Author’s response to reviews

Title: Degeneration of three or more lumbar discs significantly decreases lumbar spine/hip ROM ratio during position change from standing to sitting in AVN patients before THA

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Author’s response to reviews:

Dear reviewers,

Thank you for your feedback on our paper. We have revised the manuscript according to your comments. Our responses to your comments are listed below.

Reviewer reports:

Jeffrey Alent, D.O. (Reviewer 1): Three or More Lumbar discs degeneration significantly decreases lumbar spine/hip ROM ratio in AVN patients before THA from standing to sitting

1. In abstract, error - LLD incorrectly stated instead of LDD

2. Page 4, grammar error "zone in literature for acetabular component. Kummmer" - change to pleural "zones"

3. Page 10 : "Human body maintains the sagittal". Should read "The human body" - grammar error

4. Page 10 : Pelvis acts as a linkage... Should read "The pelvis" - grammar error

5. Overall good article, data is collected well and detailed well. Be sure to emphasize the certain changes increase the risk for posterior dislocations based off various studies (but note your study does not necessarily look at the rate of posterior dislocations).

-Overall a well done study
To Jeffrey Alent, D.O. (Reviewer 1)
&gt;Answers to 1-4: These errors have been corrected accordingly.
&gt;Answer to 5: limitation of lumbar spine movement was associated with increased risks of post-operative dislocation and revision, which was emphasized in discussion ( in Discussion ,line 238).
Polly Lama (Reviewer 2): I enjoyed reading your paper, and I understood the concept and data very clearly. Few points for improvement;

- Please compare your data with other studies especially from physiotherapy studies, as clearly your data is of some benefit for rehabilitative studies.

- Please provide more details on the control group...why were they going for radiation? - Please include figure of controls & patients with measurements

To Polly Lama (Reviewer 2)

1. We compared our results with past literature in the Discussion. Patients with stiff lumbar spine flexion are easily identified when there is a clear history of spine fusion. Multiple lumbar disc degeneration may have a similar impact on spinopelvic motion, and this requires attention from arthroplasty surgeons. There is limited research focusing on the effects of lumbar spine stiffness on hip arthroplasty rehabilitation. Currently, with the concept of fast recovery and improving patients’ satisfaction, patients and surgeons are increasingly adopting relaxed hip precautions postoperatively. During rehabilitation, surgeons should notify physiotherapists of those patients with stiff lumbar spine movements, to ensure appropriate rehabilitation. (in Discussion line 238)

2. Standing and sitting low-dose X-ray images are obtained for patients scheduled for THA in our center. We believe that these images could provide information by conventional X-ray (preoperative templating) as well as dynamic information on patients when changing position from standing to sitting. This would assist doctors in identification of patients with abnormal spinopelvic movement or uncompensated sagittal balance, such as ankylosing spondylitis patients. For these patients, accurate implant positioning or use of special instruments is warranted.

3. Figure 2 has been added, and includes the requested information.

Yawara Eguchi (Reviewer 3): This is interesting paper but I feel that there are many issues and questions not addressed yet by the manuscript.

1) Please indicate how many cases each affected side, single or both sides of AVNFH. How about coronal alignment (Cobb angle)?

2) A side X-ray of the standing and sitting positions of the LDD and Control groups should be added.

3) Please provide any literature or self-reported cases that evaluated spinopelvic alignment of THA dislocation.

4) In many cases of actual THA recurrent dislocation, spinal flexibility is lost after spine fusion surgery. In this study, patients with previous spine surgery is exclusion criteria, but rather it is thought to influence spinofemoral movement rather than flexible spine. Please mention this also in discussion.

To Yawara Eguchi (Reviewer 3):

1. We included unilateral AVN patients with less than 10o scoliosis in our study. Of 138 patients, 63 demonstrated left side involvement (45.7%), and the proportion was comparable between the two
It has been reported that limited lumbar ROM is associated with greater risk of dislocation and need for revision after THA [1-4]. Perfetti et al. reported that, compared to controls, THA patients with prior fusion were seven times more likely to dislocate their prosthesis (p < 0.01) and four times more likely to have undergone revisions (p < 0.01) at the 12-month follow-up [2]. The dislocation rate for THA without spinal fusion was 1.5% as compared to 2.96% and 4.12% for patients who underwent 1–2-level fusion and 3-level fusion with subsequent THA, respectively [3]. Buckland et al. [4] reported that the dislocation rate for 14,747 patients who had undergone THA and spinal fusion was significantly higher than that in 839,004 control subjects. (in Discussion, line 238)

Reference:


4. We agree that surgeons should recognize patients with poor spinopelvic mobility as these patients recruit greater hip flexion during sitting or even squatting. Doctors should examine and perform radiographs of patients with suspected lumbar pathology as the findings may influence cup positioning. (in Discussion, line 244)

Chun Kee Chung, M.D., Ph.D. (Reviewer 4): I have several concerns for the manuscript.

1. Their conclusion of higher posterior dislocation in less posterior pelvic tilt may sound too much, particularly considering its lack of the clinical data.

2. Age and sex were different between LDD group and control group. However, they did not control this difference.

Also there are numerous misspelling all over the manuscript, which makes reading a bit difficult.

Below are examples, which are not comprehensive.

1. Page 4, line 52. 'life' may be omitted.

2. Line 55. 'lewinneck' be 'Lewinneck'
To Chun Kee Chung, M.D., Ph.D. (Reviewer 4):

1. We agree with this point and have mentioned this in the limitations of the study. We stated that patients in the LDD group may have greater risk of posterior dislocation after hip arthroplasty. We are currently working on clinical investigation to obtain further information, including patient follow up and further measurements. (in Limitation, line 261)

2. We performed regression analysis to detect relationships between the spine/hip ratio and other variables. Patients in the LDD group, increasing age, but not sex, weight, or height were significant univariate predictors of a decreased spine/hip ratio (LDD group: p \textless 0.001; age: p = 0.048). (in Results, line 177)

The misspellings were all corrected and checked. Thanks.