

# Drop foot

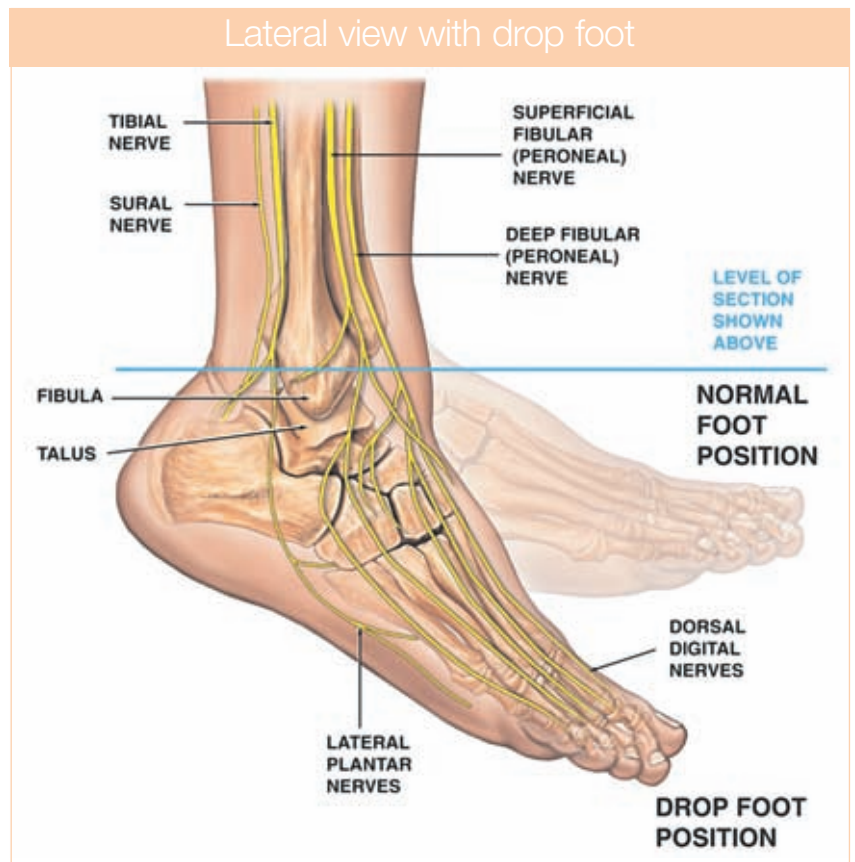
In our continuing series of A-Z features, John Gibbons discusses peroneal nerve palsy or drop foot

## Definition of drop foot

Drop foot can be defined as a significant weakness of ankle and toe dorsiflexion. The foot and ankle dorsiflexors include the tibialis anterior, extensor hallucis longus and extensor digitorum longus. These muscles help the body clear the foot during its swing phase and control plantar flexion of the foot on heel strike.

This is referred to as a steppage gait, because the patient tends to walk with an exaggerated flexion of the hip and knee to prevent the toes from catching on the ground during the swing phase of the gait cycle. This, in turn, will cause the foot to plantar flex, and potentially the foot will slap the ground.

Two specific case studies have been chosen to highlight potential secondary consequences from a resultant primary trauma. It is important to note how the initial presentation is identical but the underlying factor is completely different.



## Case studies

### Case one

A 24-year-old male presents with an inability to dorsiflex his ankle

#### History:

Six weeks before his first consultation, the rugby-playing client went in for a tackle and twisted his ankle while playing for his local team. At the time he felt a sharp pain and heard a cracking sound.

He was taken to the hospital's A and E department and was given an X-ray, which showed a fracture of his tibia. A plaster of paris (POP) cast was applied over his lower leg up to the knee and he was told to return in a few weeks.

When his fracture had healed and the cast was removed he tried to flex and point his foot to encourage range of motion through his ankle. However, he found dorsiflexion very difficult to perform due to weakness, even though the movement did not cause any pain. The nurse subsequently advised him that his

muscles were weak and suggested he try physiotherapy. Rather than wait for an appointment on the NHS, his mother booked him an appointment at my clinic.

### Case two

A 24-year-old male presents with an inability to dorsiflex his ankle

#### History:

Two weeks before the consultation, this athlete went in for a tackle while playing football. He remembered being kicked in the side of the leg and said he felt an excruciating pain shooting down the front of his leg. He went to the side of the pitch and immediately iced his anterior leg, applying a compression bandage over the injured site.

Since the injury happened, this patient has been struggling to walk normally. He finds it difficult to lift his foot off the ground while walking and describes his foot as 'slapping' the ground on impact.

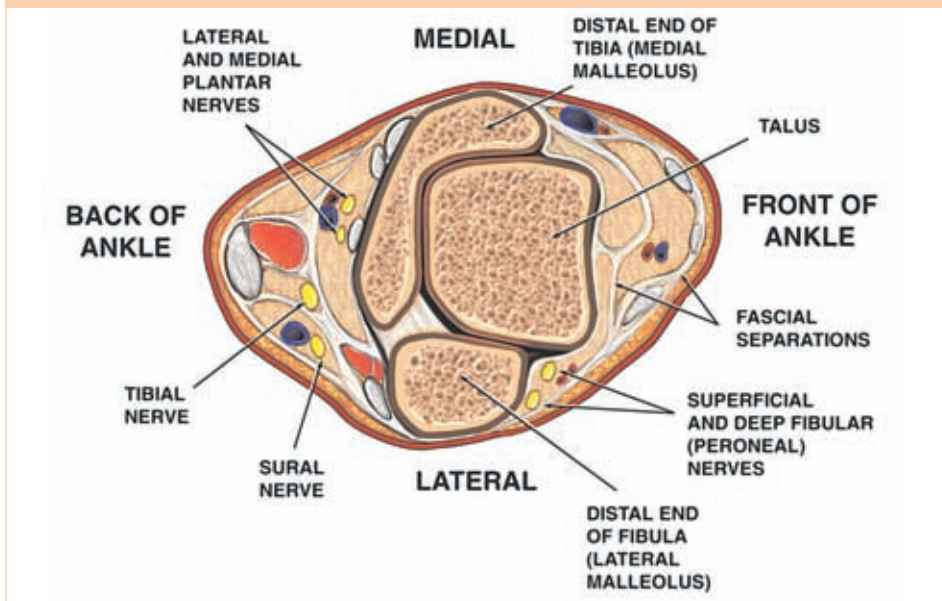
## Discussion of the case studies

Both of these athletes presented with exactly the same symptoms, i.e. they were unable to dorsiflex the ankle.

When you have a situation like this, in which the main muscle involved in dorsiflexion (the tibialis anterior) is shown to be weak – or in more severe cases, unable to show a contraction within the muscle – then it is necessary to consider a problem with the nerve controlling the muscle. This nerve is called the deep peroneal nerve, which is a branch of the common peroneal nerve. Fibres from the dorsal branches of L4-S1 are found in the peroneal nerve, which is paired with the tibial nerve to constitute the sciatic nerve. The sciatic nerve leaves the pelvic cavity at the greater sciatic foramen, just inferior to the piriformis muscle.

The sciatic nerve splits to form the peroneal and tibial nerves near the distal thigh. The peroneal nerve crosses laterally over the fibular neck to the anterior compartment of the lower leg, dividing into superficial and deep branches. The superficial supplies the peronei and then branches to the ankle anterolaterally to supply

Cut-section through ankle



sensation to the dorsum (or top) of the foot. The deep branch divides just after rounding the fibular neck.

The point where the nerve passes around the neck of the fibula is very vulnerable to potential trauma. The initial branch supplies the anterior tibial muscle. Remaining branches supply the extensor digitorum longus and extensor hallucis longus and a small sensory patch at the first dorsal web space. The peroneal nerve is susceptible to injury all along its course.

So, back to the two case studies. It is obvious from case study two that this patient sustained a kick to the side of the leg, which could quite easily damage the nerve in question. However, case study one is a different story. Yes, he had an injury – but this was to his ankle with a subsequent fracture, so why did he have a drop foot after the removal of the plaster of paris cast?

Let's consider the clinical reason. The drop foot in this case was due to compression of the peroneal nerve caused by the POP cast exerting pressure on the neck of the fibula. Initially there would be no obvious symptoms, however if you compress a nerve for many weeks then, of course, there must be a consequence, in this case a drop foot.

**Peroneal nerve treatment and repair**

It would be very tempting to treat the area of weakness by trying to strengthen the muscles that have tested as weak. But this is a neurological problem and not simply a muscle weakness.

The research shows us that this nerve is able to regenerate, by approximately 1mm per day, but research also shows that this does depend on how long the nerve has been compressed. For example, if nerve recovery takes longer than about one year, then the paralysis is permanent. Also, nerve

injuries more than several inches from the muscle do not recover well. Surgery may be an option to correct or alleviate the underlying problem causing drop foot. For example, if drop foot is caused by nerve compression from a lumbar herniated disc, a spinal surgical procedure called discectomy (removal of the disc) may be required to relieve the pressure.

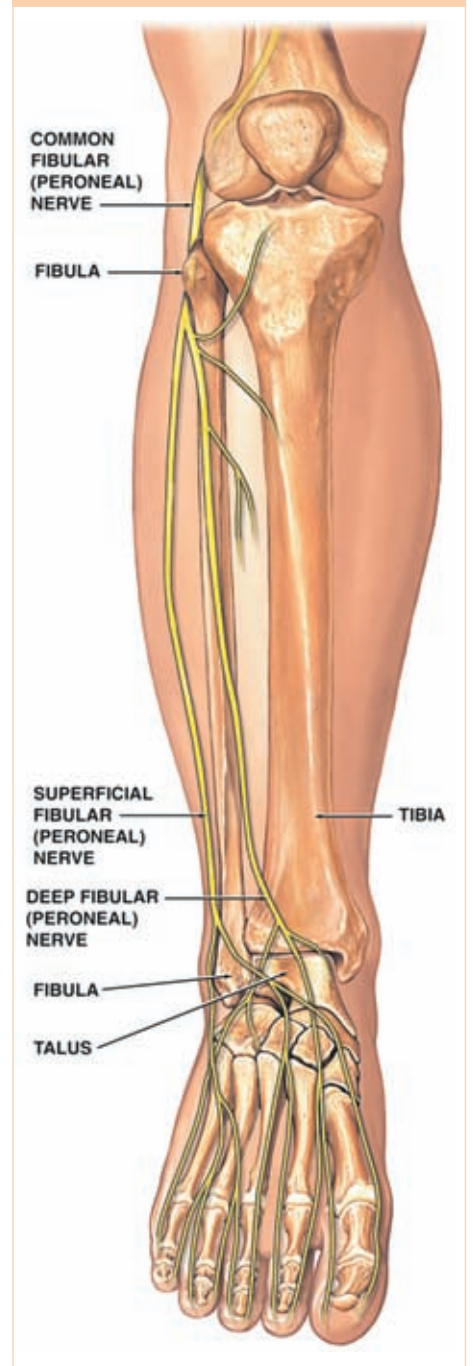
**Awareness is key**

Drop foot is not seen very often in the sports injury clinic, however when it does present itself, the first-line practitioner should have at least a basic understanding of the potential pathologies that could be causing these signs and symptoms. The good thing is that the two clients discussed in these case studies made a complete recovery over a relatively short period of time due to the capability of nerve regeneration. In this case rest was indicated to let nature do what it does best – that is, to heal.

In terms of self-help to prevent the muscle atrophying (or wasting), a TENS machine can sometimes help as it causes the muscles to contract and might even assist the nerve in its regeneration.

There are numerous presentations in clinical practice in which the client has an obvious drop foot but the cause is not related to trauma. This should make you aware of pathologies outside the scope of the sports medicine field, as not all clients participate in sport. With this in mind, keeping up to date with CPPD is paramount, as the client is our first priority.

Anterior view with drop foot



**Other possible causes of drop foot:**

- Lumbar disc herniation
- Spondylolithesis
- Compartments syndrome
- Hip replacement surgery
- Knee arthrotoomy
- Acupuncture near the head of the fibula.



**John Gibbons BSc (OST)** is a sports osteopath/therapist and lecturer in sports medicine at the University of Oxford and St Mary's University. John is a regular speaker at FHT Sports Conferences. Tel: 07850 176600, email: [j.gibbons@peaksport.co.uk](mailto:j.gibbons@peaksport.co.uk) or visit [www.peaksport.co.uk](http://www.peaksport.co.uk)

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