Author's response to reviews

Title: Anterior cruciate ligament reconstruction using quadriceps tendon autograft for adolescents with open physes - a technical note

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Author's response to reviews: see over
Resubmission “Anterior cruciate ligament reconstruction using quadriceps tendon autograft for adolescents with open physes- a technical note”

Dear Prof. Takeshi Muneta,

thank you very much for giving us the chance to resubmit a corrected new version of our manuscript “Anterior cruciate ligament reconstruction using quadriceps tendon autograft for adolescents with open physes- a technical note” from the Kantonsspital Bruderholz, Switzerland by Mauch, Arnold, Wirries, Mayer, Friederich and Hirschmann.

We have made the following extensive changes to the manuscript, which can be seen in the response to reviewers comments section.

The final manuscript has been seen and approved by all authors and they have taken due care to ensure the integrity of the work. We declare that all authors have contributed to the paper and are familiar with the contents of the final draft. We hereby affirm that the submitted manuscript is our original work, has not been published or is being considered for publication elsewhere. Looking forward to hearing from you, yours sincerely,

Michael Hirschmann, MD
Response to reviewers comments:

Thank you very much for your valuable comments and helpful feedback on our manuscript. In the following we aim to address your comments line by line to facilitate the further review process.

Reviewers’ comments:

Reviewer #1:
Authors attempted to introduce their technique of a transphyseal ACL reconstruction using quadriceps tendon-bone autograft in children and adolescents with open growth plates, and to report our early results in terms of postoperative growth disturbances. They concluded that this technique did not lead to significant growth disturbances with one exception. Most of the manuscript was well documented and the methodological flow was well conducted. However, some explanations are needed in detail. Author’s purpose might be the introduction of their technique and its good result, but only insufficient data was stated in the manuscript. Therefore, I believe that the study needs a minor revision before it can be accepted for publication.

Specific comments:
Authors should add continuous line numbering and page numbers in the manuscript.
Done as suggested.

We could not find the quotations for Figure 1-4.
Added as suggested.

Authors should make the manuscript the same font.
Done as suggested.

Abstract
It should be structured to include the following headings: Background, Purpose, Methods, Results, and Conclusions.
Information added as suggested.

Page 2, Line 14-15
Screw removal is no relation to the results. Delete this sentence.
Delete as suggested.

Page 2, Line 18-20
This sentence is not appropriate in conclusion paragraph.
The conclusion in the abstract and in the end of the text need to be the same.
*Changed as suggested.*

Introduction
The methodological flow of this paragraph was almost good. Paragraph was not structured.
Authors should arrange the paragraph. The title of this paragraph must change to
‘Background’
*Done as suggested.*

Material and methods
Surgical technique was well documented. How was the clinical result of ACL reconstruction,
such as the IKDC scores, the Lysholm scores or the side-to-side differences of the KT-1000
measurements? We could not accept your good clinical results without any clinical scores.
*As described above, it was not the purpose of this paper to describe the clinical results of the
patients after the described reconstruction technique. The intention of the authors was to
report and describe a new technique of transphyseal ACL reconstruction in patients with
open growth plates. A secondary purpose was to review the patients for clinically significant
growth disturbances*

Furthermore, how define the good alignment? Authors should state the knee alignment
results such as FTA or Mikuliczt line at the final follow up.
*We did not report good alignment, but significant, meaning excessive growth disturbances in
terms of varus/valgus or flexion/extension deformity. The alignment was assessed on
conventional long leg radiographs. We entirely agree that it would be desirable to report
alignment values, but the main purpose is to describe the technique in detail. Hence major
adverse events are highlighted.*

Was the study approved by the local ethics committee? Was there informed consent of the
patients? *The study was approved by the institutional review board. Yes.*

Authors stated the femoral bone tunnel position. How did you define the anatomical tunnel
position? Authors also mentioned the tunnel position as ‘slightly different position than in
adults’ in Page5 Line 23. How did you confirm the tunnel position intra or after operation?
The femoral position is found under standard arthroscopic view with the knee in 70 degrees
of flexion usind the high anterolateral portal. A groove is established just posterior to the
resident ridge in the 2 / 11 o`clock position, a posterior wall of at least 3mm should remain. in adults we go 1-2mm further posterior.

Page 6, Line 11-12.
I could not understand ‘the surgeon’s index finger of the 2nd hand on the lateral cortex of the femur’. Please describe more in detail.
With one hand the surgeon holds the drilling machine, the index finger of the second hand is placed as aiming point on the proximal femur. Then the retrograde drilling of the K-wire and tunnel is performed.

Page 6, Line 15-19.
How did authors define the tibial bone tunnel position? Please mention this.

Page 6, Line 21-22.
How was the applied force to the graft when the post screw fixation for tibia?
The force at time of fixation was applied manually by pulling at the graft. However, using quadriceps tendon as autograft one could not expect any graft elongation such as commonly seen in hamstring grafts.

Page 7, Line 9-16.
How was the concomitant ligament, meniscus, or articular cartilage injury?
Authors should mention this.
Information was added as suggested.

Results
The purpose of this study was to describe the technique and its early results.
Authors should explain more about the clinical results or X-ray measurements. I could not agree with your good results without any patient data.
See above.

Page 7 “Follow-up” paragraph
Are there any combined surgery, such as meniscal tear, other ligament injury, or cartilage injury.
Information was added as suggested.

Page 7 “Results” paragraph
How good were the primary reconstructions? Authors should show the clinical results of final follow-up period (Lachman test, Pivot shift, Knee measurement, etc.).

As described above, it was not the purpose of this paper to describe the clinical results of the patients after the described reconstruction technique. The intention of the authors was to report and describe a new technique of transphyseal ACL reconstruction in patients with open growth plates. A secondary purpose was to review the patients for clinically significant growth disturbances.

Page 7 “Results” paragraph Five cases revision: 10% revision rate is pretty higher than the previous report of adult ACL reconstruction. The concern is the recurrent instability of open epiphyseal ACL reconstruction. If authors mentioned revision ACL reconstructions were needed due to new trauma, they should describe the final results of primary reconstruction before another trauma, activity level of those patients, duration between primary reconstruction and revision surgery and any combined injury at the revision surgery.

We clarified that ACL re-reconstruction were necessary due to new trauma, The revision rate of 10% in children and adolescents is comparable to others such as Cohen et al. (Arthroscopy. 2009 Aug;25(8):831-8. Transphyseal anterior cruciate ligament reconstruction in patients with open physes. Cohen M, Ferretti M, Quarteiro M, Marcondes FB, de Hollanda JP, Amaro JT, Abdalla RJ. Orthopedic Sports Medicine Division, Department of Orthopaedic Surgery and Traumatology, Universidade Federal de São Paulo-Escola Paulista de Medicina, São Paulo, Brazil.)

Page 7 “Results” paragraph
A case of growth disturbance in a girl that was aged 10.5 years: “The recovery was uneventful and the patient was pain free at last follow-up 12 months after revision surgery.”

Was patient return to sports? How was she reconstructed ACL?

The information was added as suggested. The patient had an osteotomy as revision surgery. The primary ACL surgery was performed as described in detail.

Page 7, Line 18.
Authors should explain ‘a sufficient clinical and radiological follow-up’ in detail. I could not accept the good results without any clinical scores or radiological measurements.
Generally I would agree with your statement, but the main purpose of the paper was to describe the ACL reconstruction technique. We did not state good results in terms of clinical and radiological outcome, as we have not assessed it using scores. Sufficient clinical and radiological follow-up was changed to „full...“.

Page 8, Line 2-3.
If you emphasize this case, please explain more in detail. Authors should show the X-ray at the final follow-up.
Done as suggested.

Page 8, Line 5.
Authors should state the period of ACL graft failure in consideration. Five cases of re-injury were explained in next sentence.
Information added as suggested.

Page 8 Line 7-8.
Screw removal is no relation to the results. Delete this sentence.
Done as suggested.

Discussion
Authors should state the limitation with this study. A statement regarding the clinical scores or X-ray measurement is needed.
Added as suggested as limitations of the manuscript.

Page 9, Line 15-23.
This paragraph explained about why authors chose the QT. It was not appropriate in the discussion, because authors did not investigate the graft selection in this study. Authors should mention this in introduction.
We believe that the potential benefits and disadvantages of the described technique have to be discussed as this is a technical note. The use of a quadriceps tendon autograft is an essential part of the described technique. Hence, we would like to leave this paragraph in the discussion part.

Conclusion
The conclusion in the abstract and in the end of the text is needed to be the same. This paragraph does not reflect the hypothesis. Rewrite this paragraph based on your results.
Done as suggested.
Page10, Line 12
Please state the details of ‘surgical key factors’ briefly.

*The surgical key factors are newly emphasized and highlighted in the material and methods section of the manuscript.*

Page10, Line 13
What was the ‘significant’? This manuscript did not mention the significant data.

* Changed to „clinically significant“.

Page 10, Line 13-15
This sentence is not appropriate in conclusion paragraph. Authors should explain in discussion.

*See above. Deleted.*

Figures and Figure legends
Too less explanation was stated in figure legends. Please explain more in detail.

*More explanation is added.*

Authors should add the photograph of the QT graft. Authors should add the photograph of the tunnel creation, graft harvest or graft fixation, if you introduce new technique.

*The image section was changed and images were added.*

Figure 1 and Figure 2
These figures are not needed. Authors should state the source of these technique.

*We believe that the figures are of interest to the readership as these demonstrate the difference of the existing different techniques. Hence, we would like to leave these in the manuscript.*

Figure 3 Authors should explain more in detail, especially in bone tunnel position, or the relation with physis.

*See above. Additional information added.*

Figure 4 Figure 4-A was too large magnification. Please change to the whole intraarticular view in order to check the femoral bone tunnel position.
We believe that the magnification of this image is necessary to identify the physis within the image. The femoral tunnel position is better visualized on the schematic drawing.

Figure 4-C is not needed Authors should add the intra-articular view which can confirm the femoral and tibial bone tunnel position.
The image was deleted. See above.

Figure 5 Authors should state the X-ray measurement data with valgus deformity. Please add the X-ray after osteotomy, if you emphasize this case.
See above.

Reviewer #2:
Reviewer’s report
General comment
The present study intends to describe the surgical technique of their transphyseal ACL reconstruction using quadriceps tendon autograft in children and adolescents with open growth plates, and to report their early results of the surgical technique. The authors concluded that their ACL reconstruction technique represents a promising alternative to previously described procedures. In addition, the paper includes a case of growth disturbance after the surgery. The patient developed a progressive valgus-flexion deformity. A lot of controversy still exists about the surgical techniques for children and adolescents with open growth plates to minimize the risk of growth disturbance. In my opinion, the paper contains some interesting aspects. I think that the paper would be of interest to the general readership of SMARTT. However, the paper needs some revision work before it can be published.

Specific comments
1. Minor Essential Revisions
Introduction: Figures should always be cited in text in consecutive numerical order. Figures 1-4 are missing in the text.
Done as suggested.

2. Minor Essential Revisions
Methods, 6th paragraph: Abbreviations should be defined at first mention and used consistently thereafter (the AM tunnel).
Deleted and the manuscript was rechecked.

3. Major Compulsory Revisions
Results: The reviewer is well aware that one of the purposes of this study was to investigate their early results “in terms of postoperative growth disturbances”. However, some subjective and/or objective evaluation of the knee after surgery should be included in order to conclude that their ACL reconstruction technique represents “a promising alternative to previously described procedures”.

As described above, it was not the purpose of this paper to describe the clinical results of the patients after the described reconstruction technique. The intention of the authors was to report and describe a new technique of transphyseal ACL reconstruction in patients with open growth plates. A secondary purpose was to review the patients for clinically significant growth disturbances. We changed the conclusion and deleted the word „promising“.

4. Major Compulsory Revisions
Discussion: It may be desirable to discuss the case of growth disturbance after the surgery. I'd like to know why the autograft bone block was placed within the femoral posterolateral epiphyseal plate in that case, and how to prevent the malplacement of the bone block.

Done as suggested.

5. Minor Essential Revisions
References: References should be formatted according to the SMARTT reference style.

I have checked the references again, but could not find any difference to the SMARTT reference style.

6. Discretionary Revisions
Figure 3: I think that the femoral tunnel position in Figure 3 is a little bit higher although the authors described that the femoral tunnel position is 9:30 in the right knee and 2:30 in the left knee.

I entirely agree and hence the figure was changed accordingly.