



Assessing the Structural and Functional Effects of Neuromodulation Using Magnetic Resonance Imaging

Purpose

To examine the current literature regarding three commonly used neuromodulation methods [cranial stimulation therapy (CES), transcranial direct current stimulation (tDCS), and transcranial magnetic therapy (TMS)], using on magnetic resonance imaging (MRI) methods of assessing any therapeutic effects

Participants

N/A – Literature Review

How was this study conducted?

This review examines the current literature regarding three commonly used neuromodulation methods (cranial stimulation therapy (CES), transcranial direct current stimulation (tDCS), and transcranial magnetic therapy (TMS)), focusing on magnetic resonance imaging (MRI) methods of assessing any therapeutic effects.

Findings

Neuromodulation is a rapidly growing industry that promises a number of positive therapeutic and educational enhancement results. There are a number of neuromodulation technologies that have already obtained FDA approval for treatment of various neurologic conditions. Studies demonstrate a good safety record and report very few side effects. Currently, the effort to validate these methods using state-of-the-art MRI methods is in its infancy though there are a growing number of studies that demonstrate objective MRI findings that illustrate therapeutic effects.

Military Impact

The possible benefits of using MRI to study the biological underpinnings of any neuromodulation effects, to improve delivery of treatment, and to further the science of neuromodulation are described along with suggestions for future research directions. If proven effective, any of these methods would have immediate application to service members.

Tate DF, Bolzenius JD, Velez CS, Wilde EA, Bouix S, Jaramillo CA, Lewis JD, Weisend M. Assessing the Structural and Functional Effects of Neuromodulation Using Magnetic Resonance Imaging. Technology & Innovation. 2016 May 18;18(1):39-50.