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Face Off: ACL Return to Play

POINT: ACL-injured Players Need Time to Heal

Edward M. Wojtys, MD, and Alexander Weber, MD

The time needed for healing and rehabilitation after an individual undergoes anterior cruciate ligament reconstruction (ACL-R) depends upon many factors, including the following:

- concomitant injuries to the menisci, articular cartilage, and ligaments
- preoperative rehabilitation
- patient motivation

Those at the highest level of play are frequently the most motivated to return, yet this cohort may be at highest risk for reinjury or graft failure (Borchers, 2009).

Of paramount importance in this decision-making process is avoiding reinjury, which may occur in as many as 25 percent of patients (Barber-Westin, 2012). Confounding the susceptibility to injury is the fact that the contralateral knee is also at risk if return to play is premature.

The rates of reinjury to the reconstructed knee or of sustaining an ACL rupture on the contralateral knee range from 3 percent to 49 percent. Such a wide range may be due to the fact that little agreement exists on criteria for return to sports. A systematic review by Westin and Noyes ("Factors Used to Determine Return to Unrestricted Sports Activity after ACL-R") found 105 studies (40 percent) provided no criteria for return to sports, 84 studies (32 percent) only used the time period from surgery, and 35 studies (13 percent) used objective criteria to decide.

Many factors may be responsible for graft failure, including age, rigorous sports participation, incomplete healing, and inadequate rehabilitation. Some surgical reconstructions may be doomed to failure due to poor surgical technique, including inadequate graft material and/or poor graft placement.

Consequently, few studies have addressed the daunting question of when it is safe for a patient to return to sports after ACL-R. Evaluating the return of neuromuscular protection, the surgical

technique, and the details of the graft host response is difficult at best. However, there is some science to guide this decision-making process.

Knee joint kinematics remain abnormal for extended periods after ACL injury, probably due to the loss of ACL sensory receptors. Studies have demonstrated abnormal knee joint kinematics at 3 months postoperative in walking, at 5–12 months in downhill running, and at 4–12 months in single-leg hopping (Hartigan, 2010). If hamstring and quadriceps muscle power is used as a determinant for return to sports, 9 out of 10 patients will fail to meet that criteria at 6 months postoperative (Neeter, 2006).

Realizing that a free tendon graft must undergo ligamentization before it becomes a functional ACL, surgeons may be able to use the steps in that process as indicators of when it is safe to increase stress on the ACL. Although it is tempting to rely on animal data, the complexity of the human "ACL anatomy, surgical techniques, postoperative rehabilitation protocols, and testing conditions impede direct translation of animal data to the human situation" (Li, 2012).

A recent review of animal studies suggests that the early remodeling phases of ligamentization following ACL reconstruction are complete at 3 months; human data, however, show this process takes 10–12 months (Scheffler, 2008). With allografts, the most recent imaging data at 2 years postoperative suggest these alternatives lag behind autografts (Li, 2012).

In summary, knowing the risks of ACL graft failure and the tragedies caused by revision surgery, I find it difficult to recommend a return to play after an ACL reconstruction in less than 6 months.

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COUNTERPOINT: Don't Hold Them Up Without Examining the Data

K. Donald Shelbourne, MD

The philosophy of accelerated rehabilitation after ACL-R and early return to sports should be looked at as two different issues. I am a proponent of both.

"Accelerated rehabilitation" to me means patients achieve full range of motion (ROM) before surgery and that after surgery, the goal of rehabilitation is to obtain symmetry between knees with regard to ROM, strength, and function. To achieve this goal, early postoperative rehabilitation is focused on limiting a hemarthrosis, which we have found is key to a smooth progression of rehabilitation.

Cold/compression and leg elevation above the heart continually for a week after surgery is used to control swelling. Concurrently, patients perform exercise for ROM and leg control three times a day. This approach accelerates the process of obtaining symmetry after surgery. Patients who obtain and maintain full ROM through their rehabilitation have the best chance of a normal knee in the long-term.

"Early return to sports" can mean different things to different physicians. Unfortunately, early return to sports has become synonymous with return by an arbitrary point of time. In my opinion, once the patient has met the rehabilitation goals, he or she can return to activities as desired without a specific time frame mandated.

I do not see any reason why every surgeon would not be a proponent for a rehabilitation program that restores symmetry between knees as quickly as possible after surgery. Once symmetry is achieved, the issue of when to "allow" patients to return to sports can be debated. My observation is that when patients achieve symmetry between knees, it is difficult to control what they do, regardless of what is advised. Perhaps this is why others oppose accelerated rehabilitation.

As our rehabilitation program improved and patients quickly achieved symmetry between knees after

ACL reconstruction with patellar tendon autograft, many patients returned to sports earlier than I had advised and a few sustained a graft tear earlier than previous experience suggested. It would have been easy to react to these undesirable graft tears by slowing down the rehabilitation and by limiting all patients further.

However, an examination of graft tear data found that patients who returned to sports less than 6 months after surgery did not have a higher incidence rate of graft tears than patients who returned after 6 months; both groups had rates of 4 percent to 4.5 percent. The rate of injury is highest in young competitive athletes involved in basketball and soccer, but among those high-risk athletes who returned to sports at a mean of 5 months after surgery, the time of return to sports was not a significant factor for reinjury.

The use of hamstring grafts and allografts for ACL reconstruction has raised concern about subsequent ACL-graft tears. Recent discussions at national meetings have included

recommendations to limit the time of return to sports to 9 months or more after surgery, considerably longer than the 6-month time frame usually recommended. This change is being suggested without a critical look at the data to determine whether the time of return is causing re-injury. A change in protocol should not be suggested based on anecdotal incidents. I believe that surgeons need to follow their patients systematically and evaluate their own data to determine whether the time of return to sports is related to the subsequent injury rate.

The philosophy of accelerated rehabilitation to achieve symmetry should be acceptable to all surgeons because we should do everything we can to help patients feel normal so they can go on with their lives. Surgeons can choose to limit the time to return to sports, but I urge them to follow their patients carefully and to evaluate the factors for re-injury critically before reacting to anecdotal incidences of re-injury.

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