

## Peer Review File

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### Reviewer A

- 1.The causal relationship described in the cited paper is inaccurate.
- 2.The content of each section is contradictory and inconsistent.

Reply: Thank you for pointing this out. The connections to the cited references have now been made easier to understand. Specifically, we have changed the explanations in the Discussion and added references to both the Background and Discussion sessions.

#### Background (Page 6-7)

- We have organized the main introduction of this study in 1.1 through 1.3.
- We have stated that we should also consider the impact of inflammation and rehabilitation. Cited references were also added.
- The purpose of this study was organized and clarified.

#### Discussion (Page 12-15)

- We have reorganized the sections from 4.2 to 4.4 and the contents of the discussion.
- We have also added content regarding the standard error of measurement to the limitations of the study and added cited references.

### Reviewer B

#### Comments and Suggestions for Authors

##### 1. Background:

The importance of C-reactive protein should be discussed if it is one of the variables analyzed throughout the manuscript.

Reply: Thank you for your comment. We have added explanatory text to the Background and Methods sections.

Furthermore, the effects of postoperative inflammation (15) and rehabilitation (16), which are known to cause perioperative complications and changes in physical function, have not been examined. (Page 6)

The postoperative elevation of CRP (postoperative day 3) is a representative laboratory value that indicates the degree of systemic inflammatory response. Inflammation has been reported to cause functional symptoms due to inflammatory pain, edema and swelling, and is associated with postoperative complications. (Page 9)

Objective: Line 89: “This manuscript is written following STROBE checklist.” This sentence belongs to the Methods section.

Reply: Thank you for your comment. We have corrected the position of this text. (Page.7)

2. Methods: How was the sample size analysis conducted?

Reply: Thank you for pointing this out. We have added an explanation regarding the sample size.

The sample size was determined assuming that multiple regression analysis would be performed. Assuming an effect size  $f^2 = 0.15$ ,  $\alpha = 0.05$ ,  $1-\beta = 0.8$  and number of predictors = 8, a sample of 109 was required.

Subsequently, assuming that 10-20% of the total sample would be excluded, the number of participants was set at 130. (Page 7)

2.3. Spinal Motion Measurement: The authors do not include the standard error of measurement of the instrument.

Reply: Thank you for pointing this out. We have added a description of the standard error and added references.

The standard error of measurement varies from 0.61 to 13.18 degrees, depending on the area of interest (17-19). (Page 8)

19. Bayartai ME, Luomajoki H, Tringali G, et al. Differences in spinal posture and mobility between adults with obesity and normal weight individuals. Sci Rep 2023;13:13409.

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2.4. Perioperative information: Bibliographical references are needed for each of the

fixation methods used.

Reply: Thank you for your comment. References have been added for each fixation method.

20. Desai NB, Bhat PSS, Chandra SM, et al. Clinical equivalence of Trubond® and Ethibond® braided polyester sutures for valvular prosthesis fixation during aortic or mitral valve replacement: a single-blind randomized controlled trial. Cureus 2023;15:e41117.

21. Eraqi M, Diab AH, Matschke K, et al. Confirmation of safety of titanium wire in sternotomy closure, a randomized prospective study. Thorac Cardiovasc Surg 2023.

22. Takakura S, Sasaki K, Saito T, et al. Clinical assessment of efficacy of poly-L-lactide sternal pin on sternal stability and post-operative pain: a prospective randomized trial in cardiovascular surgery. J Thorac Dis 2022;14:76-89.

23. Chou SS, Sena MJ, Wong MS. Use of SternaLock plating system in acute treatment of unstable traumatic sternal fractures. Ann Thorac Surg 2011;91:597-599.

24. Morimoto K, Matsushita T, Masuda S, et al. The novel technique of sternal closure with absorbable mesh for osteoporotic patients. Heart Lung Circ 2021;30:e65-e67.

(Page 18, 19)

2.6 Statistical Analysis: The Shapiro-Wilk test is used to check the normality of the variable distribution when the number of participants is 50 or fewer. For 51 participants or more, the Kolmogorov-Smirnov test is used. On the other hand, what tests were used to analyze the correlation between variables?"

Reply: Thank you for pointing this out. The Shapiro-Wilk test was changed to the Kolmogorov-Smirnov test. No changes were found in the results. (Page 10) We also specified that the correlation analysis was done using Spearman's rank correlation coefficient. (Page 10)

### 3. Results:

Lines 172-174: "Thoracic spine range of motion was  $13.7 \pm 14.3^\circ$  preoperatively and  $8.8 \pm 15.6^\circ$  postoperatively, showing a significant decrease after surgery ( $P < 0.05$ ,  $r = 0.40$ ,  $1-\beta = 0.96$ )". "This citation that analyzes the device used by the authors to measure the range of motion, which you mention in your manuscript (doi: 10.1016/j.jmpt.2008.09.001), reports the following: 'The standard error of measurement

ranged from 0.61 degrees to 13.18 degrees.' Considering this information, it is likely that the decrease in mobility is due to the standard error of the measurement instrument itself. This should be taken into account for the correct interpretation of the results."

Reply: Thank you for pointing this out. We have added a note in the Discussion that caution should be exercised in interpreting the results based on the standard errors of measurement reported in previous studies.

Fourth, the standard error of the measurement instrument used in this study, the Spinal Mouse, has been reported in a wide range from 1.0 to 5.5 in thoracic flexion (17,19). This suggests that the results of this study may be within the measurement error range and should be interpreted with caution. (Page 15)

#### 4. Discussion:

4.2 Strengths and limitations: This subsection typically goes at the end of the discussion. In general, the discussion should be better structured into a few well-differentiated paragraphs. A first paragraph to recap the study's objectives and key findings to refocus the reader's attention, one paragraph for each analyzed variable, discussing the results in comparison with other authors, and a final paragraph addressing the implications for clinical practice, strengths, and limitations. This logical sequence would enhance its comprehension

Reply: Thank you for pointing this out. As per your suggestion, we have changed the section breaks from 4.2 to 4.4 and rearranged the order of these sections. (Page 12-15)

#### 5. Conclusion:

It is necessary to modify this section taking into account the standard error of measurement.

Reply: Thank you for your comment. A description of the standard error of measurement was added to the Conclusion.

However, the results of this study could also be due to standard errors of the equipment and further investigation and study is required. (Page.15)