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MUSCULOSKELETAL FITNESS AMONG SCHOOL BOYS

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ABSTRACT

The aim of the study was to find out the musculoskeletal fitness among school boys at the age of thirteen to fifteen years of Tamil Nadu state. The numbers of school where classes of VII, VIII, IX and X standards are available in selected 20 districts. From each district 5 school were selected at random, likewise 100 school were selected in the whole state. Fifty subjects were selected from all 100 schools from the specified age group of 13, 14, and 15 years respectively. A total of 5000 subject were selected in each age group. Muscular strength (push ups), muscular endurance (sit ups), and flexibility (sit and reach) are the measurable components of musculoskeletal fitness. The obtain data were statistically analyzed by one way analysis of variance; the level of significance was fixed at 0.05. If the obtained 'F'ratio is significant; Scheffe's post hoc test was applied. The findings of this study showed that the significant differences between 13 years and 14 years, between 13 years and 15 and between 14 years and 15 years was found Muscular strength, muscular endurance, and flexibility.

Key Words: Musculoskeletal fitness, Muscular strength, muscular endurance and flexibility

INTRODUCTION

Physical fitness has been defined in many ways, the term "health-related fitness" has been used to denote fitness as it pertains to disease prevention and health promotion. Health-related physical fitness is typically defined

as including cardio respiratory endurance, body composition, musculoskeletal fitness included in muscular strength and endurance, and flexibility (American College of Sports Medicine, 1995). It is generally assumed that a better status in each of the constituent components of health-related

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fitness is associated with a lower risk of development of disease, injury, and/or functional disability. In spite of this assumption, standards or threshold values for the critical health risk associated with each of the components of health-related fitness have not been established (Brown, and Miller, 1998).

Health-related physical fitness is typified by an ability to perform daily activities with vigor and is related to a low risk of chronic disease. Skill-related fitness, on the other hand, has more to do with agility, balance, coordination, speed, power, and reaction time (sport skills) and has little relationship to health and disease prevention (Nieman, 1998).

Chronic back pain is a recognized problem, with high healthcare and workers compensation costs, and lost productivity worldwide (Andersson, 1999). Musculoskeletal pain in schoolchildren (the adults of tomorrow) carrying heavy backpacks, is now being recognized as a worldwide problem (Harrell, 1999 and Joanne, 1999).

The commonsense guidelines that exist for safe carryon weight by schoolchildren,

deal with the percent of body weight. One drawback to this is that, a short heavy child and a tall thin child may weigh the same, but their weight distribution and centre of gravity will be different. Thus the biomechanics, and the forces applied at different parts of the skeletal system will be different. Hence the pain experienced will also probably be different (Iyer, 2001).

MUSCULOSKELETAL FITNESS

Musculoskeletal fitness refers to muscular strength, muscular endurance and flexibility. Musculoskeletal fitness is an important factor in ability to carry out everyday tasks and enjoyable life. The earlier in life an individual becomes physically active the greater the increase in positive health benefits; however, becoming physically active at any age will benefit overall health. Improved musculoskeletal fitness is associated with an enhanced health status. The purpose of the study is to compare the musculoskeletal fitness (muscular strength, muscular endurance and flexibility) among school boys at the age of thirteen to fifteen years of Tamil Nadu state.

METHODOLOGY

Sampling Technique: - The sampling procedures should be based upon large distribution of random population. **Selection of Subjects:** - The study was designed to compare the musculoskeletal fitness (muscular strength, muscular endurance and flexibility) of different age group male school going students of Tamil Nadu. The total numbers of schools where classes of VII, VIII, IX and X standards are available in selected 20 districts. From each district 5 schools were selected at random, likewise 100 schools were selected at random in the whole state. Fifty subjects were selected from all 100 schools at random from the specified age

group of 13, 14, and 15 years respectively. A total of 5000 subjects were selected in each age group. On the date of test, the subjects were within four months of their birthday. **Selection of variable:** - Muscular strength - Push ups. (Johnson,1988), Muscular endurance - sit-ups. (Barrow,1989) and Flexibility – sit and reach. (Morrow, 2000). **Statistical technique:-** One way analysis of variance was applied to find out whether there was any significant difference on musculoskeletal fitness among the different age groups. The level of significance was fixed at 0.05, if the obtained F ratio is significant; Scheffe's post hoc test was applied to find out the means difference.

RESULT OF THE STUDY

Table I

ANALYSIS OF VARIANCE DONE ON MUSCULAR STRENGTH, MUSCULAR ENDURANCE AND FLEXIBILITY AMONG THE THREE DIFFERENT GROUPS

Variables	Sources of variation	Degree of freedom	Sum of scores	Mean sum of scores	F ratio
Muscular Strength	Between	2	4866.38	2433.19	84.31*
	with in	14997	432813.42	28.86	
Muscular Endurance	Between	2	23421.81	11710.91	97.59*
	with in	14997	1799636.6	120.00	
Flexibility	Between	2	9487.09	4743.55	99.34*
	with in	14997	716123.68	47.75	

* Significant at 0.05 level (Table value 2.99)

Table I show the F value on muscular strength, muscular endurance and flexibility 84.31,97.59 and 99.34 respectively, which are more than the table value of 2.99 at 0.05 level. This is clearly indicates significant differences among the three age group.

Table II

SCHIFFE'S POST HOC TEST FOR SIGNIFICANT DIFFERENCE AMONG MEANS OF DIFFERENT AGE GROUPS ON MUSCULAR STRENGTH, MUSCULAR ENDURANCE AND FLEXIBILITY

Variables	Post hoc test			Mean difference	CI
	13 years	14 years	15 years		
Muscular Strength	7.5	12.2		4.7*	0.27
	7.5		15.4	7.9*	
		12.2	15.4	3.2*	
Muscular Endurance	37.01	38.60		1.59*	0.43
	37.01		40.7	3.96*	
		38.60	40.7	1.47*	
Flexibility	25.60	26.59		0.99*	0.38
	25.60		27.55	1.95*	
		26.59	27.55	0.96*	

The obtained mean difference for muscular strength, muscular endurance and flexibility was significantly in favor of 15 years and 14 years respectively than 13 years.

DISCUSSION

Worldwide, osteoporosis and its consequences are a major public health problem. Osteoporosis is characterized by low bone mass, resulting in an

increased risk for fractures. The bone mass in later life depends upon the peak attained during skeletal growth and the subsequent rate of bone loss. From the results of epidemiological studies it is known that body composition, weight-bearing activities, muscle strength and, also, genes and intrauterine factors, contribute to future bone mass (Bakker, 2003, Nordstrom, 1997 and McGuigan, 2002).

Recently, Gale, et al. (2001) showed that birth weight was positively associated with bone area and bone mineral content (BMC) of the spine, femoral neck, and whole body.

In the recent study by Shier-Neiss, et al (2003), carrying a sports bag in addition to a backpack was not associated with back pain. Also, Kovacs, et al (2003), reported no significant association between LBP and the manner in which books were carried by 13-15-year olds. Interest in sports and exercise during leisure time is established in the adolescent period. This and other investigations show that continuing physical activity in adulthood may reduce low back problems. Therefore, it seems important to encourage youth to participate in physical activity. This may be more suitable than back exercise when back disability becomes a reality (Harreby, M et al. 1997). Muscular strength is positively associated with independence and overall quality of life, and negatively associated with morbidity and potentially premature mortality. Muscular endurance is positively related to overall quality of life. Elevated

muscular endurance may reduce the incidence of falling and its associated injuries. Muscular power is predictive of functional capacity, resultant disability, and potentially premature mortality. Flexibility is positively associated with mobility and independence. High levels of musculoskeletal fitness are associated with positive health status, and low levels of musculoskeletal fitness are associated with lower health status.

Growth, development and maturation are terms that can be used to describe changes starting at conception at conception and continuing through adulthood that occur in the body. Growth refers to an increase in the size of the body or any of its parts. A development refers to differentiation along specialized lines of function, so it reflects the functional changes that occur with growth. Finally, maturation refers to the process of taking on the adult form and becoming fully functional, and is defined by the system or function being considered.

With the increasing popularity of youth sport and an

emphasis on increasing children's physical fitness, we must understand the physiological bases of growth and development. Children and adolescents must not be regarded as mere miniature versions of adults. They are unique at each stage in their bones, muscles, nerves and organs largely dictate their physiological and performance capacities. As children increase in size, so do almost all of their functional capacities. This is true of motor ability, strength and aerobic and anaerobic capacity.

From birth through adolescence, the body's muscle mass steadily increases. Increases in muscle mass with age appear to result primarily from hypertrophy (increase in size) of existing fitness, with little or no hyperplasia (increase in fiber number). This hypertrophy results from increases in the myofilaments any myofibrils. The motor ability of boys generally increases with age for the fifth -18 years. This improvements result primarily from development of the neuromuscular and endocrine systems and secondarily from the children's increased activity.

Brooks, and Fahey (1984), have also observed that the extent of the development and the performance capacity of muscle is dependent on the relative maturation of the nervous system. High level of strength, power and skill are impossible if the child has not reached neural maturity. Myelination of many motor nerves is incomplete until sexual maturity, so, the neural control of muscle function is limited before that time. Medford Boy's Growth study shows the changes in leg strength. The boys were followed longitudinally from the age 7 to age 18 (Clarke, 1971). The rate of strength gain increases noticeably around the age of 12, the typical age for onset of puberty.

The results of the present investigation also indicate that, when chronological age increases, muscular strength, muscular endurance and flexibility are also increased significantly. Hence it has been concluded that, growth development and maturation are positively increases the muscular strength, muscular endurance and flexibility in pubescent boys.

IMPLICATION

Regular physical activities help prevent and delay premature

development of a variety of major health problems. Some inherited characteristics and behaviors place an individual at higher risk of premature health problems (such as cardiovascular disease and low back problems) and death. Risk factors of high serum cholesterol levels, high blood pressure, glucose intolerance, high fibrinogen, obesity and mechanisms for stress reduction can be reduced or eliminated through physical activity. Regular exercise slows the rate at which VO_2 max decreases with age. Exercise helps maintain strength, bone density and independence and reduces the chance of a bone break. If we have good musculoskeletal fitness then our health is also good as it helps with to Prevent injuries, improve posture, reduce low back pain, maintain healthy joints ,improve balance during movement ,avoid injuries ,maintain good posture ,remain independent (in older age) .

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