rTMS Implementation in ELFT (East London Foundation Trust): A Prospective Clinical Study

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Aims: To evaluate the effectiveness and safety of repetitive transcranial magnetic stimulation (rTMS) in treating treatment-resistant depression (TRD), with a focus on changes in depression severity measured by the Montgomery–Åsberg Depression Rating Scale (MADRS) and the Hamilton Depression Rating Scale (HAMD).
Methods: A prospective clinical trial was conducted with 15 patients diagnosed with TRD, defined as having failed at least two adequate antidepressant trials. rTMS was administered using a left dorsolateral prefrontal cortex (DLPFC) protocol, with sessions delivered five times per week over six weeks for the majority of participants. Depression severity was assessed using MADRS and HAMD scores both before and after treatment. Adverse events were monitored throughout the study. Paired t-tests were used to analyse changes in MADRS and HAMD scores, with statistical significance set at $p<0.05$. Effect sizes were calculated using Cohen's d.
Results: The average MADRS score decreased from 35.33 pre-intervention to 24.67 post-intervention, reflecting a mean reduction of 10.67 points and a large effect size (Cohen's d=1.23). Similarly, HAMD scores decreased from 22.83 to 13.67, with a mean reduction of 9.17 points and a large effect size (Cohen's d=0.98). While most patients demonstrated significant improvement, one patient experienced worsening symptoms. Adverse events were generally mild, with 7 patients reporting no side effects and 4 reporting mild pain at the stimulation site.
Conclusion: rTMS appears to be an effective and well-tolerated treatment option for reducing depressive symptoms in patients with TRD. The significant reductions in MADRS and HAMD scores, along with large effect sizes, support the potential of rTMS as a therapeutic intervention for this population. Further research with larger sample sizes, including the use of a control group, is needed to confirm these findings and explore the long-term efficacy of rTMS in managing TRD.

The Effect of the Ketogenic Diet on Aggression and Violence in Patients with Severe Mental Illness: A Systematic Review

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Aims: The aim of this systematic review was to explore the existing literature on the impact of the ketogenic diet on aggressive and violent behaviour in patients with serious mental illness and the potential mechanisms involved, with the hypothesis that the ketogenic diet can reduce aggression and violence in this patient population. The ketogenic diet has proven to be useful as a therapeutic to reduce some clinical symptoms of certain neurological and psychiatric conditions, so this review was interested to determine if there were any correlations in impacts on behaviour in similar patient populations.
Methods: Following the PRISMA guidelines, a systematic review was conducted of the bibliographic databases MEDLINE, PsycINFO, Scopus, Web of Science, Cochrane Library, PubMed and Open Grey. The sources retrieved were narrowed down using specific inclusion and exclusion criteria and quality appraisal of the relevant sources was carried out using the Joanna Briggs Institute critical appraisal tools.
Results: Of the 32 sources included in the final review, 26 of these, when linked together by association, supported the concept of the ketogenic diet reducing aggression either directly or indirectly via metabolites upon which the ketogenic diet can impact. Increased β-hydroxybutyrate, γ-aminobutyric acid and brain-derived neurotrophic factor were all observed when following the ketogenic diet and were, in most cases, associated with reduced aggression.
Conclusion: Despite the limited literature available on the topic, the majority of the relevant sources supported the notion that the ketogenic diet could generally reduce aggression, an observation that could often be replicated in psychiatric settings. The conclusions made in this review were mostly formed by making associations between the available sources, so future research would need to be conducted with the specific focus of observing the impacts of the ketogenic diet on behaviour in psychiatric settings. Randomised controlled trials should be conducted in both inpatient and outpatient settings to enable further systematic reviews and meta-analyses to evaluate the ketogenic diet's potential for use as a non-pharmacological therapeutic in prescribing and patient care.

Functional Connectivity in the Default Mode Network During Rumination in Depression: A Systematic Review

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Aims: The Default Mode Network (DMN) is a network of brain regions that are functionally connected and become active during self-directed thought, introspection, and rumination. Rumination refers to the repetitive and passive focus on distressing thoughts, often linked to negative emotional states. Specifically, an increase in the brooding type of rumination is associated with severity of depression. Functional magnetic resonance imaging (fMRI) research offers a unique perspective on how the functional connectivity of the DMN is involved in rumination, shedding light on its neurobiological underpinnings. This systematic review aims to synthesise existing literature that explored the functional connectivity of the DMN in individuals with depressive disorders during episodes of rumination.
Methods: This systematic review investigated activity in DMN in patients with depression using resting state fMRI scans. Literature search was done on PubMed, Medline and Cochrane using search terms "depression OR Major Depressive Disorder OR depressive episode" AND "ruminat*" AND "functional MRI OR fMRI". 324

studies were identified from the three databases, and after removing 42 duplicates, 274 studies were selected for title and abstract screening.

Abstracts were assessed for eligibility using the following inclusion criteria: original studies in peer-reviewed journals, clinical diagnosis of depressive disorder, measurement of rumination using a validated scale and resting state or task-based fMRI. 193 studies were excluded, and 58 studies were moved to full-text review. Intervention studies were also excluded at this stage. Following the above criteria, 25 studies were selected for full-text review.

Results: Out of the 25 studies, 9 used task-based fMRI and 16 used resting state fMRI. Only resting state fMRI studies were included for data extraction. Results from the 16 studies showed that depressed people had both increased and decreased functional connectivity between different regions of the brain during brooding rumination. The connectivity within the DMN was increased, while connectivity between DMN and other areas of brain, including between DMN and TPN (task-positive network) was reduced, when compared with healthy controls.

Conclusion: This review shows widespread associations between depression, rumination and functional connectivity within and between various brain regions. Increase of functional connectivity within the DMN during depression might be responsible for the increase in brooding rumination seen in depressed individuals. A decrease in connectivity of DMN to other areas of the brain might result in difficulties for depressed individuals to switch from a ruminating state into the executive network mode. Overall, this review provides an overview of the neurobiological underpinnings for the increase in brooding rumination in depression.

Hippocampal Basal Forebrain Connections Involved in Young Adolescents with Psychotic Experiences

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Aims: Changes in the hippocampus and amygdala are associated with psychotic illnesses. However, there is little research examining the output tracts of these regions in psychosis. The fornix connects the hippocampus to the basal forebrain anteriorly and to the hypothalamus posteriorly, while the stria terminalis (ST) connects the amygdala to these same areas. The anterior commissure divides these tracts into anterior (pre-commissural) and posterior (post-commissural) fibres. This study investigates these two tracts and their pre- and post-commissural fibres in young adolescents with psychotic experiences (PEs) as compared with controls across two timepoints (TP), 2 years apart.

Methods: 51 young adolescents with PEs (37 female) and 43 healthy controls (25 female) underwent high angular diffusion imaging at TP1, while 39 adolescents with PEs and 29 healthy controls underwent same at TP2. Images were processed using ExploreDTI and, using a bespoke method, the fornix and ST were separated and pre-commissural and post-commissural fibres isolated. Analysis of covariance was performed correcting for age, sex and intracranial volume.

Results: Right pre-commissural fornical Mean Diffusivity (MD) (p=0.035) and Radial Diffusivity (RD) (p=0.009) were increased, with decreased Fractional Anisotropy (FA) (p=0.045) at TP1. There was increase across MD (p=0.004), RD (p=0.005) and Axial Diffusivity (AD) (p=0.042) at TP2. Only right pre-commissural fornix MD and RD increases at TP2 survived Bonferroni correction at p=0.0083. No ST differences survived correction for multiple comparisons.

Conclusion: This study uses a novel method to separate the stria terminalis and fornix, using an anatomically driven approach. The results show that the hippocampal output fibres are involved in early psychosis, while the amygdala fibres are not affected. Of the hippocampal fibres, it is the fibres going to the basal forebrain, responsible for motivation and behaviour, that are specifically impacted. These changes in adolescents are entirely right sided, reflecting similar right sided hippocampal changes found in adults with psychotic illnesses. The right basal forebrain is known to influence vigilance, attention and emotional processing, which are affected in patients with psychosis. **The findings from this study suggest that the right basal forebrain is affected in children and adolescents with psychotic experiences, which are common in people who go on to develop psychotic illnesses, and thus supports the neurodevelopmental theory of psychosis.**

A Qualitative Study to Explore Perspectives Regarding the Use of Low Field Magnetic Resonance Imaging (LFMRI) Scanners, Within Dementia Diagnosis Pathways in the United Kingdom

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Aims: The national emphasis on improving rates and timeliness of dementia diagnosis is dependent on accessibility of investigative tools. Through locally accessible, point-of-care brain scans, LFMRI has the potential to improve the experience of dementia assessment pathways and time to diagnosis, and to reduce inequalities in access to dementia assessment.

The aim of this qualitative research was to explore perspectives regarding the use of LFMRI scanning within dementia diagnosis pathways, within communities where it may have the greatest impact. We also aimed to learn more about views regarding future LFMRI research, including priorities, concerns and potential facilitators and barriers to participation.

Methods: The qualitative design incorporated focus groups and interviews with individuals with dementia and their carers. The study took place within urban, rural and coastal communities in Kent. 35 participants took part in either a focus group (n=20) or interview (n=15) with an average age of 72 years. Focus groups and interviews were recorded and transcribed verbatim for thematic analysis using NVivo software.

Results: Participants described both positive views as well as caution about the use of this new investigative tool. Five subthemes were identified: access to local neuroimaging, improvement of assessment pathways, accuracy of LFMRI, concerns about expense to the NHS and engagement in future LFMRI research.

Participants were optimistic about the potential of LFMRI within dementia diagnosis pathways. They valued the possibility of access to local scanners and the benefit this would have on timely diagnosis with improved diagnostic pathways. However, there were concerns