CATHODAL tDCS OF THE PARIETAL CORTEX COMBINED WITH MIRROR THERAPY IS EFFECTIVE AT IMPROVING HAND DEXTERITY IN FOCAL DYSTONIA: A CLINICAL CASE.

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Introduction

The role of not-invasive brain stimulation (NIBS) as an add-on treatment to motor training in children suffering from focal dystonia has already been described in the literature with contrasting results.

Purpose

To describe the clinical and functional outcome observed in a 13-years-old girl suffering from hand dystonia and undergone NIBS combined with mirror therapy.

Study Design: Case Report

Methods

We report the case of a 13-years-old girl suffering from hand dystonia following right hemisphere lesion in the basal ganglia area, due to an Herpes Simplex Encephalitis when she was three years old (Fig 1). Cognitive abilities were not affected.

Fig. 1

TYPES OF TREATMENT SUGGESTED IN THE PAST

The child had already undergone several training protocols, including splint wearing and repeated botulinum toxin injections. These last induced a partial resolution of muscle contraction at rest, without any improvement in hand dexterity.

Fig. 2

Physical examination: at basal evaluation (T0) the child showed hemisindrome with faciobrachiocrural motor deficit at left side (F4+) and **severe dystonia** of left upper limb, mild at trunk and lower limb (BFM Movement scale left-arm = 16) This condition was associated with poor dexterity at left upper limb (BFM Disability scale = 6).

EVALUATION PROTOCOL

- Functional status was assessed with **Fugl-Meyer for upper limb score** at baseline (T0), after treatment end (T1) and one month later (T2).
- Moreover, a fMRI was performed at T0 and T1, in order to look what brain networks were activated during the left and right limb movements.

TREATMENT PROTOCOL PROPOSED

- 5 Daily sessions (1 for each day) of **cathodal tDCS** on the right sensorimotor cortex (P4 - according to EEG 10-20 EEG Placement), 1 mA intensity, followed, in the same morning, by 30 minutes **mirror therapy** (Fig 2).

Results

TOLERABILITY OF tDCS

The NIBS was well tolerated. No adverse events were complained for during and after treatment.

SINTESI NARRATIVA DEI RISULTATI

The Fugl-Meyer score increased from **21/66 (T0)** to **29/66 (T1)** and up to **30/66 (T2)**. More specifically, the hand-related score increased from 1 (T0) to 8 (T1), with maintenance of improvement one month after (9 pt at T2).

The fMRI showed a significant reduction of brain activation under active left limb movement after treatment (T1).

Conclusions

References

Parietal cortex inhibition via cathodal tDCS at the lesioned hemisphere was effective at reducing dystonia, improving voluntary movement and inducing the reorganization of brain networks.

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