

Hands On

Practical advice on management of rheumatic disease



COMMON FOOT DISORDERS

Trevor Prior, BSc(Hons), FCPodS, MChS

Consultant Podiatric Surgeon

Homerton University Hospital NHS Foundation Trust, Hackney, London

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Introduction

The foot is one of the most complex structures, yet is often taken for granted and generally ignored. Many patients develop foot pain which they believe will settle until symptoms become chronic and they seek help. The focus of this article is to outline some of the common conditions and management strategies.

Hallux valgus

This is one of the most common presenting pathologies, yet the precise causal mechanism is still unknown. There is an association with hindfoot valgus in patients with rheumatoid arthritis but otherwise the cause is multifactorial, with family history, sex, ligamentous laxity and footwear all contributing factors.

Clinical symptoms

There is deviation of the hallux with prominence of the metatarsal head on the medial aspect. Trauma in footwear causes pain and inflammation and often bursitis. The deviation of the hallux can result in crowding of the lesser toes and associated hammer-toe formation. Over-riding or under-riding of the second toe is common. In the earlier stages, dysfunction of the first ray (metatarsal and hallux) results in overload of the second metatarsophalangeal joint (MTPJ) and inflammation of the capsule. This can eventually result in capsule rupture, hence the associated toe deformity.

Diagnosis

The clinical signs are obvious and classical. 15° is the accepted angle for definition of deformity, and upright weight-bearing x-rays – anteroposterior (AP) and lateral – help to confirm the extent of deformity and relationship to the midfoot and lesser metatarsals.

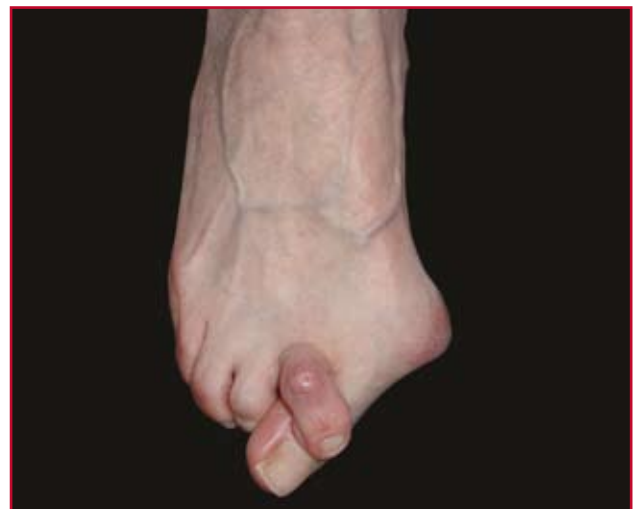


FIGURE 1. (a) Severe hallux abducto valgus with deviation, dorsal displacement and over-riding of the second toe.



(b) Post-operative x-ray of first metatarsal Scarf osteotomy and Akin osteotomy of the proximal phalanx of the hallux. Normal alignment and sesamoid position have been restored.

Management

- **Conservative** Attention to good fitting footwear (adequate length, width and depth with an adjustable fastening), orthoses, protective padding and topical homoeopathic treatments. There is no evidence that these treatments will correct or even stop the deformity but they can help with symptoms. There is some weak evidence that abductor hallucis strengthening exercises and night splints may help to slow progression in adolescents.
- **Surgical** Correction of the deformity requires surgical intervention. The aim of surgery is to reduce the increased intermetatarsal angle, relocate the metatarsal head over the sesamoids and realign the hallux. There are over 100 different procedures and the surgery is not without risk. For this reason it is generally not performed for cosmesis. However, newer procedures and advances in anaesthetic techniques mean that this type of surgery is routinely performed under local anaesthetic on a day-case basis without the need for post-operative plaster-cast immobilisation. For more severe deformities, more proximal procedures are required and may necessitate a period of immobilisation.

Hallux rigidus

The development of arthritic changes in the first MTPJ can result in a reduction (hallux limitus) or loss (hallux rigidus) of motion in the first MTPJ without deviation of the hallux. The most common cause is trauma although this can be due to an associated disease process or an idiopathic onset.

Clinical symptoms

In the early stages there is pain on motion (dorsiflexion and/or plantar flexion), often with limitation. Symptoms will be aggravated by exercise levels and footwear (either unsupportive shoes, shoes with an increased heel or short shoes causing back pressure into the joint). With time, motion becomes more limited with osteophyte formation causing dorsal and medial prominence. Involvement of the sesamoids can cause plantar pain and the loss of motion may result in increased load beneath the lesser metatarsals, hence discomfort. Classically, shoes will show deformation of the upper around the joint, reduced wear beneath the first MTPJ and a circular wearing pattern beneath the central metatarsals.

Diagnosis

This is primarily a clinical diagnosis although x-rays help to grade the extent of arthritis.

Management

- **Conservative** Appropriate footwear (including shoes with a stiff sole or rocker sole modification), range of motion exercises in the early stage, orthoses, NSAIDs and dietary supplements (e.g. glucosamine and chondroitin) have all been utilised for management. Cortisone injections can provide relief although this is often short term. Hyaluronic acid is available for small joints although it is



FIGURE 2. (a) OA changes of hallux rigidus demonstrating loss of joint space with flattening, early osteophytes and cystic changes at the first MTPJ.



(b) Lateral view demonstrating dorsal bony spurring.

generally recommended for the earlier stages and the evidence base remains weak.

- **Surgical** Surgery is generally divided into two groups (joint-sparing and joint-destructive). Debridement of the excessive bone including the dorsal aspect of the metatarsal head (cheilectomy) can be extremely successful. This remains an option for patients with a rigid joint but pain from the dorsal prominence in shoes alone. The addition of a dorsiflexion osteotomy of the proximal phalanx of the hallux (Bonney–Kessel procedure) can improve function/reduce discomfort further. A shortening decompression osteotomy of the first metatarsal has been described and been successful but the complication rates in terms of transfer pain are greater. In more severe cases a joint destructive procedure is required. The traditional procedure of a Keller's arthroplasty (debridement and resection of the base of the proximal phalanx) remains an extremely successful procedure in the right patient. Joint implants are an alternative option with silicon (Silastic) the tried and tested material. However, this is more of a joint spacer rather than joint replacement and lasts on average for 10 years. Unfortunately, failure of the implant can be associated with bony destruction

rendering further replacement difficult. For this reason, it is generally recommended for patients who are older and less active. Newer implant materials (e.g. ceramic and titanium) offer promise for longer duration and younger, more active patients but long-term follow-up is not available. The classic procedure of joint fusion is effective for pain relief but will limit shoe choice, causes transfer of load to the lateral aspect of the foot and will significantly alter function in those patients that have a degree of motion preoperatively.

Intermetatarsal neuroma/bursa

This is often termed Morton's neuroma or metatarsalgia. The most common site is between the third and fourth metatarsals followed by the second and third metatarsals. There are some rare reports between the first and second. Many patients have an adventitious bursa in the same location and this can become inflamed causing similar symptoms. Inflammation of the adjacent joints (synovitis/capsulitis) can also cause nerve irritation and careful examination is required. The precise cause is unknown but altered foot function and tight footwear are contributing factors.

Clinical symptoms

Classically, there will be pain (often burning, shooting or knife type) on the ball of the foot radiating into the toes. Some patients present with toe pain alone while others have symptoms radiating proximally. Some patients report a click or a sensation as though the joint is popping out of position. In some instances, there will be a spreading of the toes (V sign). It will be aggravated by activity levels and footwear (usually tighter shoes) and patients often report having to remove the shoes and massage the area.

Diagnosis

Careful clinical examination is the mainstay of diagnosis with pain at the intermetatarsal space rather than on the plantar or dorsal aspects of the MTPJs. The neuroma is usually located at the level of and just distal to the metatarsal heads. Some patients have some dorsal MTPJ tender-

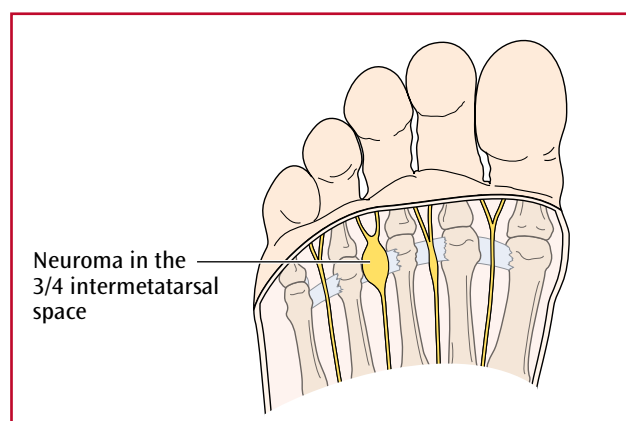


FIGURE 3. Diagram demonstrating a neuroma at the 3/4 intermetatarsal space. The nerve divides to supply the interdigital aspect of the associated toes, hence symptoms are often reported in one or both toes.

ness due to retraction of the toes as they try to reduce pressure from beneath the ball of the foot. Compression of the forefoot with pressure at the intermetatarsal space often elicits a click as the nerve is pushed between the metatarsals and this is termed a Mulder's click. This may or may not be symptomatic. A reduction in sensation to the associated web space may be present.

Ultrasound and magnetic resonance imaging (MRI) scans are both helpful in the diagnosis and can help to differentiate diagnosis, although sensitivity and specificity can be examiner-dependent. Many practitioners utilise ultrasound as the diagnostic test of choice.

Management

- **Conservative** Attention to footwear, orthoses (including the metatarsal pad) and calf-stretching exercises can all help to reduce pressure on the area. Approximately one third of patients are helped by this conservative approach with a further third benefiting from a cortisone injection. While this can be performed perfectly adequately in clinic, ultrasound-guided injections allow more accuracy and are preferable if a bursa is present. The administration of a series of sclerosant injections (alcohol and local anaesthetic) can be used to ablate the nerves. This treatment, which has received good reports in other countries, is less commonly available in the UK.
- **Surgical** The mainstay of surgical management is excision of the neuroma. While this is more easily performed from a plantar incision, a dorsal approach reduces the need for non-weight-bearing and the risk of symptomatic callus formation over a plantar scar. Furthermore, there is a risk of stump neuroma formation which would require a plantar incision and thus the initial dorsal approach leaves healthier tissue for the second surgery should it be required. There are reports of intermetatarsal ligament release to decompress the area but the efficacy of this in the long term is not proven.

Tibialis posterior dysfunction

The tibialis posterior muscle and tendon control foot pronation by eccentric contraction. Tenosynovitis, longitudinal tears and rupture all cause pain and dysfunction which, over time, allow collapse of the foot and abduction of the forefoot due to the increased activity of the antagonistic peroneus brevis. If left untreated, a painful flat foot with subsequent arthritic changes will develop, resulting in significant disability. Patients with a hypermobile pronated or flat foot type are more predisposed to dysfunction, and inflammatory conditions such as rheumatoid arthritis can precipitate the condition.

Clinical symptoms

In the early stages, there will be pain, possibly with swelling along the course of the tibialis posterior tendon from just behind the tibial malleolus to its insertion on the medial aspect of the navicular. This tendon courses very closely to the tibial malleolus. Plantar flexion with inversion may be

weak and/or painful. The patient will report discomfort on walking/exercise with symptoms in proportion to the level of activity. With normal function, patients are able to stand on one leg and lift their heel (stand on tiptoes) and inversion of the heel with formation of an arch will be evident. In the earlier stages, this activity may cause discomfort and, as the condition progresses, reduced heel inversion/arch formation or an inability to lift the heel can develop. This will be accompanied on standing by increased pronation of the foot with heel eversion, lowering of the medial longitudinal arch, and often bulging on the medial aspect in the region of the talo-navicular joint with abduction of the forefoot ('too many toes' sign).

Diagnosis

Diagnosis is largely clinical, based on symptoms and function. However, ultrasound and MRI scans can help to determine the extent of tendon pathology and associated pathologies. Weight-bearing AP and lateral x-rays are useful to determine joint arthrosis and alignment, particularly for surgical planning.

Management

- **Conservative** Preventing progression of the condition is essential. In the early stages anti-inflammatories, good supportive footwear, orthoses and calf-stretching exercises can all help reduce symptoms. For more acute or severe cases, immobilisation in either a below-knee walking cast or removable walking boot is necessary to reduce symptoms. For instances of tenosynovitis alone, a guided local anaesthetic and cortisone injection may be of benefit.
- **Surgical** Decompression of the tendon sheath and repair of longitudinal tears may be sufficient for patients without associated foot deformity. However, addressing

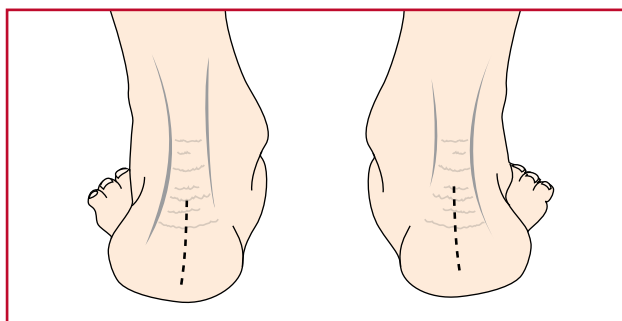
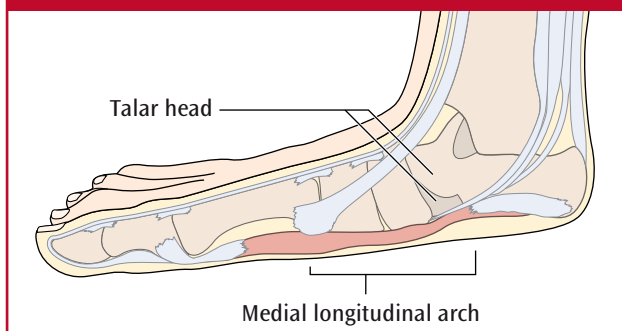


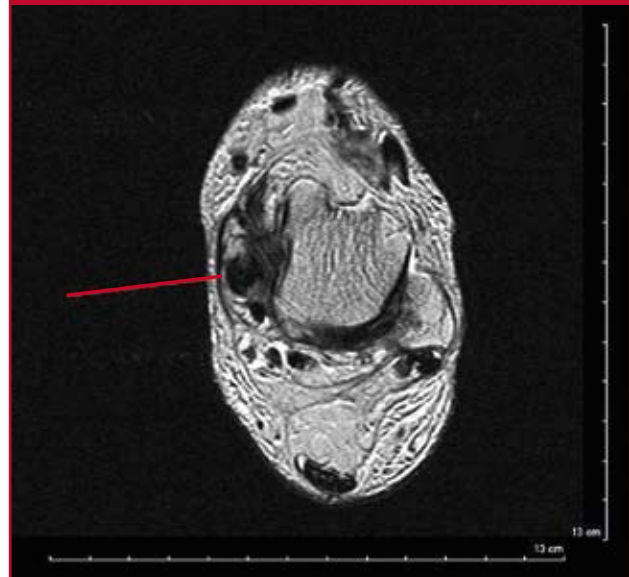
FIGURE 4. (a) Rearfoot pronation via calcaneal eversion.



(b) Clinical picture of a flat foot demonstrating collapse of the medial longitudinal arch with bulging of the talar head.



FIGURE 5. (a) The clinical appearance of tenosynovitis around the tibialis posterior tendon.



(b) MRI scan demonstrating tenosynovitis and some thickening of the tendon.

the underlying foot deformity is often necessary to prevent recurrence. To maintain a flexible flat foot a tendon transfer in combination with an osteotomy of the calcaneus and lengthening of the calf muscle (gastrocnemius) has demonstrated good results. The severest cases will require even more extensive surgery, with joint fusion – even triple arthrodesis involving the rear-foot – and possibly implants into the sinus tarsi to limit motion.

The extent of surgery required for this condition makes early diagnosis and aggressive conservative treatment essential if this is to be avoided.

Tarsal tunnel syndrome

This is the least common of the conditions described and can be compared with carpal tunnel syndrome in the hand. The tarsal tunnel is on the medial aspect of the ankle passing from just behind the tibial malleolus towards the distal aspect of the calcaneus/navicular region. The tibial nerve splits into three (medial calcaneal, medial plantar and lateral plantar nerves), often with several branches in the region. Nerve compression symptoms are most commonly caused

by a space-occupying lesion (e.g. ganglion, tenosynovitis of the flexor hallucis longus, varicosities). Abnormal pronation or trauma can all cause symptoms but an underlying neurological or metabolic condition should be ruled out.

Clinical symptoms

There may be symptoms over the medial aspect of the ankle but often the patient will report burning or pain on the plantar aspect of the foot, either generally or along one of the branches. This can be a cause of plantar heel pain and should be part of the differential diagnosis for plantar fasciitis. Some patients report paraesthesia although this is not always present.

Diagnosis

In the absence of any other underlying conditions, this is largely a clinical diagnosis. Palpation along the course of the nerve in the tarsal tunnel may elicit discomfort either locally or distally. Passive pronation of the foot may accentuate symptoms. Percussion of the nerve may cause symp-

toms distally (Tinel's sign) or proximally (Valleix phenomenon). Inflation of a blood pressure cuff about the ankle to above venous pressure (40 mmHg) may help to diagnose those with varicosities.

X-rays, ultrasound and MRI scans are all helpful in diagnosing pathology that may cause nerve irritation. Nerve conduction studies are often reported for diagnosis although it is not uncommon for these to be normal despite clinical symptoms.

Management

- **Conservative** Assuming that there is no underlying medical condition or space-occupying lesion, oral medication may be of benefit (NSAIDs, amitriptyline) and referral to a pain clinic is an option. Supportive footwear and orthoses will reduce mechanical stress to the nerve, and a local anaesthetic and cortisone injection under nerve stimulator guidance can help to reduce symptoms. Some pain specialists will utilise radio frequency lesioning.
- **Surgical** Excision of space-occupying lesions when present. For idiopathic, severe, non-responsive cases, a tarsal tunnel release is required. Careful attention has to be paid to releasing all of the branches from proximal to distal. However, there is always a risk that symptoms will return, significantly reducing further treatment options.

Conclusions

Foot pathology is a common problem, often ignored. Early diagnosis often allows simple resolution of symptoms and good general advice regarding footwear, orthoses and appropriate exercises are usually sufficient. Unfortunately, this may mean a modification of lifestyle to an extent not always popular with patients. However, if symptoms persist, further investigation and intervention are necessary and, in some instances, essential to avoid significant long-term disability.

Further reading

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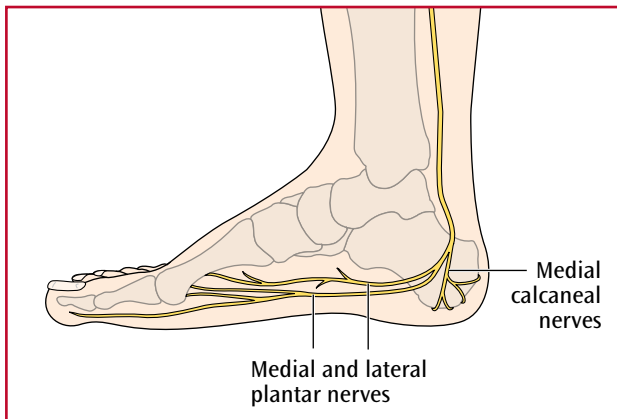
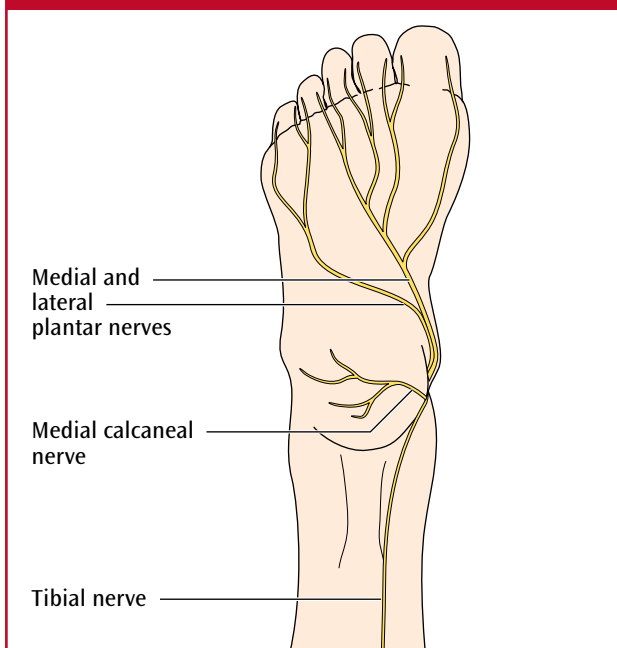


FIGURE 6. (a) Diagram showing the tibial nerve as it branches on the inside (medial aspect) of the ankle/leg.



(b) Plantar diagram showing the distribution of the three nerves: medial calcaneal, medial plantar and lateral plantar.

COMMENT

Philip Helliwell, MA, DM, PhD, FRCP

Academic Unit of Musculoskeletal & Rehabilitation Medicine
University of Leeds

Foot problems are common. A recent study in general practice from Holland reported that people consult for forefoot problems at a rate of 28 consultations per 1000 patients per year. This was ranked second behind knee symptoms for people presenting with lower limb complaints and compares to 24 per 1000 per year for shoulder complaints. Sometimes the cause of the pain is not obvious but it is worth striving to find a cause, as Trevor Prior indicates in this issue. Regrettably, many people remain undiagnosed and are consequently labelled as having 'mechanical foot pain'. Trevor Prior has covered the most common foot disorders, excluding plantar fasciitis which was the subject of Hands On 2. The localisation of the pain and the clinical features should help you to make a systematic examination for these common foot problems. Inevitably, as a podiatric surgeon, Trevor has covered surgical options in detail and, while there is a definite place for surgery in these

conditions, many people can be successfully managed by conservative treatments. As yet, we do not have any clear guidance as to who will benefit most from surgery, or when the time is right to refer for surgery, but failure of conservative treatment and patient preference must be the main pointers. For conservative management it helps to know where to find your local specialist foot-wear stockists, what modifications can be made by a good cobbler, and the range of off-the-shelf insoles available in the shops. This sort of knowledge comes with time and experience but can be enhanced by seeking advice from those with local knowledge such as podiatrists. Orthotists are also helpful but access to Appliances Departments may be slow or unavailable from primary care, although the situation may change in future. If insoles are provided people should persevere as they can take some getting used to.

This issue of 'Hands On' can be downloaded as html or a PDF file from the Arthritis Research Campaign website (www.arc.org.uk/about_arth/rdr5.htm and follow the links).

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