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ARTHROSCOPY AND LIGAMENT RECONSTRUCTION IN THE KNEE

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Ligament injuries in the knee are a common cause of disability in the active population. The advent of arthroscopy and arthroscopic surgical techniques has changed our ability to diagnose and treat these injuries. Arthroscopy has become the gold standard for diagnosis of intra-articular ligament injuries, as well as meniscal and articular cartilage pathology. It combines optimal visualization and the ability to manipulate tissue under anesthesia to best understand the degree of ligament injury and knee instability. Arthroscopy has also evolved into the primary means for the surgical treatment of injuries to intra-articular ligaments, articular cartilage, and meniscus.

Ligament injuries in the knee are commonly treated by non-surgical means when they involve extra-articular ligaments, such as the medial collateral ligament. The robust biologic environment outside of the joint often allows these ligament injuries to heal with bracing and rehabilitation. Some intra-articular ligament injuries can also be treated without surgery depending on the degree of resultant instability and the activity level of the patient. Injuries to the anterior cruciate ligament (ACL) occur most commonly in cutting and pivoting sports. The ruptured ACL does not have an adequate biologic response to heal and become a structurally viable ligament (Figure 1). The resultant instability following ACL rupture often requires ligament reconstruction to return the patient to the same level of athletic function. Currently, ACL reconstruction is the most commonly performed ligament reconstruction and has had a long-track record of clinical success.

Ligament reconstruction in the knee follows several principles that allow for successful outcome. These include 1) an adequate ligament graft, 2) recreation of the native position and orientation of the ligament, 3) optimal fixation of the graft during the period of soft-tissue healing, 4) appropriate rehabilitation following surgery. Both autograft and allograft tissue are currently available to the surgeon and have been used successfully in ACL reconstruction. Important cadaveric and biomechanic studies have elucidated the proper position and orientation necessary for successful ACL reconstruction (Figure 2). Arthroscopy and improvements in surgical instrumentation have allowed surgeons to properly position ligament grafts while minimizing trauma to the knee. Advances in surgical implants have allowed for graft fixation with optimal biomechanical and biologic characteristics. Post-operative rehabilitation following ACL reconstruction continues to improve as we better understand the soft-tissue healing process, as well as the neuromuscular strategies that can help prevent future injury.


Figure 1.

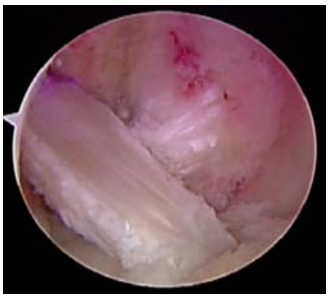
Figure 2

Technological innovations continue to transform the process of ligament reconstruction. Basic science research is being performed to create artificial soft-tissue scaffolds that may eventually replace the use of autograft and allograft tissue. Recent changes in surgical instrumentation have also allowed for less invasive means of ligament reconstruction. Ongoing research on ligament fixation implants and the role of biologic augmentation may ultimately improve the biomechanical properties of the ligament reconstruction and allow for earlier return to full athletic function.