The anterior cruciate ligament (ACL) is the most commonly injured ligament in the knee and can tear in any sports. The ACL connects the front part of the shin bone to the back part of the thigh bone and provides front to back as well as pivoting stability for the knee.

Most ACL tears occur from a non contact mechanism when the running athlete suddenly changes direction or hyperextends their knee when landing from a jump.

Young female athletes are particularly susceptible to an ACL tear because of their unique anatomy (smaller ACL and intercondylar notch where the ACL goes through), physiology (hormonal cycle variability and estrogen weakening effects on the ligament), and unbalanced neuromuscular control during sports.

Risk factors for ACL tears in this subgroup include a different muscle contraction loading sequence and patterns compared to boys, a tendency to play in a more upright position, and a tendency to have medial knee collapse (valgus) during landing. Girls tend to put increased stress on the ligaments, which are the static restraints of the knee, prior to muscular activation, which are the dynamic restraints, to absorb ground reaction forces (concept of ligament dominance).

The preferential activation of the knee extensors over their flexors in girls during sports put increased stress on the ACL (concept of quadriceps dominance). Young female athletes have also a tendency for a greater imbalance of muscle strength and coordination between the two legs (concept of leg dominance). The preferred, dominant leg is often exposed to greater stress and loads during athletic activities, putting it at increased, repetitive risk of injury. The non dominant leg is, however, also at risk because it is ill-equipped to accept loads at sudden moments of stress during the running cycle or during landing.

Neuromuscular training programs have been shown to lower the risk of ACL injury in young female athletes. These consist of balance exercises, body alignment and lower body power exercises, plyometrics, sports-specific agility drills as well as proper foot planting and landing techniques (wide base, knee caps pointing forward).

The ACL-deficient knee in the young active athlete may put increased stress on the meniscus (shock absorber of the knee). Very successful, minimally invasive, growth plate protective, surgical techniques (typically 3 small incisions) have been developed over the years to restore a stable knee and thereby protect the meniscus. These involved reconstructing the torn ACL by creating a new ligament out of tissue harvested from one of the tendons of the knee. Over the course of the rehabilitation period, this graft strengthens and becomes the new ACL of the knee.