

# Experts Call for Second Look at Primary ACL Repair

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KEYSTONE, COLO. — The time has come to revisit anterior cruciate ligament repair as an alternative to reconstruction for certain patients, said speakers at the annual meeting of the American Orthopaedic Society for Sports Medicine.

"Primary repair has potential advantages over reconstruction in that we can preserve the anatomy better," said Martha M. Murray, M.D., of the department of orthopedic surgery at Children's Hospital of Boston.

"We can also preserve the physiology and proprioceptive nerves," she said.

Primary anterior cruciate ligament (ACL) repair went out of favor in the 1990s because reconstruction techniques produced such good results.

However, a classic paper from a pioneer of repair, John A. Feagin Jr., M.D., showed that his early repairs done in West Point cadets mostly failed (a 70% failure rate), said Mark E. Sherman, M.D., an orthopedist who practices in Staten Island, N.Y.

A few surgeons have persisted with trying repairs, however, and technology has improved as well, he said. For example, endoscopy is possible, instrumentation has improved, and MRI is used routinely.

In the pioneering days, Dr. Feagin used a single, absorbable suture in his repairs, Dr. Sherman noted. Today, Dr. Sherman routinely uses two or three sutures.

While there is no definitive evidence supporting primary repair, experience has shown us successes, which in turn suggest one could identify good candidates, he said.

In his experience, the best can-



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**DR. SHERMAN**

didates for ACL repair are skiers with a type I or type II proximal tear caused by valgus stress, perhaps the most common skiing-related ACL tear, Dr. Sherman said. About 90% of these tears will have a proximal stump of the ligament long enough for the surgeon to use to reattach the ligament, Dr. Sherman said.

In a series of about 150 repair cases, Dr. Sherman said he has a 54% subjective and objective success rate, with various lengths of follow-up. But the series includes patients with football injuries and patients under age 22 years, both of which he has now found do not do well, he noted.

Addressing the conference audience after Dr. Sherman's presentation, Stephen Abelow,

M.D., of South Lake Tahoe, Calif., said he has had very good results with just the type of patient Dr. Sherman identified.

He has experience with almost 200 repairs, performed since the early 1980s. In an analysis of those cases, less than 10% went on to reconstruction. Moreover, among the patients who were over age 40 and followed for at least 2 years, less than 5% went on to reconstruction.

"Skiers tend to tear their ACLs very proximally, and those can be repaired," he said.

Overall, around 60% of ACL tear patients will have a proximal tear with a ligament-bundle stump adequate for the repair procedure, Dr. Murray said.

Dr. Murray said the reason the ACL does not heal itself naturally is probably because of the abundance of plasmin in joint synovial fluid. The plasmin keeps the joint mobile when there is an injury by interfering with clotting and fibrin formation. But fibrin formation is also the first step in tissue repair.

In tendon injuries, for example, fibrin forms a bridge in the gap between the ends of a rupture, a bridge that migrating cells follow to bring the ends back together.

She is attempting to develop a collagen-rich scaffolding that can be placed into a repair as an artificial bridge to stimulate ligament regeneration, and in the laboratory it works well.

This technique could dramatically improve repair results, she said. ■

## Training Cuts ACL Injury In Elite Female Athletes

KEYSTONE, COLO. — Even high-level female athletes show the kind of biomechanics presumed to increase the risk of anterior cruciate ligament injury, and can benefit from retraining, according to studies presented at the annual meeting of the American Orthopaedic Society for Sports Medicine.

One study subjected female soccer players from the University of North Carolina at Chapel Hill to the kind of biomechanical testing previously done on younger female athletes and showed that, as in their younger peers, these elite athletes flex and recruit the muscles around their knees differently from males.

This type of study was never done before with elite female athletes, said one of the investigators, Michael DiStefano, a certified athletic trainer at the university. In all, 18 female soccer players and 17 male soccer players performed two side-step cutting maneuvers; their trunk and hip kinematics and muscle activation patterns were measured during the tasks.

The females had a significantly more erect posture, rotated their hips more, and had more quadriceps flexion than the males when performing the maneuvers, Mr. DiStefano said. They also bent their knees less.

"Our findings agree with previous research that has focused on the recreational and high-school level athletes," he said. "So we don't believe these gender differences are influenced by skill level." ■

Another study gave specific training exercises to a German professional soccer team, and compared the rates of injury before and after training, finding a highly pronounced decrease. The investigators took 24 female soccer players from FC Bayern Munich and initiated a proprioception-coordination training program during the winter break in the team's 2003-2004 season, and then continued the training thereafter.

Investigators tracked the number of injuries that required medical attention and resulted in the player sitting out at least one practice or game, Karsten Knobloch, M.D., of Hannover (Germany) Medical School, noted in a poster presentation.

There was no reduction in the number of injuries caused by contact. There were 25 injuries caused by contact during the first half of the 2003-2004 season, before the training program began; 26 injuries in the second half of the 2004 season; and 31 contact injuries during the first half of the 2004-2005 season.

Noncontact injuries were reduced, however. The team had 36 minor muscle injuries before the training, and 14 in each of the two half-seasons following training. The team had 12 major muscle injuries in the half-season prior to training, 3 in the first half-season after training, and none in the last half-season.

Most importantly, there were two anterior cruciate ligament ruptures before the training and none afterward. ■

## Recovery Outlook for Simultaneous Bone Bruise, ACL Injury Is Good

KEYSTONE, COLO. — A bone bruise within the knee that occurs at the time of an anterior cruciate ligament injury does not predispose the patient to later bone or cartilage damage, according to a study of 44 patients seen 12 years after their reconstruction operation.

Prior to this study, it had been presumed that a bone bruise seen with MRI at the time of an acute anterior cruciate ligament (ACL) injury might lead to later degenerative changes because bruising can be associated with necrosis of osteocytes and subchondral bone.

In this study, however, bruising at the time of injury did not consistently lead to an articular cartilage lesion, said Bryan T. Hanypsiak, M.D., at the annual meeting of the American Orthopaedic Society for Sports Medicine.

Among the 44 patients, 80% had a bone bruise at the time of their injury. Most

commonly the injury was on the lateral femoral condyle (64%).

MRI imaging was performed at the time of follow-up and no persistent residual bruise was seen in any of the patients, said Dr. Hanypsiak of East Setauket, N.Y.

The mean International Knee Documentation Committee (IKDC) score of patients with bruising was 70 at follow-up compared with 70.6 for those without bruising.

There was no correlation between an articular cartilage injury at the time of injury and articular cartilage lesions at follow-up. All appeared to have resolved, and the mean IKDC score of those with an articular cartilage lesion at the time of injury was 69 at follow-up vs. 72 in those without a cartilage lesion.

Fifteen of the study patients had subsequent knee surgery, most commonly for a meniscal tear. ■

## Small Study Shows ACL Surgical Rehabilitation Can Be Accelerated

KEYSTONE, COLO. — Rehabilitation from anterior cruciate ligament reconstruction can be shortened without harm, so patients may be able to return to vigorous activity sooner than is now the case, Bruce Beynnon, Ph.D., said at the annual meeting of the American Orthopaedic Society for Sports Medicine.

In a study in which 21 patients with anterior cruciate ligament reconstruction were randomized to a regular 32-week program of rehabilitation and 28 patients to a 19-week program, there was no difference in the degree of knee laxity observed 2 years after surgery, Dr. Beynnon said.

Measuring the amount of anterior knee laxity and internal rotation, Dr. Beynnon and his colleagues found that both groups experienced an increase in laxity of 2.8-2.9 mm over the 2 years, and

both had an increase in internal rotation of about 2-3 degrees.

Both groups had similar rates of satisfaction, return to daily living, and return to sports, said Dr. Beynnon, of the department of orthopedics at the University of Vermont, Burlington.

The program used in this study involved many exercises. However, full weight bearing was not allowed until 4 weeks in the regular program, while it was begun at 2 weeks in the accelerated program.

Jogging was begun at 12 weeks in the regular program and 8 weeks in the accelerated program.

Patients in both groups took about the same time, 12 months, to return to full activity. Therefore, the next step in the research is to see if return to full activity, and even sports, can similarly be accelerated, Dr. Beynnon said. ■