Return to Play From ACL Tears

Anterior cruciate ligament tears are among the most common injuries in athletes, accounting for up 65% of all knee ligament injuries in cutting and pivoting sports. Every year, about 3% of amateur athletes injure their ACL. Combining this with progressive increases in sports participation, over 250,000 ACL reconstructions are performed annually in the United States. Despite significant advances in diagnosis, surgical techniques and rehabilitation, **recurrent ACL injury remains alarmingly high**. ACL graft failures have been reported to occur 2-3 times more frequently in adolescents than adults. Interestingly the risk of contralateral ACL injury is at least as high as graft failure in the young athlete. The combined risk of subsequent ACL (ipsilateral graft or contralateral native ACL) in school-aged children returning to high level sport is as high as 25-35%. In addition, **early return to sport is predictive of a second ACL tear**. So how do we make decisions on return to play knowing what we know about biology and these statistics? Over the past decade, a significant focus has been on learning which subsets of athletes are at the highest risk of recurrent injury and how to develop a safe return to play protocol to minimize this risk. There are certain non-modifiable risk factors associated with higher recurrence rates such as young age and the female athlete particularly involved in pivoting sports. Attention has been focused on controlling or improving upon potentially modifiable risk factors. This research has shown that return-to-play decisions must incorporate three main factors: **biology, biomechanics and readiness**.

Biology - ACL injuries almost uniformly require reconstruction with a graft. Techniques continue to be modified regarding fixation choices and type of graft but the basic principle since the inception of modern day ACL reconstruction is to place a strong graft in normal anatomic position. Choice of graft is critical in the young athlete. Tissue from the athlete (autograft) has proven to be far superior than allograft. While cadaveric grafts (allograft) can be used, these have a higher failure rate in the young athlete. Grafts typically used are from the patellar, hamstring, or quadriceps tendons. All of these graft material are stronger than the native ACL but have to undergo a process of incorporation and remodeling. Because of this, the graft in actually quite weak between the 4-12 weeks from surgery. Basic biology tells us that it takes at least 6 months for the graft to mature.

Biomechanics - Athletes who have undergone ACL reconstruction proceed with immediate rehabilitation under the guidance of a physical therapist that progresses with respect of the biologic process. Focus is initially placed on decreasing pain and swelling, regaining knee motion and muscle tone. This is followed by progressive muscle strengthening, complex motor activity and then sport-specific training. Most post-operative rehabilitation programs follow the well-accepted accelerated program. This was effective in mobilizing our athletes more quickly than in the past but has not led to uniform return to the same level of sport and avoidance of re-rupture. In the past, it was assumed that once the athlete had full motion, stability and strength on examination and completes this course of rehabilitation they were ready to return at 6 months. Unfortunately we have learned that typical exam criteria and timing of 6 months are insufficient to distinguish those with functional deficits. Average strength deficits have been measured at -23% at 6 months and upward to -14% even at one year from surgery. In some athletes, impaired knee function and asymmetric movement persist at 12-24 months. Many new testing criteria have been developed to assist in assessing these deficits such as hop tests, drop jump tests as well as functional movement assessments.

Readiness - The psychological aspects of recovery must also be factored into the decision to return to competition. Most return-to-play criteria now use a combination of validated outcome scores to assess the athlete's sense of well-being and readiness (psychologic) in the setting of their regained strength and stability (biomechanics) and coordinated muscle activity (performance). This relies on close observation and communication between all involved: the athlete, doctor, physical therapist, and coaching staff. Even our highest level athletes under the best supervision often require at least 9 and likely up to 12 months for a safe return-to-play. Studies have show that many athletes still have strength deficits at 6 months from surgery whereas risk of recurrent tear diminish between 9-12 months statistically likely due to improved **strength, performance and confidence**.

When I first started practice, the decision to return an athlete to play was made by the confirmation of stability and strength on physical examination and a minimum of 5-6 months since surgery. We have subsequently learned that recurrence ACL tear rates are higher than anticipated and that athletes were not returning to the same level of sport with the consistency we expected. In order to allow for the safest return at the highest level, we must take into account the athletes personal perception of well-being and performance as well as that of the **treating surgeon, physical therapist and coaching staff.** While no perfect return-to-sports protocol exists at this time, most involved in the care of injured athletes feel that all aspects in the post-injury phase need to be completed in order for the athlete to return at the safest level.

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