The Medial Drift of the Medial Malleolus Measuring Device

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Measuring medial drift of the medial malleolus is a simple and reliable way to evaluate the lever arm body weight has for maintaining the foot in a pronated position. This measurement has an acceptable inter-and interrater reliability (1), and unlike the arch height ratio device, medial drift of the medial malleolus measurement gives important information regarding dynamic function of the foot (Fig. 1).

By evaluating displacement of the medial malleolus, the examiner obtains important information regarding frontal plane motion of not just the rear and midfoot, but also the ankle. Although typically perceived as a pure hinge joint, *in vivo* analysis by Arndt et al. (2) confirms the ankle joint everts more than 12° during stance phase.

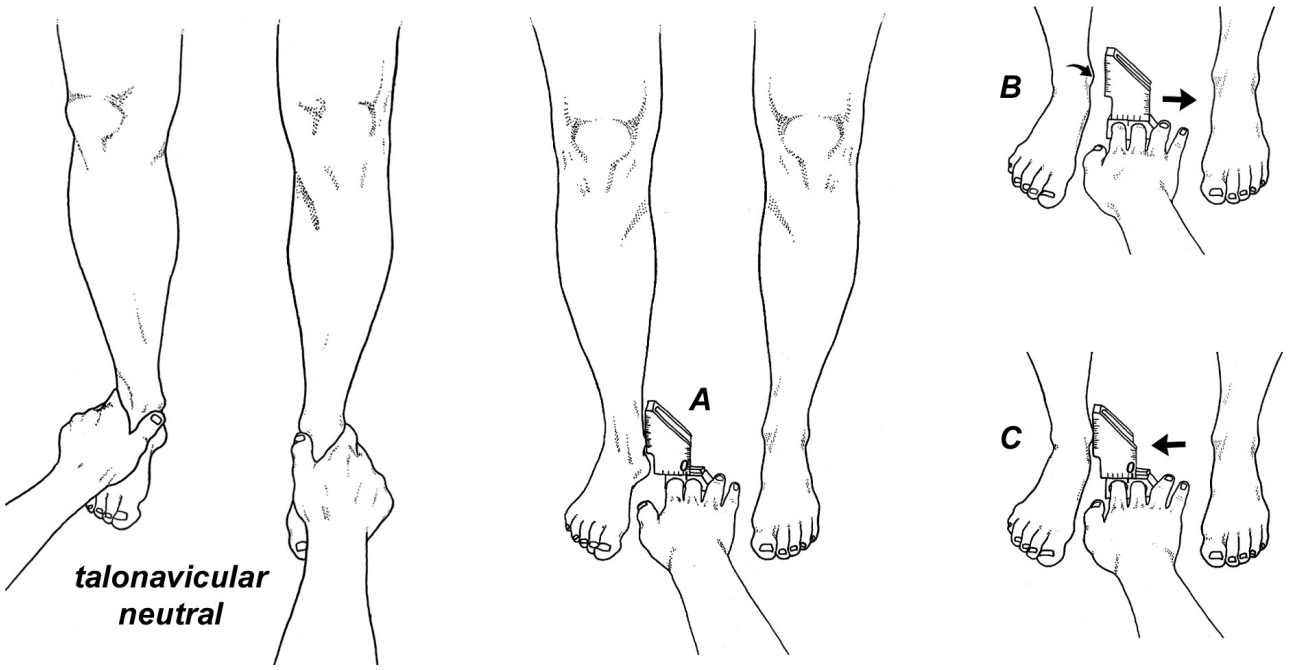

Figure 1. The Medial Drift of the Medial Malleolus Test. As with medial drift of the navicular, this measurement is performed by placing the measuring device next to the medial malleolus with the talonavicular joint maintained in a neutral position **(A).** Once the top of the device is moved to the side, the patient is instructed to relax **(B)** and the top of the device is pushed back against the medial malleolus **(C)**. The change in the horizontal position of the medial malleolus as the subject moves from talonavicular neutral to relaxed calcaneal stance is recorded. Because the patient may alter position of the medial malleolus by looking down during the procedure, the measurement is performed after instructing the patient to look forward and not down. An individual is classified as a supinator with less than 5 mm medial drift, neutral with 5 to 10 mm, and a pronator with greater than 10 mm of medial drift of the medial malleolus.

Measuring drift of the medial malleolus provides clinically useful information regarding frontal plane motions of this important joint. Furthermore, measuring medial drift of the medial malleolus allows for precise evaluation of the almost parallel translation occurring between the talus and calcaneus when the subtalar joint pronates. As described by Lundberg et al. (3), *in vivo* analysis of foot/ankle motion using surgically implanted tantalum beads reveals that pronation of the subtalar joint causes the talus to shift medially with a "sideward rolling action," resulting in an almost parallel translation of the talus upon the calcaneus (Fig. 2). Measuring medial drift of the malleolus allows the practitioner to quantify the parallel translation, which provides information regarding the length of the lever arm body weight has for maintaining the foot in a pronated position (Fig. 3). The larger lever arm afforded body weight requires the medial muscles generate more force to supinate the foot, possibly explaining why individuals who pronate excessively are more likely to present with injuries to their medial muscles and tendons (4).

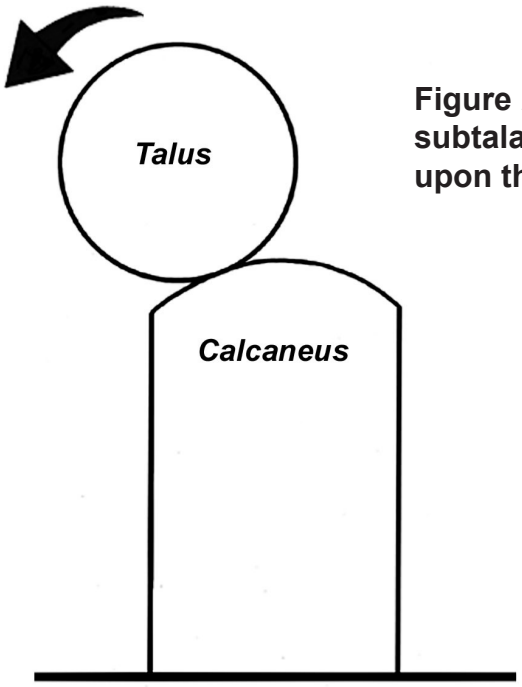

Figure 2. As demonstrated by Lundberg et al. (3), pronation of the subtalar joint causes the talus to move with a medial rolling action upon the calcaneus.

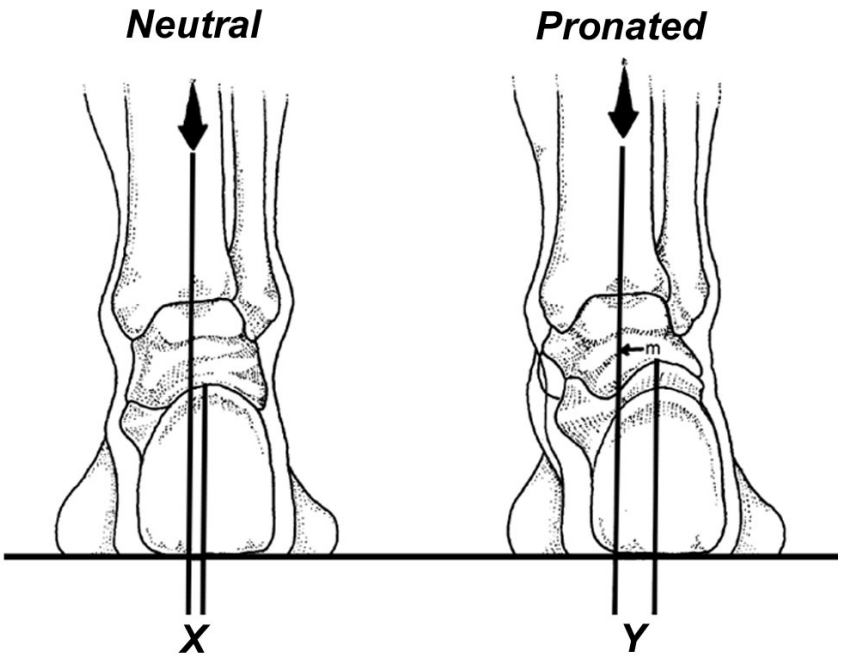

Figure 3. As the talonavicular joint moves from a neutral to a pronated position, the lever arm afforded body weight for keeping the foot in a pronated position Increases (compare X and Y).

The final degree of medial drift of the medial malleolus is important when prescribing orthotics. Because several studies suggest that orthotic posting works by improving ankle lever arms (5-7), the degree of orthotic posting should be determined by the degree of medial drift: large degrees of medial drift should be treated with large varus posts, while small degrees of medial drift should be either not posted or posted with valgus posts. A common practice is to prescribe 2° to 4° varus posting for medial drift measurements from 10 to 15 mm, 4° to 6° varus posting for medial drift measurements greater than 15 mm, and 0° or valgus rearfoot posting for medial drift measurements less than 3 mm. Because individuals with high degrees of medial drift place excessive stress on their inner ankles, exercises should be prescribed to strengthen the medial ankle musculature. Standing sideward on the ToePro Exercise Platform isolates tibialis posterior. In contrast to excessive medial drift, individuals with less than 5 mm of medial drift should be treated with interventions that reduce impact forces: strengthening the hip and knee musculature and gait recommendations to reduce stride length. As with the arch height ratio device, the medial drift device can be used to both treat and prevent future injuries.

References:

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