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Determination Of The Motor Development Levels Of 9-10 Years Old Children *

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** Measurement Of The Basıc Motorıcal Characterıstıcs Of 9-10 Year Old Chıldren In Ankara Çankaya Dıstrıct, Aksaray Unıversıty Socıal Scıences Instıtute Physıcal Educatıon And Sports Department, Master thesıs, March 2018*
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Abstract

The aim of this research was to observe the level of motor development of a group of students aged 9-10. Ninety-three students (42 girls, 51 boys) from the TAF Mehmetcik Foundation Hafize İhsan Payaza Primary School have voluntarily attended the research from Çankaya District in Ankara, Turkey. The children who were in the experimental group had the sub-tests of Test of Gross Motor Development-2 (TGMD-2); Manipulative skills and object control skill tests and each of them was graded. For each activity of the tests, 1 point was given if the students were successful and 0 points if not. At the end of the grading of each trial, total grades ached for each activity. Total grades were calculated for each skill and the status was defined. The result of this study will be useful for the students who have completed the basic Movement period of Psycho-motor development phases and who are in the last phase of sportive Movements period of Specific activity skills aged 7-10 years to define their basic motor features and to be guided to the correct sport branches. On one hand, it is aimed to help develop the normative values for the Turkish children using the TGMD-2 which was adapted from the test which is widely used in scientific researches while on the other hand, the development of basic motor properties based on anthropometric characteristics will be able to observe.

Keywords: Motor Skills, Child, Motor Performance, Motor Development, Muscle Development

INTRODUCTION

It is stated that understanding the motor development of a child is to understand the whole development of that child (19). There are several parameters that contribute to the development of a physically active lifestyle (physical self-perception, motivation, self-efficacy) for children and adolescents (1,23). One of these parameters is motor skill ability. (7,24,20). Motor skill ability is defined as the coordination, control, and movement quality that form the basis of certain motor skills as well as performance in many motor skill movements (6).

Gross motor skills are identified as an important element in children's environmental communication by developing object control and locomotor skills that primarily involve manipulating and reflecting objects with hands and feet (31). Motor skills are said to be the basis for many activities, both in early childhood and in childhood. (27). Ulrich (31) states that gross motor skills include locomotor skills in children's daily lives (such as holding, gripping) or in participating in various physical activities (such as running, jumping). Gross motor skills are considered the basic skills of movement and the basis for more complex motor skill development,

including the special skills required to participate in sporting events (2). The short and long-term benefits of physical activity for mental, emotional, and social, physical health for children and adolescents have been extensively demonstrated. However, it is stated that people who regularly participate in exercise programs less likely to experience obesity and cardiovascular disorders (26).

Identifying Motor-delayed children "allows timely guidance for developmental interventions as well as diagnostic assessments and treatment planning" and can reduce the negative impact on the development of sub-sequent skills. Physical fitness is associated with cognitive development and motor coordination, and proper motor coordination is essential for psychological development and well-being and health for people (16). According to Coe et al., the fact that the physical fitness level is above affects psychological well-being, health, and also academic success significantly. It is stated that the factor that enables children to participate in any physical activity or succeed in physical activity is the child's motor ability and the children who do not have sufficient motor qualifications will experience a lack of confidence and motivation in their participation in physical activity (21,14). Stodden et al. (25) emphasized that children who do not have sufficient motor ability decrease their perceptions of success and entertainment in various activities and this situation may cause activity or athlete to leave over time. Noritz et al. stated that determining children at the motor skill level will reduce the negative impact on the development of skills as well as determining and improving the negative effects during the period of development. In this context, the purpose of this study was to determine the motor skill levels of children between the ages of 9-10.

Method

Research model

In this research, the screening model, which is one of the experimental design models, was used to determine the levels of gross motor skills of 9-10 years old children.

Participants

The random sampling method was used to determine the research sample. The measurements were collected in the fall semester of the 2016-2017 academic year. The sample of the research consists of 93 (42 girls and 51 boys) students aged 9-10 who study at the TSK Mehmetçik Foundation Hafize İhsan Payaza Primary School in Çankaya District of Ankara.

Table 1. Descriptive statistics of the study sample

Variables		N	%
Gender	Boys	51	54,8
	Girls	42	45,2
Age	9 years old	22	23,7
	10 years old	71	76,3
Pre-School Education	Yes	76	81,7
	No	17	18,3
Body Height	93	140.67	6.396
Body Weight	93	36.47	7.717
Dominant Hand	Right hand	93	100,0
	Left hand	-	-
Dominant Foot	Right Foot	84	90,3
	Left Foot	9	9,7

Measures

In the research, The BMMDT-2, adapted by Boz (4), was used to measure the motor development levels of children.

Test of Gross Motor Development Test-2 (TGMD-2): Ulrich and Sanford (26) developed the Test of Gross Motor Development (TGMD) test to evaluate the motor development of children between the ages of 3-10. Later, Ulrich revised this test and developed TGMD-2. The adaptation study of the "Test of Gross Motor Development- Second Edition (TGMD-2)" standard, which was standardized by Ulrich (31) according to American norm values, was made within the scope of the research. Boz and Güngör Aytar (5) conducted an adaptation of the test to Turkish children, and the original test was aimed at measuring the gross motor development of children aged 3-10 years. The reliability of the test was found to be α = .92 for 5 years old and α = .91 for 6 years old. The TGMD-2 consists of two subtests: Manipulative and object control skills.

The manipulative skills (Run, Gallop, Leap, Hop, Horizontal Jump, Slide) includes a total of 6 skills and object control skills (Stationary Dribble, Catch, Kick, Overhand Throw, Underhand Roll, and Striking a stationary ball) consists of a total of 6 skills. The TGMD-2 was a test that includes 12 skills in total. Each motor skill consists of skill movement analysis consisting of three or five items.

For each item contained in each skill, 1 point is given if the child does the movement correctly, 0 points if the child cannot do it correctly. As a result of scoring each of the trials, the total score is reached for each item. The total score cannot be greater than

two points. The highest score from the manipulative skills is 48, and the highest score from the object control skills is 38 points.

Procedures

Before the data were collected, the researcher and his assistants (two hours of theoretical and two hours of practical education were given by the researcher to the six trainers and teachers who graduated from the School of Physical Education and Sports) and prepared the test setup by working in the field where the test will be applied. The conditions specified in the TGMD-2 were prepared for the application of each skill. The materials to be used in the test were also prepared in accordance with the conditions of the original test.

For the TGMD-2 test application, a separate station was established for each skill, and a trainer was assigned to each station. During the application, the children participated in the application one by one and since the beginning of the application, the trainers who were assigned separately were taken to all stations, respectively, and the application was carried out. It is evaluated that the trainer assigned for each station in practice and remained constant until the end of the application contributes to the reliability of the application.

Data Analysis

The data obtained in the research were transferred to SPSS 23.0 program. Descriptive statistical analysis (mean, standard deviation, frequency, and percentage) was performed to define the characteristics of the research group in the analysis of the data. The independent-Sample t-test was used to compare data between groups. The statistical significance level was taken as $p < 0.05$.

Results

In the result section, the findings of the research group were given.

Table 2. The TGMD-2 results of students according to gender

Variables	Gender	N	*M*	SD	Df	t	p
Run	Boys	51	7,64	,795	91	5.827	**.00***
	Girls	42	6,21	1,522			
Gallop	Boys	51	6,70	1,025		5.519	**.00***
	Girls	42	4,92	2,004			
Leap	Boys	51	9,68	,812		6.433	**.00***
	Girls	42	8,02	1,615			
Hop	Boys	51	5,11	,992		4.144	**.00***
	Girls	42	4,11	1,328			
Horizontal Jump	Boys	51	7,62	,999		5.399	**.00***
	Girls	42	6,02	1,814			
Slide	Boys	51	7,56	,984		4.308	**.00***
	Girls	42	6,02	2,321			
Manipulative Skills Total Scores	Boys	51	44,35	2,965		10.282	**.00***
	Girls	42	35,33	5,349			
Stationary Dribble	Boys	51	6,41	1,512		-,357	.722
	Girls	42	6,52	1,501			
Catch	Boys	51	5,86	,400		2,354	**.02***
	Girls	42	5,47	1,087			
Kick	Boys	51	7,15	1,347		2,033	**.04***
	Girls	42	6,52	1,656			
Overhand Throw	Boys	51	6,23	1,945		-1,176	.24
	Girls	42	6,71	1,966			
Underhand Roll	Boys	51	7,35	1,425		-,251	.80
	Girls	42	7,42	1,467			
Striking a stationary ball	Boys	51	7,31	1,805		1,420	.15
	Girls	42	6,76	1,935			
Object Control Total Scores	Boys	51	40,41	5,056		,883	.38
	Girls	42	39,42	5,678			
TGMD-2	Boys	51	84.76	,993		6.089	**.00***
	Girls	42	74.75	1,350			

p<0.05

When Table 2 was examined; Run (Mboys = 7.64 ± 0.79; Mgirls = 6.21 ± 1.52), Gallop (Mboys = 6.70 ± 1.02; Mgirls = 4.92 ± 2.00), Leap (Mboys = 9.68 ± 0.81; Mgirls = 8.02 ± 1.61), Hop (Mboys = 5.11 ± 0.99;

Mgirls = 4.11 ± 1.32), Horizontal Jump (Mboys = 7.62 ± 0.99; Mgirls = 6.02 ± 1.81), Slide (Mboys = 7.56 ± 0.98; Mgirls = 6.02 ± 2.32) and manipulative skills total scores (Mboys = 44.35 ± 2.96; Mgirls = 35.33 ± 5.34) differences were detected. Accordingly, it was observed that the average score of male students was higher than female students depending on gender (p <0.05). Again, according to gender, a significant difference was found in favor of male students in terms of Catch (Mboys=5.86±0,40; Mgirls=5.47±1,08) and Kick (Mboys=7.15±1,34; Mgirls=6.52±1,65) from the object control total scores and hitting the ball with feet. Moreover, there was a statistically significant difference in TGMD-2 Total Scores (Mboys = 84.76 ± 0.99; Mgirls= 74.75±1.35) depending on gender. According these results, male students' TGMD-2 total scores were higher than female students depending on gender (p <0.05).

Table 3. The TGMD-2 results of students according to age

Variables	Age	N	*M*	SD	Df	t	p
Run	9 years old	22	6,90	1,540	91	-,353	.72
	10 years old	71	7,02	1,330			
Gallop	9 years old	22	6,40	1,053		1,541	.12
	10 years old	71	5,74	1,925			
Leap	9 years old	22	8,59	1,680		-1,247	.21
	10 years old	71	9,04	1,418			
Hop	9 years old	22	4,36	1,364		-1,302	.19
	10 years old	71	4,76	1,212			
Horizontal Jump	9 years old	22	6,68	1,701		-,728	.46
	10 years old	71	6,97	1,612			
Slide	9 years old	22	7,18	1,789		,888	.37
	10 years old	71	6,77	1,906			
Manipulative Skills Total Scores	9 years old	22	40,13	5,083		-,124	.90
	10 years old	71	40,32	6,484			
Stationary Dribble	9 years old	22	6,09	1,570		-1,335	.18
	10 years old	71	6,57	1,470			
Catch	9 years old	22	5,72	,631		,259	.79
	10 years old	71	5,67	,858			
Kick	9 years old	22	6,54	1,870		-1,152	.25
	10 years old	71	6,97	1,393			
Overhand Throw	9 years old	22	6,00	2,047		-1,241	.21
	10 years old	71	6,59	1,924			
Underhand Roll	9 years old	22	6,09	2,388		-5,577	**.00***
	10 years old	71	7,78	,558			
Striking a stationary ball	9 years old	22	6,59	1,436		-1,362	.17
	10 years old	71	7,21	1,977			
Object Control Total Scores	9 years old	22	37,22	6,603		-2,861	**.00***
	10 years old	71	40,81	4,614			
TGMD-2	9 years old	22	77,36	10,284		-1,680	.09
	10 years old	71	81,14	8,864			

p<0.05

When Table 3 was examined, it was found that there was no statistically significant difference in the Run(M9 years old =6,90±1,54; M10 years old =7,02±1,33), Gallop (M9 years old =6,40±1,05; M10 years old =5,74±1,92), Leap (M9 years old =8,59±1,68; M10 years old =9,04±1,41), Hop (M9 years old = 4,36±1,36; M10 years old =4,76±1,21), Horizontal Jump (M9 years old = 6,68±1,70; M10 years old =6,97±1,61), Slide (M9 years old = 7,18±1,78; M10 years old =6,77±1,90), and manipulative skills total points (M9 years old =40,13±5,08; M10 years old =40,32±6,48) of students according to age (p> 0.05). Depending on the age, a statistically significant difference was found in the Underhand Roll (M9 years old =6,09±2,388; M10 years old =7,78±0,55) from Object Control Skills and Object Control Total Scores (M9 years old =37,22±6,603; M10 years old =40,81±4,61) of the students. Accordingly, the average score of 10-year-old students was found to be higher compared to 9-year-old students (p <0.05).

Table 4. The TGMD-2 results of students according to take a pre-school education

Variables	Pre-School Education	N	*M*	SD	Df	t	p
Run	Yes	76	6,98	1,331	91	-,194	,84
	No	17	7,05	1,599			
Gallop	Yes	76	5,86	1,927		-,398	,69
	No	17	6,05	,826			
Leap	Yes	76	9,00	1,469		,883	,37
	No	17	8,64	1,578			
Hop	Yes	76	4,73	1,247		1,143	,25
	No	17	4,35	1,271			
Horizontal Jump	Yes	76	6,92	1,555		,222	,82
	No	17	6,82	1,975			
Slide	Yes	76	6,81	1,866		-,597	,55
	No	17	7,11	1,964			
Manipulative Skills Total Scores	Yes	76	40,32	6,304		,163	,87
	No	17	40,05	5,617			
Stationary Dribble	Yes	76	6,63	1,486		2,356	**,02***
	No	17	5,70	1,358			
Catch	Yes	76	5,61	,878		-1,782	,07
	No	17	6,00	,000			
Kick	Yes	76	6,88	1,441		,142	,88
	No	17	6,82	1,878			
Overhand Throw	Yes	76	6,63	1,853		1,900	,06
	No	17	5,64	2,262			
Underhand Roll	Yes	76	7,61	,863		3,473	**,00***
	No	17	6,35	2,644			
Striking a stationary ball	Yes	76	7,13	1,913		,727	,46
	No	17	6,76	1,714			
Object Control Total Scores	Yes	76	40,51	4,745		2,122	**,03***
	No	17	37,52	7,116			
TGMD-2	Yes	76	80,84	8,463		1,309	,19
	No	17	77,58	12,354			

p<0.05

When Table 4 was analyzed, a statistically significant difference was found in the stationary dribble (Myes =6.63±1,48; Mno =5.70±1,35), and Underhand Roll (Myes =7.61±0,86; Mno =6.35±2,64) from the Object Control Skills and Object Control Skills (Myes =40.51±4,74; Mno =37.52±7,11) total scores on the students taken the pre-school education. Accordingly, it was observed that the mean scores of the students who take pre-school education were higher than those who did not take pre-school education (p <0.05).

Discussions and Conclusions

Sports should enter the child's life at an early age, as it will play an important role in the child's growth, maturation, and cognitive development (20). A statistically significant difference was found between the running motor skills and gender variables, which are among the Manipulative Skills of the students participating in the research. Accordingly, it was observed that the average score of male students was higher than female students depending on gender. Again, depending on gender, a significant difference was found in favor of male students in terms of catching and kicking from the object control skills.

A statistically significant difference was found in Test of Gross Motor Development-2 total scores depending on gender. Accordingly, it was observed that the average score of male students was higher than female students depending on gender. Tavşan (29) stated that there is an increase in motor skill performance with age, but gender also affects performance. Research on motor skills shows that boys' performances are better than girls, these differences are minimal in early childhood and increases in adolescence (12, 13). It is stated that the motor skill scores of boys were higher than that of girls. Lorson and Goodway (17) stated that basic movement skills may differ according to gender, and socio-cultural changes (different from what is

expected from the child). According to Blakemore, Berenbaum, and Liben (3), both physical development and application opportunities affect gender differences in motor skills (biological factors and social learning) in childhood. In the study which Valentini and Rudisil (34) examined whether boys and girls with low motor performance between 5-6 years of age to examine whether boys and girls differ in terms of motor skill, there is no significant difference between boys and girls in terms of locomotor skills, while object control skills are compared with boys who have higher scores.

Cleland and Gallahue (8) stated that after their study with 40 children (4, 6, 8 years), experience and age explained 45% of children's movement skills scores. In this study, statistically significant differences were found in the students' total scores of underhand roll and object control from object control skills and object control, and depending on the age the average score of 10-year-old students was higher than 9-year-old students. Also, Tepeli (28) stated that age affects the development of movement skills in the standardization study of the TGMD-2. Ulrich (31) emphasized that age affects performance in TGMD-2 original test and there is a significant difference between age and Manipulative Skills, object control, gross motor skills. Sevimay (22) applied the motor performance evaluation test to examine the motor performances of 205 preschool children in the age of 3-6. As a result of the research; Apart from the differences in the balance performance of the 5-6 age group children, the difference between the performance of 5-6 age group children and 3-4 age group children was found to be statistically significant. In their study with 191 children, Zachopoulou and Makri (35) examined the effect of age and gender variables on the movement skills of preschool and primary school children. As a result, a significant difference was determined for the motor fluency and flexibility factor in age groups. Williams et al. (33) stated that in their study on 80 children aged 3 years and 118 children aged 4 years of age, the locomotor and object control skill levels of children aged 3 years were lower than that of children aged 4 years.

In the research group; a statistically significant difference was found in the total scores of the Object Control Skills, Stationary Dribble, Ball, and Object Control Skill depending on the students ' attendance to a pre-school education institution. Accordingly, it was observed that the average scores of the students who received preschool education were higher than the students who did not receive pre-school education. Clelandand and Gallahue (8) in their study to examine the relationship of age, gender, movement experiences and gross motor development in different movements (performing and performing gross motor motion models) of 40 girls and boys aged 4,6, and 8, it has been determined that the difference in movements occurs at the age of four or eight, and out-of-school experiences are of great importance in the ability of young children to move, and gender is not effective in different movement abilities of the child in contrast to the age and experience. In the study of Goodway and Rudisill (13), it was applied a 12-week motor skill development program on pre-school African American children, it was found that physical capacity improved better than the control group. Similarly, Valentini and Rudisil (2000), in their study to investigate the effect of motivational education practice on 67 girls and boys with low motor performance in the 5-6 age range, 38 children participated in 12 weeks of motivating education and 29 children were treated as control groups. Both locomotor and object control skill posttest scores measured by Test of Gross Motor Development-TGMD were determined to be significantly higher than the control group. This result shows that motivational education practices increase the sense of physical ability and motor skill performance in kindergarten children with low motor performance level.

Deli, Bakle, and Zachopoulou (9) stated in their study that the manipulative skill scores of children participating in practices organized in different ways differ significantly from the scores of children participating in free play activities, so the practices organized in different ways positively affect their displacement skills. Similarly, Derri, Tsapakidou, Zachopoulou ve Kioumourtzoğlou (2001), as a result of the music and movement program applications for 4-6 year-old children, the manipulative skills scores of the experimental and control groups differed significantly, and the average of the skill scores of the children in the experimental group was significantly found high. They stated that the complex manipulative skills of the children developed with the music and movement program. In his study in Boz (4), stated that there is a significant difference between the pre-post and post-test average scores of children who participate in the

basic movement education program and that this difference is because of the basic movement training program applied. However, it is emphasized that the basic movement training program had a significant impact on gross motor development. In other words, it has been revealed that the basic movement training program can be effective in the acquisition and development of manipulative skills, object control skills, and thus in the acquisition and development of gross motor skills. Wang (32) stated that the children in the experimental group who participated in the creative movement training showed a significant difference from the scores of the children in the control group. However, he stated that there was a significant difference between the manipulative skill scores of both groups, but he noted that the difference between groups was not observed for object control skills.

Karagöz (15) stated that in his study conducted to measure the motor skill levels of eight-year-old children, the locomotor skill levels of students who do regular sports developed more than students who do not sport. In addition, he reported that the TGMD-2 object control skill levels of students who do regular sports were higher. Total motor skill scores support other subtest findings, and students who do regular sports were found to have higher total scores than those who do not sport.

Especially the 7-10 age period seems to be very important in terms of reinforcing these skills and using them effectively in their future lives. Besides the willingness of children to various sports branches, it is also important to choose those who have some special features and talent for some sports branches and to achieve national and international success in sports. For this reason, it is important to identify the students who are trained in sports starting age in line with their abilities and direct them to the appropriate sports branch.

Psychomotor tests are important to determine motor skill levels in children 9-10 years old (especially in the period of starting sports). Pre-school education has a positive effect on the development of psychomotor skills. For this reason, children should be able to continue pre-school education within the scope of opportunities and exercise programs to be implemented in this education should be designed in a way that will directly and positively affect psychomotor development within the framework of scientific methods. In this period, with the right planning, educators and families should help increase the motor mobility of children through various activities, and it should be ensured that the child is directed to the sports branch in which the child is prone. In the right branch to be directed, carrying out branch-specific studies will be important in achieving sporting success both individually and/or as a team, by directly affecting the development of the talent. Since the physical conditions (number of open spaces and parks where children can play etc.) in the region where the application is performing, economic conditions, environmental and social factors directly affect motor development according to age and gender. For this reason, the differences in motor development according to the region where the application is performing should be taken into consideration.

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