

The Relationship Between Magnetic Resonance Diffusion Tensor Imaging Parameters and Muscle Dysfunction in Patients with Osteoporosis: A Cross-Sectional Retrospective Study [Letter]

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Dear editor

We read with great interest the recent article by Wang et al, which investigated the relationship between magnetic resonance diffusion tensor imaging (DTI) parameters and muscle dysfunction in patients with osteoporosis.¹ By extending osteoporosis research beyond bone mineral density toward the microstructural assessment of the bone-muscle unit, the authors provide an innovative and clinically relevant perspective. Nevertheless, several methodological and statistical issues deserve further consideration to strengthen the robustness and interpretability of the findings.

First, unjustified dichotomization of muscle function. The authors categorized Lovett muscle strength grades 0–3 as “poor function” and grades 4–5 as “good function”. However, grades 0 (complete paralysis) to 3 (able to perform joint movements against gravity) represent a wide spectrum of clinical severity. The rationale for selecting the 3/4 boundary as the cutoff was not explicitly provided by the authors. We suggest that the authors provide a justification for this dichotomization by citing relevant literature, clinical consensus, or a data-driven cutoff analysis.²

Second, inconsistency in study design description. In the limitations section (point 5), the authors state: “The follow-up period of this study was relatively short (12 months).” However, this is explicitly a cross-sectional retrospective study. By definition, a cross-sectional design involves no longitudinal follow-up. Such inconsistency undermines methodological rigor. We advise authors to accurately describe the study design and avoid using longitudinal terminology in cross-sectional reports.

Third, discrepancy in the reported sensitivity and specificity. In the results section, the authors state: “The sensitivity (90.2%) and specificity (80.3%) of the combined prediction were also superior to those of a single parameter.” However, Table 4 lists the sensitivity as 80.3% and specificity as 90.2%. The authors should verify which pair of values is correct.

Fourth, incomplete reporting of ADC units. In the results section (Figure 4), ADC values are presented as “ $1.02 \pm 0.34 \text{ mm}^2/\text{s}$ ”. A review on musculoskeletal ADC interpretation reports that muscle ADC is approximately $1.55 \times 10^{-3} \text{ mm}^2/\text{s}$, confirming the intended unit is $\times 10^{-3} \text{ mm}^2/\text{s}$.³ We recommend that the authors explicitly append this correct unit wherever ADC values are reported.

Fifth, lack of methodological transparency for the combined prediction model. The authors reported an AUC of 0.722 for the combined FA and ADC prediction. However, the Methods section does not explicitly describe how the combined score was generated. To improve methodological transparency and reproducibility, we recommend that the authors specify in the Methods section whether the combined prediction was based on the predicted probability from the logistic regression model or another algorithm.

In summary, while the study by Wang et al offers an innovative perspective on the bone-muscle unit in osteoporosis, addressing the above five issues—providing a rationale for the muscle function cutoff, correcting the cross-sectional

design description, reconciling the sensitivity/specificity discrepancy, completing the ADC unit notation, and clarifying the combined prediction methodology—would substantially enhance the methodological rigor, transparency, and reproducibility of the findings.

Artificial Intelligence Statement

ChatGPT (OpenAI, San Francisco, CA, USA; GPT-5 version) was used exclusively to assist with language and grammatical refinement. All suggested edits were carefully reviewed and approved by the author, who takes full responsibility for the scientific content.

Disclosure

The authors report no conflicts of interest in this communication.

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