

## The Influence of a Morton's Foot on Arch Characteristics in Minimally-Shod Runners

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Individuals with a Morton's foot exhibit hypermobility of the first ray of the foot. It is unknown if this increased mobility affects static arch characteristics such as arch height, arch flexibility, and arch drop during stance in minimally-shod runners. We have previously reported that minimally shod runners with Morton's foot report more foot pain than those with a 'regular' foot. However, the relationship between Morton's foot and static arch characteristics has not been established. Therefore, **purpose** of this pilot study was to determine if having a Morton's foot is related to alterations in Arch Height Index (AHI), Arch Rigidity Index (ARI) and Arch Drop (AD). **Methods:** Sixteen experienced minimalist runners participated (age  $27.4 \pm 10.1$  yrs, hgt:  $170.3 \pm 25.0$  cm, mass  $78.1 \pm 18.0$  kg, gender 8M, 8F). Following informed consent, subjects were asked to stand barefoot with feet placed shoulder width apart while superior view photographs were taken of each foot. Feet were classified as Morton's if the second toe was longer than the great toe ( $n=8$ ). AHI, ARI and AD were obtained using the AHI measurement system. Left and right side data were considered separately, such that each subject had two data points in analyses. A MANOVA was performed with the dependent variables of AHI, ARI, and AD between subjects with a Morton's foot or a regular foot. Alpha was set at the level of 0.10. **Results:** Minimally-shod runners with a Morton's foot had a lower arch ( $AHI=0.314 \pm 0.024$ ) than runners without a Morton's foot ( $AHI= 0.34 \pm 0.03$ ) ( $p = 0.062$ ). Also, those with a Morton's foot demonstrated greater arch rigidity ( $ARI = 0.94 \pm 0.06$ ) than those without ( $ARI = 0.92 \pm 0.03$ ) ( $p = 0.088$ ). Arch drop (in mm) did not differ between the two groups ( $p = 0.137$ ). **Conclusions:** This study revealed that runners with a Morton's foot have a lower, more rigid static arch than their counterparts with a regular foot. Anatomical features of the lower extremity, such as arch characteristics, are believed to dictate the function of the foot and are associated with running injuries. Previous data indicate that minimally-shod runners with a Morton's foot report greater foot pain than those with a regular foot. Future studies should examine running biomechanics, including kinematics and loading at foot contact, to better understand the mechanism of injury in this population.