

Atraumatic bilateral rupture of the peroneus brevis tendon in recreational sport: A case report

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Abstract

Issue: Lower extremity tendon injuries often occur in physically active individuals. Most ruptures not involving great force are diagnosed in patients presenting underlying tendon degenerations. This also applies to patients taking medications because of a disease. We have observed several cases of bilateral Achilles tendon ruptures in patients who have been taking cortisone for a long period. We treated a healthy colleague (neurologist) in our clinic who sustained ruptures of the Achilles tendon on the left side (2012) and the peroneus brevis tendon on left side (2015) and right side (2016) after minimal traumata. Aim of this report is to provide a systematic review of this case and a literature review of similar cases, as few such cases have been published.

Methods: We reviewed and analysed this patient's records containing the sport-specific anamnesis, pre-existing condition, anamnesis of medications and therapy. The three injuries were magnetic resonance imaging-proven. Furthermore, the tendon's condition was examined histologically in the context of the operative treatment through lace technique of the Achilles tendon and transfer of the peroneus brevis to the peroneus longus. We also researched the literature for bilateral ruptures of the peroneal tendons.

Results and conclusion: The anamnesis confirmed no underlying disease. The patient took a macrolide antibiotic about half a year prior to the first peroneal injury for an otitis media. He denied having taken any other antibiotics, especially no quinolone antibiotics. However, the patient reported cortisone intake for 2 days some months before the second peroneal injury to treat an allergic reaction. That involved no local cortisone infiltration in the lower extremity. He underwent surgery within the first 2 weeks after each trauma. Each time, postoperative follow-ups revealed a good healing process. Three months after each operation, the patient was free of complaints. Axibal and Anderson described a patient with bilateral peroneus longus and peroneus brevis ruptures, as well as an Achilles tendon rupture on the left side plus tendinopathy of the Achilles tendon on the right side of uncertain aetiology. We detected additional similar cases in patients who had taken medications, especially cortisone and levofloxacin. Further research should be conducted to clarify other risk factors to help prevent such injuries.

Keywords

Achilles tendon rupture, bilateral peroneus brevis rupture

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Introduction

Most ruptures not involving great force are diagnosed in patients presenting underlying tendon degeneration. This is often related to an underlying disease¹ or the intake of medications.^{2,3} We thus describe several cases of bilateral Achilles tendon ruptures and concurrent ingestion of cortisone and/or antibiotics.^{4–7}

Anatomical anomalies are also possible risk factors for tendon injuries, that is, an os peroneum for a lesion of the peroneus longus tendon⁸ or a Haglund exostosis for Achilles tendinopathy.⁹ Furthermore, a sharp ridge on the dorsal distal fibula, luxated peroneal tendons¹⁰ and most notably ankle instability are potential risk factors for a rupture of the peroneus brevis tendon.¹¹

Lower extremity tendon injuries occur very frequently in physically active people, and their incidence is rising.¹² These injuries often involve the Achilles tendon, in some cases even bilaterally.^{13,14} This fact reveals missing

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Table 1. Comparison of the known risk factors with the patient's records.

Risk factors	Achilles tendon left	Peroneus brevis left	Peroneus brevis right
Special anatomy	No	No luxation of peroneal tendons, no sharp ridge	No luxation of peroneal tendons, no sharp ridge
Ankle instability	No	Yes, status post ankle sprains	No
Cortisone intake	No	No	Systemic, 3 months pretraumatic
Antibiotics intake	No	Macrolide ½ year pretraumatic	No
Underlying disease	No	No	No

knowledge about further risk factors. With this in mind, we treated a patient who suffered a threefold tendon injury caused by minimal traumata while presenting almost none of the known risk factors.

Patient information

We report about a physician (a neurologist) born in 1963 from Switzerland. In November 2012, he presented the first time in our sportorthopaedic clinic after having carried out a magnetic resonance imaging (MRI) that revealed a total Achilles tendon rupture on the left side after stumbling over the ball during a tennis match.

The next consultation took place in June 2015 because of an ankle sprain again on the left side while playing golf. The patient heard an initial 'knick' and felt pain around the peroneal tendons. Note that he had already injured the left ankle ligaments in the past.

In October 2016, we consulted with the patient again after he slipped during a walk whereby he had to come to a stop suddenly and forcefully with his right foot. Again, he heard a 'knick' and felt pain on the lateral side of the affected ankle.

Apart from these foot problems, the patient is healthy. Because of an otitis media, he had taken a macrolide antibiotic during the spring 2015. He does not remember having taken any chinolone antibiotics. Additionally, in the summer of 2016, he took 20 mg of prednisolone twice a day and 10 mg the following day because of a probably allergic reaction involving oedematous swelling of the lips during and after a meal (Table 1).

Clinical findings

In November 2012, we examined this patient presenting considerable swelling around the left ankle, a positive Thompson test¹⁵ as well as a dent in the left Achilles tendon. Active plantar flexion was attenuated.

In June 2015, he presented a haematoma and slight swelling of the distal lateral lower leg, insufficient peroneal tendons and pain during activation. Moreover, we noted a slight increase in the AP-translation of the talus.

His next examination was in October 2016. Arriving at our clinic, the patient was already wearing compression stockings and an ankle orthosis. Therefore, there was

neither swelling nor a haematoma present. Nevertheless, he reported retromalleolar pressure pain, a palpable stump of a tendon and a considerable reduction in pronation force.

Timeline

08 November 2012	Left foot, total Achilles tendon rupture after stumbling;
13 November 2012	Left foot, open reconstruction of the Achilles tendon in lace technique with reinforcement via plantaris tendon and soleus reconstruction;
09 June 2015	Left foot, peroneus brevis rupture after ankle sprain;
23 June 2015	Left foot, open reconstruction of the peroneus brevis through transfer on longus;
30 October 2016	Right foot, peroneus brevis rupture after sidestep;
08 November 2016	Right foot, open reconstruction of the peroneus brevis through transfer on longus.

Diagnostics

MRI of left Achilles tendon (November 2012)

Total Achilles tendon rupture is about 9 cm proximal to the calcanean insertion with a dehiscence of 22 mm; the plantaris tendon is intact (Figures 1–3).

Secondary findings are obvious effusion in the upper and lower ankle joints and liquid around the peroneal tendons with the peroneus brevis tendon revealing distal hypointensity. No subchondral cysts, and no further ligament lesions (Figures 4–6).

MRI of lower left leg and ankle (June 2015)

Extensive partial rupture of the peroneus brevis tendon from the musculotendinous transition to the insertion. The most severely affected part is dorsal of the lateral malleolus with 90% of the tendon ruptured. Furthermore, fibre-tears in the



Figure 1. Total Achilles tendon rupture about 9 cm proximal to the calcaneal insertion (MRI sagittal view).

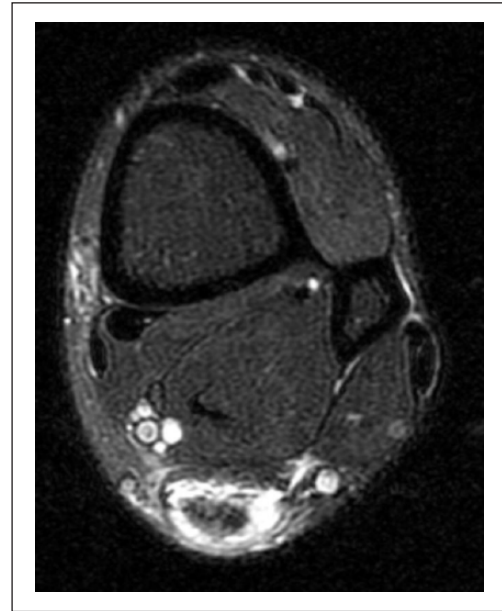


Figure 3. Para-Achilles liquid and intact plantaris tendon on the medial side (MRI axial view).

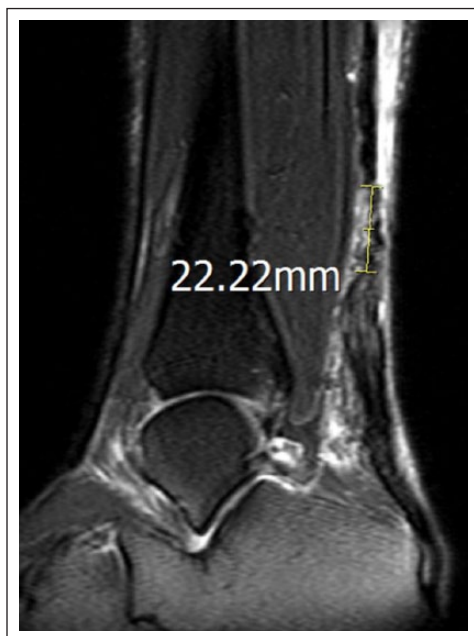


Figure 2. Achilles tendon rupture with dehiscence of 22 mm (MRI sagittal view).



Figure 4. Obvious effusion in the upper and lower ankle joints without subchondral cysts (MRI sagittal view).

mm. peroneus longus and brevis with haematomas along the fascias is visible (Figures 7 and 8).

Secondary findings are mid-portion tendinopathy of the Achilles tendon with a spindle-like distension and slight, longitudinal signal disorder (<10% of the tendon) status post Achilles tendon suture in 2012. No peritendinous changes. Furthermore, note the small cartilage defects anteromedial of the upper ankle joint (tibiotalar) with subchondral cysts. No

lesions in the ligaments; even the ligamentum fibulotalare anterius is intact (Figures 9 and 10).

Laboratory findings from 22 June 2015

Leucocytes, 4.0 G/L; haemoglobin, 158 g/L; haematocrit, 47.4%; thrombocytes, 195 G/L; international normalized ratio (INR), 1.0; C-reactive protein (CRP) < 5 mg/L;



Figure 5. Liquid around the peroneal tendons (MRI oblique axial view).

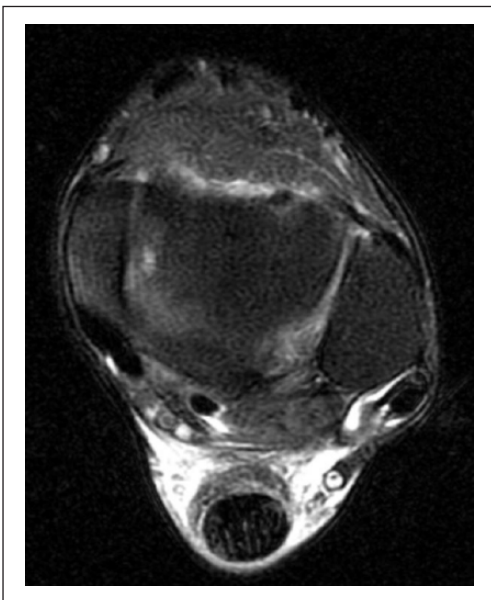


Figure 6. Distal hypointensity of the peroneus brevis tendon (MRI axial view).

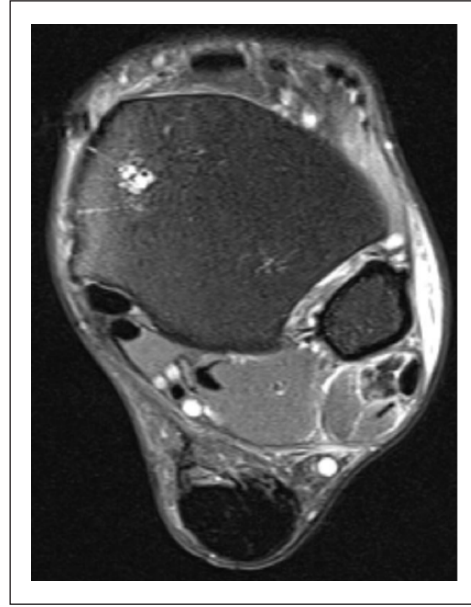


Figure 7. Rupture of the peroneus brevis tendon proximal to the lateral malleolus with haematomas along the fascia. Status post Achilles tendon suture without peritendinous changes (MRI axial view).



Figure 8. Rupture of the peroneus brevis tendon distal to the lateral malleolus, subchondral cysts of the anteromedial upper ankle joint with bone bruise of the medial malleolus (MRI coronal view).

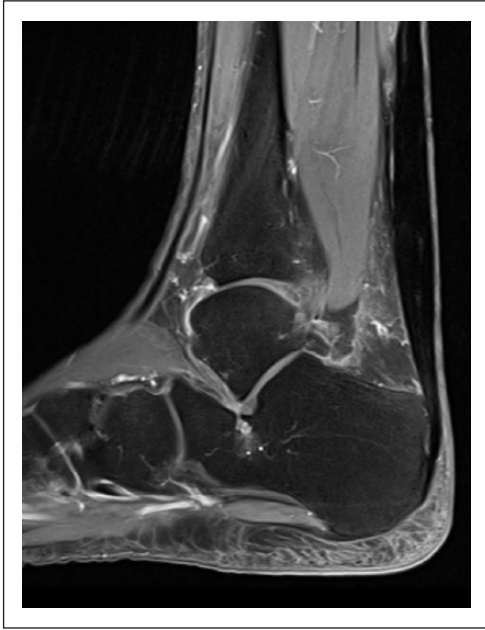


Figure 9. Spindle-like distension and slight, longitudinal signal disorder of the Achilles tendon (MRI sagittal view).



Figure 10. Cartilage defects and subchondral cysts anteromedial of the tibiotalar joint (MRI sagittal view).

creatinine, 86 $\mu\text{mol/L}$; glucose, 6.0 mmol/L ; urea, 6.02 mmol/L ; potassium, 4.7 mmol/L ; sodium, 142 mol/L ; creatine kinase, 187 U/L ; aspartate aminotransferase (ASAT), 22 U/L ; and alanine aminotransferase (ALAT), 24 U/L .

Sonography of left peroneal tendons (July 2015)

Suture material is intact. No signs of new rupture visible.



Figure 11. Rupture of the peroneus brevis tendon (MRI oblique axial view).

Sonography of right peroneal tendons (October 2016)

Subtotal rupture of the peroneus brevis tendon with wavy image of the proximal stump of the tendon and a haematoma.

MRI of lower right leg and ankle (October 2016)

A subtotal rupture of the peroneus brevis tendon 4 cm proximal of the lateral malleolus to about 4 cm proximal of the insertion with a retracted proximal stump and haematoma around the musculotendinous transition. The syndesmosis is intact. No ligament lesions and no subchondral cysts (Figures 11–15).

Therapeutic interventions

All operations were done within 2 weeks after each trauma. We administered non-steroidal anti-inflammatory drug (NSAID), paracetamol and metamizole according to the World Health Organization (WHO) pain ladder.¹⁶ No invasive methods such as infiltration were administered (except thromboprophylaxis with 40 mg of subcutaneous enoxaparine).

His first surgery was open reconstruction of the left Achilles tendon via lace technique and reinforcement by the



Figure 12. Rupture of the peroneus brevis tendon (MRI oblique axial view).

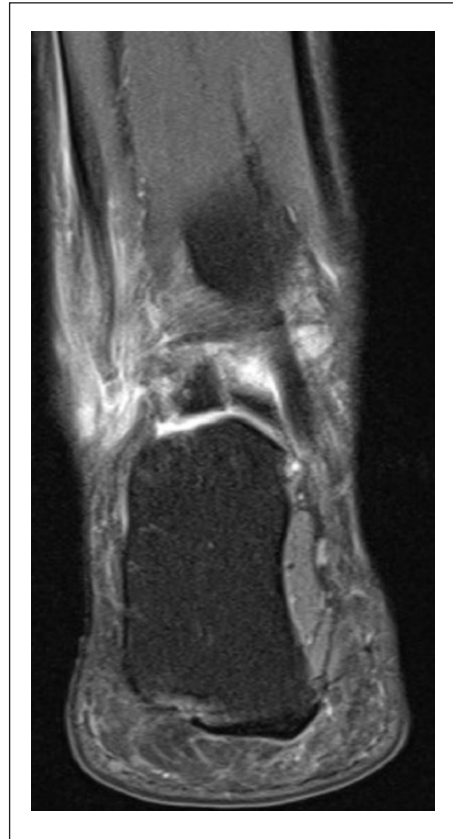


Figure 14. Retracted proximal stump of the peroneus brevis tendon (MRI oblique axial view).



Figure 13. Rupture of the peroneus brevis tendon (MRI axial view).

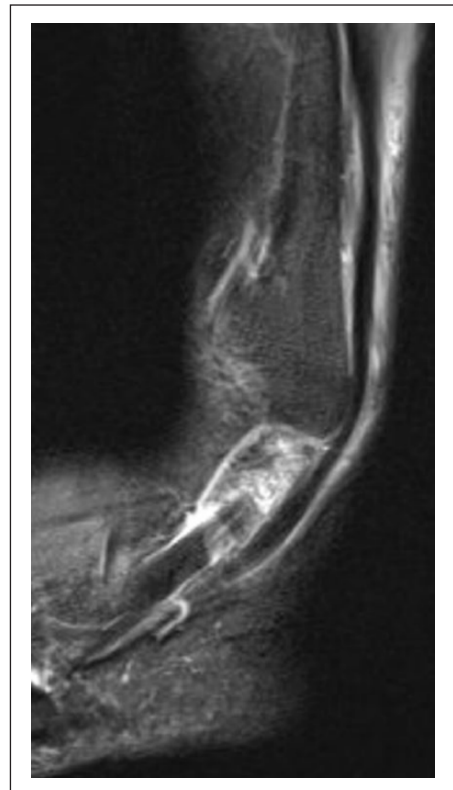


Figure 15. Distal stump of the peroneus brevis tendon (MRI sagittal view).

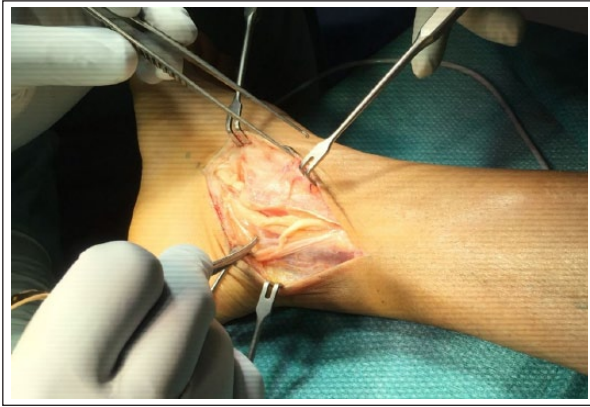


Figure 16. Total rupture of the left peroneus brevis tendon with retracted stumps.



Figure 17. Attached suture of the stumps. The peroneus longus tendon is retained.

plantaris tendon, and a soleus reconstruction, all performed on 13 November 2012. Medial para-Achilles incisions were used. After the plantaris tendon was exposed and detached proximally, the distal insertion was maintained. The Achilles tendon was reconstructed with lace technique in a maximum plantar flexion. We also fixated the soleus. We made a quadruple frame-suture of the plantaris tendon entailing spreading of the remaining fibres to reconstruct a sliding layer. Finally, the Achilles tendon reveals a good preload.

The second operation was an open reconstruction of the left peroneus brevis through transfer on the peroneus longus on 23 June 2015. Liquid drained while opening the tendon sheath; we noted a total rupture of the peroneus brevis tendon with distracted stumps, which prevented us from doing an immediate reconstruction. Since the peroneus longus was intact, we decided on a tendon transfer. The patient exhibited a good preload here as well (Figures 16–18).

The third intervention was an open reconstruction of the right peroneus brevis through a transfer on the peroneus longus on 8 November 2016. We detected intraoperatively a small lesion on the peroneus longus retromalleolar which had to be resected. Finally, we observed that the tendons were very stable (Figures 19–21).



Figure 18. Open reconstruction of the left peroneus brevis tendon through transfer on the peroneus longus.

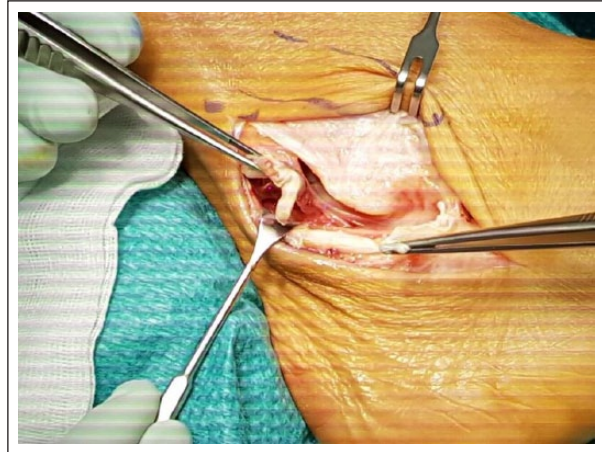


Figure 19. Total rupture of the right peroneus brevis tendon with retracted stumps. The peroneus longus tendon is retained.

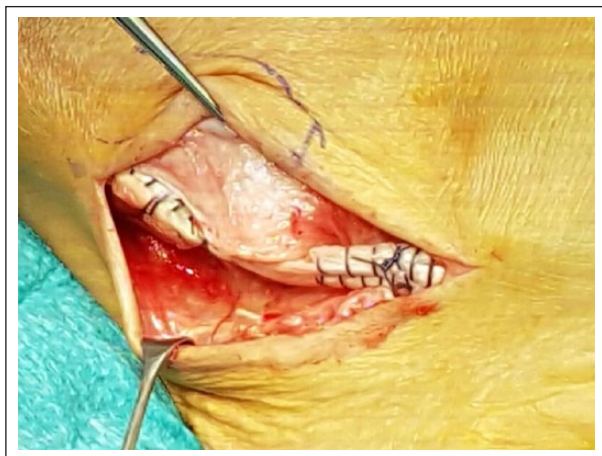


Figure 20. Open reconstruction of the right peroneus brevis through transfer on the peroneus longus.

Follow-up and outcome

After the Achilles tendon suture, the patient was immobilised in plantar flexion with a ventral splint for overnight

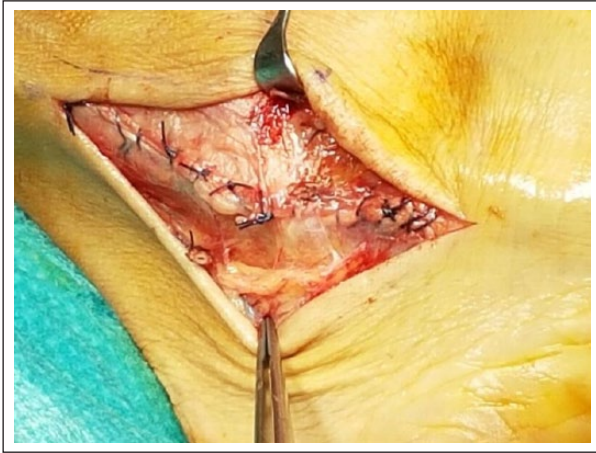


Figure 21. Closed fascia and retinaculum.

and an Achilles tendon boot with 3 wedges for 6 weeks during daytime. After those 6 weeks, use of the wedges was slowly decreased. The patient underwent regular physiotherapy and was given crutches to use for 2 weeks to assure good wound healing.

Postoperative medications consisted of enoxaparine (Clexane®) 40 mg/0.4 mL once daily administered subcutaneously, acemetacine (Tilur® ret.) 90 mg twice daily, pantoprazole (Pantozol®) 40 mg once daily, bromelain (Traumanase® forte) thrice daily and paracetamol (Dafalgan®) 1 g on demand maximum four times a day.

After the left peroneus tendon transfer, we proposed partial weight-bearing of 15 kg in the VACOPed¹⁷ with a subsequent increase in the load in a Künzli shoe.¹⁸ However, as this was not tolerated, the patient used the Airwalker¹⁹ with half of his body weight.

His clinical presentation revealed almost no irritation, little swelling and hardly any pain. Five weeks after surgery, the swelling increased after resumption of work. Nevertheless, the tendon continued to work well. Consequently, and thanks to the physiotherapy he received, the load was increased. Three months following surgery, the patient was free of complaints and exhibited good force development without swelling.

After the right peroneus tendon transfer, the same follow-up treatment with the VACOPed¹⁷ was conducted until wound healing was assured. The load was then increased in a Künzli shoe¹⁸.

Discussion

Results and conclusion

The patient's history revealed no underlying disease. He took a macrolide antibiotic once a half a year prior to the first peroneal injury because of an otitis media. He denied having taken any other antibiotics. Furthermore, the patient

reported cortisone intake for 2 days a few months before the second peroneal injury because of an allergic reaction. He experienced no local infiltration of cortisone in the lower extremity.

The operative treatment took place within the first 2 weeks after the trauma. Each postoperative follow-up revealed a good healing process. Three months after each surgery, the patient was free of complaints.

Axibal and Anderson²⁰ described a patient with bilateral peroneus longus and peroneus brevis ruptures, as well as an Achilles tendon rupture on the left side plus a tendinopathy of the Achilles tendon on the right side of uncertain aetiology. We identified more similar cases of patients who had taken medications, especially cortisone and levofloxacin.^{2,3}

Tendon injuries potentially triggered by the intake of macrolide antibiotics have not yet been reported in the literature. This patient's 2-day cortisone intake prior to the right peroneal tendon's rupture certainly did not favour tendon metabolism. A correlation with the systemic cortisone therapy cannot be entirely ruled out due to cortisone's known and lengthy latency (>6 months).²¹

To prevent such injuries, further research should be conducted to determine other risk factors.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Ethical approval

Our institution does not require ethical approval for reporting individual cases or case series.

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Informed consent

Written informed consent was obtained from the patient for his anonymised information to be published in this article.

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