

Describing and Comparing Motor Proficiency of 9 and 10 Year Old Children of Abhar, Iran

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Abstract: The aim of present research was to describe and compare the motor proficiency of 9 and 10 years old children of Abhar. 300 children (150 boys & 150 girls) were randomly selected from 4th and 5th grade male and female elementary school by cluster sampling method. For evaluating motor development, this research used standardized assessment of motor function, Bruininks-Oseretsky Test of Motor Proficiency (BOTMP). BOTMP scale has 46 items that measure 8 subscales. To compare groups according to sex, age and their interaction data were analyzed with Two way ANOVA and Independent Sample t-test. Results showed that boys are significantly better than girls in gross motor skills and girls are significantly better than boys in fine motor skills ($p < 0.05$). 10 years old had better function than 9 years old in gross motor skills ($p < 0.05$) but there was no significant difference between two ages in fine motor skills ($p > 0.05$). Also, there was no significant differences between girls and boys and 9 and 10 years old children ($P > 0.05$).

Key words: Motor proficiency • Gross motor skills • Fine motor skills • Elementary schools

INTRODUCTION

Children experience set of different motor activities during early childhood and as a result they learn different dimensions of environment. Children gradually develop their intrinsic abilities and finally during years of elementary school obvious and apparent changes of movements take place. Movements aren't as simple as they were and they have become more complex and more complete. Perception is developed and motor plans have become automatic. Childhood, adolescence and adulthood are like connected rings and each of them have an important role in developing abilities and talents but childhood is the most important.

Researchers of motor development, who are interested in considering developmental and motor processes, pay special attention to fine and gross motor skills. Actually one of the ways that specialists of motor development use for considering quality and quantity of motor development is extent and quality of developing of gross and fine motors. Fine motor skills are small

movements that give the ability for doing tasks such as writing and manipulating little objects. These skills require function of little muscles such as muscles of fingers, hand and wrist. Gross motor skills are big movements that use bigger muscles in arm, hand, leg and body for example running and jumping. Researches show that changing in these kinds of skills allow us to have more complete picture of individual differences [1]. As the children grow up, their developmental differences and problems become more apparent so evaluating motor skills of children is very important thus developmental differences of them with current standard and norms is determined and programs is set for solving them. Gallahu & Ozmun [2] stated that before maturation girls and boys are in relatively similar conditions from viewpoint of body shape, power and length of limbs. However studies have indicated that there are significant differences between boys and girls in using gross and fine motor skills. Evaluating gross and fine motor skills have been conducted in different ages by researchers. Linden *et al.* [3] reported significant differences in age (but not sex) for

boys and girls using fine and gross motor skills such as moving on chest and coordination of pencil and paper in drawing. Thomas and French [4] in analyzing 64 researches about motor skills found out that boys are better than girls in doing gross motor tasks such as jumping and running and girls are a little but significantly better than boys in doing fine motor tasks such as visual-motor coordination and flexibility. Peak [5] considered differences between girls and boys in fine and gross motor skills and their relation with self-conception. They reported that boys are better in gross motor skills and girls are better in fine motor skills and also children with better scores for self-conception, had better function in gross and fine motor skills.

Musavi and Shojaei [6] measured physical development and motor development of 1200 secondary school students of Tehran by using Anthropometric measurement and Bruininks-Osretesky test of motor proficiency. Results of this research showed that motor skills of most Iranian students are in normal level. Boys had better function in gross motor and girls had better function in fine motor skills.

Measurement of motor development is possible for children of all ages and races. These considerations show cultural and racial differences besides age differences. Studies about development doesn't consist rich history in Iran and conducting researches on bigger societies from viewpoint of number looks necessary. Given to this necessity, current research considers gross and fine motor skills of 9 and 10 year old children of Abhar. This province has good condition from viewpoint of number of cities and also existence of difference races and nationalities and it seems that results of this research shows motor skill situation of Iranian 9 and 10 year old children.

Research Methodology: Method of this research is comparative-descriptive which is done through field study.

Statistical Universe and Sample: Statistical universe of current research is all male and female students of fourth and fifth grade of elementary schools of Abhar in 2008-2009 school years. 300 (150 girl and 150 boys) of 4000 students were chosen and evaluated according to Morgan sampling table and by using multistage random sampling. Children who were studying in fourth and fifth grade of primary school but were younger than 9 years old or older than 10 years old were omitted from statistical sample.

Measuring Device: In this research for measuring gross and fine motor skills of children Bruininks-Osretesky test of motor proficiency was used. This test evaluates fine and gross motor abilities of children ranging from 4.5 years old to 14.5 years old and is organized in 8 subtest and 46 elements. 4 subtests evaluates gross motor skills (power, balance, bilateral coordination, speed of running and dexterity), 3 subtests evaluates fine motor skills (visual-motor control, speed and dexterity of upper limbs and response rate) one subtest evaluates upper limb coordination and one subtest evaluates both of them. Reliability and standardization of this test is considered by Musavi and Shojaei [6] and reliability coefficient of that is 0.78.

Method of Conducting Test: After arrangements with teachers and school staff and choosing testee, testing was started. Initially height and weight of testee was measured by using weighting machine and tape measure. All stages of tests were done in educational hours and at school. Tester explained method of conducting items for testees according to directions of test. Then testees started doing subtests and scores were given according to direction of test. After conducting test for each testee in each subtest one score was obtained.

Statistical Methods: In this research for analyzing data Toky test, variance analysis and t-student tests and descriptive statistics were used. All statistical operations were conducted by using SPSS 13.0.

Results and Findings

Describing General Traits of Testees: Testees of this test were 300 nine and ten year old students which were studying at fourth and fifth grade of primary school in Abhar. Table 1 indicates abundance and percentage of students who are left, right or mixed handed. As you see most of testees were right handed.

Subtests: After performing each subtest for each person one score was obtained for each subtest. Except first and sixth subtest which has 1 element, score of all subtests is sum of scores of 3 to 9 elements. These raw scores are converted to standard scores. Given to that standard deviation of standard score units were equal, comparing subtests and gross and fine motor skills is possible. Statistical comparing of means of standard scores of gross and fine motor skills indicates that gross motor skill standard scores of boys is significantly better than girls and standard scores of fine motor skills is better than

Table 1: Abundance and percentage of distribution of dominant leg and hand of testee

Age	Dominant hand			Dominant leg				
	Right	Left	Mixed	Right	Left	Mixed		
Girl	9 years old	Abundance	80.0	10.0	0	79.0	7.0	4.0
		Percentage	88.9	11.1	0	87.8	7.8	4.4
	10 years old	Abundance	76.0	14.0	0	81.0	9.0	0.0
		Percentage	84.4	15.6	0	90.0	10.0	0.0
Boy	9 years old	Abundance	80.0	10.0	0	77.0	7.0	6.0
		Percentage	88.9	11/1.0	0	85.6	7.8	6.7
	10 years old	Abundance	81.0	9.0	0	79.0	11.0	0.0
		Percentage	90.0	10.0	0	87.8	12.2	0.0

Table 2: Comparing girls and boys from viewpoint of fine and gross motor skills

	Girls		Boys		T	Sig
	Mean	Standard deviation	Mean	Standard deviation		
Gross motor skills	47.82	10.01	52.17	9.520	4.218	0.000
Fine motor skills	54.63	10.41	45.36	6.990	9.904	0.000
Motor proficiency	104.45	14.19	106.99	18.15	-1.240	0.123

Table 3: Comparing boys and girls from viewpoint of fine and gross motor skills

	9 year old		10 year old		T	Sig
	Mean	Standard deviation	Mean	Standard deviation		
Gross motor skills	47.65	8.56	52.34	10.78	4.560	0.000
Fine motor skills	49.07	10.44	50.92	9.470	1.755	0.080
Motor proficiency	110.12	10.25	107.94	14.95	4.951	1.738

boys. ($p < 0.05$) (Table 2) also statistical comparing of means of standard scores of gross and fine motor skill shows that standard scores of gross motor skills of 10 year old students is significantly better than 9 year old students ($p < 0.05$) but there is no significant difference between standard scores of fine motor skills of both groups. ($p > 0.05$) (Table 3).

In speed of running and dexterity, F for factor A (sex) was 101.669 and for factor B (age) was 68.478 ($p < 0.05$). These numbers indicates significant superiority of boys over girls and superiority of 10 year old students over 9 year old students. F counteract of factor A and B is 1.088 ($p < 0.05$) that indicates no significant affect on speed of running and dexterity of testees ($p > 0.05$) results of variance analysis test shows that in balance skill superiority is for boys ($F = 38.779$) and 9 year old students ($F = 4.866$) ($p < 0.05$) counteract of factor A and B had no significant affect on running speed and dexterity of testees ($F = 1.983$) ($P > 0.05$). In bilateral coordination skill original affect of sex ($F = 36.091$) was significant ($p < 0.05$) but original affect of age ($F = 3.684$) and counteract ($F = 0.140$) wasn't significant. ($p > 0.05$) In this skill boys

were superior. In power skill, F for factor a (sex) was 28.267 and for factor B (age) was 26.934. ($p < 0.05$) These numbers indicates significant superiority of boys over girls and superiority of 10 year old students over 9 year old students. In response rate there was no significant difference between factor A (sex) ($F = 1.636$), B (age) ($F = 0.068$) and counteract ($f = 40.334$) ($p > 0.05$). in visual-motor control original affect of sex ($F = 40/334$) was significant but original affect of age ($F = 0.480$) and counteract ($F = 0.127$) wasn't significant. ($P > 0.05$) counteract F for factors A and B was 5.591 ($p < 0.05$) that indicates significant affect of counter act on speed and dexterity of upper limb of testees. In gross motor skills original affect of sex ($F = 18.922$) and age ($F = 22.009$) was significant but counteract of sex and age ($F = 2.724$) had no significant affect on gross motor skills of testees ($p > 0.05$) in gross motor skills superiority was for boys and 10 year old students. In fine motor skills original affect of sex ($F = 99.073$) was significant ($p < 0.05$) but original affect of age ($F = 3.931$) and counteract of sex and age ($F = 1.670$) wasn't significant. In fine motor skills superiority was for girls ($F = 84.71$) ($p > 0.05$). generally, by calculating final

scores of motor proficiency test and comparing girls and boys as well as 9 and 10 year old students it become cleared that there is no significant difference between boys and girls as well as 9 and 10 year old students ($p>0.05$).

DISCUSSION AND CONCLUSION

Gross and fine motor skills are one the important factors of motor development, basis for learning and developing sport skills. So evaluating them in different ages and developmental stages is very important. Although most of children during natural development process reach to significant level of motor-perception ability, but if there is any delay or disorder, performing fundamental actions for changing and optimizing motor development of children is necessary. Recognizing possible problems and seek to solve them has significant necessity. Current research was performed for describing motor proficiency skills of 9 and 10 year old students of Abhar and comparing them so that complete profile of motor traits of this group of children becomes clear.

In considering results of motor performance of children in lower ages usually we observe superiority of boys over girls in gross motor skills and superiority of girls over boys in fine motor skills. As a result of lesser secretion of Androgens and cultural and social limitations, usually girls are less interested in sport and motor activities and they have lesser opportunity for participating in these kinds of activities. It is clear that because of overlapping of them, we didn't observed significant difference between girls and boys. Results of current research about relative superiority of boys over girls in gross motor skills and relative superiority of girls over boys in fine motor skills is similar to results of all other studies.

Comparing standard scores of running speed and dexterity of students with regard to age and sex indicates that speed of boys is better than girls and speed of 10 year old students is better than 9 year old students. Findings of this research are similar to results of Linden *et al.* [3]. Boys are faster than girls in all ages. Longer lower limbs of boys in compare to total length and low stimulant of girls for participating in power activities because of cultural reasons are the most important factors of these differences. Running speed of boys increases linearly in 5 to 17 years old. Some of the boys have a little shortage in 12 and 13 years old that points to adolescent awkwardness.

Comparing standard score of balance indicates that girls were significantly better than boys. 9 year old female students were better than other groups from viewpoint of balance. Findings of this part of research is congruent to William [7] and Gallahue & Ozmun [2], but isn't congruent with results of Musavi and Shojaei [6] and Thomas and French [4]. They find better balance in boys. Weakness of boys in balance is probably because of longer lower limbs in compare to whole length of body and asymmetry of limb length during adolescence. Anyhow for clearing this subject we need more researches. Although it is expected that girls have better balance in compare to the boys because of shorter length of lower limbs and wider hips but it is probable that this weakness of boys in balance is compensated through more powerful muscles and the role of muscle power in balance and even it can be better than girls.

Comparing standard scores of power indicates that boys are better than girls and 9 year old students are better than 10 year old students. 10 year old male students were better than other groups. Superiority of muscular strength in boys compared to girls is congruent with results of Musavi and Shojaei [6], Blanche & Isace [8] and Gallahue & Ozmun [2]. Boys' power increases gradually and linearly according to development up to 13 and 14 year old but in 16 and 17 year old it develops faster which is in relation with sudden leaping of power in adolescence. Power development of girls' increases as the age increases up to 16 and 17 but it is not similar to boys. Development of power in girls reaches to peak [5]. Although sexual differences of power in childhood isn't significant but it always exists. Significant speed and development of power during adolescence makes these sexual differences more apparent. Main reason of this changing is different development of muscles in boys during adolescence. Furthermore neuromuscular adaptations as a result of exercise and experiment without considering muscle bulk affect these differences. Superiority of boys in bilateral coordination and upper limb coordination and superiority of girls in response speed, visual motor control and dexterity of upper limb is incongruent with results of Thomas and French [4], Hasan [9] and Musavi and Shojaei [6].

Results of tables and standard scales of self test indicate that 9 and 10 year old male and female students of Abhar aren't in good situation. Especially girls are in very bad situation of gross motor skills and they need special attention. Among them we can refer to developmental coordination disorder (DCD) and hyper

activity- attention deficits (ADHD). Anyhow teachers or sport trainers should recognize people with movement problems and pay special attention to them and if necessary refer them to specialists for more detail evaluations and reformatory actions.

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