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Study of Age-Trend Development of Power and Flexibility among 10 To 14 Years School Boys

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Abstract: The study of the age trend development of different physical abilities in childhood and adolescence are one of the important areas in physical education. The study was conducted to investigate the rate and magnitude of age- associated changes of power and flexibility in 10 to 14 years old school going boys. For this purpose a total of 500 school-going boys were selected randomly from different schools of CoochBehar. The age of the boys was from 10 years to 14 years. Power was measured by standing broad jump test and flexibility was assessed by using Jonson box. Multiple group design with five independent groups (G1, G2, G3, G4 and G5) was formed for the present study and each age group had 100 boys within it. Mean value and standard deviation were computed for each parameter as descriptive statistics. To find out the inter group difference in power and flexibility, analysis of variance (ANOVA) was used in this study. Significance level set for the study was only 0.05 level of confidence. Results revealed that power and flexibility increased linearly across all of the age groups from 10 to 14 years. Peak velocity of improvement for the power and flexibility were found for G3 -G4 age group and G4 – G5 age groups respectively.

Keywords: *Age-trend development, Power, Flexibility and School boys*

Introduction:

Physical fitness has been defined as a set of attributes or characteristics that people have or achieve that relates to the ability to perform physical activity. The study of the age trend development of different components of physical fitness like strength, endurance, running speed, flexibility, agility, balance etc. in childhood and adolescence are one of the important areas in physical education. Several studies have been conducted to understand the status and the developmental pattern of these physical abilities among children and adolescence worldwide (Powel et al. 2009; Gantiraga et al. 2006; Chow et al. 2005; Sinaki et al. 1996; Gabbard and Patterson, 1980). Present study is concerned with the findings of age associated changes of two such physical abilities, i.e. power and flexibility in 10 to 14 years old school going boys. Findings will be helpful for the physical education teachers and coaches to plan educational curriculum as well as sports training schedule for the school aged boys. Present study has conducted with following purpose:

- To understand the influence of the age in development of the power and flexibility in 10 to 14 years old school going boys.

Materials and methods:

A total of 500 school-going boys of five age groups have been selected randomly from different schools of CoochBehar for the present study. The range of age of the school boys were from 10 years to 14 years. Most of the students were from lower socioeconomic status. In this study power and flexibility were measured by standing broad jump and sit and reach test respectively (AAHPER, 1974).

Multiple group design was adopted for this study. Five independent groups- G1, G2, G3, G4 and G5 were formed on the basis of the age of the subjects and each age group had equal 100 subjects. Mean and SD of the power and flexibility were computed for each age group and to find out the age trend development, ANOVA was administered. To find out the exact differences between means LSD were used as post hoc test. All statistical calculations were done using standard statistical software (SPSS). Significance was set only 0.05 level of confidence in this study.

Results:

Mean values and SD of power and flexibility for different age group have been computed as descriptive statistics and presented in Table-1. Table-1 indicated that the mean values for both variables were different for different age groups. So, in order to test the significance of differences among different mean values, ANOVA was administered and details results for power and flexibility have presented in Table-2 and Table-3 respectively.

Table-1: Mean Values and Sd Of Power & Flexibility For Different Age Groups In 10 To 14 Years School- Going Boys

Selected variable	Different age groups					Statistical Parameters
	G1 (10years)	G2 (11years)	G3 (12years)	G4 (13years)	G5 (14years)	
Power	136.11 ±17.45	139.12 ±34.55	151.82 ±32.94	164.81 ±24.80	177.56 ±25.80	Mn SD
Flexibility	27.73 ±5.06	28.08 ±4.86	28.58 ±5.46	29.76 ±5.98	31.54 ±5.82	Mn SD

Table-2: ANOVA of Power for Different Age Groups of School-Going Boys

Source of variation	Sum of Squares	df	Mean Square	F-value	P-value
Between groups	121788.155	4	30447.039	39.389**	.000
Within groups	382624.026	495	772.978		
Total	504412.182	499			

** Significant at both 0.05 and 0.01 level

Table-3: ANOVA of Flexibility for Different Age Groups of School-Going Boys

Source of variation	Sum of Squares	df	Mean Square	F-value	P-value
Between groups	960.38	4	240.10	8.07**	.000
Within groups	14718.46	495	29.73		
Total	15678.85	499			

** Significant at both 0.05 and 0.01 level

From Table-2 and Table-3 it has found that the F-value was statistically significant for both the variables. Now, in order to identify the exact location of the difference between means, method of Least Significance Difference (LSD) was used as a post hoc test. Results are presented in Table-4.

Table-4: LSD for Different Age Group of Agility and Running Speed in School-Going Boys

Measured Components	G1-G2	G2-G3	G3-G4	G4-G5
Power	3.01*	12.69**	12.99**	12.75**
Flexibility	0.35*	0.50*	1.18*	1.78**

** Significant at 0.05 level.

* Not significant at 0.05 level

Table-4 shows that all the mean differences for different age group (G2- G3, G3-G4 and G4-G5) for power were statistically significant except the mean difference for G1-G2 age group which was statistically insignificant at 0.05 level. The mean differences of G1-G2, G2-G3 and G3-G4 age group for flexibility were not significant statistically but the mean deference

for G4 - G5 age group was found statistically significant in this study.

Discussion on Findings:

As per results mean values for different age groups for power increased continuously from 10 to 14 years in present study with different rate (Figure-1). Figure-1 shows that it increased with slower rate for G1- G2 age span and after that it increased rapidly with higher rate for G2-G3, G3-G4 and G4-G5 age group. Peak velocity of increase in power for the present boys was noticed in G3-G4 age span. Overall trend of increase in this parameter as age grew was also reported by Singh (2010) for Manipur boys, Konar (2010) for urban Bengali boys of west Bengal, Shang et al. (2010) for Chinese boys. Milanese et al. (2010) also found higher mean value of standing broad jump for 10 to 12 years age group than their younger counterpart.

Flexibility, one of the important components of health related fitness increased as the age increased for the present boys. Figure-2 clearly revealed that it increased for G1-G2 and G3-G4 age groups with slower rate. After that a rapid improvement in this ability were noticed for G3 - G4 and G4-G5. The peak velocity of improvement in this ability was found for the G4-G5 age group for the present boys.

Present findings were similar with 11 to14 year's age group as found by Dutt (2005) but for 10 – 11 years age group a decreasing trend was reported by him. A survey was conducted by Kerala State Sports Council (2009) which also reported similar trend of increase in flexibility for the boys of Kerala. Singh (2010) also revealed similar trend of increase in this component as the age increased for Manipur boys. Results of continues increase in flexibility with increasing age was also supported by AAHPERD (1984).

Increase in flexibility at latter phase of growth for the boys might be due to physiological development of the boys in this age group. As the boys enter into adolescent phase, different changes took place in the body. Especially muscular development and its associated structures like tendons, ligaments etc. which lead to more gain in the flexibility during the latter part of adolescents growth. With this, maturation of proprioceptive neuron also perhaps plays an important role for the increase of flexibility in growth process.

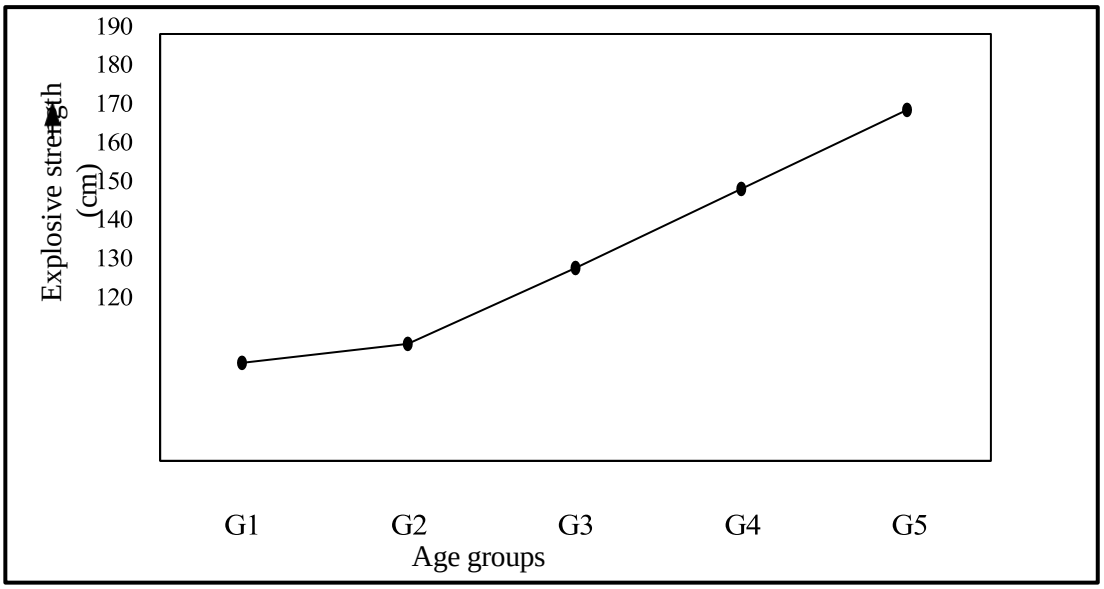

Figure-1: Age trend changes of power ability for different age groups of the present boys

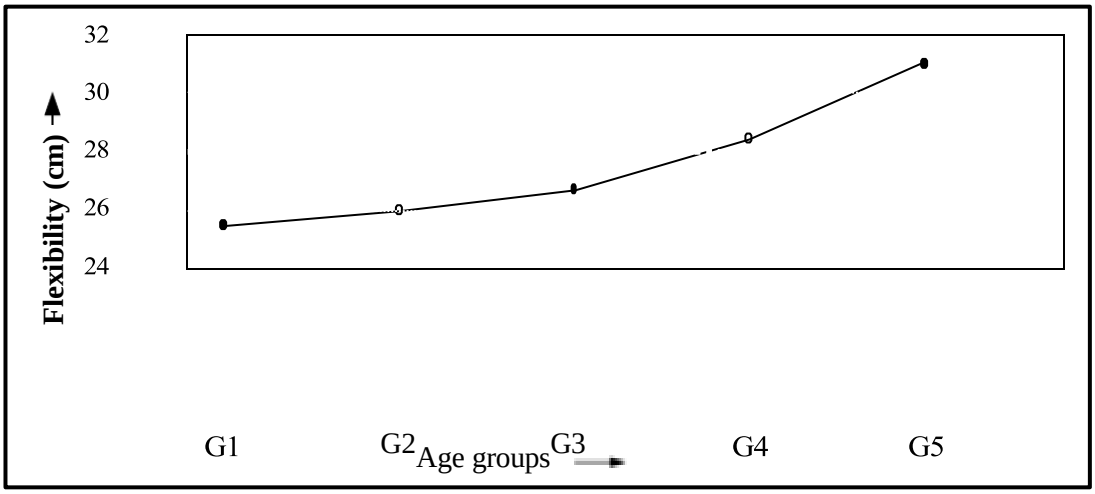

Figure-2: Age Trend Changes of Flexibility for Different Age Groups of the Present Boys

Conclusion:

Power a component of skill related fitness increased significantly as the age of the present boys increased from 10 to 14 years and greatest increase was found for the G3-G4 age group. Flexibility, a component of health related fitness increased as the age increased from 10 to 14 years and highest improvement occurred in the age group oh G4-G5 for the present subjects.

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