What are the Effects of Wearing Shoes on Foot Pressure?

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What Are The Effects Of Wearing Shoes On Foot Posture?

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Background
- Recent studies have debated the benefits that shoe wear, or lack thereof, has on reducing the forces that are imposed on the lower extremities while running, thus lowering the chance for injury\(^1\).
- Research has shown that reducing the amount of structural support provided by shoes increases cross sectional area of foot intrinsic muscles. Additionally, increased intrinsic support of the medial longitudinal arch promotes a higher degree of supination\(^3\).
- Clinically, and in the literature, it is well established that extreme foot postures are associated with injuries, while more normal foot postures are not\(^2\).
- Inter-rater reliability for the Foot Posture Index (FPI) and Dorsal Arch Height Ratio (DAHR) are established in the literature as valid ways of assessing static foot posture. These measures have a ICC interrater reliability values of .525-.655 and .98-.99, respectively\(^5\).
- To date, there are no studies that specifically evaluate the relationship between foot posture and habitual shoe wear. Habitual shoe wear does have an effect on DAHR which is a more objective measure than FPI. This suggests shoe wear may indeed affect foot posture, but the FPI was not able to pick up the change. Foot strike pattern does not affect FPI scores, DAHR, Midfoot Width, or Forefoot Width.

Hypothesis
- Habitually unshod participants will demonstrate greater foot pronation (low arch posture), compared to unshod participants.
- Foot strike patterns will have no effect on foot posture, according to the FPI, DAHR, and foot posture measurements.
- Habitual shoe wear does not affect foot posture according to the FPI.

Methods
- Participants
  - Group 1: 30-shod (mean age: 25)
  - Group 2: 21-unshod (mean age: 32)
- Ugandans- recruited in collaboration with Uganda Christian University

Inclusion Criteria
- Age: 15-40 years old
- Shod Group: Self-reported habitually shod
- Unshod Group: Self-reported habitually unshod
- All participants unhindered in walking and running ability

Exclusion Criteria
- Musculoskeletal or nervous system injuries in the past year that would affect lower extremities in walking or running.

Objective Measures:
- Foot Posture Index, Dorsal Arch Height, Forefoot Width, Total Foot Length, Foot Strike Pattern

Results
- Figure 1: Foot Posture in Shod vs Unshod
- Figure 2: Foot Strike Pattern vs FPI
- Figure 3: Normalized Metatarsal Foot Width vs Shod/Unshod
- Figure 4: (Data not provided)

Discussion
- Habitual shoe wear does not affect foot posture according to the FPI.
- Habitual shoe wear does affect metatarsal foot width, but the effect size was very small. Barefoot individuals presented with an average FFW that was 2 mm greater than habitually shod individuals.
- Habitual shoe wear does have an effect on DAHR which is a more objective measure than FPI. This suggests shoe wear may indeed affect foot posture, but the FPI was not able to pick up the change. Foot strike pattern does not affect FPI scores, DAHR, Midfoot Width, or Forefoot Width.

Limitations
- Participants in the shod group largely wore shoes with minimal support, such as dress shoes or sandals, implying that the effects of shoe wear may not have been properly represented.

Declarative Statement
The effect of shoe wear on foot posture is minimal, and clinically insignificant. In the absence of pathology, clinicians should not be concerned about affecting foot posture when prescribing various shoe wear to patients.

Different running foot strike patterns do not have an effect on foot posture. Clinicians should not attempt to alter a patient’s running foot strike pattern with the intention to alter their foot posture.

References