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A Comparison of Self-Reported Pain Levels in Minimally-Shod vs. Traditionally-Shod Runners with Different Forefoot Types

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Distance running is a popular recreational activity despite high rates of overuse injury. The efficacy of wearing minimalist shoes to prevent injury has been debated. We previously reported that minimalist runners are more likely to experience site-specific lower extremity pain; however, no clear relationship has been established between shoe type, forefoot (FF) shape (Egyptian, Morton's, or square), and pain. **PURPOSE:** Therefore, the purpose of this study is to examine self-reported pain in the lower limbs in minimalist and traditionally shod runners with various forefoot types. **METHODS:** Following consent, 48 experienced runners (age: 27.5 ± 9.3 yrs, hgt: 172.2 ± 10.2 cm, mass: 70.6 ± 15.6 kg, gender: 18M/30F) who reported running at least 10 miles a week for the past three months, completed a visual analog scale (VAS) about pain they experience in five common sites of injury: knee, ankle, calf, shin, and foot. A score of ≥ 3 on the VAS was considered pain. Shoes were categorized as either minimalist ($n=40$ feet, midsole drop <4 mm) or traditional ($n=56$ feet, midsole drop >4 mm). Superior view photographs were taken of the FF and were categorized as Egyptian (EF) ($n=73$ feet, typical foot with Hallux the most distal toe), Morton's (MF) ($n=10$ feet, 2nd toe longer than Hallux), or square (SQ) ($n=13$ feet, Hallux and 2nd toe equal length). Separate three-factor chi-square analyses determined if shoe type (minimalist, traditional) and forefoot type (EF, MF, SQ) were related to pain (yes, no). ($\alpha=0.05$). **RESULTS:** More minimalist runners with EF reported pain (61.8%; $p=0.004$) when compared to MF (50%) or SQ (20%). More minimalist runners with EF reported calf pain (77.8%; $p=0.028$) than those with MF (0%) or SQ (20%). FF type did not relate to pain at any other site. **CONCLUSION:** Runners with EF are more likely to report pain in at least one location, and specifically in the calf, than runners with other FF shapes when wearing minimalist vs traditional shoes. Minimalist shoes encourage the runner to strike the ground with the forefoot; however, this requires more eccentric loading of the calf musculature and Achilles tendon. Our minimalist runners with EF reported more calf pain than those with other FF types. Other FF types may be better able to absorb the foot contact and muscle forces better than a more typical foot when wearing minimalist shoes.