Surgical Management of Traumatic Knee Dislocation

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Purpose: The purpose of this study was to evaluate our method of surgical treatment of traumatic knee dislocation, by use of a standardized protocol, and to report our clinical results. **Methods:** Thirty-six consecutive patients presented with a grossly dislocated or reduced knee. Ten of these patients were not included in this series. Five had vascular or neurovascular injury. Three had open fracture dislocation, and two had associated severe injury. The remaining 26 patients were treated by primary arthroscopic reconstruction with autologous grafting of the anterior cruciate ligament, posterior cruciate ligament, and collateral ligaments. The anterior cruciate ligament and posterior cruciate ligament were reconstructed via the gracilis and semitendinosus tendons of the uninjured and injured limbs. The collateral ligaments were reconstructed via artificial ligaments (LARS Ligament; J. K. Orthomedic, Dollard-des-Ormeaux, Quebec, Canada). Of the 26 patients, 20 returned for subjective and objective evaluation at a minimum of 24 months after the operation. Early mobilization via a continuous passive motion machine and active exercise were started on the fourth day postoperatively. **Results:** At a mean follow-up of 43 months, the mean Lysholm score was 91 points, the mean score on the survey of daily activities was 90 points, and the sports activities score on the Knee Outcome Survey averaged 86 points. On the basis of the rating of Meyers et al., the results were excellent in 5 patients, good in 12, fair in 2, and poor in 1. The final International Knee Documentation Committee rating was not normal in any knee, nearly normal in 9, abnormal in 9, and severely abnormal in 2. The mean loss of extension was 0° to 2°, and the mean loss of flexion was 10° to 15°. **Conclusions:** By use of the described method of arthroscopic-assisted reconstruction of the cruciate ligaments and repair or reconstruction of the collateral ligament and other injured structures, 45% of the patients had good subjective results and functional stability and 45% had satisfactory subjective and functional stability within 2 to 3 weeks after surgery. According to the International Knee Documentation Committee scale, 45% of knees were nearly normal, 45% were abnormal, and 10% were severely abnormal. No patient's rating returned to normal. **Level of Evidence:** Level IV, therapeutic case series. **Key Words:** Knee dislocation—Cruciate ligaments—Collateral ligaments—Autologous graft.

Traumatic knee dislocation is an uncommon injury. The incidence may be higher than recorded because of spontaneous reduction or because the reduction was performed at the site of the accident and not recorded.[1] Most of the dislocations occur as a result of high-velocity injuries, mainly road traffic accidents, yet dislocation can also occur from low-velocity injury, as in sports. The associated morbidity is significant because of vascular and neurologic damage.[2]

Urgent operative treatment is indicated in patients with an irreducible dislocation, in patients with open dislocation, and in cases in which there is vascular injury.[2-5] Complete dislocation of the knee is possible without disruption of the posterior cruciate ligament (PCL).[6,7] The management of ligamentous injuries of the dislocated knee is variable, with one option being

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initial immobilization followed by active rehabilitation.[8,9] Advocates of this option claim that it results in a pain-free, stable knee with a mean of at least 90° of flexion.

Another option is early ligament repair, and its proponents have reported good results.[10-16] Recently, it has been reported that early ligamentous reconstruction using allografts has also yielded good results.[17-19] Autologous grafts have also been used for anterior cruciate ligament (ACL) and PCL reconstruction and repair of the collateral ligaments.[20,21]

There are currently no reports in the orthopaedic literature describing a consistent surgical arthroscopic approach for the management of these patients with autologous grafts of the gracilis and semitendinosus tendons of the uninjured and injured limbs for reconstruction of the ACL and PCL or reconstruction of the collateral ligaments using artificial graft (LARS Ligament, made of terephthalic polyethylene polyester fibers; J. K. Orthomedic, Dollard-des-Ormeaux, Quebec, Canada).[22-24] This study presents the results of arthroscopic reconstruction of the ACL and PCL and collateral ligaments by use of these grafts and implementation of a standardized program of rehabilitation in all cases. The purpose of this study was to evaluate the clinical results of surgical treatment of knee dislocation by use of a standard treatment protocol including continuous passive motion (CPM) at 4 to 5 days and complete reconstruction within weeks.

METHODS

Thirty-six patients with either obvious or reduced traumatic knee dislocation were evaluated between 1995 and 2002. We retrospectively reviewed the records of all traumatic knee dislocations that had been treated by our standard protocol. Of the 36 patients, 10 were excluded because 5 had vascular or neurovascular injuries and needed urgent vascular surgery and 3 had open fracture dislocation; these were treated by external fixation. In addition, 2 had multiple severe injuries. The remaining 26 patients underwent standard preoperative evaluation, surgical management, and postoperative rehabilitation.

Preoperative Assessment

After a detailed history was obtained and clinical examination and careful assessment of neurovascular status were performed, standard radiographs were obtained. CPM was used 4 or 5 days after the injury to achieve good range of movement before surgery or to keep the knee statically flexed to 90° to 100° during surgery to reduce swelling and hematoma and to maintain joint movement after surgery. Surgery was performed 2 to 3 weeks after the injury, at which time patients had achieved nearly full range of motion, and time was allowed for healing of the soft tissues. Addressing all injured ligaments, an early rehabilitation program was started on the fourth postoperative day, by use of the CPM machine.

Surgical Treatment

Examination with the patient under anesthesia was performed with the use of the contralateral knee as control. A tourniquet on the proximal part of the thigh was used in all patients. Our protocol is to perform reconstruction of the ACL and PCL with autologous graft (semitendinosus and gracilis tendon) of the injured knee and of the contralateral knee. Reconstruction of the medial and lateral ligaments was performed using artificial grafts. Any remaining injuries to the posterolateral corner were treated by direct repair, with peripheral meniscus tears being directly repaired in addition to capsular avulsion, whereas any central meniscus tear was excised to a stable rim.

Skin Incision: A marker was used to indicate the patella, the tibial tubercle, the fibular head, and the surface anatomy of the common peroneal nerve in a posterolateral dislocation. Anterolateral, anteromedial, and posteromedial portals were made under direct visualization with the use of the inside-out technique, if there was not marking on the skin. A 4-cm incision medial to the tibial tubercle on the proximal part of the tibia was made for the tibial tunnels of the ACL and PCL. A 2-cm incision was applied medially to the medial trochlear articular surface for the PCL femoral tunnel.

If there was a medial ligament injury, a 2-cm incision was made over the medial epicondyle and the graft was routed underneath the soft tissue from one incision to the other incision on the tibia. For the posterolateral corner, we used an incision extending between Gerdy's tubercle and the fibular head to the lateral epicondyle; this incision can be extended to explore the common peroneal nerve. An arthroscope was used, and diagnostic arthroscopy was performed to assess the cruciate ligaments, menisci, and articular cartilage. A 70° arthroscope could be placed through the anterolateral portal to visualize the tibial insertion of the PCL and the posteromedial portals that were to be used.