Multiligamentous Knee Reconstruction

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What type of injuries result in the need for multiligamentous knee reconstruction?

Multiligamentous knee injuries most often result from high-energy accidents, such as motor vehicle collisions and sporting collisions. Less commonly, multiligamentous knee injuries can occur from low-energy twisting injuries in the morbidly obese.

What criteria are used for determining whether to repair or reconstruct multiligamentous knee injuries?

Timing is perhaps the most important factor that helps to determine whether to repair or reconstruct multiligamentous knee injuries. Repair is a viable option only in the acute setting and only for certain ligaments (collaterals and corners). Cruciate injuries, whether in isolation or in the context of multiligamentous knee injury, are usually reconstructed. With surgical delay, reconstruction may be the only option. Some clinicians favor reconstruction acutely. This is performed with the belief that plastic deformation may occur to the ligaments that could allow for knee instability even with anatomic repair. Conversely, early surgery may also lead to higher rates of arthrofibrosis.

How do you decide between operative vs nonoperative management of multiligamentous knee injuries?

Most multiligamentous knee injuries require surgery. Although most individuals may tolerate some degree of normal motion and stability with a single ligament injury, depending on the combination of multiple ligament injuries, the instability typically generated is not well tolerated.

When is surgery optimal for patients undergoing multiligamentous knee reconstruction?

The optimal timing for surgery is dependent on many variables. Concurrent injury, including soft tissue damage, tibial plateau fracture, and nerve and vascular injury, often occur with multiligamentous knee injury. These other areas of injury and

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subsequent treatment may render the patient unable to comply with the rehabilitation requisite for optimal clinical outcome. In addition, capsular injury found after acute injury could result in compartment syndrome with normal arthroscopic joint insufflation. In this situation, arthroscopic reconstruction must be deferred until sufficient capsular healing.

What role does imaging play in multiligamentous knee reconstruction?

Imaging is used to confirm multiligamentous knee injury. Diagnosis is largely based on history, physical examination, and, in some cases, intraoperative examination. Radiographic imaging may be unremarkable because knee dislocations can spontaneously reduce. With close inspection, misalignment may be visible. Fracture of the fibular head may represent posterolateral corner injuries, and all intra-articular injuries should raise suspicion for additional ligament injury. Computed tomography is commonly used to better identify fracture patterns, when present. Ligament injury is best visualized using magnetic resonance imaging, which can identify cruciate, collateral, extensor mechanism, and osteochondral injuries. Intraoperative fluoroscopic-assisted evaluation under anesthesia also can help confirm ligament instability injuries.

What are the rehabilitation protocols that you use for multiligamentous knee reconstruction?

No standard rehabilitation protocol can be applied to all multiligamentous knee reconstructions. Clinicians must base their rehabilitation plans on the specific ligaments that are repaired or reconstructed. Some ligaments benefit from a period of immobilization (extensor mechanism), whereas others allow for early motion (collateral and cruciate). In addition, some ligaments can heal with various types of weight bearing (cruciate), whereas others may become stressed during knee loading. Other concurrent injuries, whether bone fixation, soft tissue coverage, or neurovascular repair, may also direct (and often preclude) other potential rehabilitation protocols.

What research is being done in multiligamentous knee reconstruction?

Current clinical research regarding multiligamentous knee injury is retrospective and nonrandomized and often uses small patient populations. This is because multiligamentous knee injury does not occur commonly. In addition, few knee dislocation injuries are identical in clinical presentation. Currently, researchers are attempting to better define optimal timing and techniques for multiligamentous knee reconstruction.

What does the future hold for multiligamentous knee reconstruction?

In the future, ideally prospective randomized trials will be available to help clinicians navigate the challenging path of caring for patients who have sustained multiligamentous knee injury. Surgical techniques will continue to be refined and improved with a goal of optimizing patient outcomes for these devastating injuries.