

ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

GENERAL INFORMATION

Virtually every patient who tears their anterior cruciate ligament has difficulty with any activity that requires sudden stops, starts, jumping, twisting and missteps, such as going down stairs, walking on rough ground or stepping off a curb. These are activities which require sudden change in momentum and direction and are the ones usually most significantly hampered with a torn anterior cruciate ligament. Patients usually feel that the knee gives way, pops, slips out or something similar. When this occurs, the knee hurts, sometimes rather severely, and will usually become swollen. An athlete's knee, in particular, is seriously compromised when an anterior cruciate ligament has been torn.

This is a very serious injury to the knee. Ligaments are structures that give the joint stability or hold it together. The anterior cruciate ligament is one of the most important ligaments and one of the more difficult to treat. It is located in the middle of the knee joint and goes from the femur (thigh bone) to the tibia (shin bone). Before a tear actually occurs, the ligament has been stretched beyond its ability to recover its original length, which means it has lost its elasticity and now has a poor blood supply. When it tears, it almost always tears like a rotten rope pulling apart.

When the anterior cruciate ligament is torn, the knee becomes acutely unstable, and if not treated, will become chronically unstable or loose. This instability allows the knee bones, femur and tibia, to move on each other in directions that are not normal. When this happens suddenly, as when trying to jump, change directions or twist, the knee can "give way" or "pop out" causing pain and frequently tearing cartilages (menisci).

There are two cartilages (menisci) between the tibia and the femur. They are important and have multiple functions, the most of which are weight bearing and load transmission, joint stability, cushioning and knee lubrication.

One or both of these cartilages are often torn when the anterior cruciate ligament is torn. About 50% to 60% of patients who tear the anterior cruciate ligament acutely will have torn a cartilage (meniscus). Patients that have had a torn anterior cruciate ligament for longer than a year have a 90% to 95% chance of having torn cartilage.

In the treatment of this injury, the cartilage should be saved, if possible. Cartilage tears that are repairable are the ones in the outer third of the cartilage. In this area, there is a good blood supply and suturing these, either arthroscopically or through an open incision depending on the location of the tear, is recommended and usually successful.

Another problem with this injury is that almost every patient that sustains a torn anterior cruciate ligament will develop arthritis in the knee if left untreated. This occurs because of the instability, meniscal cartilage tears, and repeated injuries affecting the joint surface cartilage. This is the same kind of arthritis that we all get as we get older, but can occur in the twenties and thirties. It can be quite severe, particularly in patients who sustained the injury when they were in their teens. Even with proper surgical treatment, arthritis can develop, but in most cases surgery will decrease the severity and slow the progression of the arthritis especially if the cartilages are not torn or can be saved by repair.



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TREATMENT OPTIONS

As you can tell from the above, this is a very difficult and disabling problem. The knee cannot be made totally "normal" by any presently available treatment, but surgical reconstruction is the attempt to make it as close to normal as possible. Hopefully, the above problems will either be improved or prevented when the knee is stabilised and the cartilage tear, if any, is dealt with appropriately.

There are three basic treatment options. The first is minimal treatment, which would be to use crutches and participate in an appropriate rehabilitation programme with gradual attempted return to desired activities. This would take a minimum of four to six weeks. A variety of braces have been used for this problem, none of which function as well as we would like them to. This treatment alternative is like the ostrich that puts his head in the sand and tries to ignore the problem. If you have a torn cartilage, it will continue to cause dysfunction, disability and could do further damage to the knee joint. In addition, if you have a torn cartilage that is repairable, it may not be repairable after one or more re-injuries occur. Experience has shown, however, that the vast majority of patients with this injury will continue to have considerable difficulty with the knee as described above. If you desire this treatment alternative, the most effective way you can control this problem is to become rather inactive or sedentary and avoid almost all athletic and work activities that put stress on the knee.

The second alternative is to examine the knee under anaesthesia, arthroscope the knee, and then deal with the torn cartilage as indicated. This would not do anything for the ligament itself but would deal with the cartilage problem. If the cartilage cannot be repaired, the torn portion will be removed. The knee would then be rehabilitated, and you would be placed in a brace for your activities.

This would give you the opportunity to see how your knee copes. If you are still having problems with the knee slipping in and out of its socket, a reconstructive procedure could be performed. The disadvantage of this treatment alternative is that if your knee continues to slip in and out of socket, you might go on to further hasten the degenerative process.

If the cartilage is repaired, without reconstructing the anterior cruciate ligament, then 40% to 60% of these tears will reoccur within the next one to three years. If the anterior cruciate ligament is reconstructed and satisfactory stability is obtained, then the incidence of cartilage re-tears should be less than 10% or so.

In my opinion, the best way to treat this injury is to try and restore the injured part to as normal as possible. Since the anterior cruciate ligament cannot be repaired successfully by simply sewing it back together, something must be substituted to take the place of its function and stabilise the knee.

This brings up the third and essentially last treatment alternative. This would be to arthroscope the knee and deal with the cartilage tear by partial removal, and then reconstruct the anterior cruciate ligament. There are numerous and various types of reconstructions consisting of artificial ligaments, tissue from organ donors (called allografts), and your own tissues (called autografts).

Autografts are ligaments from other places in your body which we could use to reconstruct your knee, usually from the affected leg. As far as artificial and synthetic ligaments are concerned, they have proven to fail over time and they are not routinely available.

One of the most common graft tissues used are the hamstring tendons. These run from your pelvis, along your inner thigh and attach below your knee. They are harvested via a small 3cm incision near where they attach below the knee. Numerous studies have shown there is no long term functional deficit from using hamstring tendons as a graft and, in fact, there is some evidence to suggest they may even regenerate.

Another tissue used for anterior cruciate ligament reconstruction is the patellar tendon free graft which is a portion (1/3) of the tendon on the front of the knee. Up to 50% of this tendon can be taken without weakening the strength of the extensor mechanism significantly, according to research.

Once harvested, the graft is placed through drill holes in the shin bone and the thigh bone. Screws and/or other devices are used to secure or anchor the graft in this new position.

Allografts or tissues from organ donors have been used and will continue to be used in the future, as there are circumstances in which no other tissue is available or the patient requests an allograft. Allograft or organ donor tissue seems to be equivalent to your tissue with some exceptions. One is the remote possibility of rejection since the tissue is not "self". With tissue banks using today's selection and preservation techniques, rejection is unlikely. The second problem is the remote possibility of viral disease transfer, specifically hepatitis and HIV virus.

Again, with today's rigorous selection, screening and testing, the possibility of hepatitis transfer is essentially nonexistent, and the transfer of AIDS is said to be about one in one million.

Arthroscoping the knee and reconstructing the anterior cruciate ligament through the use of the arthroscope usually takes about 1 ½ to 2 ½ hours. You will have three or four small (<1cm) incisions around the knee and either one (if hamstrings are used) or two (if patellar tendon is used) 3cm incisions at the front of the knee.

This surgery is usually performed as a day case procedure.

POST OPERATIVE

It is very important to regain your ability to do strong quadriceps contractions and fully extend the knee both actively and passively within the first few days of surgery. You will be given instructions for all exercises prior to leaving the hospital. A brace is not usually used, except occasionally when other ligaments have been injured and need protection or menisci have been repaired in addition to the anterior cruciate ligament. Occasionally a splint may be used.

You will be on crutches usually for about four weeks. The purpose of all this is to protect the graft, as it is not strong enough at first to support the stress that is placed on it by full weight bearing. Your knee will naturally feel like you will be able to bear weight on it prior to this, but my strong recommendation is that you wait.

If you have regained your motion and have sufficient strength at the end of this period you will no longer require crutches. At around four weeks, you can ride a stationary bicycle and swim. At the end of six weeks, you can use a regular bicycle, if desired and begin some walking. Jogging can begin at three to four months but without sudden stops or starts. Resumption of most athletic activities can begin after six months.

Post-operative appointments usually occur between ten days to fourteen days after surgery, at four to six weeks after surgery, then nine to twelve weeks after surgery. Following that, visits will occur depending on the needs and desires as far as rehabilitation is concerned.

WHAT WILL MY KNEE BE LIKE?

Assuming you have no complications, good motivation and good rehabilitation, I believe you can hope for 85% to 95% of normality. This obviously has limitations of interpretation. As noted, I cannot restore your knee to normality. If you can tear your own anterior cruciate ligament, then you can certainly tear the replacement. In my experience, the likelihood of this happening has been small. In fact, more patients injure their normal knee than their reconstructed knee.

COMPLICATIONS

Complications are unusual but can occur. Loss of motion can occur but should not if you do the exercises as instructed and do them diligently. After the surgery, stiffness, swelling and scarring can occur around the kneecap, which can slow down your rehabilitation and delay return of motion.

In its worst form, the causes of loss of motion are not clear or known, but we think they are related to low pain threshold and the inability and/or unwillingness to do the prescribed exercises.

The operation can fail to work, either because the graft stretches out without any injury or with a future injury to the knee.

Infection, or pus, in the wound can occur, which is serious and can make your condition significantly worse. Risk of infection is <1%. It may require further surgery, or at the worst, the graft may need to be removed.

Phlebitis, or blood clots, in the leg is a very serious complication and could potentially be life-threatening. If you get increasing calf swelling, you need to notify me.

Reflex sympathetic dystrophy is the medical term for an extremely rare complication. It is an abnormal response to injury and/or surgery, which involves the small nerves (sympathetic nerves) that supply the blood vessels and sweat glands. It is painful and the symptoms can involve the whole limb. They include hypersensitivity, increased sweating, colour change, and others. Once diagnosed, it can usually be successfully treated, but this can be long, difficult and frustrating for both the patient and the physician.

Some small nerves, which supply sensation to the front of the knee, are often cut with the incision that is made to obtain the graft. This will result in some numbness over the front of the knee, which is usually not a problem, but is quite common. Your perception of this numbness will diminish as time passes. There is often some initial discomfort and bruising along the inner thigh if a hamstring graft is used. This is normal and settles within one to two weeks.

OTHER DIAGNOSTIC PROCEDURES

Occasionally, I will recommend obtaining an MRI scan before arthroscoping the knee. The MRI scan is the best non-invasive test we have and is approximately 90% accurate.

If I feel that your circumstances are such that you would benefit from obtaining an MRI scan, I will discuss this with you. Generally, if it is obvious that someone has a torn anterior cruciate ligament and desires to have the ligament reconstructed, an MRI scan would be an optional step and an additional expense. However, an MRI scan can obtain further information regarding additional injury to the joint surface, which may impact the development of arthritic change to the knee.

The MRI scan is composed of a large electromagnet with computerised recording devices, which is used to study many areas of the body. It is a painless test, but requires the patient to lie still for approximately 30 minutes to one hour at a time.