Author's response to reviews

Title: The Effects of Isolated Ankle Strengthening and Functional Balance Training on Strength, Running Mechanics, Postural Control and Injury Prevention in Novice Runners: Design of a Randomized Controlled Trial

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Author's response to reviews: see over
Attached is the following manuscript that I would like to re-submit (MS 5840229881366042) to BMC Musculoskeletal Disorders as a Study Protocol:

**The Effects of Isolated Ankle Strengthening and Functional Balance Training on Strength, Running Mechanics, Postural Control and Injury Prevention in Novice Runners: Design of a Randomized Controlled Trial**

This paper describes the design of a randomized control trial investigating the impact of exercise training on risk factors for running injuries and injury rates in novice runners. The clinical trial is currently being conducted at the University of Calgary. One hundred and twenty novice runners will be tracked for six months to follow running injuries. Additionally, their running mechanics, balance, and strength will be assessed pre- and post-training to determine the influence of exercise training on risk factors for running injuries.

This manuscript was originally submitted to the journal on July 22, 2014, and returned to the authors with reviewer feedback on November 2, 2014. We have provided a point-by-point response to each of the reviewer comments below as requested.

**Reviewer #1:**

This Study Proposal is excellent. Addresses the Hypothesis, It is original and very well written. The Statistics are appropriate. My only concern is they do not detail the running of the comparison groups in terms of frequency per week, length of time of each run, type of run steady state, tempo runs or intervals and intensity of run-% of maximum. Will they use heart rate monitors Study is otherwise excellent.

Unfortunately due to funding limitations, we were unable to provide heart rate monitors or more sophisticated GPS tracking devices to the participants. As a result, we will not have any information regarding the type of run (e.g. tempo, steady state, intervals, % maximum). The weekly questionnaires will gather information regarding the frequency (number of runs per week) as well as the length of time of each run (minutes). This limitation has been noted in the ‘Injury Assessment’ portion of the manuscript. All changes have been highlighted in red.

**Reviewer #2:**

This manuscript outlines a RCT that proposes to examine how two different strengthening protocols can improve strength, augment running mechanics, and alter running injury incidence. The authors have composed a very well written paper outlining an ambitious study that will be highly impactful to the field of running injuries as they attempt to not only examine the preventative effect of their training interventions, but also provide insights into the
mechanisms behind these injury-rate effects. Overall my recommendation is for publication, however, I have a few minor comments for the authors to consider.

**Minor Essential Revisions:**

1. **Hypotheses 2 and 4 could be clarified more if it was stated that isolated ankle strengthening and balance training respectively produce these changes specifically during running.**

   This has been clarified as suggested in the ‘Hypotheses’ section of the manuscript. All changes have been highlighted in red.

2. **Sample size: This is a minor point as they authors have already clarified the injury incidence aspect of the study is exploratory; however, the stated 50% reduction in injury incidence stemming from the intervention seems highly optimistic. Do the authors have evidence to support this potential effect? If not, I would recommend simply omitting the power analysis for this secondary question likely because the actual effect of these training interventions on injury prevention is unknown.**

   A 50% reduction was originally chosen as a value that may have clinical significance. However, we agree with the reviewer and have omitted this power analysis from the manuscript as suggested.

3. **Randomisation: the block size of 120 seems unusually high; in fact a single block encompasses the entire sample. Can the authors clarify why this approach is used?**

   A random allocation scheme in which the entire sample is treated as one block was used for the current study. Since this study is not blinded, this randomization scheme was chosen to avoid selection bias with predictable random assignments using smaller block sizes. This was also chosen to avoid the requirement of a stratified analysis by blocks. This description was added to the ‘Randomization Procedure’ portion of the manuscript. All changes are highlighted in red.

4. **Strength Group: Why have the authors chosen to have the participants only perform isometric exercises in this group (especially since strength is assessed during an isokinetic concentric movement task)? It is also not clear how the Theraband is used in these exercises; does a participant press against a wall with their foot, or against the resistance in the Theraband? A figure would help the reproducibility of this component of the study.**

   The strength group completes two types of exercises: isometric exercises (pushing against a wall or solid object) and theraband exercises, which are dynamic in nature. Participants complete these two types of exercises for four ranges of motion: inversion, eversion, dorsiflexion and plantar flexion. We agree that this may not be clear from the table provided. Pictures have been added to Table 2 as suggested.

All authors concur with the content of the manuscript submitted for publication.

Sincerely,

Jennifer Baltich
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University of Calgary