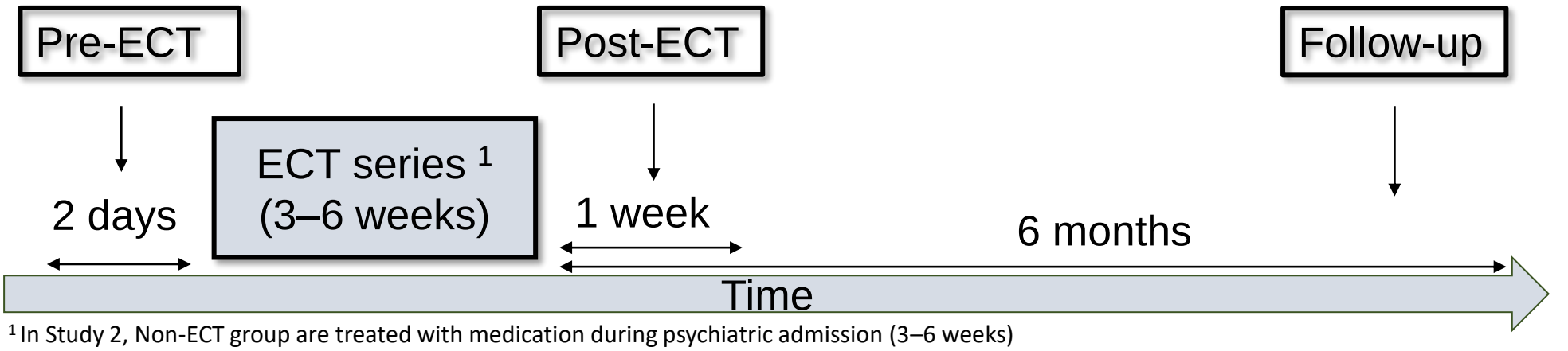
Site: Glostrup, PIs: Poul Videbech, Krzysztof Gbyl, Christoffer C. Lundsgaard, André Mathiassen
See also: https://docs.google.com/spreadsheets/d/1A2XvReFckhAeMr1ak_vBA258OF5zXL0zQwtJj6VvGQk/edit#gid=0

Overview

Nr	Name (Clinicaltrial.gov)	Design	Inclusion	Diagnosis	Sample size Current/Target	Intervention	Data collection time points
1	ECT/MRI (NCT03040388)	Observational	2017-2019	MDD or BD	22/N.A.	ECT series	3
2	DANSECT & PREDICT (NCT04160286)	Observational	2019-	MDD or BD MDD or BD	14/30 7/30	ECT series Non-ECT	3 3

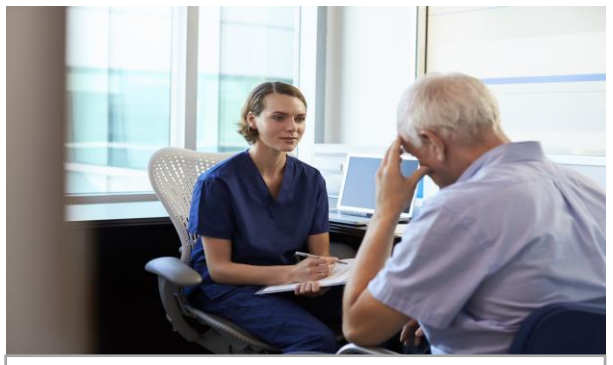
N.A.: Not Applicable, MDD: Major Depressive Disorder, BD: Bipolar Depression, Non-ECT: medication during psychiatric admission (3–6 weeks)

Design



[1] In Study 2, Non-ECT group are treated with medication during psychiatric admission (3–6 weeks)

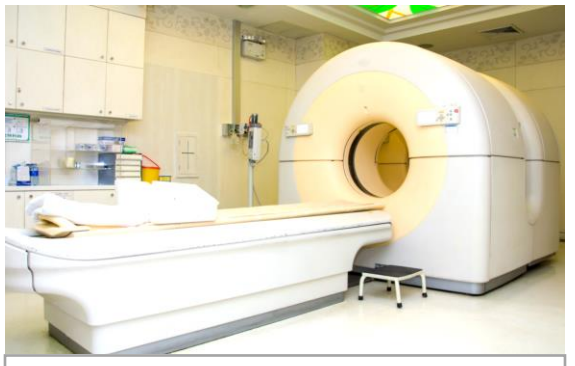
Data



Depression severity
- HAMD-17

Neuropsychological tests
- SCIP
- CAMI-SF [1]
- Vocabulary & Digit span (WAIS-IV) [2]
- Rey-Osterrieth Complex Figure [2]
- Trail Making Test A+B [2]
- Design fluency [2]
- Color-Word Interference (D-KEFS) [2]
- Paired Associates Learning (CANTAB) [2]
- Symbol Digit Modalities [2]

Questionnaires
- COBRA
- SSMQ
- MDI [2]



Anatomical
- T1
- T2
- FLAIR

Microstructural
- DWI
- DTI

Functional
- resting state fMRI
- ASL
- MRS [2]

Full blood, serum, and plasma
- BDNF & VEGF
- Glial cell protein S100B
- microRNAs [2]
- Cytokines [2]
- Metabolomics [2]

Urine
- BDNF & VEGF [2]
- microRNAs [2]

Hair
- Cortisol [2]

[2] Collected only in study 2

GEMRIC
The Global ECT-MRI Research Collaboration

Site: Glostrup, **PIs:** Poul Videbech, Krzysztof Gbyl, Christoffer C. Lundsgaard, André Mathiassen

Main hypotheses

Seizure
↓
Prefrontal inhibitory process
↓
Modulation of prefrontal circuits
↓
Clinical improvement

Electric current
↓
Hippocampal hypermetabolic process
↓
Hippocampal dysfunction
↓
Memory impairment

ECT research focus

- Mechanisms of:
  - therapeutic effect
  - memory impairment

- Biomarkers of:
  - remission
  - relapse
  - memory impairment

Major findings

1. ECT increases the volume of **both** the dentate gyrus and other hippocampal subregions.
2. The hippocampal enlargement is associated with **memory impairment**.
3. ECT increases the **frontotemporal cortical thickness**, which, in some areas, correlates with clinical effect.
4. The ECT-related increase in gray matter is **temporary**.

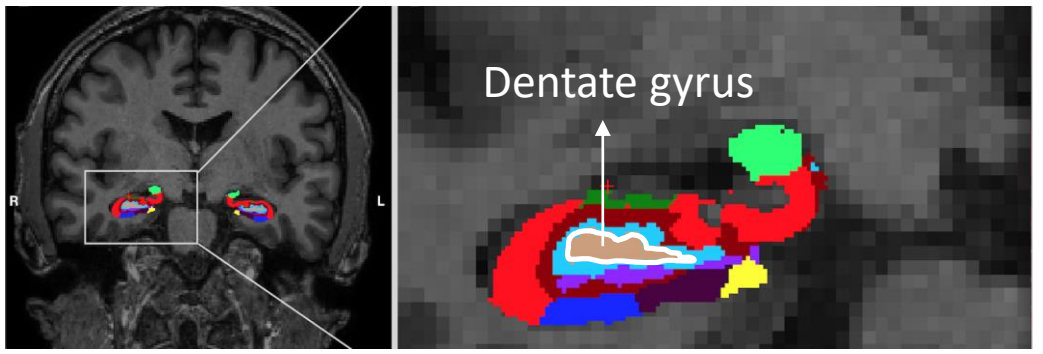


Fig. 1 Hippocampal subregions (Ref. 2)

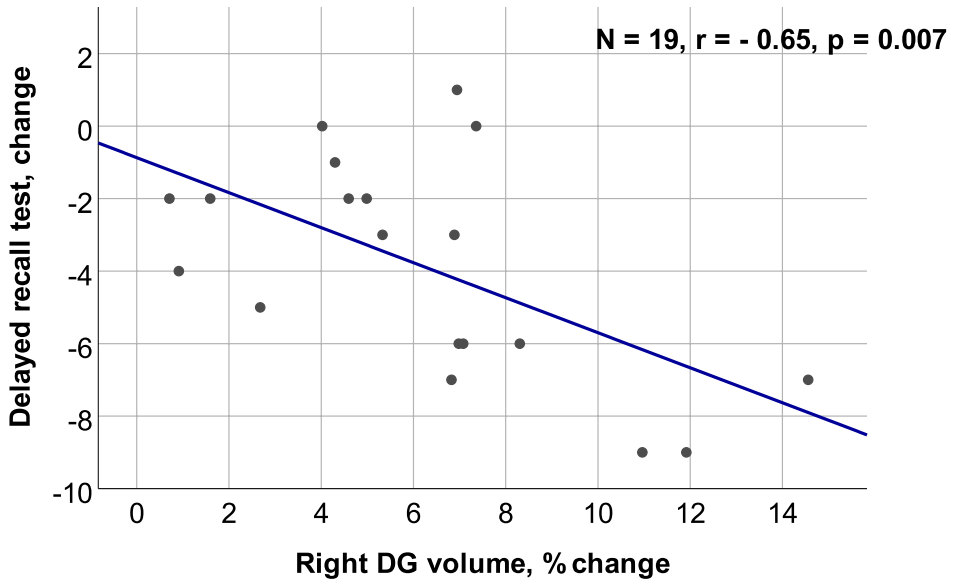


Fig. 2 Relationship between post-pre ECT change in volume and memory.
r : partial correlation coefficient after adjusting for age, gender, and number of ECT sessions

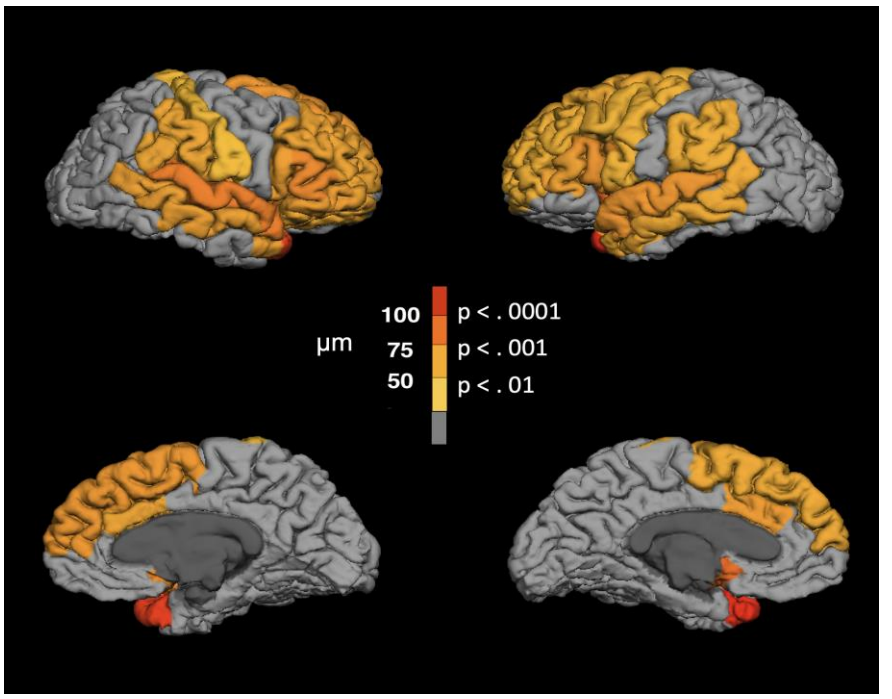


Fig. 3 Cortical regions with significant increase in thickness immediately after ECT series (the yellow-red spectrum). Regions with insignificant change are displayed in gray. The figure is reused (after modification), in accordance with Wiley and Sons copyright policy. The original figure has been published in Ref. 4.

References (max 5) to ECT related research

1. Gbyl K, Jørgensen NR, Videbech P. Serum S100B protein after electroconvulsive therapy in patients with depression. *Acta Neuropsychiatr. 2022;* 1–7.
2. Gbyl K, Støttrup MM, Mitta Raghava J, Xue Jie S, Videbech P. Hippocampal volume and memory impairment after electroconvulsive therapy in patients with depression. Acta Psychiatr Scand. 2021;143(3):238-252
3. Gbyl K, Rostrup E, Raghava JM, Andersen C, Rosenberg R, Larsson HBW, Videbech P. Volume of hippocampal subregions and clinical improvement following electroconvulsive therapy in patients with depression. Prog Neuropsychopharmacol Biol Psychiatry. 2021; 104:110048
4. Gbyl K, Rostrup E, Raghava JM, Carlsen JF, Schmidt LS, Lindberg U, Ashraf A, Jørgensen MB, Larsson HBW, Rosenberg R, Videbech P. Cortical thickness following electroconvulsive therapy in patients with depression: a longitudinal MRI study. Acta Psychiatr Scand. 2019;140(3):205-216
5. Gbyl K & Videbech P. Electroconvulsive therapy increases brain volume in major depression: a systematic review and meta-analysis. Acta Psychiatr Scand. 2018;138(3):180-195

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