Learning the LaPrade Technique for Reconstruction of the Posterolateral Corner of the Knee

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I have always been interested in research on multiligamenous knee injuries, as these are challenging problems for both patients and orthopaedic surgeons alike. My Chief Choice Grand Rounds this year was focused on reconstruction of the posterolateral corner (PLC) of the knee. Because of the complex anatomy and variable injury patterns of the PLC, a number of anatomical and nonanatomical reconstructions have been proposed.

These methods include biceps tenodesis, fibula-based reconstruction, combined tibia- and fibula-based reconstruction, and reconstruction of all or some of the posterolateral structures (the fibular collateral ligament [FCL], popliteus tendon [PT], and popliteofibular ligament [PFL]). Previous studies compared the reconstruction procedures of biceps tenodesis with FCL, combined tibia and fibula with only fibula,2 Arciero with Larson type,3 and Arciero with another three-structure reconstruction4 (notably different from the LaPrade and Arciero techniques. In 2003, LaPrade et al6 performed lateral knee reconstruction with good clinical outcomes are were completed by 2:00 am.

In January 2015, I left Albuquerque on a snowy morning for my drive to Vail. I arrived in the town that evening and stayed next door to the Vail Valley Medical Center. The following morning, I met one of the sports fellows and a surgical assistant/athletic trainer for a quick orientation on the 3rd floor of the Steadman Clinic, where the walls were adorned with jerseys and memorabilia from athlete-patients who had received superb care there. I then met with Dr. LaPrade and had time for a brief visit before a busy operating day that began at 7:00 am. Five surgical procedures were scheduled: a knee arthroscopy with anterior cruciate ligament (ACL) cyst decompression; two revision ACL reconstructions; a multiligamentous ACL and medial collateral/posterior oblique ligament reconstruction with lateral meniscus repair; and a medial patellofemoral ligament repair. Because of an ability to move quickly between two operating rooms and the efficiency of the staff, the operations were completed by 2:00 pm.

In the operating room, I was impressed with the team that Dr. LaPrade had set up. A fellow, surgical assistant, and an athletic trainer regularly scrubbed into surgery with him. I was able to observe... but was not alone. Also observing was another athletic trainer and a visiting physician from Chile who was spending 2 months in Vail working with Dr. LaPrade and had, interestingly, visited the UNM orthopaedics department as a Latin American Society of Knee Arthroscopy and Sports Medicine fellow in 2006. I learned four things about Dr. LaPrade’s technique: he uses a bone-patellar tendon-bone autograft for most ACL reconstructions even in elderly patients because of the high physical activity levels in Colorado’s older population; he performs most revision ACL reconstructions as staged procedures with bone grafting and returns 6 months later for reconstruction; he regularly uses a postero-medial portal for knee arthroscopy; and he prefers double-bundle technique for posterior cruciate ligament reconstruction.

A talk with Dr. LaPrade and his staff revealed that the clinic setup was ideal. For the past 24 years, questionnaires (now viewable on Apple iPads [Cupertino, CA]) have been given to each patient who presented to the clinic, making data collection for research much easier. Because of the mountain setting and scope of the practice, most patients are either referrals or have acute injuries. Patients with acute injuries can be examined, sent downstairs the same day for magnetic resonance imaging, and scheduled for a surgical procedure for the next day, if needed (as happened with one of the operations I observed, which was performed on a patient who, a day earlier, had been injured while snowboarding).

The next morning, time was set aside for a cadaveric dissection of the PLC of the knee. I met the team on the ground level of the Steadman Philippon Research Institute and had the opportunity to see the exceptional research facilities and resources. Dr. LaPrade expertly dissected the PLC structures while I peppered him with questions about the procedure and our proposed biomechanical study (Figure 1). He showed me how to properly perform a full release of the peroneal nerve by incising the peroneous longus muscle overlying the nerve distally, and he dissected out the anatomical femoral origins of the FCL and PFL (Figure 2).

Dr. LaPrade and I discussed testing protocols, potting of specimens, and avoiding overconstraint of the PLC by securing the FCL graft at 20° internal rotation/slight valgus and the PFL/PET grafts at 60° of neutral rotation. Although we often think that structures eventually become lax after a multiligamentous reconstruction, he recalled one patient who had an overconstrained knee and difficulty walking for 10 years after PLC reconstruction done elsewhere. Thus, Dr. LaPrade stressed the importance of appropriate positioning for tensioning grafts and avoiding internal rotation to avoid overconstraint and other problems.

This was a phenomenal learning and research opportunity for me. I know it will help me in my professional development and help our research team with the biomechanical study. Finally, I would be remiss if I did not mention Vail Ski Resort—what an awesome mountain to ski on before I returned to Albuquerque!

References