

*Ministry of Defence*

## **Synopsis of Causation**

### **Achilles Tendinopathy (Achilles Tendinitis)**

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## **Disclaimer**

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This synopsis has been completed by medical practitioners. It is based on a literature search at the standard of a textbook of medicine and generalist review articles. It is not intended to be a meta-analysis of the literature on the condition specified.

Every effort has been taken to ensure that the information contained in the synopsis is accurate and consistent with current knowledge and practice and to do this the synopsis has been subject to an external validation process by consultants in a relevant specialty nominated by the Royal Society of Medicine.

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# 1. Definition

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- 1.1 Achilles tendinopathy (syn. Achilles tendonitis) is the term used to describe the spectrum of overuse injury which may affect the Achilles tendon, ranging from inflammation of the membrane enclosing the tendon (paratenon) to tendon rupture.<sup>1</sup>
  
- 1.2 The incidence of Achilles tendinopathy in the general population is unknown although it is commonest in sportsmen, particularly in long-distance runners, and in those who participate in tennis, volleyball and soccer. There is a reported incidence of 6.5-18% in runners. It is also commonly encountered in recreational athletes aged 30-50 years who are only intermittently active but still engage in high-force and/or highly repetitive activities.

## 2. Clinical features

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- 2.1 The Achilles tendon (tendo Achilles, tendo calcaneus) is formed from the coalescence of the tendons of the gastrocnemius and soleus (calf) muscles and it is inserted into the [calcaneal tuberosity](#) of the [os calcis](#).
- 2.2 Previously it was thought that there was a natural paucity of blood vessels in the middle part of the tendon, making that section particularly vulnerable to rupture. However recent qualitative and quantitative histological analyses demonstrate that the Achilles tendon has a poor blood supply throughout its length, as determined by the small number of blood vessels per cross-sectional area.<sup>2</sup> Due to the fact that the major twisting movements of the fibres occur in this central part of the tendon it is less resilient to repetitive trauma and has a greater susceptibility to irritation, degeneration, and possible rupture.
- 2.3 Achilles tendinopathy usually develops insidiously, and occurs most commonly after abrupt changes in activity or level of training. It is nowadays generally classified in the following way:<sup>3</sup>
- **Paratendinopathy** In this condition the paratenon sheath is inflamed, thickened and typically adherent to the underlying tendon. The patient complains of localised burning pain during or following activity, and as the condition progresses, the onset of pain may occur earlier during activity, or even at rest.
  - **Tendinopathy of the main body of the tendon** This is a non-inflammatory, degenerative process (mucoid degeneration) which takes place within the body of the tendon itself, often particularly marked in the watershed area. The patient may complain of a sensation of fullness, or a nodule in the tendon. Not infrequently it is asymptomatic and is only identified on histological investigation of a ruptured tendon.
  - **Pantendinopathy** This entity combines both paratendinopathy and tendinopathy of the main body of the tendon. There is activity-related pain and diffuse swelling of the tendon sheath which is nodular and tender.
  - **Tendon rupture** Partial tears of the Achilles tendon are extremely rare. The term should be reserved to a macroscopically evident subcutaneous partial tear. Although it is frequently stated that partial or full tendon rupture may result from advanced, chronic paratendinopathy, tendinopathy of the main body of the tendon, or forceful stretching of the tendon, less than 5% of acute ruptures of the Achilles tendon occur in patients with a documented history of Achilles tendinopathy.

### 3. Aetiology

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3.1 Although much research has been performed, especially in the context of sports medicine, the exact causes of Achilles tendinopathy remain unclear; in particular there is a paucity of research into the role of occupational factors. Proposed aetiological factors may be summarised as follows:

3.2 **Extrinsic factors**, including:

Overuse:

- Training errors; for example rapidly increased intensity of activity and inappropriately increased duration of training
- Repeated hill climbing and downhill running

Poor conditioning:

- Muscle strength, flexibility and endurance are thought to be important in the prevention of tendon overuse injuries. If the muscle is fatigued or weak the energy-absorbing capacity of the limb is reduced and the muscle no longer protects the tendon from strain injury.

Adverse weather conditions:

- Training in cold weather may cause a fall in the temperature of the Achilles paratendon, with increase in the viscosity of the lubricant and thereby increases friction and risk for Achilles paratendinopathy. This same relationship illustrates why "warming up" before exercising may be important.<sup>4</sup>

Prolonged, repeated wearing of poorly-fitting footwear may be associated with the condition, but no study has proven a cause-effect relationship.

3.3 **Intrinsic causes**, including:

- Age
- Tight Achilles tendon

A number of congenital malalignments have been described as being associated with Achilles tendinopathy. These include:

- Increased hindfoot [inversion](#)
- [Hyperpronation](#) of the foot
- [Varus](#) forefoot
- [Tibia vara](#)<sup>5,6,7</sup>

Leg-length discrepancy has been identified by some workers as a contributory factor.<sup>8</sup>

3.4 **Medical diseases** that may affect tendon tissue (e.g., diabetes mellitus) and diseases requiring corticosteroid treatment (e.g., lupus, asthma) may also be responsible for pathological changes in the tendon.

3.5 **Fluoroquinolone antibiotics** increase the vulnerability of tendons to tendinopathy, even in the absence of overuse.

### 3.6 **Rupture of the Achilles tendon**

Athletes who are poorly conditioned, over-trained, or insufficiently prepared are at the highest risk for this condition, and men in the age group 30-50 years are particularly vulnerable. The usual precipitating event is a sudden force applied to a [dorsiflexed](#) foot.

## 4. Prognosis

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- 4.1 There is insufficient evidence from randomised controlled trials to determine which method of treatment is the most appropriate for the treatment of acute or chronic Achilles tendinopathy, and further research is warranted.<sup>9</sup>
- 4.2 The outcome of the condition is more favourable when treatment is instituted early; preferably within six months of the onset. Paratendinopathy and tendinopathy of the main body of the Achilles tendon are usually successfully managed conservatively, and the long-term outcome of patients managed without operative treatment has been shown to be reasonably good. In a recent follow-up study, non-operative treatment was successful in 71% of eighty-three patients with acute to subacute Achilles tendinopathy.<sup>10</sup>
- 4.3 If the condition is unrecognised or if the patient continues to engage in the activities responsible for it, chronic changes are likely to ensue which are more resistant to conservative management.<sup>11</sup>
- 4.4 The outcome of surgical treatment in 432 consecutive patients with Achilles tendon overuse injuries has recently been described, and the authors of the study report an 11% incidence of postoperative complications. However the majority of the patients who experienced complications eventually healed and returned to their pre-injury levels of activity.<sup>12</sup>

## 5. Summary

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- 5.1 Achilles tendinopathy is an overuse injury syndrome. It may affect the structures around the tendon (paratendinopathy) or the tendon itself (tendinopathy of the main body of the Achilles tendon). The affected tendon is unlikely to rupture, although it might do so if exposed to sudden strain or trauma.
- 5.2 The exact mechanism of the condition is unknown, although congenital malalignments of the foot may be a contributing factor. In addition to overuse, poor conditioning may play a role.
- 5.3 While there is much evidence to relate Achilles tendinopathy to athletic activities, particularly running; there is little to relate it to occupational factors.

## **6. Related Synopses**

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Shin Splints

Compartment Syndrome

Soft Tissue Injury of the Lower Limb

## 7. Glossary

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calcaneal tuberosity	A bony protuberance at the back of the heel bone.
dorsiflexed foot	With the foot pulled upwards.
hyperpronation of the foot	Excessive inward rotation of the foot.
inversion	Inward rotation.
macroscopic	Visible to the naked eye.
os calcis	The heel bone.
peritendinitis	Inflammation of the tissue surrounding the tendon.
varus deformities	Deformities which involve abnormal outward growth or displacement of the structure, e.g. tibia vara – bowing of the shin bone; varus forefoot – outward curving of the front of the foot.

## 8. References

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