Shoes or no shoes? A comparison of type and frequency of running injuries between shod and barefoot runners

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Level of Evidence: Prospective Cohort Study

Introduction: Attracting attention and slowly gaining momentum, barefoot running has increased curiosity amongst the running world and steadily increased its shoeless following. Injuries remain relatively common in shod runners so one of the proposed benefits of barefoot running has been decreasing injuries secondary to differences in foot strike, impact and force patterns, shorter stride, higher cadence, and increase sensory proprioception. However, absence of cushioning, support, and plantar protection would theoretically increase certain injuries in the barefoot runner. The purpose of this study was to compare the incidence, rate of injuries, and types of injuries between barefoot and shod runners.

Methods: A year long prospective web-based survey was conducted among 201 American and international runners, of which 107 were barefoot and 94 were shod. Participants were between 18-50 years old, running more than 10 miles per week, and had at least 6 months of current running prior to entry. Barefoot runners were also required to run at least 50% of their yearly mileage completely barefoot with the remaining mileage in minimalist shoes. Monthly surveys collected monthly mileage, any running related injury, location of the injury, diagnosis of the injury, and whether the injury was diagnosed by a clinician. Relative proportion of injuries was compared between groups with χ² analysis. Injuries per person and injury rate were compared with an independent t test.

Results: There were 346 running related injuries of which 164 were in shod runners and 182 in barefoot. Of these, MSK injuries were 281 of the 346 (156 shod and 125 barefoot) with 48% clinically diagnosed. The foot was the most commonly injured body part in both groups (43% shod, 41% barefoot). There was no statistically significant difference between relative number of runners reporting MSK injury between groups. There were fewer (p=0.05) MSK injuries per barefoot runner compared to shod (1.17 barefoot, 1.66 shod). However, when normalized for mileage, there was no statistically significant difference in injury rates for the two groups. With regards to clinician diagnosed specific injury location, shod runners had more hip and knee injuries while barefoot runners had more lower leg injuries. Plantar injuries such as cuts, blisters, and bruises were sustained by 30% of barefoot runners but only 6% of shod runners.

Strengths: The authors were able to get a diverse group of shod and barefoot American and international runners. They maintained acceptable compliance of 84% with email and telephone reminders to participants. With this compliance level, the number of study participants was just enough to reach the number needed for adequate power to calculate differences in combined MSK injuries between groups. Body part distribution of injuries was an interesting comparison between groups although the study was not powered to give statistical significance.

Weaknesses: Study groups were not similar, and there were multiple statistically significant differences between self-reported characteristics of the barefoot and shod runners. The barefoot running group was older (p=0.000) by four years, more male dominated (p=0.000), taller (p=0.010) by 1.1 inches, heavier (p=0.000) by 15.6 lbs, running less miles per week (p=0.000) by 13.5 miles, and running slower paces (p=0.000) by a difference of 3 min 34 sec in their 5 km times. Injury severity (e.g. time loss from running) may have provided additional insights as to the difference between barefoot and shod runners. Finally, 63% of the barefoot runners had only begun running barefoot in the preceding 6-12 months.

Conclusion: While anthropometric and performance differences between the study groups limits the conclusiveness of the results, the study suggests fewer overall MSK injuries in barefoot runners compared to shod runners. However, this difference disappears when mileage is taken into consideration. Preliminary data also suggest that incidence and type of injury appear to be different but the study was not powered to assess these potential differences.

Practice Pearl: Possibly due to a recent transition to barefoot running or the experience itself, the barefoot running group in this study ran less mileage and at a slower pace compared to shod runners. While fewer overall injuries occurred in barefoot runners compared to shod runners, this difference may be related to differences in the runners’ mileage as well as pace. Nevertheless, a larger cohort with control of confounding variables such as mileage/week and running pace seems an important next step.

References: