Peroneal Tendon Subluxation

Subluxation or dislocation of the peroneal tendons is a relatively rare injury. The injury occurs in the posteriolateral area of the ankle and was first diagnosed in a ballet dancer in 1803.\textsuperscript{1} It is commonly misdiagnosed or hidden by lateral ankle sprains due to the mechanism of injury and the location of pain and edema. Of the over 20,000 ankle injuries that occur every day in the United States, only a very small fraction of them include peroneal tendon subluxation.\textsuperscript{2} It is most commonly seen in sports that require quick cutting movements under a significant load, such as skiing, basketball, ice skating, soccer, and gymnastics.\textsuperscript{1} Acute subluxation of the tendons typically occurs when the foot is in dorsiflexion and slight inversion. The tendons sit in the retromalleolar groove of the posteriolateral ankle and are secured by the superior and inferior peroneal retinaculum (SPR and IPR respectively). Subluxation involves the tendons popping out of the groove or tearing, and laxity of the SPR. Surgical interventions are the most common and effective methods of injury resolution, but there have been some instances where a more conservative non-surgical rehabilitation process has shown success.\textsuperscript{3}

The two tendons involved in peroneal tendon subluxations injures are the peroneus longus tendon and the peroneus brevis tendon. The peroneus longus tendon passes posterior to the lateral malleolus through the retrofibular groove and inserts on the lateral side of the base of the first metatarsal and the medial cuneiform. The peroneus brevis tendon passes through the same retrofibular groove and inserts on the base of the fifth metatarsal.\textsuperscript{4} Though it is rare for the tendons to tear during a subluxation or dislocation, it does happen in some cases. Typically the tendons are only displaced and are not actually receiving any damage. Both of the tendons sit just posterior to the lateral malleolus in the concave retrofibular groove, which is formed by a
ridge of collagenous soft tissue, along with the periosteum that runs along the lateral edge of the distal fibula. The depth and width of this ridge varies greatly person to person and can be a predisposing factor that contributes to peroneal tendon subluxation and lateral ankle instability. Though most people have a deep groove that supports the tendons well, some people have a convex groove, and some have just a flat surface where the groove should be. The structure that is most affected by subluxations is the superior peroneal retinaculum (SPR), which is a fascia that originates from the posterior surface of the lateral malleolus and inserts on the aponeurosis of the Achilles tendon. The width and integrity of the SPR can also vary greatly from person to person and can be a huge contributing factor to subluxations and dislocations. As mentioned earlier, the tendons are also supported and guided to their insertion points by the inferior peroneal retinaculum (IPR), but this structure is not involved in subluxations and does not receive damage, as the SPR is the key structure that stabilizes the tendons. Also located near the IPR is the peroneal tubercle which divides the tendons as they near their separate insertion points. The IPR is also not involved in peroneal tendon subluxations or dislocations.

The most common mechanism of injury is when an athlete makes a cutting move where the foot is in dorsiflexion and slight inversion and a great amount of stress is being placed on the muscles that are attached to the peroneal tendons. This happens most commonly in skiing, soccer, basketball, football, tennis, gymnastics, and rugby. If the force is great enough, the SPR can separate from its insertion on the lateral malleolus. This is seen most commonly in acute peroneal subluxations. In chronic subluxations it is more common for the SPR to remain attached yet become lax enough that the tendons can still be held in place during times of low activity, which will allow subluxations during intense physical activity. There are four grades
of tears in the SPR, ranging from the SPR detaching at the lateral malleolus insertion site to a complete rupture and detachment of the SPR to its calcaneal insertion site.\textsuperscript{1} It is also possible for the tendons to switch positions within the retrofibular groove while the SPR remains intact.\textsuperscript{9} Peroneal tendon subluxations occur most commonly in athletic populations, though it has been seen in non-athletes as well.

It has not been determined exactly why this injury occurs in some people and not in others that are involved in the same sports or activities. It has been said that there are a few predispositions that may make this injury more likely such as: a shallow or flat retrofibular groove, a weak or narrow superior peroneal retinaculum, an lack of a fibrocartilage ridge in the retrofibular groove, or a hypertrophied peroneal tubercle.\textsuperscript{2} Peroneal tendon subluxations have a very high rate of reoccurrence in people who have experienced the injury before and have not had it corrected via surgical means. Age, gender, weight, or level of athleticism do not seem to play a part in the risk factors surrounding this injury.\textsuperscript{1}

Peroneal tendon subluxation is a relatively rare injury and is not commonly seen in most popular sports. The sports in which it is most prevalent are skiing, soccer, ice skating, and gymnastics. It is most commonly discovered in previously misdiagnosed lateral ankle sprains. Subluxation of the peroneal tendon occurs in only 0.3-0.5\% of all ankle injuries.\textsuperscript{1}

A patient’s history of previous ankle trauma is incredibly important when attempting to diagnose a peroneal tendon subluxation.\textsuperscript{10} If a patient has had previous lateral ankle injuries or complains of an unstable ankle, peroneal tendon subluxation can be a suspect. A patient might also
complain of a pop or snap surrounding their lateral malleolus, which could be the peroneal tendon subluxating over the malleolus. A patient may also complain of retromalleolar pain that is worse on uneven surfaces or when the ankle is rotated. Physical examination could present swelling and bruising around the lateral malleolus. A common test used to find peroneal tendon subluxation is putting the patient’s foot in plantar flexion and inversion and having them force their foot back into a 90-degree neutral position. The patient may complain of pain on the lateral aspect of their foot and the peroneal tendon may visibly snap over the lateral malleolus. The most effective modality used to identify peroneal tendon subluxation is a dynamic ultrasound. This works best because the ankle can be mobilized while the imaging is taking place, so the tendons and SPR can be better seen in action. MRIs are considered the second most effective method of identifying the injury, mostly for the use of looking for tears in the SPR or tendons.

One thing that can be agreed on, by most studies, with peroneal tendon subluxations is that surgery is the most effective way to treat this injury, though which surgery is most effective is up for debate. This injury is not common enough or operated on enough to determine a single most effective method of treatment. For cases of acute injuries only, a more conservative non-surgical approach may be taken to see if the SPR will heal and tighten back down over the peroneal tendons. One study reported using a cup over the lateral malleolus made from splinting material, which was held in place by a simple ankle brace. This worked to keep the tendons from snapping over the lateral malleolus and the athlete was able to continue competing with limited pain and no displacement of the tendons. In cases of chronic subluxations, surgery seems to be the only option for complete recovery. One popular surgery option involves deepening of the retrofibular groove that the tendons sit in so that they do not so easily pop back
out of it and disrupt the SPR. Another surgery takes a strip of the Achilles tendon and either replaces or reinforces the SPR. This procedure is more uncommon than the others because of the potential for a weakened Achilles tendon. Use of a bone block is another common surgery that is designed to physically restrain the tendons in place behind the lateral malleolus. This procedure is more of a risk of the tendons still snapping over the bone block, the bone block shifting out of place, or pain in the area where the tendons place pressure on the bone block. Rerouting of the peroneal tendons is the final surgical option. This option splits the peroneal tendons and the calcaneofibular (CF) ligament, and reroutes them behind a portion of the CF ligament. The CF ligament acts as a second SPR to help hold the peroneal tendons in place, although this method does run the risk of potentially weakening the CF ligament. All of these surgeries have been shown to have great success with only minimal numbers of patients reporting further subluxations or experiencing prolonged retromalleolar pain. With all of these surgical options, patients typically wear a non weight bearing cast for approximately two weeks, then are moved to a walking boot for an additional month. Rehabilitation starts around the time that a walking boot is introduced and activity is slowly incorporated, typically starting with swimming exercises to help re-strengthen the muscles in the ankle. Return to pre-injury activity levels usually occurs within 3-5 months following surgery.

Peroneal tendon subluxations are a relatively rare sports-related injury that involves displacement of the peroneal tendons over the lateral malleolus or a tearing of the superior peroneal retinaculum. It occurs most commonly in sports such as skiing, ice skating, and soccer, which involve a lot of quick cutting maneuvers and placing the foot into extreme dorsiflexion with a great amount of force translated down through the ankle. It is an injury not commonly
seen in an athletic training room and is typically misdiagnosed as a lateral ankle sprain. The best ways for identifying a subluxation of the peroneal tendon is a dynamic ultrasound along with an MRI. Surgery is the best treatment for chronic cases, although some acute cases may be resolved by more conservative methods of bracing and taping. Typical recovery postoperatively takes approximately five months to return to pre-injury level.\textsuperscript{12,13}
References


