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# Peroneus Quartus Muscle As Cause Of Chronic Lateral Ankle Pain By A Female Professional Ballet Dancer: A Case Report

## Zusammenfassung

*Musculus peroneus quartus als Ursache eines retromalleolären Impingements bei einer Ballett-Profittänzerin: Fallbeschreibung.*

Der Musculus peroneus quartus wurde erstmals 1816 von Otto beschrieben. Es handelt sich um einen akzessorischen Muskel, welcher seinen Ursprung auf dem Muskelbauch des Peroneus brevis hat und am lateralen Calcaneusrand inseriert. Seine Sehne kann einen retromalleolären Konflikt auslösen. Wir beschreiben diesen Fall bei einer professionellen Ballett-Tänzerin.

*Fallbeschreibung:* Die 20-jährige Ballett-Tänzerin klagte über belastungsabhängige Beschwerden retromalleolär lateral besonders bei Landungen in den Stellungen «pointes» oder «demi-pointes» in maximaler Plantarflexion des oberen Sprunggelenkes. Bei der klinischen Untersuchung, Druckdolenz am lateralen Calcaneus und diskrete Schwellung infra- und retromalleolär. Eine probatorische und therapeutische Lokalinfiltration mit Cortison konnte den Zustand momentan deutlich verbessern. Beim Wiederauftreten der Beschwerden und bei entsprechender funktioneller Behinderung wurde eine chirurgische Behandlung beschlossen.

Wir fanden einen retromalleolären Konflikt am Insertionsort der Sehne des M. peroneus quartus am Calcaneus. Die Sehne wurde reseziert, und der N. suralis wurde nach lateral subkutan verlagert. Der postoperative Verlauf war komplikationslos. Nach 2 Wochen Teilbelastung im OSG-Scotch-Cast konnten die Belastungen im Wasser progressiv gesteigert werden. Eine Vollbelastung wurde nach 6 Wochen erlaubt. Die Tänzerin konnte dann an der Barre trainieren, nach 6 Monaten war sie in ihrem Sport wieder voll im Einsatz und beschwerdefrei.

Die Sehne des M. peroneus quartus kann einen retromalleolären Konflikt verursachen. Bei chronischen therapieresistenten Beschwerden in maximaler Plantarflexion des OSGs soll man an diese Differentialdiagnose denken. Durch chirurgische Exzision der Sehne konnte in diesem Fall ein optimales Resultat erreicht werden.

## Résumé

*Muscle peroneus quartus comme cause de conflit rétromalléolaire externe chez une danseuse de ballet professionnelle: exemple de cas et revue de littérature*

Le muscle peroneus quartus a été décrit pour la première fois par Otto en 1816. Il s'agit d'un muscle accessoire de la jambe ayant pour origine le corps musculaire du court péronier et pour insertion le bord latéral du calcaneum. Son tendon peut être à l'origine d'un conflit rétromalléolaire externe. Il s'agit là, à notre connaissance, du premier cas d'un tel conflit publié chez une danseuse professionnelle.

*Description du cas:* Il s'agit d'une jeune danseuse professionnelle de 20 ans souffrant de douleurs rétromalléolaires externes principalement à l'effort et lors de réception de sauts sur pointes et demi-pointes, en flexion plantaire maximale de la cheville. A l'examen clinique, douleur à la palpation du bord latéral du calcaneum, rétromalléolaire et légère tuméfaction. Une infiltration locale de corticostéroïdes a permis une nette amélioration, momentanée toutefois. En raison de la persistance des douleurs et de la gêne fonctionnelle, on se décide pour une exploration chirurgicale.

*Résultats:* Il s'agissait d'un conflit rétromalléolaire causé par le tendon du péronéus quartus à son insertion sur le calcaneum. Le tendon fut réséqué et le nerf sural transposé latéralement en sous-cutané. Les suites post-opératoires furent simples avec immobilisation par botte plâtrée amovible durant 15 jours et augmentation progressive de la charge en piscine. A 6 semaines, charge totale autorisée et reprise de la danse en piscine. A 3 mois, reprise de la danse à la barre et en classe. A 6 mois, la patiente est asymptomatique et peut pratiquer son sport sans retenue.

*Conclusion:* Le tendon du muscle peroneus quartus peut causer un conflit rétromalléolaire à l'origine de douleurs chroniques chez le sportif. Il doit faire partie du diagnostic différentiel et un traitement agressif avec résection du tendon et transposition du nerf sural permet d'obtenir un excellent résultat fonctionnel.

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## Introduction

The peroneus quartus muscle is an accessorius muscle of the lateral compartment of the lower leg. The first description of this muscle was done by Otto in 1816: «This muscle originates from the external surface of the lower third of the fibula and continues as a very thin tendon up to the external surface of the calcaneus» [2]. Since then a few other authors made a precise anatomical description of this muscle and his different variations. Hecker [1] described six types of variations and more recently, Sobel and coworkers [3] described eight types of variations and interestingly a simultaneous attrition of the peroneus brevis in the fibular groove in 18% of the cases. The frequency of occurrence of this muscle varies between 3% and 21.7% in the literature.

This muscle has more an anatomical interest for the surgeon and very few cases are reported where this muscle could be the origin of a chronic pain of the lateral ankle, producing a retromalleolar

conflict or lateral ankle stenosis with or without lesion of the peroneus brevis muscle [4].

## Case Report

We present the case of a 20 years old female professional dancer who developed a chronic lateral ankle pain without any trauma and without any particular increasing of her sport activities. The pain occurred very progressively principally on the «pointes» and «demi-pointes» position and by landing on the «demi-pointes» and was essentially localized on the lateral aspect of the calcaneus, slightly retromalleolar and was only present by exercising without persistence at rest. The patient did not note any swelling or local redness and had no subjective instability or neurological symptoms.

Local physical therapy and strong reduction of training intensity could not influence the evolution of the pain. We saw the

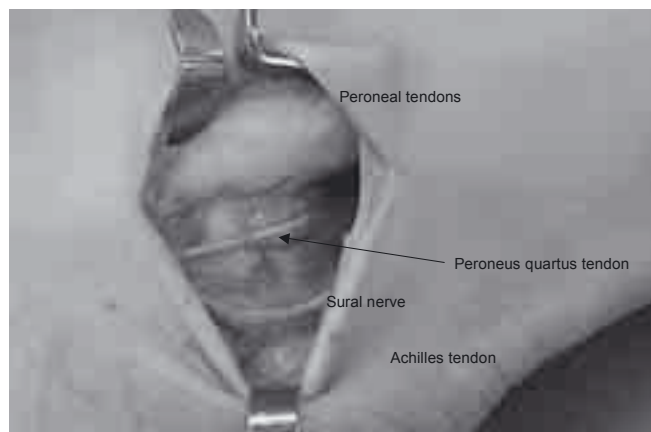
patient at our foot and ankle clinic about five months after onset of the symptoms. The clinical examination showed local tenderness, rather superficially retromalleolar on the calcaneus. There was no redness or swelling at the examination. The patient presented a slight Tinel phenomenon at the percussion of the sural nerve as a sign of local irritation, but had clinically no subjective or objective neurological deficit at the foot. The ankle joint was clinically stable and the peroneal tendons were not painful at the palpation and by forced contraction. The pain could be reproduced by forced ankle plantarflexion and digital pressure on the lateral calcaneus. There was no strength deficit in comparison with the opposite side. The x-ray of the hindfoot revealed no abnormality and a MRI examination could exclude a lesion or an inflammation of the peroneal tendons. A CT-Scan could also exclude any bony modification like bone bruise, fracture of the os trigonum or stress fracture of the calcaneus.

Our first hypothesis was a local entrapment of the sural nerve (calcaneal ast) so that we performed a local infiltration of the sural nerve with 1 ml Scandicain 2% (Mepivacain) and 1 ml Kenacort 40 mg (Triamcinolone). This local infiltration gave a total pain relief with return to full sport activities for about three weeks. Then the pain returned at the same level than before the injection. As the patient had to train hard to get a place in another company, we decided to be more aggressive and went on for a local revision. The sural nerve had no signs of constriction or inflammation, the peroneal tendons were not inflamed, but we found a unique accessorius peroneus quartus tendon attaching directly on the lateral calcaneus without any bony prominence about 2 cm proximally of the insertion of the calcaneofibular ligament (*Fig. 1*). This thin tendon was under tension particularly in neutral position of the ankle and did clearly impinge posteriorly with the retinaculum of the peroneal tendons in maximal plantar flexion and eversion of the ankle. The entire tendon of this peroneus quartus muscle was resected to the level of the superior border of the lateral calcaneus (*Fig. 2*). The sural nerve was prepared and moved slightly distally into the subcutaneous tissue. The peroneal tendons sheath was closed with a Monocryl® 3.0 and the wound was closed in a usual fashion. The histological examination of the resected tissue revealed skeletal muscle fibers with strong atrophic fibers and interstitial fibrotic degeneration without inflammation signs.

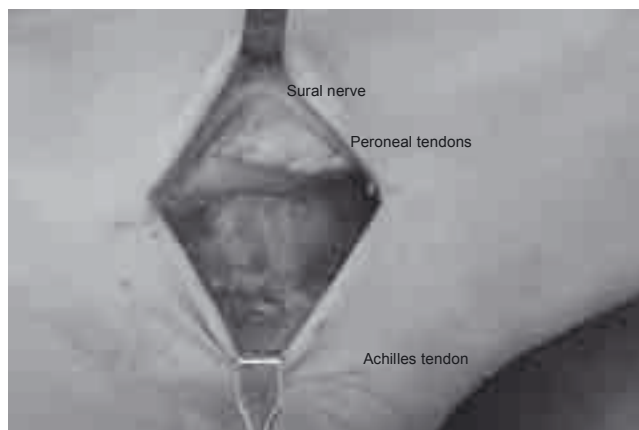
The post-operative rehabilitation consisted of partial weight bearing for the first two weeks, then progressive increase of the sport activities, first in water then actively on the barre and return to dance on the floor 6 weeks after surgery. The patient could progressively increase her activities, returned to her preoperative level and remained nearly pain-free.

## Discussion

The peroneus quartus muscle is an anatomical variation of the lateral hindfoot [3]. His frequency varies from 3% to 21.7% [3, 5] and



*Figure 1:* Note the thin tendon of the peroneus quartus muscle on the lateral border of the calcaneus.



*Figure 2:* The tendon of the peroneus quartus was resected.

it can be involved as a source of pain in the lateral hindfoot area, particularly in relation with a lesion of the peroneal brevis tendon [3]. Anatomically there are many descriptions of the various insertion types of this accessorius muscle on the calcaneus and the literature is very confusing. We did not find any report in the literature where this muscle only could be at the origin of a chronic lateral ankle pain without any lesion of the peroneal tendons, but most probably by causing a local mechanical impingement. This particular presentation by a professional female ballet dancer is also due to the pattern of stresses on the ankle joint by «pointes» and «demi-pointes» positions and by the extreme forces occurring in the hindfoot by landing on «demi-pointes» position causing a maximal active plantarflexion at the ankle joint. This particular movement and the presence of this accessorius muscle on the lateral calcaneus can explain the local conflict and the pain created by the chronic degeneration of the peroneus quartus tendon, as the histological examination showed by our patient.

The differential diagnosis of chronic lateral ankle pain includes intra- and extraarticular pathologies. The most common are chronic tendinitis of the peroneal tendons, chronic dislocation of the peroneal tendon, chronic instability of the ankle and subtalar joint, subtalar arthrosis, stress fracture of the calcaneus and of the os trigonum and neurogenic pain produced by an entrapment of the sural nerve and the calcaneal ast. In a population of sportive active patients and particularly when extreme ankle plantarflexion movements are repeated, like in dancing and artistic gymnastics, a possible impingement of the peroneus quartus tendon against the peroneal tendon sheath as a cause of a chronic exercise related pain of the lateral ankle joint should be excluded. Because it is a mechanical conflict we think that the only effective treatment is the resection of this degenerated accessorius tendon.

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