

# Universal neuromuscular training reduces ACL injury risk in young athletes

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As youth participation in high-demand sports such as football, basketball and soccer has increased over the past decade, so has the number of anterior cruciate ligament (ACL) injuries in teens and young adults. New research presented today at the 2014 Annual Meeting of the American Academy of Orthopaedic Surgeons (AAOS) found that universal neuromuscular training for adolescent athletes—which focuses on the optimal way to bend, jump, land and pivot the knee—is an effective and inexpensive way to avoid ACL sprains and tears.

The ACL is a critical ligament that stabilizes the knee joint. An ACL injury, one of the most common sports injuries, often requires surgery and a lengthy period of rehabilitation before an athlete can return to sport and other activities. Recent research has found that screening tools, such as "hop" or isokinetic (computer/video) tests to identify neuromuscular deficits, as well as neuromuscular training programs, may reduce ACL injuries.

"Use of both preventative measures and screening tools sounds appealing, but often there are significant financial, administrative and social hurdles that have to be overcome before they can be implemented on a widespread level," said lead study author Eric F. Swart, MD, an orthopaedic resident at Columbia University Medical Center in New York.

Researchers evaluated three strategies for young athletes: no training or screening, universal neuromuscular training, and universal screening with

neuromuscular training for identified high-risk athletes only. Risk of injury, risk reduction from training and sensitivity and specificity of screening were based on published data from clinical trials. Costs of training and screening programs were estimated based on existing literature.

The research, a modeling study based on data from recent clinical trials, evaluated a hypothetical cohort of student athletes ages 14 to 22, found that, on average, universal training reduced the incidence of ACL injury by 63 percent (from 3 to 1.1 percent per season), while the screening program, on average, reduced the incidence rate by 40 percent (from 3 to 1.8 percent). Out of 10,000 athletes, the model predicted 300 ACL injuries in the no-screening group, 110 in the universal training group, and 180 in the universal training/[screening](#) for "at risk" athletes group. Researchers estimated the cost of implementing a universal training program, including coach and player instruction, at approximately \$1.25 per day. The study authors estimated that ACL reconstruction costs between \$5,000 and \$17,000. They concluded that universal training is the most cost-effective strategy for reducing ACL injury risk, saving an average of \$275 per player per season.

"While we were not surprised that training was more cost effective than no intervention, we were impressed at the magnitude of the benefit," said Dr. Swart. "According to our model, training was so much less expensive and so much more effective than we anticipated. In addition, fewer players injured mean fewer surgical reconstruction procedures, which also saves money. The research suggests that widely implementing a universal training strategy could actually pay for itself in terms of injuries prevented and surgeries avoided, which makes a very appealing case for primary prevention."

Provided by American Academy of Orthopaedic Surgeons

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