Comparing neuroplasticity changes between high and low frequency gait training in subacute stroke: Protocol for a randomized, single-blinded, controlled study

ABSTRACT

Walking recovery post stroke can be slow and incomplete. Determining effective stroke rehabilitation frequency requires the assessment of neuroplasticity changes. Neurobiological signals from electroencephalogram (EEG) can measure neuroplasticity through incremental changes of these signals after rehabilitation. However, changes seen with a different frequency of rehabilitation require further investigation. It is hypothesized that the association between the incremental changes from EEG signals and the improved functional outcome measure scores are greater in higher rehabilitation frequency, implying enhanced neuroplasticity changes. The purpose of this study is to identify the changes in the neurobiological signals from EEG, to associate these with functional outcome measures scores, and to compare their associations in different therapy frequency for gait rehabilitation among subacute stroke individuals. A randomized, single-blinded, controlled study among patients with subacute stroke will be conducted with two groups: an intervention group (IG) and a control group (CG). Each participant in the IG and CG will receive therapy sessions three times a week (high frequency) and once a week (low frequency), respectively, for a total of 12 consecutive weeks. Each session will last for an hour with strengthening, balance, and gait training. The main variables to be assessed are the 6-Minute Walk Test (6MWT), Motor Assessment Scale (MAS), Berg Balance Scale (BBS), Modified Barthel Index (MBI), and quantitative EEG indices in the form of delta to alpha ratio (DAR) and delta-plus-theta to alpha-plus-beta ratio (DTABR). These will be measured at preintervention (R0) and postintervention (R1). Key analyses are to determine the changes in the 6MWT, MAS, BBS, MBI, DAR, and DTABR at R0 and R1 for the CG and IG. The changes in the DAR and DTABR will be analyzed for association with the changes in the 6MWT, MAS, BBS, and MBI to measure neuroplasticity changes for both the CG and IG. We have recruited 18 participants so far. We expect to publish our results in early 2023. Conclusions: These associations are expected to be positive in both groups, with a higher correlation in the IG compared to the CG, reflecting enhanced neuroplasticity changes and objective evaluation on the dose-response relationship.