly changing direction.

**ACL injury rates for girls begin to increase at 12 to 13 years old** **therefore the best window of opportunity for ACL injury risk reduction may be during early pubertal maturation.**

Girls’ high school sports associated with the highest rates of ACL injuries are **soccer**, basketball, and gymnastics, which account for 11.7, 11.2, and 9.9 injuries per 100,000 athlete exposures (an athlete exposure is 1 athlete participating in 1 practice or competition)2. See Figure 2.

Another study showed that girls of this age also sustained **more severe injuries**. The study measured the severity of injury by number of days lost per injury.

ACL injuries have both immediate and long-term consequences for young athletes. Short-term consequences include pain and disability during the treatment phase, which involves surgery and 6 to 9 months of intensive rehabilitation before return to sports is considered. The potential consequences of an ACL injury may be more pronounced for girls than for boys. A study of high school athletes found that compared with boys in similar sports, girls were more likely to have surgery and less likely to return to sports after an ACL injury4.



Factors that increase Female injuries:

* Hormonal

*Estrogen relaxes or allows stretching of the ACL*

* Neuromuscular

*Girls tend to have less neuromuscular control of knee motion during athletic maneuvers*

* Anatomical differences

*Increased hamstring flexibility, increased foot pronation, wider pelvis and a tendency towards “knock knee” in women*

Programs that have focussed on injury prevention techniques, incorporating progressive strengthening for the core and lower extremities, plyometrics, and feedback-driven technique modification, have been shown to be effective in reducing injuries in young women5.

These programs have also been shown to **increase overall performance.** Studies have shown that the benefits include **increased** vertical jump, **improved** control of dynamic load of the knee, **improved** balance and **increased** hamstring strength, power and peak torque6.

Example exercise: **Single leg squat**

The athlete should maintain a straight line through the hip, knee and toe. She should keep a horizontal orientation of the hips and avoid a pelvic tilt during one-legged squat balance exercises. The athlete should be encouraged to reach deep knee flexion when performing this drill7.

In order for these programs to be successful, prevention programs should be attended **before, during and after** the sports participation season in order to minimise injuries7.

References:

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4. Swenson DM, Collins CL, Best TM, Flanigan DC, Fields SK, Comstock RD. Epidemiology of knee injuries among US high school athletes, 2005/2006-2010/2011. Med Sci Sports Exerc. 2013;45(3):462-469.
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