



Prevention Key To Reducing ACL Injuries

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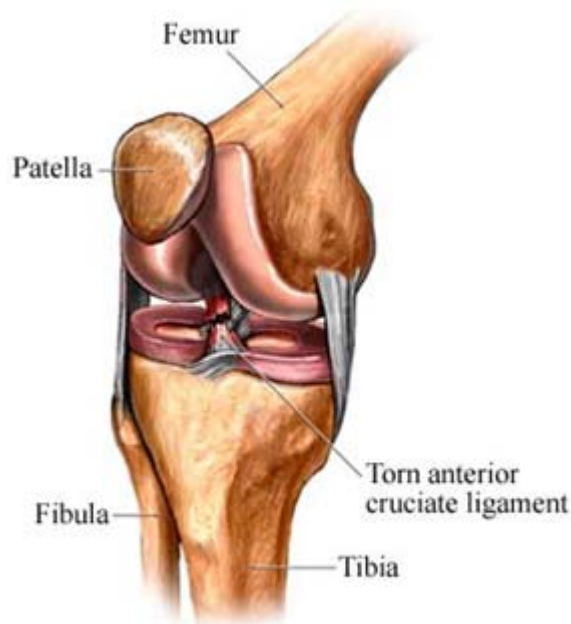
The anterior cruciate ligament, or ACL, is a large band of tissue that stretches diagonally from the bottom of the thigh bone to the top of the shin in front of the knee. It keeps the shin bone, or tibia, from pushing forward against the knee and along with the three other main ligaments in the knee, provides stability when the knee is rotated.

An awkward landing from a jump, a sudden slow down in forward movement, or a pivot move attempted with the foot firmly planted can lead to one of the more excruciating and debilitating injuries an athlete can experience, a tear in the ACL. Football players, skiers, soccer players, and basketball players are more prone to ACL injury than athletes in other sports, and more and more, statistics point to the ACL injury as one that afflicts female athletes more than their male counterparts.

According to the Mayo Hospital website, teenage girl athletes in particular are at risk for kneecap injuries, like ACL. The American Academy of Orthopedic Surgeons has collected data since 1995, and points to patterns in ACL injury that differ between men and women in the same sport. Women basketball players are two times as likely to suffer an ACL injury as are men basketball players, and in the game of soccer, women experience four times the number of ACL injuries as do the men.

There are many reasons why an increasing number of women athletes are blowing out their knees, including the fact that significant numbers of women are involved in sports every year. Physiological factors come into play, as do training methods, or rather, the lack of training.

"Ninety percent of ACL injuries in women are not a contact injury," said local sports trainer Cody Foss. "There is something in the body that affects the ability

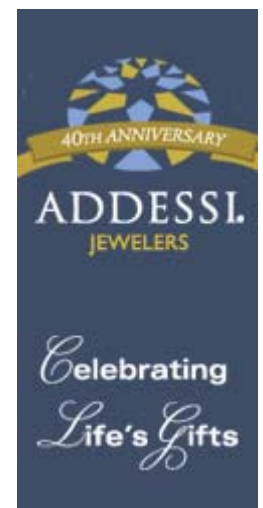


Diagonal view of the bent right knee

Slight physical differences and improper landing techniques lead to a higher rate of partial and complete tears of the anterior cruciate ligament among young female athletes than male athletes. Proper education and strength training can reduce this injury, say trainers and surgeons. - Illustration courtesy Dr Michael Brand, Danbury Orthopedics

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to turn at high speeds, and it is difficult for women athlete to learn to decelerate under control, particularly when turning."

Learning to control speed and movement is important for women athletes who want to avoid an ACL injury, said Mr Foss. "Partially this is a strength issue, partially it is teaching them to use the hamstring muscles. You want a 60:40 ratio of quadriceps strength to hamstring strength," he explained. "It is more common for women to have a 70:30 ratio." Relying on the quadriceps muscle at the front of the leg too much puts unwanted stress on the kneecap. Add that to a woman's tendency to land from a jump in a more upright than bent position, and an ACL injury can easily result.

Through Newtown Parks and Recreation, Mr Foss, who will be opening a strength training facility on Route 25 in Sandy Hook this December, works with Newtown athletes at the high school. Newtown High School athletic director Gregg Simon is thrilled to have Mr Cody's expertise. "We've seen our share [of ACL injuries]," said Mr Simon. "Mr Foss has worked with Olympic caliber athletes and brings a wealth of knowledge. One of the things he does is an ACL injury prevention program, and he teaches the girls to use the fitness center effectively," Mr Simon said.

"To prevent an ACL injury, the first thing we do is physically assess the player," said Mr Foss. "We look at the arches of the foot and we look at how the athlete runs, jumps, lands - how are the knees holding up? Are the knees turning in? Assessing the movement is important." From there, conditioning can be tailored to the athlete to build up weak areas and to learn new, safer ways to turn and stop.

In addition, the high school's dedication to preventing athletic injuries is further exemplified through the use of a certified team trainer, Tim Crowley, said Mr Simon. Mr Crowley, through Church Hill Physical Therapy and with Dr Michael Brand of Danbury Orthopedics, has introduced the preseason Prevention-Enhance Program (PEP) focused on teaching young athletes safe practices and playing positions that lessen the likelihood of injury to knees.

"It started two years ago when the school had several young female athletes who sustained ACL injuries. What this prevention program emphasizes is conditioning the female athlete and teaching them through drills and exercises ways to stabilize their knees when performing pivoting and landing maneuvers," said Dr Brand.

Mr Crowley sees the ACL issue as one of the problems female athletes face in dealing with deceleration forces. "Often girls are guilty of landing with locked knees," said Mr Crowley. "If you land awkwardly with knees locked, the deceleration occurs in rotational forces through the knees." Since the ACL and PCL (posterior cruciate ligament) are responsible for preventing rotation in the knee joint, said Mr Crowley, the ligament tears due to the forces placed upon it.

The PEP at the high school cannot prevent ACL injuries that occur in recreational settings, however. Mr Crowley has observed that younger players enter the high school programs already having suffered a tear to the ACL. "I have seen more kids than ever coming into the high school with previous ACL tears," he said. "This is probably due to the increase in 'at risk' hours. More kids are playing Premier and AAU [soccer]. More time on the field is more time at risk."

Better conditioning allows an athlete to move and perform with more agility and efficiency for longer periods of time, said Mr Crowley. The program he and Dr Brand have adapted from one developed for girls' soccer by a Santa Barbara,



Calif., hospital includes an evaluation of landing forces and how the athlete adapts to them. Education on proper landing technique and cutting form through jumping and cutting exercises designed to challenge the athlete are an important part of the program.

Physiological issues that are unique to women athletes include the question of how big a role hormones play in ACL injury, as well as the differences in physique that are believed to contribute to ACL injury. A woman's smaller intercondyler notch, that space through which the ligament runs, may account for increased friction on the ACL, according to an article posted on Mr Foss's website, silverspringstrainingcenter.com. The same reports cites the possibility that women who are excessively flexible may be at risk for this injury. In general, females tend to be wider through the hips, with the ACL attaching to the knee at a different angle than it does in males. It is possible that even a slight physiological difference such as this can be aggravated by poor landing, jumping, and turning habits.

In a 2005 report, Dr Paul Maritineau, chief resident at McGill University in Montreal, addressed the hormone question by noting that preliminary studies have shown a decrease in ACL injury among women who take the birth control pill, possibly due to less knee laxity. Muscle laxity during ovulation has been suspected of adding to ACL injury in high school and college age female athletes.

Dr Brand is not so quick to adhere to the correlation of hormones to ACL injuries. "Hormonal influences are being studied with no conclusions," said Dr Brand. To take a player out of play at certain times during the menstrual cycle would be impractical, he added.

Dr Brand, who performs 75 ACL injury surgeries each year, believes that the best thing a female athlete can do to avoid this injury is to participate in a year-around conditioning program that emphasizes strengthening, as well as strategies, to fire the correct muscles when cutting, pivoting, or landing from a jump. The vast majority of female ACL injuries are incurred in these movements, said Dr Brand, as well as from performance problems when decelerating.

When an ACL injury happens, young athletes face the choice of diminishing the number of cutting and pivoting activities to avoid surgery or undergoing a surgery that involves a six-month recovery period. "Young athletes are not willing to give up pivoting sports and subsequently usually opt for surgery," Dr Brand said. The good news is that after recovery and rehabilitation, nearly 100 percent of players can return to play.

The other way NHS athletes can prevent ACL injury, said Dr Brand, is to participate in the Prevention-Enhance Program (PEP). He would like to see high schools across the state become involved in the PEP. The key to the success of the PEP at Newtown High School, said Dr Brand, is the support of the athletic director, coaches, and trainers there.

For female athletes, the numbers show that the PEP is putting a new twist on ACL injury at Newtown High School. "[ACL injuries have] been less than one a year," Mr Crowley said, and he believes it is because of this education and training that the incidences of ACL injury at NHS are now rare at the school.