

Sports Update: The Knee, Part II

Continuing with our update on the knee, we will discuss:

- The role of early rehabilitation following anterior cruciate ligament (ACL) reconstruction;
- The role of bracing in knees with ACL repairs;
- The long-term effects of meniscal repair.

Is Early Postoperative Return to Activity Deleterious to Knees Having ACL Reconstructions?

Although most surgeons recognize that early postoperative mobilization is important to prevent fat pad and knee flexion contractures and help minimize muscle atrophy, early return to activity through weight bearing and other rehabilitative attempts has been viewed with extreme caution. The concern is that the tendon graft would be either elongated and lose its function or actually fail. The two following studies evaluate whether this concern is warranted.

Barber-Westin SD, Noyes FR, Heckmann TP, Shaffer BL. The Effect of Exercise and Rehabilitation on Anterior-Posterior Knee Displacements After Anterior Cruciate Ligament Autograft Reconstruction. *Am J Sports Med* 1999;27(1).

The researchers evaluated the amount of displacement of the tibia on the femur using the KT-2000 (the standard for measuring displacements that occur when the ACL is not functioning: an objective Lachman's test). They followed patients for a minimum of two years after surgery. All patients had a reconstruction for their ACLs using a patellar tendon autograft. They found that after two years, 85% had normal displacements (less than 3mm); 10% had 3-5.5mm displacements; and 5% had more than 5.5mm displacement, indicating failure.

All patients had undergone an exercise/rehabilitation program postoperatively. There was some variation as to when some patients entered a particular phase of rehabilitation. The program generally consisted of the following:

- through weeks 4-8 after surgery -- cane or crutch support and performing range of motion, isometrics, straight leg raising, mild closed-chain exercises including mini-squats and toe-raises; electrical muscle stimulation was used also;
- through weeks 4-8 to the 12th through 16th -- addition of balance, proprioceptive and gait-training exercises;
- through weeks 12-16 to the 24th through 52nd -- intensive strength training phase including resistive exercises and swimming, bicycling, ski machines, stair climbers and running programs;
- return to sport.

There was no indication that this rehabilitation program had any effect on the graft's stability.

Shelbourne KD, Davis TJ. Evaluation of Knee Stability Before and After Participation in a

Functional Sports Agility Program During Rehabilitation After Anterior Cruciate Ligament Reconstruction. *Am J Sports Med* 1999;27(2):156-161.

The authors of this paper had devised pre- and postoperative criteria for patients in the hopes of avoiding complications following surgery. Preoperatively, they required the patient to have full range of motion of the knee (including full hyperextension). Postoperatively, they required the patient to stay overnight in the hospital, and for the first week, they must remain at home and limit all activities except prescribed exercises.

Patients were asking as early as the third and fourth week post-op if they could begin activities such as dribbling a basketball or hitting ground strokes in tennis. The authors soon realized that many patients were not asking but doing these activities. The authors found that the patients who were not compliant were doing better than those that were.

In evaluating patients after surgery and after return to sport with a KT-2000, the authors found that approximately 93% had stable knees with no displacement greater than 3mm. They noted that no patients had a graft failure before returning to sports. Interestingly, in reviewing the failure rate of the graft, they found that there was a 4.4% ACL tear rate for the normal knee as compared to a 2.4% tear rate of the surgically treated ACL deficient knee.

Do Patients With ACL Reconstruction Have to Wear Braces?

It is not uncommon for patients with ACL reconstructions to continue wearing functional knee braces years after their surgery. The concerns over not using the brace may come from the surgeon worried about failure of the graft or from the patient not feeling that they can do without the brace or worried about reinjury. The current trend is away from recommending long-term bracing with as many as one third of surgeons changing their recommendations. Studies have indicated that the failure load and stiffness properties of the healed graft are similar to normal ACLs after eight months. The following study looked at the differences between patients who continued to wear the brace and those that did not.

Risburg MA, Holm I, Steen H, et al. The Effect of Knee Bracing After Anterior Cruciate Ligament Reconstruction: A Prospective, Randomized Study With Two Years' Followup. *Am J Sports Med* 1999;27(1):76-83.

The researchers took 60 patients with ACL reconstructions and randomized them into one of two groups. Patients in the braced group wore rehabilitative braces (limits knee ROM) for two weeks followed by the use of a functional brace for 10 weeks. Patients in the non-braced group did not wear any brace. Followup started at six weeks and continued for two years. Some of the braced patients continued to use the brace after two years. The outcome measures used were the KT-1000; the Cincinnati knee score; goniometry to record ROM; CT for measuring thigh muscle atrophy; three functional knee tests; and a visual analog scale for pain.

For all measures, there were no significant differences with the exception of the Cincinnati knee score, which showed that patients in the braced group had significantly improved knee function at three month followup. However, this same group had significantly lower quadriceps strength as compared to those that did not. Those patients that stopped wearing the brace also had significantly more function at the six month followup as compared to those that continued to wear a brace.

What Are the Long-Term Results of Meniscal Repairs?

It has been argued that total and partial meniscectomies are the last resort with meniscus

treatment. There is an unacceptably high rate of early degenerative changes. Meniscal repair has been accepted as the first choice when possible, yet long-term followup regarding early degenerative changes and rate of failure (retear) have only recently been evaluated. The following two studies evaluate long-term followup with open and arthroscopically repaired menisci.

Johnson MJ, Lucas GL, Dusek JK, et al. Isolated Arthroscopic Meniscal Repair: A Long-Term Outcome Study (More Than 10 Years). *Am J Sports Med* 1999;27(1):44-49.

This study used strict criteria for measuring success that included:

1. history of pain of grade one or less, absence of locking, catching or giving way; 2. on physical examination, no significant effusion and a painless or negative jump sign (pain felt with a forceful anterior drawer test); 3. no subsequent surgeries on the repaired meniscus.

The clinical success rate was 76%. Using Fairbank's criteria with standing radiographs, eight percent of operated knees showed minimal joint changes as compared to three percent in the contralateral, nonoperated knee.

Muellner T, Egkher A, Nikolic A, et al. Open Meniscal Repair: Clinical and Magnetic Resonance Imaging Findings After Twelve Years. *Am J Sports Med* 1999;27(1):16-19.

It has been assumed that the knees that were repaired in open procedures did not fare as well as those arthroscopically. The re-tear rates were reported as significantly higher. This study followed patients for over 12 years and found that the re-tear rate (11%) was lower than reported in other studies. The long-term survival of the repaired menisci was 91%. It was also noted that MRI is not cleanly able to differentiate between re-tears and the repaired area, and that this may account for the higher report in other studies.

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