

PCL Tears and other Ligament Injuries

Alan M. Reznik, M.D., MBA

The PCL (posterior Cruciate) is stronger and it takes a higher level of trauma to injure it than the ACL. The trauma is often to upper tibia in a collision during sports, a fall on the bent knee or trauma like a car, ATV or motorcycle accident. In baseball, non-break-away bases were the primary cause of PCL injury to a bent knee while sliding. This has improved with the newer bases that “break away” when hit too hard. When the PCL tears the tibia is pushed backwards while the femur stays relatively still. The movement causes the large ligament to tear. An MRI in figure 1 shows a complete mid-substance PCL tear. This picture shows it torn in the middle of the ligament, sometimes it tears near the femoral attachment other times it tears off the tibia with a small piece of bone. When it breaks off with a piece of bone, on rare occasion, the ligament is still strong and the bone piece is big enough to just put it back. When the knee is unstable because of a tear or injury to the PCL pending the level of instability the treatments may include rehabilitation with therapy, bracing and/or reconstruction of the ligament.

When the PCL is torn by itself, the injury tends to lead to less “instability”, yet it puts a large strain on the surface of the kneecap. It can be a relatively silent destroyer of the kneecap cartilage. Over time the kneecap wears out and the patella (kneecap) becomes arthritic over time. Dr. Reznik can test the knee for PCL instability and pending the level of damage figure out if it will need repair or reconstruction to help prevent future damage to the knee. In many cases when the instability is low bracing and exercise may be the best treatment. In others a reconstruction is best.

Many times, a PCL tear is associated with multiple other injuries and a nearly or completely dislocated knee. When with other injuries the knee can be very unstable. Dr. Reznik evaluates each ligament separately and often add information from an MRI to figure out the best treatment. Sometimes the ligaments need repair other times reconstruction.

The MCL can be torn by itself- this is very common injury (it is the most common knee ligament tear) and consists of a sprain grade 1 or 2 and these heal by themselves with protection and time. Isolated Grade three tears often will heal with immobilization, and protection. Once healing has started, motion is allowed in a protective brace. See figure 2 a grade 3 (or complete) MCL tear as seen on an MRI.

When torn completely, **the LCL** does not heal and if completely torn and must be repaired and/or reconstructed. It can be associated with an ACL or PCL tear. When with major ligament tears the knee can be very unstable. When more than one ligament is torn in the same knee and the knee is unstable, repair and reconstruction of the damaged ligaments is mandatory. Ideally, all should be fixed at the same time. One exception, pending the severity of the MCL



tear, if there is an **ACL and MCL** combination injury, usually fixing the ACL alone will allow the MCL to heal.

In an **LCL and PCL** or **ACL and LCL** combination injury, the knee is very unstable and both need to be repaired/reconstructed. As one would expect, with each additional ligament and the more traumas the knee has had, the more challenging it is to get the knee put back together. We need to remember that the peroneal nerve is very close to the LCL. Sometimes the peroneal nerve is injured at the time of the injury. If just a stretch injury, it can recover once the ligaments are stable. This takes a lot of time and sometimes we don't know what will happen to a stretched nerve for 3-6 months or more. Complete tears of the nerve at the time of the initial trauma are far more problematic, recovery is not predictable and the treatment is more complicated.

PCL Post Op rehabilitation protocol:

PCL has the opposite function of the ACL and is injured far less frequently. The ACL prevents anterior translation of the tibia under the femur and the PCL prevents posterior translation of the tibia. The ACL usually causes instability and giving way. The isolated PCL injuries causes less rotational instability-it causes anterior and posterior motion to increase and, at the same time, increases the load on the patella (kneecap) and it is a relatively silent killer of the patella cartilage and the medial knee. *Of course more severe PCL injuries associated with other ligament tears can cause significant functional instability.*

For rehabilitation purposes, we all know active quads strengthening puts strain on the ACL, especially open chain exercises. It follows that active hamstrings strengthening puts strain on the PCL reconstruction. Therefore, during the first three months post op we want to avoid hamstring curls.

In general: Once the knee settles (4-6 weeks post op) hip extension can be used for hamstring strengthening instead. Quads, abduction and adduction strengthening with slowly graduated resistance applied through the thigh (not through the foot or ankle) will be less limited as the motion involved does not directly stress the new ligament.

0-4 Weeks – Dressing change at first PT visit. Reinforce ankle pumps and hip motion to reduce risk of DVT. Quad sets, straight leg extensions, E-stim and modalities as needed. Superior patella glide to help quads sets and improve extension. Replace brace with clean ace wrap at end of session.



Patients may **WB as tolerated** with the knee immobilizer on. The patient will need the knee immobilizer at all times, except for showers and exercises for 3-4 weeks including sleeping.

After 3-4 weeks when the skin is healed and the swelling resolved, the knee immobilizer can be changed to the PCL specific brace once the leg swelling is gone, providing the brace is comfortable when worn. At that point the patient can sleep with the brace off. The brace should be used at all times except for showers, sleep and when supervised by therapist.

4-6 Weeks: Increase ROM from 90 to 120 degrees. Once passed 115, can start some light stationary bike for ROM only - NOT for long DURATION or STRENGTH. Add Hip extension and leg raises with knee in full extension. Add core and very simple balance exercises. MD follow up appointment should be set for week 6-7.

6-8 Weeks: work toward full ROM, active and passive ROM. Add strengthening, increase balance program. Increase bike as comfort allows.

2-3 Months: start Light hamstrings curls if hip extensions are adequate strength to support motion. Increase bike, balance and core.

3-4 months: Follow up appointment with MD. Isokinetic exercises for quads only, Isokinetic for hamstrings with no resistance. Increase bike, add walk backwards on treadmill.

D/C to home program when there is no pain with ADL's, good strength, good ROM and great balance. Some patients might benefit from a once a week or every other week therapy-monitoring program. Your judgment here is key.

6 months post op- running, agility drills, backward running and advanced balance exercises.

After 6-9 months sport specific exercises can begin. Lighter sports can begin with brace on. More difficult sports can start non-contact practice after 8-9 months with full return at 1 year. PCL specific sports brace should be used the first year back at sports to reduce player apprehension, protect the knee and improve performance.

Copyright © 2020, AMReznik All rights reserved.