

CASE STUDY

pedCAT® provides critical anatomic information to allow for precise surgical planning.

When evaluating the patient with metatarsalgia there are many anatomic and biomechanical factors to consider: first ray hypermobility, metatarsal length, metatarsal elevation and metatarsophalangeal joint stability (plantar plate). Traditional weight bearing radiographs can evaluate metatarsal length, but cannot assess metatarsal sagittal plane position. Sesamoid axial views can be used to evaluate the metatarsal head sagittal plane position, but such radiographs are not reliable as the patient or the x-ray technician positions the foot that clearly does not represent a resting stance position. Weight bearing CT can accurately measure the relative position of the metatarsal heads to one another and to the weight bearing surface.

History:

A 63 year old female presents complaining of persistent left forefoot pain. She points to the plantar margin of the 3rd metatarsal head as the area of discomfort and pressure. She has had 4 previous foot surgeries by another provider including a first metatarsal base osteotomy, a revision of the base osteotomy with bone grafting and a first metatarsal head osteotomy. She has also had a second metatarsal head osteotomy.



3D rendering with soft tissue and bone



3D rendering with soft tissue

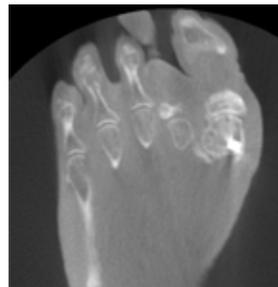


Figure 1a: Transverse plane slice to evaluate the metatarsal head parabola.



Figure 1b: Transverse plane slice with measurement tools.

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**Kent Feldman, DPM, FACFAS**

Kent A. Feldman, DPM is a local and national leader in foot and ankle care. Dr. Feldman is the podiatry provider for the San Diego Chargers and the Depts. of Athletic Medicine at San Diego State University, Point Loma Nazarene University and Christian Heritage College. Dr. Feldman has lectured locally and nationally on new advanced surgical techniques. He is Board Certified in Foot Surgery by the American Board of Podiatric Surgery.

Dr. Feldman completed his undergraduate degree in biology at California Polytechnic State University at San Luis Obispo and attended medical school at the California College of Podiatric Medicine. He performed his residency in foot and ankle surgery at Hillside Hospital and Scripps Mercy Hospital in San Diego and completed his training at Kaiser Permanente Medical Center in Oakland, California. In 1990, Dr. Feldman began his practice in San Diego with the OASIS Sports Medicine Group. After 18 years working under the banner of OASIS, Dr. Feldman began OASIS Podiatry.



Figure 2: Sagittal plane slice to evaluate the 2nd metatarsal head position.



Figure 3: Sagittal plane slice to evaluate the 3rd metatarsal head position.

Relevant Physical Exam:

Clinically she has a normal neurovascular and dermatological exam with the exception of a small callous beneath the left 3rd metatarsal head. The plantar fat pad is thinned beneath the 3rd metatarsal head. The 2nd metatarsal is shortened and elevated and doesn't bear weight. In a relative sense the 3rd metatarsal head is plantar prominent. The 2nd metatarsophalangeal joint is extended and she has poor flexor strength within the 2nd toe. The 3rd metatarsophalangeal joint is slightly extended.

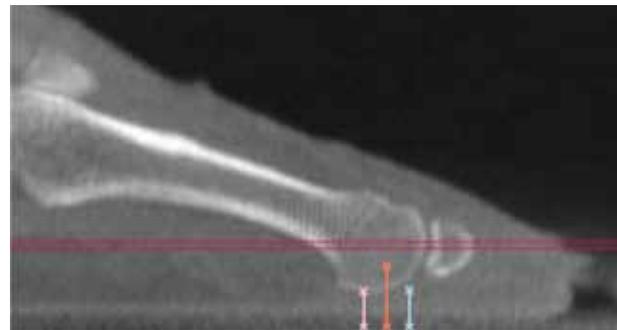


Figure 4: Sagittal plane slice to evaluate 4th metatarsal head position.

Weight Bearing Foot CT Scan:

The transverse slices allow for the precise evaluation of metatarsal length. Depending on the technique for determining metatarsal parabola and the ideal postoperative position, the surgeon can accurately measure metatarsal length. (Figure 1) The sagittal weight bearing slices can identify the position of the metatarsal heads in relation to the ground and one another. In this study, the 2nd metatarsal head is elevated off the weight bearing surface 9.10mm (Figure 2), while the 3rd metatarsal head is elevated 5.60mm (Figure 3) and the 4th metatarsal 5.42mm (Figure 4).

CONCLUSION:

The weight bearing pedCAT study provides the surgeon with the critical anatomic information to allow for precise surgical planning. This information can be used to lengthen and plantarflex the 2nd metatarsal head or to shorten and elevate the 3rd metatarsal head. This information may also be used to conservatively manage patients with altered metatarsal weight bearing patterns.