

Effectiveness of TMS in Children with Cerebral Palsy

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Annotation: Currently, research in pediatric neurology focuses on the effectiveness of non-invasive brain stimulation (NIBS) in treating various neurological diseases in children. Transcranial magnetic stimulation (TMS), as a type of NIBS, has the technical characteristics of being non-invasive and painless, in which electromagnetic principles are applied to brain areas and regulate the functions of various areas of the cerebral cortex by changing the excitability of neurons.

Currently, TMS is increasingly used in the treatment of children with cerebral palsy (CP). TMS can improve motor function, relieve spasm, restore speech function in patients with CP, and change brain function by modulating developmental plasticity.

The study involved 34 children with spastic diplegic cerebral palsy to demonstrate the effectiveness of transcranial magnetic stimulation (TMS) as a new method for restoring motor functions. After TMS, children with spastic diplegic cerebral palsy showed significant improvements in motor and speech activity.

Keywords: cerebral palsy, TMS, motor function, effectiveness.

Relevance. The most common cause of cerebral palsy (CP) is damage to the white matter of the brain. CP is a non-progressive disease that, if left untreated, leads to a deterioration of clinical symptoms with abnormal development of the central nervous system [1]. To achieve an effective and long-term therapeutic effect, therapeutic interventions must have a function that affects brain neuroplasticity in the long term [2]. Currently, research in the field of pediatric neurology is focused on the effectiveness of non-invasive brain stimulation (NBMS) in the treatment of various pediatric neurological diseases [3]. NBMS is a means of inducing electrical currents in brain tissue

with the aim of stimulating immediate and long-term modulation of the excitability of the motor cortex. Thus so, this childhood movement disorders treatment for non-drug is a strategy [4, 5, 6].

NBMS method one type as, Transcranial magnet stimulation (TMS) of technician features non-invasive and it is painless, in that electromagnetic principles brain to the regions applies and brain half balloon of the bark different sectors function neurons excitability change and arrange [7, 8, 9].

Current At that time, TMS was BBMF the children in treatment increasingly more in use [10]. TMS can improve motor function, relieve spasm, restore speech function in patients with BBMF, and alter brain function by modulating developmental plasticity [11, 12, 13,].

RESEARCH PURPOSE. Children 's brain paralyzed TMS efficiency study.

MATERIALS AND METHODS OF RESEARCH. Spastic BBMF diplegia type action functions restoration new method TMS which is efficiency show for treatment at “BIO NUR MAD SERVIS” past 34 BBMF spastic diplegic children This was taken. treatment for the children selectively to take following criteria based on: approved BBMF spastic diplegia diagnosis; age 3-7; motor function I-III degree of impairment existence; this the research completion for enough understanding and cooperation to do competence; parents or responsible individuals consent. If a child has a brain tumor from the hemispheres action potential in one if not, the organs dysfunction, cognitive disorders, severe epilepsy or other heavy diseases if, involuntarily movements, ataxia or BBMF mixed type if yes, during the last 6 months spasmolytics received children and parents against was in cases children to research not included in the study. included children 20 days during (5 days a week, 4 weeks) during) damaged 15 minutes per hemisphere 1000 pulses during with 5-Gs rTMS treatment Evaluation of TMS treatment before (T0), 10 days after treatment then (T1) and treatment since it ended after (T2) in the period was held.

RESEARCH RESULTS. Of the children with spastic diplegia, 53% were girls and 47% were boys. The mean age of the children was 68.42 ± 17.32 months, the mean height of the children, taking into account anthropometric indicators, was 117.42 ± 12.64 cm, and the mean weight was 21.56 ± 6.28 kg.

When assessing general motor function impairment in children, grade I impairment was detected in 32.4% (11) of children, grade II impairment in 47% (16) of children, and grade III impairment in 20.6% (7) of children.

In children functional mobility and balance assessment for wide applicable method as We used *the Timed Up and Go (TUG) test*. In the TUG test child's sitting from the place standing, short distance pressing to pass, to go back return and to sit to the state return for necessary was time We evaluated the TUG test. children's functional mobility, dynamic balance and agility about valuable information This method child's independence and different in environments participation to be able for necessary was daily life activities, including cut to pass, to walk and turns to perform ability assessment opportunity gave. The child is in a chair during the TUG test. or other designated in place sitting in case started. He got up. stand, known distance (usually three meters) walk, back to turn around and sit down to the state return It was said. The task to perform for spent time record was done.

The “Kertes apraxia test” was used to assess speech and movement disorders in children with spastic diplegia of the BBMF. The test scored 0-3 points on 20 activities. Face: sticking out tongue, closing eyes, whistling, smelling a flower, putting out a fire. Hands: fist to do, up to raise, to say goodbye, to bow to pinch, fingers to crackle. Things action with: comb, tooth brush, spoon, hammer, wrench use show. Complex exercises: machine to drive, to open the door to knock, to roll folding, fire turn on the piano to play show tasks The total score ranged from 0 to 60, with lower scores indicating more severe apraxia.

GMFCS scale (Gross motor function classification system) - Movement functions according to the

international system for the classification of global motor functions degrees rated:

Level I: 2-4 years old: without jumping or without running independent walking. 4-7 years old: independent walk, up the stairs exit, run and jump

Level II: 2-4 years old: four to the foot crawls, support along walks, at the age of 4 independent walks. 4-7 years: short distances independent accordingly walks, fenced to the stairs rises, runs can't and jump can't.

Level III: 2-4 years: abdomen or four foot crawls on (each other), hand help with short to the distance walks. 4-7 years: from a chair helpless to stand possible, but only help with walks.

Level IV: 2-4 years old: on devices sits, on the stomach crawls. 4-7 years: adults help with from the chair sitting, standing possible, most good in case help with short to distances move takes.

Level V: 2-4 years old: Some children motorized, high technological stroller using mobility 4-7 years old: Some children motorized, high technological stroller using mobility they achieve.

All reviews The scales were assessed in children before TMS treatment (T0), 10 days after treatment (T1), and after the end of treatment (T2) (Table 1).

Table 1. Changes in functional motor and speech scales in dynamics in children with spastic diplegia type BBMF who received TMS (n=34)

| Evaluation scales | | T0 | | T1 | | T2 | |
|----------------------------------|--------------|-----|------|-----|------|-----|------|
| | | abs | % | abs | % | abs | % |
| General motor dysfunction | Level I | 11 | 32.4 | 16 | 47 | 19 | 55.8 |
| | Level II | 16 | 47 | 12 | 35.4 | 12 | 35.4 |
| | Level III | 7 | 20.6 | 6 | 17.6 | 3 | 8.8 |
| TUG | 13-16 sec | 7 | 20.6 | 13 | 38.2 | 18 | 53 |
| | 17-20 sec | 10 | 29.4 | 11 | 32.4 | 13 | 38.2 |
| | 20 sec < | 17 | 50 | 10 | 29.4 | 3 | 8.8 |
| Kertes apraxia tests | 0-20 points | 9 | 26.4 | 13 | 38.2 | 17 | 50 |
| | 21-40 points | 11 | 32.4 | 14 | 41.2 | 11 | 32.4 |
| | 41-60 points | 14 | 41.2 | 7 | 20.6 | 6 | 17.6 |
| GMFCS scale | Level I | 6 | 17.6 | 7 | 20.6 | 9 | 26.5 |
| | Level II | 4 | 11.8 | 6 | 17.6 | 7 | 20.6 |
| | Level III | 8 | 23.5 | 6 | 17.6 | 8 | 23.5 |
| | Level IV | 11 | 32.4 | 11 | 32.4 | 7 | 20.6 |
| | V daraja | 5 | 14.7 | 4 | 11.8 | 3 | 8, 8 |

1 - table from the data visible As you can see, TMS treatment then BBMF spastic diplegia type played motor and speech in the activity noticeable changes observed. In particular, in children from treatment before general motor function Grade I disorder in 32.4% (11) children determined if so, from the treatments then 55.8% (19) children had movement disorders of the I degree as was assessed as level II-III. disruption in 47% (16) and 20.6% (7) children before treatment observed if so, from the treatment after suitable 35.4% (12) and 8.8% (3) of children respectively was determined. In general when receiving general motor function to the violation according to 35.3% (12) of children efficiency observed.

To the TUG test according to from treatment before instead of stand, known distance (usually three meters) walk, back to turn around and sit down to the state 20.6% (7) children 13-16 seconds to return spent, 29.4% (10) children distance in 17-20 seconds and 50% (17) of children under 20 seconds more time during pressing passed. TMS treatments then TUG test performed to the results

according to this 53% (18) children 13-16 seconds into the workout, 38.2% (13) children 17-20 seconds and 8.8% (3) children under 20 seconds more time spent. In general when receiving instead of stand, known distance walk, back to turn around and sit down to the state to return expendable to time according to 73.5% (25) of children efficiency observed.

Kertes apraxia in the test received to the points according to in analysis from treatment Before treatment, 26.4% (9) children scored 0-20 points, 32.4% (11) children scored 21-40 points, and 41.2% (14) children scored 41-60 points. Post -treatment assessment The results were 0-20 points in 50% (17) children, 21-40 points in 32.4% (11) children, and 41-60 points in 17.6% (6) children. showed. TMS treatment then BBMF spastic diplegia with sick in children hand fist to do, to start from a chisel, a comb, a spoon, a hammer use, sheet folding, fire turn on the piano to play show tasks in showing positive results observed, generally 47.1 % (16) of children efficiency observed.

GMFCS scale Action functions on when evaluated Before treatment, grade I movement disorder was present in 17.6% (6) children, grade II movement disorder was present in 11.8% (4) children, grade III movement disorder was present in 23.5% (8) children, grade IV movement disorder was present in 32.4% (11) children, and grade V movement disorder was present in 14.7% (5) children. TMS treatment was determined. hands and feet driving force main muscles movement braking central neurons to stimulate focus because of from treatment after in children's motor functions positive dynamics In particular, grade V movement disorders were observed. 2 people who were from TMS treatment in a child then the movement disorder was assessed as grade IV, grade IV movement disorder 6 people who were The child was assessed as having grade III, grade III movement disorder. 6 people who were The child was assessed as grade II. and grade II movement disorder 3 people who were The child was assessed as grade III, in general when receiving in 50% (17) of children in total efficiency observed.

CONCLUSION. Thus, in order to demonstrate the effectiveness of TMS, a new method for restoring motor functions in the BBMF spastic diplegia type, a study was conducted in 34 children with BBMF spastic diplegia. After TMS treatment, significant changes were observed in motor and speech activity in children with BBMF spastic diplegia. In particular, according to general motor function impairment, 35.3% (12) children, according to the TUG test, the time taken to stand up, walk a certain distance, turn around and return to a sitting position was 73.5% (25) children, according to the Kertes apraxia test scores, 47.1% (16) children, and a total of 50% (17) children were effective when motor functions were assessed according to the GMFCS scale. Thus, TMS treatment showed an overall efficacy of 51.5% in children with BBMF spastic diplegia on the general motor function impairment, TUG, Kertes apraxia test, and GMFCS scales.

ADABIYOTLAR RO'YXATI:

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