Metatarsalgia, Lesser Toe Deformities, and Associated Disorders of the Forefoot

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KEYWORDS

• Metatarsalgia • Hammertoe • Metatarsophalangeal joint instability • Gastrocsoleus • Morton neuroma

KEY POINTS

- Metatarsalgia is a symptom complex of pain localized to the forefoot.
- There are many etiologies to metatarsalgia.
- Hammer toe, mallet toe and claw toe are lesser toe deformities created by an imbalance between the extrinsic and intrinsic musculature of the foot.
- Most conditions of the forefoot can be treated successfully with shoe modifications and off the shelf appliances to alleviate areas of pressure.
- When conservative treatment is unsuccessful, referral to a foot and ankle specialist is necessary to assist the patient in the appropriate selection of corrective procedures.

METATARSALGIA

Metatarsalgia is a term attributed to pain localized to the forefoot region. While there are many conditions that create pain in the forefoot, the term metatarsalgia serves to differentiate such conditions from pain in the area under the second, third, and fourth metatarsal heads.[1]

Pain localized to the forefoot may be associated with disorders of the hallux and lesser toes. It is also important to recognize that in addition to these entities there are conditions of the hindfoot, ankle, and leg that also contribute to metatarsalgia. Distinguishing between these variables can be accomplished through a thorough physical examination.

Classification

Espinosa and colleagues[1] described 3 types of metatarsalgia: primary, secondary, and iatrogenic. Categorization of these entities is useful to help identify the cause of forefoot pain and thus guide treatment.

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Primary metatarsalgia is caused by intrinsic abnormalities of metatarsal anatomy and the relationship between the metatarsals and the rest of the foot. The end result is overload to the forefoot. The most common cause is a long second metatarsal.[2] Excess plantarflexion of the forefoot caused by a cavus foot or as a result of a fracture or surgical procedure are additional examples of primary metatarsalgia.[3]

Individuals with large bunion deformities (hallux valgus) may complain of pain in the forefoot caused by incompetence of the first ray (great toe and first metatarsal) in its weight-bearing function, creating transfer pressure to the lesser metatarsals. In addition, primary metatarsalgia can be seen as a consequence of congenital deformities or a neoplastic process that causes enlargement of the metatarsal head.

Individuals with metatarsalgia will experience pain during the midstance phase of gait, which occurs as the foot moves from heel strike to toe off. It is during this phase that the foot makes full contact with the ground. Disorders of the leg, such as contracture of the Achilles tendon complex and leg length discrepancy, can contribute to this type of forefoot pain.[4]

Secondary metatarsalgia can occur as a result of trauma. Fractures of the foot that cause angular or rotational displacement of the metatarsals, resulting in malalignment, may lead to forefoot pain. Additional causes include hallux rigidus (degenerative disease of the hallux metatarsophalangeal [MTP] joint), inflammatory arthropathy, instability of the lesser MTP joints, interdigital neuritis, tarsal tunnel syndrome, and Freiberg infraction.[5] Although these conditions may not exert a direct effect on the metatarsals, they can lead to overload of the forefoot. In addition to trauma affecting metatarsal alignment, damage to the supporting structures of the MTP joint (plantar plate, collateral ligaments) can occur. Injury to these stabilizing structures as a result of a traumatic event or because of inflammatory arthropathy (rheumatoid arthritis) can lead to imbalance of the relationship of the lesser toes to the metatarsal head. This incompetence in the supporting soft tissues around the MTP joint leads to instability and forefoot pain.[6]

Iatrogenic metatarsalgia, as the name implies, may arise as a result of a reconstructive procedure on the foot to address lesser toe abnormality from hallux valgus surgery that has created a shift in plantar pressures to the forefoot.[7] When assessing a patient who complains of forefoot pain, it is important to ask about previous surgical procedures on the foot.

As noted earlier, foot position during the gait cycle will lend clues to the cause of forefoot pain. The gait cycle consists of two components: swing phase and stance phase. Forty percent of the gait cycle is the swing phase with the remaining 60% spent in the stance phase. The stance may be staged simply by 3 time intervals: heel strike, foot flat, and toe off. Pain felt during these intervals can again lend clues to the cause of the pain (**Fig. 1**).

Metatarsalgia felt during heel strike can be seen in the setting of a cavus foot, congenital deformity, or a tight heel cord. Symptoms exhibited during midstance or foot flat are influenced by ankle motion and, therefore, conditions affecting the ankle (degenerative joint disease) may limit dorsiflexion of the ankle and cause pain in the forefoot. During the toe-off phase only the forefoot is in contact with the ground and MTP joints are in a dorsiflexed position. Hammertoes or conditions that create MTP joint instability will be most symptomatic during this phase. It is during this portion of the gait cycle when metatarsalgia occurs most frequently.[1]

Clinical Assessment

As with any encounter with a patient, a thorough history and physical examination is essential. It is important to take note of a history of previous trauma or surgery, as this may change the morphology of the foot. History of diabetes and, in particular,