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Editors:
Ade O Adebajo FRCP(Glasgow)
D John Dickson MBChB FRCP(Glasgow) FRCP(London) MRCGP

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THE THERAPEUTIC SCOPE OF MODERN PODIATRY

Jane McAdam BSc(Hons) SRCh
Chief Podiatrist (Clinical Lead in Orthoses), Salford Primary Care and Salford Royal Hospitals NHS Trusts

Frank Webb FCPod(S) FPodA SRCh
Specialist/Surgical Podiatrist, Salford Royal Hospitals NHS Trust

• Foot and ankle symptoms are common in primary care
• Effective treatment requires an accurate diagnosis
• Callosities mean abnormal pressure distribution – early podiatric referral is vital to avoid progression to ulceration
• Footwear assessment and advice are very important
• Correctly prescribed insole orthoses work well to reduce pain and pressure
• Where required, specialist podiatric surgery is available
• The rheumatoid foot requires special podiatric vigilance

INTRODUCTION

What do podiatrists do?
‘Chiropodist’ and ‘podiatrist’ are interchangeable terms, ‘podiatrist’ now being preferred by the profession. Podiatrists’ responsibilities are to assess and treat painful and disabling foot conditions. National Health Service (NHS) podiatrists are state registered, having undergone a 3-year university-based training programme.

What is podiatric surgery?
This is a new and growing area. The Fellowship in Podiatric Surgery, FCPod(S), is a qualification over and above the state-registered one, and requires 5 years’ additional postgraduate study. This includes an entry examination, within-training written examinations in surgery, case presentations, and a final practical examination in basic surgical techniques (including soft tissue surgery and bone fixation). Podiatric surgeons acquire comprehensive knowledge of radiographic interpretation, and they are able to prescribe antibiotics and analgesia according to Local Patient Group Directions (formally known as group protocols). Thus, modern podiatry offers a wide range of services to community and hospital patients alike.

Primary care physicians receive little training in respect of foot problems, yet many patients present to them with foot and/or ankle pain. Such symptoms can impair walking and in turn reduce patients’ abilities to carry out normal daily tasks, including exercise. Apart from the disruption and frustration experienced by patients in the short term, more chronic pain may significantly reduce their mobility and impoverish lifestyle, i.e. cause disability. Until recently, podiatry services have mostly benefited diabetic patients who are routinely referred to podiatry departments for rigorous regular inspections to detect potential ulceration early on. Reducing pressure over high-risk areas minimises the likelihood of such ulceration, and facilitates its healing once established. As a result of such vigilance, podiatrists have been very successful in reducing diabetic foot problems and their complications. There are many conditions other than
diabetes which present as foot and/or ankle pain. This article highlights those conditions potentially amenable to specialist podiatric interventions, and these should be undertaken in collaboration with attending community or hospital-based physicians. Making the correct diagnosis of these conditions early on, to facilitate their effective treatment, is of great importance in primary care.

**ARTICULAR AND BONE CONDITIONS**

**Hallux valgus**

This common deformity presents as a swelling on the medial aspect of the 1st metatarsal head, associated with a broadening forefoot and rotation and dislocation of the hallux into valgus (see Figures 1, 2). Deformities of the lesser toes follow. Affected patients suffer pain in the 1st metatarsal, as well as general metatarsalgia and hyperkeratotic lesions over the medial aspect of the hallux and the extensor aspects of the lesser toes. Patients also complain of increasing difficulty in finding footwear that fits comfortably. Some patients remain asymptomatic but become concerned about the appearance of the foot and the progressive nature of the deformity.

The treatment options vary according to the extent of the deformity and the age of the patient. In a young patient with only a minor pain and deformity the first option is footwear advice, i.e. regarding broad-fitting shoes. However, it is also important to control the angle of forefoot pronation, i.e. to alter the angle of direction of the forces into the joint and thus relieve pressure. The other advantage of controlling pronation is that excessive foot movements in the shoe, and therefore friction, will be reduced. Podiatrists are able to provide patients with a comprehensive range of insoles that are worn inside patients’ own footwear. Such specialised insoles are hereafter referred to as orthoses. Following a process of clinical assessment, which includes a history of symptoms and lifestyle and an examination including biomechanical assessment, specific orthoses can be prescribed. An excessively pronated foot (i.e. pes planus, or flat foot – loss of longitudinal arch – see Figure 3b) is one of the most common factors associated with foot pain. However, ‘filling in the arch’ alone does not address the cause of pronation. Biomechanical examination identifies abnormalities in bony relationships, muscle function, ligament strength and gait. These are the entities for which an insole-type orthosis can be prescribed in order to modify, realign and support the foot structures. The same principle applies to the excessively supinated foot (i.e. pes cavus, or claw foot – see Figure 3c). Orthoses can also address problems such as a rearfoot varus, a plantar-flexed first ray, and hypermobility, which are other causes of foot pain.
In a young person with a moderate to severe deformity causing pain despite the use of orthotics, surgery should be considered. The surgery of choice depends on the size of the intermetatarsal angle, i.e. that between the 1st and 2nd metatarsals, and the deviation of the hallux. These abnormalities are usually dealt with surgically by metatarsal osteotomies – which reduce the metatarsal angle, thus correcting the bunion deformity – and with realignment of the sesamoids. In older patients with severe deformity, but where pain is restricted purely to the bony exostosis, then a simple removal of the exostosis (i.e. a cheilectomy) is the treatment of choice. This is also done where there has been a history of, or in the presence of, ulceration. A metatarsal osteotomy can be performed once the ulcer site has healed. Intra-articular steroid injections are of benefit in moderate to severe cases, but should not be repeated more than about 2–3 times a year. Such injections should be given in conjunction with orthoses. For those patients unwilling to undergo surgery for severe hallux valgus, the only other option is for them to wear surgical shoes, which achieve comfort by simply accommodating the deformity.

**Hallux limitus and rigidus**

These conditions reflect progressive osteoarthritis of the 1st metatarsophalangeal (MTP) joint. This process restricts dorsiflexion of the joint, especially due to the eventual growth of osteophytes dorsally. Affected patients complain of pain and stiffness in the joint during walking and of difficulty purchasing comfortable footwear due to an increasingly painful lump on the dorsum of the joint. Plain radiographs in early cases show loss of joint space, but in more advanced cases typical osteoarthritic changes occur, including further loss of joint space, dorsal osteophytosis, and bony sclerosis. Various biomechanical theories have been proposed to explain a predisposition to develop hallux rigidus or limitus. For instance, an inappropriately long 1st metatarsal in relation to the 2nd may cause overloading and jamming of the 1st MTP joint, causing elevation and/or dorsiflexion and local trauma of the joint, and predisposing to osteoarthritic change.

Treatment depends on the stage of the problem. Early on, when there is no or only moderate osteoarthritic deformity, the use of orthotic insoles to facilitate plantar flexion of the 1st metatarsal and to reduce pronation of the foot will often greatly relieve discomfort. Treatment may be augmented by intra-articular steroid injections. In more severe cases patients often complain of pain related to footwear irritation on the osteophyte, as well as that due to joint movement. In these instances simple cheilectomies can be performed. However, opening up the joint can also increase pain, as increased joint movements result. If pain remains severe despite these measures, fusion of the joint is usually therapeutic. This is carried out with the hallux held at a 20° angle to take account of the needs of ‘toe-off’.

**Sesamoiditis**

Patients with this problem complain of pain, usually under the 1st metatarsal head during weight-bearing, and especially when walking. In particular, pain is felt under the 1st metatarsal head as the weight is taken around about ‘toe-off’. A distinct planter callosity may be detectable clinically, but will not be the only cause of localised tenderness. Extension of the 1st MTP joint may also be reduced. This condition results from arthritic changes of the surface of the sesamoids at their site of articulation with the plantar head of the 1st metatarsal. Similar pain can also be due to fracture or hypertrophy of the sesamoid.

Treatment consists of insoles with an aperture cut to raise the sesamoid off the bottom of the shoe, and thus to cushion the lesion to afford relief. Simple cushioning such as silicone gels or Sorbothane insoles applied to the area can also help, particularly in relation to high-
impact sports. Steroid preparations injected directly into the sesamoid apparatus will also help reduce pain.

**Metatarsalgia**

This is a symptom and not a diagnosis. The term simply describes pain felt beneath the plantar aspect of one or more metatarsal heads during weight-bearing. Metatarsalgia may result from a number of problems, e.g. mass lesions, loss of padding, MTP joint problems, or prominence of the plantar metatarsal heads due to subluxation of phalanges. Metatarsalgia is thus very common in the rheumatoid foot.

The treatment for metatarsalgia varies according to the cause. For example, orthoses are used to relieve pressure in the pes cavus type foot or to alter the pressure of the forefoot where there is either a long, short or plantar-flexed metatarsal. Simple debridement of callosities over the metatarsal heads relieves pain in many instances, such as in the rheumatoid foot.

**Dorsal midfoot exostosis – midfoot pain**

This condition most commonly occurs in the overpronated foot, but it can also occur in the supinated foot. The most frequently seen exostosis is that at the base of the 1st metatarsocuneiform joint, often incorporating the base of the 2nd and intermediate cuneiform joints. Midfoot pain is experienced on weight-bearing and patients also complain of discomfort due to shoe abrasion.

In the early stages the use of orthotics to relieve excessive movement reduces the pain significantly, and they may be used in conjunction with steroid injections directly into the joint(s) under radiographic control. If a large exostosis causes severe and intractable pain, surgical removal is indicated in conjunction with post-operative orthotic care. An alternative is fusion of the joint. In the supinated foot a dorsal exostosis may be seen around the naviculocuneiform and/or talonavicular regions. Again, the biggest problem here is shoe wear causing discomfort on weight bearing. The therapeutic options are similar to those for the pronated foot, namely orthotics to reduce excessive movement, steroid injections to reduce pain, and surgery, either to remove the exostosis or to fuse the joint. In the initial stages of these conditions it is most important to accurately localise the joint responsible for symptoms. This can be undertaken with the use of local anaesthetic injected directly into the joint under radiographic control, with resultant relief of pain if the correct joint has been injected. This thus represents a very good diagnostic test, and can be used alongside imaging such as isotope bone and magnetic resonance (MR) scans.

**Ankle pain and osteoarthritis**

Ankle pain is a common clinical problem presenting to general practitioners, either with patients recurrently spraining their ankle due to ligamentous instability or due to osteoarthritic degeneration of the ankle joint itself. Unstable ankles are effectively treated with physiotherapy aimed at increasing proprioception and strength in the ligaments and muscles around the joint. In addition, orthoses can be used to prevent excessive movement at the subtalar joint, which can cause instability in the ankle joint itself. The most common instability is that of the lateral ligament, and this may require surgical repair. The use of MalleoLoc and lateral ligament splints is particularly helpful in the acute stages of pain, although it is also possible to immobilise the joint in a removable cast.

Osteoarthritis of the ankle joint is a more difficult problem to treat. Maintenance of normal movement is important and is achieved with ankle splints and insole orthoses to maintain alignment of the calcaneus and subtalar joint. Steroid injections directly into the joint are beneficial. Surgical options include simple cheilectomies of the anterior part of the tibia where this articulates at the head of the talus; arthroscopic removal of debris and loose cartilage and any ligament which may be impinging within the joint; and fusion of the ankle joint (in extreme cases). Ankle replacement surgery is in its infancy in terms of development at present.

**Subungual exostosis**

This is a benign osteochondroma presenting as a bony spike on the dorsomedial aspect of the distal phalanx, usually of the hallux. Patients will usually complain of pain when shoes are worn, and often of increasing discoloration of the nail with associated swelling and elevation of the nail plate. The common result is subungual corn or callus formation, and occasionally secondary infection.

Treatment will depend on the stage of the problem. Early advice on footwear is recommended, but a more definitive procedure is to have the exostosis surgically excised. Should the nail be thickened or deformed it may be necessary to remove part, or all, of the nail on a permanent basis.

**Hammer toe**

This is a specific condition the name of which is often used generically to describe various problems of the lesser toes. The general term refers to the condition where the toe(s) change position, with the extensor tendons pulling the affected toes into deformity at the proximal interphalangeal and (potentially) distal interphalangeal joints (see Figure 2b). The actual type of ‘hammer toe’
present (hammer, claw, retracted or mallet) depends on where the deformity is, and its cause. Whichever deformity is actually present, the result is increased pressure on the skin overlying the interphalangeal joint, the apex of the toe or the metatarsal head itself. Chronic pressure at these points initially leads to hyperkeratosis, but ulceration and all its potential dangers may follow. Major causes of claw toe are secondary to degenerative and inflammatory arthritic conditions affecting the forefoot, neuromuscular disorders, biomechanical dysfunction and genetic factors. Inappropriate footwear may also cause a similar problem, but more usually exacerbates a pre-existing deformity.

In treating minor cases, the use of simple splints to straighten the toe and advice on footwear, along with orthotics to control any underlying biomechanical abnormality, is all that is required. In the later stages, where a fixed deformity may have developed, surgical shoes or surgery are the treatments of choice. Arthroplasty at the distal interphalangeal joint, or at the proximal interphalangeal joint where a pseudoarthrosis has developed, or fusion at these joints (holding the toe in a straightened position) are the surgical options.

**SOFT TISSUE PROBLEMS**

**Plantar fasciitis – heel spur**

These are among the more common causes of plantar heel pain. The cause of fasciitis is thought to be traction injury with inflammation of the plantar fascia at its insertion into the calcaneus, i.e. traumatic enthesitis. This heals by calcification, and radiographs may thus reveal the development of a calcaneal spur, although this is not necessary for fasciitis to be diagnosed and about 25% of the normal population display radiographic heel spurs yet remain pain free. It is important to remember that, although plantar fasciitis is relatively common, it is more common in individuals who have or who are destined to develop ankylosing spondylitis or seronegative oligoarthritis. The history should thus enquire about personal or family history of back pain, psoriasis, iritis and inflammatory bowel disease.

Patients with plantar fasciitis complain of pain in the middle of the plantar aspect of the heel, as well as along the medial longitudinal arch. This pain is worse on first arising, but may continue during the day and recur when patients rise after sitting for any length of time (dyskinesia). With activity the pain tends to diminish, although in chronic cases pain may cause considerable debilitation. Pain can be elicited during deep palpation at the insertion of plantar fascia, and sometimes along its length. Examination of the patient standing and walking will commonly reveal an excessively pronated foot, although it is possible for this condition to exist in a supinated foot.

In treating this condition it is essential that the cause of the problem is addressed, as well as the cause of the symptoms. If the foot is excessively pronating or supinating (see Figure 3) orthoses should be provided to control the deformity and reduce the stress on the plantar fascia. Simple heel cushions, of either Sorbothane or silicone gel, greatly relieve discomfort. It is also usual to find that, along with the excessive pronation or supination, the tendo-achilles is tight, giving less than 10° dorsiflexion at the ankle. It is important that patients stretch their tendo-achilles on a daily basis, both with the knee straight and with the knee flexed, to stretch all the muscles that insert into the tendo-achilles. In conjunction, the plantar fascia should also be stretched. This can be achieved by pulling the toes up with a piece of Tubigrip or elastic, while the patient bears weight on the affected foot on a rolling pin on the floor, and rolls the pin from the toes toward the heel. This should be done for approximately 2–3 minutes a day and the patient should be warned that the foot may be uncomfortable afterwards. To relieve this discomfort the foot can be placed for about a minute on ice, a cold can of drink or frozen peas.

If the pain continues despite these physical methods, it is then worthwhile injecting the area with Depo-Medrone. The most painful spot should be located and the steroid injected directly into this area. During needle siting it is important to go deep enough to reach the calcaneal bone, and care should be taken to inject around the affected area. Should these measures fail then physiotherapy in the form of ultrasound treatment and deep massage, and more intensive stretching exercises, may help. Early aggressive treatment is very important if difficult, chronic cases are to be avoided. In chronic patients who struggle to stretch their tendo-achilles the use of night splints, putting the tendon on stretch during the night, may be beneficial – if uncomfortable to wear. In this condition surgery is a last resort, as severing the plantar fascia from the calcaneus may cause severe pronation of the foot and mechanical problems in the future.

**Tibialis posterior tendon dysfunction**

This condition is usually seen in conjunction with overpronation of the foot. 70% of sufferers are females who are overweight and have previous underlying problems of overpronation. The function of the tibialis posterior is to reduce and control pronation of the foot. Therefore, when a foot overpronates this muscle has to overwork and the tendon thus becomes irritated, particularly as it skirts around the medial malleolus, resulting in inflammation, pain and swelling. The pain may be felt in the sole of the foot, around the ankle and up the leg. Over
time the tendon will degenerate and may ultimately rupture, causing collapse of the arch and presenting as a talonavicular bulge on the medial aspect and laterally, when viewed from behind, as ‘too many toes’.

In the early stages this should be treated aggressively with orthoses and splints to secure the medial malleolus and reduce overpronation at the subtalar joint. In the acute stages a plaster cast can be applied to rest the tendon. In severe cases tendon repair, on its own or in conjunction with fusion of the talonavicular joint, or possibly a triple fusion, is recommended.

**Achilles tendinitis**

This can occur at the insertion of the tendon on the calcaneus, or a few centimetres proximally. The patient will complain of pain during exercise and localised swelling. It can follow a sporting injury, often following a change in the type of sports footwear. However, the more common cause, especially when it is chronic, is predisposing abnormal foot function.

Treatment in the acute stage consists of rest, ice and elevation, as well as the use of a simple heel raise during any walking to reduce the tension in the tendo-achilles. Once the acute stage has passed, stretching and strengthening exercises of the calf muscles are the more important. When stretching the tendo-achilles, the stretch should be gently held for a count of 10–30 seconds, in groups of 5–10, four times a day. This is done with the knee straight and flexed, thus stretching all the muscular components of the tendo-achilles. Orthoses and heel raises should be used when there is an underlying abnormality, such as pronated foot or equinus foot type.

**Dupuytren’s contracture**

In this condition fibromatous nodules form in the plantar fascia and long plantar ligament. They are normally not symptomatic, but can be inconvenient, especially if gradual tightening of the ligament and fascia results in marked clawing of the toes and discomfort and mobility restrictions follow. Orthoses can be used to improve function, taking care to allow for the nodules and avoid irritation. Surgery is indicated when clawing of the toes becomes severe or if pain arises from the fibromas themselves.

**NERVES**

**Morton’s neuroma**

Technically this condition is not a true neuroma, as a degenerative rather than a proliferative process is involved. The common digital nerve to the 3rd/4th metatarsal interspace is the most often affected, although other interspaces can be involved. It is four times more common in women than men. Affected patients complain of a burning pain in the metatarsal heads which radiates into one or two toes, and sometimes proximally. Pain is worse on walking, and especially in tight-fitting shoes. The patient will be very clear about relief of pain being achieved by removing the shoe and manipulating the foot. Eventually the patient will be restricted to one or two pairs of shoes that do not exacerbate the pain. Some patients also complain of numbness in the affected toes. Pain can be reproduced on examination by squeezing the metatarsal heads together while pressing into the interspace. It is important to be clear that the pain is between the metatarsals, rather than on the plantar aspect of the metatarsal heads. Radiographs are not useful, except to rule out other causes. The ‘neuroma’ is mainly the result of overpronation of the foot, causing stretching of the intermetatarsal nerves against the intermetatarsal ligament and consequently thickening and fibrosis. Other causes are related to inflammatory conditions such as rheumatoid arthritis, where small bursae develop and swell around the intermetatarsal ligament, again causing irritation. Direct compression from tight-fitting footwear causes compression of the metatarsal heads and thus irritation of the nerve.

Treatment initially involves changing the footwear. However most patients have already done this by the time they seek help. The use of antipronatory orthotics to reduce the tension on the intermetatarsal ligament is important. Should this not provide sufficient relief of pain, then up to three cortisone injections should also be administered. If no significant improvement occurs after the second injection, then the third should not be given and the alternative is surgical excision of the neuroma. This results in the toes being permanently numb, but pain is alleviated.

**Tarsal tunnel syndrome**

This condition is analogous to carpal tunnel syndrome, but is far less common, and the nature of the symptoms makes it more difficult to diagnose. It is due to compression of the posterior tibial nerve as it passes under the flexor retinaculum behind the medial malleolus. Compression can be due to trauma, biomechanical malalignment of the bony structures, oedema, lipoma and so on. Affected patients complain of pain typically localised to the sensory distribution of the tibial nerve, and it has the nature of a sharp or burning sensation involving the sole of the foot. Activity makes the pain worse. Sometimes pain will occur at night and can also radiate proximally into the calf at any time. The best way to clarify a diagnosis is a positive Tinel’s sign – i.e. pressure or percussion along the course of the nerve elicits radiating pain, usually around the point of entrapment. If only one limb is affected, this same test
can be performed on the other side as a comparison. Nerve conduction studies would show a reduction in the conduction velocity of the entrapped nerve.

Treatment involves control of abnormal foot motion, using orthoses or splints. Space-occupying lesions should be drained or removed surgically, and any fibrous tissue formation around the nerve itself should be debrided. When trauma is a factor, cortisone injections into the flexor retinaculum around the tibial nerve have been shown to be beneficial, although care should be taken not to inject directly into the nerve itself.

**THE RHEUMATOID FOOT**

Although the above conditions may occur in isolation, in some patients a number may occur simultaneously. This is especially so in rheumatoid arthritis patients whose joint and ligamentous damage is followed by secondary osteoarthritis. The resulting deformities usually include hallux valgus with clawed (over-riding) lesser toes, a broadened forefoot, and pressure-exposed metatarsal heads. These combined abnormalities predispose to pressure/friction over the plantar aspect of the forefoot, the medial aspect of the hallux MTP, the lateral aspect of the 5th MTP and the dorsal aspect of the clawed lesser toes, all of which could thus ulcerate. This is of course the classic ‘rheumatoid foot’ (see Figure 4).

Once the skin barrier is breached, local infection may follow. As most rheumatoid patients are iatrogenically immunocompromised, this local infection predisposes to the more serious and potentially lethal complications of septic arthritis and septicaemia. It is for this reason that the rheumatoid foot should be viewed with the same alarm as the diabetic foot, and we suggest the same level of podiatric vigilance which has been so successful in reducing diabetic foot complications.

**SUMMARY**

Corns, calluses and pathological nail conditions remain common problems that demand routine podiatric care, as well as thorough assessment to determine their aetiology (so that changes can be made to prevent deterioration or the development of new lesions). Such treatments thus continue to represent a large portion of any podiatrist’s workload. However, podiatric practice has expanded considerably, and this article has highlighted the current scope of therapeutic interventions. A major podiatric development is the understanding of the importance of the role of insole-type orthoses. Where an abnormality of foot function causes excess pressure or friction, and where the potential result is skin damage and ulceration, footwear advice and the provision of such orthoses are vital and integral to therapy. Podiatrists have the assessment skills necessary for prescribing the highly specific orthoses needed to speed healing and/or prevent recurrence of problems. Podiatrists are also expert at assessing the vascular and neurological status of feet, and to ascertain the presence and risk of developing limb-threatening complications. Patients with diabetes and peripheral vascular disease may particularly benefit. We also emphasise the special role of the podiatrist in the care of the rheumatoid foot. Understanding the range of specific podiatric skills and interventions should facilitate greater primary care use of podiatric services, especially as more and more Primary Care Groups, Primary Care Trusts and Local Health Care Cooperatives allow increasing direct access to Podiatry Departments.

**FURTHER READING**
