

Lateral Ankle Instability after Rotational Injury: A Case Report

Christina Pechlivani¹, Danai Grammatikopoulou¹, Georgios Antonoglou^{1,2}, Thomas Pelopidas¹,
Dimitrios N Varvarousis², Aristeidis Vrettakos¹

Learning Point of the Article:

Surgical treatment of chronic misdiagnosed lateral instability of the ankle after acute rotational injury, treated with autologous semitendinosus graft posing a good clinical outcome.

Abstract

Introduction: One of the most common orthopedic injury injuries seen in patients at the emergency department is that of the ankle. There are some efficient protocols for their treatment, but more often the clinician is fo-cused in finding and treating possible fractures and disregards ligamentous lesions that lead to instabil-ity, if they become chronic.

Case Report: A patient that suffered an ankle sprain was improperly handled, developed lateral instability of the ankle, and was treated surgically using an autologous semitendinosus graft. A 42-year year-old Caucasian male that after an ankle sprain was examined in various primary health - care centers, four times within six 6 months, with persistent symptoms of his left ankle. After all these months, he was eventually diagnosed with post-traumatic lateral instability of the ankle that was resistant to con-servative treatment. In stress view X-rays, the talar tilt angle was 21° and the anterior drawer was measured at 13 mm. The patient was treated surgically with reconstruction of the anterior talofibular and the calcaneofibular ligament using an autologous semitendinosus graft from the left knee. The graft was pinned in the anatomical insertion sites of the ligaments with absorbable screws. A post-surgical physiotherapy regimen was applied for two 2 months. In the post-surgical dynamic stress view X-rays, the talar tilt angle and the anterior drawer were markedly improved, measured at 3° and 4 mm, respec-tively. In 11 months post-surgical follow-up, the patient's American Foot and Ankle Score was 85, from the 60 evaluated before treatment.

Conclusion: The use of guidelines, regular follow-ups, and functional rehabilitation are key factors to treating ankle injuries. The reconstruction of lateral collateral ligament complex with a semitendinosus graft is one of the surgical options for restoring lateral ankle instability.

Keywords: Ankle sprain, autologous semitendinosus graft, lateral instability of the ankle.

Introduction

Acute ankle injuries are some of the most frequently encountered orthopedic injuries [1] occurring at a rate of 1/10.000 individuals every day [2]. About 85% are associated with lateral ligamentous trauma that can lead to lateral ankle instability [3]. The occurrence of ankle injuries can come up to 45% of the total number of injuries in sports with high prevalence, such as

basketball [1]. In general, they are con-sidered “self-healing” with good prognosis and good outcomes following conservative treatment [4], but there are studies that show persistent symptoms for months, even years, after the initial injury [2]. These symptoms may be an indication of ankle instability and they range from mechanical symptoms, transient edema, weakness, stiffness, loss of range of motion, osteochondral

Access this article online

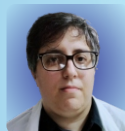
Website:
www.jocr.co.in

DOI:
<https://doi.org/10.13107/jocr.2023.v13.i08.3848>

Author's Photo Gallery



Dr. Christina Pechlivani



Dr. Danai Grammatikopoulou



Dr. Georgios Antonoglou



Dr. Thomas Pelopidas



Dr. Dimitrios N Varvarousis



Dr. Aristeidis Vrettakos

¹Department of Orthopedic Surgery and Traumatology - Unit for Sport Injuries, General Hospital of Thessaloniki “Agios Pavlos,” Ethnikis Antistaseos, Thessaloniki, Greece,

²Department of Anatomy-Histology-Embryology, Faculty of Medicine, University of Ioannina, Ioannina, Greece.

Address of Correspondence:

Dr. Christina Pechlivani,
Department of Orthopedic Surgery and Traumatology - Unit for Sport Injuries, General Hospital of Thessaloniki “Agios Pavlos,” Ethnikis Antistaseos, Thessaloniki, Greece.
E-mail: cpechlivani4963@gmail.com

Submitted: 06/05/2023; Review: 11/06/2023; Accepted: July 2023; Published: August 2023

DOI: <https://doi.org/10.13107/jocr.2023.v13.i08.3848>

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License <https://creativecommons.org/licenses/by-nc-sa/4.0/>, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms



Figure 1: Stress radiograph anteroposterior of the left ankle, taken while an assistant performed varus stress forces on the ankle. (left picture).



Figure 2: Stress radiograph profile of the left ankle, taken while an assistant performed posterior stress forces on the ankle. (right picture). The subluxation is apparent in both radiographs.



Figure 3: Marking the incision. The incision is marked over the lateral malleolus.

lesions, and osteoarthritis [2, 5] that may lead to disability and may affect the quality of life [5]. The percentage of patients that may present with lingering symptoms and/or pathological signs is between 32% and 74% when examined from 6 months up to 7 years after a sprain [5].

Despite their prevalence and relative detrimental consequence in a patient's life, there is still a staggering lack of effective treatment guidelines [6]. The fact that ankle sprains are easily dismissed by clinicians when no fracture is present is apparent when taking into account that in 77–99% of cases, X-ray is prescribed but only in 9–15%, there is a fracture [7]. Ligamentous abrasions should be brought into focus, as they are way more common than fractures [3].



Figure 4: Harvesting the semitendinosus graft with a small medial oblique incision of the knee. A small oblique incision is made over the pes anserinus. The semitendinosus tendon is identified under the sartorius tendon, its attachments to the crural fascia dissected, and the graft harvested.

Case Report

In this case report, a patient with rotational ankle injury and acute ligamentous trauma was insufficiently treated and he developed lateral ankle instability that was belatedly treated surgically using an autologous semitendinosus graft.

History

Male Caucasian, 42 years old, manual worker had a rotational left ankle injury with varus-internal rotation mechanism of trauma. No symptoms from his lower extremities were recorded before his injury and he reported amateur sport activities during childhood (soccer). After the injury, he immediately consulted a medical practitioner at a primary care center, where a clinical and X-ray evaluation ensued, with no apparent bony defects. Gradually, he recovered and fully resumed the previous level of activity in 3–4 weeks, with no apparent protocol of rehabilitation. In 6 months, the patient was subjected to two additional ankle injuries with the same mechanism of action and no fractures were found with the two additional X-rays. He also consulted thrice a medical practitioner at two different primary care centers. The patient was occasionally using cold compresses and elastic bandages for his ankle but he did not follow a specific rehabilitation plan. Because of his worsening symptoms, the patient turned to our out-patient clinic for a solution.

Signs and symptoms

During his clinical evaluation, the patient complained of pain, especially at the lateral side and after activity, with a sense of instability and unreliability when walking and driving. On palpation, pain was reproduced just inferior and anterior of the



Figure 5: The ankle approach. After careful dissection, the destruction of the lateral ankle ligamentous complex is apparent.



Figure 6: Tunnel preparation in fibula, talus, and calcaneus. The fibular tunnel is prepared.

lateral malleoli, anterior drawer test, and talar tilt test [8] tested positive. That showcased a rupture of both anterior talofibular and calcaneofibular ligaments [8].

Radiographic evaluation

Static and stress anteroposterior and profile radiographs were performed on both ankles. In the stress radiographs, the talar tilt of the left ankle was measured at 21° in the anteroposterior view (Fig. 1). In addition, anterior sliding of 13 mm was measured in

profile view (Fig. 2). In the magnetic resonance imaging, there was confirmation of the ruptures of anterior talofibular ligament (ATFL) and calca-neofibular ligament (CFL).

Treatment

A program of non-surgical treatment followed our evaluation for 6 weeks that targeted on functional reeducation, biofeedback, and strengthening of dynamic ankle stabilizers. The non-surgical treatment failed, so we turned to anatomical reconstruction of ATFL and CFL with autologous semitendinosus graft as the best treatment for our case [9].

The procedure was performed as described in bibliography [9]. A lateral ankle approach was chosen with a straight incision that carved slightly posteriorly distally (Fig. 3), the soft-tissue was dissected, and complete degeneration of the lateral ligamentous complex of the ankle was found (Fig. 4), that signified no chance of anatomical repair and made the anatomical reconstruction imperative. The semiten-dinosus graft was harvested from the ipsilateral knee (Fig. 5), debridement of the scar tissue was performed, and the positions of fixation in the lateral malleolus, talus, and calcaneus were marked and prepared. The graft was fixated with absorbable screws with the ankle in neutral position and the graft was slightly tightened (Fig. 6, 7, 8). The intra-operative stability of the ankle was found satisfactory and the surgical wound was closed. A dorsal backslap splint with the ankle in neutral position was placed.



Figure 7: Tunnel preparation in fibula, talus, and calcaneus. The talar tunnel has been prepared.

Post-operative protocol

The splint was kept for 6 weeks. The sutures were removed at 2



Figure 8: The graft has been fixed. The graft can be seen after the insertion of the absorbable screws and its tensioning. The reconstruction is complete.

weeks with no wound complications. After the 2nd week, the patient started exercises to improve the range of motion and light partial weight bearing. After the 4th week, a complete program of functional physiotherapy was applied for 2 months and included exercises for range of motion, stability, elasticity, and biofeedback of the ankle.

The patient had several follow-up appointments, the last one being 11 months post-operatively. The patient's American Foot and Ankle Score [10] improved from 60 before surgery to 85, with no complaints about subjective instability when walking on irregular surfaces (sandy or rocky terrain). On post-

operative dynamic X-rays of the ankle, the talar tilt decreased from 21° to 3° in the anteroposterior view (Fig. 9) and the anterior translation from 13 mm to 4 mm in the profile view (Fig. 10).

Discussion

Chronic lateral ankle instability may well be one of the most severe complications of a neglected ankle sprain [3]. About 20% of acute ankle sprains will become chronic instability [11], mainly because of the destruction of mechanoreceptors [12]. Most studies suggest conservative treatment initially, as results are similar compared to surgical treatment and lack the consideration of cost and complications of the second [13]. If the patient shows no or minimal clinical improvement, there is still the option of surgical repair or reconstruction, for which several procedures have been described [14], with 80–95% of their authors reporting good or very good results [15]. The procedures can be categorized to anatomical re-pairs, non-anatomical reconstructions, and anatomical reconstructions [14], the last of which has been proved to be superior in biomechanical studies [15]. In our patient, this anatomical reconstruction was chosen because of its advantages: The length of the graft was satisfactory, harvest and fixation were easier, the incision was smaller, and no anatomical structures of the ankle or foot were sacrificed as grafts [14]. The early observed good results are corroborated by

studies with a longer list of cases that underwent anatomical reconstruction either with a semitendinosus graft [12] or a peroneus brevis graft [15].

Conclusion

To sum up, the treatment of acute ankle injury must follow the appropriate algorithms, as the one described by Polzer et al., according to which clinical evaluation and re-evaluation after 3–5 days when the pain and edema have eased up is the key and following rehabilitation protocol therein can ensure a satisfactory functional result [6]. In the cases that lateral



Figure 9: Anteroposterior (left) and profile (right) stress radiographs of the left ankle after the reconstruction under anesthesia. The radiographs were taken with the same technique and the same assistant as pre-surgical reconstruction. No subluxation is visible in these radiographs.

instability sets in and non-surgical treatment has failed, reconstruction of ATFL and CFL with autologous semitendinosus graft can restore stability surgically with good results.

Clinical Message

Acute ankle injuries are some of the most common injuries; an orthopedic surgeon will be called to treat in the emergency department, however, they appear to be mistreated in a very high rate. In our case, although the patient repeatedly visited medical practitioners due to clinical symptoms, he continued to be insufficiently treated for up to 6 months. It is of great importance to never forget the possibility of severe ligamentous injury and instability and if so to be appropriately treated.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

1. Trevino SG, Davis P, Hecht PJ. Management of acute and chronic lateral ligament injuries of the ankle. *Orthop Clin North Am* 1994;25:1-16.
1. Struijs P, Kerkhoffs G. Ankle sprain. *Clin Evid* 2006;15:1493-501.
2. Peters JW, Trevino SG, Renstrom PA. Chronic lateral ankle instability. *Foot Ankle* 1991;12:182-91.
3. Groff GD. Ankle sprain. In: Klippel J, Dieppe P, editors. *Rheumatology*. London: Mosby; 1998. p. 14.10-14.13.
4. Anandacoomarasamy A, Barnsley L. Long term outcomes of inversion ankle injuries. *Br J Sports Med* 2005;39:e14.
5. Polzer H, Kanz KG, Prall WC, Haasters F, Ockert B, Mutschler W, et al. Diagnosis and treatment of acute ankle injuries: Development of an evidence-based algorithm. *Orthop Rev (Pavia)* 2012;4:e5.
6. Cameron C, Naylor CD. No impact from active dissemination of the Ottawa Ankle Rules: Further evidence of the need for local implementation of practice guidelines. *CMAJ* 1999;160:1165-8.
7. Van Dijk CN, Lim LS, Bossuyt PM, Marti RK. Physical examination is sufficient for the diagnosis of sprained ankles. *J Bone Joint Surg Br* 1996;78:958-62.
8. Paterson R, Cohen B, Taylor D, Bourne A, Black J. Reconstruction of the lateral ligaments of the ankle using semitendinosus graft. *Foot Ankle Int* 2000;21:413-9.
9. Kitaoka HB, Alexander IJ, Adelaar RS, Nunley JA, Myerson MS, Sanders M. Clinical rating systems for the ankle-hindfoot, midfoot, hallux, and lesser toes. *Foot Ankle Int* 1994;15:349-53.
10. Berlet G, Anderson RB, Davis W. Chronic lateral ankle instability. *Foot Ankle Clin* 1999;4:713-28.
11. Colville MR. Surgical treatment of the unstable ankle. *J Am Acad Orthop Surg* 1998;6:368-77.
12. Tiling T, Bonk A, Hoher J, Klein J. Acute injury to the lateral ligament of the ankle joint in the athlete. *Chirurg* 1994;65:920-33.
13. Chan KW, Ding BC, Mroczek KJ. Acute and chronic lateral ankle instability in the athlete. *Bull NYU Hosp Joint Dis* 2011;69:17-26.
14. Tourné Y, Besse JL, Mabit C; Sofcot. Chronic ankle instability. Which tests to assess the lesions? Which therapeutic options? *Orthop Traumatol Surg Res* 2010;96:433-46.

Conflict of Interest: Nil

Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this case report

How to Cite this Article

Pechlivani C, Grammatikopoulou D, Antonoglou G, Pelopidas T, Varvarousis DN, Vrettakos A. Lateral Ankle Instability after Rotational Injury: A Case Report. *Journal of Orthopaedic Case Reports* 2023 August;13(8):137-141.