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Transcranial stimulation by direct current: a promising tool for people with cerebral palsy

Cerebral palsy (CP) is caused by non-progressive lesion of the developing brain in the pre-, peri- or postnatal periods. Clinical manifestations include disorders of tonus, posture and movement, and can undergo intense transformations throughout life. In the most severely affected children, motor gains may decline during adolescence and adulthood, further reducing functional independence[1]. Considering that the life expectancy of adults with mild or moderate CP is slightly lower, when compared to that of the neurotypical population, throughout the life of these individuals the costs for health services can exceed 800 million dollars per year[2].

Advances in neuroscience originated non-invasive techniques to treat individuals with lesions in the nervous system, improving their functionality even when there are severe disabilities of active and independent movement, or great limitations to carry out daily activities. Transcranial direct current stimulation (tDCS) is one of the main forms of non-invasive brain stimulation, being easy to manipulate, low-cost and capable of inducing regional changes in cortical excitability, activating new neural networks and strengthening the effects of motor training[3,4].

Recent studies have shown that the tDCS, combined with motor exercises, significantly improves short- and medium-term mobility of children with mild to moderate motor impairment CP *(Gross Motor function Classification System*, levels I, II and III)[4]. In adults and older adults with neurological dysfunctions, tDCS combined with kinesiotherapy also showed very promising results, but without the same level of evidence in cases of CP with stagnation or decline of motor gains, as in the most severely affected individuals (*Gross Motor function Classification System*, levels IV and V).

Therefore, the question remains about the tDCS being a possible tool that will provide hope for motor recovery and improvement of functional independence of children, adolescents and adults with major motor impairments caused by cerebral palsy and other brain injuries acquired in childhood.

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