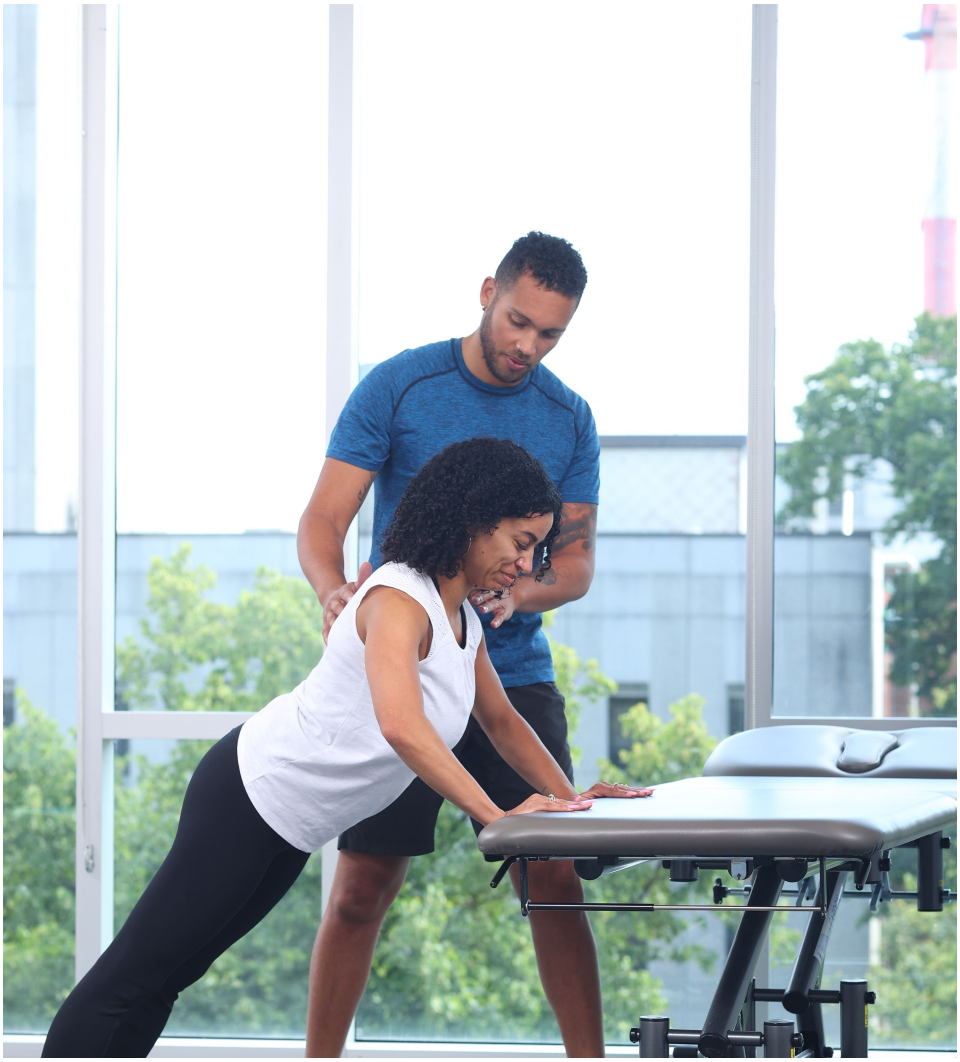


# FINDING THE OPTIMAL TIME TO DELIVER INTENSIVE MOTOR REHAB AFTER STROKE

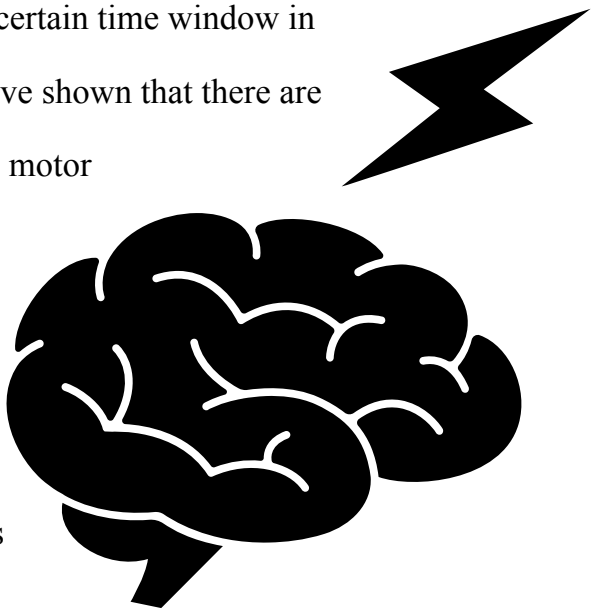
*By Janice Eng PhD PT*

## KEY POINTS

1. Intensive motor rehabilitation involving high repetitions of practice are most effective when applied at 2-3 months after stroke compared to earlier or later time points
2. Most patients will have been discharged home by 2-3 months post-stroke.
3. Outpatient, community or home based programs will be critical to ensuring that patients receive intensive motor rehabilitation in this optimal window of recovery

## Background and objective

An important aspect of stroke recovery is brain function restoration and the degree of neuroplasticity an individual has. It is theorized that there is a certain time window in which optimal neuromotor recovery occurs. Animal models have shown that there are certain critical time periods post-stroke that benefit most when motor rehabilitation is applied. A phase 2, randomized control trial called the Critical Periods After Stroke Study (CPASS) was designed and used to test if different time periods of recovery are responsive to intensive motor training. The purpose of this study was to determine the critical time periods in human stroke patients.



> *"CPASS is the first early stroke rehabilitation trial in humans to demonstrate superior recovery of UE motor function in an experimental group"*

## Methods

72 stroke patients were randomized to receive 20 additional hours of task specific motor therapy at three timeframes:

(a) Less than 30 days (acute),

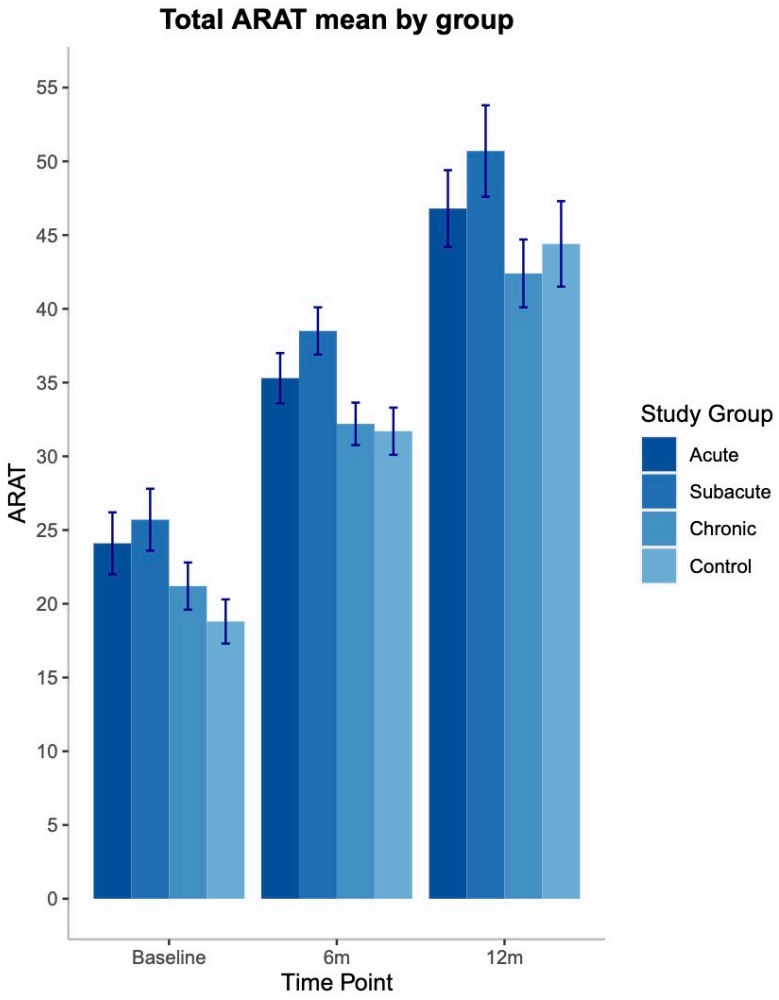
(b) 2 to 3 months (subacute)

(c) More than 6 months (chronic) after stroke

A control group received standard motor rehabilitation. The primary outcome measure was the upper extremity function measured by the Action Research Arm Test (ARAT) at 1 year after stroke.

## Results

- After one year, the group that made the most gains in upper extremity motor function compared to the control group was the subacute group (2-3 months after stroke)
- The acute group made smaller, but significant gains
- The chronic group did not make significant gains
- These results mirror what was found in animal models and confirm a heightened period of neuroplasticity after a stroke




## Limitations

The study was unique in including so many groups at different times post-stroke. However, the number of participants per group (16) was relatively small which limits the generalizability of the study.

## Clinical Implications

Understanding heightened periods of neuroplasticity can help to deliver motor rehabilitation treatments when they will benefit the most. Physical therapists will need to structure intensive motor rehabilitation around this window of time, and this may require coordinating outpatient, community or home programs since most patients will have returned home by 2-3 months after stroke.

## STUDY REFERENCE

**Dromerick AW, Geed S, Barth J, Brady K, Giannetti ML, Mitchell A, Edwardson MA, Tan MT, Zhou Y, Newport EL, Edwards DF. Critical Period After Stroke Study (CPASS): A phase II clinical trial testing an optimal time for motor recovery after stroke in humans. Proc Natl Acad Sci U S A. 2021 Sep 28;118(39):e2026676118**

## ABOUT THE REVIEWER

Janice Eng, PhD PT is a Professor and Canada Research Chair in Neurological Rehabilitation at the University of British Columbia. She is also Director of the Rehabilitation Research Program at the GF Strong Rehab Centre. She developed the GRASP Program (neurorehab.med.ubc.ca) shown to improve arm and hand function and FAME Program (fameexercise.com) shown to improve fitness and mobility after stroke. Both of these programs are free to access and are used in over 50 countries.