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A cross sectional study of flexibility among the teen aged students

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Abstract

Flexibility is one of the major aspects of total physical fitness of a human being. Purpose of the present study was to assess the level of flexibility of school students. The study was conducted on 300 school students of Ludhiana District in Punjab region. The age of the subjects ranged from 09-11 years. Subjects were selected randomly in Ludhiana randomly. No coaching or any guidance was given to the students before the test. Only demonstrations were provided to the subjects. Aspect of flexibility was measured with the help of bend and reach test. The test was employed to assess the level of difference in flexibility in various age groups. ANOVA and Scheffe's Post Hoc Test were employed to get range of difference among various age groups. As we all know that agility is main component in physical fitness. As per the results indicate that there was a significant difference in all the three age groups and it was further found that the level of flexibility keeps on deteriorating with the increase in age.

Keywords: Flexibility, asses, bend and reach test

Introduction

Health and physical fitness have much in common but they are not properly explored in this part of the country especially in teen aged students. Fitness is a mean to an end, where end is the overall development of an individual. Productivity is directly related to human efficiency and it totally depends on physical proficiency which is attained through adequate laws of physical fitness. Further physical fitness is also essential for everyone to live a healthy life, thereby, emphasizing the individual values attached to being physically fit.

Statistical estimates reveal that the main cause of various disease and deformities in today's fast moving life is basically related to low level of life style. Therefore to improve the quality of life and also to increase longevity, one has to follow all the health rules and accept a positive lifestyle program. Obesity is one of the main causes, which leads to various health problems among people. Obesity is not just a product of the western world. In fact, developing countries hold around one-third of the world's obese population. The sudden boom in obesity is mostly attributed to technological advances that have left us to lead a more sedentary life. We drive moderately than walk or cycle; we use up a lot of time assembling in front of computers; we have a great quantity of junk foodstuff. Children particularly spend a lot of time playing computer games, watching television and eating fatty snacks instead of playing outside and eating nutritious meals. Children are very active in between the age of nine and eleven years. In this phase of life, there is a strong urge to engage in physical activities. Perception improves with the maturation in sense organs and with the accumulation of experiences and by a correct interpretation of perceived sensations. There are various interacting influences, both genetic and environmental that has a bearing on the child. The motor fitness abilities of a child are also influenced by these factors. From the age of nine to eleven there is an improvement in the sense of balance, timing and Kinesthetic perception.

Concerned literature gives us an idea that flexibility plays an important role in the life of human being. With the help of a study three methods of teaching physical fitness and their effect on flexibility, cardiovascular endurance and strength was checked. Results indicated that aerobic activities were important for the attainment of flexibility, cardiovascular endurance and leg strength (Rhoda 1990) [13]. Another study examined the relationship of flexibility, cardiovascular endurance, body composition, balance, muscular strength and leg power on the performance of golfers and the results showed a significant correlation (Micheal 1994) [10]. Moreover cross sectional study of motor abilities of girls was conducted in the age group of 7 to 11 years, Where flexibility, speed, explosive power, agility, cardio

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vascular endurance, shoulder strength, abdominal strength were used as testing variables. Results revealed that urban residents were significantly superior to the rural subjects. Most of the experts agree on three major categories of fitness; flexibility, muscular and aerobic. Here our main concern is with the variable of flexibility which is a property of the musculoskeletal system that determines the range of motion achievable without injury to a joint or group of joints (Holt, Holt, & Pelham, 1996) [7]. But each of these variables are associated with one category of exercise, at least one at a time. The problem with adopting only-one-type of fitness routine is that it doesn't help against the forces that attack the body as it ages. As we age we lose balance, muscle mass, and flexibility. For example if the low back is inflexible, undue stress will be placed on the hamstring muscles which can cause pain in the lower back and make forward and lateral movements difficult (Patterson *et al.*, 1996) [12]. Lack of hamstring flexibility has been associated with postural deviations, gait limitations, risk of falling and susceptibility to musculoskeletal injuries (Jones *et al.*, 1998) [8]. Additionally, good flexibility in boys may contribute to a decreased risk of tension neck (Mikkelsen *et al.*, 2006) [11]. Additionally, early flexibility research suggested that there were both static and dynamic expressions of flexibility (Fleishman, 1963) [5], giving rise to the common use of "static" and "dynamic" modifiers for two kinds of flexibility (Anderson & Burke, 1991) [1]. However, use of this "dynamic" flexibility was stopped because they involved ballistic movements that may be more related to speed,

coordination, and strength rather than flexibility. While there is considerable anthropometric research showing static flexibility differences between athletes from different sports, the retrospective nature of most studies limits our understanding of these differences (Clarke, 1975) [3]. Depending on the nature of the movement, less static flexibility may actually benefit performance. For example, less static flexibility has been associated with better running economy (Gleim *et al.* 1990; Craib & Mitchell, 1996) [6, 4].

Material and Method

Sample: The present study was a cross sectional study with the purpose to assess the flexibility level of 09-11 years school boys. A sample of 300 students (100 subjects in each age group) was randomly selected from two convent and two government schools of Ludhiana District in Punjab.

Procedure: Present study targeted at the assessment of flexibility level in school kids. Bend and reach test (Johnson, 1977) [2] was administered for the collection of data where the subject was instructed not to achieve reach with a jerk but bend down gradually and slowly. Care was taken that the knees were fully extended while the subject bends forward. Collected data was computed with the help of following statistical procedure. Level of significance chosen was 0.05 level.

1. Descriptive Analysis
2. Analysis of variance (ANOVA)
3. Scheffe's Post Hoc Test

Results

Table 1: Provides information on the mean and standard deviation of various age groups.

Variable	Age Groups					
	9 Years		10 Years		11 Years	
Flexibility	Mean	SD	Mean	SD	Mean	SD
	10.989	2.2945	9.702	2.2704	9.118	1.9847

The results of descriptive analysis reveal that the boys of 9 years age group were more flexible than the other two

groups. Figure-1 indicates the value of descriptive analysis of different age groups in flexibility.

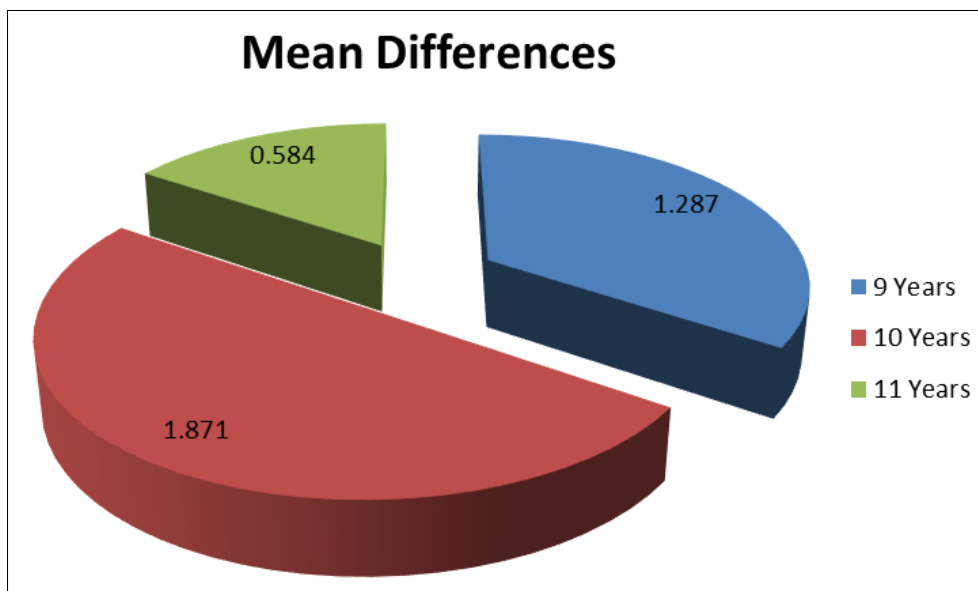


Fig 1: Mean difference of flexibility in different age groups

Table 2: indicates the analysis of variance of three age groups in flexibility

Variable	Variance	Sum of square	D.F	Mean square	F
Flexibility	Between Group	183.353	2	91.677	19.154*
	Within Group	1421.511	297	4.786	

Significant at 5% level $F \geq 3.03$

The result presented in the above table reveals that there was a significant difference in the variable flexibility of various age groups. The obtained F value (19.154) was found significantly higher than the required table value of 3.03 significant at 5% level.

Table 3: Scheffe’s Post Hoc test to find out direction of superiority

Variable	9 years	10 years	11 years	Mean difference	I
Flexibility	10.989	9.702	-----	1.287*	0.0566
	10.989	-----	9.118	1.871*	0.0566
		9.702	9.118	0.584*	0.0566

Significant at 5% level

demonstrated significant difference in flexibility of the various age groups. But it has been observed that there was a decline in the level of flexibility among the students with increasing age. Students of 11 years showed minimum amount of flexibility as compared with 10 and 9 years boys. This fact can be compared with the relevant study that shows that with the increase in age, our muscles naturally lose strength and size and can become less supple and stiffer. This can influence the series of association just about our joint, which may guide to inflexibility in the brute force and joint. It is the loss in tissue elasticity that can cause muscles and joints to tighten up. Several studies have found that less stiff muscles are more effective in utilizing elastic energy in stretch-shortening cycle movements (Kubo *et al.*, 1999, 2000; Walshe^[9, 14]. Stiffer muscles may have advantages in isometric and concentric movements (Wilson, Murphy, & Pryor, 1994)^[16].

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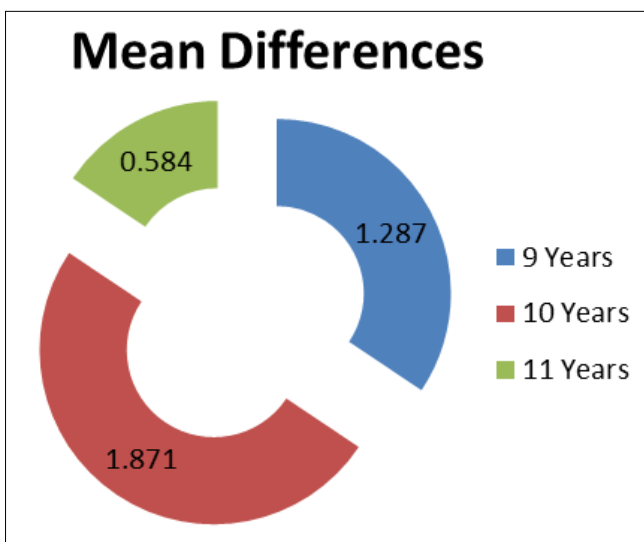


Fig 2: Indicates the resulting values of Scheffe’s Post Hoc test to find out direction of superiority

The result of Scheffe’s Post Hoc test related to flexibility indicated that the 9 years age groups boys were significantly more flexible as compared to 10 and 11 year age group boys. The mean difference of 10.989, 9.702 and 9.118 between scores pertaining to flexibility was found higher than the critical ratio of 0.0566.

Discussion

Flexibility in children and youth is currently the topic of major concern. There is an assertion that lifetime physical activity and health patterns are established in childhood in such a way that active children should translate into active adults. Flexibility is considered a significant component of health status. It is noted that there is a decline in aerobic fitness and increase in body fat which results in various body deformities, adult onset diabetes and low back problem are very common. Because of the growing importance of fitness in today’s life, researcher has made an attempt to evaluate fitness status of school children. It was conducted in the form of cross sectional study in order to evaluate the developmental pattern of children with their age.

It was hypothesized that there would be a general increase in flexibility with the increase in age. The present study

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