

# Unveiling the Potential: Task-Based Bilateral Arm Training in Stroke Neurorehabilitation

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## COMMENTARY

My primary area of interest lies in neurorehabilitation, specifically focusing on upper limb recovery. I envision contributing to diagnostic methods and therapeutic strategies in rehabilitation to enhance neuronal and behavioural aspects of upper limb recovery. As a PhD research scholar immersed in the field of neurorehabilitation, my journey led me to explore the profound impact of task-based bilateral arm training (BAT) on individuals recovering from stroke. Through a systematic review and meta-analysis (1) “Gnanaprakasam, A., Karthikbabu, S., Ravishankar, N., & Solomon, J. M. (2023). Effect of task-based bilateral arm training on upper limb recovery after stroke: A systematic review and meta-analysis. *Journal of stroke and cerebrovascular diseases: the official journal of National Stroke Association*, 32(7), 107131. (Q1-Category, Impact factor-2.677) <https://doi.org/10.1016/j.jstrokecerebrovasdis.2023.107131>” Our published study sheds light on the multifaceted effects of BAT, unravelling its potential in enhancing recovery at the impairment level, refining movement quality, and paving the way for future investigations. The first noteworthy revelation from our systematic review is the enhanced recovery at the impairment level. Utilizing the Fugl-Meyer Assessment for Upper Extremity (FMA-UE), BAT emerged as a promising intervention for motor recovery in people with post-stroke. This finding marks a significant stride forward, suggesting that BAT

improvement in movement quality, as measured by the Motor Activity Log Quality of Movement (MAL-QOM), stands out as a distinctive advantage of BAT over unilateral arm training. This insight emphasizes BAT's capacity to refine motor skills, an aspect that is integral to the intricate process of neurorehabilitation. The implications of this improvement in movement quality extend beyond the clinic, hinting at the potential for BAT to foster meaningful improvements in daily life activities. However, as we celebrate these achievements, we encounter a critical juncture in our understanding. The benefits of task-based bilateral arm training appear less clear when it comes to activity performance and participation in real-life scenarios. This realization underscores the importance of further exploration, prompting a call to action for researchers and investigators to unravel the complexities of BAT's impact on the broader aspects of stroke recovery. So, we advocate for a shift towards more holistic outcome measures

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and therapeutic procedures, aligning with the International Classification of Functioning, Disability, and Health (ICF) guidelines that consider impairment, activity performance, and social participation. Looking ahead, our call for future research extends beyond the individual to embrace bimanual arm training that incorporates the practice of complex tasks, we have innovatively designed and developed a “Bilateral hand activity training manual” and copyrighted this exercise booklet at “Register of Copyrights, copyright office, Government of India, Registration number: L-124703/2023, dated: 12-06-2023. This manual addresses the eligibility criteria to perform BAT, selection of tasks, table wrap for BAT, required instruments for BAT practice and all the 26 task-specific tasks self-explained about task description, required objects for task progression, spatial-temporal parameters, and movements need to be emphasized during BAT practice. Instructions to the patients on how to use both hands, 26 activities spatial and temporal aspects of bilateral arm training, translating acquired skills into meaningful real-life activities (2). Moreover, it underscores the importance of preserving psycho-social and physical well-being, acknowledging the interconnectedness of mental and physical health in the rehabilitation journey. With the implementation of task-based bilateral arm activities, we are currently engaged in a trial investigating the "Effect of Enhanced Bilateral Hand Activity Training on Upper Limb Functional Recovery in People with Stroke - A randomized controlled trial." This trial is being compared with a standard physiotherapy program and has been duly registered in the Clinical Trial Registry of India. Through this trial, we aim to ascertain the effectiveness of incorporating task-based activities in upper limb training, both within clinical settings and for home practice, for individuals recovering from strokes. Our findings have the potential to provide valuable insights into the benefits of such an approach in enhancing upper limb functionality among stroke patients. Anticipating completion in the next couple of months, we are enthusiastic about contributing to the growing body of knowledge in stroke rehabilitation and improving the quality of care for those affected by this condition. During this trial, we observed intriguing behavior among stroke

patients with upper limb impairment, noting fluctuations in depressive symptoms and inconsistent adherence to upper limb exercises. This prompted us to conduct a cross-sectional study assessing total adherence percentage, depression symptoms, and other confounding variables. Our sample comprised 215 patients chosen through convenience sampling. We were involved as a team of neurologists, physiotherapists, and psychologists and conducted the study on “Association between depression and adherence to upper limb exercises among community-dwelling stroke survivors: A cross-sectional study.” Results revealed a robust association between depression and exercise adherence, indicating that the type of exercise had an impact on adherence, and stroke severity affected both depression and exercise adherence. Tailored intervention programs should be designed and implemented for stroke survivors with moderate depression. It should incorporate mental health support alongside physical rehabilitation to enhance overall well-being and increase adherence to exercise. Collaborative efforts between physiotherapists, neurologists, psychologists, and other multidisciplinary professionals may be necessary. Developing community-based support groups to provide additional motivation for exercise adherence. Importantly, implement regular monitoring and follow-up procedures to assess the mental health status of stroke survivors throughout their recovery. Lastly, continued research into effective strategies for promoting exercise adherence among stroke survivors with depression is crucial. Currently, this cross-sectional study is under review in a reputable journal. In conclusion, my passion lies in neurorehabilitation, particularly in unlocking the full potential of task-based bilateral arm training (BAT) in stroke neurorehabilitation. This journey is not solely about discovering the benefits; it's about shaping a future where BAT becomes an indispensable tool, bringing hope and meaningful recovery to individuals on the path to reclaiming their lives after stroke. In future, I have outlined research outcome measures and bilateral arm exercises for home practices.

## REFERENCES

1. Gnanaprakasam A, Karthikbabu S, Ravishankar N, Solomon JM. Effect of task-based bilateral arm training on upper limb recovery after stroke: A systematic review and meta-analysis. *Journal of Stroke and Cerebrovascular Diseases*. 2023 Jul 1;32(7):107131.
2. Alexander Gnanaprakasam, Suruliraj Karthikbabu, John M Solomon. [https://copyright.gov.in/Documents/ERegister/E-Register\\_June\\_2023.pdf](https://copyright.gov.in/Documents/ERegister/E-Register_June_2023.pdf). [cited 2024 Apr 21]. Bilateral Hand Activity Training Manual. Available from: [https://copyright.gov.in/ERegister\\_2023.aspx](https://copyright.gov.in/ERegister_2023.aspx)

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