

## **Telerehabilitation In The Home Versus Therapy In-Clinic For Patients With Stroke**

An assessor-blind, randomized, non-inferiority, multisite StrokeNet clinical trial

Stroke remains a leading cause of human disability. Rehabilitation therapy can help. The quantity of rehab matters, as higher doses can provide greater benefits. Most patients do not get a large therapy dose, however, for reasons that include high cost, difficulty traveling to a provider, few care providers regionally, and low patient compliance with assignments. The quality of rehab matters, as well. Greater gains are associated with therapy that is challenging, motivating, accompanied by appropriate feedback, interesting, and relevant.

These points suggest that telerehabilitation may be useful to stroke survivors. Telerehabilitation can be defined as provision of rehab services using telecommunications technology. In our pilot study of home-based telerehab (Neurorehab Neural Repair. 2017; 31:923-933), we found excellent (979%) compliance with assignments and significant arm motor gains--and subjects did not need any computer skills given the design of our telerehab system.

The current trial built on these findings and directly compared home-based telerehab to dose-matched traditional in-clinic therapy. A total of 124 subjects was enrolled, each receiving 36 sessions of 70-min duration, targeting arm motor function, over 6-8 weeks. Half of the sessions were supervised by a licensed occupational/physical therapist (live visits, for in-clinic group; or videoconference with the telerehab system, for telerehab group) and half were unsupervised (written homework, for in-clinic group; or using the telerehab system, for telerehab group).

Subjects were on average 61 years old, 4.5 months post-stroke, and had moderate arm motor deficits at study entry. When examined 30 days after the end of therapy, subjects in the in-clinic group improved by 8.4 points on the Fugl-Meyer scale, which measures arm motor status and ranges from 0 to 66 with higher numbers being better. Subjects in the telerehab group improved by 7.9 points, and this difference was not significant with respect to the prestated cutoff. Telerehab was found to be non-inferior to in-clinic therapy.

This study demonstrated that telerehab has comparable efficacy to therapy provided in-clinic for improving arm motor status after stroke. Arm motor gains were substantial and suggest functional value for most enrollees. The current findings support the utility of a computer-based system in the home, used under the supervision of a licensed therapist, to provide clinically meaningful rehab therapy. Future applications might examine longer-term treatment, pair home-based telerehab with long-term dosing of a restorative drug, treat other neurological domains affected by stroke (such as language, memory, or gait), or expand the home treatment system to build out a smart home for stroke recovery.

This study was made possible by support from the National Institutes of Health (U01 NS091951), the NIH StrokeNet Clinical Trials Network, the 11 US enrollment sites, the research team at the primary study site at the University of California, Irvine, and the patients/families who took part.