What's Afoot

Metatarsalgia

by L.A. Sidari, Podiatrist

The patient presents to the clinic and complains of a sore foot. On questioning, pain is centred around the ball of the foot. The pain is a severe burning-like ache which gets worse as the day progresses and is especially painful in high heels.

Biomechanical Examination Tips:

Usually on examination you can locate the exact area of discomfort with palpation both on the plantar surface of the forefoot and in the sulcus of the forefoot. Occasionally the metatarsal heads are tender, but more often the ends of the metatarsals in the sulcus are much more irritable.

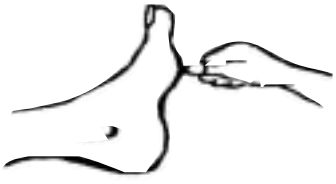


Figure 1: Palpate the plantar surface of each metatarsal head to elicit pain if present.

Figure 2: Palpate the distal end of the metatarsal heads to elicit pain if present.

After you have established the pain centres, the metatarsal formula should be examined to determine if unusual patterns exist. These patterns could be a long metatarsal present, or a drop in the metatarsal position increasing pressure on an area. The range of motion should be examined - the 1st metatarsal should be able to dorsiflex/plantarflex 5mm, the 2nd & 3rd metatarsal should be fairly stable (very little dorsiflexion/plantarflexion) and the 4th & 5th metatarsals should have a good range of motion.

Figure 3: Check the metatarsal length of any unusual patterns or prominences.

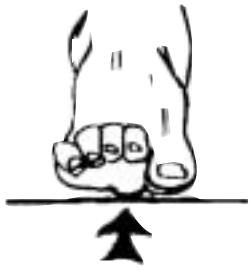


Figure 4: Check for plantarflexion of any met heads - E.g. 2nd metatarsal head creating a pressure point against the ground surface.

The foot should be checked for other contributing factors such as excessive pronation with lateral fore-foot splay, Hallux Abducto Valgus (Bunions) and other toe deformities such as hammer toes, mallet toes etc.

Once the area of irritation has been identified and the contributing factors looked at, then a diagnosis is possible.

The differential Diagnoses are:

1. Metatarsalgia
2. Intermetatarsal neuritis or Neuroma
3. Stress fractures
4. Endrochondroma *(tumour)*

Metatarsalgia

Treatment Suggestions:

When confronted with forefoot pathology a decision has to be made on whether to treat just the symptons or the presenting problem. A patient with a pressure point on the 2nd metatarsal head may only have pain locally but the pathology may still be present in another part of the foot. When looking at these problems consider the foot as a whole unit and try to picture the cause of the pressure point to be able to determine the treatment regime.

When the metatarsalgia is indicative of a forefoot instead of rearfoot malfunction then the main consideration is to ensure better function of the lesser toes and metatarso-pharangeal joints. If the digits are clawed or retracted this impedes the normal function of their respective metatarsal heads and increases the stress on the area in question.

The following diagrams demonstrate some of the padding or splinting techniques that can be used to reduce the pressure on the metatarsal heads.

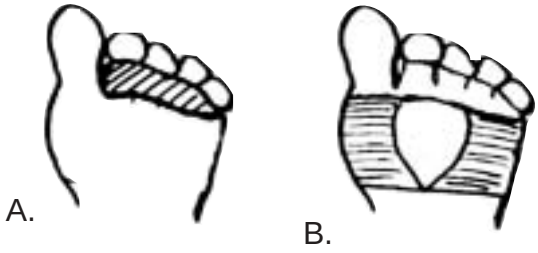


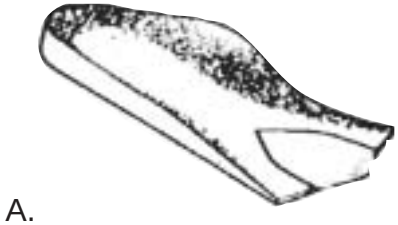
Diagram 1: A) toe prop to extend digits
B) metatarsal lift taped to forefoot

If the problem seems to stem from a rearfoot pathology such as Pes Planus, Pes Cavus, Hallux Abducto Valgus, Equinus condition, Hallux Rigidus or Limitus then these abnormalities have to be dealt with to reduce the stress placed on the forefoot. These conditions usually cause abnormal compression, abnormal shearing or abnormal tensile stress on the metatarsals.

After examining the foot type and determining the weaknesses present then some form of correction can be instituted to control the abnormal motion and reduce the stress to the forefoot.

The main consideration is - in what position is the subtalar joint at the end of the midstance just before propulsion - if the foot is pronated and shows no sign of resupination before toe off then some form of rearfoot correction is necessary - the device type is dependant on the severity of the foot's abnormal position.

The forefoot position is then also examined to determine the extent of posting needed to realign the structure for better placement of force over the area of the metatarsal heads ie; a forefoot varus will allow more lateral splay of the forefoot and therefore more abnormal shear force. A forefoot valgus whether rigid or flexible will allow more abnormal compression forces on the metatarsal heads and both conditions can lead to abnormal tensile stresses allowing stretching of the joint capsules and ligaments and therefore fatigue. Metatarsal lifts (Domes) are not likely to be helpful if the rearfoot pathology is not controlled and the cases where the shearing force across the forefoot is too great.



Perspective View Top

Plan View Bottom *Plan View Bottom*

Figure 2: A) Device with a metatarsal lift
B) Device with a forefoot valgus post
C) Device with a forefoot varus post

Treatment should also consist of advice on footwear to allow proper toe function and protection for the soles of the feet. Passive and active exercises to stretch toes, improve the range of motion and strengthen the intrinsic muscles. #