Thank you very much for your insightful comments. We did our best to answer them to the best of our knowledge.

1. Firstly, I recognize the authors' efforts to clarify the quasi-experimental nature of the study and to address the issue of randomization. The revised methodology explicitly acknowledges the lack of randomization and explains that group allocation was based on clinical decision-making. This is a welcome addition. However, the discussion around "residual confounding" remains somewhat vague. It would strengthen the manuscript to include concrete examples of potential confounders that might influence the outcomes, even if the baseline characteristics were statistically similar across groups. A deeper exploration of these potential confounders would provide readers with a clearer understanding of the study's limitations.

Response:

Thank you for your thoughtful comments and for highlighting the importance of addressing potential residual confounding in our study. While we recognize the value of conducting a sensitivity analysis to assess the potential impact of unmeasured confounders, we were unfortunately unable to perform such an analysis due to data limitations. Specifically, certain variables, such as detailed rehabilitation protocols, bone density, and comorbidities, were not systematically collected during the study.

To address this limitation, we have carefully outlined the potential sources of residual confounding in the revised discussion section ***(lines: 845-869)*** *and acknowledged how these might influence our findings. While we could not directly evaluate the impact of these factors, we sought to mitigate their influence by ensuring baseline comparability across groups and employing statistical adjustments for measured confounders.*

We also emphasize the need for future studies, including randomized controlled trials or those employing advanced statistical methods like propensity score matching, to further validate our findings and minimize confounding. We have incorporated these points into the discussion to provide a transparent account of our study's limitations.

2. Regarding the lack of blinding, I note that the authors have included a statement in the discussion, acknowledging this as a limitation and explaining why blinding was not feasible. While this explanation is detailed, it leans heavily toward justifying the absence of blinding rather than focusing on its implications for the study's findings. A more concise acknowledgment of the limitations imposed by the lack of blinding, alongside a discussion of its potential impact on subjective measures like pain and quality of life, would better serve the transparency of the manuscript. Additionally, suggesting how future studies might incorporate blinding where feasible could add value to the discussion.

Response:

We greatly appreciate your insightful comment. This has encouraged us to broaden our literature review, particularly focusing on works such as DOI: 10.12688/f1000research. While blinding of patients is possible, it is generally only applicable in clinical trials, not in retrospective or prospective studies. Additionally, blinding of the assessor can be applied in all types of studies, but it should be noted that blinding of the surgeon is not feasible, as the surgeon must perform the specific procedure.

In response to your point on the potential impact of the lack of blinding, we have added information regarding meta-analyses by Moustgaard et al. (2020) and Efficace et al. (2022), which found no significant differences between studies with and without blinding. However, since no such research exists for assessments of quality of life following short-segment spinal stabilization, we are unable to determine how the lack of blinding might have influenced the results. We agree with your

suggestion and recommend that future studies in this area incorporate randomization and blinding procedures to address this limitation. These details have been incorporated into the discussion section of the manuscript **– lines 870-882**.

3. The section on statistical analysis has been improved, with the authors providing a thorough explanation of how baseline differences were evaluated and managed. This enhances the study's credibility. However, this information would be more impactful if explicitly integrated into the limitations section to highlight its relevance to the study's validity. Making this connection clear would provide a more balanced perspective on the study's strengths and weaknesses.

Response:

Thank you for your thoughtful feedback and recognition of the improvements made to the statistical analysis section. In response to your suggestion, we have integrated the discussion on baseline differences and their evaluation into the limitations section. This addition emphasizes the relevance of these analyses to the study's validity and provides a balanced perspective on its strengths and weaknesses.

*Furthermore, the methodology section has been revised to explicitly describe the steps taken to assess baseline differences between groups, including the specific variables compared (e.g., sex distribution, hospital stay duration, and injury causes) and the statistical methods employed (e.g., chi-square test, Tukey's HSD) (**Lines:248-254).** These revisions aim to improve the clarity and comprehensiveness of the manuscript, further enhancing its credibility.*

Thank you again for your valuable feedback, which has been instrumental in refining the presentation of our study.

4. In terms of methodological clarity, the revised manuscript has made progress in defining the primary and secondary outcomes and in elaborating on the procedural details of the surgical techniques. However, these details remain somewhat scattered across the manuscript. A dedicated subsection that consolidates all procedural information would significantly improve the clarity and reproducibility of the study.

Response:

Thank you very much for your constructive feedback, which has allowed us to improve our manuscript.

*A section titled "Surgical Techniques and Procedures"**(Lines: 135-195)** has been added to the Materials and Methods section. This section includes all the information regarding the number and distribution of patients, a detailed description of the surgical procedures, an explanation of the radiological assessment, and an evaluation of patients' quality of life.*

5. The limitations section has been expanded, which is commendable. The authors now address the quasi-experimental design and the lack of blinding. However, the discussion on generalizability remains cursory. For instance, it would be beneficial to explore how the findings might apply—or fail to apply—to different patient populations or clinical settings. This additional detail would provide readers with a clearer picture of the broader implications of the study.

Response:

*Thank you for your valid point. The limitations section has been further expanded **(Lines: 885-886)** to include suggestions from this review. Our study showed that regardless of the fixation*

technique chosen, the correct curvature of the spinal column can be significantly restored, although no significant differences between the groups were observed in the postoperative follow-up examination. However, it should be noted that the highest post-traumatic kyphosis was observed in patients in the Schanz group, which proves that this technique is preferred in patients with a large Cobb angle [11]. It was also observed that the Schanz technique ensured a better recovery of AVH. As well as the assessment of the quality of life of patients after the operation using the WAS and ODI scales showed that the stabilization using Shanz screws is significantly better. Therefore, it can be stated that in medical practice this may be the best type of short-segment stabilization of lumbar spine and thoracolumbar junction injuries. Especially in patients with high fracture kyphotization. However, the lack of analysis of confounding factors and blinding of the study may have influenced the results. Our study was also limited to one hospital, one patient population, and one surgical team performing the procedures. However, the lack of analysis of confounding factors and the blinding of the study may have influenced the obtained results. Also, our study was limited to one hospital, one patient population and one surgical team performing the procedures. We therefore recommend further studies in this direction to confirm this hypothesis. However, our team recommends further studies in this direction based on blinding and randomization to obtain more reliable results. We also recommend that further studies be conducted in several centers to check whether the obtained results are influenced by the patient and can be reproduced by other surgical teams.

6. Finally, I noticed that the suggested studies for contextualization, specifically those addressing therapeutic exercise and pain sensitization (DOIs 10.3390/jcm12206478 and 10.1097/PHM.0000000000002239), do not appear to have been incorporated. Including these references in the discussion would not only enrich the context of the findings but also demonstrate a comprehensive engagement with the existing literature. For example, these studies could enhance the discussion on postoperative care strategies and the management of chronic pain, which are relevant to the manuscript's focus.

Response:

Thank you for your input. Paragraph added to materials and methods, additionally, included study limitation regarding lack of control on postoperative care in discussion. The suggested studies have also been added and cited in the manuscript.

"Postoperative care

Weeks following the surgery, physiotherapy played a crucial role in the patient's recovery [10,11]. During the initial six weeks, the patient performed light activities to improve circulation and prevent stiffness, while protecting the surgical site. Range-of-motion exercises for the hips and lower extremities were included, along with short, supervised walking sessions. Core engagement exercises were cautiously introduced to maintain stability.

In the later weeks, the rehabilitation program advanced to core strength, flexibility, and endurance exercises. The patient engaged in light strengthening activities for the back, abdominal, and pelvic muscles while gradually increasing walking distances and participating in controlled, low-impact activities like swimming or stationary cycling.

After 12 weeks, the focus shifted to restoring full function and preparing the patient for daily activities and work. Advanced strengthening and flexibility exercises were implemented, emphasizing posture correction and proper body mechanics to protect the spine during movements. The patient avoided high-impact activities or heavy lifting until cleared by the surgeon.

Throughout the program, exercises were tailored to the patient's progress, ensuring appropriate intensity and avoiding excessive strain on the spine. Education on proper movement techniques and lifestyle adjustments was provided to support long-term recovery and prevent reinjury."

Lines: 196-215, 887-894