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DEVELOPMENT OF FINE MOTOR SKILLS THROUGH ART THERAPY IN PRESCHOOL CHILDREN WITH CEREBRAL PALSY

Аннотация. Целью исследования была разработка и апробация программы комплексного использования арт-терапии как самостоятельного метода физической реабилитации в целях развития мелкой моторики рук у детей дошкольного возраста с детским церебральным па- раличом. Исследование проведено на базе детского научно-практического центра физической реабилитации и спорта «Гросско», г. Москва. Программа включала такие средства арт-тера- пии, как рисование с помощью разных предметов и техник, пластилинография, лепка, аппли- ка- ция, вырезание, обведение по контуру и др., каждое из которых оказывает свое специфическое воздействие на состояние моторики. Для оценки динамики состояния мелкой моторики рук были использованы диагностические тесты, хорошо известные в литературе. Установлено, что под воздействием предложенной программы произошло более существенное и стати- стически значимое ($p < 0,05$) улучшение измеренных показателей в экспериментальной группе по сравнению с группой сравнения. Показано, что применение арт-терапии как средства физи- ческой реабилитации для развития мелкой моторики рук у детей дошкольного возраста с дет- ским церебральным параличом позволяет достичь более высокого результата по сравнению с существующими и известными из доступной литературы методами.

Ключевые слова: детский церебральный паралич, мелкая моторика рук, арт-терапия, дети дошкольного возраста

Abstracts. This study aims to developing and testing a program for the complex use of art-ther- apy, as an independent method of rehabilitation, for improving of fine motor skills of hands in pre- schoolers with cerebral paralysis. The study was carried out in the Children's Rehabilitation Center "Grossko", Moscow. The program includes drawing with different objects and techniques, painting, plasticineography, modeling, appliqué, cutting, tracing, etc. Each of them has its own specific effect on the fine motor skills state. To assess the dynamics of fine motor skills, special diagnostic tests were used. It was found that there was a more significant and statistically reliable ($p<0.05$) improvement of the measured parameters in the experimental group compared with the control group under the influence of the proposed program. It has been shown that the use of art-therapy for the development of fine motor skills of hands in

preschoolers with cerebral paralysis allows to achieve a higher result in comparison with existing methods that are well known in literature.

Keywords: cerebral paralysis, fine motor skills of hands, arts-therapy, preschoolers

Cerebral palsy (CP) is a "group of permanent disorders of the development of movement and posture, leading to limitations in functional activity and motor impairments, caused by non-progressive damage and/or abnormalities of the developing brain in the fetus or newborn child" [1, 2].

CP is a relatively common condition with a growing prevalence, which is partly associated with the introduction of high-tech medical equipment and improvements in healthcare, as today premature infants—who are at very high risk of developing CP—are successfully surviving. According to the WHO, the global prevalence of CP is 2–3 per 1,000 live births, and among extremely preterm children, it reaches 40–100 per 1,000 live births.

Due to significant changes in the brain structures, nearly half of children with CP exhibit intellectual impairments, and in all cases, the disorder is accompanied by motor dysfunction [2, 4, 5]. A key function of the motor apparatus that determines quality of life is the development of fine hand movements. Impairment of this function leads to a loss of independence in daily activities and creates a range of problems even if gross motor skills and intelligence are preserved.

Today, in the context of inclusive education, many children with CP face difficulties in learning from the very beginning due to impaired fine motor skills. They are unable to complete written assignments at the same pace and with the same accuracy as healthy peers. This reduces motivation, academic performance, the student's authority in class, and further lowers their overall quality of life.

Fine motor skills of the hands are physiologically inseparably connected with a child's speech and are therefore often used to support speech development. In pedagogy, the primary methods for developing fine motor skills in children with CP are recognized as finger games combined with speech therapy exercises, which simultaneously engage the fingers and the speech apparatus. Direct attention to motor skills as an independent object of development is often insufficient.

Considering the wide and growing prevalence of CP, all of the above can be regarded as socially significant problems. The search for new forms and methods to develop fine motor skills in children with CP is therefore highly relevant.

Table 1. Description of activities conducted in the control and experimental groups

Indicator	Control Group (CG)	Experimental Group (EG)
Frequency	Twice a week, 30 minutes each, for three months	A cycle of 24 sessions, twice a week, 30 minutes each, for three months
Program	CG followed the basic program developed at the	EG followed an experimental program for developing fine

	"Grosso" Center (comprehensive rehabilitation program for children with CP)	motor skills of the hands. Art therapy methods and tools were used in EG sessions
Indicator	Control Group (CG)	Experimental Group (EG)
Session Structure		
Preparatory Part	5 minutes	3 minutes (warm-up): - Hand massage - Finger gymnastics - Finger games with poems and tongue twisters - Finger "pools" with various fillers (beans, pasta, small grains, sand)
Main Part	20 minutes	25 minutes (creating artwork using art therapy methods). Art therapy tools variably used in different sessions: - Modeling with clay (plasticine) - Sculpting objects from clay or plasticine - Applique work - Cutting out shapes - Tracing along contours - Hatching/shading - Dot-to-dot drawing - Drawing with yarn balls - Arranging images with objects (buttons, beads) - Paper crumpling - Painting - Drawing with pencils (colored or graphite, various hardness) - Drawing with chalk on a board - Drawing with pastels and crayons on paper
Concluding Part	5 minutes	2 minutes: - Reflection of

		emotional state in a playful form (“Smiley Faces”, “Colored Cards”) - Discussion of the session with the participant

The sessions were built on the principles of accessibility, “from simple to complex,” an individual approach taking into account the psychophysical and age characteristics of children, and friendly communication.

Sessions were conducted in individual or small group formats (no more than 3 children per group) depending on the degree of CNS impairment and the individual psychological characteristics of the children.

To assess the dynamics of fine motor skills in preschool children, the following well-known diagnostic tests were selected:

“Examination of Voluntary Finger Movements” by N. M. Trubnikova [7] (assessment of static and dynamic coordination);

“Paths” method by L. A. Venger [8];

Functional test with a spool (method by H. Zinnhuber) [9];

Finger gnosis and praxis test by A. L. Sirotiuk [10];

“Manipulations with Objects” test by N. V. Nischeva [11].

All tests used a scoring system.

Throughout the experiment, hidden participant observation was conducted for the experimental group. Observations included: the child’s emotional state, interest, engagement (distractibility), compliance with teacher instructions, posture, head and body position, and eye focus. Each parameter was scored. Observation results were recorded in a diary every two weeks.

Statistical analysis of measurement results was performed using the “Descriptive Statistics” program in the “Data Analysis” package built into Excel. Standard error, confidence interval width (95% confidence level), and Student’s t-test at $p < 0.05$ were used to determine the significance of differences between compared indicators.

Results and Discussion

To evaluate the effectiveness of the proposed experimental program for developing fine motor skills in preschool children with cerebral palsy, the results of diagnostic testing of the studied groups at the initial and control stages of the experiment were compared. The initial (pre-experiment) and final (post-experiment) states of fine motor skills in both groups were assessed using the set of tests described above.

The analysis of hidden participant observation allowed the following conclusions:

The program corresponds to the age and psychological characteristics of preschool children with cerebral palsy, as evidenced by the dynamics of emotional state and interest;

The program promotes the development of attention and concentration during sessions (positive dynamics were observed in indicators such as “follows teacher’s requests” and “focus”);

The program meets health-preservation requirements and supports the maintenance of health in preschool children with CP (observations suggest the formation of self-monitoring habits for posture and body position during sessions).

Conclusion

Analysis of specialized scientific and methodological literature suggests that a combination of techniques requiring precise fine movements with varying degrees of hand and finger pressure improves mastery of hand and finger function. Rehabilitation programs using art therapy can be adapted not only to a child’s physical condition but also to personal preferences and interests.

The experimental program proposed in this study for developing fine motor skills in preschool children with CP involves the use of art therapy as an independent method of physical rehabilitation. Sessions are conducted in the form of creative individual activities with game elements. Success situations are maximized, work occurs naturally, and mental tension is minimized. All games and tasks are safe for children. Regular, comprehensive use of art therapy tools develops fine motor skills, improves precision, coordination, and controllability of hand movements in children with CP.

The results of the control stage of the experiment showed a more significant and statistically reliable ($p < 0.05$) improvement in measured indicators in the experimental group compared to the control group, indicating the effectiveness of the developed experimental program.

The trial demonstrated that using art therapy as a means of physical rehabilitation for developing fine motor skills in preschool children with CP allows a higher level of fine motor development compared to existing and literature-known methods.

The developed program can be recommended for use in specialized rehabilitation centers for children with CP and in preschool institutions during educational activities.

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