

## Gymnast, family dedicate themselves to successful ACL rehabilitation

by James Wolf, PT, DPT

Anterior Cruciate Ligament (ACL) injuries are very common in teenagers and young adults. There are approximately 150,000 ACL reconstruction surgeries performed in the United States each year. These injuries and the recovery have a profound impact on the life of the patient and their family. I had the opportunity to work with a patient and her family during the recovery process which lasted nearly a year. The patient was 11-years-old at the time of her injury. Dr. Chudik performed a growth plate-sparing ACL surgery he developed. Now, four years after her injury and surgery, I recently met with the patient and her mother to talk with them about their experience.



Savannah first came to physical therapy a few weeks after her injury, which was still a month prior to her surgery. Her medical report stated that she was injured doing gymnastics. Savannah more specifically stated that she was doing a front walkover on a hill with her cousins. Her main sport at that time was gymnastics.

The few therapy sessions prior to surgery focused on preparing Savannah and her mother Amy for what to expect in the coming months. Amy is a mother of three, one of whom is now injured. This meant that during first few therapy sessions Savannah's young brothers often came along. Amy was accustomed to watching all three of them after school. While the siblings' presence was not a problem, it was clearly not going to be a solution for therapy three times a week for the next nine months.

Farther out from surgery, Savannah's biggest concern was whether or not she was going to be able to catch up in gymnastics after missing nearly a year of participation. Her friends were all in one group at the same level, and if she couldn't join them, returning to her sport would not be the same. Amy was kept very busy organizing logistics to get Savannah to and from therapy. A neighbor helped Amy by watching Savannah's two brothers during therapy. It took effort from the entire family to make sure Savannah was getting to her therapy regularly.

When asked what she learned from her surgery, Savannah stated, "It might take a long time, but you'll be okay and get back to where you were before." She has done just that—she currently participates in high school gymnastics, and just made her school's badminton team. Savannah says she is not concerned about hurting herself again while playing sports. Amy attributes this lack of fear of re-injury to Savannah's young age at the time of her injury. I personally recall her being highly fearful of different activities as they were introduced in therapy. For the first few weeks any bending of the knee was painful and difficult for her to do.

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## Knee dislocation can be a devastating injury

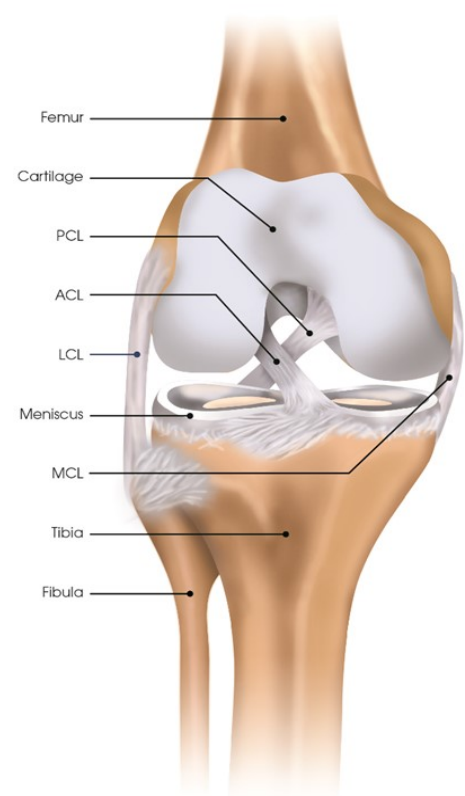
Knee dislocations, while uncommon, are serious injuries with significant consequences when it comes to staying active or even going about every-day life. According to the UCLA Medical Center, there are approximately 1.3 million emergency department visits each year for knee trauma. However, the number of knee dislocations is underreported because it is estimated that as many as 50 percent of the injuries “self-reduce” before an emergency room visit occurs. The most common causes of a knee dislocation are falls, motor vehicle accidents, industrial accidents or sports injuries with football, downhill skiing, etc.

The knee is one of the largest and more complex joints in the human body. The knee joint (tibiofemoral joint) is comprised of the area where the femur (thighbone), the tibia (shinbone), fibula (small bone between the knee and ankle) and the patella (kneecap) come together (see the anatomy picture for a visual representation). The knee is stabilized by four main ligaments that connect the femur to the tibia. Those main ligaments are:

1. Anterior cruciate ligament (ACL)
2. Posterior cruciate ligament (PCL)
3. Medial collateral ligament (MCL)
4. Lateral collateral ligament (LCL)

Knee dislocations occur when a large amount of indirect force is placed on the knee, which results in the tearing of multiple ligaments and the dislocation of the tibia from the femur. These injuries are typically high energy and tear both the ACL and PCL or three of the four main ligaments. Associative cartilage and meniscal injuries also are common. Sometimes, the forces are so large that they also injure (stretch or tear) the nerves and arteries crossing the knee and compromise the function and survival of the lower leg and foot.

Chicago Bears tight end, Zach Miller, suffered a torn popliteal artery when he dislocated his left knee in a game against the New Orleans Saints. Fortunately for Miller, the team’s medical staff quickly diagnosed his injury and Miller underwent emergency surgery at University Medical Center New Orleans. Surgeons repaired the damaged popliteal artery and saved his leg. Had Miller not had immediate care to repair circulation to his leg, the injury would have resulted in the amputation of his lower left leg. Early evaluation of serious knee injuries is important for the identification of nerve or muscular injuries like Zach Miller’s.



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## Return to sports is possible after knee dislocation, physical therapy

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Signs and symptoms of a knee dislocation include, but are not limited to:

- Knee pain, usually with injury
- Difficulty or inability to put weight on the knee
- Popping felt or heard during the injury
- Edema or swelling noted after the injury
- Inability to fully straighten knee
- Knee “giving out,” “locking,” or buckling
- Possible numbness, tingling, paralysis, discoloration, and/or a feeling of coldness in the joint or limb



After the knee dislocation is reduced and splinted, a thorough physical exam is required to identify which ligaments are torn. Additionally, several evaluations of the pulses in the lower leg and foot are required. If there are any abnormalities, an arthrogram is needed to evaluate the arterial blood flow to the legs. Surgery is required for significant arterial injuries compromising blood flow. If there are no vascular injuries, the knee is elevated, iced, splinted, and sent for an MRI to confirm and diagnose the full extent of any injury to the ligaments, meniscus, and cartilage of the knee. For knee dislocations with multiple ligament injuries, surgery (within two to three weeks) to repair and reconstruct (make new) all of the injured ligaments of the knee results in the best outcome. Surgery typically involves an open and arthroscopic approach. Arthroscopy is used to address and repair any meniscus or cartilage damage and repair or reconstruct the ACL and PCL within the joint. Open incisions are needed to repair or reconstruct the MCL and PCL injuries.

To allow the ligaments to heal properly following surgery, the knee is typically braced in full extension for four to six weeks. The patient is non-weight-bearing and physical therapy is needed to help maintain surrounding joint motion and function. After six weeks, the brace is discontinued, weight-bearing is progressed and aggressive rehabilitation continues. Eventually, Dr. Chudik performs FCE (functional capacity exam) testing. Upon passing this exam, the patient can return to sports. After surgery, the knee is never the same; however, if the patient has a successful surgery with no more neuromuscular injuries, has high compliant rates with physical therapy, and works hard, Dr. Chudik expects the knee to be stable, and thus predicts that the patient will be able to return to high functioning activities such as sports.

## **Surgery not appropriate for all meniscus root tears**

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For acute injuries, surgery is often recommended to repair the meniscal root and is performed arthroscopically. Non-operative treatment is best for chronic degenerative root tears; however, sometimes surgery is needed to partially remove the torn meniscus in order to relieve pain. Surgical repair requires six weeks of non-weight bearing followed by four to six months of physical therapy, a considerably longer recovery than surgery to remove only torn meniscus fragments which may require six to 12 weeks.

## **FCE guides safe return after ACL surgery**

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When Savannah first started working on walking, stairs and squats, she was eager to get moving, but cautious. The progression to running, jumping and basic tumbling was slow. We continued to practice these activities frequently until Savannah showed good body mechanics and no hesitations.

Savannah said the hardest part about all the rehabilitation after surgery was that she missed a lot of time that she could have been hanging out with her friends. She did acknowledge that it would have been very hard for her to do her training consistently without therapy. She thought it was important for her to go to therapy to have someone make sure she was doing all the exercises needed to recover. Amy agreed therapy was very important for Savannah's full recovery; however, looking back now, Amy is not quite sure how she was able to manage everything with Savannah and the rest of her family. Thankfully, after months of hard work,

Savannah successfully passed Dr. Chudik's ACL Functional Capacity Examination (FCE), a test designed to ensure that patients are ready to return to sports.

Some of the exercises will remain in Savannah's memory forever. She and her mother would do Bosu squats together and she dreaded Russian electrical stimulation used to activate the quadriceps muscle after surgery; however, for Savannah and Amy, this experience is best remembered as a challenging time where their hard work really paid off.