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: 17 Apr 2020

Reviewer: Nathan Schilaty

Reviewer's report:

I commend the authors on their revisions to address the concerns of the reviewers. They have done a thorough job to address the reviewers concerns, especially with this complex issue that is being summarized. The manuscript is much improved. It is a controversial topic that many are attempting to address from multiple research methodologies.

However, prior to publication, I would strongly recommend a couple clarifications to the manuscript at Lines 274 - 279:

- It is stated (and cited) that greater knee abduction angle is significantly greater 2 years after injury compared to baseline. I agree that it may be an increase risk for second injury, but I think it is important to state that the same potential 'lack' of motor control that existed with the primary injury is likely to persist and cause further risk for secondary injury.

Thus, what was an injury threshold initially, may be an even more pronounced threshold later as the motor control has not been adequately addressed.

- Further, a recent systematic review is cited [57] about bone bruising from MRI imaging to support a non-valgus positioning at the time of ACL injury. I somewhat disagree with the conclusions of this study and these details should be considered in the Discussion. Review of the data reported in this meta-analysis demonstrates that 66% (471/713) of the bruising occurred on the lateral tibial compartment and 72% (266/371) on the lateral femoral compartment. Clearly, if the majority of bruising is on the lateral compartment, this would indicate a prevalence of valgus position of the knee at impact with a force strong enough to cause bone bruising. If the valgus occurred after the ACL ruptured, the force would likely not be strong enough to bruise the bone with the knee 'buckling' into valgus afterward.

As I have mentioned earlier (and as is demonstrated in recent cadaveric studies), higher levels of ACL strain (and thus higher likelihood of ACL rupture) occur with both internal rotation and abduction of the tibia. These combined motions would account for the bone bruises on the lateral compartments and with shifts in the 'antero-posterior' aspects of the compartments demonstrated in the data. Once again, not all non-contact injuries are the same. Some will occur with hyperextension of the knee. Some will occur with internal rotation. Some will occur with knee abduction. Most will be multifactorial. However, there is a plethora of objective data that
continues to point to a few key kinetics / kinematics that account for the majority of these injuries (thus, risk factors). These risk factors include: knee abduction, internal rotation, and lower knee flexion.

Thus, even though this citation concludes that the knee abduction occurs after the ACL rupture event, I would argue that the data clearly demonstrates that a knee abduction IS present at the time of ACL rupture.

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

Yes

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?  
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Yes

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