Manuscript ID: 60212

Title: Effect of Suspension Training on Neuromuscular Function, Postural Control and Knee Kinematics in Anterior Cruciate Ligament Reconstruction Patients

Response to Reviewers' comments

Dear editor,

We are grateful to you for your careful consideration of our manuscript, for your time and effort. We have taken all of the comments into consideration and have revised our manuscript accordingly. We include a point-by-point response below. The changes in the manuscript are in red font. Please do not hesitate to contact us with other questions or concerns regarding the manuscript. Once again, we would like to thank you for your comments and suggestions.

Best regards,

Gang Liu

Reviewer #1:

Specific Comments to Authors: Author concluded that suspension training was an effective rehabilitation strategy for ACLR patients before they back to play. I agree to author's opinion. According to Figure 4A, from percent change of the scaled peak torque at pre to post training, SET group is much higher compared to Control in injured leg. But there is no difference between SET and Control in non-injured leg. I ask some questions to author.

1. Please tell me the reason why SET group is much higher compared to Control in injured leg. But there is no difference between SET and Control in non-injured leg from the percent change of the scaled peak torque at pre to post training in Figure 4A.

Reply:

We feel grateful to your constructive comments. There were no differences in the increased percentage of the uninjured knee between the SET group and the control group. We speculate that this is due to several possible reasons. Long-time knee immobilization affected the injured joint activities, exacerbating muscle atrophy of quadriceps and hamstring. On the contrary, the uninjured knee movement is not restricted, while the dysfunction of the injured side leads to compensation on the uninjured side. The muscular atrophy of the uninjured leg was not significant after the injury. After six-week training, the change of uninjured knee was small that larger sample size studies are needed to detect their changes. At the same time, the suspension training program in this study focused on the injured leg, and the suspension training scheme was not only designed to improve muscle strength, but also to enhance balance ability and motor ability. Although there was no statistical difference was found in the change of the increased percentage in the uninjured leg, the symmetry of bilateral muscle force was improved.

2. According to table 3, there is no difference between pre and post in SET and Control from the point of gait biomechanics. Please tell me the reason why there is no difference between pre and post in SET and Control from the point of gait biomechanics.

Reply:

We feel grateful to your constructive comments. In this study, the relative motion of tibial femur joint was analyzed to reflect the kinematic changes of the injured knee. The relative motion of the knee joint on the coronal plane mainly reflects the varus and valgus of the joint. Moderate rotation of tibia occurs during a normal gait cycle. The function of the medial and lateral collateral ligaments is very important for maintaining lateral stability of the knee joint, and none of the ACLR patients included in this study had a history of medial and lateral ligament injury. Both before and after the training, the patients had a good ability to control the knee valgus and valgus at a slow speed, which may also be one of the reasons why there was no significant difference in the internal-external relative translation of the uninjured leg between groups. In the sagittal plane, anterior-posterior and proximal-distal relative translation were mainly affected by soft tissue and muscle around the knee. After training, not only the isokinetic muscle strength of the injured quadriceps and hamstrings were

improved, but also the balance of power between the agonist and antagonist muscles was enhanced, which avoided the kinematic changes in the sagittal plane of the knee joint due to the imbalance of the strength of the front and back muscles of the knee joint. It is known that factors affecting the motor function of the lower limbs include the coordinated movement of multiple joints and muscles, so changes in the hip and ankle joints will also affect the walking pattern. We intend to design a long-term suspension training program in the future and explore its impact on the biomechanical changes of the hip and ankle joints of ACLR patients.

Reviewer #2:

Specific Comments to Authors: This is an interesting study that aimed to investigate the effect of suspension training on the neuromuscular function, postural control and knee kinematics of patients after anterior cruciate ligament reconstruction surgery. In general, the manuscript is well written and quality of English language is adequate. Please check for typo errors (i.e. in the Abstract, “traditional”) The Methods section is clear and well described. Tables and figures are detailed and helpful for the reader. I would include further discussion in the conclusion paragraph on the future direction and possible application of the results.

Reply:

We feel grateful to your constructive comments. We have carefully checked the manuscript again and modified the text to avoid typo errors. We have added further discussion in the discussion and conclusion paragraph on the future direction and possible application of the results.

Editorial Office’s comments:

(1) I found the authors mentioned funding in the author contributions section. Please confirm if the study was financially supported. If yes, please upload the approved grant application form(s) or funding agency copy of any approval document(s). If no, please delete relevant information from the manuscript.

Reply:

Thank you for your helpful suggestion. We confirm that the study received no financial support, and we have deleted relevant information from the manuscript.

(2) I found the authors did not provide the original figures. Please provide the original figure documents. Please prepare and arrange the figures using PowerPoint to ensure that all graphs or arrows or text portions can be reprocessed by the editor.

Reply:

Thank you for your helpful suggestion. The original figure documents have been provided using PowerPoint.

(3) I found the authors did not add the PMID and DOI in the reference list. Please provide the PubMed numbers and DOI citation numbers to the reference list and list all authors of the references. Please revise throughout

Reply:

Thank you for your helpful suggestion. We have added the PMID and DOI in the reference list.

(4) I found the authors did not write the “article highlight” section. Please write the “article highlights” section at the end of the main text.

Reply:

Thank you for your helpful suggestion. We have added the “article highlights” section at the end of the main text.

(5) the author should number the references in Arabic numerals according to the citation order in the text. The reference numbers will be superscripted in square brackets at the end of the sentence with the citation content or after the cited author’s name, with no spaces

Reply:

Thank you for your helpful suggestion. We have carefully checked the reference in accordance with the guidelines for authors of the journal.

(6) please don’t include any *, #, †, §, ‡, ¥, @….in your manuscript; Please use superscript numbers for illustration; and for statistical significance, please use superscript letters. Statistical significance is expressed as $aP < 0.05$, $bP < 0.01$ ($P > 0.05$ usually does not need to be denoted). If there are other series of P values, $cP < 0.05$ and $dP < 0.01$ are used, and a third series of P values is expressed as $eP < 0.05$ and $fP < 0.01$

Reply:

Thank you for your helpful suggestion. We have carefully checked special symbols in accordance with the guidelines for authors of the journal.

(7) please provide an audio core tip file where the core tip content is recorded.

Reply:

Thank you for your helpful suggestion. We have provided the audio core tip file.

(8) please provide the signed Conflict-of-Interest Disclosure Form and Copyright License Agreement. 6 Re-Review: Required. 7 Recommendation: Conditionally accepted.

Reply:

Thank you for your helpful suggestion. We have provided the signed Conflict-of-Interest Disclosure Form and Copyright License Agreement.

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Response to editor's comments

Dear editor,

We are grateful to you for your careful consideration of our manuscript, for your time and effort. We include a point-by-point response below:

Comment 1:

Please answer whether all the figures are original by you? (1) If an author of a submission is re-using a figure or figures published elsewhere, or that is copyrighted, the author must provide documentation that the previous publisher or copyright holder has given permission for the figure to be re-published; and correctly indicating the reference source and copyrights. (2) If all the figures are your original figures, please see the comment 2.

Reply:

We feel grateful to your constructive comments. We confirm that all the figures are our original figures.

Comment 2:

Please provide the decomposable figure of figures, whose parts are all movable and editable, organize them into a PowerPoint file, and submit as “Manuscript No. -Figures.ppt” on the system, we need to edit the words in the figures. All submitted figures, including the text contained within the figures, must be editable. Please provide the text in your figure(s) in text boxes (see Figure-samples).

Reply:

We feel grateful to your constructive comments. We have uploaded a PowerPoint file to provide the decomposable figure of figures.

Comment 3:

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Reply:

We feel grateful to your constructive comments. We confirm that the copyright license agreement is signed by all the authors themselves and we have uploaded copyright license agreement.

Please do not hesitate to contact us with other questions or concerns regarding the manuscript. Once again, we would like to thank you for your careful guidance of this article.

Best regards,

Gang Liu