

Recovery and Prediction of Bimanual Hand Use After Stroke

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Study Question

What are the key predictors of poststroke recovery of bimanual hand use?

What Is Known and What This Paper Adds

The recently developed Adult Assisting Hand Assessment Stroke (Ad-AHA) is a valid and reliable measure of poststroke recovery of bimanual hand use. This investigation's results show that shoulder abduction and finger extension measured with the corresponding Fugl-Meyer Assessment (FMA) items (FMA-SAFE) predicts Ad-AHA outcomes.

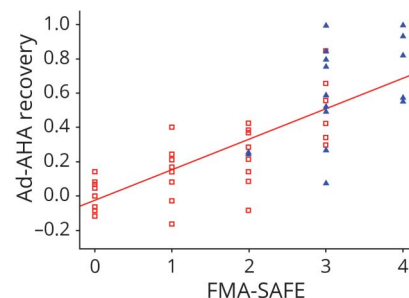
Methods

For this prospective longitudinal study, the investigators recruited 89 survivors of first-ever stroke events with arm paresis (74% male; mean age, 52.3 ± 9.4 years) through a neurorehabilitation clinic affiliated with a Swedish university hospital. The participants underwent assessments at 3 weeks, 3 months, and 6 months after stroke onset. The investigators assessed bimanual activity performance with the Ad-AHA and unimanual motor impairment with the FMA. The participants underwent MRI scans for measurements of weighted corticospinal tract lesion load (wCST-LL) and resting-state interhemispheric functional connectivity. Stepwise regression analysis was used to test candidate predictors of Ad-AHA outcomes, with FMA-SAFE being such a candidate. The primary outcomes were the predictors of Ad-AHA outcomes.

Results and Study Limitations

Initial Ad-AHA performance was poor but improved over time, and Ad-AHA scores positively correlated with FMA scores at all timepoints. In patients with moderate-to-severe initial FMA scores, FMA-SAFE scores were the strongest predictors of Ad-AHA outcomes ($r^2 = 0.81$) and the degree of recovery ($r^2 = 0.64$). Repeated analyses without FMA-SAFE scores identified

Figure Initial FMA-SAFE Scores and Ad-AHA Recovery



Relationship between FMA-SAFE scores at 3 weeks and Ad-AHA-measured recovery in patients with moderate (blue) and severe (red) initial FMA-measured motor impairments.

wCST-LLs, sensory and cognitive impairment as additional outcomes predictors, with wCST-LLs >5.5 cm³ strongly predicting low-to-minimal FMA/Ad-AHA recovery. This study provides Class I evidence that the FMA-SAFE predicts bimanual recovery after stroke. The present study's limitations include its unsuitability for evaluating age as a predictor of recovery outcomes and a relatively small patient sample given the number of independent variables tested.

Registration, Study Funding, and Competing Interests

This study was funded by the Promobilia Foundation, STROKEKeriksförbundet, NEURO Sweden, and Lars Hedlund (Karolinska Institutet Dnr 2-1582/2016) and was registered at ClinicalTrials.gov (NCT02878304). Dr. Lindberg owns shares in the company Aggero MedTech AB and has patented a method for measuring manual dexterity. Go to Neurology.org/N for full disclosures.

A draft of the short-form article was written by M. Dalefield, a writer with Editage, a division of Cactus Communications. The corresponding author(s) of the full-length article and the journal editors edited and approved the final version.

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CORRECTION

Recovery and Prediction of Bimanual Hand Use After Stroke

In the Research Article “Recovery and Prediction of Bimanual Hand Use After Stroke” by Plantin et al.¹, the Outcome–Ad-AHA–R2 column of eTable1 contained incorrect values. A corrected version is available at <http://doi.org/10.5281/zenodo.5054068> as Version 2. The authors regret the error.

REFERENCE

¹Plantin J, Verneau M, Godbolt AK, et al. Recovery and Prediction of bimanual hand use after stroke. *Neurology*. 2021;97(7):e706-e719.

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