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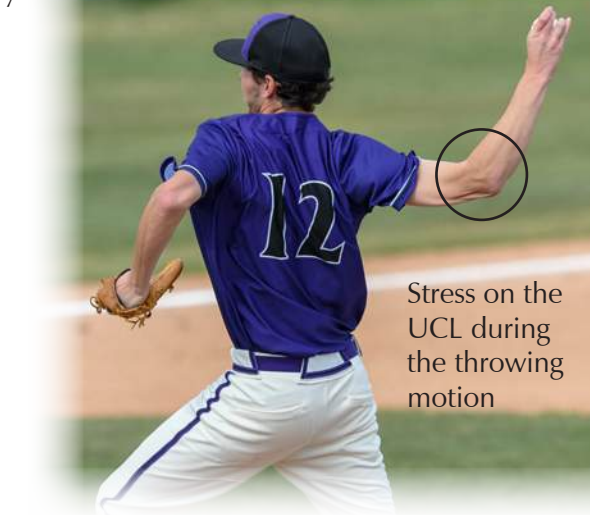
Tommy John Surgery

The medial ulnar collateral ligament (UCL) of the elbow is a small band of tissue, yet it has played a giant role in the history of sports. The media coined the name “Tommy John” 50 years ago when it brought the surgery into the limelight after the first surgical reconstruction of the UCL in 1974. Tommy John was a successful major league pitcher who thought his career was over until he had the first surgery performed by Dr. Frank Jobe. Twelve months postsurgery, Tommy John returned to the pitcher’s mound and stayed there for another 14 years.

The UCL stabilizes the elbow, especially through certain ranges of motion and stress. The ligament, located on the medial or inner portion of the elbow, runs from the humerus (upper arm bone) to the ulna (lower arm bone), deep to the flexor muscles of the forearm (**Fig. 1**). During normal activities of daily living, the UCL contributes very little to the elbow’s function. However, when placed under the stress of the throwing motion, the UCL has its moment, restraining the elbow from gapping open and allowing amazing acts of human performance, like throwing a 104 MPH fastball. In fact, as throwing sports demand higher and higher velocities from pitchers, the rate of UCL injuries continues to climb. Interestingly, UCL tears can occur in both amateur and professional athletes, adolescents, and veteran pitchers in their 40s. Researchers are still examining the factors that place an athlete at risk; but obviously, the volume of throwing, however measured, is the most significant contributor.

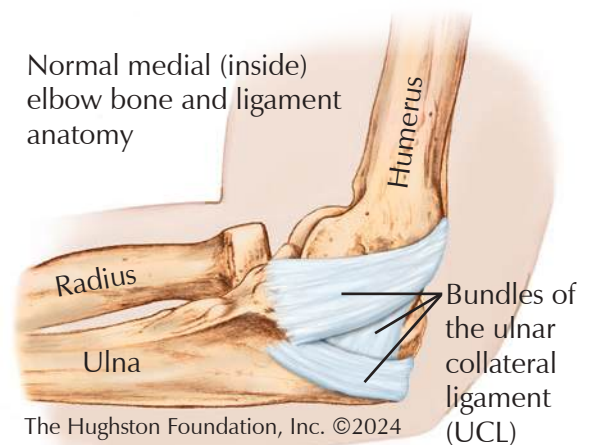
Both partial and full thickness tears can occur or the ligament can simply become thin after years of stress and microtrauma (small tears to soft tissue). Historically, patients who do not participate in heavy throwing activities can function well with a torn or deficient UCL. However, with frequent or higher velocity throwing, patients without a functioning UCL often experience elbow pain and the inability to throw at their usual velocities or with accuracy. Often, injured athletes will describe a single throw in which a “pop” was felt in the elbow; however that isn’t always the case.

Fig. 1. Anatomy of the pitcher's elbow

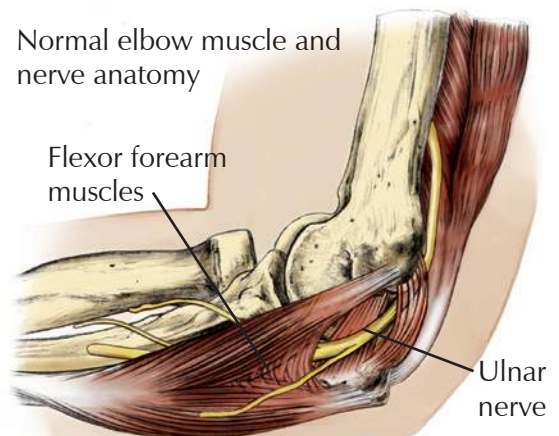


Stress on the UCL during the throwing motion

Normal medial (inside) elbow bone and ligament anatomy



Normal elbow muscle and nerve anatomy



Patients may also occasionally sense a feeling of “giving way” or numbness of the fingers in the middle of the throwing motion.

Diagnosing the injury

Making the diagnosis of a torn UCL usually requires a physical examination and x-rays of the elbow. Some physicians use ultrasound for additional imaging during a clinic visit. Others may order a magnetic resonance imaging study (MRI, test that shows the bones, muscles, tendons, and ligaments) that can confirm the presence of a UCL tear, and help the physician fully see and understand the injury.

Treatment

Until recently, tears of the UCL were treated simply with either nonoperative care through rest, physical therapy, and bracing, or surgical care with reconstruction of the torn ligament using grafted tendon. In high-level baseball pitchers, Tommy John reconstruction became the gold standard of care for many years because most athletes were able to return to play approximately 12 months postsurgery.

Recent innovations have added improved treatment options to the surgeon’s toolkit. Doctors have used orthobiologic treatments, such as platelet rich plasma (PRP), with some success in partial tears; however, research continues in this area. The most exciting development, however, is the internal brace repair. In this procedure, the surgeon uses specialized bone anchors and high strength suture tape to repair and then “splint” the healing ligament internally. This surgical technique allows for earlier aggressive rehabilitation and return to throwing. (Fig. 2). Some therapy protocols allow throwing progression starting as early as 3 to 4 months after internally braced surgeries.

The decision making process on how to treat UCL tears in throwing athletes can be complex, taking into account many factors such as the age and competitive

level of the athlete, their position (especially in baseball), future aspirations, and other sporting activities. Also, the MRI findings and quality of existing ligament tissue may determine whether an athlete is better suited for nonoperative care, repair with internal brace, reconstruction, or some hybrid of reconstruction with the internal brace. Younger athletes with an acute injury and good ligament tissue are better candidates for repair with internal brace, while more seasoned throwers with attritional (wearing down, or weakening) tears and poor ligament quality, should undergo reconstruction with a graft. For a successful outcome, patients should consult with a skilled orthopaedic practitioner who has experience in dealing with throwing athletes.

Physical therapy

Recovery after UCL surgery often involves physical therapy, which focuses on re-establishing range of motion of the elbow and rebuilding the throwing motion of the athlete. While recovering from the surgery, often the athlete needs to correct strength deficits or imbalances in the rest of the body, which may have contributed to the UCL tear in the first place. Management of the postoperative period and decisions on return to play require a team approach, with surgeon, therapist, trainer, and coaches all in communication about the athlete’s progression. Athletes return to high-level throwing around 9 to 12 months for a ligament reconstruction, while repairs with internal bracing return closer to 4 to 6 months postoperatively.

Outcomes

The surgical outcomes for both reconstruction and repair surgery are quite good in the literature. Historically, reconstructions using traditional techniques have demonstrated a return to play rate of around 80% to 90%.¹ The newer UCL repair technique with internal bracing also has very favorable results, with 92% to 95% return to play rates.² Complications are relatively rare, but most commonly involve irritation of the nearby ulnar nerve, superficial infection, and stiffness. Overall, throwing athletes with UCL disorders seem to have a higher return to sport than those with shoulder disorders. Thus, the future of orthopaedic care for UCL looks bright, and through surgical innovation, we are now providing better care for the many throwers plagued by elbow pain.

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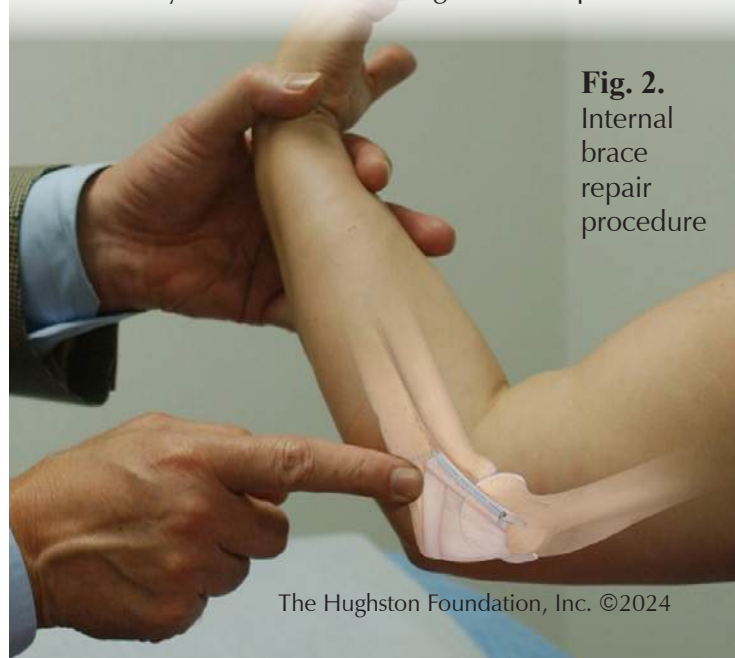


Fig. 2.
Internal
brace
repair
procedure

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Lesser Toe Deformities

UNDERSTANDING CLAW TOE, HAMMER TOE, AND MALLET TOE

Foot health is essential for overall well-being, yet we sometimes endure discomfort to wear fashionable shoes until we start experiencing pain or notice deformities. Claw toe, hammer toe, and mallet toe are common conditions that can make walking painful and they can change how your feet look. Recognizing lesser toe conditions early can help you alleviate these common foot problems.

Recognizing the problem

Three small bones—the distal, middle, and proximal phalanges—form the lesser toes. The joint between the distal and middle phalanges is the distal interphalangeal joint (DIP); the joint between the middle and proximal phalanges is the proximal interphalangeal joint (PIP); and the metatarsophalangeal joint (MTP) connects the toe to the foot at the metatarsal bone. Two tendons—the extensor digitorum longus (EDL) and flexor digitorum longus (FDL)—allows the lesser toes to flex (bend) and extend (straighten) (Fig. 1). Determining a toe deformity depends on how the joints are flexed or extended while at rest. (Figs. 2 - 4)

Fig. 1. Normal foot anatomy and tight shoe box example.

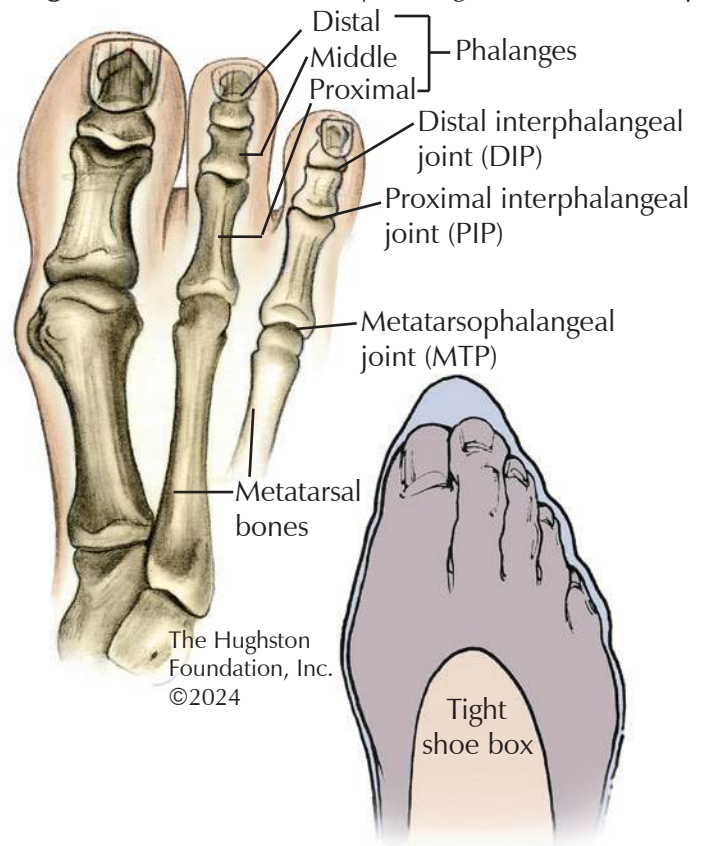


Fig. 2. Claw toe: flexed DIP and PIP, with the MTP hyperextended (extending or straightening the joint beyond its normal range of motion)



Fig. 3. Hammer toe: a normal DIP, a flexed PIP, with the MTP extended



Fig. 4. Mallet toe: a flexed DIP, with normal PIP and MTP



Causes

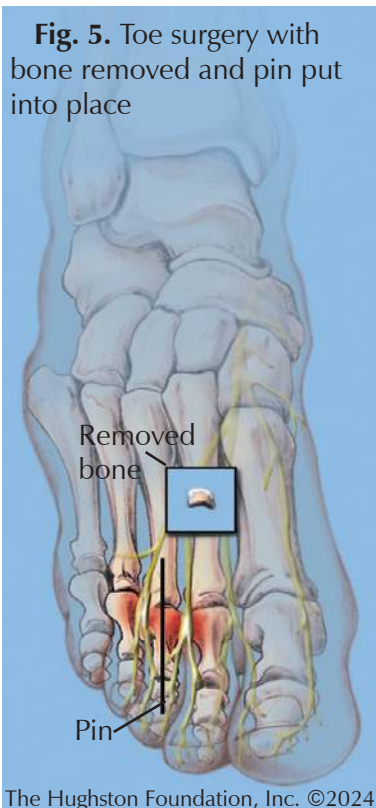
These toe deformities can result after an injury to the joints and tendons and some, namely claw toe, has been linked to chronic conditions like diabetes and alcoholism. However, the most common cause for these deformities comes from wearing shoes that do not fit properly. Wearing the wrong size shoe or a shoe with a narrow shoe box can place your toes in unnatural and uncomfortable positions. Doing this day after day can lead to permanent changes in your foot anatomy, which leads to your toes remaining in an abnormal position after removing the shoes. For this reason, toe deformities are more common in women who spend their days in high heels and small toe boxes. Besides shoes, the lesser toe deformities can result from trauma, genetic abnormalities, and arthritis.

Symptoms

Apart from appearance, most patients experience irritating corns, calluses, or wounds caused by contact and friction within the shoe. In mallet toe, for example, the DIP bends to the point where the tip of the toe rubs into the ground when walking. The skin becomes sensitive and you experience pain with each step. When the top of the toe bends upward, it can rub against the top of a low toe box causing additional blisters and raw skin.

Treatment

When dealing with toe deformities, it's best to start with nonsurgical treatments; however, if the condition worsens, then surgical intervention may be necessary. For most patients, getting shoes with a high toe box can help alleviate discomfort. A larger toe box stops the problem of the toes crammed into a small area forcing the joints into unnatural positions. Your doctor may also recommend you use toe sleeves to provide cushion



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Fig. 5. Toe surgery with bone removed and pin put into place

between the toes and the shoe or sock. For claw and sometimes hammer toe, if the PIP joint is still flexible, your physician can apply tape to the toe to hold it straight. This prevents the joints from contracting further and helps loosen the muscles and tendon causing the deformity. Unfortunately, if these options are unsuccessful and issues continue to persist, surgery may be the best choice.

If the joints are still flexible, surgery to lengthen the tendons allows the toe to return to the correct position. The surgeon can also transfer the tendons from

areas where the pull is too strong to an area where the pull is too weak to correct the imbalance of the forces on the toes. Finally, if the joints have been in their abnormal position for too long and have become inflexible in these positions, arthrodesis (fusion of the joint in the straight position) may be necessary (**Fig. 5**). The surgeon lengthens the tendons while also removing a part of the bone at the joint and inserting a pin through the entire length of the toe. The pin remains until the bones on either side of the joint have fused together to prevent any movement of the toe at that joint. In this scenario, the toe will still be unable to move at the joint, however, it should be in a position that causes less pain.

Don't wait

Pain and appearance are what often lead people to seek medical advice about toe deformities. However, some people avoid seeking help, allowing their deformities to worsen. This can lead to a number of more serious issues, such as infection from untreated abscesses, and wounds developing on other parts of the foot from changes in the way you walk. You may even begin to have issues with balance. Not to mention, the longer you wait to have your condition treated, the more difficult the treatment and recovery becomes. When symptoms start, don't wait. See an orthopaedist and start making the small changes before you need more extensive treatment.

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Achilles Tendon Rupture

The strongest and largest tendon in your body, the Achilles tendon is vital for positioning the foot for walking and running. A rupture of your Achilles tendon is common if you are over 40 and participate in sporadic recreational activities. This can be especially true if you are a weekend athlete who is new to a sport or exercise.

The Achilles tendon forms from contributions of the gastrocnemius (visible calf muscle) and the soleus (deeper calf muscle) muscles and inserts into the posterior or back of the calcaneus (heel bone). There is a decreased blood flow in the midportion of the Achilles tendon in an area known as the hypovascular zone, which is where most tendon ruptures occur. Doctors treat Achilles ruptures with nonsurgical techniques or by performing surgery.

Screening and diagnosing your injury

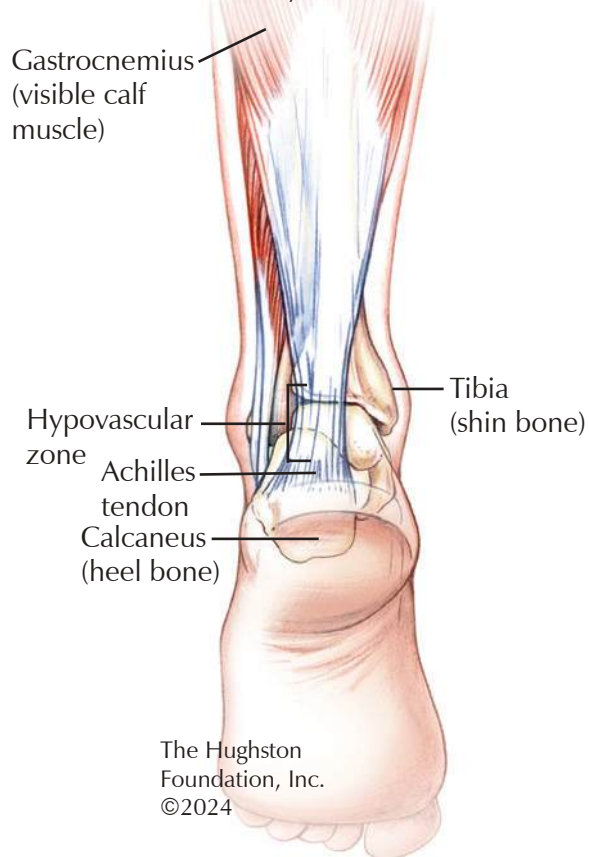
A patient with a ruptured Achilles tendon will generally complain of an abrupt snap in the calf area followed by intense pain. Patients often describe the feeling of being kicked, cut, or shot behind the leg when the injury occurs. You may not be able to bear weight on the affected leg to walk, run, or raise up onto your toes. There will often be marked swelling at the site of rupture and assessment will reveal discontinuity or a gap where the tendon should be.

While the doctor assesses your injury, he or she will rule out other possible injuries, such as an ankle fracture. When an orthopaedist suspects a rupture, he or she may perform the Thompson test during the clinic visit. If you cannot plantarflex (point your toes to the ground) while squeezing your calf, it reflects the telltale sign of an Achilles rupture. Often, the results are enough to make the diagnosis without further testing; however, physicians usually confirm the diagnosis with radiological imaging, such as an x-ray or MRI scan (magnetic resonance imaging test that show the bones, muscles, tendons, and ligaments).

Causes

The causes of Achilles tendon rupture include direct trauma, abrupt forced plantarflexion (forcefully and suddenly pointing the foot downwards), excessive pronation (foot rolling inwards), and chronic degeneration of the tendon.¹ Certain sporting activities are associated with rupture of the Achilles, such as track and field, volleyball, diving, basketball, running, cycling, and tennis. The risk factors for a rupture of the Achilles tendon include overexertion, poor warm-up or conditioning before exercise, extended use of corticosteroids, and the use of quinolone antibiotics² (treats bacterial infections). There are also certain factors related to the foot and ankle that increase the risk of tendon rupture such as a cavus (high arched) foot type, decreased flexibility of the gastrocnemius (calf muscle) and reduced dorsiflexion

Fig. 1. Posterior or back view of normal foot and ankle anatomy



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(ability to draw toes towards your shins) of the ankle. Patients who have had an Achilles tendon rupture in the past are more likely to have a repeat rupture on the contralateral, or opposite side.³

Treatment

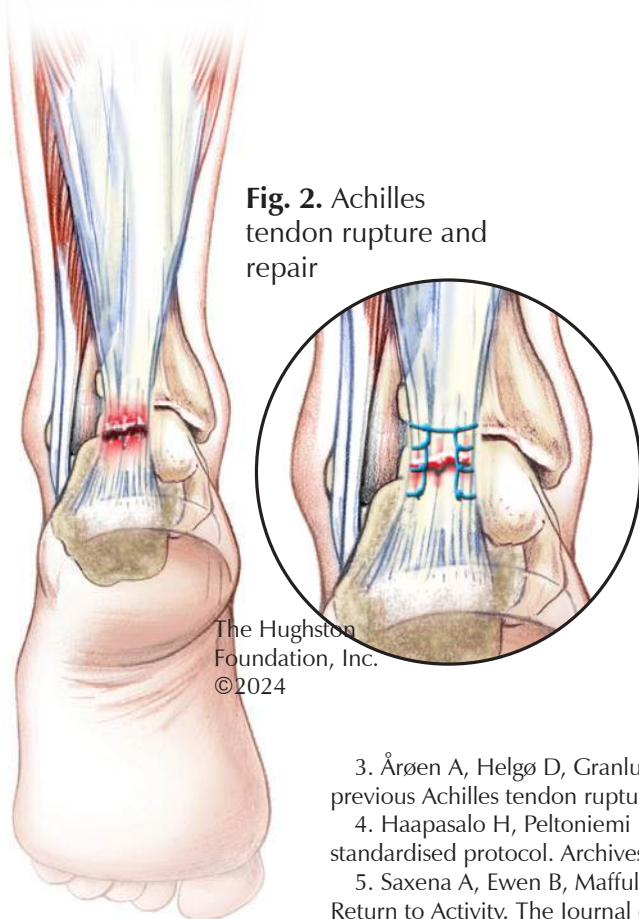
With an Achilles tendon rupture, you should seek medical attention immediately. Early treatment involves pain control, rest, elevation, and bracing of the ankle. For elderly patients who have multiple medical conditions and live sedentary lifestyles, nonoperative management can be the best option. Your doctor may recommend surgical treatment if you are a highly active individual; however, treatment is unique for each patient. Overall, studies have shown good functional results and patient satisfaction with both nonoperative and operative treatment.¹ Nonoperative treatment involves casting or functional bracing for a period of 6 to 12 weeks. Surgical management involves several ways of re-approximating (joining the 2 ends together) the severed ends of the Achilles tendon followed by a cast or rigid orthosis. Regardless of the treatment, physicians usually recommend that patients use an orthotic and start physical therapy after removal of the cast to improve the range of motion of the ankle and strengthen the muscles.⁴ Your physical therapist can recommend a slow resumption of activities such as swimming and walking before fully returning to sport. The healing rates between surgical and nonsurgical treatments are roughly the same although the return to work can be longer in patients with nonoperative treatment.

Outcomes

The prognosis for patients with Achilles tendon rupture is excellent; however, some patients may experience a reduced range of motion in the ankle. Most active patients can resume their sport without limitations. It is important to note that nonoperative treatment carries a rerupture rate of nearly 40% compared to surgical treatment with only a 0.5% rate.⁵ Some patients may experience delayed wound healing following surgery, especially patients who smoke and are using corticosteroids. By instituting a thorough warm-up regimen, gradually increasing the intensity of workouts, and stretching before engaging in physical activity, you will reduce the risk of another Achilles tendon rupture.

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Fig. 2. Achilles tendon rupture and repair



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Modified Lemaire Lateral Extra-Articular Tenodesis

IMPROVING ACL SURGERY OUTCOMES

Anterior cruciate ligament (ACL) injuries commonly occur in high-performance athletes, especially during cutting and pivoting moves. The ACL is a ligament (tough connective tissue) in the knee that connects the femur (thighbone) to the tibia (shinbone). (**Fig. 1**). When the knee bends, the ACL provides structural support to the bones while maintaining slight elasticity, which allows dynamic, yet stable movement.

With the goal of restoring ligamentous stability to the knee after an injury, ACL reconstruction is the standard treatment for safely returning athletes back to their same level of sport. Reconstruction usually involves using a tendon graft, which is a piece of healthy tendon that is transplanted surgically to replace the torn ACL. The graft is held in place with screws or other fixation devices. The tendon graft used may be an autograft (from the patient) or an allograft (from a tissue donor).

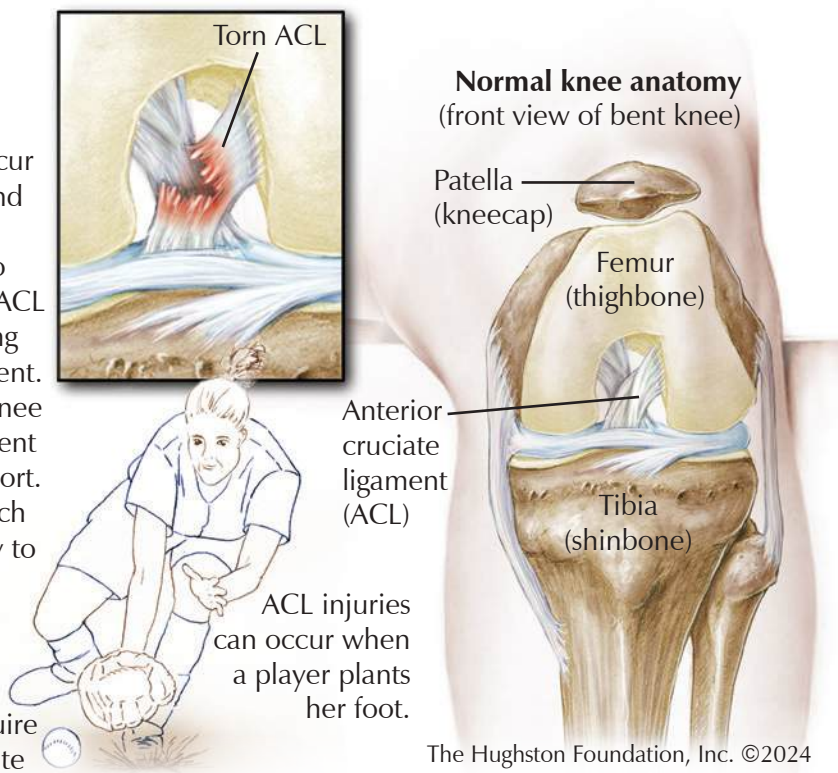
After these athletes undergo surgery, they typically require up to a year of physical therapy and rehabilitation. Despite improvements in surgical techniques and rehabilitation, ACL reconstructions can retear or “fail,” which can be devastating to the patient’s athletic career and lifestyle.

The modified Lemaire procedure, or lateral extra-articular tenodesis, has garnered recent attention due to several scientific studies showing that it can improve the stability of ACL reconstruction and even decrease failure rates.¹ The surgeon completes the modified Lemaire procedure alongside the ACL reconstruction (**Fig. 2**). The addition of the procedure, carries few risks and can be performed through a small 2cm incision. The surgery involves harvesting a small portion of the iliotibial band (a thick, wide tendon extending from the top of the pelvic bone to the knee joint) on the lateral (outer) side of the leg. Then the surgeon attaches the band to the lateral side of the femur to stabilize the rotational forces of the knee, thus protecting the reconstructed ACL.²

Not all patients will benefit from the Lemaire procedure. Your doctor may recommend the surgery if you play a high-risk sport that requires cutting, jumping, or pivoting, such as football, LaCrosse, soccer, or basketball. Your physician may also recommend the procedure if you have hyperlaxity (a large range of motion), high-grade rotational instability (severe instability due to ligament damage) of the knee, had an ACL injury on the other leg, or if you already had ACL revision surgery. Nonetheless, both professional and adolescent athletes can benefit from this procedure since it enhances the primary ACL reconstruction for active patients at risk for graft retears.

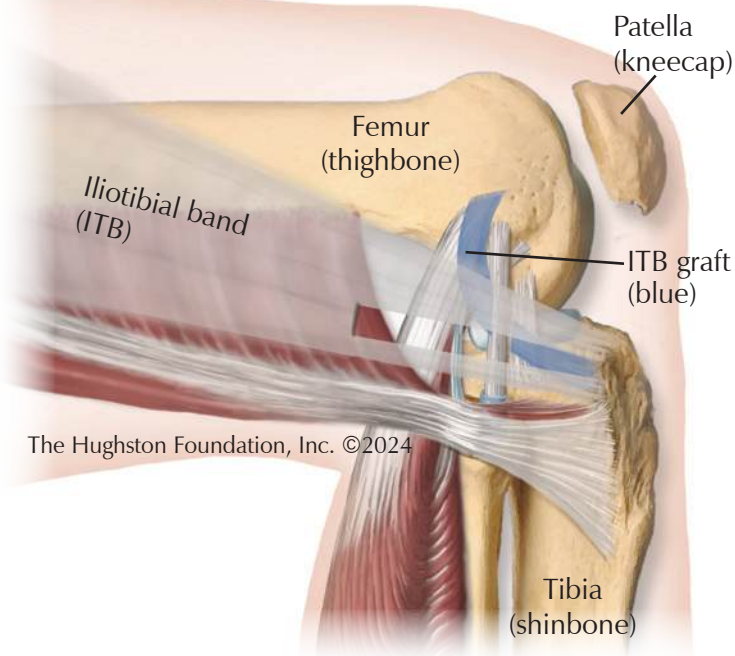
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Fig. 1. Knee (bent) anatomy and torn ACL.



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Fig. 2. Side view of bent knee with ITB graft.



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Human Flourishing

What does it mean to flourish?

Flourishing, which originates from the Latin word *floreo*, meaning, “to bloom,” is best defined as a state of optimal functioning and well-being in all aspects of a person’s life. It’s used to describe and assess positive mental health and overall life satisfaction. Flourishing involves consistently experiencing positive emotions, maintaining robust physical and mental health, and enjoying fulfilling social relationships. While there are other aspects to flourishing, it ultimately represents the pinnacle of overall well-being.

Although the word “flourishing” has Latin roots, its philosophical concept comes from Aristotle’s concept of *eudaimonia*, which means achieving the best conditions possible for a person, both mental and physical. This overlap illustrates how flourishing has been a topic of philosophical and psychological discussion for centuries.

The Flourishing Index

During the last decade, research into human flourishing has dramatically increased, partly due to the growing prevalence of mental health issues and heightened awareness of overall well-being in the United States. To understand if a person is flourishing, there needs to be an objective scale or criteria of what it means to flourish. To address this gap, Harvard professor Tyler J. VanderWeele published *On the Promotion of Human Flourishing*, in the *Proceedings of the National Academy of Sciences* in August 2017. In the paper he developed the Flourishing Index, which consists of 6 domains with 2 questions each, designed to better determine if a person is achieving their full potential (**Box**).

Importance of flourishing in healthcare

Flourishing is important in healthcare because it encompasses the full spectrum of what it means to live a good life. While having a good life can indicate low stress or avoiding illness, people with chronic health conditions can still achieve a good life and experience fulfillment. Flourishing aims to quantify and qualify this state of fulfillment. The degree of flourishing can affect individuals’ health, and current studies are investigating the relationship between flourishing and health outcomes. Health outcomes measure a patient’s response to treatment. With further research into the link between flourishing and health outcomes, treatments can become more personalized, ensuring optimal care and enhanced quality of life. This information can lay the groundwork for new health policies and support the implementation of additional interventions that positively affect a person’s well-being and overall health. This comprehensive approach ensures that people can flourish in every dimension of their lives.

Consider what it means to flourish

Take a moment and reflect on the concept of flourishing and your life. Keep in mind; we are unique individuals with different aspirations and ideals as to what brings us joy; therefore, the questionnaire may prove useful as a guide rather than a number scale. After some thought, ask yourself; am I content? What can I do to achieve fulfillment? Based on your thoughts, create actionable goals. If you strive to flourish, you may find yourself living a more fulfilling and balanced life.

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Box. The Flourishing Index Questionnaire

Domain 1: Happiness and Life Satisfaction.

1. Overall, how satisfied are you with life as a whole these days?
0=Not Satisfied at All, 10=Completely Satisfied
2. In general, how happy or unhappy do you usually feel?
0=Extremely Unhappy, 10=Extremely Happy

Domain 2: Mental and Physical Health.

3. In general, how would you rate your physical health?
0=Poor, 10=Excellent
4. How would you rate your overall mental health?
0=Poor, 10=Excellent

Domain 3: Meaning and Purpose.

5. Overall, to what extent do you feel the things you do in your life are worthwhile?
0=Not at All Worthwhile, 10=Completely Worthwhile
6. I understand my purpose in life.
0=Strongly Disagree, 10=Strongly Agree

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Domain 4: Character and Virtue.

7. I always act to promote good in all circumstances, even in difficult and challenging situations.
0=Not True of Me, 10=Completely True of Me
8. I am always able to give up some happiness now for greater happiness later.
0=Not True of Me, 10=Completely True of Me

Domain 5: Close Social Relationships.

9. I am content with my friendships and relationships.
0=Strongly Disagree, 10=Strongly Agree
10. My relationships are as satisfying as I would want them to be.
0=Strongly Disagree, 10=Strongly Agree

Domain 6: Financial and Material Stability.

11. How often do you worry about being able to meet normal monthly living expenses?
0=Worry All of the Time, 10=Do Not Ever Worry
12. How often do you worry about safety, food, or housing?
0=Worry All of the Time, 10=Do Not Ever Worry



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