

# Self-directed upper limb rehabilitation following stroke

<b>Submission date</b>	<b>Recruitment status</b>	<input type="checkbox"/> Prospectively registered
27/12/2019	No longer recruiting	<input checked="" type="checkbox"/> Protocol
<b>Registration date</b>	<b>Overall study status</b>	<input type="checkbox"/> Statistical analysis plan
09/01/2020	Completed	<input checked="" type="checkbox"/> Results
<b>Last Edited</b>	<b>Condition category</b>	<input type="checkbox"/> Individual participant data
08/01/2020	Circulatory System	

## Plain English summary of protocol

### Background and study aims

In traditional motor rehabilitation training, patients practice repetitive limb movements aimed at improving motor function with the help of physical therapists. However, this training paradigm requires extensive training periods for patients and intensive labor for therapists. We aimed to build an EEG-based active engagement monitoring system that can be applied to various motor task of stroke patients.

### Who can participate?

Patients aged 18 to 70 years old who have suffered their first stroke

### What does the study involve?

Participants will be required to perform three simple motor tasks whilst brain activity is monitored using EEG equipment.

### What are the possible benefits and risks of participating?

Benefit : contributing to research that may support the rehabilitation for the stroke in the future

Risk : No risks by executing three motor task(motor execution by themselves(Active task) or robot assist(Passive task)/ by imaging motor task (MI task)

### Where is the study run from?

Samsung Medical Center, South Korea

### When is the study starting and how long is it expected to run for?

January 2013 to August 2014

### Who is funding the study?

The Korea Institute of Science and Technology (KIST), South Korea

### Who is the main contact?

Dr Laehyun Kim

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# Contact information

## Type(s)

Scientific

## Contact name

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# Additional identifiers

## Clinical Trials Information System (CTIS)

Nil known

## ClinicalTrials.gov (NCT)

Nil known

## Protocol serial number

KIST 2013-009; SMC 2013-02-091

# Study information

## Scientific Title

Development of Robot-assisted Motor Rehabilitation of the Upper Limb Using Bio-signal Interface

## Study objectives

The present study aimed to gauge patient engagement during rehabilitation training using an EEG-based BCI. We hypothesize that information related to motor task engagement can be extracted from distinct neural activity patterns associated with each motor task.

## Ethics approval required

Old ethics approval format

## Ethics approval(s)

Approved 17/10/2013, Institutional Review Board of both Korea Institute of Science and Technology (Hwarangno 14-gil 5, Seongbukgu, Seoul 02792, Republic of Korea; +82-2-958-6929; yeeun.lee@kist.re.kr), ref: KIST 2013-009

**Study design**

Observational cross-sectional study

**Primary study design**

Observational

**Study type(s)**

Diagnostic

**Health condition(s) or problem(s) studied**

Stroke

**Interventions**

In order to obtain the characteristics of brain networks of chronic stroke patients during upper limb movements for rehabilitation, participants performed grasp movements with the affected hand by collecting their EEG signals. The haptic device in the experiment was controlled by a DSP processor, and it was synchronized with a stimulation program by FlashTM. This stimulus of haptic was connected to EEG System (sampling rate: 2048 Hz; Active-two, BiosemiTM, Amsterdam, Netherlands).

The experimental protocol included the following three motor tasks: an active task to be executed by a voluntary movement; a passive task to be executed using a robotic device; and a motor imagery task in which participants were instructed to imagine their movement without any physical movement. Each task involved 42 trials.

For each trial, participants fixed their gaze on the monitor for 2 or 3 s, after which they performed the motor task for 2 s after the visual and auditory cues. Participants maintained their grasping movement for 1 s, after which they were asked to release the handle while the robotic device returned it back to its starting position

**Intervention Type**

Behavioural

**Primary outcome(s)**

1. Brain activity measured using EEG data collected at the time of participation
2. Device data measured using the device log data collected at the time of participation

**Key secondary outcome(s)**

1. Months after stroke onset at time of participation measured using patient records
2. Diagnosis at time of participation measured using patient records
3. Arm mobility measured using the upper-FMA score at time of participation

**Completion date**

13/08/2014

# Eligibility

## Key inclusion criteria

1. First ischemic or cerebral hemorrhagic stroke, which lasted over 3 months after onset
2. Between 18 and 70 years old

## Participant type(s)

Mixed

## Healthy volunteers allowed

No

## Age group

Adult

## Lower age limit

18 years

## Sex

All

## Total final enrolment

16

## Key exclusion criteria

1. Intracranial metal insertion
2. Claustrophobia
3. Pacemakers
4. Prohibited from taking MRI

## Date of first enrolment

04/01/2013

## Date of final enrolment

13/08/2014

# Locations

## Countries of recruitment

Korea, South

## Study participating centre

Samsung Medical Center

81 Irwon-Ro Gangnam-gu

Seoul

Korea, South

02878

# Sponsor information

## Organisation

Korea Institute of Science and Technology

## ROR

<https://ror.org/05kzfa883>

## Funder(s)

### Funder type

Research organisation

### Funder Name

Korea Institute of Science and Technology

### Alternative Name(s)

KIST

### Funding Body Type

Government organisation

### Funding Body Subtype

Local government

### Location

Korea, South

## Results and Publications

### Individual participant data (IPD) sharing plan

All data generated or analysed during this study will be included in the subsequent results publication.

### IPD sharing plan summary

Other

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>	results	14/12/2015	08/01/2020	Yes	No
<a href="#">Results article</a>	results	02/03/2016	08/01/2020	Yes	No

<a href="#"><u>Results article</u></a>	results	01/08/2017	08/01/2020	Yes	No
<a href="#"><u>Protocol article</u></a>	protocol	01/05/2015	08/01/2020	Yes	No
<a href="#"><u>Participant information sheet</u></a>	Participant information sheet	11/11/2025	11/11/2025	No	Yes
<a href="#"><u>Study website</u></a>	Study website	11/11/2025	11/11/2025	No	Yes