

Reviewer comments

Introduction

- The authors state '*due to the redundancy of the muscle architecture, compensation for muscle recruitment may occur without a change in trajectory*' (lines 81-82), according to van der Kruk et al., 2021. Please explain the concept of redundancy of the muscle architecture more precisely, given that the reference alludes to elderly subjects, whereas the research is on young adults.
- In Table 1 (line 95) please clarify the abbreviations used and which articles refer to two-arm goniometers.
- The authors should review the plane and axes terminology described in lines 156-158.

Material and methods

- Please clarify how health conditions stated as exclusion criteria were identified (lines 192-196).
- In lines 208-209 the authors state that for tracker positioning they used the spinous process of vertebrae of the thoracic spine. Please clarify procedure for determining spinous process location. As shown in the figures, it is only attached to the back, without specifying location.
- Please clarify the credentials of evaluators A and B and whether they received training in the VR system used in the investigation.
- Please detail the processing applied to angular time series performed in Matlab.
- Authors should detail the credentials of the person in charge of the visual selection of movement performed in data processing, in addition to referencing the manual selection procedure.
- Please clarify sampling technique.
- Authors should indicate normative values of SEM and MDC for further interpretation.

Results

- Please clarify which movements were processed: only flexion and not extension? Regarding rotation, lateral or medial? Regarding lateral flexion, right or left?
- CI of 95% are shown on tables but in data analysis section they mention 90%. Please clarify.
- Abbreviations in tables 4 and 5 should be described.

Discussion

- The authors should clarify the comparison of cervical ROM with the cited articles (lines 496-500), since Kiper et al. report different values from those stated in this section.
- I suggest moving the interpretation of ICC values from lines 512-514 to the methods section.
- Please clarify interpretation of ICC values on lines 514-516 if it refers to central tendency or CI values.

- I suggest moving the ROM estimation procedure and its formulas described in lines 561-595 to the methods section and only discuss the findings related to this procedure.
- Please provide more background on the usability of the VR system as discussed in lines 597-602.
- Regarding limitations, I suggest considering signal processing and manual event selection and their mitigation procedures.

Conclusion

- There is too much discussion in the conclusion. I suggest narrowing to the hypothesis or research question sought to be answered.