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A Relative Study on Strength, Endurance and B.M.I

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Abstract

The purpose of the study was to find out the difference between hill and plain school going student's explosive strength, strength endurance and body mass index [B.M.I]. The researcher has taken twenty five (n=25) school students from Kurseong and twenty five (n=25) school students from Siliguri randomly as the subject for the study. The subject's age ranges from 13 to 15 years which is taken from school admission register. The researcher measured age, weight, height as personal data and conducted standing broad jump and sit ups as tools to measure the explosive strength and strength endurance. Similarly B.M.I is measured by using the formula=Wt.(Kg)/Ht.(mts.). In standing broad jump the mean and S.D of hill and plain female students are 1.52, 0.21 and 1.40, ±.15 respectively with 't' value 3.44 which indicates that hill students are significantly better than plain female students. In sit ups the mean and S.D of hill and plain male students are 19.3, ±2.83 and 22.1, ±4.18 with 't' value1.78 which indicates that plain students are better than hill students but is not significant at any level. Similarly in B.M.I the mean and S.D value of hill and plain students are 16.14, ±1.28 and 15.66, ±12.03 with 't' value of 0.64 which is not significant at both level.

Keywords: Explosive Strength, Strength Endurance, BMI, Hill, Plain Students.

Introduction

Since prehistoric times physical fitness is the major subject of concern. Everyone should keep a particular fitness level to smoothly run their daily life. For many years strength was regarded as a symbol of physical fitness though it is one of its components. In fact strength is a conditional ability that means it depends largely on the energy liberation processes in the muscles. Strength is also perhaps the most important motor ability in sports as it is a direct product of muscle contraction.[1] All movements in sports are caused by muscle contraction and therefore strength is a part and parcel of all motor abilities, technical skill and tactical actions. In this background, strength and strength training assumes high importance for achieving good performance in all sports. The role of strength training for general, good posture and for prevention of injuries is usually overlooked which in the long run can prove harmful. Strength is the ability to overcome resistance or act against resistance. Strength should not be considered a product of only muscular contraction. It is, in fact, a product of voluntary muscle contractions caused by the neuro-muscular system. Strength is of three types, they are: maximum strength, explosive strength and strength endurance.

[1] HE Garrett, *Statistics in Psychology and Education*, New Delhi, 12th edition, Paragon International Publisher, 2007.

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Explosive strength is the ability to overcome a resistance with high speed and strength endurance is the ability to express force over a longer period of time. B.M.I refers to body mass index of an individual. The researcher has tried to find out whether hill or plain students are better in case of explosive strength, strength endurance and B.M.I respectively. The purpose of the study was to find out the difference in explosive strength, strength endurance and B.M.I of female students in plain and hill schools.

Methodology

The twenty five school going[2] female students from Kurseong and Siliguri had been selected randomly as the subject for the study. The subjects' age ranged from 13 to15 years. Criterion measures such as the researcher measured age, weight, height as personal data and conducted fitness items including the following items: Standing broad jump; Sit ups and B.M.I.

Standing broad jump: To measure the explosive power of the legs. Equipment required: Measuring tape to measure distance jumped, non-slip floor for takeoff, and soft landing area preferred. Commercial Long Jump Landing Mats are also available. The take off line should be clearly marked. The procedure was as follows: The athlete stands behind a line marked on the ground with feet slightly apart. A two foot take-off and landing was used, with swinging of the arms and bending of the knees to provide forward drive. The subject was asked to attempt to jump as far as possible, landing on both feet without falling backwards. Three attempts were allowed.[3] Scoring of the measurement was taken from take-off line to the nearest point of contact on the landing (back of the heels). The record the longest distance jumped, the best of three attempts were retained.

Sit ups: The curl up test measured abdominal muscular strength and endurance of the abdominals and hip-flexors, important in back support and core stability. Equipment required was a flat, clean, cushioned surface, stopwatch, recording sheets, and pen. Sit-up technique was that the subject laid on a cushioned, flat, clean surface with knees flexed, usually at 90 degrees. Specifying distance of the feet from the buttocks, being about 12 inches. A partner could assist by anchoring the feet to the ground. The position of the hands and arms affect the difficulty of the test. Therefore, they are generally not placed behind the head as this encourages the subject to stress the neck and pull the head forward. The hand could be placed by the side of the head, or the arms crossed over the chest, reaching out in front. Some protocols use curl up strips or other marks on the ground to slide the hands along and indicate how much to curl up. The subject was asked to raise the trunk in a smooth motion, keeping the arms in position, curling up the desired amount. The trunk is lowered back to the floor so

[2] Ramkrishna Girls Higher Secondary School and the twenty five school going female students from Siliguri Kadamtala High School.

[3] HM Barrow and MC Gee, *A Practical to Measurement in Physical Education*, Philadelphia, Lea and Febiger, 1979.

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that the shoulder blades or upper back touch the floor. Test procedure[4] for a common method of performing a sit up fitness test is to record the maximum number of sit ups in 30 seconds. Scoring is for the completion of one complete curl up (up and back) counts as one. The sit-up must be performed correctly for it to be counted.

B.M.I: BMI stands for Body Mass Index. It is a measure of body composition. BMI is calculated by taking a person's weight and dividing by their height squared.

Result and Discussion

Table: 1

Mean, S.D., range and 't' value of age, height & weight of hill and plain school going female students

Groups	Age			Height			Weight		
	Mean	S.d	Range	Mean	S.d	Range	Mean	S.d	Range
Hill	13.5	.75	13-15	147.2	4.74	145-155	34.5	3.21	32-42
Plain	13.6	.53	13-15	148.5	5.23	145-160	35.4	3.81	31-43

The above table indicates that age range was same for hill and plain school going students. Height and weight had slight difference. Height for hill students ranged from 145-155cm and 145-160 cm for plain students. Similarly weight for hill ranged from 32-42 and for plain player's weight ranged from 31-43 kgs. The difference of weight was due to height. This is because for higher level of height the weight is also more.

Table : 2

Mean, S.D., SED, and 't' value of standing broad jump, sit ups and body mass index of hill and plain school going female students

Variables	Groups	Mean	Standard Deviation	Sed	't' ratio
Standing broad jump	Hill	1.52	.21	.02	3.44*
	Plain	1.40	.15		
Sit ups	Hill	19.3	2.83	1.57	1.78
	Plain	22.1	4.18		
Body mass index	Hill	16.14	1.28	.75	0.64
	Plain	15.66	2.03		

* Significant at 0.01 level -To be significant at 0.05 level=2.88

**Significant at 0.05 level -To be significant at 0.05 level=2.10

From the above table it can be observed that mean and S.D of standing broad jump of hill and plain are 1.52 (.21) and 1.40 (.15) respectively with 't' ratio of 3.44 which was

[4] Johnson and Nelson, *Practical Measurements for Evaluation in Physical Education*, Burges Publishers, 1935.

significant at .01 level. This indicate that the hill students have more explosive power than the plain students as because the daily activity in hill are very strenuous, they have to walk up and down in the hill which makes their muscle very strong. It was also observed that mean and S.D of sit ups of hill and plain are 19.3 (2.83) and 22.1 (4.18) respectively with't' value of 1.78 which was not significant at any level.[5] In the same manner the mean and S.D of body mass index of hill and plain are 16.44 (1.28) and 15.66 (2.03) respectively with 't' value of 0.64 which was not significant at any level.

Conclusion

The following conclusions can be drawn from the study:

First, in explosive strength, hill students are superior to that of plain students.

Second, in relation to strength endurance, plain students are slightly better than hill students.

Third, in case of B.M.I, hill students are slightly better than plain students.

Similar studies could provide better understanding of students and help them in their academic as well as sports related career options.

[5] MJ Michael, O Tim, S Arthur & JE Carter, *International Standards for Anthropometric Assessment*, Cataloguing-in-Publishers, 2001.