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The Level of Physical Fitness and Everyday Activities vs. Sensory Integration Processing Disorders in Preschool Children – Preliminary Findings

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ABSTRACT
Introduction:

Sensory integration processing is defined as organization and interpretation of stimuli reaching the organism. The correctly functioning nervous system interprets sensory impressions, which enables development of awareness of one's own body and of the surrounding environment. Sensory processing disorders can have a significant impact on the child's functioning.
Aim:

The objective of the research was to answer the question whether sensory integration processing disorders in preschool children have an influence on their physical fitness and everyday activities. The research covered a group of 60 preschool children. The studied group comprised 30

children with diagnosed sensory processing disorders, while the control group consisted of 30 children with no disorders diagnosed.
Results:
The results achieved demonstrate lower physical fitness of children from the studied group and problems with performing everyday activities. The tasks connected with speed and agility were the most problematic. Among everyday activities, the most difficult were: cycling, ball catching, getting dressed and descending stairs. Knowledge of sensory integration processing disorders helps understand problems in the child's functioning and provides an opportunity to intervene in the form of the sensory integration therapy.

Key words: sensory integration, physical fitness, everyday activities, preschool age

INTRODUCTION

Sensory integration processing is carried out via the central nervous system. This process consists in organization and correct interpretation of stimuli reaching the organism through sense organs. We distinguish the following basic senses: sight, hearing, taste, smell, touch, balance and proprioception. J. Ayres, PhD, the author of the sensory integration theory, defined sensory integration as: *"The neurological process that organises sensation from one's own body and from the environment and makes it possible to use the body effectively with the environment."* [9] In the context of sensory integration, the notion of "learning through senses" is encountered quite frequently. In practice, this term refers to the ability to interpret sensory impressions correctly for the purpose of building the image of oneself and the surrounding environment [4]. On the basis of multidisciplinary knowledge, the sensory integration theory provides guidelines for appropriate stimulation of the child's development. Furthermore, it enables diagnosis and therapy of disorders which may arise in this sphere [10,14].

The effective functioning of the central nervous system determines the correct development of sensory integration. The development of sensory integration processes begins during the prenatal period and continues until approximately the age of 7 [13]. Children entering school education should be fully developed with respect to sensory integration.

Nowadays, the incidence of sensory disorders in the society accounts for 15% [14]. The risk factors of sensory integration processing disorders include: genetic determinants, low birth weight, premature birth, caesarean section, prolonged birth, environmental factors, i.e. lack of proper stimulation, frequent hospital treatment, traumas, ailments: ear inflammation, injuries, jaundice. [7]

An important aspect in the process of diagnosing sensory integration disorders is to find out whether these disorders hamper everyday functioning. The sensory profile is different for each person and not every deviation from the norm testifies to a sensory integration disorder [2,12].

THE AUTHORS' RESEARCH

Objective:

The research carried out was focused on the analysis of the influence of the sensory integration processing disorders on physical fitness and everyday activities of preschool children. The main hypothesis predicted that children with sensory processing disorders would be less physically fit in comparison to children with no disorders, which would adversely affect the performance of everyday activities.

Materials:

The studied group comprised 30 children aged 4-5 (20 boys and 10 girls) with diagnosed sensory processing disorders. All the children had the written diagnoses of sensory processing disorders, issued by psychological and pedagogical counselling centres. The exclusion criteria were comorbidities, i.e.: autism, hyperactivity disorder, mental impairment.

The control group consisted of 30 children aged 4-5 (13 boys and 17 girls) with no sensory processing disorders diagnosed.

The research was carried out in educational institutions in the Lublin Province, with the written consent of heads of the institutions and parents of the examined children. Participation in the research was voluntary and anonymous.

Methods:

The following research tools were used in the study: Wrocław Physical Fitness Test for Children Aged 3-7 by B. Sekita and the authors' survey questionnaire concerning everyday activities.

Wrocław Physical Fitness Test by B. Sekita consists of four attempts: strength – throwing a 1 kg medicine ball from over the head, power – a standing long jump, speed – a 20 m run, agility – a 4x5 m shuttle run. After adding up the scores from particular attempts it was possible to determine the fitness level for each child. The research analysis was based on the mean score in the studied group and the control group separately. The results were presented in percentage terms. The maximum possible score was 100%.

The questionnaire was addressed to parents of the examined children. The questions pertained to 4 categories of the child's activity: play, self-care precision activities, movement and involvement in play. The play-related questions concerned the following skills: catching a ball, cycling, crawling, climbing, running and jumping. The questions about self-care precision activities referred to the following skills: getting dressed, using cutlery, buttoning up, buttering a slice of bread, opening doors, using toilet and brushing one's teeth. The movement-related questions included: stumbling, passing obstacles, frequency of falls, descending stairs, walking on uneven ground. The category of involvement in play referred to the child's willingness to participate in group movement games. Responses from the questionnaires were allocated a relevant number of points. The results were presented in percentage terms. The maximum possible score was 100%.

Results:

The research demonstrated that children from the studied group achieved lower scores in fitness tests than children from the control group. On the basis of the analysis of the results from Wrocław Physical Fitness Test for Children Aged 3-7 by B. Sekita it was found out that children from the studied group reached a 15% lower fitness level. As regards detailed results of the examined group, the lowest scores were obtained in the agility and speed tests (31%), while the highest in the power test (54%). Children from the control group achieved the best scores in the speed test (68%) and the worst in the strength test (48%). If we compare the scores in the studied group and the control group, we can claim that there were no differences between the two groups with respect to the strength test (46% and 48%). On the other hand, the two groups had significantly different results in the speed test (31% and 63%) and the agility test (31% and 55%) [Chart 1].

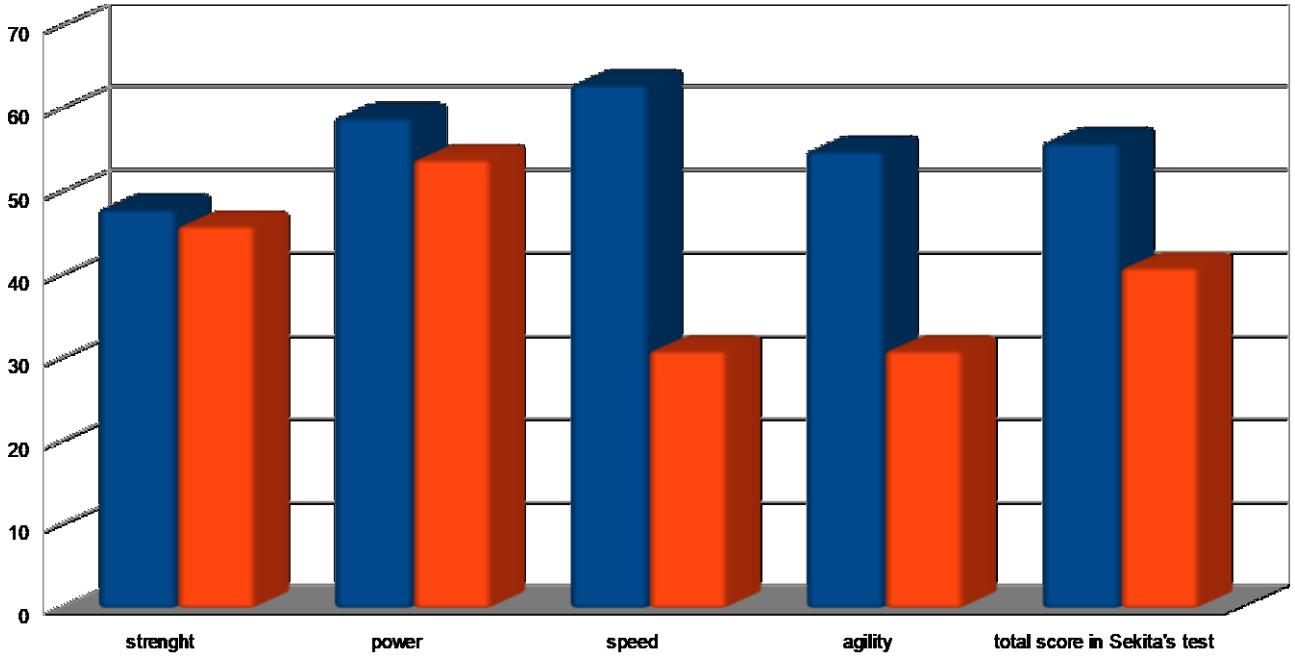
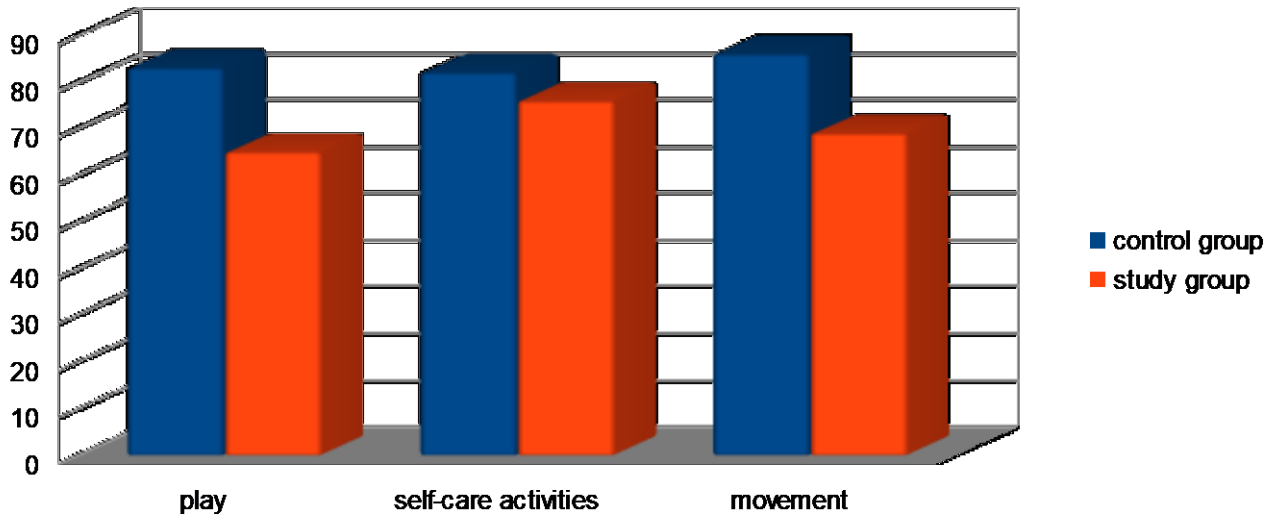


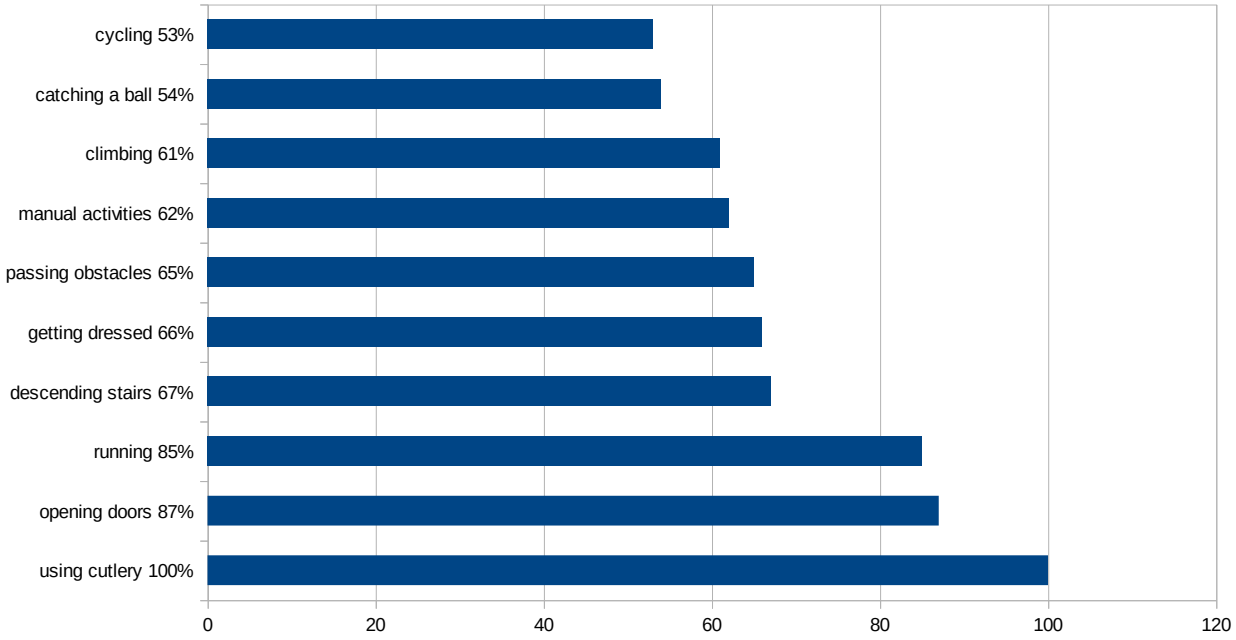
Chart 1. Mean percentage scores in the Physical Fitness Test by B. Sekita.

For the purposes of the analysis of the everyday activity questionnaires, children's activities were divided into three groups: play, self-care precision activities and movement. The analysis of the questionnaire results indicates that play-related activities were the most problematic for children from the studied group (65%), while self-care precision activities were the least difficult (76%). The results of the control group were at a similar level in all categories. The least distinct differences between the studied group and the control group were observed with respect to self-care precision activities (76% and 82%) [Chart 2].



Graph 2. Mean percentage scores in everyday activities in both groups.

A detailed analysis of the questionnaire results in the studied group shows that the most challenging activities for children were: cycling, catching a ball and climbing, manual activities, passing obstacles. Graph 3 presents detailed percentage scores of children from the studied group. The most problematic activities in the control group were: cycling, catching a ball and climbing.



Graph 3. Detailed results in everyday activities of children from the studied group (100% means that all children were able to complete a task).

DISCUSSION

The early childhood, frequently referred to as “the golden period” in the motor development, is the time of the largest growth in the area of motor coordination. The children at this age should have already developed the basic gross and fine motor skills in order to acquire new, more complicated motor abilities [11]. At this age, children learn how to cycle, ski, skate and swim; they are able to hop, climb a ladder, do a roll, kick and throw a ball precisely, and they also develop their speed and muscle strength [6].

The correct development of physical fitness depends on the effective functioning of sensory stimuli processing mechanisms. By exploring the surrounding environment, a child experiences new sensations which give rise to adequate reactions. The adaptive responses are more complex and movement is easier, which in turn encourages new motor challenges. Physical activity develops and strengthens the whole body, contributes to its morphological features and fitness. An appropriate amount of physical activity is especially important for children who are in the intensive development phase [1].

Lack of full integration of early childhood reflexes can affect the child’s posture, balance, and functioning of eyeballs, and – as a result – the visual-motor-sensory coordination. This is reflected in difficulties in everyday functioning and has a considerable influence on school abilities at further stages of development [8]. It is suggested that patients with sensory integration disorders may suffer from comorbidities (including postural defects, orthoptic disorders, epilepsy), which also affect the child’s functioning [15].

It is indicated that sensory processing disorders can have an impact on the social and emotional development, attention span, development of speech, as well as on building one’s own identity and self-control. The correct course of sensory processing is the basis for development of further skills [3]. Children with untypical reactions to stimuli and with dysfunction of sensory stimuli processing pose a considerable challenge to their parents and guardians who do not understand their reactions and difficulties, which can additionally aggravate the child’s condition.[5]

Conclusions:

1. Children from the studied group obtained lower scores in physical fitness tests than children from the control group. The largest differences were noted in agility and speed.

2. Children from the studied group had more difficulty in everyday activities than children from the control group. The most problematic were play-related activities (cycling, catching a ball).
3. Children with a lower motor ability level or with difficulties in self-care activities may need to be diagnosed for sensory processing disorders.
4. The research carried out is a preliminary study providing a starting point for further research in a larger group.

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