

“The Use of Repetitive Transcranial Magnetic Stimulation May have a Role in Intellectual and Developmental Disabilities?”



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Opinion

The repetitive transcranial magnetic stimulation is a non-invasive medical therapy which is a brain stimulation technique with the production of short magnetic fields by using a coil placed over the scalp. These magnetic fields are of the same type as of those used in magnetic resonance imaging (MRI) imaging. Magnetic pulses produce a weak electrical current in the brain that activates neuronal circuits which could have been underactive or overactive in different areas of the brain by either providing stimulation or inhibition based on the different frequencies and protocols being used in each time.

The use of repetitive transcranial magnetic stimulation (rTMS) clinically has increased in the last decade after receiving FDA approval in 2008 for major depressive disorder and recently being included in National Institute of Clinical Excellence Guidelines [1] for depression since 2015 which is a treatment option with no major side effects and well tolerated especially if it's to be compared with medication treatment.

It has also shown promising results in a variety of neuropsychiatric disorders such as anxiety [2], obsessive compulsive disorder [3], auditory hallucinations[4], PTSD [5], tinnitus [6], migraine [7], post-stroke rehabilitation [8] etc. It also provides a neuroprotective mechanism [9] which may enhance cognitive function and improve memory difficulties seen in Alzheimer's [10] disease for example.

An area that should be considered to be studied further is the intellectual and developmental disabilities with limited research data as to date. The argument to be made is if the repetitive transcranial magnetic stimulation may enhance cognitive function by enhancing the activity in the cortical area which is being stimulated and perhaps the associated areas to this structure with neuronal connections. This could have a positive role in patients with intellectual or developmental disability

as it was seen for example in improving movement-related cortical potentials in autism spectrum disorders [11] which was hypothesised at the time that this could be in the context of the influence on cortical inhibitory processes.

The rTMS potentially could create new neuronal circuits-pathways and synapsis that may have a positive role in the above population. These neuroplastic changes may have a role in positively altering the cognitive function of the patient being stimulated with rTMS and perhaps could be used in conjunction with cognitive training by using tasks to complete simultaneously.

A new area that needs to be further explored as if we could enhance the brain function by concurrently training the brain with providing magnetic stimulation and new learning could have a huge potential in altering the brain function changes. Neuro-plasticity [12] has been shown that continues throughout the human life and can provide new dynamic in our brains by altering the way our brains work. Can we then produce changes in the brain throughout someone's lifespan that would have a meaningful result in their day to day living, social skills, mood, cognitive function by providing brain stimulation with (rTMS)?

The above is an interesting debate which research needs to answer it with future studies.

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