

THE IMPORTANCE OF PHYSICAL ACTIVITY FOR THE DEVELOPMENT OF MOTOR SKILLS OF YOUNGER SCHOOL AGE CHILDREN

ZNAČAJ FIZIČKE AKTIVNOSTI ZA RAZVOJ MOTORIČKIH VEŠTINA DECE MLAĐEG ŠKOLSKOG UZRASTA

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Abstract

Physical activity plays an important role in the motor and psychological development in a pediatric population. The maturation of human motor skills is gradual over the time. It depends on several factors, including but not limited to: individual differences, health condition, quality of neuromuscular structures and stimulating factors.

Research included in this review shows that different types of physical activity, including aerobic training, strength training, dance, yoga, and walking programs, improve mood and mental health. Aerobic physical activity has the greatest effect on reducing the symptoms of anxiety and stress. Habits related to the physical activity, acquired in childhood, can be maintained in adulthood, which contributes to the better health and quality of life. Extensive literature indicates that regular physical activity encourages growth and development and has multiple benefits for the mental, physical, cognitive and psychosocial health of children.

Children capacities for exercise change in accordance within defined developmental periods. Young children are active at short intervals and their capacity for continuous activity increases as they grow and mature. The health benefits of sporadic exercise at a younger age are not well established, stressing the short-term benefits of physical activity for some aspects of cognitive and mental health, indicating that maximum benefit can be achieved by frequent bouts of exercise during the day.

Keywords:

physical activity,
children,
younger school age,
motor skills,
children's development

Sažetak

Fizička aktivnost ima veoma važnu ulogu u razvoju motoričkih sposobnosti i psihološkom razvoju svakog deteta. Razvoj motoričkih sposobnosti čoveka odvija se postepeno i fazno i zavisi od više faktora, a neki od najznačajnijih su individualne razlike, zdravstveno stanje, kvalitet nervno-mišićnih struktura i podsticajno stimulativni faktori. Istraživanja uključena u ovaj pregledni rad pokazuju da različite vrste fizičke aktivnosti, uključujući aerobni trening, trening snage, ples, jogu i programe hodanja, poboljšavaju raspoloženje i utiču na poboljšanje mentalnog zdravlja. Aerobna fizička aktivnost najviše utiče na smanjenje simptoma anksioznosti i stresa. Navike vezane za fizičku aktivnost, stečene u detinjstvu, mogu se zadržati i u odraslom dobu, što doprinosi boljem zdravlju i kvalitetu života. Opsežna literatura ukazuje na to da redovna fizička aktivnost podstiče rast i razvoj i ima višestruku korist za mentalno, fizičko, kognitivno i psihosocijalno zdravlje dece.

Kapaciteti dece za vežbanje menjaju se u skladu sa razvojnim periodima. Mala deca su aktivna u kratkim intervalima i njihov kapacitet za neprekidne aktivnosti se povećava kako rastu i sazrevaju. Zdravstvene koristi sporadičnog vežbanja u mlađem uzrastu nisu jasno utvrđene, ali jesu kratkoročne koristi fizičke aktivnosti za neke aspekte kognitivnog i mentalnog zdravlja, koje ukazuju na to da se maksimalna korist može postići čestim naletima vežbanja tokom dana.

Ključne reči:

fizička aktivnost,
deca,
mlađi školski
uzrast,
motorne veštine,
razvoj dece

Introduction

Proper development of motor skills is considered important for the physical, social and psychological children development. There is an evidence of numerous health benefits that can be achieved by improving motor skills. It has been shown that well-developed motor skills affect cardiorespiratory readiness (1, 2) and body weight (1,3,4,5), which indicates the fact that the timely development of motor skills can have important health benefits. There are some indications that over time (6), the level of motor skills remains stable, and deficits in motor development observed in early childhood are also visible in adolescence (7), which highlights the preschool period as particularly important for the development of motor skills. Early childhood is an age period in which the development of basic movement skills is necessary to create a foundation for more complex movement activities in everyday life and physical exercise in later childhood (8). There are indications of the connection between motor development and language development (9-13), executive function (14) and general well-being (15).

A group of scientists from Minnesota investigated the impact of physical exercise on the development of motor skills of children aged 6 - 12 years and came to the conclusion that increased physical activity has positive effects on the development of motor skills in children. Additionally, studies included in this meta-analysis showed that prolonged duration and frequency of physical activity did not have any detrimental effects on the development of motor skills in children (16).

Most existing studies include only short-term follow-up, so there is a real need for more longitudinal studies on the importance of motor skills with long-term follow-up, including physical and psychological outcomes.

The human motor skills development

The development of the motoric movements, locomotion and statics (balance of the body at rest) take place in a certain order. The human motor skills development occurs in stages, and each stage has its own characteristics. The factors that have the greatest impact on the development and improvement of movement in a pediatric population are maturation and learning. Solely maturation is not sufficient for motor skills development and improvement, thus, it is advised to make a planned and directed impact with physical exercise for the purpose of creating the possibilities for learning and practicing motor skills (17). Maturation is a physiological process, and learning signifies the child's cooperation with the environment, allowing improvement of movement habits by repeating techniques (18). It is very important to align learning with maturation. If a child is not mature enough, attempts to learn new skills may be unsuccessful. Thus, learning can only begin when the child is mature enough. On the other hand, if the child is mature and capable of mastering new motor habits, but not given the opportunity to exercise, developmental delays in various degrees could occur. The central nervous system (CNS) plays the most important role in learning movement, and with the repeating of ones, both the nervous system and conditioned reflex actions develop. This way, the experience as well as learning can be defined as a conscious process of acquiring knowledge and skills that is most often achieved through repetition (19, 20). The process of learning motor skills, unlike the process of learning verbal content and the process of problem solving, is characterized by specific laws. It is relatively independent and autonomous process that differs from other forms of learning.

According to Piaget (21), for the proper cognitive development of children, it is necessary for them to discover their environment through movement. In early

childhood, they learn about their surroundings through motor activities such as crawling, walking, jumping and running. According to Gelahju and Ozmun (22), basic motor skills as fundamental movements begin to develop at the same time when the child is able to walk independently and to move freely in space.

Types of motor skills and their characteristics

At Basic characteristics of motor skills according to Welford (23) are:

- Stably built and coordinated activities in relation to the goal or situation, in which the entire chain of motor, sensory and central mechanisms is involved;
- Learned in accordance with proposed aims in the form of activities that are gradually built by repetition;
- They represent a series of different actions or processes that are aligned in time sequences.

If it is necessary to distinguish between more skilled and less skilled performers of certain motor skills, it is necessary to know the three important properties of practiced behavior in relation to which the assessment would be performed. These properties that are defined by E.R. Guthrie (24) are the following: "Skill consists in the ability to achieve some end result with maximum certainty and minimum consumption of energy, or time and energy" (25). Thus, the three essential properties of practiced behavior imply maximum confidence in achieving the goal, minimum energy expended, and minimum time to perform the skill.

According to Nicin (26), motor skills represent learned, acquired movements, as well as those that are genetically inherited in the central nervous system, and imply natural forms of movement (walking, running, jumping, throwing, climbing, etc.). Abernet et al., define motor skills development as changes in the performance of motor skills over time and processes that emphasize these changes (27). Physical development and experience in mastering various motor tasks contribute to the adoption of proper motor movements (28).

Basic motor skills are divided into three categories (29):

- locomotor skills - walking, running, jumping;
- non-manipulative skills - turning, skipping, stepping, sideways movement; and
- manipulative skills (manipulation of a certain object) - shooting, throwing, catching, guiding, pushing, pulling.

Physical activity: through play towards education

Up to nine years of life (preschool and younger school age), the development of motor skills intensifies (30 - 32). It is influenced by several factors, among which the most dominant role is played by physical growth and development, physical activity, socioeconomic status and hereditary traits (33).

In the process of acquiring new motor skills, the goal is to master each new movement so the action is less

controlled by the will, thus in the end, it is performed without the participation of the cerebral cortex. The number of repetitions of a movement or movement pattern used to create a motor habit is different and depends on age, previous experience, methodical procedure, motivation, concentration, initial level of motor skills and the complexity of the movement being learned (26, 34). Acquiring motor habits is a continuous, long-term and multi-year process (30). During this period, the child should not participate in competitive activities, so that the focus is completely on performing the exercise correctly. Motor and skill competencies in a child depend on other children acceptance and inclusion of the one in joint activities (31). Basic motor skills are the basis for developing movements that are specific to sports games, dance and various recreational activities (35). A study by Brant et al. (36) showed that the activity in adulthood depends on the experience gained in mobile games during childhood. Through play, the child learns and exercises new movements, along with acquiring ones own possibilities and limits. By learning new movements, motor skills and motor abilities are developed.

Physical education is a complex educational process that institutionally lasts from preschool to schooling in higher education institutions (37). There is a lot of research that talks about the importance of organized physical activities on children's development (22, 28, 31, 35). It should be emphasized that the impact of physical exercise on children's development depends on the intensity, scope, duration and form of activities.

Physical activity and motor skills relationship

ReIt was stated previously that children who do not acquire fundamental motor skills by the time they start school will later have a problem engaging in physical activities (38, 39). Children who are not skilled enough will not be as physically active as their peers, which can affect the occurrence of obesity in this group (39,40). Lubans et al. (41) examined the impact of motor skills on health, and the obtained results show that basic motor skills are in a positive relationship with a self-confidence, physical activity, and cardiorespiratory condition in a younger school-age children, as well as in the adolescents. The links between physical activity and motor skills are dynamic (42). With the development of motor skills, the engagement of children in physical activities increases, and more active participation in physical exercise contributes to the improvement of motor skills. A moderate and low correlation between the levels of motor competencies and physical activities was found in preschool children (42) and younger school age respectively (43, 44), meaning that the children at this age have a tendency to participate in physical exercise regardless of the level of mastered skills. In contrast, older children who are aware that they are insufficiently skilled in a relation to their peers, tend to avoid physical activities, so as not to publicly display their insufficient motor competence.

Physical activity overall benefit

Physical activity also has a positive effect on the psychological health. A large number of research has been done on the topic of the influence of regular physical activity on the psychological status of children and adolescents (31 - 33). Positive associations were found between physical activity, self-efficacy, and self-confidence (45), as well as social behavior, motivation, and friendship (46, 47). Younger school-age children, as well as adolescents, tend to be accepted by their peers. Those who are motor-skilled, handy, agile, and can run fast are more popular among the children of younger school age (48). Along with the improvement of their abilities among peers, the ego increases in all dimensions of quality of life (49, 50). Children with acquired skills feel more comfortable when performing physical activities and they have affection to exercise, which contributes to better health, general mood, and better relationships with family and friends. Previous reports confirm that children who are physically active, are mentally more stable than the inactive ones (31, 32, 46). Globally, about 15% of children have some mental illness (51, 52), and in America, 20% of school children are diagnosed with depression, anxiety and other mental disorders (53). According to some research, children who suffer from mental disorders most often have problems with both body weight (53 - 55) and school success (55, 56). Physical activity has a positive effect on a mental health and emotional stability in both children and adults (57, 58), and, if applied regularly, it can have long-term positive effects on mental health. Insufficient physical activity adversely affects mood and mental function. In a study by Petty et al. (59) the results showed that children aged 7 - 11 years who performed a 40-minute daily exercise program had reduced symptoms of depression and greater self-confidence compared to the control group. Regular exercise increases the stimulation of the production of endorphins, which act on the CNS, so that the person is feeling calm and good mood after the activity (60). Previous reports stated that, children who are more physically active have better physical and mental health and social functioning (61). It was also stated that children who are more active show signs of better school success. There is a growing body of research examining the link between physical exercise and intellectual abilities. Namely, a group of Japanese (62) scientists explained the influence of physical activity on the blood flow in the brain and on the improvement of the work of neurotransmitters that affect cognitive abilities.

Recent research indicates the effect of physical exercise, which secretes a hormone called irisin, serves as a memory regulator (63). Bruce Spiegelman, a cytologist from the Boston Institute, is responsible for the discovery of this hormone (63).

Conclusion

Summarizing the researched aspects of the influence of physical activity on the development of motor skills

of children of younger school age, several conclusions can be reported. Physical activity of children of younger school age is a recommended category for optimal acquisition of motor skills, which affects the proper growth and development of the child. No negative effects of physical activity have been determined if the content of the activity is adjusted to the characteristics of age and dosed according to the volume and intensity of the load, in accordance with the age of the child and his individual abilities. In the first eight years of life, motor skills develop the most, and in that period it is desirable for children to organize games in which the natural forms of movement are dominant - walking, running, jumping, throwing, catching, and climbing. During these activities, the child learns how to coordinate and control his body, using the information he receives from his environment. By exercising regularly, the child becomes more agile, stronger, faster and more endurable every day. Physical activity is the basic psychomotor activity of school-age children, and the degree of health and motor maturity of future generations depends on the prevalence and frequency of physical exercise through the educational process.

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