Comparing Strides: The Impact of Running Cadence in Zero Drop Shoes

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Introduction

Running in barefoot has been known to increase cadence and decrease stride length compared to running in traditional running shoes (da Silva et al., 2020, p. 231).

Traditional running footwear (drop shoe) have a heel drop which is the difference in height between the heel and toe (heel is higher than toe).

Shoe manufacturers (ex. Altra) have developed zero drop shoes which shows a greater replication to barefoot running by having a wider toe box shape and no drop. The creation of this type of footwear protects the sole of the foot while trying to replicate some of the benefits of bare foot running.

Zero Drop Shoe

Dropped Shoe

Research Question

Can zero-drop shoes replicate the benefits of bare foot running by increasing cadence (steps per minute) and shorten stride length during running?

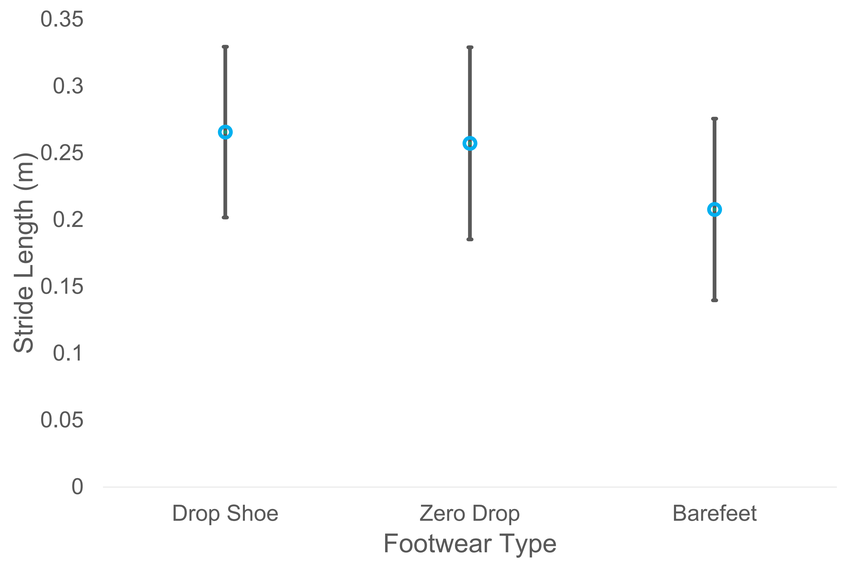
Methods

1. Study received Douglas College Ethics Board approval
2. Six healthy adult runners (19-65 years old) ran twice for 2 minutes in each type of the footwear condition (drop shoe, zero drop shoe and bare feet)
3. To quantify cadence, participants wore Stryd Pod on their shoes (verified by video)
4. Post testing the participants completed a survey asking how running in the different footwear felt throughout trials.

Results

There was a difference between the cadences during different running conditions ($F_{2,10} = 17.9$, $p<0.001$). Running in zero-drop shoes increased cadence (m= 164.6 spm) compared to drop shoes (m =161.5 spm) but not as much as running barefoot (m= 171 spm).

The increase in cadence was not accompanied by a reduction in stride length ($F_{2,10} = 2.87$, $p = 0.057$, $\eta^2=0.14$).

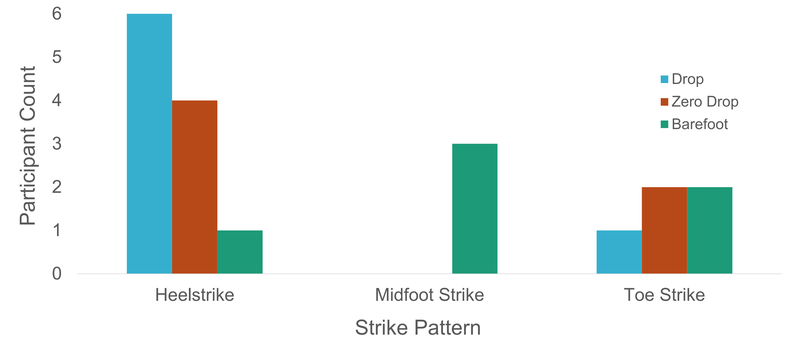


Based on the footwear survey, participants preferred their normal runners (drop shoes) to zero-drop or barefoot running.

Discussion

Running with zero-drop shoes can simulate barefoot running by increasing cadence compared to drop shoes. The stride length showed a trend in reduction, but the statistical power was not big enough to suggest a difference between the groups. Collecting data from a greater number of participants would increase statistical power and allow us to investigate this further.

When running in drop/zero drop shoes, more participants used a heel striking running pattern. In the barefoot condition, most participants adopted a midfoot striking pattern. Therefore, simulating barefoot running requires more than just removing the heel drop of a shoe as shown in the strike patterns.



Note. A graph depicting strike pattern (HS, MF or TS) through 3 variances (dropped runners, zero drop runners and bare feet). Bare feet brings out MF striking the greatest where the other two mainly bring out Heel Striking.

Conclusion

More research needs to be conducted to fully understand ways to simulate barefoot running while wearing shoes for protection.

Reference/ Bibliography

da Silva, C. C., Machado, Á. S., dos Santos, G. R., Schimidt, H. L., Kunzler, M. R., & Carpes, F. P. (2020). Acute responses to barefoot 5 km treadmill running involve changes in landing kinematics and delayed onset muscle soreness. Gait & Posture, 77, 231–235.

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