Anterior Cruciate Ligament Repair – Surgery and Strengthening Rehabilitation

By Chen Ping-Hung

Mr. Yu, a 32-year-old man, suffered a jogging injury. After hearing two snapping sounds in his right leg, he realized he had no strength in his leg and couldn't continue his exercise routine. After his arrival at the hospital, he was diagnosed with a ruptured ACL (Anterior Cruciate Ligament) and meniscus damage in his right knee. After undergoing reconstructive, minimally invasive arthroscopic surgery conducted by Dr. Liu Kuan-Lin, Director of the Sports Medicine Center, Hualien Tzu Chi Hospital, he fully cooperated with a comprehensive rehabilitation program. Six months later, the muscle strength in his right leg had been restored to the same level as that in his left leg.

Since cruciate ligaments are located deep in the center of the knee joint, they are invisible from the outside and can't be touched even if the knee is pressed. Sudden stops and turns when taking a shot during a basketball game or missteps during jogging tend to cause

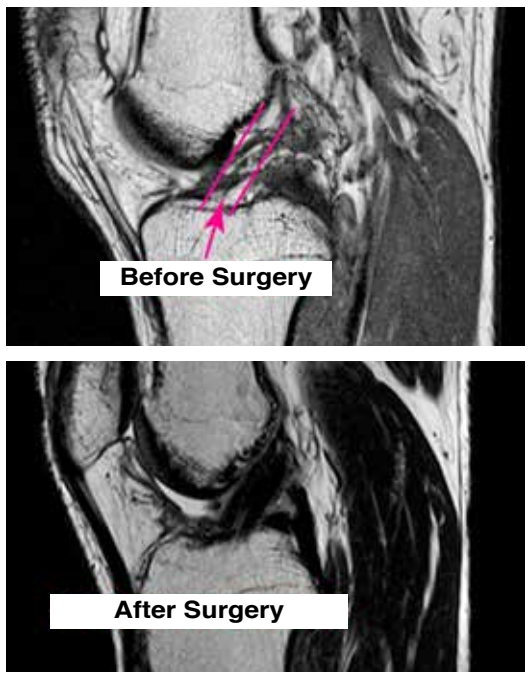
Dr. Liu Kuan-Lin, Director of the Sports Medicine Center, Hualien Tzu Chi Hospital

inward bending of the knees followed by a snapping sound. One to two hours later, patients start to experience pain and swelling in their knee joints, their legs give way, and they can't continue their exercise routines. These symptoms usually indicate cruciate ligament damage.

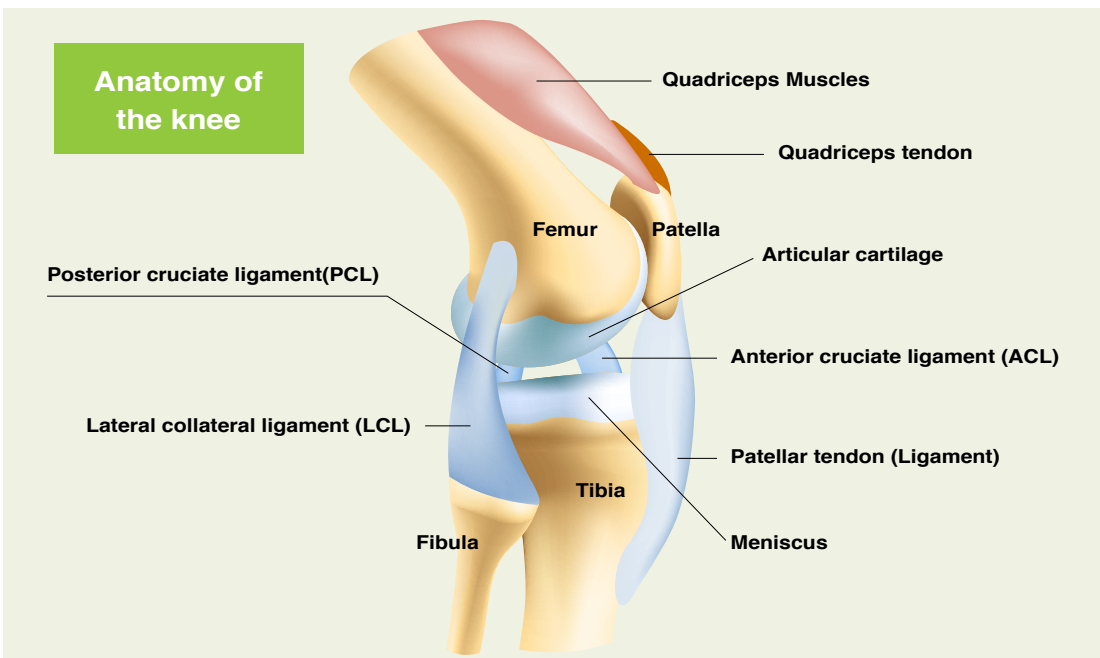
Dr. Liu points out that ACL damage in the knee joints has the following unique characteristic: bone fractures are generally associated with blood

clots caused by blood vessel rupture and pressure on the surrounding tissue results in inflammation. Slowly growing in-vivo substances encapsulate the injured part, resulting in bleeding and blood suffusion. Crucial ligament damage, on the other hand, is associated with blood in the knee joint cavity seeping into the surrounding tissue with no resulting blood suffusion or blood clotting. Surgery is therefore the only option for successful treatment.

Currently surgery options include physical and biological strengthening treatment. Traditional ligament repair or reconstructive surgery is a form of physical strengthening treatment. Biological strengthening treatment options include Platelet-Rich Plasma



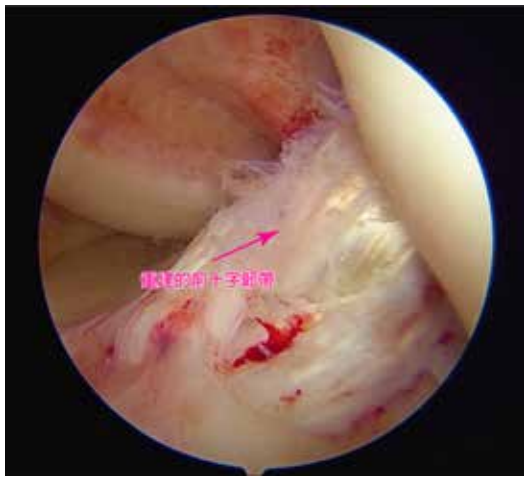
MRI images of the ACL taken before and three months after surgery clearly show the recovery process.



Injection (PRP) and Stromal Vascular Fraction (SVF) cell treatment. Dr. Liu stresses that treatment success tends to be strongly dependent on the patient's cooperation. Surgery ensures protection of the cruciate ligaments in the injured knee joint, but the injury also leads to muscle atrophy. The key to successful treatment is therefore not only successful orthopedic surgery but also post-surgery self-protection and continued strengthening rehabilitation to increase muscle strength.

Dr. Liu further recalls that Mr. Yu was unable to stand on his injured leg when he first examined him in the outpatient department. After diagnosing him with a ruptured ACL (Anterior Cruciate Ligament) and meniscus damage, he performed reconstructive surgery. On the first day after the surgery, the patient was able to perform basic leg lifting exercise after the anesthesia wore off.

After his discharge from the hospital, he continued his rehabilitation program under guidance by a physical therapist. Due to the fact that his knee was still swollen after the surgery, he could only perform simple yoga exercises three times a week in the first stage. After three to four weeks, he had to undergo knee bending and pull-aparts performed with force by the therapist. However, when his muscle strength was examined during a follow-up visit after three months, it was confirmed that his ligament was fully repaired and recovery was normal, but it was also detected that significant muscle atrophy was present in his right leg. With a view to preventing future impacts on his work



ACL recovery three months after surgery.

ACL recovery can be accelerated with Stromal Vascular Fraction (SVF) cell treatment (shown in the image)

and life, he put even more effort into his rehabilitation routine which consisted of three 30- to 40-minute sessions a day. Under guidance by his physical therapist, he engaged in step-up, exercise ball, bridge, and plank exercises. He even utilized fitness equipment in a gym for his rehabilitation regimen. Sure enough, the muscle strength in his right leg had recovered to the normal level in his left leg at the time of a follow-up visit three months after surgery.

Mr. Yu recalls that his knees were stiff, and he was unable to walk right after surgery. He therefore had to rely on the knee bending training performed by his physical therapist, which was very exhausting and painful. However, he was forced to bravely endure the pain since his bad knee would affect his ability to take business trips and engage in his beloved ball sports. He states that he can run and jump without problems now and his athletic ability has been restored to 80% (his ultimate goal is 90%). It is his firm conviction that rehabilitation can increase muscle strength and prevent reinjury in the future.

Dr. Liu explains that in the first stage within four weeks after sustaining ACL damage in the knee joint, patients can engage in ankle joint, knee bending, straight leg raises, and quadriceps femoris stretching and contraction exercises along the bed. It is strongly recommended that patients continue their rehabilitation program in the prescribed order in accordance with the recommendations of the rehabilitation team after their discharge from the hospital to speed up recovery of the injured part.

Swiss ball, rehabilitation exercises performed under guidance by a physical therapist.