Injuries Observed in Minimalist Runners

Matthew Salzler, MD
Samantha Noonan, PA-C
Eric Bluman, MD, PhD

Brigham and Women’s Hospital
Foot and Ankle Service
Boston, MA
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Matthew Salzler, MD
Sam Noonan, PA-C

We have no potential conflicts with this presentation.

Eric Bluman, MD, PhD

I have a potential conflict with this presentation due to:

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9 – Board of Directors/ Committees
AOFAS BOD, Multiple Committees
AAOS Taskforce on Non-physician Scope of Practice, Foot & Ankle Evaluation Subcommittee

Our disclosures are in the Final AOFAS Program Book.
Background

- **Minimalist running**
  - Utilizes midfoot or forefoot strike rather than heel strike\(^1\)
  - Claims of lower incidence of running injuries\(^2-6\)
  - No evidence for decreased injury rate

- **Minimalist footwear**
  - Use increasing rapidly
    - #1 minimalist shoe sales revenue $11 million in 2009\(^6,7\)
    - Projected to account for 25% of running shoe sales\(^6,7\)
Case Series

- 10 experienced runners presented with injuries within one year of switching from traditional to minimalist footwear
  - Mean age of 43 (range 21 to 57) years
  - Average of 25.9 (range 6 to 45) miles/week
  - Average prior running history of 18.9 (range 1 to 40) years
  - Presented within 1 to 10 (mean, 2.8) months after switching to minimalist footwear
<table>
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<tr>
<th>Patient</th>
<th>Age</th>
<th>Gender</th>
<th>Injury</th>
<th>Prior injury?</th>
<th>Miles/week</th>
<th>Transition length (mos.)</th>
<th>Time to injury (mos.)</th>
<th>Tx for injury</th>
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</table>

Calc (calcaneus), PF (Plantar fascia), SF (Stress fracture), mos (months), ACB (pneumatic cast boot), NR (No running)
Potential Etiology of Injuries

- **Metatarsal Stress Fractures**
  - Greater cumulative microtrauma to metatarsals than when habitually shod
    - Forces in a different location when midfoot or forefoot striking (metatarsals versus calcaneus)
    - Forces transmitted to foot may be mitigated by cushioned shoes

- **Calcaneal Stress Fracture**
  - Likely running with a hindfoot rather than midfoot or forefoot strike
Potential Etiology of Injuries

• New minimalist runners may differ from habitually barefoot runners
  • Lower extremity connective tissues may be differently conditioned than in habitually barefoot runners

• New minimalist runners that become injured may differ from new yet uninjured minimalist runners
  • Vertical leg compliance is a measure of the connective tissue’s ability to act as a natural shock absorber
  • Pre and post transition changes in vertical leg compliance may differ between the injured and uninjured
Conclusion

- Lower extremity injuries occur in minimalist runners
  - Metatarsal and calcaneal stress fractures
  - Plantar fascia ruptures

- The incidence of injuries in minimalist runners still unknown
Future Studies

• Determination of incidence of injuries in minimalist runners

• Comparison of injury incidence in minimalist and habitually shod runners

• Determination of injury risk factors
  • Kinematic and biomechanical comparison of injured and uninjured minimalist runners
References


