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OPEN PEER REVIEW

Isometric or Isotonic Exercises in Alleviating Chronic Neck and Shoulder Pain and Enhancing Quality of Life Among Computer Users with Upper Crossed Syndrome: A Randomized Controlled Trial

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About this report

This open peer review (OPR) report shows the public comments made on this article during peer review, by the reviewers, the associate editor and the editor-in-chief, for every revision round, together with the authors' replies. Comments appear only with the consent of the people who wrote them. Reviewers who chose to sign their report are named; the others are shown as "Referee". Comments are edited for language only, and confidential remarks to the editors are not included.

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Contents

1 **Original submission** Referee 1, Laleh Hakemibarabadi, Referee 2, Editor-in-Chief 2

2 **Revision 1** Laleh Hakemibarabadi, Referee 1, Associate Editor, Editor-in-Chief 5

Authors' reply to reviewers 6

Reviewer and editor comments 13

1 Original submission

4 comments · 15 Mar 2025 – 9 Apr 2025

Referee 1 Reviewer

MAJOR REVISION 15 Mar 2025

Dear AE,
Thanks for your invite. The study addresses an important health issue prevalent among computer users, making it highly relevant to occupational health and rehabilitation research.
My opinions are as follows:

-Revise the introduction to include a well-defined research question and its significance.

-The manuscript lacks a strong rationale for selecting the specific methodology used. There is no discussion on why this method is the most appropriate.
Please provide a justification for the chosen methodology by comparing it with alternatives and referencing previous studies.
-Improve the structure by ensuring smooth transitions between paragraphs and eliminating redundant content.
-While the study suggests isometric exercises may be slightly better for pain reduction, the lack of statistical significance should be emphasized to avoid overstating conclusions.

-Rewrite the conclusion to concisely summarize key findings and provide recommendations for future research.

-The manuscript contains grammatical errors, awkward phrasing, and overly complex sentence structures that reduce readability.

-Many references are outdated, with few citations from the last five years. This weakens the study's relevance to current research.

Laleh Hakemibarabadi Reviewer

MINOR REVISION 6 Apr 2025

Thanks to the authors.
1- The aim of the study was to assess the effects of two types of interventions compared to a control group in a population affected by upper cross syndrome, so kyphosis per se would not be appropriate as a keyword.
2- You have to mention the mean VAS and SF-36 scores pre- and post-intervention as well as the changes.
3- Please provide the statistical significance of the differences between pre- and post-intervention mean scores in each group as well.
4- Define computer users. How many hours a day of computer use are required?
5- In the 2nd paragraph of the results section, although the improvements in VAS & SF-36 scores were greater in the isometric and isotonic groups, respectively, neither differed statistically between the two intervention groups.
6- In the discussion section, 3rd paragraph, regarding the sentence: "Notably, the overall SF-36 HRQoL score was slightly higher in the isotonic exercise group ($p < .001$, % change = 17.7%) compared to the isometric group ($p = .002$, % change = 14.9%). " As previously mentioned in the abstract, here you did not compare the absolute scores; rather, you compared the changes.
7- In the discussion section, 4th paragraph, regarding the sentence: "Extending the regimen to 12 weeks or longer could reveal a more pronounced advantage for isometric exercises in pain reduction and HRQoL improvement."

How could you arrive at this potential theory, given that in your study, isometric exercises were superior with regard to health-related quality of life?
8- In the conclusion: You did not report anything about the safety of the protocols, so your conclusion about safety is not relevant to the study.
9- In table 1: Two important measures are missing: 1- The p-value for the pre-intervention VAS score comparison between the three groups. 2- The p-value for the pre-intervention SF-36 score comparison between the three groups.
10- Which version of SF-36 was used: the short or original form? Did you use "Persian"? Please mention its reliability and validity.

Referee 2 Reviewer

MAJOR REVISION 8 Apr 2025

I was pleased to have the opportunity to review the manuscript entitled 'Isometric or Isotonic Exercises in Alleviating Chronic Neck and Shoulder Pain and Enhancing Quality of Life Among Computer Users with Upper Crossed Syndrome: A Randomized Controlled Trial'. This randomized controlled trial (RCT) addresses a clinically relevant question by comparing the efficacy of isometric and isotonic exercises in managing chronic neck and shoulder pain (CNSP) and improving health-related quality of life (HRQoL) in individuals with Upper Crossed Syndrome (UCS). The study design is robust, and validated outcome measures (VAS, SF-36) strengthen the findings. However, methodological and reporting issues should be addressed to enhance clarity and validity. I believe that the manuscript could be accepted once the concerns have been addressed. My queries follow.

Absence of participant/therapist blinding introduces performance/detection bias. Please discuss how expectations (e.g., preference for dynamic exercises) might have influenced outcomes, particularly HRQoL.

Adherence monitoring (bi-weekly check-ins) is mentioned, but adherence rates are not quantified. Please report adherence percentages and analyze their impact on outcomes (e.g., per-protocol vs. intention-to-treat), if available.

Exercises (e.g., "cobra couché") are listed but lack specifics (duration, resistance, progression).
Please include a supplementary table or appendix detailing sets, holds/repetitions, and progression criteria for reproducibility.

The waitlist control group received educational materials, which may not account for attention/time effects. Please discuss whether the observed effects could partially stem from increased attention in intervention groups.

Reliance on subjective measures (pain, HRQoL) without objective metrics (e.g., posture, muscle strength) is acceptable but should be mentioned as a limitation. The authors might suggest incorporating biomechanical assessments in future work.

Confidence intervals for mean differences are not reported, limiting interpretability.
Figures 3 and 5 could be safely eliminated, and the values could be reported in the text of the results section.

It would be much more informative if the authors could replace Figure 4 with a Table.
Finally, we will have 2 informative tables and 2 figures.

Finally, I would be pleased if the authors could summarize the introduction and discussion sections. As a pain specialist and a member of the Journal's main audience, I find these sections too long.

Editor-in-Chief MAJOR REVISION 9 Apr 2025

Dear Author,
Thank you for submitting the article. It needs some revision. Please revise it based on the reviewers' and AE's comments.

2

Revision 1

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

Dear Esteemed Reviewers,

We would like to express our sincere gratitude for your invaluable comments and feedback. We have carefully addressed all the requested corrections to the best of our ability. The revisions made in response to the first reviewer's suggestions are highlighted in red, those from the second reviewer in green, and the changes based on the third reviewer's comments in blue.

Thank you once again for your thoughtful and constructive input.

Best regards,
The Authors

Response to Reviewer #1

Dear Esteemed Reviewer,

We sincerely appreciate your valuable feedback. All suggested revisions have been carefully addressed, and the modifications are **highlighted in red** within the manuscript for your convenience.

Thank you for your time and insightful comments.

Best regards

Absence of participant/therapist blinding introduces performance/detection bias. Please discuss how expectations (e.g., preference for dynamic exercises) might have influenced outcomes, particularly HRQoL.

We have thoroughly addressed this important point in both the Discussion section and the Study Limitations subsection. In these sections, we explicitly acknowledge how the absence of blinding may have introduced performance and detection bias, particularly regarding HRQoL outcomes. We discuss how participants' and therapists' expectations could have influenced the results, while also noting.

Adherence monitoring (bi-weekly check-ins) is mentioned, but adherence rates are not quantified. Please report adherence percentages and analyze their impact on outcomes (e.g., per-protocol vs. intention-to-treat), if available.

We appreciate the reviewer's insightful comment regarding adherence monitoring. In our study, all participants were instructed thoroughly on the correct performance of the exercises at baseline and during follow-ups. Adherence was self-reported during bi-weekly check-ins, and participants who failed to correctly perform the exercises or did not follow the protocol were excluded from the study.

As such, only individuals who consistently adhered to the prescribed exercise regimen remained in the final analysis. Therefore, adherence rates were effectively 100% among those included in the final data, and there was no deviation from the protocol to necessitate an intention-to-treat analysis. Consequently, all outcome data are based on a per-protocol approach.

Exercises (e.g., "cobra couché") are listed but lack specifics (duration, resistance, progression). Please include a supplementary table or appendix detailing sets, holds/repetitions, and progression criteria for reproducibility.

Thank you for raising this important point. As requested, I've added the details in the appendix (attached).

The waitlist control group received educational materials, which may not account for attention/time effects. Please discuss whether the observed effects could partially stem from increased attention in intervention groups.

To address attention/time effects and maintain ethical standards, we provided the same educational materials to both exercise groups (isometric and isotonic) as well as the control group. This helped minimize bias from unequal contact and ensured the control group was not fully deprived of intervention. Additional details regarding this approach have been included in the Methods section.

Reliance on subjective measures (pain, HRQoL) without objective metrics (e.g., posture, muscle strength) is acceptable but should be mentioned as a limitation. The authors might suggest incorporating biomechanical assessments in future work.

This point has also been added to the research limitations section in response to your comments.

Confidence intervals for mean differences are not reported, limiting interpretability.

Thanks for the feedback. Added to the results section.

Figures 3 and 5 could be safely eliminated, and the values could be reported in the text of the results section.

Thank you for your valuable feedback. As per your suggestion, Figures 3 and 5 have been removed, and the corresponding data have been added to a table in the Results section for better clarity and presentation.

It would be much more informative if the authors could replace Figure 4 with a Table.

Thank you for your valuable comment regarding Figure 4. While we understand and appreciate the suggestion to replace the figure with a table, we respectfully believe that, from a descriptive

statistical perspective, using a figure to illustrate the percentage differences is more effective in conveying the patterns and group differences to the reader.

Presenting numerical values for three groups across eight subscales and two overall variables in a table format may overwhelm the reader and reduce clarity. The figure allows for a more intuitive and immediate comparison of the trends and differences, particularly for visual learners. However, we are open to replacing the figure with a table if the editorial team deems it more appropriate.

Finally, I would be pleased if the authors could summarize the introduction and discussion sections. As a pain specialist and the Journal's main audience, I find these sections too long.

Thank you for your valuable suggestion. We have summarized the introduction and discussion sections to make them more concise, while retaining the key points and relevant details.

Response to Reviewer #2

Dear Esteemed Reviewer,

We sincerely appreciate your valuable feedback on our manuscript. To the best of our ability, all suggested revisions have been carefully implemented, with the modifications **highlighted in green** throughout the text for easy reference.

Thank you for your time and constructive comments, which have significantly improved our work.

Best regards

-Revise the introduction to include a well-defined research question and its significance.

We appreciate your valuable feedback. In response, we have revised the introduction to clearly define the research question: Which type of strengthening exercise— isometric or isotonic— is more effective in reducing chronic neck and shoulder pain (CNSP) and improving health-related quality of life (HRQoL) in individuals with Upper Crossed Syndrome (UCS)?

-Improve the structure by ensuring smooth transitions between paragraphs and eliminating redundant content.

Thank you for your comment. We revised the Introduction and Discussion to ensure smoother transitions between paragraphs and removed redundant content. In the Introduction, we clarified the logical flow from UCS prevalence to treatment rationale. In the Discussion, we reorganized the structure to improve coherence, reduced repetition, and refined the link between findings, mechanisms, and prior literature.

-While the study suggests isometric exercises may be slightly better for pain reduction, the lack of statistical significance should be emphasized to avoid overstating conclusions.

As recommended, we have revised both the abstract results and the conclusion sections (discussion and abstract) to clearly state that although isometric exercises showed slightly greater pain reduction, the difference was not statistically significant. This clarification ensures that interpretations remain appropriately cautious and aligned with the data.

-Rewrite the conclusion to concisely summarize key findings and provide recommendations for future research.

The conclusion has been revised to more concisely summarize the key findings, emphasizing the lack of statistically significant differences between interventions, and to clearly recommend future research directions including longer durations and larger sample sizes.

-The manuscript contains grammatical errors, awkward phrasing, and overly complex sentence structures that reduce readability.

The manuscript has been thoroughly revised to correct grammatical errors, simplify overly complex sentence structures, and improve phrasing for clarity and fluency throughout the text.

-Many references are outdated, with few citations from the last five years. This weakens the study's relevance to current research.

Thank you for your valuable feedback. We carefully reviewed the reference list and replaced outdated sources with more recent and relevant studies published within the last five years where applicable.

Response to Reviewer #3

Dear Esteemed Reviewer,

We sincerely appreciate your time and insightful feedback on our manuscript. Your constructive comments have been invaluable in strengthening our work. We have carefully addressed all of your suggestions to the best of our ability, with all revisions **highlighted in blue** for easy reference.

Please find below a point-by-point summary of the changes made in response to your recommendations:

Best regards

1- The aim of the study was effect of two types of interventions compared to control group in a population affected by upper cross syndrome, so kyphosis per se would not be appropriate as a key word.

Thank you for your insightful comment. The keyword "kyphosis" has been removed.

2- You have to mention the mean of VAS and SF-36 scores pre- and post-intervention as well as the change.

Thank you for your suggestion. The mean values of the VAS and SF-36 scores before and after the intervention, as well as the changes, have been reported in the table in the Results section.

3- Please provide statistical significance between pre and post-intervention means of scores in each group as well.

Thank you for your comment. We would like to clarify that, due to the differences in pre-test means and the potential influence of confounding variables, we conducted ANCOVA to adjust for baseline scores. This approach allows us to control for pre-intervention differences and focus on the effect of the intervention itself.

In ANCOVA, only the post-test scores (adjusted for pre-test values) are compared across groups. The pairwise comparisons of the adjusted post-test means were subsequently conducted using Bonferroni post hoc tests. Therefore, the statistical significance reported reflects differences in post-intervention outcomes while accounting for pre-test variability

4- Define computer users, how many hours a day of computer use is required?

Thank you for your comment. In this study, "computer users" were defined as individuals who used a computer for more than 3 hours per day. This threshold is consistent with research that has shown an association between prolonged computer use and musculoskeletal symptoms, such as those observed in individuals with Upper Crossed Syndrome. We have updated the methodology section to clarify this definition.

5- In the 2nd paragraph of results section, although the improvement in VAS & SF-36 scores were greater in isometric and isotonic groups respectively, none were statistically different between the two intervention groups.

As recommended, the results section has been revised to clearly indicate that although the isometric group demonstrated numerically greater improvement in pain (VAS), and the isotonic group showed slightly higher scores in quality of life (SF-36), none of these differences were statistically significant between the two intervention groups. These clarifications were applied to both the pain and HRQoL results to ensure accurate interpretation and avoid overstating the findings.

6-In the discussion section- 3rd paragraph, about the sentence: "Notably, the overall SF-36 HRQoL score was slightly higher in the isotonic exercise group ($p < .001$, % change = 17.7%) compared to the isometric group ($p = .002$, % change = 14.9%). " As previously mentioned in abstract, here you did not compare the absolute scores, however you compared the changes.

Thank you for pointing this out. As suggested, the sentence in the discussion was revised to clarify that the comparison was based on change scores rather than absolute post-intervention values. We have emphasized that although the isotonic group showed a slightly higher percentage improvement, the difference between the two intervention groups was not statistically significant.

7- In the discussion section- 4th paragraph, about the sentence: "Extending the regimen to 12 weeks or longer could reveal a more pronounced advantage for isometric exercises in pain reduction and HRQoL improvement." How could you reach this potential theory? While in your study isometric exercises were superior in regard of health-related quality of life.

Thank you for your thoughtful observation. The paragraph in question has been revised to avoid overinterpreting the findings. We have clarified that, although isometric exercises showed numerical advantages, the differences were not statistically significant, and thus, any projection of long-term superiority remains speculative. The revised text now emphasizes the need for future studies to explore these possibilities with appropriate caution.

8- In conclusion part: You did not report anything about the safety of protocols, so your conclusion about safety is not relevant to the study.

Thank you for your attention to detail and for highlighting this important point. As suggested, the reference to the safety of the interventions has been removed from the conclusion. The conclusion has been revised accordingly to maintain scientific accuracy.

9- In table 1: two important measures are missing: 1- p.value for pre intervention VAS score between the three groups. 2- p.value for pre intervention SF-36 score between the three groups.

Thank you for your valuable comment. Regarding your first point, we have now included the p-value for the pre-intervention VAS scores between the three groups in Table 1, as requested.

In ANCOVA, only the post-test scores (adjusted for pre-test values) are compared across groups. The pairwise comparisons of the adjusted post-test means were subsequently conducted using Bonferroni post hoc tests. Therefore, the statistical significance reported reflects differences in post-intervention outcomes while accounting for pre-test variability

10- Which version of SF-36 was used? short or original form? Did you use "Persian"? Please mention about the reliability and validity.

Thank you for your valuable comment. We have clarified that the Persian version of the original 36-item Short Form Health Survey (SF-36) was used to assess HRQoL in this study. The relevant sentence has been revised in the Methods section accordingly.

2 Revision 1

4 comments · 30 Apr 2025 – 7 May 2025

Laleh Hakemibarabadi Reviewer — ACCEPT — 30 Apr 2025

Thank you to the authors for their corrections.

Referee 1 Reviewer — ACCEPT — 4 May 2025

Dear AE,
I reviewed the manuscript again. The great effort in improving the manuscript is highly appreciated.
The authors have addressed all comments.
Thank you

Associate Editor — ACCEPT — 7 May 2025

Dear EIC.
Previous errors have been corrected, and there are no further recommendations.

Editor-in-Chief — ACCEPT — 7 May 2025

Dear Authors,
Thank you for paying attention and responding to the reviewer's comments.
Your revisions have significantly improved the article, and it is now deemed acceptable for publication.
Congratulations on your hard work and dedication to enhancing the quality of your work.