

## RETURN TO SPORTS AFTER ACL RECONSTRUCTIVE SURGERY

ACL injuries are the most common knee ligament injury in athletes. In cutting and pivoting sports, ACL injuries can account for 64% of knee injuries. For a safe return to sports, the recommended treatment for the ACL rupture is to reconstruct the ligament to eliminate instability in the joint. Without the ACL reconstruction (ACLR), the instability of the knee greatly increases the risk of subsequent injury to the menisci and articular cartilage. The long-term health of the knee joint depends on these structures.

Even with this information, some athletes may elect to not have the ACLR surgery and still continue to play sports. We at ISMI, and the general sports medicine community, do not advocate this as there is increased risk for continued knee instability and subsequent injury. Often times, these are athletes who injured the knee just prior to their senior-year season (high school or college). If the athlete has ACLR surgery just a few months before the season was scheduled to start, the recovery will not be complete until well past the end of the season. These athletes will typically plan to have surgery at the end of the season, hopefully with minimal damage created during the season. Quite often though, the athlete finds that the knee is too unstable to play, and they elect to stop playing part way through the season.

After ACLR surgery, the return to sports depends on several factors:

1. Length of time after surgery. The new ligament needs time to mature and allow it time to handle the loads created with sports. Bone bruises that occur at the time of the injury heal slowly and need time to fully heal. For cutting and pivoting sports, we prefer at least 9 months and ideally closer to 12 months before full return.
2. Strength in the muscles around the knee and hips. Research shows that if quadricep and hamstring strength deficits are present, the risk of re-injury is increased. Strength deficits in the knee and hip muscles also contribute to altered mechanics when landing and stopping.
3. Neuromuscular performance. Hop tests and agility drills can look at stability and coordination.
4. Psychological readiness for full return. This may be the most important aspect in the return to sports, but perhaps is the most difficult to assess. Time, strength, neuromuscular performance, and a planned progressive return to sports all contribute to the psychological readiness.

These four factors will be discussed in depth in other sections.

## RETURN OF RETIRE

Somewhere along the line from the time right after the ACL injury up to the point where the doctor releases the athlete for return to play, the athlete will answer the question “Return or retire?”. The answer is completely up to the individual. The deciding factors are unique for each athlete. The percentage of people that return to sports after ACLR varies greatly depending on several factors, including age, gender, sport, position of play, level of competition, damage to menisci and articular cartilage, as well as social and psychological factors. As the literature demonstrates, not everyone returns to their pre-injury sports.

Early on, the athlete may vow to return. Or conversely, they may decide they have had enough, and they are ready for something new. Everyone has their own reasons. If they are a professional athlete, does their income require them to play? Do they feel they need to play in order to get their college education? The knee may have sustained too much damage to the articular cartilage and meniscus for the joint to tolerate the training needed to play at the same level as before the injury. Fear of re-injury weighs on athlete’s decisions. The competitive season may just start too soon, and the athlete simply needs more time to fully recover. Returning to play maintains that important relationship with your team. Unfortunately, athletes can struggle to find their identity if they are not on a team. The reality is, not all athletes will return to their pre-injury sport, or it may take longer than originally anticipated.

In an analysis of 48 studies (C Arden, Br J Sports Med, 2011), with a mean follow-up time of 41.5 months, 44% of patients returned to their competitive sports, 63% had returned to their pre-injury sport (which may not have been a competitive sport), and 82% had returned to some form of sports (perhaps trying a new sport?). This same group of researchers (C Arden, Amer J Sports Med, 2011) looked at just competitive athletes in Australia (basketball, soccer and netball). By 12 months post-operatively, only 33% attempted to return to their competitive sport, while 67% had attempted a return to some other form of sport. Of those that had not attempted a return by 12 months, about half indicated they were planning to return eventually.

Perhaps 12 months is too soon to expect full return back to sports. A follow-up study of these competitive athletes (C Arden, Am J Sports Med, 2012) found that after a range of 2 to 7 years, 93% of the athletes had returned to some form of sports (up from 67% at 12 months). However, only about half were playing at their pre-injury level.

Athletes who played a sport with a seasonal competition versus year-round competition were more likely to return by 12 months. Perhaps having a specific date in mind for a return to play (RTP) helps athletes set more specific goals and help maintain mental focus during an arduous recovery.

Collegiate female soccer players from the Southeast Conference (SEC) from an 8-year period were followed after ACLR (J Howard, Am J Sports Med, 2016). The overall return to play rate was quite high at 85%, but this varied greatly based on remaining years of eligibility. Athletes in the 4<sup>th</sup> or 5<sup>th</sup> year of eligibility had only a 40% return to play. The return to play rate was higher

in the athletes who were in the early years of eligibility. In addition, the RTP for scholarship athletes was 91% versus 46% for non-scholarship athletes. These numbers point out that other factors besides just recovery from surgery can influence RTP.

A review of the literature that looked at return to play (RTP) and performance after ACLR in NCAA and NFL football players (BJ Ross, Orthopaedic Journal of Sports Medicine, 2020) found that the mean RTP was 67% at 11.6 months. The rate of return to play varied by position. Quarterbacks had about a 90% RTP while linemen had about a 60% RTP. Other studies on NFL players found 64.5% of running backs and 60% of wide receivers returned to play at a mean time of 13.6 months.

Most of the studies report a decline in performance following ACLR. The number of games played after the injury was significantly less than the number of games played before the injury. With wide receivers and running backs, yards-gained and touchdowns decreased after the return to play. The return to pre-injury sports is difficult and the return to pre-injury level of performance is even more difficult.

In a study of high school and college football players (K McCullough, Am J Sports Med, 2012), return to play rates were 63% for high school players and 69% for collegiate players. Based on the player's perceptions, 43% were able to return to the same self-described performance level. About 27% felt they did not return to pre-injury level of performance, and 30% were unable to return to play. In those who did not return to play, 50% indicated the fear of either reinjury or fear of further joint damage weighed heavily in the decision to not return. Also, in this group that did not return to play, 67% reported that "other interests" contributed to the decision to not return to play.

An interesting study (M Walden, Br J Sports Med, 2016) looked at return to play after ACLR in professional male soccer players in Europe over a 15-year period. At 7 months from surgery, about 40% of the soccer players were back in competition. By 10 months close to 85% had RTP and by 12 months 90% had RTP. These high return to play rates may be in part due to the culture of professional soccer in Europe. That is, the return to playing (even if early) may be more important than long-term outcomes for the knee. After 3 years, only 65% of the athletes were still playing at the top level.

A high prevalence of osteoarthritis was found in male soccer players (n=154) in Sweden 14 years after ACL injury (A von Parat, Ann Rheum Dis, 2004). Significant radiographic changes were found in 78% of the injured knees and 41% met the criteria for definite radiographic osteoarthritis.

These two articles (Walden and von Parat) demonstrate that although an athlete can return to sports by 7 months, the long-term health of the knee may be compromised. At time of the ACL injury, the femur and the tibia can sustain bone bruises that may take several months to heal. Rebuilding normal quadriceps and hip strength can take more than 12 months; and these are the muscles that help protect the knee joint from shock loads. Returning to play before adequate

shock protection from the muscles is available, and if the joint is still recovering from the bone bruises, may set the knee up for the early development of osteoarthritis. Perhaps the athlete needs 12 months or more for the knee to be fully ready for a return to play. Going back to play early may lead to an early retirement.

Older athletes that have ACL reconstructive surgery, often have the surgery so they can continue enjoying their sports (skiing, tennis, running, and cycling are typical sports). Although these older athletes may not be competing at the same level as the younger athletes, they still have that competitive “fire” that motivates them to return to play. A study by KD Plancher (JBJS, 1998) looked at athletes at least 40 years old following ACLR. Those athletes that were cyclists had a 100% return to cycling by 4 months. Runners had an 86% return to running by 9 months. Skiers had a 91% return by 10 months, and tennis players showed an 80% return to play by 12 months. Even though this is an older study, the numbers are probably quite similar to what we see today at ISMI with our older ACL patients. In a way, the older patients have time on their side; they can return to their sport whenever they feel ready without having to worry about a specific season coming up in a couple of months.

Everyone has their own reasons to return or retire. If you do go through the process of ACL surgery and recovery, even if you do not go back to your pre-injury sports, do yourself a favor and stay fit and strong as you get older.

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