Reviewer’s report

**Title:** Are changes in radiological leg alignment and femoral parameters after total hip replacement responsible for joint loading during gait?

**Version:** 0  **Date:** 24 Jul 2019

**Reviewer:** David Lunn

**Reviewer's report:**

Thank you for the opportunity to review this paper. The paper aims to understand the effects of total hip replacement on joint moments during gait, specifically trying to determine if leg alignment and joint orientation plays a role in any postoperative changes. The paper presents some interesting findings regarding leg alignment changes and gait differences from pre to post-op in THR patients. However there are a number of issues which need clarifying and areas where more information is required. Some general points are listed below with more detailed queries listed successively.

**General points-**

There is no mention about how the gait data was modelled, for example how was the hip joint centre determined? Modelling of the skeleton during gait analysis can have large impacts on both the kinematics and kinetics. Through the EOS scans it should be possible to include patient specific hip joint centres to a certain degree of accuracy. Can this be included in the modelling if not already done so?

Was there a reason why only stance phase was considered for the kinematics? Considering the largest range of movement is seen in the swing phase for the knee this would be an important phase to study and should be included. This is understandable for kinetics but not so much for kinematic analysis.

**Discussion-** The main findings aren't restated at the beginning of the discussion which loses the impact of the main findings.

The discussion is overstating the findings. Few gait differences were observed however the discussion reads as though there is evidence of differences which were caused by changes in alignment, which from the results isn't apparent.
Specific point-

Line 91 and 92- "Leg alignment"- which variable be more specific.

Line 100- Was the same implant used? Implants can have an effect on the alignment and each implant can have a different templating procedure which might influence overall leg alignment. This information should be included to ensure it is either controlled for or highlighted as a limitation.

106- Was pain assessed as part of the exclusion criteria?

Line 113- Why was this comparison to healthy group necessary. Change from pre-op is more important as it is patient specific change. The cohort used seems to be from an entirely different population and comparisons between the two groups does not add anything to the results.

Line 148- I am not sure this processing is correct. It would be more reliable to calculate the peak of each trial and average the peak, rather than a peak of an averaged trial. Can this way of averaging be justified?

Line 171- delete the additional )

Line 320- "again" suggests that medial OA has been previously discussed, which it hasn't.

Line 370- This isn't correct the contralateral limb shouldn't be classed as healthy limb. Irrelevant of how close it is to healthy data it will be compensating for the operated limb in some way.

Line 393- Why was leg length not measured? This should have been included as an exclusion/inclusion criteria.

Table 2- Why compare to healthy controls? They are not a patient group I am not sure what this adds to this part the story. Justification needs to be included about why they are being compared.

Table 3- "Hip ROM" is this sagittal?

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

Are you able to assess any statistics in the manuscript or would you recommend an additional statistical review?
If an additional statistical review is recommended, please specify what aspects require further assessment in your comments to the editors.

I recommend additional statistical review

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