Reviewer's report

Title: Do knee abduction kinematics and kinetics predict future anterior cruciate ligament injury risk? A systematic review and meta-analysis of prospective studies

Version: 1 Date: 06 May 2020

Reviewer's report:

1. AUTHORS RESPONSE
"We are not sure of which demographic variables the reviewer wants us to add in Table 1. We have included year of publication, sample size, number of ACL injuries, age, sex, activity level, sports played, the task used to assess knee abduction, method to assess knee abduction, follow-up period and methodological quality of each individual study. The results of individual studies are commonly not reported in Tables including study characteristics when meta-analysis is applied and the results are reported across all studies [2-4]. We have, however, added Table 2, including the results of the 2 studies that included factors that were not eligible for meta-analysis.


COMMENT: Table 1. missed important details about demographics such as weight, height, and BMI. The authors mentioned, "The results of individual studies are commonly not reported on Tables including studies [2-4]." I strongly disagree with the comment since a main goal of the systematic review is to provide a great overview of previous findings and thus the tables should involve main findings of each study with sufficient details [1-6]. It is very critical for readers to understand the previous studies related to this topic.

2. AUTHORS RESPONSE

"Although 3D motion analysis is considered gold standard in assessing kinematics, this equipment is expensive and time consuming and is not always available in all research, sporting and clinical settings. We wanted to also include measures of knee abduction that may be more likely to be used in the clinics or as a screening measure in the sport setting. We agree that these measures may not assess exactly the same thing, although a systematic review and meta-analysis indicates that visual assessment of knee abduction is valid in both 3D and 2D [5]. We did, however, not find any studies that used visual observation to investigate if knee abduction is a risk factor for ACL injury and consequently no such studies are included in the present review. Most importantly, we did not pool studies using different methods to assess knee abduction (3D, 2D, visual) in our analysis. We do not think that including both 2D and 3D measures of knee abduction is a flaw of this review but rather a strength as this reflects current literature. Also, since we did not pool 2D and 3D measures and all results point in the same direction, i.e., knee abduction (assessed both with 2D and 3D) is not related to ACL injury, we do not believe that excluding 2D analysis from this review would make any difference for the result. 5. Nae J, Creaby MW, Cronstrom A, Ageberg E: Measurement properties of visual rating of postural orientation errors of the lower extremity - A systematic review and meta-analysis. Phys Ther Sport 2017, 27:52-64."

COMMENT: Although the different measures (2D and 3D) were not used to pool data, the authors did interpret the results of different measures for the same aspect of the risk of ACL injury, which came from the assumption that these methods would not result in any differences in injury mechanisms. Thus, this study is not inconclusive due to the heterogeneous variables.

3. The author mentioned,

"We do believe that including longitudinal, prospective studies is a strength of this review, compared to also including cross-sectional studies where a more even distribution would be possible, but no causal relationship could be reported. As the reviewer points out, some of the individual studies report a small number of ACL injuries, but by pooling the studies this number rise to up to 72 in the separate analysis which may be compared to the 9 ACL injuries reported in the study by Hewett et.al that gave rise to the thesis that knee abduction was a major risk factor for ACL injury."

COMMENT: I understand that involved studies are valuable and followed participants for the potential ACL injuries, and thus it might be inevitable to have unbalanced samples. However, I don't think it is not a reason for pooling data to get better generalizability. First, the author insisted that an increase in the post-ACL subjects by pooling data is a strength of this study. However, I don't think merely increasing samples could strengthen the current study. Thorlund et al [7] have warned that if meta-analyses are performed too early, before enough studies are available, there is a danger that incorrect conclusions may be drawn. Thus, it is recommended that we be careful
when interpreting the results from underpowered meta-analysis, and thus extremely underpowered meta-analysis should not be performed. Also, I found critical errors in the results of I2. For example, the I2 value for Figure 3 (peak knee abduction moment) was wrong as compared to my calculation (I2 = about 90%, extremely heterogeneous). The I2 cannot be.

Are the methods appropriate and well described?
If not, please specify what is required in your comments to the authors.

No

Does the work include the necessary controls?
If not, please specify which controls are required in your comments to the authors.

Yes

Are the conclusions drawn adequately supported by the data shown?
If not, please explain in your comments to the authors.

No

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If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I am able to assess the statistics

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