Chapter 1

Clinical Examination of the Foot and Ankle

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Introduction

Accurate history taking and examination of the foot and ankle are the cornerstones of diagnosis; in turn diagnosis underpins treatment. The complexity of the bony and soft tissue anatomy of the foot and ankle means that modern imaging is no substitute for clinical examination. In some patients pathology is present but not the cause of symptoms; in others, where the imaging technique lacks sensitivity, imaging will miss subtle lesions. For example, in some countries or institutions, ultrasound (US) scanning is preferred over magnetic resonance imaging (MRI) for imaging tendons.

The aim of this chapter is to give you a method that is reliable in clinical practice, as well as under exam conditions. We have divided the examination into "general," which is undertaken on each patient, and "specific," which is aimed at teasing out a specific diagnosis. It is important to bear in mind that foot and ankle pathology is often secondary to systemic disease, for example diabetes mellitus or a hereditary sensorimotor neuropathy. Furthermore the outcome of surgery is closely linked to neurological and vascular pathology. For this reason careful attention and documentation of these systems is mandatory.

If you learn nothing else from this chapter you should remember that knowledge of the surface anatomy is paramount, as diagnosis is related to the precise location of pain and tenderness. Even if the patient has more than one site of tenderness, establishing the region of maximal tenderness will usually yield a differential diagnosis of one or two possibilities, which can be clarified by imaging. We emphasize a simple request to the patient, "point with one finger to where you feel the pain worst." Some patients will wave the hand over an ill-defined broad area of the foot. They should be encouraged to point with a *single finger* to the precise site of the pain – if they are unable to localize their pain precisely this raises the possibility that the pain is "non-surgical," for example it may be neurogenic or secondary to a complex regional pain syndrome.

Alternatively the patient may have more than one pathology. In these cases the patient is encouraged to point to the different areas of pain, and quantify the level of pain in the different areas. Thus ask the patient where the most painful area is. The patient is then told that if this area of pain has a severity of ten out of ten, how painful, on the same scale, is the second area? Thus in a patient with two areas of pain at level of ten and eight, both areas should be carefully assessed. Whereas if one area has a severity of ten, and the other of three, it is likely that the lower scoring area is not of such importance, and will settle spontaneously once the primary pathology has been treated.

Descriptive Terms

Understanding descriptive terms is necessary for communication, spot diagnoses, and linking pathologies.

cavus	A hollow or high-arched foot. Associated with varus hindfoot position "cavovarus."
planus	A flat foot – the opposite of cavus. Associated with valgus hindfoot position "planovalgus."
equinus	Flexion of the foot relative to the tibia.
varus	Describes the position of the distal segment, which inclines toward the midline, from proximal to distal.
forefoot varus	Describes a forefoot where the first metatarsal is elevated relative to the fifth metatarsal, i.e., the forefoot is supinated.
adduction	Deviation toward the midline in the horizontal plane. Most commonly used for the mid and forefoot, for example metatarsus adductus.

valgus	Describes the position of the distal segment, being away from the midline relative to the proximal. Most commonly used for the hindfoot.
forefoot valgus	Describes a forefoot where the first metatarsal is lower than the fifth metatarsal, i.e., the forefoot is pronated.
abduction	Similar to valgus, to denote deviation away from the midline in the horizontal plane. Most commonly used for the mid and forefoot.
supination	Complex movement of the foot and ankle composed of inversion, adduction, and plantar flexion. The principal axis is through the talonavicular joint.
pronation	Opposite of supination with eversion, abduction, and dorsiflexion.
plantaris	Plantar flexion of the forefoot, relative to the hindfoot, also called forefoot equinus.
calcaneus	Dorsiflexion of the ankle, the opposite of equinus.

History

The clinical history provides the diagnosis in approximately 75% of general medical patients, there is little to suggest that diagnosis in the foot and ankle is any different. Listen to the patient, "if you only ask questions you will only receive answers in reply[1]." Take a focused history; it will lead to a focused examination.

It is important to take a thorough history, in particular with regards to pain – where is the pain? Is there a history of trauma? How long has the pain been present? Is the pain burning or felt at night? The last is suggestive of neurological pain, which is not an uncommon finding. Early morning and start-up heel pain is characteristic of plantar fasciitis. Instability and giving way should also be noted.

It is important to establish if the patient has a history of arthropathy, psoriasis, skin rashes, vascular disease, neurological disease, or diabetes mellitus.

Smoking cigarettes has been associated with higher non-union and complication rates in foot and ankle surgery, and should be noted.

Enquire what treatments patients have already tried and what the patient is prepared to try. If she has had physiotherapy, what did the treatment consist of? Exercises? Stretches? "Show me what the physiotherapist taught you," is often a good indicator of their experience.

The use of orthoses and shoe modification should be recorded.

Finding out a patient's expectations is key to being able to meet their expectations. For example, a builder who walks on rough ground and uses ladders extensively is going to have more limitations in his day-to-day activities, following an ankle fusion, than an individual who wishes to walk to the shops and back.

General Examination

Setting and Equipment

The examination should take part in a quiet, well-lit room. There should be available space to observe the patient walking for approximately ten meters. An adjustable examination couch and two chairs should be provided. Examination can usually take place with exposure to the knee, but facility to undertake a full examination should be available. Repetition will lead to a slick technique (Box 1.1).

Special equipment required:

A goniometer.

A hand-held Doppler is useful to assess the vascularity, where pulses cannot be felt.

A 5.07/10 gram Semmes–Weinstein monofilament is a cheap and excellent way of screening for peripheral neuropathy. The monofilament is pressed perpendicular to the skin in five locations until it buckles, it should be held in place each time

Box 1.1 Tips for slick examination technique

- Ask the patient to roll up their trousers, not push them up – they will fall down!
- Kneel when observing the patient standing. Ask the patient to turn rather than moving around the patient – it is more efficient.
- Make sure to look at the shoes and orthoses.
- When asking the patient to perform a single-leg heel raise, ask them to stand facing a wall, the vertical surface can be used for balance but not assistance.
- Always examine the patient standing and walking.
- Note any aids.

for about one second and then released. The patient is asked to confirm they can feel the monofilament and the location.

Standing blocks are also essential, both to assess leg length and for undertaking the Coleman block test (see "Special Tests" section).

Tuning fork 128 Hz or biothesiometer. The biothesiometer or neurothesiometer is a simple handheld device that gives semi-quantitative assessment of vibration perception threshold.

Look

The foot can be considered as a tripod. The three legs of the tripod are the calcaneum, the head of the first metatarsal, and the head of the fifth metatarsal. Hindfoot valgus is associated with planus deformity while varus is associated with cavus. The flat foot has a more equal distribution of pressure and therefore is likely to have fewer callosities (areas of thickened skin secondary to high pressure). The cavovarus foot induces higher point pressures and consequently callosities – these will characteristically be under the three "legs" of the tripod – namely the heel, and the first and fifth metatarsal heads. Different kinds of symptoms are seen in cavovarus, compared to planovalgus feet, especially in active or athletic individuals in whom the cavovarus foot is far more symptomatic than the planovalgus. There are a number of common foot pathologies associated with each foot type (Table 1.1).

Table 1.1 Typical pathologies seen with the principal foot morphologies

Cavovarus foot[2]	Planovalgus foot
ankle instability	hallux valgus
subtalar instability	hallux rigidus
symptomatic os trigonum	tibialis posterior dysfunction
peroneal tendon pathology/tear	spring ligament attenuation/rupture
enlarged peroneal tubercle	midfoot arthritis
painful os peroneum syndrome	peroneal tendon impingement
stress fracture of fourth or fifth metatarsal	ankle instability
sesamoid overload	valgus ankle arthritis
plantar fasciitis	anterior knee pain
vertical stress fracture of medial malleolus	genu valgum
metatarsus adductus	
midfoot arthritis	
varus ankle arthritis	
medial compartment knee arthritis	
iliotibial band friction syndrome	
tibial stress fracture	
exertional compartment syndrome	
tight gastrocnemius	

Examination of Gait, Aids, and Shoes

Observe whether the patient has walking aids and take the opportunity to ask whether they use walking aids during day-to-day life.

Take the insoles out of the shoe and look at them. Have they ever been used or worn just for your benefit? Similarly, has the patient's heel ever contacted the inside of the ankle foot orthosis (AFO)?

What type of shoes does the patient like wearing? Are they the correct fit? Look at the wear pattern on the sole and damage to the upper and any insole as a static imprint of their gait pattern.

Static Inspection

Weight bearing can exacerbate deformity; therefore assessment with the foot in its functional position – standing – is important. Pay attention to the general alignment, rotation, and foot position. Asymmetry and evidence of leg-length discrepancy should be noted.

Look from the side and posteriorly with the patient standing. The hindfoot has a normal valgus of around 5°, in the normal foot this will correct to varus on heel raising (Figure 1.1).

Hindfoot and forefoot positions should be noted independently. One first notes the hindfoot varus or valgus with the patient standing. Then with the patient seated the talonavicular joint is brought into neutral (see below), and the forefoot position is noted. If deformity is present it is important to note whether it is fixed and uncorrectable, or flexible and correctable.

As outlined in the introduction, a thorough understanding of the surface anatomy is key to examination of the foot and ankle. Three-dimensional osteology and surface markings are best appreciated

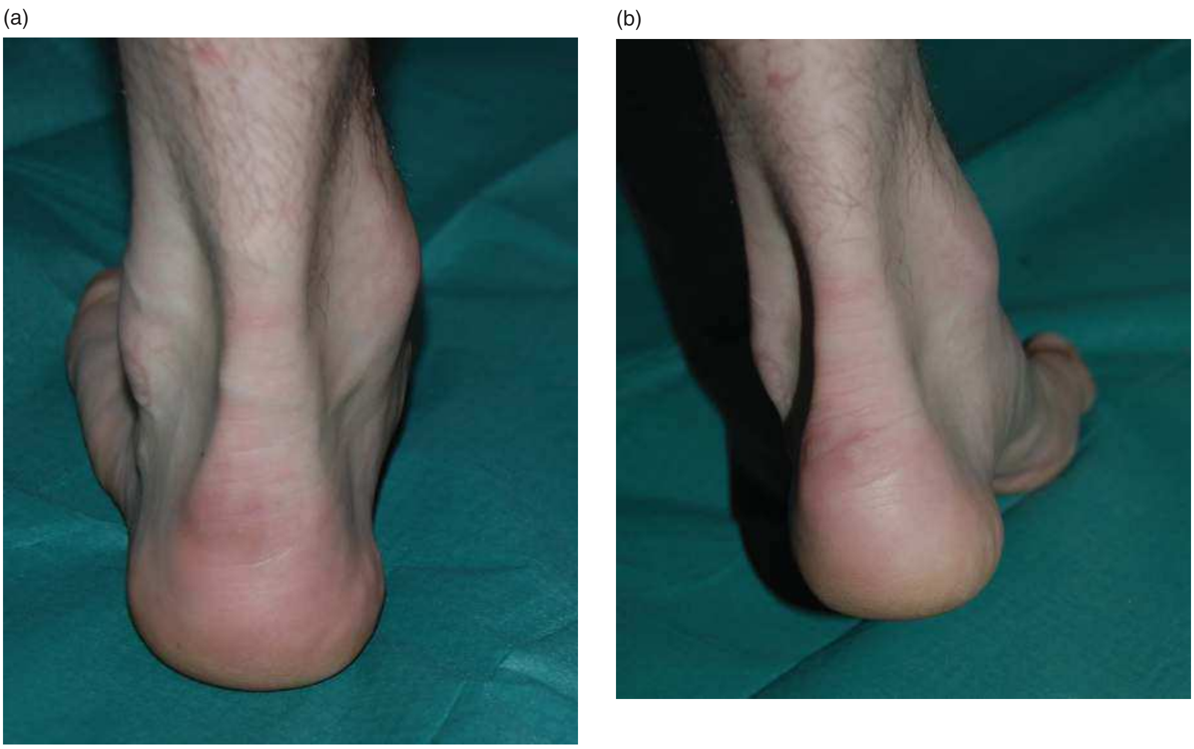

Figure 1.1 In the normal foot **(a)**, on going onto tip toe **(b)** the arch elevates and the heel moves into varus on raising.

by repeated examination comparing the "normal" to "abnormal" (Figure 1.2).

Next, look at the color and quality of the soft tissues. Is the skin woody, hard, or shiny? Is there hair growth? Bare, atrophic skin is a sign of poor vascular supply; coarse hair with shiny skin may be an indicator of a complex regional pain syndrome. Swellings and scars should be recorded.

Look for pressure areas over the dorsum from ill-fitting shoes and callosities of the sole indicating regions of overload.

Finally, check between the toes for soft corns and the condition of the nails.

Gait

While analysis of gait is part of the examination of movement, it is easier to watch the patient before they sit down, as opposed to asking them to stand and walk later. Ask the patient to walk, both in shoes and barefoot. Kneel down to give yourself a level view. Make sure to look from the front, side, and behind.

If the gait type has a specific pattern – describe it (Table 1.2). Otherwise break down the gait cycle to assess for rhythm, swing and stance phase, overall alignment, and proximal joint movements. Then look specifically at the foot alignment, and point of contact and push off.

Perry[3] described the three "rockers of gait." It helps to consider the subdivisions of the stance phase when observing the patient walk:

Heel rocker: From initial contact of the heel to foot flat, the foot decelerates as a result of eccentric contraction of tibialis anterior and the long toe extensors. The heel rocker may be abnormal in the presence of a tight tendo Achillis (failure of heel strike) or weak tibialis anterior (poor control and a slapping foot).

Ankle rocker: From foot flat to heel rise with controlled forward progression of body weight over the fixed foot. The triceps surae contracts eccentrically while the tibialis anterior is quiet. This rocker is abnormal with ankle pathology and stiffness.

Forefoot rocker: From heel rise to toe off. Gastrocnemius is the prime mover. This rocker is abnormal if the triceps surae is weak or there is forefoot pathology, such as hallux rigidus.

Table 1.2 Abnormal gait patterns

Common gait pattern terminology	Definition
Antalgic gait	Painful gait; asymmetric rhythm with less time spent on the affected, painful limb.
Hemiplegic gait	The patient has a unilateral weakness on the affected side, arm flexed, adducted, and internally rotated. The ipsilateral lower limb is in extension with plantar flexion of the foot and toes (equinus). When walking the patient holds his/her arm to their side and circumducts the foot.
Diplegic gait	Secondary to hypertonicity. The patient walks with an abnormally narrow base, dragging both legs and scraping the toes. The hip adductors may also be tight causing the legs to cross the midline, producing a "scissoring" gait. Fixed flexion at the hip and knee may also be present.
High stepping/foot-drop gait	Active dorsiflexion of the foot is weak. The foot may drag or is lifted clear of the floor through the swing phase with additional hip and knee flexion. Causes include proximal (spinal) and distal neurology with deep peroneal nerve dysfunction.

Figure 1.2 The bony landmarks of the foot and ankle. (1) medial malleolus; (2) navicular tuberosity; (3) first tarsometatarsal joint; (4) first metatarsophalangeal joint; (5) sustentaculum tali; (6) metatarsophalangeal joint parabola; (7) base of fifth metatarsal; (8) talonavicular joint; (9) lateral malleolus; (10) second tarsometatarsal joint; (11) peroneal tubercle.

Table 1.3 Gage's prerequisites for normal gait cycle: (4) and (5) relate to the foot

1	Energy conservation
2	Adequate step length
3	Sufficient foot clearance
4	Appropriate pre-positioning of the foot in swing phase
5	Stability in stance

An adequately functioning foot and ankle are essential for two of Gage's five prerequisites for a normal gait cycle (Table 1.3)[4].

The midtarsal and subtalar joints are inter-related and influence one another. When the talonavicular and calcaneocuboid joints are in a valgus position they are parallel, and the midfoot is supple; when they are in a varus position they are divergent and, consequently, the foot is stiff. These interactions in the hindfoot allow two foot morphologies. Firstly, from heel rocker through ankle rocker, with the subtalar joint everted and the transverse talar joints parallel, the foot is supple for shock absorption and to allow for irregularity in the ground. Secondly, from heel rise in forefoot rocker, the subtalar joint is inverted, the transverse talar joints are not parallel, and the hindfoot is locked, facilitating the propulsion by creating a rigid segment between the tendo Achillis and the forefoot.

As shock absorption and energy conservation are dependent on hindfoot version and transverse tarsal position, errors in the positioning of any element of the kinetic chain from pelvis to toes will have a detrimental effect on gait efficiency.

At heel strike the subtalar joint starts to evert making the foot suppler. Foot pronation provides flexibility to adapt to uneven surfaces. A stable platform is provided throughout the stance phase. Hindfoot valgus (or subtalar joint eversion) then moves to inversion (or hindfoot varus) through the stance phase, and on heel raise the heel inverts providing a stiff lever for propulsion. This can be observed in a simple heel raise with the normal valgus position changing to varus as the heel is elevated.

Feel

This is best done with the patient seated on a high couch, with the examiner seated opposite.

With focused and systematic palpation for areas of bony or soft tissue thickening, focal lesions, and tenderness, the differential diagnosis can often be narrowed. History and the patient pointing to the area of maximal pain gives a good indication of the site of maximal tenderness. Careful palpation, combined with knowledge of the deep and surface anatomy, allows the affected structure or structures to be identified. This is illustrated in the regional "feel maps" later in the text. Where areas of tenderness are found, try to define the exact limits of the tenderness, and how they are related to, or changed by, motion of the joints and tendons.

Move

While the patient remains seated, this is an excellent position to assess the movements of the foot and ankle. Start from the ankle and hindfoot and move distally. It is also important to establish the relationship between the hind and forefoot.

When examining the foot and ankle it is important to understand the basic biomechanics. The ankle joint is not a simple hinge. Stiehl suggested that the articular surface of the talus was an approximation of a frustum (a section of a cone)[5], the apex of which is directed medially. The axis of rotation is just distal to the intermalleolar axis, which is easily located by palpation. The obliquity of the axis of rotation results in a change in foot position with pure ankle movements, with internal rotation of the foot in plantar flexion and external rotation in dorsiflexion. The normal arc of movement of the ankle is 50 to 60°. Ankle movements can be separated from dorsiflexion and plantar flexion of the midtarsal and tarsometatarsal joint (TMTJ) by grasping the heel with the foot rested along the forearm (Figure 1.3). Ankle dorsiflexion should be recorded with the knee flexed and extended by performing Silferskiöld's test. This is also a good time to assess the ankle ligaments – see "Special Tests" later in the chapter.

The range of motion in the subtalar joint is most accurately assessed prone with the knee flexed; however, the inconvenience to the patient is rarely necessary and examination can usually be undertaken with the patient sitting. It is usually sufficient to compare the two sides, expressing the range of movement as a percentage of the normal side. The patient remains seated and the calcaneus is aligned with the tibia. The

Figure 1.3 When examining the ankle it is useful to place the forearm along the sole of the foot to isolate the ankle movement from the midfoot.

heel is then moved from inversion to eversion. The normal subtalar joint range of movement is about 20 to 60°, with twice as much inversion as eversion.

The range of first TMTJ motion is difficult to test accurately, nevertheless it is more important to assess stability than range. The foot is taken in two hands, one hand taking the first ray in isolation, the other hand taking the lateral four rays. The two hands are then moved dorsally and plantarwards. If the inferior aspect of the first metatarsal does not reach that of the lesser rays the first ray is considered stiff, whereas if it dorsiflexes above the dorsal aspect of the lesser rays, the first ray is considered hypermobile.

The metatarsophalangeal joints (MTPJs) are assessed individually. Pain at the limits of movement of the first MTPJ is assessed. Midrange pain of the first MTPJ is recorded, as this helps determine if a patient is suitable for a cheilectomy to treat hallux rigidus.

The Relationship Between the Hindfoot and Forefoot

The ability of the midfoot to compensate for hindfoot position is core to understanding foot and ankle pathology, as well as the establishment of a plantigrade foot with varying hindfoot morphologies.

Imagine a theoretical solid foot, where no movement, or compensation, were possible. If the heel is placed in varus, the forefoot will twist so that the first ray is elevated (*forefoot varus*). In such a foot weight bearing will lead to pressure and symptoms under the entire lateral border of the foot, often with a callus under the fifth metatarsal base and head. Thus compensation for the forefoot varus is necessary. This compensation occurs through rotation in the midfoot, thus *forefoot valgus* compensates for *hindfoot varus*. On the other hand, a *valgus hindfoot* requires a compensatory *forefoot varus* to elevate the first ray. These compensatory rotations of the forefoot occur in the coronal plane, and are fundamental to maintain a plantigrade foot.

Clinically establishing the position of the hind- and forefoot is achieved by placing the subtalar joint in neutral. The talonavicular joint forms a ball and socket in the midfoot – the “acetabulum pedis.” Subtalar neutral is established by centering the navicular on the talus. This is achieved by placing a finger on either side of the talar neck. There is usually a deeper recess palpable laterally than medially. As the heel, through the subtalar joint, is brought into varus, the depth of the soft tissues equalizes on both sides of the talar neck. When the soft tissues are equal, the talonavicular joint is said to be in neutral.

Thus the hindfoot position is established with the patient standing, then in the seated patient the heel is held and moved to “subtalar neutral.” The position of the forefoot is then noted. If the forefoot lies in varus or valgus, use your second hand to establish if this deformity is correctable, or flexible.

The importance of this in surgical practice is in establishing the surgery required to correct a deformity. For example, a patient with a significant hindfoot valgus may well have compensatory forefoot varus (supination). If this forefoot deformity is fixed, surgical correction will require a bony procedure, often a fusion, through the midtarsal joint to produce a plantigrade foot. If the forefoot is flexible, or correctable, simply addressing the hindfoot should be acceptable. The Coleman block test is a weightbearing variation of these principles (see below).

The importance of this examination has been magnified in recent years, by the advent of total ankle arthroplasty, because coronal plane deformity of the foot has been shown to be the major driver of failure, due to transmission of coronal plane forces to the ankle replacement.

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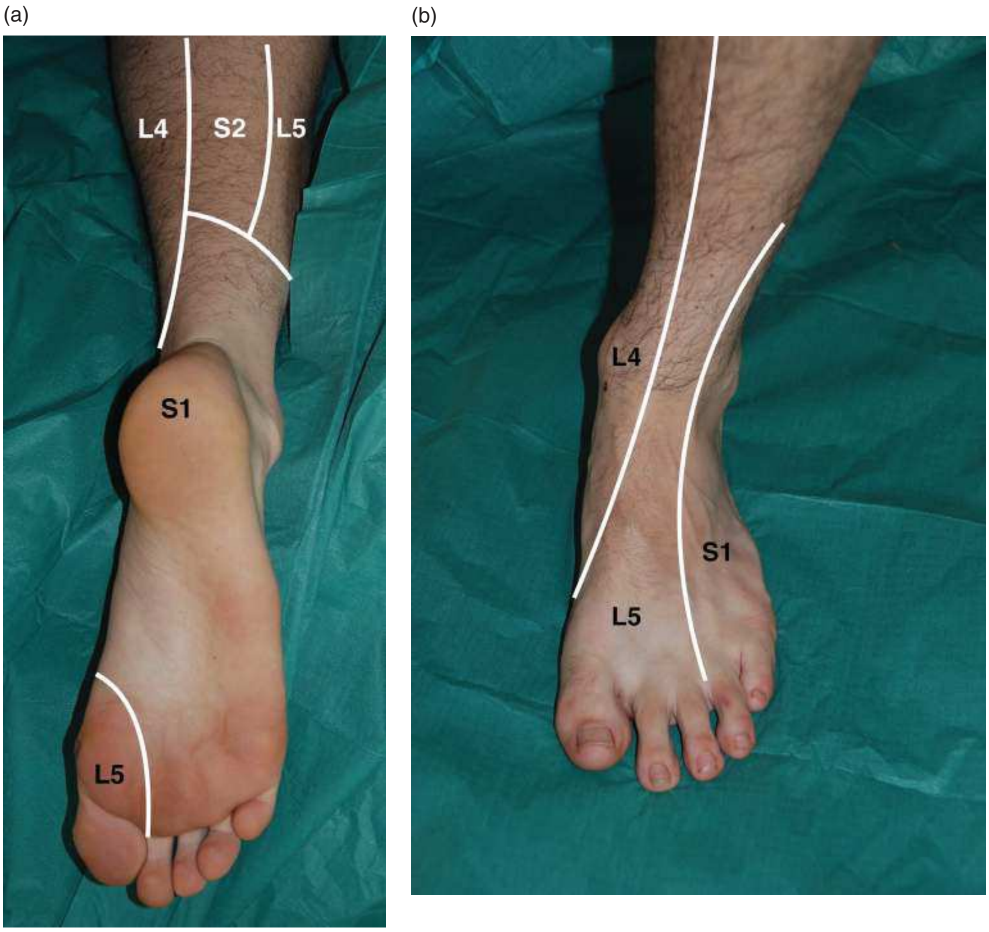

Figure 1.4 Dermatomes of the foot.

Extras

- The need for complete examination of the spine, hip, and knee is determined by the patient's history. Be sure to check the spine and any cutaneous manifestations of neuromuscular disease, such as café au lait spots, if the history is suggestive.

Neurology

Test light touch in the dermatome regions. Sensibility with a 5.07/10 g Semmes–Weinstein monofilament is probably easiest. A 128 Hz tuning fork and a monofilament have similar specificity for detecting diabetic neuropathy, but the monofilament is more practical[6]. Neurological pain is not uncommon in the foot and ankle, and the dermatomes and peripheral nerve distributions are important (Figures 1.4 and 1.5).

Power and muscle balance should be assessed and compared to the contralateral side. Relate muscle weakness to the myotome where a proximal nerve cause has been identified, or with the peripheral supply if local causes are suspected (Table 1.4). Documentation of the Medical Research Council (MRC) grade should be noted (Table 1.5).

Vascular

Look for general signs of venous and arterial insufficiency. Visible varicosities, edema, and hemosiderin pigmentation should be noted. Skin color, warmth, and soft-tissue quality should be assessed. Are there any signs of active or healed ulceration?

Check the presence and quality of the dorsalis pedis pulse, just lateral to the extensor hallucis longus (EHL) tendon at the midfoot, and the posterior tibial

Table 1.4 The actions and innervation of the principal long muscles of the foot and ankle

Muscle	Test	Myotome	Peripheral nerve
Gastrocnemius–soleus complex	Resisted plantar flexion in neutral	S1, S2	Tibial nerve
Tibialis posterior	Resisted inversion in plantar flexion Ability to invert across midline of limb	L5, S1, S2	Tibial nerve
Tibialis anterior	Resisted inversion in dorsiflexion	L4, L5, S1	Peroneal nerve
Peroneus brevis/longus	Resisted eversion	L4, L5, S1	Peroneal nerve
Extensor hallucis longus	Resisted great toe extension	L5	Deep peroneal nerve

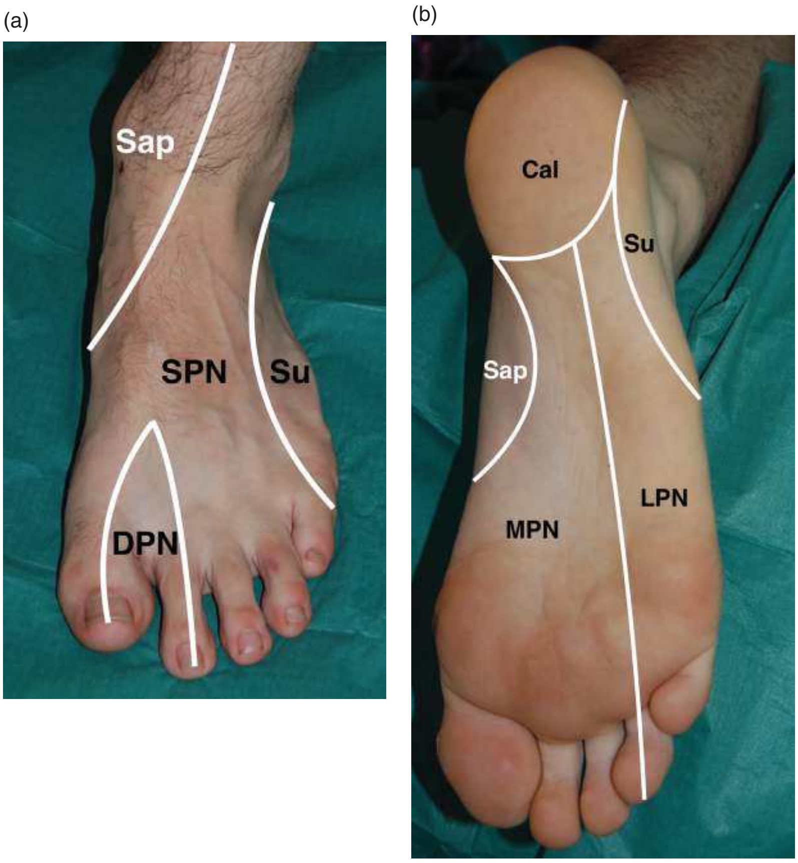

Figure 1.5 Sensory innervation of the foot. Sap: saphenous nerve; Su: sural nerve; SPN: superficial peroneal nerve; DPN: deep peroneal nerve; Cal: calcaneal branches of posterior tibial nerve; MPN: medial plantar nerve; LPN: lateral plantar nerve.

pulse, posterior to the medial malleolus. It is worth bearing in mind that the presence of pulses and absence of symptoms gives a 96% accuracy in excluding vascular disease.

If pulses are not easily palpable, use the handheld Doppler to measure the pressure. The blood pressure cuff is inflated until the pulse disappears. The blood pressure cuff is then slowly deflated and when the pulse is redetected through the Doppler probe the pressure in the cuff at that moment indicates the systolic pressure of that artery. Measure the ankle brachial pressure index (ABPI). The ABPI is obtained by dividing the ankle systolic pressure by the higher of the two brachial systolic pressures. An ABPI of >0.9

Table 1.5 The Medical Research Council (MRC) grading of muscle strength. Grade 4 is sometimes divided into 4–, 4, and 4+

MRC Grade	
0	No muscle contraction
1	Flicker of contraction but no movement
2	Active joint movement with gravity eliminated
3	Active movement against gravity, but not resistance from examiner
4	Movement against resistance, but reduced power
5	Full and normal power against resistance

Table 1.6 The components of the Beighton score for hypermobility

	Score
Passive extension of the little finger >90°	1 each side
Passive apposition of thumb to flexor aspect of forearm	1 each side
Hyperextension at the elbow	1 each side
Hyperextension at the knee	1 each side
Ability to touch hands flat on floor from standing with knees extended	1
Total score	9 **(>4 "hypermobility")**

is normal, <0.8 is associated with claudication, and <0.4 is commonly associated with ischemic rest pain and tissue necrosis. Note that the lower extremity measurements may be spuriously elevated in advanced diabetes due to calcification of the vessels.

Hypermobility

There are several hypermobility scores. The Beighton score (Table 1.6) remains the most widely used and the one on which exam knowledge is expected[7,8]. Test the upper limbs first; if a zero score is achieved there is no need to assess the lower limbs.

Systemic hypermobility is important in many aspects of foot and ankle disease, maybe most notably hallux valgus/first ray instability and lateral ankle ligament instability. It should also be borne in mind that patients with Ehlers–Danlos syndrome have more foot and ankle problems than the normal population, and hallux valgus, generalized foot pain, pes planus, or ankle instability may be their presenting complaint. Most hypermobility is mild, benign, and idiopathic and is not part of the Ehlers–Danlos spectrum, which is associated with many serious organ (e.g., cardiac) abnormalities.

Specific Examination

The patient is asked to put his or her finger on the point of maximal tenderness. The location of pain gives rise to a differential diagnosis. Many of the eponymous tests are described in the "Special Tests" section.

Hindfoot

See Figure 1.6 – the numbers in the text relate to the figures.

Central/Calcaneal Tuberosity

Differentials: Insertional tendinopathy of the tendo Achillis (1), retrocalcaneal bursitis (2), Haglund's deformity (2), and Achilles enthesophytes (3).

Features: Tenderness at the tendo Achillis insertion, tenderness and swelling of the retrocalcaneal bursa, pain and limitation on dorsiflexion.

Central/Midtendon

Differentials: Non-insertional tendinopathy (4), tendo Achillis rupture (4).

Features: Tendinopathy – tenderness and nodule of the tendon, crepitus (paratendinopathy). Positive Silfverskiöld's test. Palpate medially to assess for plantaris involvement[9].

Rupture: Perform (Simmonds'/Thompson's) calf-squeeze test. If it produces passive ankle plantar flexion, equal to the contralateral limb, the triceps surae and tendo Achillis are intact. Acutely feel for a palpable gap in the tendon. If the rupture is chronic there will be excess ankle dorsiflexion, a gait with a weak push off, and recruitment of the long toe flexors.

Posteromedial

Differentials: Posterior ankle impingement by an os trigonum (5), fracture of posterior process of