Reviewer’s report

Title: Differences and mechanisms underpinning a change in the knee flexion moment while running in stability and neutral footwear among young females

Version: 0 Date: 09 Sep 2018

Reviewer: Luke Kelly

Reviewer's report:

Dear Editor

Thank you for the opportunity to review this interesting manuscript, which seeks to determine if shoe support characteristics can influence peak knee flexion moment during running, in healthy adolescent females. The primary finding of the study is that running shoes do influence peak knee flexion moment, when compared to barefoot running. However, there is no difference between high and low support shoes. I found this to be a well-written manuscript that will be of interest to a broad audience. I have a few suggestions that I am sure the authors can address, prior to publication.

General comment

Introduction - I believe the authors need to use the introduction to better develop a rationale for how and why shoe stability features such as dual density midsoles, mid-foot frontal plane torsional stiffness or heel counter stiffness might influence knee flexion moment. If these shoe features were to alter knee mechanics, it seems that this would be in the frontal plane, rather than the sagittal plane. In terms of sagittal plane biomechanics, the most obvious factors of shoe design that would influence knee flexion moment would be the pitch of the shoe and the presence of a thick midsole (stack height). The current literature probably supports this.

Specific comments

Introduction, Line 96-100 - orientation / direction of the GRF vector will also influence the magnitude of the knee flexion moment. This may be an interesting variable to consider.

Methods, Line 167 - Is there a reason that the authors haven't used conventional footwear terminology, such as "stability" and "neutral" shoes? This would certainly be more applicable / understandable for clinicians and the general public.
Methods, Line 172-178 - Were stiffness (heel counter, torsional stiffness, longitudinal stiffness) characteristics measured in each shoe to determine the suitability of classification? If so, it would be useful to present the scores to provide readers with a measure of the structural differences in the shoes.

Methods, Line 185 - Please provide greater detail of the lower limb model. Does increasing knee angle indicate more flexion or extension?

Methods, Line 191 - Basic kinematic data such as stride time, contact time and stride length should be included, in order to provide a reader with an overview of how general running kinematics differed between conditions.

Discussion, Line 290 - "attenuate" may not be an appropriate term here. It is possible to attenuate energy, but you can't attenuate force. I suggest "reduce" is more appropriate in this instance.

Discussion, Line 293 - Is it possible that the presence of a compliant midsole might also be responsible for changes in running biomechanics?

Discussion, Line 325 - As mentioned above, it is unclear why the authors have not included basic spatio-temporal data in this paper. Presumably it would be relatively easy to calculate and include.

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An article of importance in its field

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Please indicate the quality of language in the manuscript:

Acceptable

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