What are the most common causes of anterior cruciate ligament (ACL) injury in athletes?

The most common causes for ACL injury in athletes are noncontact, twisting injuries that involved a pivoting motion. For example, in sports such as soccer, athletes frequently perform motions that plant and twist the lower extremities, putting those who play soccer at one of the highest likelihoods of ACL injuries. Less common mechanisms for ACL tears are contact injuries. Players are often hit from the lateral aspect of the knee, resulting in injuries not only to the ACL, but also to the medial collateral ligament and other ligaments.

For ACL reconstruction in athletes, are the surgical and graft decisions different from in other patient populations?

Discussions regarding ACL grafts are individualized in every patient. Historical data suggested equal efficacy between bone–tendon–bone and hamstring reconstructions in particular.1 Within the past 10 years, an increased use of allograft reconstructions has occurred. Discussions regarding graft use in professional and nonprofessional athletes are individualized based on the patient’s wishes, input from family and agents, and a surgeon’s experience and comfort with individual procedures and understanding of the scientific literature. Historically, a good rule of thumb for high-level athletes younger than 30 years is to proceed with autologous hamstring vs autologous bone–tendon–bone reconstruction. Recent MOON data suggested that no significant difference is found in terms of outcome or stability as it relates to hamstring or bone–tendon–bone use.1

In addition, greater attention has been placed on the location of the femoral tunnels. Discussion initially centered on whether surgeons should use a single- or double-tunnel drilling technique, but the recent focus has been on more of an anatomic tunnel placement. Surgeons have also focused on hamstring use and anatomic ACL reconstructions.

What is the role of imaging in ACL reconstruction?

With initial injuries in which an ACL tear as suspected, plain radiographs are essential. This is particularly important in the pediatric population, in which avulsion fractures of the tibial tuberosity can be common and are treated differently from a traditional ACL tear in a skeletally mature individual. After con-
firming that no fractures exist, magnetic resonance imaging is frequently used to confirm the diagnosis and to evaluate any additional concomitant injuries. It is believed that the greater the degree of damage to the other structures within the knee, such as the menisci or chondral cartilage, the higher the risk of later developing arthritis. As such, magnetic resonance imaging assists in preoperative discussion and counseling with the patient regarding his or her long-term risks, likelihood of return to sports, and future treatment.

What are the risk factors for ACL reconstruction failure in athletes?

Recent evaluation by the MARS Study Group identified risk factors for ACL failure. One of the most common reasons for ACL failure is a nonanatomic position of the femoral tunnel. Studies have suggested that individuals are at a 5 times greater risk of having a repeat ACL rupture following a primary reconstruction regardless of whether autograft or allograft is used. In addition, other studies have suggested that allograft use in professional athletes or athletes returning to Division I–level sports may have a higher risk of repeat rupture when using allograft in particular. However, these studies have not yet controlled for location of tunnel placement and the pretreatment and preparation of the allografts, so results are inconclusive.

Is there a higher rate of recurrent ACL failure in athletes compared with other patient populations? If so, how can the risk of ACL failure be reduced by surgeons?

Anterior cruciate ligament failures are one of the most discouraging things that can happen to an athlete and to a sports medicine physician. This is a patient who had previously been high-level athlete and wants to return to a high level of sports participation. Often, these patients are able to return to their sport for a period of time and are again disrupted in their training or sports participation due to a recurrent injury. These injuries are often the result of a recurrent mechanism, such as a repeat twisting and turning episode. In collision sports, recurrent traumatic injury is also a possibility. Using a custom ACL brace during play is often used to allay surgeon and patient concerns. However, repeat injuries can occur despite bracing therapy.

What should surgeons do pre-, intra-, and postoperatively for patients undergoing ACL reconstruction?

Surgeons need to have an attention to detail. It has been said that this is the “key to success” (J. Bergfeld, oral communication, August 2006). Attention to preoperative comorbidities, underlying medical conditions, and the patient’s desire to return to play or work must be noted. Attention to medical history is necessary in an effort to risk stratify postoperative deep vein thrombosis formation and treatment options. An absolute concern for sterile technique and appropriate tissue handling is necessary to limit the known risk of perioperative infections. Attention to normal postoperative expectations and focusing on issues that may be outside the norm can often minimize perioperative complications and optimize postoperative outcomes.

What research is being done in ACL reconstruction?

Research continues in all areas of ligamentous reconstruction of the knee. Attention has focused on tunnel location, fixation, graft choice, and navigation-assisted ACL reconstruction. Understanding the biomechanics of the ACL and the reconstructed graft are continued areas of research that will hopefully assist surgeons in gaining a better understanding of this injury and treatment options for the future.

What does the future hold for ACL reconstruction?

Anterior cruciate ligament injuries are often considered an epidemic in sports medicine. Previous research has demonstrated an ability to create an ACL injury prevention program. A recent American Orthopaedic Society for Sports Medicine and Sports Trauma and Overuse Prevention (STOP) Sports Injury campaign has helped the general population understand the importance of injury prevention. Often, surgeons are called on to provide care following an injury. However, a reduction of the number of injuries would reduce the number of subsequent failures. Orthopedists will continue to debate the benefits of anatomic ACL reconstruction and to investigate graft options, allograft use, and fixation methods for ACL reconstruction.

REFERENCES