Manuscript ID: 59719
Title: Three-dimensional finite element analysis with different internal fixation methods through the anterior approach
Journal: World Journal of Clinical Cases

Response to Reviewers' comments

Dear Editor,

We thank you for your careful consideration of our manuscript. We appreciate your response and overall positive initial feedback and made modifications to improve the manuscript. After carefully reviewing the comments made by the Reviewers, we have modified the manuscript to improve the presentation of our results and their discussion, therefore providing a complete context for the research that may be of interest to your readers.

We hope that you will find the revised paper suitable for publication, and we look forward to contributing to your journal. Please do not hesitate to contact us with other questions or concerns regarding the manuscript.

Best regards,
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Reviewer #1

1.The information on the precision of the analysis that the authors used for this study needs to be shown.

Response: We thank the Reviewer for the comment. The original scanning was performed at 1-mm-thick slices (as stated on page 7), and the 3D finite element model of the pelvis could be constructed using a 2-mm mesh without error reported by the software (as stated on pages 8-9). There are currently no optimal methods described in the literature for constructing the mesh. Here we used 2 mm, but other authors can use various mesh sizes from 2 to 6 mm [1-4].

2.More explanation are needed for Fig. 4 and Fig. 5, both figures are difficult to understand. The manuscript can be accepted for publication after minor revisions.

Response: We thank the Reviewer for the comment. In Figure 4, the different colors correspond to different stress and displacement (please see the color bar at the left of each figure). Dark blue indicates the smallest stress and displacement, while light blue, green, yellow, orange, and red indicate gradually higher stress and larger displacement. As can be seen by the colors on the model, in the standing position, the stress was transmitted to the bilateral sacroiliac joints and ilium through the sacrum, backward and downward through the posterior acetabular column, forward through the medial arcuate edge of the pelvis to the pubic symphysis, and finally to the bilateral lower limbs through the hip joint. In the sitting position, the stress distribution of the pelvis was from top to bottom, and the sacrum bore the simulated gravity load at the upper end, which has a downward and forward displacement trend. The stress was mainly concentrated in the sacroiliac joint, posterior column, superior ischial branch, and pubic branch.

In Fig. 5, the grey parts represent the pelvis, and the materials in blue and green are the internal fixation devices. The color on the material corresponds to different stress (please see the color bar at the left of each figure). If the color is toward red, it means that the stress is relatively high, suggesting that this part of the internal fixation might fail.

We tried to improve the descriptions in the manuscript and figure legends.

Reviewer #2

The authors have addressed a health issue of increasing incidence in the Chinese population. Different fixations for hip fractures were analyzed with no major differences among them. The most relevant limitations have been discussed by the authors. The study is timely and the model has been well explained, including the limitations associated to the oversimplification of the clinical situation.

Response: We thank the Reviewer for taking the time to review our manuscript and for the comments.

Editorial office

(1) I found the authors did not provide the approved grant application form(s). Please upload the approved grant application form(s) or funding agency copy of any approval document(s).

Response: We have provided the approved grant application form.

(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.

Response: We are providing the original figures in a powerpoint file.

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

Response: We now provide the Article Highlight section at the end of the main text.

Requirements for tables: *Please provide decomposable Tables (whose parts are all movable and editable), organize them into a single Word file, and submit as* ***"59719-Tables.docx"*** *on the system. The tables should be uploaded to the file destination of "Table File".*

Response: We have organized the tables into a single Word file.

References

1. Vogel D, Wehmeyer M, Kebbach M et al. Stress and strain distribution in femoral heads for hip resurfacing arthroplasty with different materials: A finite element analysis. J Mech Behav Biomed Mater 2021; 113: 104115. doi: 10.1016/j.jmbbm.2020.104115. PMID: 33189013.
2. Jiang D, Zhan S, Wang L et al. Biomechanical comparison of five cannulated screw fixation strategies for young vertical femoral neck fractures. J Orthop Res 2020. doi: 10.1002/jor.24881. PMID: 33034914.
3. Wang CC, Lee CH, Chin NC et al. Biomechanical analysis of the treatment of intertrochanteric hip fracture with different lengths of dynamic hip screw side plates. Technol Health Care 2020; 28: 593-602. doi: 10.3233/THC-202248. PMID: 32716339.
4. Zeng W, Liu Y, Hou X. Biomechanical evaluation of internal fixation implants for femoral neck fractures: A comparative finite element analysis. Comput Methods Programs Biomed 2020; 196: 105714. doi: 10.1016/j.cmpb.2020.105714. PMID: 32858283.