DIFFERENCES IN THE LEVEL OF DEVELOPMENT OF THE UNDERHAND ROLL SKILL IN CHILDREN AGED 7 - 10

Aceski Aleksandar, Aleksandar Tufekchievski

Ss. Cyril and Methodius University in Skopje, Faculty of Physical Cutlure, Skopje, Macedonia

Abstract

Underhand roll is a skill that is part of the manipulative skills that are present in the curriculum for health and physical education. The aim of the study was to determine the level of development of basic motor skills of manipulative kind of ball rolling in male children aged 7 to 10 years. All groups of respondents statistically are significantly different, except for the respondents 9 and 10 years old. A monotonous increasing trend is present in the average score of the skill and the percentage of master levels of manifestation of the skill in the first and third criteria. Consistency was not achieved among groups of respondents in terms of the most difficult and the easiest criteria for manifestation. This approach, by monitoring the level of development of motor skills in students, is of great benefit to the teacher, thus enabling more effective and efficient planning and programming of the lessons in physical and health education.

Key words: *motor skill, students, performance criteria, level of development, physical and health education.*

INTRODUCTION

Achieving a high level of proficiency in basic motor skills is essential, given that they are building blocks for other more complex and more specialized movements that appear in sports, recreation, dance and other forms of physical activity (Anderson et al., 2012, Department of Education Community and Cultural Development, 2006, Department of Education and Early Childhood Development, 2009, Haywood & Getchell, 2005, 2009, Okely & Booth, 2004, Vallentyne, 2002), and are an integral part of the curriculum for physical and health education for children at preschool and class instruction. They usually emerge between 1 and 7 years of age (Burton, 1998).

The group of manipulative skills involves manipulating or controlling an object by hand or by foot (SPARC, 2012). Rolling the ball characterizes the coordinated contralateral movement of the arm and leg by keeping the balance to achieve greater accuracy in throwing the ball. The aim of the research was to determine the level of development of the skill underhand roll for children aged 7 to 10 years.

METHODS OF RESEARCH

The research covered 137 children aged 7 to 10 years, male students from "11 October" children's home in Skopje (7 year olds – 32, 8 year olds – 33, 9 year olds – 39 and 10 year olds – 34 students). The students were asked to perform two consecutive rolling of a tennis ball.

This research uses the Test of Gross Motor Development pattern to estimate the level of development (Ulrich, 2000), where the motor skills of underhand roll are defined by four performance criteria.

For greater objectivity in the assessment, each movement was recorded with two High Speed cameras Sony EX-FH 100 adjusted to 240 fps and placed in the frontal and sagittal plane of motion. Movements were then analyzed using software Kinovea 0.8.7 using multiple options which the program allows.

For each student we calculated the total score of skill which represents the total sum of registered criteria in two trials.

Determining the differences in the total score between the groups of respondents was done with applied nonparametric analysis of variance i.e. the

Table 1. Basic descriptive statistics and Kruskall-Wallis test

Age	Average age (days)	Minimum	Maximum	Mean Score	N	Kolmogorov-Smirnov (sig.)	Shapiro-Wilk (sig.)	Kruskall-Wallis test	
								Chi - Square	Asymp. Sig.
7	2517.88	.00	7.00	1.3125	32	.000	.000	33.624	.000*
8	2907.85	.00	6.00	2.8485	33	.047	.001		
9	3003.14	.00	8.00	4.0000	38	.001	.005		
10	3663.32	.00	7.00	4.4412	34	.006	.007		

Table 2. Mann-Whitney test for significance of differences among groups

	Age	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Underhand roll	7	32	26.69	854.00	326.000	854.000	-2.731	.006*
	8	33	39.12	1291.00				
	Total	65						

	Age	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Underhand roll	7	32	23.52	752.50	224.500	752.500	-4.600	.000*
	9	38	45.59	1732.50				
	Total	70						

	Age	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Underhand roll	7	32	21.13	676.00	148.000	676.000	-5.154	.000*
	10	34	45.15	1535.00				
	Total	66						

	Age	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Underhand roll	8 years	33	30.61	1010.00	449.000	1010.000	-2.080	.038*
	9 year	38	40.68	1546.00				
	Total	71						

	Age	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Underhand roll	8 years	33	27.23	898.50	337.500	898.500	-2.838	.005*
	10 years	34	40.57	1379.50				
	Total	67						

	Age	N	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Underhand roll	9 years	38	34.55	1313.00	572.000	1313.000	-.846	.398
	10 years	34	38.68	1315.00				
	Total	72						

Table 3. Percentage of criteria performed on master level

Performance criteria	(Total number) Percent %			
	7 ã.	8 ã.	9 ã.	10 ã.
1. Preferred hand swings down and back, reaching behind the trunk while chest faces cones	(4) 12.500%	(6) 18.182%	(16) 42.105%	(20) 58.824%
Strides forward with foot opposite the preferred hand toward the cones	(3) 9.375%	(13) 39.394%	(21) 55.263%	(19) 50%
3. Bend the knees to lower body	(4) 12.500%	(12) 36.364%	(21) 55.263%	(23) 60.526%
4. Releases ball close to the floor so ball does not bounce more than 4 inches high	(1) 3.125%	(8) 24.242%	(6) 15.789%	(4) 10.526%

Kruskall-Wallis test, and for determining of the significant differences among each group separately, the Mann-Whitney U test was applied.

For determining the presence of criteria that respondents performed on master level, percentage was calculated (if the respondent performed the criteria in two trials, then it was registered as a master level).

Data processing was done with the statistical package program SPSS 16.

RESULTS

Basic descriptive statistics (table 1) shows that respondents aged 7 had the lowest average score (1.3125) and respondents aged 10 had the highest (4.4412). The data of the respondents were not normally distributed. Therefore, the Kruskall-Wallis test was applied.

After the application of the Kruskall-Wallis test, it has been noted that there are statistically significant differences in the average score among the four groups of respondents (sig.000*).

In order to determine which groups of respondents have statistically significant differences among each other, we applied the Mann-Whitney test and it was determined that all groups differ among each other except for students aged 9 and 10.

The analysis of the percentage of criteria performed on the master level (table 3) showed that they are moving in the range from 12.500 to 58.824 in the respondents aged 7, 9.375 to 55.263 in 8 year olds, 12.500 to 60.526 in 9 year olds and 3.125 to 24.242 year olds.

DISCUSSION

There was a monotonous trend of average score by students of four groups (table 1). In terms of aver-

age score these statistics groups differ from each other, except for students aged 9 and 10.

This manipulative skills was defined by four criteria, two of which defining movement of the hand and two the leg movement. The lowest percentage, and at the same time the most difficult for manifestation at the respondents aged 7, 9 and 10, is the forth criterion which defined "Releases ball close to the floor whereas the ball does not bounce more than 4 inches high" while for the 8 year olds the first criterion is the most difficult "preferred hand swings down and back, reaching behind the trunk while chest faces cones".

The highest percentage i.e. the easiest for manifestation among 7 year olds is the first criterion and the third criterion, among 8 year olds the second criterion, among 9 year olds the second and the third criterion, while among 10 year olds the third criterion. A monotonous increasing trend in the percentage of master level was present in the first and the second criterion.

Such diversity in terms of representation of the most difficult and the easiest criterion for manifestation among groups may be due to the small number of students included in our research, and that the analysis was conducted by only one analyzer. However, if more respondents are present we could obtain a more comprehensive idea and generalization of greater size, and with the inclusion of more analyzers we could gain greater objectivity in the assessment.

Such research was conducted by Ulrich (2000) where he observed that according to the percentage of master level, the lowest percentage among students aged from 7 to 10 was the forth criterion, and the highest percentage among all students group was the first criterion. In the second, third and forth criteria a monotonous increasing trend in per-

centage of master level was observed.

Knowing the level of development of the skills is important because learning other more complex skills depend on the proficiency of fundamental motor skills (Delaš, et al., 2008). This kind of information can give the teacher a clear picture of the activities that he should conduct for more effective and efficient implementation of instruction. Such information is relevant for professionals who develop curricula as well as for parents who are interested to have insight in the development level.

CONCLUSION

In conclusion, our results suggest that the students aged 7 to 10 years have statistically significant differences in the level of development of skill underhand roll. Statistically significant difference has not been determined between respondents aged 9 and 10.

Among the students, constancy by age in terms of the most difficult and the easiest criterion for manifestation was not observed. A monotonous increasing trend was present in the average score of the skill and the first and third criterion.

Such an approach in the assessment of the level of development of skills should be an integral part of the work of every teacher of Physical and Health Education. By doing so, the teacher will have insight into the effects of his work and thus will be able to properly plan and program the lessons for the students.

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Correspondence:
Aleksandar Acevski
Ss. Cyril and Methodius University in Skopje
Faculty of Physical Culture,
Zeleznicka b.b.
1000, Skopje, Macedonia
e-mail:aceskiffk@yahoo.com

РАЗЛИКИ ВО НИВОТО НА РАЗВОЈ КАЈ ВЕШТИНАТА ТРКАЛАЊЕ НА ТОПЧЕ КАЈ ДЕЦА ОД 7 ДО 10 ГОДИНИ

Александар Ацески, Александар Туфекчиевски

Универзитет св. Кирил и Методиј во Скопје, Факултет за физичка култура, Скопје, Македонија.

Апстракт

Тркалањето на топче е вештина која е составен дел од манипулативните вештини кои се присутни во наставните планови по физичко и здравствено образование. Целта на истражувањето беше да се утврди нивото на развој на основната моторна вештини од манипулативен вид тркалање на топче кај деца од машки пол на возраст од 7 до 10 години. Сите групи на испитаници статистички значајно се разликуваат меѓусебно освен испитаниците на 9 и 10 годишна возраст. Присутен беше монотоно растечки тренд во просечниот скор на вештината и во процентуалната застапеност на мастер нивоата на манифестирање на вештината кај првиот и третиот критериум. Не беше добена константност кај групите на испитаници во однос на најтешкиот и најлесниот критериум за манифестирање. Ваквиот приод преку следење на нивото на развој моторните вештини кај учениците е од голема корист за наставникот, со што се овозможува поефективно и поефикасно планирање и програмирање на часот по физичко и здравствено образование.

Клучни зборови: *моторна вештина, ученици, критериуми на изведба, ниво на развој, физичко и здравствено образование.*