

# How does vertical loading rate and landing pattern alter in adult habitual shod runners when acutely trialling barefoot running? A literature review

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# Footstrike Pattern

Rearfoot Strike >



10k run organized by sporlab in 2015 (Sporlab 2019)

Midfoot Strike

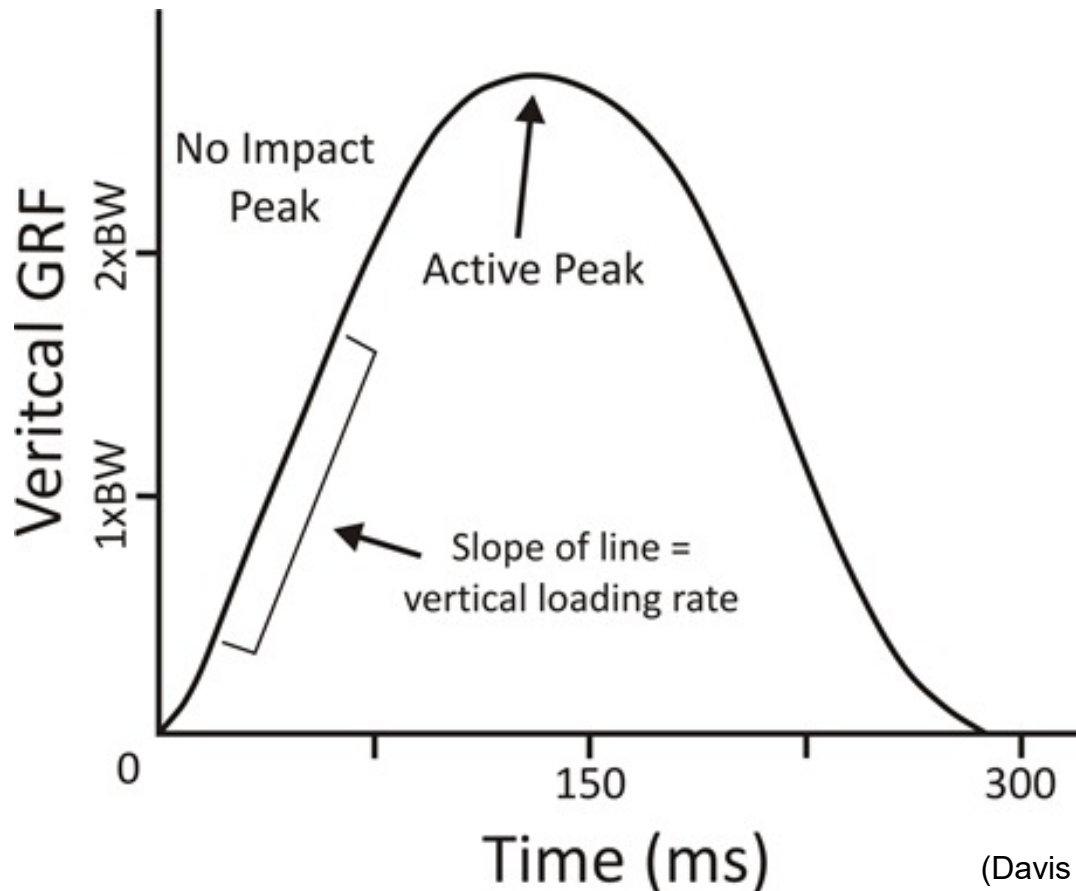


Human machines (Chris B 2016)

Forefoot Strike >

(Hamill and Gruber 2017; Lieberman et al. 2010; Hojjati Zidashti et al. 2017)

# Vertical Loading Rate (VLR)



Vertical GRF forefoot (Larson 2011).

**Greater VLR associated with running-related injuries**

**Lower VLR associated with a Forefoot strike landing**

(Davis et al. 2016; van der Worp et al. 2016; Pohl et al. 2009; Lieberman et al. 2010; Hojjati Zidashti et al. 2017)

# Barefoot Running

**Barefoot running promotes a forefoot strike which reduces vertical loading rate**

**Cushioned running trainers reduce the vertical loading rate during a rearfoot strike landing**



(Lieberman et al. 2010; Hashish et al. 2016; Davis et al. 2016)

barefoot-2521931\_1920 (Uveese 2017)



# What Did I Want to Discover?

**How does vertical loading rate and landing pattern alter in adult habitual shod runners when acutely trialling barefoot running?**



Hand-shoe-sport-feet-run-train-593571 (Pxhere 2017)

# What Did I Find?

## During Barefoot Running:

**Across all runners:  
(average)**

VLR: ↑

**Runners with a forefoot strike/more  
plantar-flexed ankle at ground contact:**

VLR: ↓

**Foot Strike Patterns: Mixed**

**Plantar-Flexion Angle at IGC: ↑**

(Lieberman et al. 2010)

# Further Considerations

- **Prolonged habituation yields similar results**  
(Hollander et al. 2017; Hollander et al. 2019; Tam et al. 2016)
- **Instruction to FFS decreases VLR (barefoot and in trainers)** (Samaan et al. 2014; Shih et al. 2013; Futrell et al. 2019)

## Barefoot Running:

- **Reduces knee stress and increases stress at the Achilles tendon and ankle**  
(Hashish et al. 2016; Sinclair 2014; Bonacci et al. 2014; Altman and Davis 2016)
- **Reduces hip internal rotation and adduction (lead leg) which alters knee motion**  
(Monaldi et al. 2019; McCarthy et al. 2015; Meira and Brumitt 2011)

# Thankyou for Listening

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# Articles Included Within My Literature Review

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