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Snapping ankles: peroneal tendon subluxation and dislocation

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Abstract

Peroneal tendon dislocation or subluxation is an orthopaedic condition that usually occurs as a result of injury to the superior peroneal retinaculum. The peroneal muscles are located in the lateral compartment of the leg, and their tendons run in the retromalleolar groove anchored by the superior peroneal retinaculum. Peroneal instability is usually classified using the Eckert and Davies classification, which was modified by Oden into a four-point grading system. The mechanism of injury is typically sudden forced dorsiflexion, resulting in aggressive tautness of the peroneal tendons, combined with a forced eversion of the hindfoot. Plain X-ray, ultrasound and magnetic resonance imaging are useful for imaging of the injury and in planning for surgery. Operative management has high success rates and there are multiple surgical techniques available, including superior peroneal retinaculum repair, tenoplasty, bone block procedures, groove deepening and endoscopic approaches, with little variation in outcome found between the approaches.

Key words: Dislocation; Peroneal; Subluxation; Tendon

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Introduction

Peroneal tendon dislocation is an uncommon orthopaedic condition accounting for 0.3–0.5% of all traumatic ankle injuries (Roth et al, 2010). Dislocation or subluxation of the peroneal tendons occurs secondary to a tearing or incompetence of the superior peroneal retinaculum from recurrent ankle sprains or a shallow retromalleolar groove. The mechanism of injury, similar to that of a common lateral ankle sprain, is often misdiagnosed. Without effective surgical intervention, peroneal tendon dislocation can result in recurrent subluxations and long-term instability in the ankle joint, predisposing patients to chronic discomfort and tenosynovitis (Roth et al, 2010). A chronic rupture would present with difficulty in hindfoot eversion, functional instability and pain (Hamid and Amendola, 2017). This review explores the anatomy, pathomechanics, clinical manifestation, imaging and management of peroneal tendon dislocations.

Anatomy

The two peroneal muscles, namely peroneus longus and peroneus brevis, are found in the lateral compartment of the leg. The functions of the peroneal muscles are ankle eversion, stabilising the subtalar joint and initiating plantar flexion. The peroneal tendons are located in a common synovial sheath 4 cm proximal to the lateral malleolus, which channels through the retromalleolar groove posterior to the lateral malleolus before dividing. The peroneus longus inserts to the medial cuneiform and first metatarsal base while the peroneus brevis inserts to the styloid process of the fifth metatarsal. The tendons are anchored into the retromalleolar groove by the superior peroneal retinaculum, acting as the primary stabiliser preventing subluxation or dislocation of the peroneal tendons (Wallace and Metzl, 2021; Draper, 2023). The groove has a concave shape in most people, with a small number demonstrating a flatter or convex groove, which can predispose them to injury (Kane et al, 2017; Wallace and Metzl, 2021).

Two other tendons, peroneus tertius and quartus, may coexist at the lateral ankle as an anatomical variant. Peroneus tertius is present in 80–90% of the population, originating at the distal third of the fibula and inserting at the dorsal aspect of the fifth metatarsal with

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the peroneus brevis. Peroneus quartus is present in 15–20% of the population, connecting to the peroneal muscles with variations of insertion points such as the cuboid, the peroneal muscles, fifth metatarsal and the retrotrochlear eminence of the calcaneus. The existence of the peroneus quartus may lead to overloading inside the retromalleolar groove, predisposing to instability (Draper, 2023).

Classification

The most common classification used in peroneal tendon instability was developed by Eckert and Davis (1976), using a three-point grading system according to the severity of injury sustained at the lateral ankle compartment resulting in its instability. This was further expanded by Oden in 1987 to a four-point grading system (Table 1) (Oden, 1987).

Pathomechanics

The acute mechanism of injury is usually sudden forced dorsiflexion, resulting in a rapid and aggressive tautness of the peroneal tendons, combined with a forced eversion of the hindfoot. In chronic cases, recurrent ankle sprains can lead to chronic instability of the peroneal tendons secondary to tearing and incompetence of the peroneal retinaculum (Draper, 2023). However, a forced plantar flexion of the ankle combined with eversion of the hindfoot has also been reported to cause subluxation of the peroneal tendons (Akiki et al, 2007). This mechanism of injury is commonly seen in sports that involve rapid lateral movements, including basketball, ice-skating, football and tennis (Arrowsmith et al, 1983; Oden, 1987). Other factors, including calcaneal fractures and neurological disorders (eg poliomyelitis) may manifest subluxation (Kwaadu et al, 2015). Toussaint et al (2014) found that 28% of peroneal tendon displacement was accompanied by calcaneal fractures. Additionally, Urbina et al (2017) showed that 42.5% of calcaneal fractures had peroneal tendon displacement, a phenomenon that is under-reported. Certain joint depression-type fractures and Sander A type fractures are more frequently seen with peroneal tendon dislocation or subluxation (Park et al, 2021a). Congenital factors such as having a shallow peroneal groove, high-arched foot or a weakened peroneal retinaculum predispose to peroneal tendon subluxations; however, 90% of cases are precipitated by acute and chronic traumatic injuries to the ankle (Akiki et al, 2007). Other abnormalities that predispose to peroneal tendon issues included peroneal tubercle or retrotrochlear eminence hypertrophy, and the presence of a peroneus quartus in a lower belly of peroneus brevis (Kane et al, 2017).

Clinical manifestation

The traumatic nature of most peroneal tendon subluxations acutely results in ecchymosis, oedema and localised tenderness to the lateral aspect of the ankle. Therefore, initial assessment of this mechanism of injury can make it difficult to differentiate peroneal tendon subluxations from a simple ankle sprain (Akiki et al, 2007; Kane et al, 2017). Patients with peroneal tendon subluxations often present with an antalgic gait, complaining of chronic lateral ankle pain that has not resolved over several weeks (Draper, 2023). Pain and unsteadiness of the ankle joint are often aggravated by walking and standing, and, at

Table 1. Modified Eckert and Davis classification of peroneal tendon instability

Grade I	Elevation of the superior peroneal retinaculum from the fibula, resulting in the dislocation of the peroneus brevis and longus tendons
Grade II (Bankurt type)	Dislocation of the peroneal tendons secondary to avulsion of the fibrocartilagenous rim with the superior peroneal retinaculum from the fibula
Grade III	Avulsion of the cortical rim of the posterolateral aspects of the fibula together with the fibrocartilagenous rim, resulting in the dislocation of the peroneal tendons
Grade IV	Elevation of the superior peroneal retinaculum from its posterior calcaneal attachment

From Oden (1987)

times, a 'snapping sound' associated with tendon dislocation over the lateral malleolus may be reproduced by active dorsiflexion and eversion of the foot (Akiki et al, 2007; Wallace and Metzl, 2021). Hindfoot varus is thought to contribute to peroneal tendon instability (Wallace and Metzl, 2021).

Lying the patient either in a prone or lateral position on the bed can aid the clinician in assessing for lateral tendinopathies. Pain over the lateral ankle can be reproduced by the four-step walking test, direct palpation over the posterior aspects of the lateral malleolus or the trajectory of the peroneal tendons, or through resisting active dorsiflexion and eversion of the affected ankle (Kane et al, 2017). In severe cases, passive dorsiflexion and eversion may precipitate localised ankle pain (Espinosa and Maurer, 2015). Chronic lateral ankle swelling and discomfort combined with a palpable and visible ridge over the lateral distal fibula is characteristic of progression from peroneal tendon subluxation to dislocation (Akiki et al, 2007). The extension of oedema and ecchymosis, with pain upon passive dorsiflexion and eversion of the affected ankle, often signifies greater severity of peroneal tendon injury (Draper, 2023).

Imaging

Plain X-rays of the ankle are used in the acute setting as the first-line investigation of peroneal tendon instability given the low cost, high accessibility and exclusion of differential diagnoses of a painful swollen ankle, such as fracture and arthropathies (Draper, 2023; Wallace and Metzl, 2021). In addition to orthodox antero-posterior and lateral X-ray, axial-heel and mortise views are useful to delineate the 'fleck sign' commonly associated with grade III peroneal tendon injuries, where a bony avulsion of the posterolateral aspect of the fibula is evident. However, as this only accounts for 10–15% of all peroneal tendon injuries, plain X-rays alone often remain non-conclusive in the diagnosis of such soft tissue pathologies (Eckert and Davis, 1976).

The Ottawa ankle rule is recommended as best practice to determine the need for radiological imaging in patients with ankle pain for the diagnosis of fractures. According to this, an ankle X-ray is only indicated if there is tenderness along the distal 6 cm posterior edge of the tibia or fibula, or tenderness at the tip of the medial or lateral malleoli, or an inability to bear weight both immediately after the injury and during a four-step walk test in the emergency department (Pope, 2002). A systematic review showed that the Ottawa ankle rule had a sensitivity of 94–100% and a specificity of 15–20% in diagnosing ankle fractures, and should be used in the acute setting to prevent unnecessary radiation exposure and reduce the length of stay in the emergency department (Espinosa and Maurer, 2015).

Magnetic resonance imaging was considered the best modality for assessing the integrity of the peroneal tendon through visualisation of the superior peroneal retinaculum and tendon sheath, as well as any evidence of tenosynovitis (Kane et al, 2017). However, ultrasound studies have regained popularity in both acute and non-acute settings, as their real-time, dynamic nature means that they are often better for evaluating tendinopathies than static magnetic resonance imaging or computed tomography images (Espinosa and Maurer, 2015). Ultrasound studies can also display small peripheral nerves of the ankle, which are susceptible to damage and entrapment from trauma, and are not affected by artefacts associated with orthopaedic hardware that can often affect image quality produced by magnetic resonance imaging and computed tomography scans.

Rockett et al (1998) showed ultrasound studies had a sensitivity of 100% and a specificity of 90% for peroneal tendinopathies in comparison to magnetic resonance imaging studies, which had a sensitivity of 23% and a specificity of 100%. However, ultrasound examination is very operator dependent, so it relies on experience for proper use in diagnosis (Hamid and Amendola, 2017). The use of magnetic resonance imaging scans may be preferred in institutions where expertise in musculoskeletal ultrasonography is limited, and when ruling out other differential diagnoses of ankle pain when symptoms are less consistent with tendinopathies (Draper, 2023). Gorelik et al (2020) found that the axial oblique sequence of T2 ankle imaging improved diagnostic confidence significantly and had a greater clinical correlation and reliability when compared to standard ankle magnetic resonance imaging sequences. Magnetic resonance imaging is therefore useful in accurately diagnosing peroneal tendon issues.

Treatment

Treatment of peroneal tendinopathies is either non-operative or operative, and whether the insult is acute or chronic often defines the choice of therapeutic management. The best treatment for an acute injury treatment is controversial (Porter et al, 2005). Non-operative treatment can be a safe, acceptable approach to enable healing of the retinaculum and periosteum, and avoids the risks associated with operative management. This consists of initial immobilisation in a well-moulded cast or splint with the foot in plantar flexion and mild inversion for 4–6 weeks, followed by rehabilitative eccentric exercises. This prevented recurrence in 62–83% of patients who had conservative treatment (Bakker et al, 2020). The foot position is crucial to allow peroneal tendons to relax and maintain their reduction in the retrofibular groove (Akiki et al, 2007).

Other adjunctive therapies have varying evidence of efficacy. Lateral heel wedges, ankle tapings and compression sleeves may also provide support to the tendons, alleviate pain and minimise further injuries (Ogawa and Thordarson, 2007). However, a literature review found that taping, compression bandaging and early mobilisation were associated with higher failure rates (Bakker et al, 2020). Non-operative therapy is advocated for inpatients with lower functional demand, and where there is a higher relative risk of surgery (Hamid and Amendola, 2017; Shun Hau et al, 2018). It is because of the relatively high number of patients who require eventual surgery (44–74%), and the subsequent success of surgical intervention, that surgery is the advised treatment for most cases (Shun Hau et al, 2018; Wallace and Metzl, 2021).

Definitive operative management is recommended if 6 months of rehabilitative exercise does not improve the peroneal tendon instability. Initial operative management is being used more frequently, especially in young, active patients and athletes, as the failure rate of conservative treatment in acute injuries is 50–76% (Bakker et al, 2020). Escalas et al (1980) reported poor outcomes with a high rate of recurrent subluxation in 28 of 38 patients (74%) treated non-operatively for acute peroneal subluxation. In contrast, Bahad and Kane (2020) reported a 95% patient satisfaction rate from surgical repair. Less debate exists for the management of chronic peroneal tendon subluxations or dislocations, where the majority of surgeons advocate operative management.

The operative measures of subluxated or dislocated peroneal tendon can be divided into the following categories:

Periosteal or superficial peroneal retinaculum repair

The procedure can be performed through an incision over the path of the peroneal tendons immediately posterior to the fibula, where the torn retinaculum or periosteum can be directly reattached via multiple drill holes or sutures in the fibula. This will create a better physical restraint for the peroneal tendons to prevent subluxation. Any injury to the peroneal tendon itself can be repaired using debridement and tubularisation at this stage. The success of this procedure relies on the quality of the remaining retinaculum to cover the tendons. Eckart and Davis (1976) described direct suturing of the anterior retinacular edge to the fibrous lip or through drill holes in the malleolar ridge if the lip was avulsed for grade I and II injuries. Surgical repair was successful, except for three patients who had a re-dislocation of the peroneal tendon. Park et al (2021b) found no increase in recurrence when superficial peroneal retinaculum repair was performed without groove deepening, and there was a similar improvement in pain and satisfaction score among patients postoperatively.

Tenoplasty technique

Many tenoplasty techniques have been described, including roof reconstruction using the Achilles tendon (Escalas et al, 1980), rerouting procedure involving use of the calcaneofibular ligament (Steinbock and Pinsger, 1994) or the middle portion of the external lateral ligament (Platzgummer, 1967).

Steinbock and Pinsger (1994) showed good to excellent outcomes in 12 patients an average of 9 years after transposition of the peroneal tendons under the calcaneofibular ligament. Others have reported typical clinical examination, typical muscle power and return to the preoperative level of sports in patients treated with this technique (Martens et al, 1986).

The superior peroneal retinaculum can also be reconstructed by modifications of techniques used for lateral ankle instability. The Evans technique has been modified so the peroneus brevis tendon is divided proximally, passed through a drill hole in the fibula, looped around the peroneus longus tendon and sutured to itself (Arrowsmith et al, 1983).

The advantages of these techniques include using healthy tissues to address the pocket of injured tissue directly, preserving the anatomy of the retrofibular groove and avoiding osteotomy. However, concerns exist surrounding the risk of creating additional deficits by weakening these normal structures, and there is a high risk of complications including sural nerve injury, stiffness of the subtalar joint and persistent discomfort (Ogawa and Thordarson, 2007).

Bone block procedure

Micheli et al (1989) described distal sliding fibular osteotomy, where a sagittal cut is made in the lateral cortex of the fibula and the bone block rotated to create a physical barrier while preserving the fibro-osseous floor of the sulcus to prevent scarring. This technique maintains the fibro-osseous floor of the groove, allowing smooth tendon passage within the tunnel. However, this procedure is technically challenging and has a reasonably high rate of hardware-related complications and tendon attrition.

Groove deepening procedures

Zoellner and Clancy (1979) described the technique of deepening the retrofibular groove, minimising the risk of tendon irritability. An osteotomy is carried out at the posterior aspect of the lateral malleolus to raise an osteoperiosteal flap. The groove is deepened using a burr, and the osteoperiosteal flap is then replaced to the base of the groove, providing a smooth tunnel surface. Porter et al (2005) described the use of this technique combined with superior peroneal retinaculum reconstruction in 13 patients. Eight patients were able to return to preoperative levels of sports activities, while the rest decided to return to lower levels of sports activities.

Another method using this technique involves making a hole in the bone below the posterior cortex of the fibula by inserting a drill into the intramedullary canal of the fibula and using a bone tamp to collapse the floor of the fibular groove, combined with superior peroneal retinaculum repair (Shawen and Anderson, 2004).

In a biomechanical cadaver study of pressure reduction after peroneal groove deepening, Title et al (2005) concluded that decompressing the peroneal tendons in the groove may relieve intra-tendinous stresses and result in less pain and improved tendon function. They suggested that a combination of both groove deepening and peroneal tendon debridement might be advantageous for the treatment of partial peroneal tendon tears and tendinitis.

Endoscopic repair

With advances in surgical techniques and technology, endoscopic approaches have been used to repair the superior peroneal retinaculum. Two techniques can be used: groove deepening and peroneal tendon repair. The procedures involve inserting a distal portal distal to the tip of the lateral malleolus and a proximal portal at the proximal edge of the superior peroneal retinaculum, which also allows direct visualisation of the peroneal tendons for diagnostic purposes (Shun Hau et al, 2018). The advantages of an endoscopic procedure include increased preserved soft tissue and vascularity, improved recovery times, less postoperative pain and a lower rate of soft tissue complications. However, the procedures require a longer learning curve and longer anaesthetic time to perform compared to open procedures. There is an increased risk of sural nerve injury and iatrogenic tear to the retinaculum or damage to the lateral malleolus because of portal placement (Shun Hau et al, 2018).

There is no specific study that has determined the relative effectiveness of one surgical technique over another. No difference in patient satisfaction or functional outcome between the surgical techniques has been found. Additionally, the grade of the disease, type of lesion or time to surgery did not influence the decision for surgical intervention or outcome (Bourgault et al, 2018).

Conclusions

Peroneal tendon subluxation or dislocation often occurs secondary to a traumatic ankle injury. In the acute setting, these injuries can be mis- or undiagnosed unless careful clinical and radiological assessment is undertaken. Imaging including X-rays, ultrasound and magnetic

Key points

- The mechanism of injury of peroneal tendon subluxation or dislocation, similar to that of a common lateral ankle sprain, is often misdiagnosed.
- Careful clinical and radiological assessment should be considered to avoid these injuries being mis- or undiagnosed.
- Magnetic resonance imaging is the best modality for assessing the integrity of the peroneal tendon.
- The surgical techniques vary and depend largely on the surgeon's experience and preference.
- Definitive operative management is recommended if nonoperative measures fail to improve the instability of peroneal tendons.

resonance imaging will help determine the diagnosis. The surgical techniques vary and depend largely on the surgeon's clinical experience and preference. There are few variations to surgery required ranging from repair of superior peroneal retinaculum, reinforcement of the superior peroneal retinaculum with local tissue transfer, rerouting the tendons behind the calcaneofibular ligament to bony block and groove-deeping procedures. This review raises the awareness of peroneal tendon subluxation or dislocation and discusses surgical options with the intention of improving patient outcomes.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

References

Akiki A, Arlettaz Y, Crevoisier X. Peroneal tendon dislocation. A tendon protective and bone preserving technique of stabilization. Saudi Med J. 2007;28(10):1607–1609

Arrowsmith SR, Fleming LL, Allman FL. Traumatic dislocations of the peroneal tendons. Am J Sports Med. 1983;11(3):142–146. https://doi.org/10.1177/036354658301100306

Bahad ST, Kane JM. Peroneal tendon pathology. Orthop Clin N Am. 2020;51(1):121–130. https://doi.org/10.1016/j.ocl.2019.09.001

Bakker D, Schulte JB, Meuffels DE, Piscaer TM. Non-operative treatment of peroneal tendon dislocations: a systematic review. J Orthop. 2020;18:255–260. https://doi.org/10.1016/j.jor.2019.08.031

Bourgault C, Pougès C, Szymanski C et al. Clinical results of peroneal tendon repair in a retrospective series of 30 patients. Orthop Traumatol Surg Res. 2018;104(4):511–517. https://doi.org/10.1016/j.otsr.2018.01.020

Draper TR. Non-Achilles ankle tendinopathy. 2023. https://www.uptodate.com/contents/non-achilles-ankle-tendinopathy/print (accessed 7 September 2023)

Eckert WR, Davis EA Jr. Acute rupture of the peroneal retinaculum. J Bone Joint Surg Am. 1976;58(5):670–672

Escalas F, Figueras JM, Merino JA. Dislocation of the peroneal tendons. Long-term results of surgical treatment. J Bone Joint Surg Am. 1980;62(3):451–453

Espinosa N, Maurer MA. Peroneal tendon dislocation. Eur J Trauma Emerg Surg. 2015;41(6):631–637. https://doi.org/10.1007/s00068-015-0590-0

Gorelik N, Boily M, Lafreniere A-S et al. Impact of the T2-weighted axial oblique MRI sequence in the assessment of peroneal tendons. Clin Radiol. 2020;75(8):624.e15–642.e23. https://doi.org/10.1016/j.crad.2020.02.018

Hamid KS, Amendola A. Chronic rupture of the peroneal tendons. Foot Ankle Clin N Am. 2017;22(4):843–850. https://doi.org/10.1016/j.fcl.2017.07.011

Kane JM, Zide JR, Brodsky JW. Acute peroneal tendon injuries in sport. Oper Tech Sports Med. 2017;25(2):113–119. https://doi.org/10.1053/j.otsm.2017.04.001

Kwaadu KY, Fleming JJ, Florek D. Superior peroneal retinacular injuries in calcaneal fractures. J Foot Ankle Surg. 2015;54(3):458–463. https://doi.org/10.1053/j.jfas.2014.12.018

Martens MA, Noyez JF, Mulier JC. Recurrent dislocation of the peroneal tendons. Results of rerouting the tendons under the calcaneofibular ligament. Am J Sports Med. 1986;14(2):148–150. https://doi.org/10.1177/036354658601400210

Micheli LJ, Waters PM, Sanders DP. Sliding fibular graft repair for chronic dislocation of the peroneal tendons. Am J Sports Med. 1989;17(1):68–71. https://doi.org/10.1177/036354658901700111

Oden RR. Tendon injuries about the ankle resulting from skiing. Clin Orthop Relat Res. 1987;216:63–69

Ogawa BK, Thordarson DB. Current concepts review: peroneal tendon subluxation and dislocation. Foot Ankle Int. 2007;28(9):1034–1040. https://doi.org/10.3113/FAI.2007.1034

Park CH, Gwak HC, Kim JH et al. Peroneal tendon subluxation and dislocation in calcaneus fracture. J Foot Ankle Surg. 2021a;60(2):233–236. https://doi.org/10.1053/j.jfas.2019.09.002

Park SH, Choi YR, Lee J, Seo J, Lee HS. Treatment of recurrent peroneal tendon dislocation by peroneal retinaculum reattachment without fibular groove deepening. J Foot Ankle Surg. 2021b;60(5):994–997. https://doi.org/10.1053/j.jfas.2020.04.027

Platzgummer H. On a simple procedure for the operative therapy of habitual peroneal tendon luxation. Arch Orthop Unfall-Chir. 1967;61(2):144–150. https://doi.org/10.1007/BF00418812

Pope R. Ottawa. Ankle rules are more sensitive than Dutch in detecting significant ankle fracture. Aust J Physiother. 2002;48(4):320. https://doi.org/10.1016/S0004-9514(14)60178-1

Porter D, McCarroll J, Knapp E, Torma J. Peroneal tendon subluxation in athletes: fibular groove deepening and retinacular reconstruction. Foot Ankle Int. 2005;26(6):436–441. https://doi.org/10.1177/107110070502600602

Rockett MS, Waitches G, Sudakoff G, Brage M. Use of ultrasonography versus magnetic resonance imaging for tendon abnormalities around the ankle. Foot Ankle Int. 1998;19(9):604–612. https://doi.org/10.1177/107110079801900907

Roth JA, Taylor WC, Whalen J. Peroneal tendon subluxation: the other lateral ankle injury. Br J Sports Med. 2010;44(14):1047–1053. https://doi.org/10.1136/bjsm.2008.057182

Shawen SB, Anderson RB. Indirect groove deepening in the management of chronic peroneal tendon dislocation. Tech Foot Ankle Surg. 2004;3(2):118– 125. https://doi.org/10.1097/01.btf.0000115842.62946.5d

Shun Hau WW, Lui TH, Nhai WK. Endoscopic superior peroneal retinaculum reconstruction. Arthrosc Tech. 2018;7(1):e45–e51. https://doi.org/10.1016/j.eats.2017.08.050

Steinbock G, Pinsger M. Treatment of peroneal tendon dislocation by transposition under the calcaneofibular ligament. Foot Ankle Int. 1994;15(3):107–111. https://doi.org/10.1177/107110079401500305

Title CI, Jung HG, Parks BG, Schon LC. The peroneal groove deepening procedure: a biomechanical study of pressure reduction. Foot Ankle Int. 2005;26(6):442– 448. https://doi.org/10.1177%2F107110070502600603

Toussaint RJ, Lin D, Ehrlichman LK et al. Peroneal tendon displacement accompanying intraarticular calcaneal fractures. J Bone Joint Surg Am. 2014;96(4):310–315. https://doi.org/10.2106/JBJS.L.01378

Urbina C, Aviles C, Bastias C et al. Peroneal tendon subluxation and dislocation in displaced intra-articular calcaneal fractures. Abstract presented at the 6th IFFAS Triennial Meeting/Foot and Ankle Surgery, Lisbon, Portugal: 2017

Wallace SB, Metzl JA. Peroneal subluxation and association tears. Oper Tech Sports Med. 2021;29(4):150870. https://doi.org/10.1016/j.otsm.2021.150870

Zoellner G, Clancy W. Recurrent dislocation of the peroneal tendon. J Bone Joint Surg. 1979;61(2):292–294