PHASE I (0-6 months: Study preparation)
5 educational courses and testing reliability and validity of measurement instruments

PHASE II (6-48 months: Intervention phase)
2 RCTs (projects A1 and A2)

High probability of the return of dexterity in the 2nd week post stroke (project A1) (N=60)

Low probability of the return of dexterity in the 2nd week post stroke (project A2) (N=120)

RCT: project A1

Investigating the impact of early CIMT with shaping exercises for 3 weeks compared to conventional care alone (project A1), starting in the 2nd week post stroke (6-48 months)

RCT: project A2

Investigating the impact of EMG-NMS of wrist and finger extensors for 3 weeks compared to conventional care (project A2), starting in the 2nd week post stroke (6-48 months)

In a selected group of patients (N=30) with a favourable prognosis will be investigated by functional Magnetic Resonance Imaging (fMRI), Trans Cranial Magnetic Stimulation (TMS) (Project B1) haptic robotics (Project B3) and upper limb performance (project B2).

In addition, 30 patients with poor prognosis will be selected in UMC Utrecht for TMS and 30 for haptic Robotics in LUMC for comparison.

Exploring behavioural compensation while grasping with the paretic arm (N=30) (Project B2)
Exploring the longitudinal relationship between corticospinal integrity on development of peripheral myotatic reflex activity and stiffness of upper limb with haptic robots (N=30) (project B3)

Exploring intactness of corticospinal tract with TMS in the first week and 26 weeks post stroke. Investigating cortical reorganization with fMRI as soon as possible (i.e., first extension of wrist and fingers) and at the 4th week and 26th week post stroke (N=30) (Project B1)

PHASE III: (48-54 months)
Exploring longitudinal recovery profiles of impairments and activities (project C) and investigating quasi-causal relationships of neurological deficits with kinematics (project B3) and observed changes (project B1) on fMRI and TMS by first-order autoregressive (Markov) modeling.

Phase IV (54-60 months)
Dissemination of knowledge