

# Metasynchronous Bilateral Achilles Tendon Rupture

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## Abstract

*Although Achilles tendon ruptures are a common occurrence, bilateral ruptures of the Achilles tendon are not. We present the case of a 33-year-old female who sustained metasynchronous (i.e., very close in time) bilateral ruptures of her Achilles tendons with no obvious predisposing factors. She was treated using a percutaneous technique and six months following surgery has returned to her normal activities.*

**A**chilles tendon ruptures are relatively common.<sup>1</sup> The true incidence is difficult to determine, but has probably increased over the last decade,<sup>2</sup> but bilateral ruptures are uncommon. They are associated with rheumatoid arthritis,<sup>3</sup> systemic lupus erythematosus,<sup>4</sup> renal transplantation,<sup>5</sup> use of systemic<sup>6,7</sup> and local corticosteroids,<sup>8</sup> and use of quinolone antibiotics.<sup>9,10</sup>

We report a 33-year-old female who sustained bilateral ruptures of the Achilles tendon approximately 48 hours apart with no obvious predisposing factors.

## Case Report

A previously fit and well 33-year-old Caucasian female experienced sudden onset of severe pain in her right calf while dancing. She felt her right calf snap, and was unable

to bear weight on her left leg. She presented to the accident and emergency department on the following day. Examination revealed a palpable defect 3 cm proximal to the right os calcis and a positive calf squeeze test. A complete rupture of the right Achilles tendon was diagnosed. She was placed into a below knee equinus cast and referred to the next available fracture clinic. The patient had not been taking corticosteroid or fluoroquinolone antibiotic medication, had not been previously diagnosed with connective tissue diseases, and gave no previous history of Achillodynia. Serology was unremarkable; calcium, uric acid and blood glucose were all within normal values. She smoked 20 cigarettes per day.

On the way to the fracture clinic, two days later, the patient was descending a step at home with crutches when she felt something snap and experienced excruciating pain over the posterior aspect of her left ankle. She was unable to bear weight, and had to be carried by her husband to the fracture clinic where examination revealed a palpable defect in the left Achilles tendon 3 cm proximal to its insertion on the calcaneum. She had a positive calf squeeze test. A diagnosis of complete rupture of the left Achilles tendon was made. The treatment options were discussed at length, and the patient elected to undergo a percutaneous repair. The patient was admitted from the fracture clinic and listed for surgery on the following day.

At surgery, a complete rupture of both Achilles tendons was confirmed (Fig. 1). With the patient prone, bilateral percutaneous repairs<sup>11,12</sup> were undertaken. Samples from both rupture sites were sent for histological examination. The patient was placed in a full Plaster of Paris cast in gravity equinus postoperatively; this was followed by four weeks in an anterior synthetic cast, plantigrade, full weight bearing. She was advised that full recovery would take on average six months and that she was likely to be able to recommence dancing at that time. Postoperatively, she had a stitch abscess on her left side that resolved with antibiotic treatment. She

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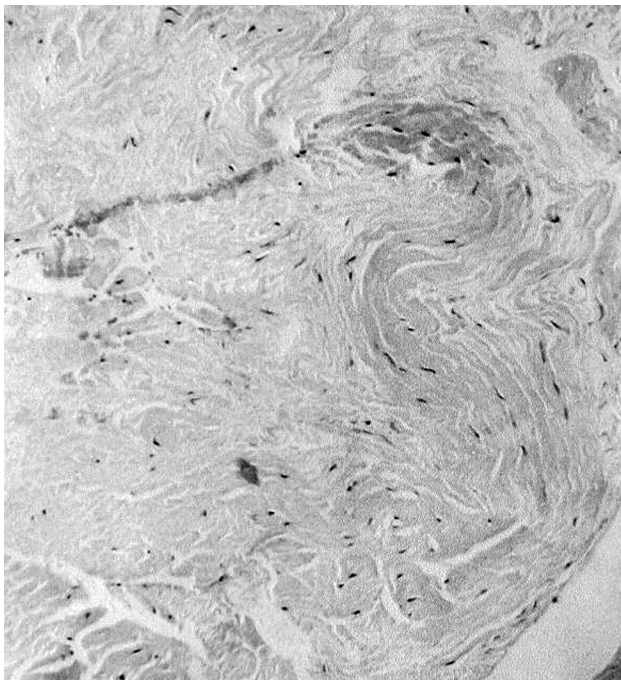
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**Figure 1** Intra-operative photograph showing torn ends of ruptured Achilles tendons protruding from incisions.

is now mobilizing normally and has a full range of motion of both ankles and normal strength. She has returned to her normal activities of daily living, including dancing. She has been discharged from our care.

Histological examination from both tendons revealed fascicles of dense collagen containing ovoid fibroblast-like cells. Small pale eosinophilic acellular foci with a degenerative appearance were seen in keeping with features associated with tendon rupture (Fig. 2). No cellular atypia



**Figure 2** Histology of ruptured Achilles tendon. Note the disordered appearance of the matrix, the degenerative features of the ground substance, and the hypercellularity. The normal well-organized appearance of the collagen fibers has been lost (original magnification: X120).

was seen. The histological picture was compatible with the degenerative features typical of acute Achilles tendon rupture.

## Discussion

The Achilles tendon is the largest and strongest human tendon, resulting from the joining of the tendons of the two heads of gastrocnemius and soleus. The tendon fibers spiral through 90° as they descend to insert into the posterior calcaneal surface.<sup>3</sup> Despite its strength, Achilles tendon ruptures are common occurrences. The true incidence is difficult to determine, but has probably increased over the last decade.<sup>2</sup> Achilles tendon ruptures are more common in males, with a male to female ratio ranging from 1.7:1 to 12:1.<sup>13,14</sup> Typically, acute ruptures occur in men in the third or fourth decade of life, particularly those that work in a white-collar profession and play sports occasionally.<sup>15,16</sup>

Type I collagen is the main constituent of tendons.<sup>17</sup> However, microtrauma may cause an increase in production of Type III collagen,<sup>1</sup> which predisposes the tendon to rupture due to its decreased ability to resist tensile forces.<sup>18</sup> Achilles tendon rupture has also been shown to be associated with a definable band on magnetic resonance imaging just posterior to the region of the tendon 2 to 6 cm proximal to the insertion of the Achilles tendon in the calcaneus.<sup>19</sup> This is the region where the majority of the pathology of the Achilles tendon takes place.<sup>1</sup>

Bilateral ruptures of the Achilles tendon are uncommon (Table 1). They are associated with rheumatoid arthritis,<sup>3</sup> systemic lupus erythematosus,<sup>4</sup> renal transplantation,<sup>5</sup> and use of quinolone antibiotics.<sup>9,10</sup> Quinolone antibiotics produce disruption of the extracellular matrix of cartilage in animal models. If the same mechanism exists in humans, a weakened tendon predisposed to rupture may result.

Ruptures associated with systemic corticosteroid<sup>6,7</sup> and local steroid injections<sup>8</sup> have been reported. The exact mecha-

**Table 1** Published Cases of Bilateral Achilles Tendon Ruptures

Source	Nos	Age	Sex	Cause	Comments	Treatment
Mahan et al <sup>20</sup>	1	31	M	Postoperative complication	Bilateral gastrocnemius equinus treated by gastrocnemius recession	Surgical repair
Poon and Sundaram <sup>10</sup>	1	70	F	Ciprofloxacin	2 days between ruptures. 5 days after starting course of ciprofloxacin. Also taking oral corticosteroids.	Surgical repair
Baruah <sup>21</sup>	1	46	F	Long term corticosteroid therapy	24 hours between ruptures.	Surgical repair
Burchhardt and Krebs <sup>22</sup>	1	61	M	Long term corticosteroid therapy	Synchronous ruptures	Surgical repair
Cowan <sup>23</sup>	1	52	M	Chronic discoid lupus erythematosus		Conservative
Dickey and Patterson <sup>24</sup>	1	43	F	Long term corticosteroid therapy	12 month duration corticosteroids for asthma	Conservative: cast for 5 weeks
Haines <sup>6</sup>	4	86	M	Chronic bronchitis Oral steroids for three months	Spontaneous rupture while walking	Conservative management
		55	M	Chronic bronchitis Oral steroids for five years	Synchronous ruptures	Conservative management
		57	M	Chronic bronchitis Oral steroids for 12 years	Partial rupture	Conservative management
		79	M	Polymyalgia rheumatica Oral steroids for 5 months	At presentation complete rupture of left, partial rupture of right. After 3 weeks examination revealed complete rupture of both tendons	Conservative management
Hanlon <sup>23</sup>	1	33	F	Trauma	Sky-diving	Surgical repair
Hestin et al <sup>5</sup>	1	61	M	Renal transplantation	Spontaneous rupture. 12 days prior to rupture complained of pain in the region of the Achilles tendon. No injury.	Conservative: cast for 8 weeks
Herreman et al <sup>26</sup>	1	43	F	Cushing's disease	Asynchronous ruptures – 1 year between each	Conservative
Khurana et al <sup>27</sup>	1	69	M	Chronic obstructive pulmonary disease	Inhaled steroids for 4.5 years	Surgical repair
Lambert and Coppens <sup>28</sup>	1	56	M	Long term corticosteroid therapy	30 year duration steroid therapy for COPD.	Conservative: cast for 6 weeks
Lee <sup>29</sup>	1	61	M	Lupus erythematosus Polyarthritis Oral Steroids	Sequel to triamcinolone therapy	Surgical repair

(continued on next page)

**Table 1** Published Cases of Bilateral Achilles Tendon Ruptures (*continued*)

Source	Nos	Age	Sex	Cause	Comments	Treatment
Lee and Collins <sup>9</sup>	1	33	M	Renal failure, Insulin-dependent diabetes mellitus, Ciprofloxacin	Four day after starting on Ciprofloxacin developed pain in tendoachilles regions. Two days later bilateral rupture while alighting from car.	Conservative: Cast for 12 weeks
Mayer <sup>30</sup>	1	46	F		Traumatic	Conservative
Melmed <sup>31</sup>	1	68	M	Shortness of breath	Betamethasone	Conservative
Shukla <sup>32</sup>	1	61	M	Limb ischemia	Asynchronous ruptures – Two weeks between each	Reconstruction
Skovgaard et al <sup>33</sup>	2	36 50	M M	Renal transplantation		Surgical repair
Smaill <sup>34</sup>	1	68	M	Chronic bronchitis, Oral Steroids	Presented with ruptured Achilles, ruptured remaining Achilles tendon while being examined in the clinic.	Conservative management
Vovor et al <sup>35</sup>	1	49	M	Trauma	Synchronous ruptures	Surgical repair
		57	M	Insulin dependent diabetes mellitus	Asynchronous ruptures – 2 years between each.	Surgical repair
Weinstabl and Hertz <sup>36</sup>	1	69	F	Long term corticosteroid therapy, Rheumatoid arthritis	Synchronous ruptures with minor trauma	Surgical repair

nism is unknown, but the analgesic and anti-inflammatory effects of steroids may mask the pain of tendinopathy. This may allow individuals to continue the offending activities, further damaging the tendon. Systemic steroid use also acts by suppressing healing in degenerate tendons, thus predisposing the tendon to rupture after only minor trauma.<sup>1</sup>

Although cases of bilateral rupture of the Achilles tendon have been reported, they are usually associated with other pathology. Our patient was a healthy, previously asymptomatic 33-year-old female who sustained bilateral ruptures of the Achilles tendon approximately 48 hours apart and with no obvious predisposing factors. Smoking has been shown to delay healing<sup>36</sup> and lead to reduced tissue oxygenation of subcutaneous tissues.<sup>37</sup> We were not able to find any published data to suggest a link between tendon degeneration and smoking, but it is possible that in this patient it may have played a role.

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