Volume : 2 | Issue : 5 | May 2013 • ISSN No 2277 - 8160

Research Paper | Physical Education

Comparative Analysis of Coordinative and Balancing Abilities Among 10-15 Years of Rural and Urban School Boys

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ABSTRACT

Coordination is about controlling all of body parts while doing different activities of children. It is about making and maintaining connections between the brain and the muscles that control movement of the children. Balance is a complex process involving the coordinated activities of multiple sensory, motor, and biomechanical components. Correct postural balance is basic to wellbeing. Its effects will be felt in every movement in every activity. The development of postural stability in children is critical for being able to engage and explore their surrounding environment. The purpose of the study was to compare the coordinative and balancing abilities between urban and rural school going boys. For this purpose One hundred eighty boys age ranging from 10 to 15 years were selected as subjects for the study of which ninety were urban and the remaining ninety students were rural school going from different schools of Bangalore District, Karnataka. The subjects were tested their respective school ground for a week. The criterion measures included are differentiation ability was used measured by backward medicine ball throw test; hand-eye coordination was used measured by alternate hand wall toss test; static balance was used measured by stork balance stand test and dynamic balance was used measured by modified bass test. For the purpose of comparison of above criterion variables between rural and urban school going children, 't' ratio and One-way ANOVA statistical technique was used to analyze the data through SPSS package. The level of significance was set at $p<0.05$ level. The results showed significant differences between rural and urban school boys' coordinative and balancing abilities. Analysis of variance was found significant in relation to orientation ability, static and dynamic balance abilities of school boys among different age categories. Long-term studies are needed to be done to determine the long-term effect of this childhood load bearing effect and by this way, it would be easier to establish the needed guidelines to protect children from injuries and tainted posture.

KEYWORDS: coordinative, balancing abilities, school boys

INTRODUCTION :

Childhood is considered one of the most important stages in man's life. During this stage, a child's abilities develop and his talents mature and s/he gets manageable and docile. This makes the early years crucial for his/her future as they have a profound effect on his/her lifelong formation. This also makes the attention paid to childhood one of the most important criteria against which the progress of any society is measured (El-Lababidy and Khalaima, 1993).

School age children are faced with the daily responsibility of transporting a variety of items to, from and around the school. Coordination is also important controlling all of the body parts while doing different activities. It is making and maintaining connections between the brain and the muscles that control movement. Activities that make the child use all his/her body parts at the same time are great. Dance, gymnastics and rhythmic activities are great for coordination, as are any activities that require a child to hit any object with their hand or a bat.

Hockey (1983) refers that the availability of the coordination abilities, its development is also associated coordination motor abilities of individuals in a correct with the development of the different associated physical manner will properly helps to good thinking and ease of and skill qualities (Fattah, 1997). Stanistaw and Duda mentioned that referred that coordination abilities divided to physical developing the coordination abilities plays an important abilities, sport motor performance abilities and mixed role in achieving the best results where there is correlation abilities, these abilities considered the main base of between the coordination abilities and motor skills, reaching the optimal skill performance.

Balance is thought to be of great significance as it is an integral part of all movements (Westcott, Lowes and Richardson, 1997). It can be defined as the ability to maintain or recover the body's centre of mass within the body's base of support to prevent falling and complete the required movements (Shumway Cook and McCollum, 1997). Balance is a complex process involving the coordinated activities of multiple sensory, motor, and biomechanical components. Balance (static and dynamic) likes agility, takes a long time to develop, and there are two types of balance that children should master. They should be able to balance when standing still (static balance) and balance when they are moving around (dynamic balance). Static balance can be developed by simple activities, such as standing on one foot, balancing on both knees, or balancing with moving on a narrow line or fallen log. Balance is about making connections between the part of the brain that controls balance, and the limb movements needed to stay upright. Dynamic balance develops along with agility as the child learns to walk and run. Activities that develop agility will also develop dynamic balance. This moving type of balance is also developed with learning new skills such as riding a bicycle, learning to skate etc. Static balance is the ability to maintain a posture in a resting position, while dynamic balance is the ability to maintain postural control during the performance of functional tasks (Westcott, Lowes and Richardson 1997). With this in mind, a study was undertaken to carry out a comparative study of coordinative and balancing abilities in school boys (10 to 15 Years) in urban and rural areas of Bangalore district, Karnataka.

MATERIALS AND METHODS :

Method : The descriptive method was used as it suits the nature of this research.

Population and Sample: The research population involves children aged above 10 to 15. The research sample was randomly selected. The study was conducted in healthy school boys from the rural and urban areas of Bangalore district. This study included the school boys in the age group between 10 to 15 years. A total of 180 school boys from rural and urban areas of Bangalore district were taken for study. Out of 180 boys, 90 were urban school boys and 90 were rural school boys. A special proforma was prepared to register name, age, coordinative and balancing abilities of children. Urban school boys studied were from private schools and rural school children were from government schools. Detailed physical examination was carried out and only healthy boys were selected for study. Appropriate principled permission for studies was obtained from the concerned authority before commencement of this study.

Data collection Tools : The criterion measures included are differentiation ability was used measured by backward medicine ball throw test; hand-eye coordination was used measured by alternate hand wall toss test; static balance was used measured by stork balance stand test and dynamic balance was used measured by modified bass test.

Administration of Tests: The necessary data was collected by administering coordinative and balancing abilities tests.

Statistical Analyses: All statistical analyses were performed with SPSS (Statistical Package for Social Science, Version 11). Descriptive statistics including mean scores and standard deviations were computed for all variables. Group differences in coordinative and balancing abilities were assessed using unpaired student's 't' test. The age-related differences in coordinative and balancing abilities were analyzed using One-way ANOVA (Analysis of Variance) and post-hoc test follow-up test. A value of $p<0.05$ was considered as significant.

RESULTS:

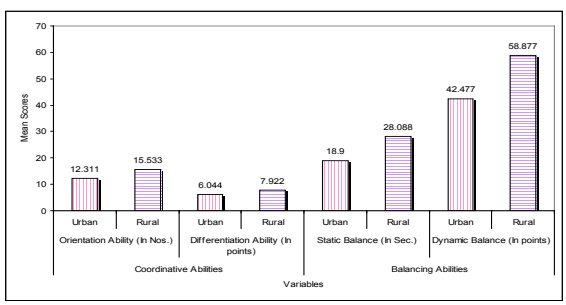
Table-1 procures the comparison of coordinative and balancing abilities between rural and urban school going boys. Statistically significant differences are revealed in the coordinative and balancing abilities between rural and urban school going boys. Rural school going boys were found to possess greater quick coordinative and balancing abilities than their urban school going counterparts.

Table-1: Significant differences of mean scores of Coordinative and Balancing Abilities of rural and urban school going boys.

Variable	Group	Mean	Standard Deviation	S.E. Mean	Mean Difference	't' Ratio	Level of Significance
Coordinative Abilities							
Orientation Ability (In Nos.)	Urban	12.311	4.296	0.452	3.222	4.80	*
	Rural	15.533	4.705	0.495			
Differentiation Ability (In points)	Urban	6.044	5.753	0.606	1.878	2.82	*
	Rural	7.922	2.606	0.274			
Balancing Abilities							
Static Balance (In Sec.)	Urban	18.900	5.340	0.562	9.188	6.63	*
	Rural	28.088	12.015	1.266			
Dynamic Balance (In points)	Urban	42.477	18.992	2.002	16.400	6.22	*
	Rural	58.877	16.300	1.718			

* Significant at 0.05 level of significance; [NS]Not Significant

Fig.1: Comparison of mean scores of Coordinative and Balancing Abilities of rural and urban school going boys.



The table exposes that, the obtained 't' ratios for orientation and differentiation abilities are 4.80 and 2.82 respectively greater than the table value 1.97 at 0.05 level. The statistical analysis shows that there exist significant differences in orientation and differentiation abilities between rural and urban school going boys. The rural boys were found to be great orientation and differentiation abilities than the urban school going boys.

The table further reveals that, the obtained 't' ratios for static and dynamic balancing are 6.63 and 6.22 respectively greater than the table value 1.97 at 0.05 level. The statistical analysis shows that there exist significant differences in static and dynamic balancing abilities between rural and urban school going boys. The rural boys were found to be great static and dynamic balancing than the urban school going boys.

To observe the difference between school going boys of different age categories on their selected coordinative and balancing abilities, the analysis of variance (ANOVA) was adopted and data pertaining to these has been presented in Table-2

Table-2: Analysis of Variance of Coordinative and Balancing Abilities among different age categories of school going boys.

Variables	Source of Variation	df	Sum of Squares	Mean Squares	F Ratio and Level of Significance
Coordinative Abilities					
Orientation Ability	Between Groups	2	437.211	218.606	10.62*
	Within Groups	177	3643.700	20.586	
Differentiation Ability	Between Groups	2	15.100	7.550	0.36[NS]
	Within Groups	177	3693.850	20.869	
Balancing Abilities					
Static Balance	Between Groups	2	2123.078	1061.539	11.01*
	Within Groups	177	17063.917	96.406	
Dynamic Balance	Between Groups	2	4787.378	2393.689	6.72*
	Within Groups	177	63067.933	356.316	

NS= Insignificant at 0.05 level of confidence; * Significant at 0.05 level confidence F,0.05 (2,177)=3.04

Table-2 revealed that there was not any significant difference in different age categories in relation to differentiation ability, as obtained F ratio was 0.36, which was lower value than the value 3.04 required for F Ratio to be significant at 0.05 level with (2, 177) degree of freedom.

Table-2 further revealed that there was significant difference in different age categories in relation to orientation ability, static and balancing ability, as obtained F ratios were 10.62, 11.01 and 6.72 respectively, which were higher value than the tabulated value 3.04 required for F ratio to be significant at 0.05 level with (2,177) degree of freedom.

Since the one-way Analysis of variance was found significant in relation to Orientation Ability, static and dynamic balance abilities, the Least Significant Difference (LSD) test was applied to find out which of the differences of the means amongst the different age categories were statistically significant.

Table-3: Least Significant Difference Post-Hoc Test for Means of All Age categories in relation to orientation ability, static and balancing ability.

Variables	Age Categories			Mean Difference	Critical Difference
	10-11 years	12-13 years	14-15 years		
Orientation Ability (In Nos.)	12.466	16.083		3.616*	1.355
		16.083	13.216	2.866*	1.355
	12.466		13.216	0.750	1.355
Static Balance (In Sec.)	26.766	24.966		1.800	2.912
		24.966	18.750	6.216*	2.912
	26.766		18.750	8.016*	2.912
Dynamic Balance (In points)	57.633	49.100		8.533*	5.599
		49.100	45.300	3.800	5.599
	57.633		45.300	12.333*	5.599

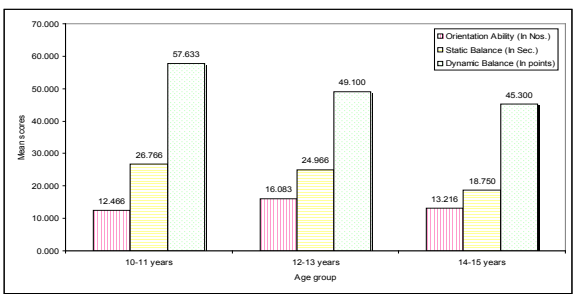
* Significant at 0.05 level

It is evident from table-3 that mean differences of all age categories in relation to orientation ability was found to be significant difference between 10-11 and 12-13 year age group; 12-13 and 13-14 year age group categories. 10-11 and 14-15 years age group category did not prove to be significant at 0.05 level of confidence.

It is evident from table-3 that mean differences of all age categories in relation to static balance was found to be significant difference between 12-13 and 14-15 year age group; 10-11 and 14-15 year age group categories. 10-11 and 12-13 years age group category did not prove to be significant at 0.05 level of confidence.

It is also evident from table-3 that mean differences of all age categories in relation to dynamic balance was found to be significant difference between 10-11 and 12-13 year age group; 10-11 and 14-15 year age group categories. 12-13 and 14-15 years age group category did not prove to be significant at 0.05 level of confidence.

Fig.2: Comparison of Mean scores of differentiation ability static and dynamic balance of rural and urban school going boys with different age category.



DISCUSSION OF RESULTS :

The orientation ability is the ability determined and changed the position and movement of the body in time and space in relation to definite field of action. Significant difference in the rural and urban school going boys might be due to the reason that rural school going children have high kinesthetic sense organs assume more importance of orientation than urban school going children.

Differentiation ability is the ability to achieve a high level of fine tuning or harmony of individual movement phases and body part movements. Significant difference between rural and urban school going children in relation to differentiation ability might be due to the reason that the different level of tuning and harmony of individual movement phase and body part movements. Rural school going boys might have high level of tuning and harmony due to less weight. This result is reliable with the results reached by Bakhit (2010).

The statistical analysis shows that there exist significant differences in static and dynamic balancing abilities between rural and urban school going boys. Significant difference in the rural and urban school going boys might be due to the reason that rural school going boys have the ability to rhythmically transfer their center of gravity (COG) from left to right and forward to backward with more excursions than urban school going children.

No significant difference was found among different age different group students in relation to differentiation ability. Orientation ability is the ability to determine and change the position and movement of the body in time and space in relation to definite field of action. This might be due to the reason that similar kinesthetic sense organs and on the other hand significant difference was found in different age group students have different orientation ability of school boys. This might be due to the reason that different age group level of tuning and harmony of individual movement phase and body part movements. Difference in static and dynamic balance in all the age group categories might also be due to the same reason such as difference in adiposity.

CONCLUSION :

Balance represents a complex integration of mechanical, sensory and motor processing strategies. The coordinative and balancing abilities in rural schools boys are found to higher as compared to urban school children in all age groups. This is due to differences in food habits, environment, locality, nutritional status and socio economic status in rural and urban areas.

RECOMMENDATIONS :

The present study recommends that there is a need to create awareness among urban school boys and their parents about physical growth and health which can be improved by providing proper care and nutrition right from early childhood period. Further researches are required to investigate physical growth, coordinative and balancing abilities of school going children. More studies are needed to identify the effect of carrying books for different period of time on posture. A similar study with a large sample size may give more significant differences in coordinative and balancing abilities of school going both boys and girls. Long-term studies are needed to be done to determine the long-term effect of this childhood load bearing effect and by this way, it would be easier to establish the needed guidelines to protect children from injuries and tainted posture.

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