

Orthopaedic Observations

A Matter of Medicine...

TM Pending

Knee Ligament Injuries in Female Athletes

By Alan M. Reznik, M.D., MBA



ACL injuries in women jumped into the spotlight in 1999 when WNBA star Rebecca Lobo blew out her knee. The truth is she was only one of many knee injuries in professional, college, high school and recreational sports. Now, these injuries are adding up, and 1.4 million women have torn their “A-C-L,” that’s Anterior Cruciate Ligament, in the last ten years. That’s twice as

many women than the decade before. So, we must ask ourselves: Why is this happening? What do we know about this problem? Lastly, what can the female athlete do to prevent being part of the newest and largest epidemic in sports?

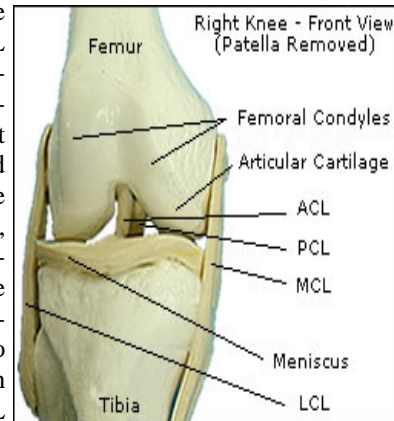
One fact is clear; women have entered competitive sports in the last two decades. Each year, there are more girls playing sports in high school, college level sports, and professional level teams than the year before. The standard of play at all levels has gone up. For these reasons alone, the number of total knee injuries should have increased. Yet, when counted, the number of torn knee ligaments is far greater than expected. It seems the risk of this type of injury far surpasses the number of women playing hard. In fact, the NCAA found female athletes were six times more likely to tear their ACL than the male athletes each hour of play. This finding translated to nearly 2,200 high-level female college athletes being sidelined per year. So, the answers to the mystery have to be more complex.

It turns out that ACL tears occur in differing age groups in women and men. In females, ACL tears start around age 14. The number peaks near age 18 and then the occurrence decreases dramatically. In males, it starts at age 16, peaks near 20 and continues to be an issue until the age of 40. The younger onset in women may be due to an earlier maturity. We know the quality of bone and its stiffness changes when you stop growing, making the

bone less forgiving and the ligament more susceptible. The age-related drop off in women may, in part, be due to bearing children, since most competitive sports have to pause during pregnancy.

Women are anatomically different than men. They have wider pelvises and legs that are, on average, tend to “bow outward “ (valgus alignment) versus “bowing in” (varus alignment) in men. The roof of the center of the knee, the femoral notch, is narrower in women than

men placing more strain on the ACL with knee extension. Female hormones are also felt to cause increased joint laxity of the so called, “secondary restraints” of the knee; those ligaments that also guide knee motion along with the ACL are less taunt putting more stress on the ACL. The early age of maturity, leg alignment, tighter space around the ACL, and the hormone-related looseness of the knee are all considered important reasons for an increase injury rate in women athletes over their male counterparts.



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Women’s and men’s muscles react in differing ways in sports. Video tapes of high school athletes during competition have taught us that men and women have their own ways of jumping and landing. Women tend to bend their knees less, landing with their knees straighter, and they use their quadriceps muscles to a greater extent than their hamstrings. This causes them to be more flat-footed when they land. This lack of muscle balance causes increased strain on the ACL particularly at the end of a quick move. Adding the muscle pattern difference to the anatomic factors does explain why many of the injuries occur as non-contact events.

Since the anatomic factors are given, the only way to de-
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crease the risk is to improve the athlete's muscle balance and landing style. From the video tape studies, we know practicing two-legged landing has the potential to reduce the risk for female athletes when working on keeping the knees more bent when jumping, when landing on the balls of the feet while using their hamstrings (back of thigh) and glutei (buttock) muscles to protect the knee. In fact, studies have shown that pre-season and in-season balance and jumping programs does provide some protection although, not all authors agree on by how much. Once the ACL is torn, many athletes lose knee stability with jumping, twisting and pivoting motions. Rehab can help and muscles compensate for some of the loss but they cannot replace the mechanical protection the normal ACL gives in high level sports. The result is often recurrent injury that leads to tearing of the meniscal cartilage. Damage to the cartilage can be the start of arthritis and is associated with the knee locking or getting stuck in one place. With repetitive injury, the knee can even become completely locked and the player cannot extend the knee or even walk on it.

To avoid long term problems, most athletes opt to have the ligament reconstructed. With modern techniques, this can be done arthroscopically through a fiber optic telescope. A graft replaces the torn ACL and this is all done through small incisions with a video camera and special instruments designed for this type of surgery. With modern, high-tech, techniques the procedure can be done as an outpatient. After surgery the patient is in a brace to protect the graft.

Rehab can start in the first few days of post-op and many patients can be completely free of crutches within two weeks. The majority of players can start a sport-specific training program within three to six months and can return to competitive sports at the completion of the program. Remembering, as always, return to full sports varies pending the extent of the original injury, the exact surgery required for that injury, the type of sport played and the athletes own rate of recovery.

A Westinghouse Science Talent Search Honoree, Dr. Reznik received his Bachelors of Science from Columbia University's School of Engineering. At Columbia, he participated in Sudden Infant Death Syndrome research. He then attended Yale Medical School and after graduation from Yale, Dr. Reznik returned to New York City for his Orthopaedic Residency at the Mount Sinai Medical Center. He was selected for a Fellowship at Oxford in Orthopaedics under Professor Robert Duthie, the Head of the Nuffield Orthopaedics Center. At Nuffield, he met Dale Daniel, M.D. a world renowned expert on knee ligament reconstruction and the Director of the San Diego Sports Medicine Fellowship. After completing Dr. Daniel's Fellowship in advanced Shoulder and Knee Arthroscopy, Dr. Reznik returned to the New Haven area to enter private practice Orthopaedics and teach Orthopaedic Surgery at the Yale School of Medicine.

Board Certified in Orthopaedics since 1991, in 2001 he became a member of the Arthroscopy Association of North America. Dr. Reznik was a founding member of the Yale-New Haven Hospital's Orthopaedic Trauma team and was awarded the Yale Resident Teaching Award. He also served on the game organizing committee for the 1995 World Special Olympics, where he helped care for special athletes from over 105 countries. During his residency, he was court doctor for the US open in Forest Hills, NY and, in 1999, he was appointed the team physician for the New Haven Knights professional hockey team.

Dr. Reznik donates his time to many charitable activities. More recently, after Hurricanes Katrina and Rita, he served as the surgeon on a medical relief team to New Orleans. At that time, Dr. Reznik treated patients and helped set up a clinic that cared for hundreds of victims of those two storms. Currently, he serves as volunteer member and committee chair of a local school board and, in January of 2008, Dr. Reznik joined a medical/humanitarian mission to Cuba.

Dr. Reznik consults on surgical improvements for arthroscopic surgery. He has several patents pending. One of his inventions was licensed by Johnson and Johnson and available nationally in 2007. Another was produced by Innovative Medical Products, and shown for the first time at the 2008 American Academy of Orthopedic Surgeons (AAOS) annual meeting.

In 2000, 2004, 2005, 2006 and again in 2007, Dr. Reznik was selected by Connecticut Magazine as one of the "Top Docs" in the state by nurses, physicians from other specialties and his peers. He was also named one of "America's Top Physicians" for 2004, 2005 and 2006 by the Consumer's Research Council of America. Currently, he is the managing partner of The Orthopaedic Group, LLC. He especially enjoys caring for recreational, competitive and professional athletes of all ages.

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