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Standardizing classification and assessment methods in clinical frailty scale evaluation for elderly trimalleolar fractures

Jia-Wen Wang[1], Jia-Hui Liu[1] and Mu-Wei Dai[1*]

Abstract

In the field of geriatric orthopedics, the correlation between Clinical Frailty Scale (CFS) assessment and postoperative outcomes in elderly trimalleolar fracture patients remains a critical area of investigation. The retrospective study by Zhou et al. examines this relationship through postoperative complication analysis. While this research contributes valuable insights into frailty's impact on surgical outcomes, it presents several methodological limitations that warrant careful examination. This commentary highlights critical oversights in fracture classification standardization, particularly the absence of validated tools such as AO/OTA and Tscherne classifications, which potentially compromise the study's reliability and clinical applicability. Additionally, the insufficient consideration of soft tissue damage assessment and various confounding factors, including socioeconomic and psychosocial variables, limits the study's generalizability. The commentary proposes methodological improvements through standardized classification systems, comprehensive tissue evaluation protocols, and detailed subgroup analyses. These recommendations aim to enhance future research design and strengthen the evidence base for managing elderly trimalleolar fracture patients, ultimately advancing clinical practice in geriatric orthopedic trauma.

Keywords Clinical frailty scale, Trimalleolar fractures, Elderly patients, Methodological limitations, Classification systems

Dear Editor,

We read with great interest the article by Zhou et al. investigating the relationship between the Clinical Frailty Scale (CFS) and postoperative complications in elderly patients with trimalleolar fractures [1]. While this study provides valuable insights into the role of frailty in ankle fracture outcomes, we would like to highlight several methodological concerns that warrant careful consideration when interpreting the results.

*Correspondence:
Mu-Wei Dai
48601849@hebmu.edu.cn
[1]Department of Orthopedics, The Fourth Hospital of Hebei Medical University, 12 Health Road, Shijiazhuang 050011, Hebei Province, China

First, the study's inclusion criteria lack standardization in fracture classification, particularly regarding fracture completeness, patterns, and injury mechanisms. The absence of validated tools, such as the AO/OTA classification system, the Berndt and Harty grading system, and the Tscherne classification, limits the homogeneity and reliability of the findings. Specific shortcomings include: 1. Fracture Integrity Classification: The study does not clarify whether it includes complete or incomplete fractures, crack-type injuries, or the number and location of fracture lines. Different fracture integrities necessitate distinct treatment approaches, directly impacting the study's reliability [2]. 2. Injury Mechanism Classification: High-energy and low-energy injuries cause varying degrees of damage, influencing both surgical planning

and postoperative outcomes [3]. 3. Fracture Type Definition: The lack of differentiation between transverse, oblique, spiral, comminuted, and impacted fractures—each with unique healing characteristics—inevitably affects the study's validity [3]. To address these deficiencies, we recommend adopting standardized classification systems, such as the AO/OTA system, to specify fracture patterns, quantify fracture displacement, and classify injury mechanisms (e.g., high- vs. low-energy injuries), including causes and impact force magnitude. Furthermore, detailed assessment of articular surface involvement is essential, given its critical role in post-traumatic arthritis development. Grading systems like the Berndt and Harty classification for articular damage, the ICRS cartilage injury grading system, and measurements of articular step-off height should be employed for precise evaluation [4].

Second, the study does not adequately assess surrounding soft tissue damage, particularly vascular injuries, which are crucial in determining treatment strategies and prognosis [5]. Incorporating the Tscherne classification for soft tissue injuries, along with detailed evaluations of ligament damage and vascular conditions, would strengthen the reliability and clinical applicability of the findings.

Third, while the study accounts for baseline variables such as age, gender, BMI, smoking status, alcohol consumption, operation time, and blood loss, it overlooks several critical confounding factors, including:1Socioeconomic and Lifestyle Factors: Variables such as dietary habits, sleep quality, exercise frequency, occupational activity level, and socioeconomic status (e.g., education level, income) are not addressed.;2Psychosocial and Support Systems: Factors like living conditions, family relationships, psychological state, stress levels, rehabilitation motivation, and degree of social support can significantly influence recovery and prognosis.

Moreover, the lack of subgroup analyses for these factors—such as stratified analyses based on socioeconomic status, psychological state, or dietary patterns—limits the study's depth and may introduce bias, reducing its generalizability and clinical relevance. Future research should incorporate these variables and conduct subgroup analyses to provide a more comprehensive understanding of outcome differences across diverse populations.

In conclusion, we believe these suggestions would enhance the study's robustness and clinical utility.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Competing interests
The authors declare no competing interests.

Human ethics and consent to participate declarations
Not applicable.

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References

1. Zhou Q, Deng W, Zhao M, et al. The clinical frailty scale is associated with an increased risk of postoperative complications and the development of post-traumatic osteoarthritis in elderly patients with trimalleolar ankle fractures - a retrospective study. J Orthop Surg Res. 2025;20(1):120.
2. König M, Huber J. Evaluation of ankle fracture classification systems in 193 trimalleolar ankle fractures. J Orthop Surg Res. 2022;17(1):1–9.
3. Lintz F, Bernasconi A, Buedts K, Welck M, Ellis H. Current management of trimalleolar ankle fractures. J Orthop Surg Res. 2021;16(1):405.
4. D'Lima DD, Colbert A. Post-traumatic osteoarthritis: A review of pathogenic mechanisms. PubMed Cent. 2023: PMC10323219.
5. Kutzner J. Assessment of alternative techniques to quantify the effect of injury on soft tissue in closed ankle fractures. PLoS ONE. 2022;17(3):e0268359.

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