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Helsinki improved transcranial magnetic stimulation for depression

Submission date	Recruitment status	[X] Prospectively registered
26/05/2021	No longer recruiting	[ ] Protocol
Registration date	**Overall study status**	[ ] Statistical analysis plan
01/06/2021	Completed	[ ] Results
Last Edited	**Condition category**	[ ] Individual participant data
14/02/2025	Mental and Behavioural Disorders	[X] Record updated in last year

Plain English summary of protocol

Background and study aims
The symptoms of depression can be complex and vary widely between people. If you're depressed, you may feel sad, hopeless and lose interest in things you used to enjoy. Transcranial magnetic stimulation (TMS) is a noninvasive procedure that uses magnetic fields to stimulate nerve cells in the brain to improve symptoms of depression. TMS is typically used when other depression treatments haven't been effective.
The present randomized study aims to test whether a new targeting method of repetitive transcranial magnetic stimulation (rTMS) improves outcomes in depression and to develop imaging-based targeting of TMS further.

Who can participate?
Patients referred to the Helsinki University Central Hospital for rTMS for major depressive disorder (MDD) are asked to participate.

What does the study involve?
The study involves a 2-hour visit to Aalto University Advanced Magnetic Imaging Centre for magnetic resonance imaging (MRI). This is followed by a 2-hour meeting with a psychiatrist including an interview and definition of dose and possible targets for the treatment. A nurse delivering the treatment uses a randomized list to select the targeting method, and participants and researchers who evaluate the outcome are blind to the method. TMS is delivered 5 times a week for up to 20 sessions or remission and continued 5 more times in case of partial response.

What are the possible benefits and risks of participating?
Possible benefits of the study include improved outcomes of rTMS treatment and risks resemble those of usual TMS treatment, including uncomfortable stimulation site sensations and a small risk of seizure.

Where is the study run from?
Helsinki University Central Hospital Department of Psychiatry (Finland) in collaboration with researchers at the Aalto University and Massachusetts General Hospital (USA)

When is the study starting and how long is it expected to run for?
May 2021 to February 2025

Who is funding the study?
Finnish government funding for the health care research and the Helsinki and Uusimaa Hospital District.

Who is the main contact?
Dr Tuukka Raij, tuukka.raij@hus.fi

Contact information

Type(s)
Scientific

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Additional identifiers

EudraCT/CTIS number
Nil known

IRAS number

ClinicalTrials.gov number
Nil known

Secondary identifying numbers
HUS/1232/2021

Study information

Scientific Title
Helsinki Improved Transcranial magnetic stimulation vs treatment as usual for depression

Acronym

HIT

Study objectives
Helsinki Improved Transcranial magnetic stimulation reduces depression symptoms more than usual Transcranial magnetic stimulation

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 19/05/2021, HUS Ethics committee IV (PL 705, 00029 HUS Biomedicum Helsinki 2 C 7. krs, Tukholmankatu 8 C, Helsinki, Finland; +358403594618; eettiset.toimikunnat@hus.fi), ref: HUS/1232/2021

Study design
Interventional double-blind randomized controlled trial

Primary study design
Interventional

Secondary study design
Randomised controlled trial

Study setting(s)
Other

Study type(s)
Treatment

Participant information sheet
Not available in web format, please use the contact details to request a patient information sheet.

Health condition(s) or problem(s) studied
Major depressive disorder

Interventions
Participants are randomized 1:1 to receive transcranial magnetic theta burst stimulation with
1. Regular targeting method based on skull metrics, or
2. Individually planned targeting based on functional imaging

The research nurse who delivers treatment uses balanced lists for randomization, while researchers who evaluate the outcome and the patient remain blind to the treatment arm. Theta burst stimuli are delivered at 110 - 120% (or nearest tolerated) of motor threshold five times a week for maximum of 25 days.

Intervention Type
Device

Phase
Not Applicable

Drug/device/biological/vaccine name(s)
Transcranial magnetic stimulation

Primary outcome measure
Current primary outcome measure as of 03/06/2021:

Montgomery Åsberg Depression Rating Scale (MADRS) rated by research team psychiatrist before, and within two weeks after treatment

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Previous primary outcome measure:

Montgomery Åsberg Depression Rating Scale (MADRS) rated by research team psychiatrist before, and within one week after treatment

Secondary outcome measures
Current secondary outcome measures as of 03/06/2021:

1. Social and occupational functioning scale (SOFAS) rated by research team psychiatrist before and within 2 weeks after treatment
2. Self-evaluated Patient health questionnaire (PHQ-9) measured before and within 2 weeks after treatment and 6 weeks after treatment
3. Remission defined as MADRS <11 within 2 weeks after treatment (rated by research team psychiatrist)
4. Response defined as MADRS within 2 weeks after treatment >50 % less than MADRS before treatment (rated by research team psychiatrist)

Previous secondary outcome measures:

1. Social and occupational functioning scale (SOFAS) rated by research team psychiatrist before and within one week after treatment
2. Self-evaluated Patient health questionnaire (PHQ-9) measured before and within one week after treatment and six weeks after treatment
3. Remission defined as MADRS <11 within one week after treatment (rated by research team psychiatrist)
4. Response defined as MADRS within one week after treatment >50 % less than MADRS before treatment (rated by research team psychiatrist)

Overall study start date
19/05/2021

Completion date
28/02/2025

Eligibility

Key inclusion criteria

1. Diagnosis of major depressive disorder (DSM-IV) as the principal diagnosis with Patient Health Questionnaire-9 score >14
2. Inability to tolerate antidepressant medication or unresponsiveness to minimum of 2 months trial with adequate dose of antidepressant
3. No change in antidepressive medication in four weeks prior to treatment

Participant type(s)
Patient

Age group
Adult

Sex
Both

Target number of participants
Independent data monitoring group conducts interim analysis at n = 40 with stopping rules p < 0.005 or a new power calculation suggesting power < 80 % to detect group difference with p < 0.048 with n = 80

Total final enrolment
94

Key exclusion criteria
1. Previous rTMS treatment
2. Borderline personality features exceeding 7 points in McLean Screening Instrument for Borderline Personality Disorder, or other somatic or psychiatric conditions that likely interfere with recovery from depression with TMS (an unstable medical illness, substantial neurological illness, chronic pain, psychotic disorder or current psychotic symptoms, substance abuse or dependency within last 3 months, >2 mg lorazepine equivalents benzodiazepine use daily or any anticonvulsant, or lifetime history of non-response to an adequate course—ie, a minimum of eight treatments—of electroconvulsive therapy)
3. Patients with safety risks including active suicidality, pregnancy, magnetic metal or leads in the upper body, or history of seizures

Date of first enrolment
14/06/2021

Date of final enrolment
31/12/2024

Locations

Countries of recruitment
Finland

Study participating centre
Helsinki University Central Hospital
Department of Psychiatry

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Sponsor information

Organisation
Hospital District of Helsinki and Uusimaa

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Sponsor type
Hospital/treatment centre

ROR
https://ror.org/020cpqb94

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
Hospital District of Helsinki and Uusimaa

Results and Publications

Publication and dissemination plan
Findings are published in congress abstracts and peer reviewed Journals.

Intention to publish date
31/05/2026

Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study are not expected to be made available due to the need to protect privacy of the participants. Psychiatric patients are unfortunately still sometimes discriminated and publishing detailed individual data collected in the present study would possess a risk of identification.

IPD sharing plan summary

Not expected to be made available