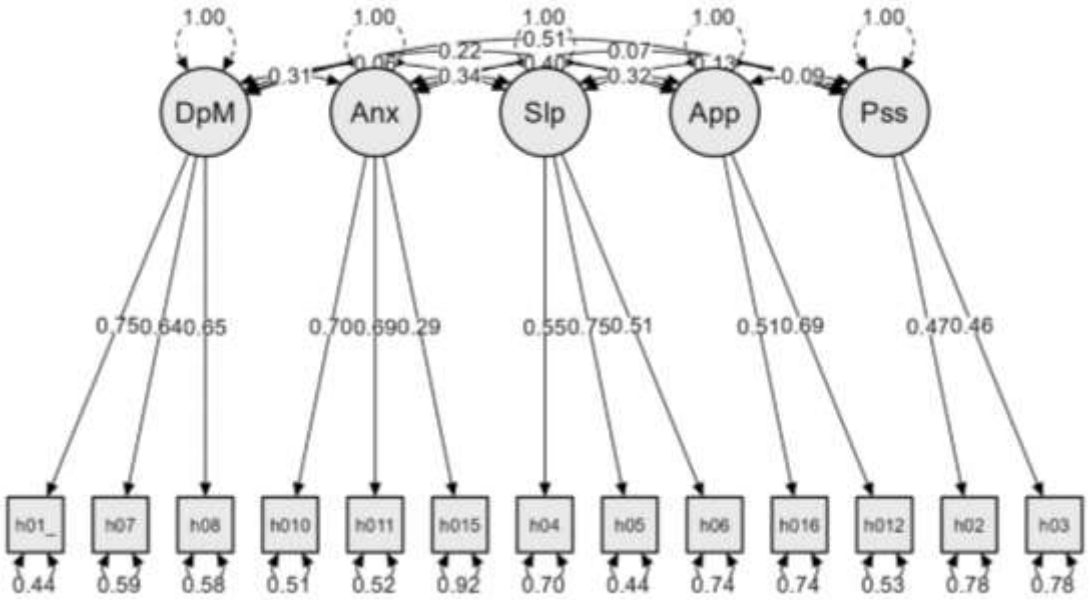

Figure 1. Hamilton depression rating scale confirmatory factor analysis model plot

Results: We analysed 125 patients treated with H1-coil, 55% women, and 107 patients treated with 8-coil, 51% women. Median (interquartile range; IQR) age was 54 (44-60) years in H1-coil arm and 52 (43-61) years in 8-coil arm. Two arms were well balanced in terms of diagnosis (depressive episode or recurrent MDD), duration and baseline severity of MDD. Patients in 8-coil arm more often had psychiatric comorbidity, primarily organic mental disorders. Five dimensions model of HDRS: depressed mood, anxiety, pessimism, sleep difficulties and changes in appetite fitted the empirical data very well (X^2=69.5, p=0.091; CFI = 0.96; TLI = 0.94; RMSEA = 0.035, 90% CI 0.000; 0.058), SRMR = 0.050).

Lowering of total HDRS-17 score was significantly larger in H1-coil, than in 8-coil arm (59% and 52% respectively; p=0.025; η^2=0.03; FDR <5%). H1-coil had significantly better effect on depressed mood dimension (p=0.046; η^2=0.02; FDR <5%). In other dimensions and 2nd order factors (mood, cognitive, neurovegetative) we have not observed significant differences between the two coils (Table 1, 2).

Conclusion: This study indicated somewhat better effect of H1-coil on total HDRS-17 score and on depressed mood dimension, but not on any other dimension or the 2nd order factor.

References:

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THE USE OF TMS IN TREATMENT OF GAMBLING DISORDERS

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Gambling disorder is characterized by persistent and recurrent gambling behavior that can lead to devastating consequences for those with the disorder and their families. Disorders in the prefrontal activity of the brain are mentioned as the upcoming pathophysiological substrate in the development of gambling disorders (GD). A fundamental feature of this disorder is a craving that we define as an urgent and irresistible desire to indulge in addictive behavior, which usually results in a loss of control, and its biological correlates are dysfunctional dopamine cortical – subcortical pathways, particularly of the inhibitory control of the dorsolateral prefrontal cortex (DLPFC).

Repetitive transcranial magnetic stimulation (rTMS) is used to modulate local brain activity and thus modulating neurocircuitries involved in the pathophysiology of gambling disorders (GD) potentially resulting in therapeutic effects. Dopaminergic dysfunctions have been found to be critically involved in the development of GD, especially in presynaptic structures, in the reduced availability of dopamine transporters (DAT) in GD subjects. Stimulating the DLPFC with rTMS may restore a physiological basal dopaminergic activity and increase DAT levels, as well as modulate glutamatergic neurotransmission.

The aim of this review paper was to highlight possibilities for further research in determining efficacy of rTMS in the treatment of cravings in behavioral addiction, as well as recommendations for optimal stimulation settings and its clinical application.

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TREATING DEPRESSION IN PATIENTS WITH NEUROPATHIC PAIN AND DEMYELINATING DISEASE OF THE CENTRAL NERVOUS SYSTEM

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Transcranial magnetic stimulation (TMS) is a technique for noninvasive stimulation of the human brain. Stimulation is produced by generating a brief, high-intensity magnetic field by passing a brief electric current through a magnetic coil. The field can excite or inhibit a small area of brain below the coil.

Repetitive TMS has a modulatory effect on cortical excitability, which outlasts the stimulation period and can be used in a variety of indications, delivered to either motor or nonmotor brain regions. The impact of rTMS can be observed at the site of stimulation and mostly at a distance, according to the nature of the activated neural circuits.

Functional or clinical effects outlast the period of stimulation for minutes or hours, likely due to long-term depression (LTD) of synaptic transmission for low-frequency rTMS and long-term potentiation (LTP) for high-frequency rTMS.

Therefore by modifying brain functions, with after-effects lasting beyond the time of stimulation, rTMS opens exciting perspectives for therapeutic applications, especially in the domain of depression and chronic pain syndromes.

Neuropathic pain is caused by a lesion or disease of the somatosensory system, including peripheral fibres (Aβ, Aδ and C fibres) and central neurons, and affects 7-10% of the general population. The somatosensory system allows for the perception of touch, pressure, pain, temperature, position, movement and vibration. Neuropathic pain is associated with increased drug prescriptions and visits to health care providers and can substantially impair quality of life as it often associates with other problems, such as loss of function, anxiety, depression, disturbed sleep and impaired cognition.

Progress in the understanding of the pathophysiology of neuropathic pain is spurring the development of new diagnostic procedures and personalized interventions, which emphasize the need for a multidisciplinary approach to the management of neuropathic pain. Repetitive sessions (5-10 sessions over 1-2 weeks) with high-frequency rTMS (5-20 Hz) have shown benefits in a mixture of central, peripheral and facial neuropathic pain states, with effects lasting >2 weeks after the stimulation. Contraindications of rTMS include a history of epilepsy and the presence of aneurysm clips, deep brain electrodes, cardiac pacemakers and cochlear implants.

Multiple sclerosis (MS) is a chronic inflammatory disease in which the fatty myelin sheaths around the axons of the brain and spinal cord are damaged, leading to demyelination and scarring as well as a broad spectrum of signs and symptoms. Multiple sclerosis (MS) associated neuropsychiatric disorders include major depression (MD), obsessive-compulsive disorder (OCD-MS), bipolar affective disorder, euphoria, pseudobulbar affect, psychosis, and personality change. A point prevalence of 15% to 30% and a lifetime prevalence of 40-60% of MD have been reported in MS patients; this rate of depression is 3 to 10 times that of the general population. H-coil rTMS is safe and well tolerated in patients with MS. The observed sustained reduction in fatigue after subthreshold MC stimulation warrants further investigation.

Our experience in treating depression in patients with demyelinating disease of the central nervous system also showed promising results on mood disorder.

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