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The relationship between physical, motor, and intellectual development of preschool children

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Abstract

The study examined the relationship of physical, motor, and intellectual development of preschool children. The sample included 72 children aged 5.60 (±0.32) years. Two anthropometric measures (body height, body weight), two motor skills tests (obstacle course, broad jump), and an intelligence test (Raven's CPM) were applied. Taxonomic analysis identified two distinctive developmental profiles in terms of physical growth and motor competence: 1) Shorter children of a lower body weight, less competent; 2) Taller, heavier and more competent children. Physical growth and motor development are positively correlated in children aged 5-6, with no such relation between these domains and intelligence.

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Keywords: Preschool children; Development; Physical growth; Motor development; Intelligence

1. Introduction

Development is a lifelong process, and different aspects of development (physical, motor, cognitive, emotional, etc.) are correlated and interdependent in multiple ways. The complex interreaction of our genes, and our social, cultural, and physical environment, is what defines us. According to the current theories, cognition, perception, motor behavior, and emotions are in close relationship [1].

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During the first 7-8 years of life, development of basic movement patterns depends largely on the rate of neuromuscular maturation of an individual, residual effect of movement experience and current movement experience, as well as growth and maturation status [2]. When fundamental movement patterns are once established, learning and exercising become significant factors of influence on motor competence.

Physical and motor development of the child must be considered within a certain context. Lifting head or unaided sitting of the infant is not an exclusive source of maturation processes (age-dependant ones) as physical and social characteristics of environment play significant roles in it too. Adolph and Berger use the example of crawling and learning to walk to illustrate how much everyday practice and mothers' expectations in bringing up children are significant for mastering motor benchmarks [3]. Maturation of brain and nerve structures produces favorable effects on power and balance by increasing speed and efficiency of information processing. Brain growth is very fast during infant age and young childhood, and it continues the growth pattern of the brain and related tissues commenced in the prenatal period. Relationship between motor development and brain growth is especially expressed at the infant age, and this can also be related to a unique cerebellum growth spurt. Intensive and fast development of cerebellum is significant for coordination, postural control, balance and muscular tone [2], and for cognitive functioning, as well [4]. Independent walking increases child's mobility andopportunities for social interactions, while motor development in general has significant effects on the child's cognitive and language development [5].

Relatedness of different developmental aspects is also confirmed by association of motor, cognitive, and other deficits often encountered in developmental disorders. For example, Developmental Coordination Disorder (DCD), which is essentially deficient motor coordination, is often followed by other developmental problems such as disorder of attention, speech/language, behavior, etc. [6].

Within the context of the current understanding of integrality of development, research was carried out with an aim to examine the relationship between physical, motor, and intellectual development, i.e. to identify developmental profiles of preschool children. Better understanding of the relationship between different developmental domains could help in creating the most supportive developmental environment in preschool years.

2. Method

2.1. Participants

The study was carried out in the Preschool institution *"Radosno detinjstvo"* Novi Sad, Serbia. Recruiting the participants was approved by the Preschool institution's management, as well as by parents of children who attended the preschool institution during data collection. Prior to testing, all parents got information about testing procedures to be used and gave the written consent. Children's participation was voluntary, so that the final sample included the total of 72 healthy children (35 boys and 37 girls). Age of participants on the date of measurement, i.e. testing, was 5.60 (±0.32) decimal years.

2.2 Measures

All anthropometric measuring and motor testing were carried out in the morning (from 8.00 to 12.00) by trained personnel who followed standardized procedures. Within the broader project, higher number of measures and tests was applied, with the following ones used for the requirement of the current study:

Anthropometric measures. *Body height* was measured in mm by Martin anthropometer. Body height measurement was taken barefooted with feet together, whereas the head was positioned according to the