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Introduction

- Running features repetitive, impactful movements resulting in 79% of runners getting injured each year.¹
- Ground reaction forces while running can reach between 2.5-2.8 times a person's body weight and must be dissipated properly to prevent injury.²
- Rearfoot strikers generate a higher impact peak in comparison to forefoot strikers.³
- Running with shorter stride lengths can also reduce the peak vertical ground reaction force.⁵
- It is hypothesized that runners who are barefoot will run with shorter strides and a mid or forefoot strike pattern thus reducing the ground reaction force that must be absorbed by the limbs of the runner.⁶

Research Question

What are the effects of running barefoot on a runner's striking style and stride length?

Methods

Two participants (ages 20 and 21, 1 female 1 male) ran in two conditions:

- While wearing normal running shoes.
- While running barefoot.

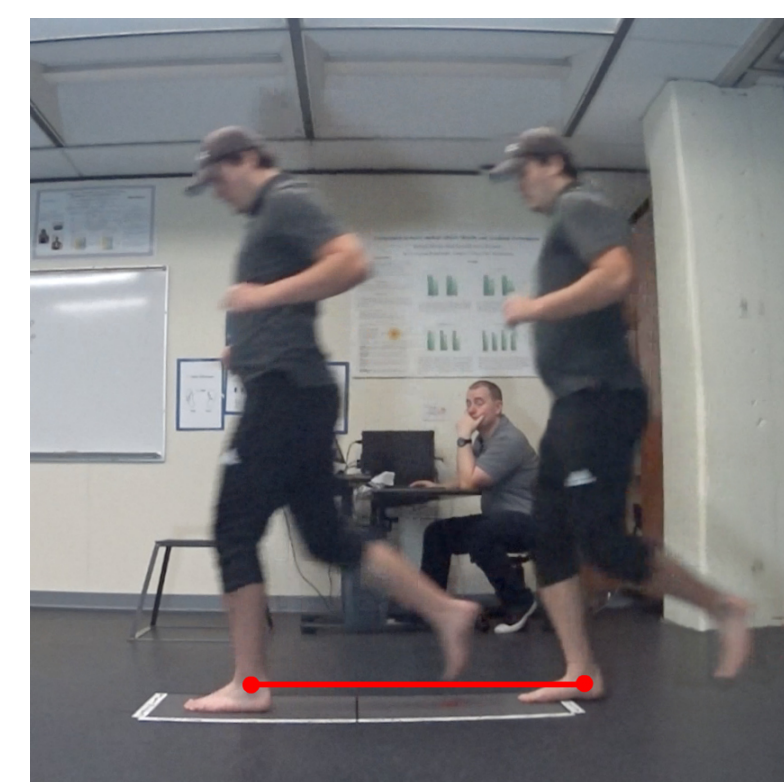
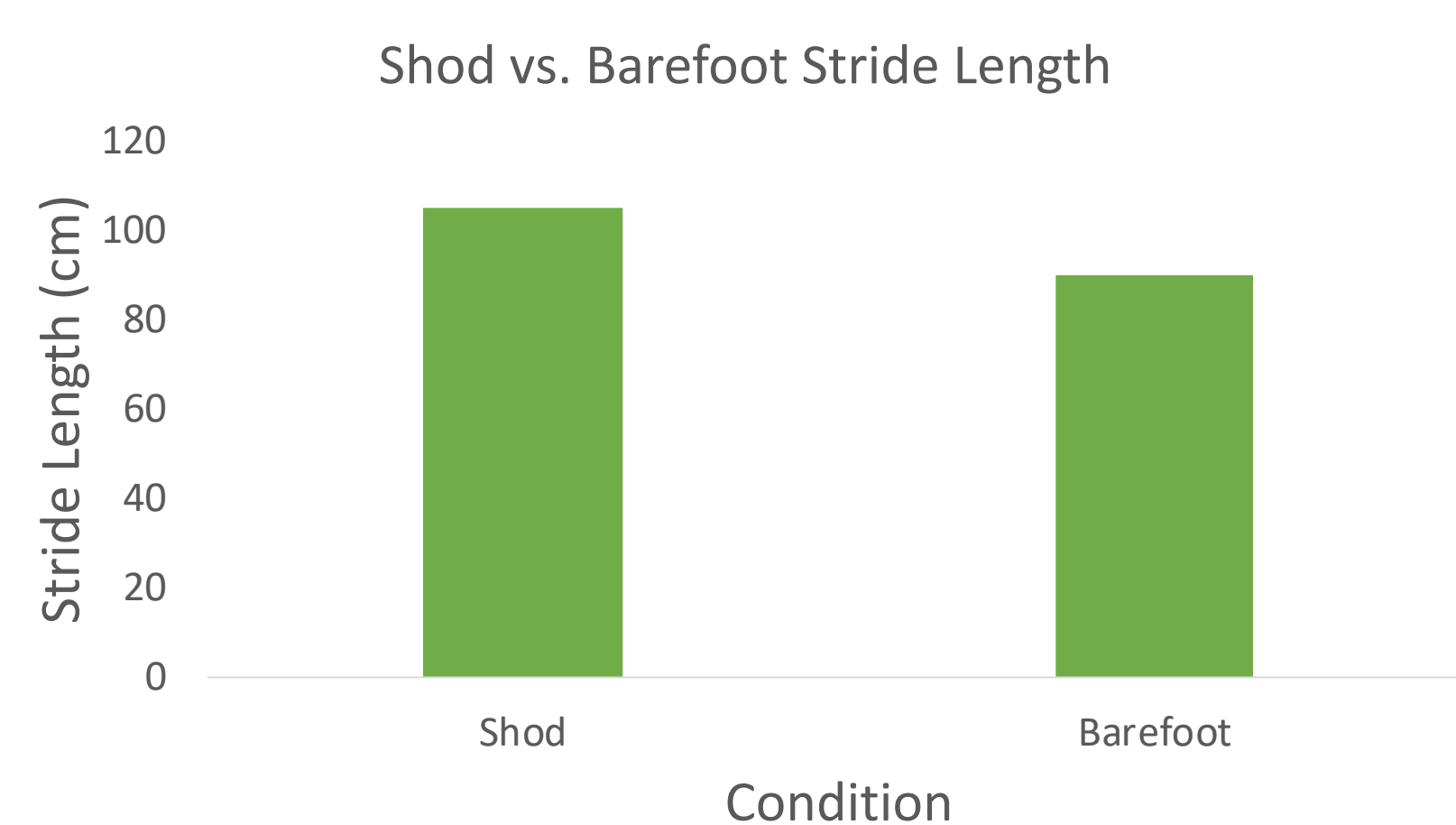
Ground reaction forces were analyzed using a force plate, and striking style and stride length were quantified using video recording.

References

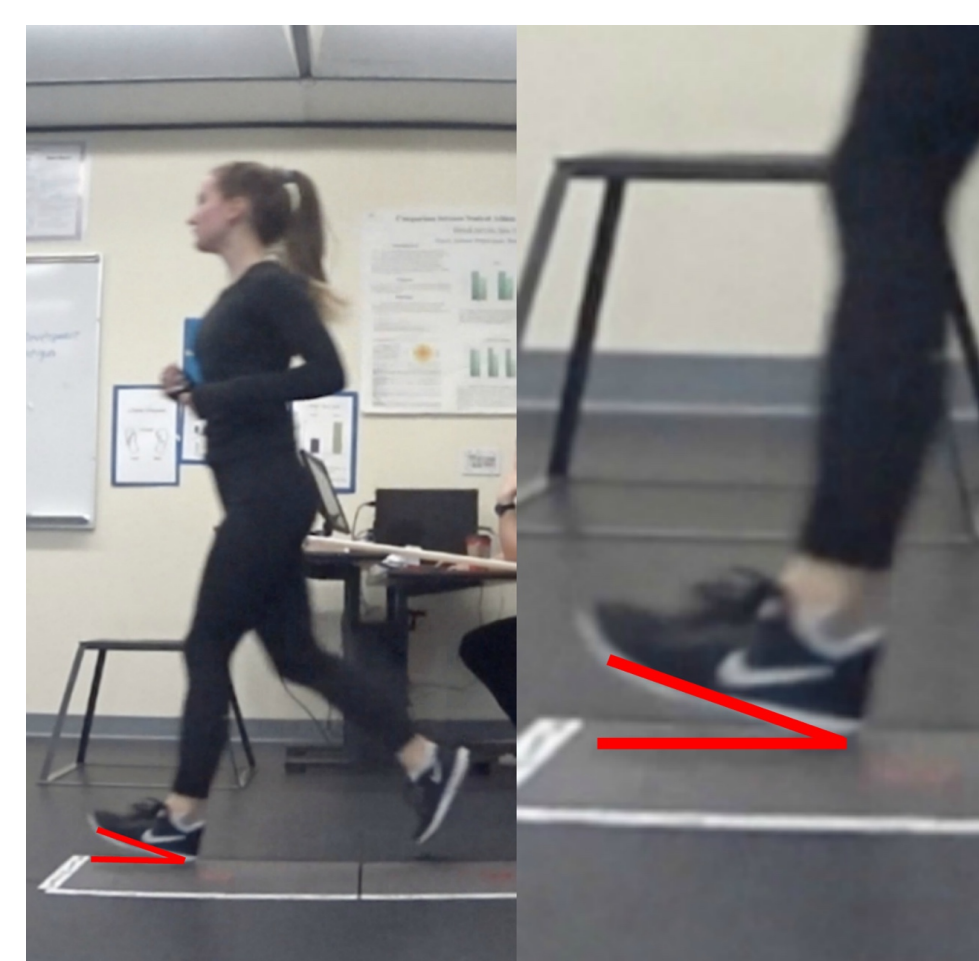
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Results

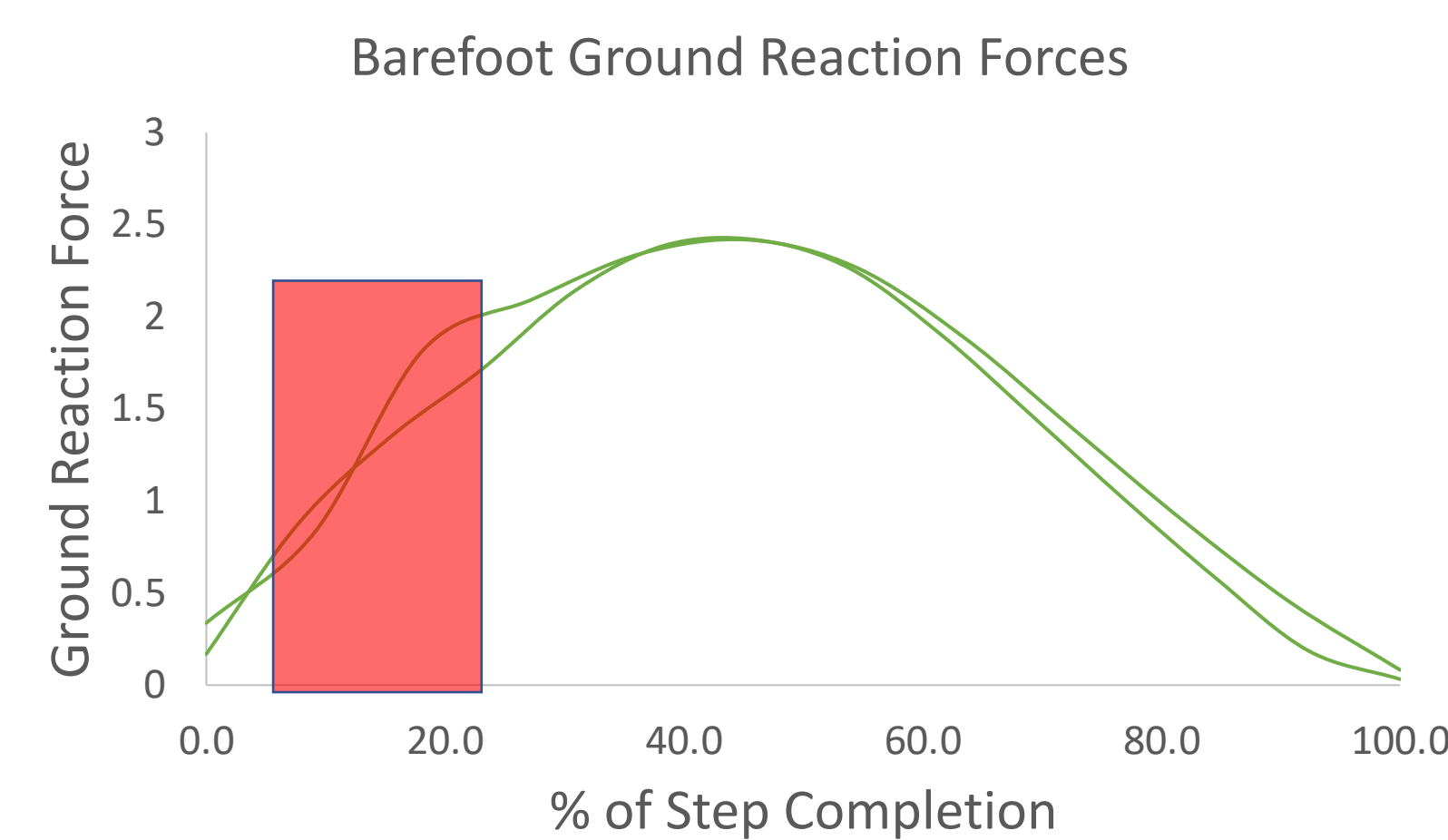
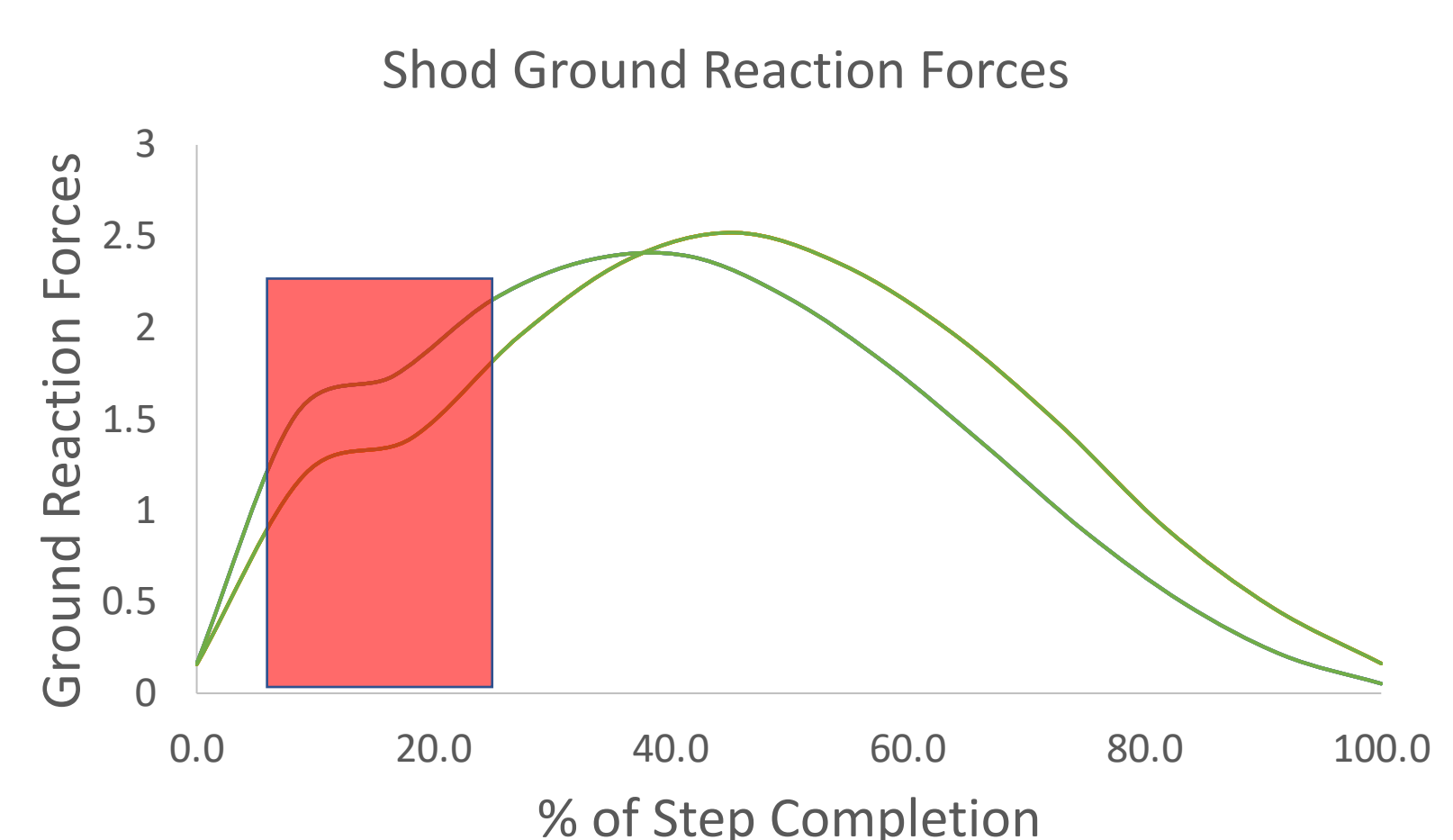
1. Stride Length



2. Striking Style



3. Ground Reaction Forces



What is a Barefoot Running Shoe?



(Vivobarefoot, n.d.)

Heel-to-Toe Drop

A thick heel is common in many conventional running shoes to provide support and cushioning⁴. A large heel-to-toe drop unnaturally elevates the heel and despite a lack of research regarding its influence on lower limb kinematics, it is suggested that it may elicit negative alterations striking pattern⁴.

Shoe Flexibility

Shoe flexibility usually means a lack of stabilization and motion control⁴. Such features allow the foot to move more freely and naturally interact with the environment. It is likely that these qualities would have a positive influence on lower limb kinematics since the foot is able to move more naturally rather than being confined to a specific range of motion.

Light Weight

Shoes that are light in weight will likely place less restrictions on the foot and allow it to move more naturally. A light shoe could be beneficial to running economy since the runner has to lift slightly less weight with each step, and also because the arch of the foot could better compress, allowing greater energy storage and release.

Summary

- Running barefoot resulted in a shorter stride length compared to running with conventional running shoes.
- Running barefoot elicited a forefoot striking style while running in conventional running shoes elicited a rearfoot striking style.
- While running in conventional running shoes, the ground reaction forces suggests a greater braking impulse at initial contact with the ground compared to barefoot running. This impact force should be investigated as a probable cause of overuse injuries commonly seen in runners.

Take Home Message

Running barefoot or in a barefoot shoe has the potential to minimize the magnitude of forces imparted on runner's bodies, and thus reduce their overall risk of overuse injury. Runners should transition to a barefoot shoe or barefoot running safely and gradually.

Start with just a few minutes per run and increase the time spent barefoot as your body gets used to the new running pattern.