



# NEWS

## Getting an edge on a very common youth sport injury

### *Highlights*

- U-M researchers to focus on components of prevention training programs that reduce ACL injury risk.
- New study will measure joint movements and the force of movements performed on the athletic field.
- Results hope to give young athletes tools needed to play sports more safely and improve performance.

Watch the video: [http://www.youtube.com/watch?v=fwHT\\_GLNAvI](http://www.youtube.com/watch?v=fwHT_GLNAvI)

Download photos for this story at <http://tinyurl.com/luoyns> (requires registration)

Research at the Bone & Joint Injury Prevention & Rehabilitation Center (the Center) is moving a step closer to solving a problem that affects at least 400,000 young athletes every year and causes them to sit on the sideline for months.

Injuries to the knee anterior cruciate ligament (ACL)—one of four major ligaments in the knee—is one of the most common youth sport injuries, and the injury frequency has been steadily climbing over the last decade. With kids becoming increasingly active and competitive, the rate of ACL injury has dramatically risen. These injuries also have a steep price—nearly 70 percent of ACL injuries will lead to an early onset of painful [osteoarthritis](#).

The new study, led by Center members and Kinesiology Professors Riann Palmieri-Smith and Scott McLean, will determine which components of current ACL prevention training programs work best to reduce injuries.

McLean noted this study is a critical step to help prevent ACL injuries and osteoarthritis—a significant long-term consequence of tearing the ACL. Osteoarthritis can reduce quality of life, and it is well known that 5-14 years after an ACL tear, osteoarthritis can develop. Within the coming decades we may have many young men, and in particular young women, requiring knee replacements by the time they are in their 30s.

Current ACL prevention programs have athletes training three times per week at 90 minutes per session. Palmieri-Smith said, “While these programs are showing significant promise, what we tend to see are kids getting overwhelmed because these programs are extra training on top of what they are already doing. We see a

lot of kids drop these training programs completely, because they think they are too much work and cut into their practice time.”

The study’s main focus is to uncover the key components from the typical 90-minute prevention program that reduce the risk of injury. To test any type of prevention program, you first have to know if it improves something. To do this, Palmieri-Smith and McLean are bringing in 120 females between the ages of 10 and 18 to the Center’s lab. They will measure their joint movements and forces typically performed on the athletic field, such as landing on one leg or pivoting to the side.

Once all subjects are pre-tested, they will be placed into one of four different, six-week prevention training programs: Core stability and balance, plyometrics, neuromuscular training, or a control group. At the end of the six-week program, the subjects will come back to the lab and U-M researchers will assess the differences between movements performed before the training program and compare them to the movements after the training. They will evaluate the success of each of the training program components (including the control group) in being able to modify otherwise hazardous landing maneuvers.

McLean says there are known movements that increase ACL injury—like landing with a knee too straight or even landing knocked-knee. He and his colleagues want to find out if any one of the isolated components of current ACL training will successfully modify an at-risk movement, for example, the way a person lands—with knees more bent or aligned straight versus knock-kneed. Once the team analyzes all the data, they hope to come up with an improved and far more efficient prevention program that coaches, parents, and kids will be more inclined to incorporate into an athletic routine.

U-M researchers anticipate that by changing the way people move and by making them more aware of how their bodies move, ACL injuries will finally begin to decline. Palmieri-Smith added, “We hope to give young athletes the tools needed to play their sport safer and at the same time improve their performance in both strength and speed on the field.”

**Meet the expert:**

[Scott McLean, Ph.D.](#)

[Riann Palmieri-Smith, Ph.D., A.T.C.](#)

**Learn more:**

[U-M School of Kinesiology](#)

[Bone & Joint Injury Prevention & Rehabilitation Center](#)

### **About the Center**

The University of Michigan Bone & Joint Injury Prevention & Rehabilitation Center is a collaborative effort between the Medical School, the College of Engineering, the School of Kinesiology and the School of Public Health. The Center's mission is to excel in the creation of new knowledge in all areas relevant to the prevention, treatment, and rehabilitation of musculoskeletal injury and arthritis. The Center is dedicated to conduct mission-driven research, train the next generation of multi-disciplinary researchers, provide leadership for local, national, and international collaborations and partnerships, promote the effective translation, use, and exchange of knowledge and develop organizational excellence.

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