i want to make a website about the ACL, and the recovery of ACL

First we need to know what is it

The anterior cruciate ligament (ACL) is one of a pair of cruciate ligaments (the other being the posterior cruciate ligament) in the human knee. The 2 ligaments are also called cruciform ligaments, as they are arranged in a crossed formation. In the quadruped stifle joint (analogous to the knee), based on its anatomical position, it is also referred to as the cranial cruciate ligament.[1] The term cruciate translates to cross. This name is fitting because the ACL crosses the posterior cruciate ligament to form an “X”. It is composed of strong fibrous material and assists in controlling excessive motion. This is done by limiting mobility of the joint. The anterior cruciate ligament is one of the four main ligaments of the knee, providing 85% of the restraining force to anterior tibial displacement at 30 degrees and 90 degrees of knee flexion.[2] The ACL is the most injured ligament of the four located in the knee.

Then we need to know how does ACL tear happen?

An ACL tear or sprain occurs with a sudden change in direction or pivot against a locked knee. A pop, followed by pain and swelling of the knee are the most common symptoms of an ACL tear. Women are more likely to tear their ACL because of differences in anatomy and muscle function.

three main surgery

There are many variations of ACL reconstruction, all of which aim to give the patient the best functioning knee possible. The variability depends on what the graft, the new ligament, is made from. In general, there are three main graft options: a patellar tendon autograft, a hamstring autograft, and an allograft.

Patellar tendon autograft

The standard operation to fix a torn ACL is with a patellar tendon graft. Orthopedic Surgeon Dr. Paul Kiritsis takes out the middle section of the patellar tendon below the kneecap (patella). This new graft includes the strip of tendon, along with attached plugs of bone on each end.

Hamstring autograft

The hamstring muscles run down the back of the thigh. Their tendons cross the knee joint and connect on each side of the tibia. The graft used in ACL reconstruction is taken from the hamstring tendon along the inside part of the thigh and knee.

allograft

An allograft is tissue from an organ donor that has been sterilized and processed. The cadaver tissue is obtained from a tendon that closely matches the structural properties of your own ACL.

ACL recovery timeline

The First 2 Weeks After Surgery

This is a critical time during the recovery process because it is when your body is most vulnerable. Surgery is a traumatic experience for your muscles, ligaments, and other tissues, which is why the body responds with inflammation. During the period immediately after surgery, you may experience pain, swelling, and the buildup of excess fluid around the knee joint. The rehabilitation process starts right after the surgery, and you may be given exercises that must be performed daily to support your recovery. During this time, your ability to bear weight on the affected leg may be limited, so plan on using crutches and limiting your mobility for at least 10 days.

2-6 Weeks After Surgery

You may be able to bear weight on both legs during this time, but activity may still be limited as your tissues are actively healing. Depending on the type of car you drive, your medication use, and which leg is injured, you might also be able to resume driving during this time. Your physical therapist will focus on helping you regain full range of motion. Because your knee is still vulnerable at this stage, you may have to wear a protective brace to protect it from unnecessary stress.

6 Weeks to 3 Months After Surgery

As the healing process progresses and your knee continues to grow stronger, you may be allowed to do more low-impact activities such as cycling, swimming, and rowing. By the end of this period, you may be able to resume light jogging if your physical therapist thinks you are ready.

when you can return sports?

The time elapsed since surgery alone does not reflect the condition of the knee; however there are still important implications relating to this post-surgery timeframe. The ligament reconstruction in ACL surgery requires time to heal and regain strength, as do the surrounding muscles which will have depleted in strength, stability and proprioception. This healing phase needs to occur despite extensive rehabilitation. Indeed, statistics show that around 70% of ruptures occur within the first 6 months post-surgery8.

A secondary concern is the significantly increased risk of osteoarthritis in those who also sustain a meniscal injury along with the ACL. Research suggests that 50% of these patients will require meniscus surgery within 5 years9. Post-ACL surgery trauma could therefore accelerate this meniscal damage, increasing the prognosis of osteoarthritis from 0-13% to 21-48%, with a potentially significantly poorer outlook for future knee health10. This is often because athletes return to sport too early and the surgery is not yet fully robust, coupled with the fact that the knee hasn’t regained effective neuromuscular function to cope with extra demands11. Beyond 6 months however, there is a 50% reduction in rupture risk for every month return to play is delayed12.

Despite progressing through and achieving the discharge criteria mentioned above, there should be further checks prior to returning to full competition. The recent World Congress in Sports Physical Therapy suggested a three-phase model that allows graded progression:

Return to participation – participating in rehabilitation and training but at a low level.Return to sport – returning to their specific sport but not at the normal skill level.Return to performance – participating in their specific sport and performing at or above their pre-injury level13.

Within each stage the athlete should be monitored and assessed continuously to identify their weaknesses. The return-tosport phase should differentiate between normal rehabilitation drills and sports – pecific drills with optimal loading. This is where the load of the task is progressed appropriately until it matches that of the demands of the sport, and where the athlete can maintain this load. This can be monitored by comparing their load in the current week to that of the previous 4 weeks14.

This phase should also see the introduction of open skills15. Open skills allow for reactions, decision making, and the spontaneous elements of sport that cannot be practised within closed skills, which are routine, pre-prepared exercises. Open-skill training also allows optimal loading within the sports environment where fatigue will accumulate and the athlete can be assessed under more realistic conditions, but still within a controlled framework.

Figure 2 below details a thorough risk assessment that can be used to measure the athlete’s health, activity, and risk tolerance in returning to play. This model takes into account the multiple factors that should be considered including the condition of the tissues, the stress they will face, and the risks involved with sport after an injury.