Archives of Neuroscience
Volume 12 · Issue 4 · e164682

OPEN PEER REVIEW

Tractography-guided EMG Biofeedback in Stroke: An Exploratory Study of Plasticity and Motor Outcomes

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SUBMITTED	REVISED	ACCEPTED	DOI
9 Aug 2025	25 Aug 2025	30 Aug 2025	10.5812/ans-164682

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** Mohammad Ali Sahraian, Referee 1, Associate Editor, Editor-in-Chief 2
2 **Revision 1** Associate Editor, Editor-in-Chief 4
Authors' reply to reviewers 5
Reviewer and editor comments 10

1 Original submission

4 comments · 15 Aug 2025 – 16 Aug 2025

Mohammad Ali Sahraian Reviewer

MINOR REVISION 15 Aug 2025

The study is nicely designed, and the following comments may enhance the manuscript.
As stroke itself is an acute condition with residual disability, please omit the word "chronic in the text".
2. Did all patients have a stroke in the MCA territory?
3. Was there any influence of risk factors such as HTN, smoking or DM on recovery?

Referee 1 Reviewer

MAJOR REVISION 16 Aug 2025

Dear Author
The sample size is the major weakness of this study. With 12 participants, the results should be framed strictly as hypothesis-generating. Consider reducing emphasis on statistical significance (e.g., “p = 0.05”) and instead highlighting effect sizes, trends, and plausibility.

Results are lengthy and somewhat difficult to follow. Suggest restructuring into clearer subsections:

*Clinical outcomes

*EMG findings

*Imaging findings

*Structure–function associations

Associate Editor

MINOR REVISION 16 Aug 2025

Dear EIC,
This is a high-quality exploratory study, but the uncontrolled design and small sample require cautious interpretation. I recommend publication after substantial revision as requested by reviewers.
Also, minor changes should be made to the text:

1- The Discussion section is very comprehensive but occasionally reads more like a review article. I suggest condensing it to focus on: What was found (summarize main results in plain terms).
What it might mean mechanistically.
Why it is important despite limitations.

2- The Limitations section could be expanded to emphasize: lack of a control group, small sample size and potential selection bias, and no long-term follow-up.

Editor-in-Chief

MINOR REVISION 16 Aug 2025

Dear Author
Thank you for your submission. We have now completed the review process, and I am pleased to inform you that the reviewers found your work to be of interest and suitable for publication pending minor revisions.
The reviewers have provided constructive feedback to help improve the clarity and presentation of your

manuscript. I encourage you to carefully address each of the reviewers' comments and submit a revised version of your manuscript.
Please include a point-by-point response to the reviewers' comments, detailing the changes you have made. Once the revisions are complete, submit your revised manuscript through the online submission system. We will evaluate the revised version to ensure all concerns have been adequately addressed.

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 Editorial Board of Archives of Neuroscience,

We would like to express our sincere gratitude to the editorial board, associate editors, and reviewers for their careful evaluation of our manuscript, ***"Tractography-Guided EMG Biofeedback in Stroke: An Exploratory Study of Plasticity and Motor Outcomes."***

We have made every effort to address all comments thoroughly and have highlighted the corresponding revisions throughout the text. We are deeply appreciative of the reviewers' and editors' constructive feedback, which has greatly contributed to enhancing the clarity, rigor, and overall quality of the work.

We once again thank the editorial team for their guidance and for the opportunity to further refine our manuscript.

Dr. Anahita Torkaman-Boutorabi

Associate Editor:

1. ***Discussion section is very comprehensive but occasionally reads more like a review article. i suggest condensing on: What was found (summarize main results in plain terms). What it might mean mechanistically. Why it is important despite limitations.***

#1: We are very grateful for your insightful feedback on the Discussion section. We fully understand your point regarding its occasional resemblance to a review article, and we agree that a more focused structure would strengthen the manuscript. In light of your suggestion, we have carefully revised the Discussion to:

1. Provide a clearer and more concise summary of the main findings in plain terms.
2. Frame the potential mechanistic interpretations in a more focused manner.
3. Conclude with a balanced reflection on the importance of the findings, while openly acknowledging the study's limitations.

2. ***Limitations section could be expanded to emphasize: Lack of control group, small sample size and potential selection bias and no long-term follow-up.***

#2: We thank the reviewer for this helpful suggestion. The *Limitations* section has been expanded to note the absence of a control group, the small sample size, potential selection bias, and the lack of long-term follow-up, to provide clearer context for interpreting the findings.

Reviewer 1:

1.Could the authors clarify how the title and focus of the manuscript highlight novelty compared with prior works, such as Maier et al. (2019) on motor learning and brain plasticity and Aderinto et al. (2023) on neuroplasticity in stroke rehabilitation?

#1: We thank the reviewer for this valuable comment and for pointing out the overlap with existing review literature. We fully agree that the title should clearly reflect the exploratory and preliminary nature of our work and distinguish it from review articles on neuroplasticity and stroke rehabilitation. In response, we have revised the title to:

"Tractography-Guided EMG Biofeedback in Stroke: An Exploratory Study of Plasticity and Motor Outcomes."

2.The sample size is the major weakness of this study. With 12 participants, the results should be framed strictly as hypothesis-generating. Consider reducing emphasis on statistical significance (e.g., "p = 0.05") and instead highlight effect sizes, trends, and plausibility.

#2: We sincerely appreciate the reviewer's observation regarding the limitations of our small sample size. We fully agree that with only 12 participants, the results should be interpreted strictly as hypothesis-generating. In line with this recommendation, we have carefully revised the manuscript to reduce emphasis on statistical significance and instead highlight effect sizes, confidence intervals, and observable trends. Where p-values are reported, they are presented in the context of exploratory findings rather than definitive outcomes.

3.The sample size is not enough. The sample size in this study is small for this investigation.

#3: We sincerely thank the reviewer for this important observation regarding the limited sample size. We fully acknowledge that the number of participants is small for this type of investigation, and we have emphasized this more clearly in the revised Limitations section. The study is presented as exploratory, with findings framed as preliminary and hypothesis-generating, to be interpreted with caution and viewed as groundwork for future studies with larger, controlled cohorts.

In line with this, we have reduced emphasis on formal significance testing and instead highlighted effect sizes, trends, and plausibility. Group-level results are now complemented with individual-level trajectory plots to illustrate consistency across participants. We have also incorporated supplementary robustness checks, including bootstrap confidence intervals, outlier diagnostics, and Bayesian analyses, to enhance transparency and strengthen the presentation of findings.

Above all, we accept that the small sample size is a central limitation of this work, and we have taken careful steps to ensure that the findings are presented with appropriate caution and humility.

4. What about STROBE checklist

#4: We thank the reviewer for this comment. The manuscript has been revised to align with the STROBE checklist, which has also been completed and included as a supplementary file.

Material and Methods

5.Participants: What about patient consent form?

#5: We thank the reviewer for raising this important point. In the revised manuscript, we have placed greater emphasis on the informed consent process in the Participants section, detailing how consent was obtained and reinforced throughout the study. In addition, a sample of the signed informed consent form has been provided as supplementary material to ensure full transparency.

Result:

6. Demographics and Clinical Background: In this small population of patients these variabilities could affect the final conclusion.

#6: We appreciate the reviewer's observation regarding variability in demographics and clinical background. We agree that in a small population such heterogeneity could influence the outcomes, and we have explicitly acknowledged this limitation in the revised manuscript.

7. *Results are lengthy and somewhat difficult to follow. Suggest restructuring into clearer subsections: Clinical outcomes, EMG findings, Imaging findings, and Structure–function associations.*

#7: We thank the reviewer for the suggestion. The Results section has been reorganized into subsections (*Clinical Outcomes, EMG Findings, Imaging Findings,* and *Structure–Function Associations*) to improve clarity and readability.

Discussion:

8. Not need, because this is your aim. Wang R, Zhang S, Zhang J, Tong Q, Ye X, Wang K, et al. Electromyographic 510. biofeedback therapy for improving limb function after stroke: A systematic review and 511, meta-analysis. *PLOS ONE*. 2024;19

#8: We thank the reviewer for the comment and have edited this part.

Reviewer 2:

1. As stroke by its self is an acute condition with residual disability, please omit the word "chronic in the text"

#1: We thank the reviewer for this observation. In the revised manuscript, we have removed the word *“chronic”* where unnecessary, while retaining clarification of stroke chronicity only when specifying the post-acute phase of participants.

2. Did all patients had stroke in MCA territory?

#2: Yes, all participants had ischemic strokes in the middle cerebral artery (MCA) territory, and we have clarified this in the Participants section of the manuscript.

3. Was there any influence of risk factors such as HTN, smoking or DM or recovery?

#3: We thank the reviewer for this thoughtful question. All participants had a history of hypertension, two participants also had diabetes mellitus, and none were current smokers (though two male participants reported a history of smoking). Given the small sample size, it was not possible to conduct subgroup analyses to formally assess the influence of these risk factors on recovery outcomes. We have now noted this in the revised manuscript, emphasizing that while these comorbidities were present, the exploratory nature and limited cohort size preclude any firm conclusions regarding their impact on the observed findings.

4. Participants: All brain stem or only pons?

#4: We thank the reviewer for this important clarification. Participants with pontine lesions were excluded, and this has now been explicitly stated in the *Participants* section.

2 Revision 1

2 comments · 30 Aug 2025 – 30 Aug 2025

Associate Editor

ACCEPT 30 Aug 2025

Dear EIC,
I reviewed the manuscript ID 164682 after revision. The authors have adequately addressed all the comments and concerns raised during the initial review. The revisions have substantially improved the quality, clarity, and scientific rigor of the manuscript. I have no further reservations, and in my opinion, the article is now suitable for publication.

Editor-in-Chief

ACCEPT 30 Aug 2025

Dear Authors,

Thank you for addressing the identified issues and responding to my queries. Your revisions have substantially improved the manuscript, and it is now considered acceptable for publication. Congratulations on your hard work and commitment to enhancing the quality of your research.