Disorders of the forefoot and toes

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The forefoot

Short first metatarsal bone

This is known as Morton’s syndrome. Sometimes a short first metatarsal is related to pain, sometimes it is not. If the first metatarsal is too short and hypermobile, most of the body weight will be borne by the second metatarsal. Because of the hypermobility and shortening, the transverse arch becomes depressed and metatarsalgia results (p. e308 of this chapter).

March fractures

This condition was first described in 1855 by Breithaupt, a Prussian military doctor, who stated that many soldiers developed painful swellings at the dorsum of their feet after long marches. He called this Schwellfuss but the cause remained unclear until Stechow proved that the condition is caused by stress fracture.

Stress fractures of the metatarsal bones comprise 3.7% of all sport-related injuries, with the second and third metatarsal accounting for 80–90% of the fractures. Stress fractures of the metatarsals are also common in military recruits and in long-distance runners. It has been reported that up to 20% of stress fractures in athletes and 23% of stress fractures in military recruits are located in the metatarsals.

The lesion should be suspected when a patient presents with unilateral and localized warmth and oedema at the dorsum of the foot. Often the symptoms appear after a long walk but sometimes there is no specific precipitating activity. It is surprising that children are almost as liable to marching fractures as adults. Cyriax’s (his p. 440) youngest patient was a 6-year-old boy.

During the first weeks after the onset of pain, there is local warmth and oedema over the dorsum of the forefoot. The
normal findings on functional examination of the ankle and midfoot contrast with tenderness at the forefoot. Because not only the bone but also the interosseous muscles at both sides are involved, the tenderness is more extensive than might be expected from the fracture itself.

During the first few days, the fracture (usually a hair-line crack) may not be revealed by routine radiography. The diagnosis is confirmed after a few weeks, when the callus formation around the fracture becomes radiologically apparent. Earlier confirmation of the diagnosis is obtainable by either radionuclide bone imaging, or ultrasound examination.

**Differential diagnosis**

Localized swelling, warmth and tenderness in the forefoot can also occur in:

- **Gout in one of the tarsometatarsal joints.** A history of recurrent acute attacks of arthritis at the same joint or in other joints is helpful.
- **Rheumatic forms of arthritis, such as rheumatoid arthritis, psoriasis and reactive arthritis.** These disorders affect multiple joints. The history is also longer than the usual 6 weeks of that of a march fracture.
- **Freiberg’s arthritis at the second metatarsophalangeal joint.** Although ischaemic epiphyseal necrosis of the base of the second metatarsal bone occurs in adolescence, the disease may be asymptomatic until adult life, when the deformity of the joint and the degenerative arthritis produce pain.
- **Ringworm and erysipelas.** Local cellulitis, caused by an infection of β-haemolytic Streptococci spp. or fungi, can cause considerable redness, thickening and tenderness. In erysipelas, there is malaise, chills and fever, together with an increased erythrocyte sedimentation rate. In ringworm, there is considerable itching and inspection of the interdigital clefts very often reveals a small localized infection between two toes.

**Treatment**

March fractures, whether partial or complete, always heal spontaneously in about 6 weeks. By that time, the bone is usually firm enough to be painless and mis-union need not be feared.

Treatment consists of relative rest. Normal walking need not be forbidden during the period of union. Immobilization is achieved when the forefoot is firmly bound, so that the other metatarsals splint the broken bone. Because, even with a splinted fracture, weight bearing still hurts a little, it is up to the patient to do as much as can be tolerated. If the pain is too severe, a plaster cast can be applied for 4 weeks.

If there is persistent pain after 6 weeks have elapsed, the interosseous muscles must be at fault. It is obvious that when there is a broken bone, the interosseous muscles will suffer abnormal stresses and become strained. Such a strain, whether the cause is a direct injury, a march fracture or an overstrain, hardly ever undergoes spontaneous cure and chronic pain can last for years. The only effective treatment for this condition is deep transverse friction for 15 minutes, three times a week, for about 2–4 weeks. After the massage, faradic and resisted flexor exercises are given to the toes. The results of this combined treatment are excellent.

**Technique: friction**

The patient lies supine on the couch. The therapist sits facing the foot and with the ipsilateral hand encircles the toes in such a way that the thumb lies at the dorsal aspect and the proximal interphalangeal joint of the flexed index finger presses under the metatarsophalangeal joints. The big toe is left free. The thumb keeps the toes flexed and the index finger presses upwards, so as to render the metatarsus convex. The shafts move apart and the muscle bellies lie closer to the surface. The middle finger of the other hand, reinforced by the index finger, is now placed in the groove between the two metacarpal bones (Fig. 1). Fingers, wrist and forearm are kept in one line and parallel to the metatarsal bones. Deep friction is imparted by rotating the fingers through an alternate pronation and supination movement of the forearm, so that the muscle is moved between the fingertip and the metatarsal shaft.

**Fractures of the fifth metatarsal**

Three distinct fracture patterns occur in the fifth metatarsal: tuberosity avulsion fractures, Jones fractures, and diaphyseal stress fractures.

Tuberosity avulsion fractures are the most common and usually complicate an inversion sprain (see p. 776). The majority heal with symptomatic care in a hard-soled shoe.

The true Jones fracture is defined as an acute fracture at the junction between the proximal diaphysis and metaphysis of the fifth metatarsal without distal extension beyond the fourth to fifth intermetatarsal articulation. The mechanism of injury is believed to be an abduction force applied to the forefoot with simultaneous ankle plantar flexion. A Jones fracture can be treated with 6 to 8 weeks of non-weight-bearing immobilization resulting in fair to good outcomes. Operative treatment is selected if the patient is a high-performance athlete or nonoperative treatment fails.
A proximal diaphyseal fifth metatarsal stress fracture is defined as a stress fracture in the zone of the proximal fifth metatarsal immediately distal to the Jones fracture’s anatomic area. The mechanism of this injury is believed to be a repetitive load applied under the metatarsal head over a relatively short time, resulting in an overuse phenomenon. A proximal diaphyseal fifth metatarsal fracture may have a very long healing time and non-union can develop in as much as 25% of cases. For this reason, operative treatment is usually recommended.

**Splay foot**

A splay foot is a broadened forefoot, with weakness of the intermetatarsal ligaments, associated with weakness of the intrinsic muscles.

Very often splay foot starts with excessive dorsiflexion movement of Lisfranc’s joint, which occurs when too much weight falls on the midfoot. This is particularly likely to occur in women who wear high heels. When excessive weight falls on the midfoot, the talus is pressed downwards, and the metatarsals undergo an upwards pressure, so that they are given excessive horizontal play and the transverse arch flattens. The result is a painful overstretching of the transverse interosseus ligament and an increase in weight on the middle metatarsal heads. Calluses will form on the plantar surfaces of the heads and bruising of the plantar aspect of the capsule of the metatarsophalangeal joints (so-called chronic metatarsalgia) results. In practice, splay foot is not a specific entity but usually accompanies a midtarsal strain.

Treatment includes a high heel with a horizontal upper surface, which prevents the forwards gliding of the talus and thus releases the forefoot (see Ch. 59), and energetic training of the short plantiflexor muscles of the toes.

Localized splaying indicates a ganglion lying between two metatarsal heads. When the patient stands, an excessive interval is seen between two toes and palpation reveals a semisolid tumour keeping the heads apart (see p. e309 of this chapter).

**The first metatarsophalangeal joint**

The capsule of the first metatarsophalangeal joint is reinforced on the plantar surface by a fibrocartilaginous plate that is attached distally to the proximal phalanx and proximally to the plantar aspect of the neck of the first metatarsal. This volar plate contains the two sesamoid bones, inserted in the tendons of the flexor hallucis brevis (Fig. 2). The flexion–extension movement is a rolling and sliding of the metatarsal head within the stable support made up of the base of the proximal phalanx and the volar plate.

The joint is extremely important for normal gait. There must be 60–70% of extension with the first metatarsal to allow the hallux to function normally during the stance phase of gait. In the final stage of forefoot contact, 40% of body weight is imposed on the joint and the big toe (Fig. 3).

**The capsular pattern**

The capsular pattern at the first metatarsophalangeal joint is slight limitation of flexion, together with marked limitation of extension (Fig. 4).
Arthritis in adolescence

Early osteoarthrosis at the first metatarsophalangeal joint, mostly bilateral, occurs in adolescence and is the result of osteochondritis dissecans. It leads to the formation of a hallux rigidus in young adults.

The teenage patient, nearly always male, develops large osteophytes at the dorsum of both first metatarsophalangeal joints. The onset is slow and there is no history of overuse or injury. Initially the pain appears only during hyperextension of the big toe. Later, the joint gradually fixes in the neutral position, leading to a hallux rigidus. Pain at every step is inevitable from stress on the rigid joint.

Clinical examination shows the big toe to be fixed in a neutral position. There is only a small range of extension and flexion. The end-feel is hard and large osteophytes can be palpated on the dorsum of the joint.

Because the patient is unable to extend the big toe during the foot-off phase, treatment must aim to introduce a forefoot movement that does not interfere with the mobility of the joint but nevertheless enables the heel to move upwards while the forefoot is on the ground. To do this, a ‘rocker’ is placed in or under a thick and solid sole of a shoe, at the joint line (Fig. 5).

Instead of extending at the first metatarsophalangeal joint, the forefoot will now rock during a normal gait. If this is not adequate, a steel plate in the sole prevents further stress on the rigid joint, but the resulting gait is less natural.

Surgery for hallux rigidus consists of resection of osteophytes and metatarsal head (cheilectomy) or resection arthroplasty.

Traumatic arthritis

This results from a direct trauma or forceful hyperextension of the joint. This is the case in osteoarthritis, in which a superimposed post-traumatic arthritis easily occurs. It is also encountered in certain sports, such as soccer and American football. Treatment consists of an intra-articular injection of 10 mg of triamcinolone and prevention of further overstretching.
Arthrosis in middle age

Osteoarthrosis at the first metatarsophalangeal joint (MPJ) is the second most common disorder affecting the foot after hallux valgus. The prevalence of the condition increases with age, and it has been reported that radiographic changes in the first MPJ are evident in approximately 46% of women and 32% of men at 60 years of age. The degeneration and stiffness is not the result of a previous aseptic necrosis but has probably been induced by trauma or repetitive stresses. Sometimes a heavy weight falling on the joint or a fracture is the precipitating cause. Repetitive stresses during extension (as in women wearing high heels) can influence the degeneration.

Deterioration is slow and insidious, and therefore symptoms may not arise for years. They appear only when the joint becomes overstrained. In other words, the source of the pain is not the osteoarthrosis as such but the superimposed post-traumatic arthritis. Symptoms therefore start when some dorsiflexion is lost: in men when 45° of extension range has been lost, in women who wear high heels when only 20 or 30° has been lost. The typical case is consequently a middle-aged man or woman who has pain at the big toe during and after walking.

Clinical examination shows a painful and markedly limited extension of the big toe, together with slight limitation of flexion. The end-feel is hard. Osteophyte formation and some local tenderness can be palpated at the dorsum of the joint.

Because the pain is the result of a post-traumatic arthritis, it can be abolished by one intra-articular injection of triamcinolone. If the patient is careful in the future, wears appropriate shoes with thick, solid soles and avoids high heels, relapses are not to be expected. During the last decade an alternative treatment termed ‘viscosupplementation’ – the intra-articular injection of hyaluronan with the aim of restoring the viscoelasticity of the synovial fluid – has been proposed and studies show promising results. Good results can also be achieved by traction. Alternatively, mobilization, using traction–translation techniques can be used. In advanced cases, in which there is hallux rigidus, the use of a ‘rocker’ and a steel sole must be advised (Fig. 5). If all conservative treatment fails, surgery can be undertaken.

Rheumatoid arthritis

This disease often affects the metatarsophalangeal joints. The usual signs and symptoms of an inflamed joint are seen. The patient has nocturnal pain and morning stiffness. Clinical examination reveals a capsular pattern and a capsular thickening at a warm and swollen joint. Treatment is causative.

Non-capsular patterns

Metatarsalgia

Metatarsalgia at the first metatarsophalangeal joint is not as frequent as at the outer four toes. When it occurs, it is usually the result of an increase in the angle between the forefoot and the hindfoot. This is the case in a pes cavus deformity and also in osteoarthrosis at the cuneiform–first metatarsal joint (after a previous osteochondritis), which fixes this joint in plantarflexion and therefore increases the pressure on the plantar aspect of the first metatarsophalangeal joint during walking.

The clinical signs are pes cavus deformity of the foot, with normal mobility and painless resisted flexion of the big toe. However, there is significant tenderness at the plantar aspect of the capsule of the first metatarsophalangeal joint.

Treatment consists of an intra-articular injection of 10 mg of triamcinolone (see earlier). In a pes cavus deformity, the patient must also wear a raised heel with a horizontal upper surface (see Ch. 59). This measure relieves the excessive stress on the joint and prevents recurrences.
Halux valgus

This is the most common deformity of the big toe. It has been estimated that about 25% of the population have it to some degree. There is no parallel between the degree of valgus and the severity of the symptoms, and many patients with severe deformity are free of symptoms.

Much has been written about the aetiology of hallux valgus. Because hallux valgus also occurs in barefooted people who never wear shoes, there must be congenital factors predisposing to the deformity. The causative components seem to be multiple: the first metatarsal shaft is shorter than the second, there is a hypermobility of the first ray and the first intermetatarsal angle is enlarged. All these factors contribute to the origin of a widely splayed forefoot (A in Fig. 8). Because of the shortness of the first metatarsal, the second toe takes most of the weight during the final phase of the step. If there is a muscular imbalance between the adductor hallucis and abductor hallucis, the big toe will deviate laterally (B) and undergoes a pronation movement (C). This is accentuated by the contractions of the flexors and long extensor of the toe, which act like a bowstring and shift the tip of the big toe further into adduction (D). When this predisposed splayed forefoot is now forced into a high-heeled pointed shoe, excessive weight is added and the first toe deviates increasingly and rapidly in a lateral direction. The pointed shoe increases the pressure at the medial aspect of the metatarsophalangeal joint, which results in an inflamed and painful bursa (tailor’s bunion).

The diagnosis is made on the typical appearance:
- The forefoot is broadened and the transverse arch flattened.

Sesamometatarsal lesions

Traumatic periostitis of the sesamoid bone of the flexor hallucis longus usually results from local trauma, such as stepping barefoot on a sharp pebblestone or landing on the medial side of the extended joint. After the accident the patient feels pain at the inner aspect of the forefoot with each step.

Clinical examination shows a full range of movement, sometimes with pain at the end of extension. Resisted flexion hurts at the plantar aspect and the sesamoid bone is tender to the touch, the exact point shifting with the position of the hallux. Clinical diagnosis can be confirmed with conventional radiography and MRI imaging.

Treatment consists of infiltration of the correct area with 10 mg of triamcinolone. Usually one infiltration is sufficient. Some authors advise orthotics as a prophylactic measure but experience shows that this is never necessary. If conservative treatment is not followed by quick recovery, fracture or post-traumatic osteochondritis should be suspected. Immobilization in a plaster cast or surgical intervention is then required. Surgical treatment may include partial or complete resection of the sesamoid, shaving of a prominent tibial sesamoid or autogenous bone grafting for non-union.

Alternatively, the pain can be caused by overuse, which sets up a traumatic arthritis at the sesamoid–first metatarsal joint. This condition is similar to metatarsalgia of the big toe. Treatment is an infiltration with 10 mg of triamcinolone between the sesamoid and the first metatarsal, together with prevention by use of a raised horizontal heel.

**Technique: infiltration and injection**

The patient lies supine on a high couch. The tender point is identified. Because the skin is usually thick and difficult to sterilize, the medial side of the metatarsophalangeal region must be scraped until the epidermis is clean. A 1 ml syringe is fitted to a thin needle and filled with 10 mg of triamcinolone. The insertion is made from the medial aspect. The thumb of the free hand is kept on the tender spot and the needle is advanced in the direction of the palpating thumb (Fig. 7), whether at the sesamoid bone or at the joint between sesamoid and metatarsal. Depending on the lesion, an infiltration or an injection is then made.
Gout is less frequent at the outer toe joints than at the big toe. The acute redness and tenderness should always be differentiated from a march fracture.

**Freiberg’s osteochondritis**

This is an ischaemic epiphyseal necrosis of the head of the second metatarsal bone, first described by Freiburg in 1914, and later by Kohler, who showed that the third instead of the second metatarsal is involved in about 20% of cases. The disease occurs in adolescence, before the epiphyseal closure of the metatarsal head has been completed.

The precise aetiology is unknown but it is assumed that the development is precipitated by an abnormally long second metatarsal bone, indirect trauma and changes in bone marrow pressure. Sometimes the disease is asymptomatic until adulthood, when deformity of the involved metatarsal head and osteoarthrosis supervene and cause symptoms.

If the condition itself causes symptoms, examination will show localized arthritis of the second (or third) metatarsophalangeal joint, with local swelling and warmth and limitation of flexion and extension. It takes a month from the onset of pain before the characteristic radiographic changes become visible. Therefore, in its early stages the lesion is difficult to diagnose and a scintigraph or MRI image may be needed to distinguish it from a march fracture of the metatarsal shaft.

Spontaneous recovery from this subacute stage takes up to a year. By that time the metatarsal head is permanently enlarged and palpation reveals a prominent ridge at the dorsal aspect of the metatarsal shaft. There is also some painless limitation of flexion and extension. Sometimes, and if no proper prophylactic measures are taken, metatarsalgia caused by the bony enlargement may supervene.

Later on, when the patient is 40–50 years old, osteoarthrosis may complicate the picture and the joint becomes fixed in a manner analogous to hallux rigidus.

Treatment consists of using orthotic metatarsal platforms to release pressure on the second metatarsal head. If there is limitation of extension, a ‘rocker’, as in hallux rigidus, can be prescribed. In advanced cases, surgery may be necessary.

**Rheumatoid arthritis and gout**

Rheumatoid arthritis affects the metatarsophalangeal joints symmetrically. In advanced cases, the toes become fixed in the clawed position of extension at the metatarsophalangeal joint and flexion at the proximal interphalangeal joint.

Treatment depends on the degree of disability. It is as well to remember that many patients with extreme deformities have no pain at all. Because most of the pain stems from the compression of the enlarged forefoot in too narrow shoes, the primary conservative treatment is appropriate shoes: a wide shoe with a horizontal heel should be advised; sometimes a ‘pouch’ can be pressed out at the side of the metatarsal head. Local tenderness at the skin or at the inflamed bursa can often be treated successfully with ichthammol ointment. Surgery is indicated when there is continuous pain or for cosmetic reasons. There is a choice of several procedures depending on the severity of the lesion and the age and mobility of the patient.

**The outer four metatarsophalangeal joints**

**The capsular pattern**

The capsular pattern at the outer metatarsophalangeal joints is more limitation of flexion than extension (Fig. 9).

**Rheumatoid arthritis and gout**

Rheumatoid arthritis affects the metatarsophalangeal joints symmetrically. In advanced cases, the toes become fixed in the clawed position of extension at the metatarsophalangeal joint and flexion at the proximal interphalangeal joint.

**Traumatic arthritis**

Traumatic arthritis at a metatarsophalangeal joint is rare. It can result from a direct blow or from indirect trauma, for instance during a hyperextension movement. Recently, hyperplantar-flexion injuries to the great toe sustained in beach volleyball players have been described. This injury is referred to as ‘sand toe’ and may result in significant functional disability. Untreated, the capsulitis can continue for months, whereas one injection with 5 mg of triamcinolone can completely relieve pain within 2 days.

**Osteoarthrosis**

Local injury or a former Freiberg’s osteochondritis can cause osteoarthrosis at the metatarsophalangeal joints. Limitation of flexion and extension with a hard end-feel results.
Treatment consists of prescribing shoes with hard and thick soles, eventually fitted with a ‘rocker’ to render extension asymptomatic.

### Non-capsular patterns

#### Chronic metatarsalgia

Pain in the plantar aspect of the forefoot is called metatarsalgia. Chronic metatarsalgia affects the middle three toes and arises when the metatarsal heads have to bear a disproportionate amount of the body’s weight.

#### Aetiology

Scranton differentiates secondary and primary metatarsalgia. In the former, the lesion is the result of structural changes in the joint (e.g. Freiberg’s disease, rheumatoid arthritis or gout). The latter occurs if there is any incongruence between load and load-bearing capacity.

The aetiology of primary metatarsalgia is as follows. In a normal foot, only one-third of the body weight is borne by the forefoot. The transverse arch and the contraction of the long flexor muscles of the toes distribute the weight between the pads of the toes and the metatarsophalangeal joints. Because of the tautness of the anterior arch, the big toe and the outer toe take most of the weight. When too much weight falls on the forefoot, flattening of the anterior arch and insufficiency of the flexor muscles of the toes results in abnormal pressure on the plantar aspects of the second, third and fourth metatarsophalangeal joints. In due course, a local capsulitis develops. This happens in the following conditions:

- **Splay foot**: the broadened forefoot, associated with weakness of the intrinsic flexor muscles leads to flattening of the anterior arch and some clawing of the toes.
- **Plantar deformity**: the dropped forefoot leads to too much pressure at the plantar aspects of the metatarsophalangeal capsules.
- **High heels**: if the shoe has a high heel with an oblique upper surface, the patient will stand on an inclined plane, sliding constantly downwards on the forefoot. Too much weight is imposed on the forefoot, with chronic metatarsalgia as a result. It is not the high heel itself but the oblique upper surface which is the source of the trouble. High heels with a horizontal upper surface do not cause problems and are even beneficial to women with a plantaris deformity of the forefoot. Unfortunately, no such ready-made shoes exist.
- **Pes cavus deformity**: a pes cavus deformity is very often accompanied by extreme hyperextension at the metatarsophalangeal joints, caused by shortening of the extensor digitorum muscles together with ineffective intrinsic flexors, holding the toes clawed. In such cases, the toes do not bear body weight at all and serious metatarsalgia results, with large callosities under the metatarsal heads, together with corns at the dorsal aspects of the interphalangeal joints.

- **Weak flexor muscles**: sometimes the short muscles in the sole of the foot are weakened after a long rest in bed during an illness. If too much weight is borne too soon for too long a time, metatarsalgia can result.
- **Dancer’s metatarsalgia**: a dancer working en pointe may bruise the plantar aspect of the second, third and fourth metatarsophalangeal joints. To prevent this, most ballet shoes are fitted with a small semilunar pad, which ensures that the joints are protected and the body weight distributed as widely as possible.

#### Symptoms and signs

There is pain at the plantar aspect of the forefoot on standing and walking, relieved by rest. Sometimes a callus will form, which increases the pressure on the metatarsal head and aggravates the irritation.

Clinical examination shows pain at the end of dorsiflexion, sometimes at the end of both dorsiflexion and plantiflexion. Tenderness is noted under the metatarsal heads. Although the tenderness is described as being of the metatarsal heads, it is not the articular cartilage but the plantar aspect of the metatarsophalangeal joint that is at fault. The difference is important, because irreversible changes never take place and relief of too much weight bearing will always lead to full recovery.

#### Treatment

The most important measure is to avoid excessive weight bearing at the forefoot: the high heel must have a horizontal surface. This brings more weight onto the hindfoot than the forefoot and prevents the foot from sliding forwards. A support with its thickest part stopping just behind the heads of the metatarsals (metatarsal pad) must be fitted into the shoe. This ensures that the shafts of the metatarsals bear more weight than the joints themselves.

In a splay foot or after a long stay in bed, vigorous strengthening of the short flexor muscles of the toes by exercises is necessary, so that the toes flex properly at each step to take most of the body weight during walking.

In long-standing cases, good results can be obtained by a single intra-articular injection of triamcinolone into the joint.

**Technique: injection**

The patient lies supine. The joint is identified at the plantar and dorsal aspect; usually the joint line is more proximal than might be expected. A thin needle is fitted to a syringe filled with 0.5 ml of triamcinolone. By pulling at the toe and by moving the proximal phalanx in slight plantar flexion, the joint line becomes accessible to the needle. The needle is thrust downwards, lateral to the long extensor tendon. After 1 cm the tip of the needle is in the joint space and the steroid is injected.

Some soreness is to be expected for about 24 hours. Good results follow after 2 days. If preventive measures are also taken, the relief is permanent.

#### Interdigital ganglion

A ganglion arising from a flexor tendon sheath may arise between the toes at the dorsum of the foot. It can cause painful
pressure, especially if small shoes are worn. The diagnosis is obvious when a firm mass appears during standing. An excessive interval is then seen between the two toes and palpation reveals a semisolid tumour. Lying down permits the ganglion to recede. Because the mass is thick and composed of fibrolipomatous material, aspiration often fails. Excision is indicated if problems persist.

Pressure on the nerves in the forefoot

Symptoms caused by pressure on nerves at the forefoot are very often regarded as metatarsalgia. The differential diagnosis relies on the fact that the patient describes sharp, unexpected and sudden twinges instead of continuous pain during walking or running. During clinical examination, no signs of bruising of the plantar capsule of the metatarsophalangeal joints are discernible. Sometimes the symptoms can be reproduced by local pressure on a nerve.

Bruising of the second digital nerve

This is a rare condition, which is rather surprising, because the nerve passes forwards on the lateral side of the plantar aspect of the first metatarsophalangeal joint, close to the surface and unprotected from external trauma. It can easily be palpated as a thick band, before it bifurcates just distal to the joint, to supply sensation at the adjacent borders of the first and the second toes. If there is repetitive injury, bruising will persist. Consequently, the patient gets sharp twinges during walking. The twinges will be followed by pins and needles and by a constant ache.

During clinical examination the symptoms can be reproduced by local pressure on the bruised nerve. Treatment consists of wearing a thick rubber pad under the forefoot for 3–6 months. An alternative is the injection of triamcinolone suspension around the inflamed nerve: a needle of the suspension is infiltrated. If problems persist, aspiration often fails. Excision is indicated if problems persist.

References


64. D’Arcangelo PR, Landorf KB, Munteanu SE, Zammit GV, Menz HB. Radiographic correlates of hallux valgus severity in older people. *J Foot Ankle Res* 2010;3(20).


