

## Practical GaitScan™

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### Morton's Neuroma

Patient presents with radiating pain in the forefoot and, after clinical and/or diagnostic testing, the diagnosis of Morton's Neuroma was made. Classically, this is a time when many clinicians will discuss a treatment protocol beginning with injections and discussions of surgical intervention. Since this is largely a biomechanical problem, I prefer to discuss lower limb mechanics and recommend orthotics and physical therapy.

Morton's Neuroma is a thickening of the intermetatarsal nerve sheath as it passes between the bulbous heads of the third and fourth metatarsal heads. By altering the foot mechanics and gait line we can reduce the continual irritation caused by these metatarsal heads during midstance and propulsion. Since a proper orthotic can affect the foot's three planes of motion and three phases of gait, we can off-load the area of concern by adjusting the gait line, forefoot loading pattern, time spent on the met heads and add a neuroma pad. We know where the third and fourth met heads are off-weightbearing but they move throughout gait. GaitScan™ can pinpoint those spots.

With patient complaints stemming from forefoot problems, the early gait pattern sets an important tone. Classically, we are looking for the heel to lift at 55% of gait cycle. Early heel-off often causes an extended terminal phase of gait which in turn, causes an overall increase in forefoot impulse and thus, not helpful to our Neuroma patient. Gait percentages can be found on GaitScan™ as the bottom axis in the dynamic report's wave graph. The overall metatarsal time and impulse values go left to right on the 2nd section of the dynamic report along the lanes of M1-M5.

To zero in on what's happening at the Neuroma site, I'm particularly interested in isolating and accentuating forefoot loading and drift. I use a technique call the Dancer's dynamic scan. In addition to the "normal" dynamic testing, I ask the patient to land on their heels and rise up on the balls of their feet, holding that position until the test completes. This test can also be done in "Squat" mode which gives you a longer time to observe the drift in transverse plane motion but is not transmittable to the labs for orthotic construction.

Now that we have all this data, we can construct a more suitable orthosis. For Neuroma patients, I like a mildly deepened heel cup, a full contact semi-rigid plate on the more flexible side with a low-profile met pad placed a bit distal to usual lab discretion and a neuroma pad. Our GaitScan™ images clearly identify the loaded third and fourth ray and now, thanks to our Dancer's dynamic scan, the lab can pinpoint the appropriate placement of the neuroma pad during orthotic construction. Keep in mind that our goal is to have the third and fourth met heads fall away from each other during midstance and propulsion. What seems to work best is a neuroma pad made of a Poron type material 1.5 mm wide x 3 mm deep and 3 cm long, then covered plantarly with vinyl or suede. Adding a smooth leather top covers will help to further identify the area if adjustments are warranted as the pressure under the metatarsal heads will stain.