

Toe deformities

There are three main forms of toe abnormalities in the human foot:

- Claw toes.
- Hammer toes.
- Mallet toes.

A claw toe involves abnormal positions of all three joints in the toe. It consists of an extension contracture with dorsal subluxation of the metatarsophalangeal (MTP) joint, together with flexion deformities of the proximal interphalangeal (PIP) and distal interphalangeal (DIP) joints.

A hammer toe shows extension of the MTP joints and the DIP joints. The PIP joints are hyperflexed.

A mallet toe shows a flexed DIP joint, most commonly of the second toe.

How common are toe deformities? (Epidemiology)

- They occur throughout life, although are most often seen in the seventh and eighth decades.
- Women are affected four to five times more often than men.

What causes toe deformities? (Aetiology)

Toe deformities are caused by a variety of factors:

- Associated with a pes cavus deformity resulting from an underlying neurological condition - eg, [Charcot-Marie-Tooth syndrome](#).
- Genetic.

- Poorly fitted shoes - usually the result of wearing shoes that are too short. Many people have second toes that are longer than their big toes. If they wear shoes sized to fit the big toe, the second toe has to bend to fit into the shoe - causing mallet toe. High-heeled shoes with pointed toes are also a major cause of claw toes.
- Bunions.
- Highly arched feet.
- Rheumatoid arthritis.
- Tendon imbalance. When the foot cannot function normally, the tendons may stretch or tighten to compensate, leading to toe deformities.
- Traumatic injuries of the toes.

Assessment

This should include neurovascular evaluation and appreciation of muscle bulk/wasting.

Claw toe

- Assess the degree of MTP hyperextension and PIP flexion.
- Note whether there is metatarsalgia.
- Note any associated skin changes - eg, plantar keratosis.
- Establish whether the claw toes are flexible or fixed:
 - This should be performed with the ankle in plantar flexion and dorsiflexion.
 - If the claw toe deformity disappears with plantar flexion then the deformity is considered flexible.
- Apply pressure underneath the metatarsal heads and note the degree of correction.

- Assess the patient whilst he or she is walking barefoot:
 - Note whether the clawing becomes worse during walking; in stance phase vs swing phase.
 - Clawing during swing phase: may indicate weak ankle dorsiflexors and overcompensation of toe extensors.
 - Clawing during stance phase: may indicate weak triceps surae and overcompensation of long toe flexors.
- Note presence of pes cavus deformity.

Hammer toe

- Assess deformity whilst the patient is standing (to see functional significance).
- Note any associated deformities – eg, hallux valgus or pes cavus.
- Attempt to correct the deformity passively.
- Palpate plantar and articular portions of the metatarsal head.
- Palpate the webspace and compress the forefoot (by squeezing the metatarsals together) to exclude interdigital neuroma.

Mallet toe

- Consider overall foot alignment.
- Assess the MTP joint and PIP joint.
- Observe calluses and nail deformity.
- Assess flexibility of the DIP joint with toe plantar and dorsiflexed at the MTP joint and PIP joint.

Investigations

- Consider fasting glucose or HbA1c (to exclude diabetes).
- Rheumatoid factor.
- Imaging – plain X-ray will often show arthritic change, synovitis, osteomyelitis and toe position.

Vascular investigations may be necessary to ensure adequate tissue healing/viability.

Toe deformities treatment and management^[1] ^[2]

These principles are applicable to all three conditions. Treatment of these conditions often includes shoe modifications, appliances, therapeutic exercises and surgical repair.^[3]

Deformities of the lesser toes are common and can be associated with significant morbidity. These deformities are often multiple, and the goal of surgical treatment is to improve symptoms by restoring alignment and function, and avoiding recurrence.

Hammer, claw, and mallet toes are sagittal plane deformities of the lesser toes. Toe sleeve or padding can be applied over high-pressure areas in the proximal or distal interphalangeal joints or under the metatarsal heads. A metatarsal off-loading insole can also be used to alleviate the symptoms of lesser toe deformities.

Conservative treatments

- Chiropody.
- Trimming, or wearing protective padding on, corns and calluses.
- Wearing supportive custom-made plastic or leather shoe inserts (orthotics) to help relieve pressure on toe deformities.
- Using splints or small straps to realign the affected toe.
- Wearing shoes with a wider toe box.
- Injecting anti-inflammatories to relieve pain and inflammation.

Surgery

- When the toe deformity is painful or permanent, surgical repair is performed to relieve pain, correct the problem and provide a stable, functional toe.
- Type of surgery depends on whether the deformity is fixed or flexible.

- Surgery may include soft-tissue rebalancing and sometimes fusions of the PIP joint.
- Arthrodesis of small joints for hammer and claw toe deformities is a common forefoot operative procedure.^[4]
- K-wire fixation for correction of hammer toe deformity is a common, low-cost method for fixation of hammer toes after PIP arthroplasty or fusion.^[5]
- Correction of hammer toe using either joint resection arthroplasty, PIP arthrodesis without osteotomy, or interpositional implant arthroplasty are all common techniques that lead to adequate pain relief and correction of the deformity. However, interpositional implant arthroplasty has been shown to result in significant radiographic correction in the axial plane.^[6]

Risks associated with surgery include:

- Nerve injury.
- Infection.
- Swelling for one to six months following surgery.
- Persistent pain and discomfort.
- Recurrence of the deformity.

Surgical treatment should be followed by a rehabilitation programme, usually with full load bearing in a flat orthopaedic shoe.^[7]

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