

## Modern approaches to ergotherapy of children with the Down syndrome

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### Abstract

The issue of limited social interactions, household possibilities, and self-care gain increasing social importance. Under the general term of ergotherapy interventions, scientists use a wide array of different approaches used separately or in combination. In particular, this article discusses the ergotherapeutical intervention where we analyzed the stages, goals, directions, and principles of ergotherapy that have a positive effect on the social adaptation of children suffering from Down syndrome. We have found that ergotherapy is aimed at helping children suffering from Down syndrome to build or improve basic social or household skills through a series of special exercises, which will allow them to achieve the maximum level of independence and self-sufficiency in life. It was also identified that the important role in the program of ergotherapy is dedicated to a game, which is often the only way in which children can express themselves because of their specific needs. Ergotherapy was found to be one of the methods of holistic rehabilitation for children with Down syndrome, since its main goal is to develop independence and socialization. The positive effect such therapy has when performed both in specialized institutions and at home is undoubted. Apart from that, it should be noted that there is no established correlation between the number of exercises and their ultimate effect. Although a lot of research sheds light on some of the aspects of the issue in question, there is no holistic picture of how to organize practical social activities for children with Down syndrome during the ergotherapy sessions. However, the systematic study of other research indicated the insufficient evidence basis of the majority of methods as well as the low quality of the mentioned research.

**Key words:** ergotherapy, Down syndrome, children, rehabilitation.

### Introduction

Physical rehabilitation of children is an important social issue. Rehabilitation approaches to children suffering from Down syndrome are of holistic and consistent nature. In modern conditions, the process of forming executive skills by the means of physical therapy and ergotherapy in children with Down syndrome requires accounting for the foreign experience, creating new rehabilitation programs, and applying an interdisciplinary approach, as well as taking into consideration the peculiarities of children's development and specialists' creativity (Bilash, 2020; Dido et al., 2021). While carrying out the rehabilitation for children with Down syndrome, it is important to pay attention to ergotherapy, which is widely applied today and yields positive results over a short period of time. Ergotherapy improves the physical, cognitive, sensory, psychological, social skills and abilities of the person through meaningful and purposeful activities; It is a person-centered health profession that aims to increase the level of independence and participation in daily life activities and to improve health and well-being. Ergotherapy is among the most effective approaches to the rehabilitation of children with Down syndrome, since it helps develop and retain important household skills, teaches children to look after themselves, and helps them become active members of society (Sokolova, 2018; Grygus et al., 2019, 2021; Shestopal et al., 2021).

Ergotherapy includes three aspects:

- child's ability to look after themselves (on a household level),
- child's productivity (games, school studying, house chores)
- active rest (hobbies etc.) (Hreyda et al., 2019).

**The purpose of this article** is to analyze and summarize the impact ergotherapy has on children with Down syndrome.

**Material & methods**

This study is the result of the analysis of scientific and methodological developments on the practical implementation of ergotherapeutical interventions in terms of their timing, scope, complexity, and role of the family in it. The method in this research is descriptive quantitative. It does not modify or add data, only presents data obtained through research.

**Results**

The timely implemented rehabilitation interventions help children suffering from Down syndrome to acquire the skills and knowledge they are likely to need in everyday life and communication. To date, the largest evidence base has been accumulated by intervention programs based on the principles of improving parent-child relationships and aimed at developing patients' social and communication skills (Arkhytova, 2017).

Ergotherapeutical interventions should be manifested in implementing a set of specifically chosen exercises that are compatible with the child's needs and the goals of the physical therapy, as well as different types of activities, the use of special techniques and strategies aimed at the formation, restoration, and improvement of the skills that can children more independent and enhance the quality of their lives (fig 1).

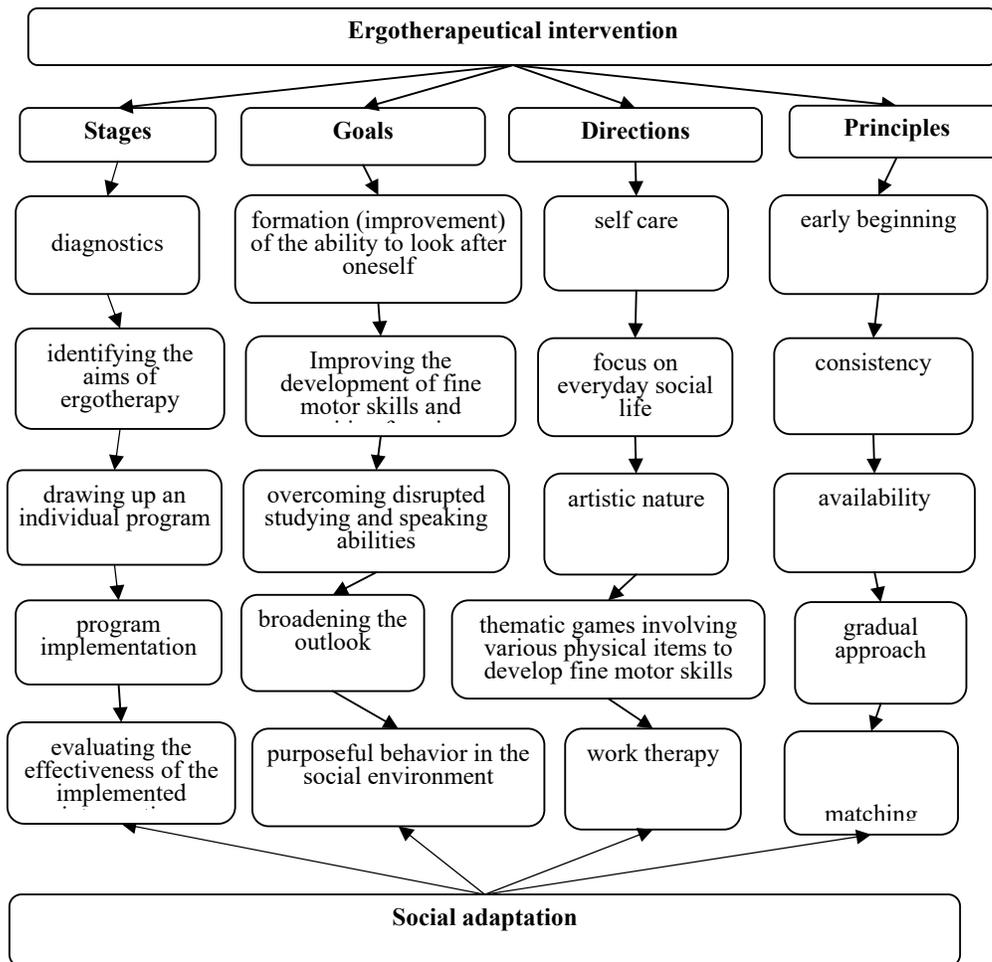


Fig. 1. Ergotherapeutical intervention

It must be mentioned that ergotherapy programs must be constructed in accordance with the peculiarities of development of every specific child suffering from Down syndrome. When choosing the activities, methods, techniques, and approaches to include in the program, it is vital to consider the individual characteristics and abilities of every child (Vakulenko et al., 2018).

In most cases, the purpose of individual sessions is to help children master new skills that they will later be able to use independently (Kravchuk, 2017).

It is also important to have an algorithm, that is, a decided sequence of activities, during an ergotherapy session. Such an approach enables us to make an effective program for carrying out the outlined tasks (fig. 2).

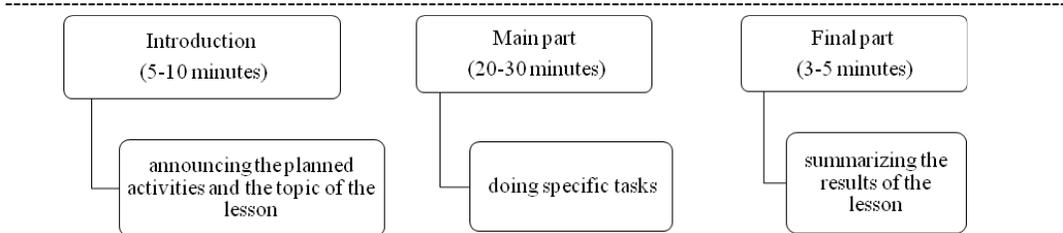


Fig. 2. Lesson structure

Ergotherapy classes should include working with various physical items, pictures, participation in various games (didactic, role-play), performance of various exercises, as well as practical activities (drawing, modeling, designing, etc.). It is also important to use different visual aids (natural artifacts, pictures, photos, diagrams, mock-up models, toys) (Lohvinova, 2018).

In table 1 you can see didactic gamified activities for pre-school children with Down syndrome (Shul’zhenko, 2017).

Table 1

<b>Didactic gamified activities</b>	
<b>Name of the game</b>	<b>Goals</b>
“Shoelaces”	Developing fine motor skills, finger coordination, eye estimation. Teaching the sequence of guided actions. Concentration. Color differentiation. Speech development. Development of artistic abilities.
“Canning fruit and vegetables”	Consolidation of knowledge about fruit and vegetables. Development of fine motor skills, color differentiation, and coordination. Teaching the sequence of guided actions. Concentration.
“Colorful necklace”	Development of fine coordinated finger movements. Consolidation of knowledge about basic colors and shades. Learning to bead following spoken instructions and a specific scheme
“Find a match”	Finding pairs of shoes that match in color and pattern. Finding a shoe hook that matches this pair of shoes’ color. Development of thinking, speech, attention, and fine motor skills.
“Geometrical shapes”	Development of fine motor skills, thinking, and attention. Studying geometrical shapes. Development of logical thinking and constructing abilities.
“Magical birds”	Development of fine motor skills. Sensory-motor coordination. Consolidation of knowledge about basic colors. Concentrating attention. Development of thinking and speech. Activation of visual functions.
“Flower field”	Development of fine motor skills, thinking, and speech. Concentration. Coordination. Consolidation of knowledge about basic colors and shades.

Ergotherapy lessons with children suffering from Down syndrome should be based on the exercises connected with acquiring or developing basic household skills, which will later allow children to achieve the maximum level of independence and self-sufficiency in life. In the process of formation (improvement) of the ability to look after oneself, special attention should be paid to the skills of:

- consuming food (drinking from a cup, using a spoon and a fork);
- dressing and undressing (shoes, clothes, zipping and unzipping);
- personal hygiene (washing one’s face, washing one’s hands with soap, brushing teeth, drying out one’s hair using a hairdryer, using a handkerchief, a toilet, etc.)
- using home appliances (locking and unlocking doors etc.);
- doing house chores (washing the dishes, setting the table for guests, dusting, sweeping the floors, washing, wringing out, and hanging out the laundry, ironing, cleaning up after oneself) (Pustovoyt et al., 2017).

For such children, game activities are usually of big importance. When playing a game, a child develops their thinking, relieves some stress and possible anxiety. Playing contributes to the holistic development of a child. Gaming therapy must entail positive easy-to-grasp activities using colorful toys and music chosen in accordance with the child’s age, where the child will feel comfortable and confident.

Motivation for independent physical activity is achieved with the help of consistent sensory impact from toys of various shapes, textures, and colors. Children perceive positive classes held in front of the mirror as a pleasurable and necessary opportunity to communicate with others.

Different authors of methodological literature highlight gamification as a dominant method of performing

ergotherapy. However, there is still a number of unanswered questions regarding the practical implementation and the lack of information about sensory impact; additionally, there are no holistic rehabilitation programs involving ergotherapy with a focus on the peculiarities of the psycho-motor characteristics of children suffering from Down syndrome (Bilash, 2018; Sydoruk et al., 2019).

### Discussion

Ergotherapy is useful for infants, children and adolescents who are limited in their ability to act or are at risk of such a limitation, with the result that the child and their family is hindered or at risk of being hindered in their participation in social life.

In individuals with Down syndrome, problems such as slow learning, difficulty in problem solving and decision making, drooling, difficulty in speaking, delay in motor development, frequent falls and bumps, low muscle tone and delay in fine and gross motor development due to laxity in joints are experienced. Occupational therapists in the treatment of these problems use sensory integration, vestibular stimulation, oral-motor therapy, cognitive therapy, daily living activities training and activity-oriented neurodevelopmental therapy methods. (Hreyda, Andriychuk, 2019).

The peculiarities of organizing ergotherapy for children with Down syndrome are still open to discussion. However, the positive effect such therapy has when performed both in specialized institutions and at home is undoubted. Apart from that, it should be noted that there is no established correlation between the number of exercises and their ultimate effect. Although a lot of research sheds light on some of the aspects of the issue in question, there is no holistic picture of how to organize practical social activities for children with Down syndrome during the ergotherapy sessions (Bihunyak, 2018; Bilash, 2020).

### Conclusions

Sensory, motor, cognitive and perceptual impairments can be seen in children with Down syndrome. These impairments probably affect the development and learning of their various fundamental and complex actions. Those children experience decreased motor proficiency, reduced social participation and lower life quality. Fine motor skills are important for children's everyday functioning such as dressing, feeding, bathing, holding objects, cutting etc. In addition, fine motor skills are related to cognitive, social and academic abilities in children.

Ergotherapy is aimed at helping children suffering from Down syndrome to build or improve basic social or household skills through a series of connected exercises, which will allow them to achieve the maximum level of independence and self-sufficiency in life.

Nevertheless, the systematic review and analysis of the research on the topic demonstrate that there are still no proofs of the effectiveness of ergotherapeutical practices for children suffering from Down syndrome. More so, there is also an issue of the quality of research on the effectiveness of such interventions. There still lingers the question of the role of physicians, ergotherapy specialists, educators, as well as that of the child's family for their future health. To date, the amount of information on the topic is insufficient to make any conclusions or suggestions about the general model of impact with the consideration of all existing criteria and individual characteristics.

Further research should be carried out in order to develop special ergotherapy programs for children with Down syndrome and to efficiently measure their effectiveness.

### Compliance with Ethical Standards

**Conflict of Interest.** The authors declare that there is no conflict of interest that could be perceived as interfering with publication of the article.

**Competing Interests.** The authors declare that they have no competing interests.

**Ethical Approval.** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent.** Informed consent was obtained from all individual participants included in the study. All subjects of the institutional survey gave consent for anonymized data to be used for publication purposes. Funding sources. This study has not received any financial support from any government, community or commercial organization.

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