INTRODUCTION

Objectives: To describe the response of mTBI cases to various non-invasive brain stimulation techniques. Mild Traumatic Brain Injury (mTBI) and Persistent Post Concussion Syndrome, the long-term consequence of mTBI, are emerging as serious public health concerns. Major advances in the diagnosis of mTBI sequelae are being made, but effective treatment options are lacking. The field of neuromodulation has lead to a number of non-invasive techniques of brain stimulation that may find clinical application in the treatment of persistent post-concussion symptoms. This paper describes the use of several types of non-invasive neuromodulation techniques in cases of mTBI that failed to respond to traditional methods of neural rehabilitation. Techniques employed include Cranial Nerve Non-Invasive Neuromodulation (PoNs™), Transcranial Direct Current Brain Stimulation (tDCS) and Galvanic Vestibular Stimulation (GVS).

METHODS

Methods: Cases were recruited from a private chiropractic neurology practice. Patients (BE, BA, JM, DG) all females, ages 19, 25, 42 and 58 respectively who suffered from persistent post-concussion symptoms as a result of mTBIs associated with motor vehicle accidents. A major clinical feature common to all four cases was balance dysfunction and dizziness. Each of these cases had at least one and in the case of BA and JM multiple trials of vestibular rehabilitation without improvement prior to non-invasive neuromodulation. BA had significant cognitive and motor impairment that failed to respond to 18 months of traditional speech and occupational therapy. BA developed vertigo and syncope. All complained of chronic headaches and brain fog. JM had significant anxiety symptoms. Before treatment none of these cases could drive due to dizziness and related symptoms. BA and BE had third party formal neuropsychological testing. All had been or were under the care of multiple specialists prior to non-invasive neuromodulation. BA and JM were unable to work due to their ongoing signs and symptoms. All were previously diagnosed with mTBI by appropriate neurological specialists. Patient BA was treated using the PoNS device and neural rehabilitation techniques. Patients BE, DG and JM were treated with GVS (anode on left mastoid, cathode on right mastoid) and tDCS anode over the DLPFC.

Results: BA demonstrated dramatic cognitive and overall improvement (Figures 1 and 2 below). She was able to return to work as an attorney after more than 2 years of mTBI related total disability. In all cases vestibular signs and symptoms were completely resolved. Headache and other associated symptoms were dramatically improved or completely resolved with the addition of non-invasive brain stimulation to traditional neural rehabilitation.

CONCLUSIONS

Conclusions: Non-invasive brain stimulation techniques were used as an add-on treatment in a group of patients suffering from intractable symptoms of mTBI/post-concussion syndrome. The rapid improvement in these cases suggests that brain stimulation techniques deserve more study in patients suffering from persistent sequelae of mTBI.

REFERENCES

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