Author’s response to reviews

Title: Effects of nine weeks isokinetic training on power, golf kinematics, and driver performance in pre-elite golfers.

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Version: 1 Date: 04 Jul 2017

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Response to reviewers, and overview of changes

Reviewer # 1,

General comments
The purpose of this manuscript was to whether isokinetic rotational training could improve driver performance and swing kinematic variables amongst elite golfers. Although the paper may be of interest to the readership of the journal, but it has been written in inappropriate format. For example, the introduction has written very wide and also the methods and results have written in misunderstanding format. I thinks it is not fine for publication with this writing format.

Authors: We have followed the guidelines of the BMC as published on the BMC website. We understand if the inclusion of sex differences might seem to broaden the background in respect to the main purpose, however, this is important background which aid the readers to draw relevant conclusions about our mixed-sex sample. In addition, a previous reviewer for BMC Sports
Science, Medicine & Rehabilitation asked for a more thorough background on this issue specifically.

Reviewer #2
General comments and authors’ responses:
Authors: Thank you very much for your valuable comments on our manuscript. We agree with the comments and changes reviewer 2 suggests and have adjusted the text accordingly as detailed below. We have added new page and line numbers in parentheses after each response.

Methods
Authors: We added “ballistic rotation exercises” to clarify the IT group’s training sessions included ballistic or plyometric exercises such as medicine ball rotational throws and that the IK group replaced this with the isokinetic exercises (Page 09 Line 180-181).

Discussion
Page 17 Line 364 Please include in ( ) the value that lead to classification of "likely"
Authors: We have now added (80-85%) as suggested (Page 17 Line 363).

Page 18 Line 734 Please include in ( ) the value that lead to classification of "probable"
Authors: We have added (85%) as suggested by the reviewer and changed the word probably to the actual classification descriptor “likely” (Page 18 Line 374)

Page 20 Line 415 You mention that another study (16. Fletcher) showed that plyometric training showed similar improvements with respect to carry distance and CHS. Can this indicate that plyometrics might show the same benefits over isotonic (IT) training. I realize this is not a question in your study, but your manuscript raises the question by pointing out the Fletcher findings.
Authors: We realized after another read-through, that Fletcher et al. [16] classification of participants as “good club golfers” (handicap - 5.5) had very little previous experience with strength and plyometric training, which would place them among good recreational golfers
(compared to our population of pre-elite/elite population with handicap +0.4). Thus, we included Fletcher et al. [16] among the studies looking at recreational golfers (Page 20 Line 407). We added “and plyometric training” to the following text “All participants in this study had an extensive background in isotonic strength training and plyometric training, but little to no prior experience of isokinetic training” to clarify that all participants in our study were experienced with both forms of training which is in contrast to the participants in the study by Fletcher et al. [16] who were not experienced in strength or plyometric training (Page 20 Line 416-417). To clarify the comparison of our results for carry distance and CHS with the results from Fletcher et al. [16], we reworded and rearranged the paragraph to the following: “All participants in this study had an extensive background in isotonic strength training and plyometric training, but little to no prior experience of isokinetic training. The isokinetic group increased in carry distance (7.6%), which is change in CHS (1.7%), which is similar to Fletcher et al. [16] results who also found a greater increase in carry distance (4.3%) compared to CHS (1.5%) from weight and plyometric training among good club golfers with very little prior strength and conditioning experience” (Page 20 Line 416-421).

In addition, we added the following clarification as to what is different in our study compared to other strength and conditioning interventions: “We cannot exclude the possibility that the training adaptations seen in our study are in part due to an unaccustomed exercise modality. Nevertheless, we show that isokinetic training elicits additional responses in golfers already well adapted to plyometrics and isotonic training. This is similar to a previous multi-joint isokinetic intervention study in athletes with considerable experience in strength and power training [28]” (Page 20 Line 421-425).

It makes me question you supposition that the IK training was better because of neuromuscular recruitment being maximized through the range as the main benefit if IK, versus the fact that you trained the IK group faster than their self selected speeds, especially eccentrically. Your findings might simply be a training effect of speed of training, which could also be accomplished through plyometrics, which do not require expensive isokinetic equipment to perform.

Authors: We understand if this can be a bit confusing so we will clarify it. In our study, the IK group performed their isokinetic standing rotations at 1m/s concentrically and the isokinetic machine was set to rewind at 4m/s eccentrically. The concentric part of the standing rotation
exercise set at 1m/s was approximately 1/3 of the actual speed measured during the seated rotation test (peak velocity around 3 m/s, table 5), indicating that the concentric isokinetic speed was really slower than their self-selected speed making this a true isokinetic movement. The eccentric part set at 4 m/s was not intended to be an isokinetic movement, but rather 4 m/s was chosen so that the self-selected eccentric speed used by the participants was not limited by the speed the cable is wound back at (instead they still had to “brake” a bit). The eccentric speed used by participants was between approximately 1.3-1.8 m/s (training records, data not shown) and thus well within the maximum eccentric speed of 4 m/s permitted by the isokinetic training machine. Therefore, we agree with the reviewer that the eccentric part of the movement that was self-selected could possibly be the same speed that they would use in a similar plyometric movement, but the concentric part of the movement would be difficult to achieve without isokinetic equipment.

Page 21 Line 432 Change to read "...which permitted the participants to self select experimental group to allow..."
Authors: We made the change as suggested by the reviewer. The text now reads “which permitted the participants to self-select experimental group to allow for” (Page 21 Line 437).

Page 21 Line 434 Variable need to be plural "variables"
Authors: We have now changed to the plural “variables” as suggested by reviewer (Page 21 Line 442).

Page 21 Line 435-436 correct "regimes" to "regimens" and punctuation as follows: "adaptations; for example, the current study...preseason training regimens. Both these variables..."
Authors: We corrected "regimes" to "regimens", made small amendments and corrected punctuation as follows: “adaptations; for example, the current study did not investigate load and intensity of the normal pre-season training regimens. Both these variables are well known to influence strength and” (Page 21 Line 443-444).

Conclusion
Page 22 Line 463 " its effects could translate...at impact" all needs to be deleted. This statement is pure speculation. Simply state what was actually proven. "...did not increase CHS, but did result in greater ball speed..."
Authors: We have now omitted all text in the conclusion not directly proven in our study and added a line about the training history of the participants, as follows:

“Isokinetic training among pre-elite golfers with a history of strength and conditioning training increased rotational power development, SSC characteristics around the shoulder, lead arm peak speed, ball speed, and carry distance more compared to isotonic training. Even though isokinetic training did not increase CHS, it did result in greater carry distance and thus improved driver performance” (Page 22 Line 468-472).

In addition, we have changed the conclusion in the abstract accordingly:

“In the present study on pre-elite golfers we found that nine weeks of isokinetic training increased seated rotational force and power, peak arm speed and arm acceleration, ball speed, and carry distance more compared to isotonic training. Even though isokinetic training did not increase CHS, it did result in greater carry distance” (Page 3 Line 46-49).

Table 3 Please add units to Height and Weight (I would assume CM and KG, but this needs to be in parenthesis after height and weight. Table 3 hcp please spell this out. I do not know what this is a measure of (handicap).
Authors: We added the following units Height (cm) and Weight (kg) to Table 3 as suggested by the reviewer. We made one further correction to Table 3 adding Age (years) in alignment with previous suggestions from reviewer 2. Furthermore, we changed hcp to handicap as suggested by the reviewer (Table 3).