Gender May Predispose Women to ACL Injuries

By Bernard J. Colan
ADVANCE Staff

Mary Lloyd Ireland, MD

Women's knees may be paying too high a price for equality in athletics.

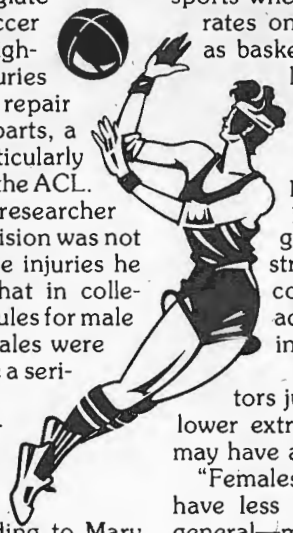
While the finger of blame has typically been pointed at playing fields and cleats for provoking anterior cruciate ligament injuries, the role of gender has been relatively ignored.

But a study by the National Collegiate Athletic Association presented at the 1993 American College of Sports Medicine's annual meeting in Orlando, FL, lent credence to the notion that females may be particularly susceptible to ACL injuries.

Randall W. Dick, assistant director of the NCAA sports science division in Overland Park, KS, presented the study, which compared knee injuries by gender in collegiate soccer and basketball from 1989 to 1991.

The data, which was gathered from NCAA institutions which sponsored male and female basketball and soccer programs, focused on ACL injuries that occurred during practice or in games and restricted the athlete's participation for at least a day.

Dick found that collegiate female basketball and soccer players experienced a higher percentage of knee injuries which required surgical repair than their male counterparts, a pattern which was particularly apparent with respect to the ACL.



In his abstract, the researcher noted that contact or collision was not a significant factor in the injuries he examined, concluding that in collegiate sports with similar rules for male and female players, females were more likely to experience a serious knee injury.

THAT STRICT criteria makes the study one of the most pertinent in injury comparisons between the sexes, according to Mary Lloyd Ireland, MD.

An orthopedic surgeon and former champion collegiate swimmer, Dr. Ireland is the president of Kentucky Sports Medicine Clinic in Lexington, KY, and an orthopedic surgeon who lectures and writes extensively on orthopedic sports injuries.

"I've been doing research for noncontact deceleration knee mechanisms, and I have found that the female athlete does appear to be at increased risk compared to the male in certain sports where we can compare injury rates on the collegiate level such as basketball and soccer and to a lesser degree, gymnastics and lacrosse," she told *ADVANCE* recently.

"I think there are multiple factors involved. In the past, women may not have gotten the conditioning, the strength training and the coaching necessary to safely acquire skills and participate in sport. That is improving.

"But there are intrinsic factors just in the alignment of the lower extremities in females [which may have an effect on injuries].

"Females have a wider pelvis; they have less muscular development in general—more flexible hyperextensile joints; they have more genu valgum; some rotational differences in their lower extremities of femoral anteversion or inward turning of the femur, and increased external tibial torsion.

"Sometimes the [female] foot is more flexible and they may have differences in talar motion and forefoot pronation. In general, women are more ligament-dominant where they rely on their ligaments for stability of the knee joint. Men tend to have more hamstring and quadriceps development potential so they are typically more muscle dominant.

"STILL ANOTHER factor is that the ACL in women is probably a little smaller just because women are smaller, and there is a femoral notch where the ACL runs and there has been some mechanism proposed that the size and shape and ratio of how wide the notch is can contribute to ACL injuries."

To reduce the prevalence of ACL damage to women engaged in noncontact mechanisms, Dr. Ireland said, the people who deal with active women must conduct research in a more prospective way.

She suggested, for instance, that middle school soccer players should be tested for their ability to land effectively single-legged, as well as for their strength and flexibility. Follow-up studies should be used to determine what factors place them at higher risk.

"Naturally, if a family has a history of ACL tears it may be hard to tell if there is a genetic reason behind a sibling tearing an ACL vs. an activity level. There are some families who are going to go outside playing, while others might be practicing music," she said.

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Preventing ACL Injuries in Female Athletes

(Cont'd from page 25)

"Certainly there is a trend for some families to tear their ACLs in a non-contact way. If you tear one side (if it is a non-contact mechanism) you are at increased risk for injuring the other, uninvolved, side."

Karen Rakowski, PT, ATC, agrees that as female participation in athletics grows, a better understanding of their gender differences is essential.

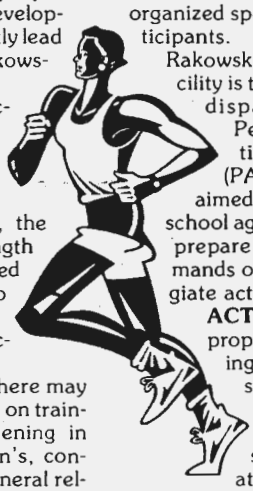
Rakowski, a faculty member of Southwest Missouri State University Sports Medicine and Athletic Training Program is also a staff athletic trainer and PT and coordinator for clinical education at Midwest Sports Medicine Center in Springfield, MO. She reported that her facility treats between 100 and 150 women with ACL injuries each year.

The clinician agreed that the increase in female ACL injuries over the past few years is likely due to multifactorial causes and it would be a mistake at this point to ascribe the increased incidence among female athletes entirely to anatomical differences.

OVER THE PAST several decades a societal influence and even law has put more emphasis on equality in sports, leading to increased participation by females.

Because women are relative newcomers in playing organized sports, their training, including conditioning and coaching, may not be yet up to the same level as males.

"In fact, females in general tend to have poor coaching and training during their developing years, which contributes toward a lack of appropriate motor skill and strength development, which may consequently lead to an increase in injury," Rakowski said.



Once an injury has occurred, there are no significant differences in the rehabilitation techniques used to treat a male or a female patient, she said; however, the lack of motor skill and strength development which prefaced an ACL injury may figure into the time required to return the athlete to optimal function.

She suggested that since there may be less of an emphasis placed on training, coaching and strengthening in women's sports than in men's, consequently there may be in general relatively less development of fundamental motor skills.

And if the outcry against inexperienced coaching, which is resurrected annually in youth sports programs generally populated by boys, have any merit, the criticism may be compounded in sports programs for young girls whether they are coached by a male or female coach with no sports training related to females.

Rakowski suggested that females may have less access to good coaches, facilities, equipment and athletic trainers because both funding and incentive have been prioritized by the more established relationship between organized sports and their male participants.

Rakowski indicated that her facility is trying to address gender disparities by offering a Performance And Conditioning Enhancement (PACE) program, which is aimed at junior high and high school age students to help them prepare for the physical demands of high school and collegiate activities.

ACTIVITIES focus on appropriate strength conditioning, flexibility and motor skill development on a before-the-fact basis so that the demands of sport don't take aspiring athletes by surprise.

Although not specifically directed at female students, it does offer them the opportunity to start out in athletic activities on a theoretically equal footing with males.

She noted that among the younger ages, the females may even have a head start over males due to differences in onset of puberty and hormone levels. "It's interesting to watch the young ladies working out beside their male counterparts, especially at the junior high level because the females are often stronger and less awkward. This seems to excite the ladies and helps to develop their self-confidence and interest in strength and conditioning."

PACE offers classroom activities which introduce youngsters to concepts such as appropriate methods of conditioning and the need to maintain flexibility, observe proper body mechanics, safe ways to promote and maintain strength and cardiovascular fitness.

Athletic trainers, physical therapists and a strength and conditioning coach talk to the students and supervise them during workouts, trying to make the exercises enjoyable.

"We're hoping to start people on a lifetime fitness program rather than just encouraging them to become high school athletes, because from each year, from the youngest team sports, people will drop out at each level," Rakowski said.

From virtual hoards of small-fry participants only a crowd of athletes participate in high school programs, and only a handful at the college level so that by the time adult life beckons, only a few are left to carry on the legacy of sports at the athletic level.

THE PURPOSE of PACE is not to reverse that trend, but to get students interested in lifetime fitness, so the allied health professionals involved with the program venture out into local schools to develop relationships with the coaches, players and spectators to start out on the right cleat and keep going.

Rakowski maintains that education is the key to retard the ascension of numbers for female ACL injuries, and so it is vital that at an early age, girls especially, are taught to comprehend the entire body from the trunk out.

There is no evidence to support any definitive conclusion that gender alone triggers ACL injuries, and although more studies are necessary to pinpoint specific valid reasons for the increased incidence among women, educational programs may provide some remedies.

Rakowski emphasized that because she believes that the majority of ACL injuries are related more to the dramatic increase of participation by females in organized sports than to gender differences, PTs and athletic trainers may use education to decrease the damage to knees in sports.

"On a scale of life's problems, things like head and spinal cord injuries are much more devastating, and rightfully gain more attention on a prevention basis. ACL injuries, however, can have a tremendously negative effect and lifelong consequences," she said. "Hopefully, pro-active research, as advocated by Dr. Ireland coupled with pro-active programs such as PACE, will help to reduce the prevalence of ACL injuries. It's up to us not only to treat the injuries after the fact, but to prevent them before they occur. ■