The foot does not simply bear the weight of the whole body but the weight springs off it many times a minute in walking, running or jumping and it helps to absorb the impact of landing. The bones, ligaments and muscles absorb an enormous amount of impact over a lifetime, especially in an athlete but perhaps more so in the obese.

The foot is a dynamic piece of engineering. It has both a longitudinal and a transverse arch. The longitudinal arch is higher on the medial side. The foot may be inspected with the patient seated and the foot elevated to facilitate inspection, especially of the sole; however, it is essential to examine the foot in a weight-bearing mode. This is when almost all the problems occur in this dynamic structure and failure to do so will result in missing the correct diagnosis in most cases. Problems of the ankles, knees, hips and back also merit examination of the feet.

**Epidemiology**

- Painful feet are a very common problem. One cross-sectional postal survey reported a 9.4% prevalence of disabling foot conditions.[1]
- Risk factors for foot pain include advancing age, obesity, injudicious footwear, high-impact exercise (eg, jogging) and underlying medical conditions (see under 'Aetiology' section).

**Aetiology**

There are many causes of painful feet:

- Neuropathy - eg, sciatica, peripheral neuropathy.
- Ischaemia from peripheral arterial disease or embolism.
- Skin lesions may be painful, including blisters, corns, calluses, fungal skin and nail infections and bacterial infections (skin and osteomyelitis).
- Hallux valgus.
- Plantar fasciitis.
- Tarsal tunnel syndrome.
- Freiberg's disease.
- Arthritis affecting the feet, especially rheumatoid arthritis or the painful first metatarsophalangeal (MTP) joint in acute gout.
- Ingrowing toenails, especially if infected.
- Abnormalities of the joints, ligaments and tendons of the foot.
- Often there appears to be an inherent predisposition but other factors include poor footwear, obesity and hypermobility syndromes.

**History**

- Establish when it started.
- Ask whether it is becoming worse.
- Ask whether the pain is diffuse or at a point.
- Establish aggravating and relieving factors.
- Note occupation, sport, training routines and any recent injury.
- Establish whether there is pain elsewhere. Poor posture of the feet can cause pain in the ankles, knees and back.
Examination

- Look at the shoes. Note the type of shoes the patient chooses to wear. Fashionable shoes may distort the foot. Trainers are unique in the history of footwear in being designed for feet; however, ask when he or she last got a new pair. If training seriously, ask whether he or she has several pairs. Just as cars need to have tyres and shock absorbers replaced periodically, so too trainers need replacing.
- Note whether there is abnormal or uneven wear of the shoes.
- Note any obesity.
- Consider whether the shape of the foot looks normal. Look at the sole. Note any abnormal callus. Weight should be taken over the first and fifth metatarsal heads. Callus over other metatarsal heads means fallen transverse arch.
- Establish whether there is local tenderness.
- Now examine the feet with the patient standing with both feet bare. Note whether the longitudinal arches are normal. Check that you can get your finger under the medial arch. Look at the feet from behind. Fallen arches cause hyperpronation and upset the line of the Achilles tendon.
- If there is a postural problem such as a fallen arch it is often possible to put something underneath it, like a small pile of leaflets, to correct the abnormality and to prove that posture can be corrected.

Children rarely complain of painful feet and if they do, think of a foreign body. Pressure from shoes on a prominent navicular bone, or sometimes an accessory bone, or a prominent posterosuperior os calcis may require surgical trimming\[2, 3\]. Osteochondritis and similar conditions may affect the bones of the foot. Osteochondritis of the metatarsals is called Freiberg's disease\[4\]. An X-ray will aid diagnosis. A podiatrist can help. Usually an insertion into the shoe is satisfactory but occasionally a plaster cast is required.

Metatarsus primus varus

The first metatarsal shows angulation towards the midline. It usually affects teenagers and may run in families. If deformity is marked, a metatarsal or proximal wedge osteotomy may be beneficial\[5\]. The addition of a plantar shelf has been found to assist in bone healing\[6\].

Hallux rigidus

The first MTP joint has arthritis, pain and restricted movement. A dorsal ring of osteophytes may occur. In early cases, manipulation and injection of the joint with steroid and local anaesthetic may offer relief. However, in more advanced cases, arthrodesis, Keller's operation, distal oblique osteotomy or decompression osteotomy may be required\[7\].

Ingrowing toenails

See separate Nail Disorders and Abnormalities article.

Surgical interventions are more effective than non-surgical interventions in preventing the recurrence of an ingrowing toenail. The addition of phenol is probably more effective in preventing recurrence and regrowth of the ingrowing toenail\[8\].

Flat feet

See separate Pes Planus article.

Stress (march) fracture

See separate Foot Fractures and Dislocations article.

Hallux valgus

See separate Hallux Valgus article.
Plantar fasciitis
See separate Plantar Fasciitis article.

Tarsal tunnel
See separate Tarsal Tunnel Syndrome article.

Metatarsalgia

- This is pain across the metatarsal heads. It is often due to collapse of the transverse arch. A range of abnormalities including plantar plate tears may be visible on ultrasound[9].
- A metatarsal pad will often reform the arch and give relief. If there are difficulties, ask a podiatrist to help.
- Surgical treatment for severe painful rheumatoid forefoot deformities has usually involved resection of the metatarsal heads with realignment of the lesser toe deformities and first MTP joint arthrodesis.
- Correction of severe rheumatoid forefoot deformities by arthrodesis of all five MTP joints has been suggested as an alternative surgical approach[10].

Morton's metatarsalgia

There is pain from pressure on an interdigital neuroma between the metatarsals. Fashionable shoes often contribute. Pain usually radiates to the lateral side of one toe and the medial side of its neighbour. Pressure on the affected web space reproduces the pain. Ultrasound and MRI are the best modalities to diagnose the condition[11]. Excision of the neuroma may be needed. Ultrasound-guided steroid injection may be another option[12].

Pain in the heel
See separate Heel Pain and Plantar Fasciitis articles.

Further reading & references

- Morton's Neuroma: Interdigital Perineural Fibrosis; Wheeless' Textbook of Orthopaedics
- Radiofrequency ablation for symptomatic interdigital (Morton’s) neuroma; NICE Interventional Procedure Guidance, December 2015
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