

Effect of Weight Training on Fitness and Performance of Young Cricketers

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Abstract: Weight training has motivated the athletes to develop their strength and no exception in case of cricketers like any other game. Apart from developing a wholesome personality it also helps to keep a person fit and healthy. The purpose of the study was to find out the effect of weight training on fitness and performance of male (aged 14-17 years) cricketers. 20 subjects were selected randomly who represented the club team under-17 cricket tournament organized by Cricket Association of Bengal (C.A.B.) in the year of 2015-16. The mean age and height of the group was 15.05(±0.88) years and 160.48(±4.94) cm. respectively. A weight training schedule of thrice a week for 6 weeks was administered. Two days before and after completion of the weight training program all physical fitness components were taken through various standard tests and the performance of the subjects was rated by 3 experts in match condition. The obtained scores of physical fitness components were compared accordingly and observe that except Flexibility and Cardio-vascular endurance all other components like Speed, Leg explosive strength, Muscular strength & endurance of arm, Strength endurance tests score were significantly higher than the pre-test score of the group. All these result have justified the overall improvement in physical fitness capacity following weight training program. So far cricket performance in match situation were concerned the result shows that the overall performance in Cricket have improved significantly following weight training program.

Key words: Cricket, Fitness, Performance, Weight training.

I. INTRODUCTION

Recently, a growing interest has been observed in the field of sports and physical education not only for excellence but also for fitness and good health. People are becoming more and more aware of the dangers of leading activity in life and physical deterioration. Various new methods have also been developed for the improvement of fitness specific to the sports and general health & wellbeing. (Mondal, 1988) The word training means different things in different fields. In sports the word 'Training' is generally understood to be synonym of doing physical exercises. In a narrow sense, training is doing physical exercises for the improvement of performance. In addition to sports training competitions and use of other factors which are complementary to sports training and competition as comprising the total system of preparation of sportsman for better performances. (Singh, 1984)

Training becomes more popular for developing strength, speed, endurance and other related criterion of fitness. For developing these they use various processes and aid also. It is well known that the use of heavy stone and weight material during exercise by Greek and Spartan at that time. The resistive type exercises were invented in the beginning of nineteenth century. Development of resistive exercises becomes more popular after the beginning of modern Olympic. (Encyclopedia) The physical demands made on a modern cricketer's body have increased dramatically. To enable a cricketer's performance with greater ability and reducing the risk of injury especially during the summer or off season, they need to follow strength and conditioning program. It is proved that developing better fitness levels improves cricket performance. Maximum numbers of young cricketers were very much aware about their fitness level, for that they undergo in regular fitness program and testing to see if they're as fit as they should be.

The game of Cricket has historically been known as "the gentleman's game". Near about three decades ago Cricketers were certainly not the fittest athletes on the planet. Often it was remarked that Cricket is physically an easy game which requires one to stand on the field for most of the day and requires little running, jumping or strength. (Sarkar, 2013) So Cricket was not really considered a physical game, thus proper strength development was often ignored by Cricketers. Now if any one looks at modern day players he/she will notice how these guys use their muscular strength to their advantage and perform better. Means, it is quite impossible for a cricketer to survive for long time in the international arena without a strong body. So, each and every Cricket teams of this universe place a big amount of time on developing the strength of their players.

Along with building a good base of strength and fitness, the skills of the game should be worked on, ideally as a team in order to produce a higher level of combined skills, as cricket is a sport that is played in three forms, batting bowling and fielding. Weight training exercises are exercises in which body movements are made overcoming resistance provided by weights. The weight is gradually increased as the capacity to overcome resistance is increased as a result of practicing the exercises. So, for improvement of this muscular strength, Weight Training is one of the best training procedures. The purpose of the study was to throw some light on the effectiveness of weight training on some selected physical fitness components as well as on performance of young cricketers.

II. METHODOLOGY

2.1 Selection of Subjects: Twenty (N=20) male cricketer were randomly selected as subjects for this study from South 24 Parganas district in West Bengal. The age ranged from 14-17 years. They were basically representing the Club team in under-17 Cricket Tournament, organized by C.A.B. in the year of 2015-16.

2.2 Experimental protocol: The players were given the selected weight training exercises treatment, three day per week throughout six weeks. The exercises were given for the particular muscle groups which are involved in playing cricket, adopting progressive load method. The exercises were:- Half-Squat, Leg Press, Heel Raise, Seated Dumbbell Presses, Bench Presses, Triceps Extensions and Barbell Curls.

In the first two weeks intensity was 40% of maximum with a fixed set of repetitions. In the fourth week the intensity was 50% and in the later weeks the load was increased and the repetition and set were also changed according to the capability of the subjects.

Before conducting the weight training program all the subjects' personal data, physical fitness and performance variables were tested. In personal data age, height and weight were taken. For the measurement of physical fitness components 50 yard dash for speed of lower extremity and explosive strength, Pull-ups for muscular strength (dynamic) and muscular endurance of arm and shoulders, Sit-ups for strength endurance, Standing broad jump for explosive strength of legs, Sit and reach test for flexibility and 12 min. run-walk test for cardio-vascular endurance were conducted. For performance variables 3 experts have evaluated the performance and given marks (out of 100) according to their performance during match situation. All the test and measurements were conducted according to standard accepted norms. After completion of six weeks weight training program all the subjects were again tested accordingly as it was done before the onset of the training program.

2.3 Weight Training Schedule:

Sl. No.	Exercises	1st & 2nd week	3rd & 4th week	5th week	6th week
		Load(k.g.) X Repitation Set	Load(k.g.) X Repitation Set	Load(k.g.) X Repitation Set	Load(k.g.) X Repitation Set
1	Half-Squat	$\frac{15 \times 8}{3}$	$\frac{15 \times 10}{3}$	$\frac{18 \times 10}{3}$	$\frac{18 \times 12}{3}$
2	Leg Press	$\frac{18 \times 10}{3}$	$\frac{18 \times 12}{3}$	$\frac{20 \times 12}{3}$	$\frac{20 \times 15}{3}$
3	Heel Raise	$\frac{10 \times 10}{3}$	$\frac{10 \times 12}{3}$	$\frac{15 \times 12}{3}$	$\frac{15 \times 15}{3}$
4	Standing Straight Arm Pull-over	$\frac{2.5 \times 6}{3}$	$\frac{2.5 \times 8}{3}$	$\frac{4 \times 8}{3}$	$\frac{4 \times 8}{3}$
5	Seated Dumbbell Presses	$\frac{8 \times 8}{3}$	$\frac{8 \times 10}{3}$	$\frac{8 \times 10}{3}$	$\frac{13 \times 12}{3}$
6	Bench Presses	$\frac{12 \times 8}{3}$	$\frac{12 \times 10}{3}$	$\frac{15 \times 10}{3}$	$\frac{18 \times 10}{3}$
7	Triceps Extensions	$\frac{8 \times 6}{3}$	$\frac{8 \times 8}{3}$	$\frac{12 \times 8}{3}$	$\frac{12 \times 10}{3}$
8	Barbell Curls	$\frac{12 \times 8}{3}$	$\frac{12 \times 10}{3}$	$\frac{15 \times 12}{3}$	$\frac{15 \times 12}{3}$

2.4 Selection of the Variables:

2.4.1 Personal Data:Age, Height & Weight.

2.4.2 Physical Fitness Variables:Speed, Explosive Strength, Muscular Strength (Dynamic) and Muscular Endurance, Abdominal Strength Endurance, Flexibility, Cardio-vascular Endurance.

2.4.3 Performance Variables:Performance rating in match situation.

2.5 Criterion measure:

Two days before of conducting the weight training program all the subjects’ personal data, physical fitness and performance variables were tested through standard procedure as Pre-test of the study. In personal data age were taken from the Players Identity Card which was given by C.A.B, height were measured by Steel Tape and weight were measured by Weighing machine. For the measurement of physical fitness components 50 yard dash for speed of lower extremity and explosive strength, Pull-ups for muscular strength (dynamic) and muscular endurance of arm and shoulders, Sit-ups for abdominal strength endurance, Standing broad jump for explosive strength of legs, Sit and reach test for flexibility and 12 min. run-walk test for cardio-vascular endurance were conducted. For performance variables 3 experts have evaluated the performance and given marks (out of 100) according to their performance during match situation. All the test and measurements were conducted according to AAHPER Youth Fitness manual (1976) and Cooper’s (1968). After completion of six weeks weight training program all the subjects were again Post-tested accordingly as it was done before the onset of the training program.

2.6 Statistical analysis:

In the present study for the sake of analysis of data mean and standard deviation of the variables were calculated. To find out significant difference of mean between the pre and post intervention in different variables statistical t-test was used. The significance of means was tested at 0.05 level of confidence.

III. RESULTS AND DISCUSSIONS

Age: The researcher had been collected the date of birth of the subjects in an oral interview. Since he had no scope to see their birth certificates but he had got the chances of seeing the identity card which was given by C.A.B. After collecting their date of birth, age was calculated in nearest year. The mean age of the group was 15.05(± 0.88) years.

Height: The mean height of the group of subject was 160.48 (±4.94) cm.

Table-1: Mean, S.D. and ‘t’ Test Value of BodyWeight (kg.)

	Pre-test Weight	Post-test Weight
Mean	51.83	52.03
S.D.	11.83	11.59
‘t’ value	0.085	

*the critical value is **2.093**.

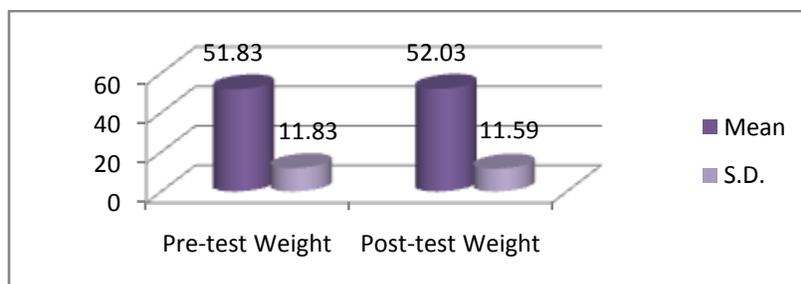


Figure: 1-Graphical representation of Mean & S.D of pre and post-test Value of Body Weight

The Table-1and Figure-1 showed that the pre-test mean & S.D of body weight of the group of subject was 51.83 kg.& 11.83 kg. and the post-test mean & S.D of weight of the group of subject was 52.03 kg.&11.59 kg. It may observed that there was an effect of six weeks weight training program on the body weight of the subjects but the calculated ‘t’ value (0.085) was lesser than the critical value (2.093) at 0.05 level of significance, so the means are not significantly different. Thus it may conclude that 6 weeks Weight training program has no positive effect on body weight of young cricketers.

Table: 2-Mean, S.D. and ‘t’ Test Value of 50 Yard Dash (Sec.)

	Pre-test 50 yard	Post-test 50 yard
Mean	7.58	7.55
S.D.	0.61	0.63
‘t’ value	3.417*	

*the critical value is **2.093**.

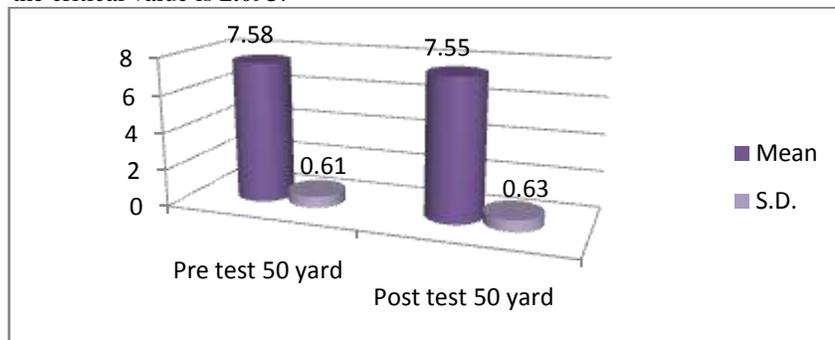


Figure: 2-Graphical representation of Mean & S.D of pre and post-test Test Value of 50 Yard Dash

The Table-2 and Figure-2 showed that the pre-test mean & S.D of 50 yard dash of the group of subject were 7.58 & 0.61 and the post-test mean & S.D of 50 yard dash of the group of subject were 7.55 & 0.63. It may be observed that both the Mean and S.D. were higher in Post-test than Pre-test of 50 yard dash and also the calculated ‘t’ exceeds the critical value ($3.417 > 2.093$) at 0.05 level of significance, so the means are significantly different. Thus it may be concluded that 6 weeks Weight training program has a positive effect on 50 yard dash of young cricketers.

McEvoy et.al (1998) concluded that ballistic resistance training can increase performance in baseball throwing and base running, thus such training methods should be incorporated in baseball training programs. Saunders et.al (2006) studied that, 9 weeks plyometric training helps to improve Running Economy, with likely mechanisms residing in the muscle, or alternatively by improving running mechanics. Ronnestad et.al (2008) concluded that 7 weeks heavy strength training leads to significant gains in strength and power-related measurements in professional soccer players.

From the above mentioned reviews the researcher may conclude that 6 weeks Weight training program has a positive effect on speed of young cricketers, as the results of the other study were same.

Table: 3-Mean, S.D. and ‘t’ Test Value of Pull-Ups (No.)

	Pre-test Pull-ups	Post-test Pull-ups
Mean	3.6	3.95
S.D.	3.41	3.71
‘t’ value	3.198*	

*the critical value is **2.093**.

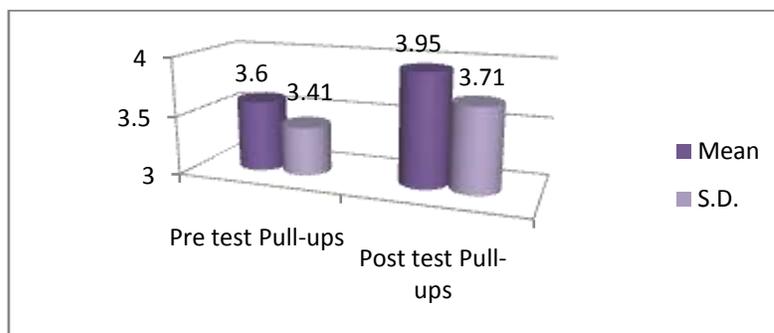


Figure: 3-Graphical representation of Mean & S.D of pre and post-test Test Value of Pull-Ups

From the Table-3 and Figure-3 the researcher wants to show that the pre-test mean & S.D of Pull-ups of the group of subject were 3.60 & 3.41 and the post-test mean & S.D of Pull-ups of the group of subject was 3.95 & 3.71. It may observe that both the Mean and S.D were higher in Post-test than Pre-test of Pull-ups. The absolute value of the calculated 't' value exceeds the critical value ($3.198 > 2.093$) at 0.05 level of significance, so the means are significantly different. Thus it may conclude that 6 weeks Weight training program has a positive effect on Pull-ups of young cricketers.

Santos et. al. (2008) showed in their study that 10 weeks complex training with more strength conditioning during the sport practice season improve the upper and lower body explosive levels in young basketball players. Furthermore, they also concluded that complex training is a useful working tool for coaches, innovative in this strength-training domain, equally contributing to a better time-efficient training.

From this above mentioned review the researcher may conclude that 6 weeks Weight training program has a positive effect of Pull-Ups on muscular strength and endurance of arm and shoulder of young cricketers, as this study also showing same trend.

Table: 4-Mean, S.D. and 't' Test Value of Sit-Ups (No.)

	Pre-test Sit-ups	Post-test Sit-ups
Mean	30.25	30.75
S.D.	9.85	10.32
't' value	2.236	

*the critical value is **2.093**.

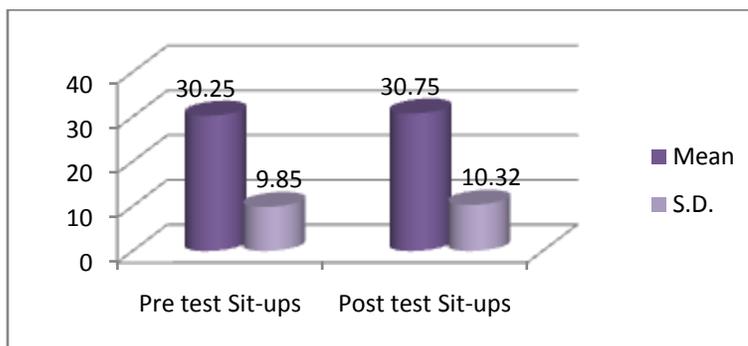


Figure: 4-Graphical representation of Mean & S.D of pre and post-test Value of Sit-Ups

The Table-4 and Figure-4 showed that the pre-test mean & S.D of Sit-ups of the group of subject were 30.25 & 9.85 and the post-test mean & S.D of Sit-ups of the group of subject were 30.75 & 10.32. It may observed that both the Mean and S.D were higher in Post-test than Pre-test of Sit-ups and also the absolute value of the calculated 't' value exceeds the critical value ($2.236 > 2.093$) at 0.05 level of significance, so the means are

significantly different. Thus it may conclude that 6 weeks Weight training program has a positive effect on Sit-ups of young cricketers.

Table:5-Mean, S.D. and 't' Test Value of Standing Broad Jump (m.)

	Pre-test S.B.J.	Post-test S.B.J.
Mean	1.89	1.99
S.D.	0.29	0.34
't' value	4.815	

*the critical value is **2.093**.

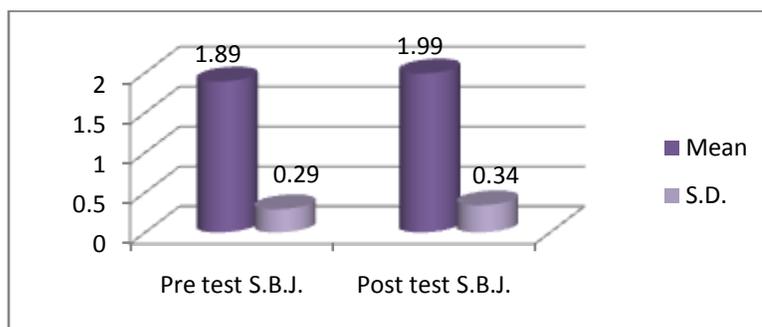


Figure: 5-Graphical representation of Mean & S.D of pre and post-test Test Value of Standing Broad Jump

The Table-5 and Figure-5 showed that the pre-test mean & S.D of Standing broad jump of the group of subject were 1.89 & 0.29 and the post-test mean & S.D of Standing broad jump of the group of subject were 1.99 & 0.34. It may observe that both the Mean and S.D were higher in Post-test than Pre-test of Standing broad jump. The absolute value of the calculated 't' value exceeds the critical value ($4.815 > 2.093$) at 0.05 level of significance, so the means are significantly different. Thus it may conclude that 6 weeks Weight training program has a positive effect on standing broad jump of young cricketers.

Darling (1962) studied that heel raise and deep knee bend exercises have a positive significant increment on vertical jump. Holmes (1962) determined in his study that there was a positive effect of 10 weeks weight training program on vertical jumping ability.

From these above mention studies it may see that the same result shows in this present study which indicates that 6 weeks weight training program has a positive effect on leg explosive power of young cricketers.

Table:6-Mean, S.D. and 't' Test Value of Sit-and- Reach Test (cm.)

	Pre-test Sit & Reach	Post-test Sit & Reach
Mean	8.48	8.75
S.D.	2.59	2.88
't' value	1.764	

*the critical value is **2.093**.

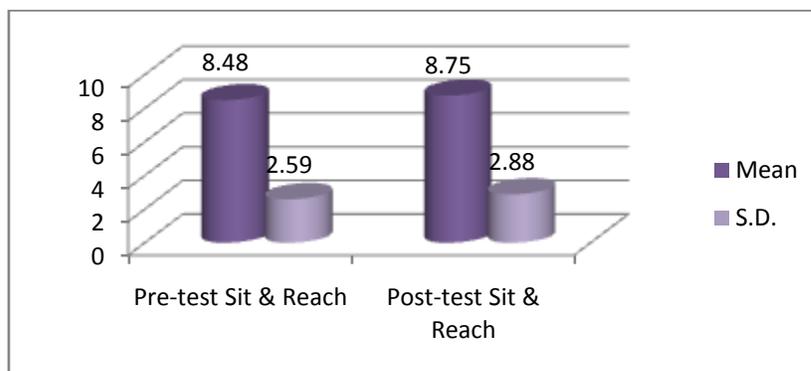


Figure: 6-Graphical representation of Mean & S.D of pre and post-test Test Value of Sit-and- Reach Test

From the Table-6and Figure-6the researcher wants to show that the pre-test mean & S.D of Sit & Reach test of the group of subjects were 8.48 & 2.59 and the post-test mean & S.D of Sit & Reach test of the group of subjects were 8.75 & 2.88. It may observe that both the Mean and S.D. were higher in Post-test than Pre-test of Sit & Reachtest but the absolute value of the calculated 't' is smaller than critical value ($1.764 < 2.093$) at 0.05 level of significance, so the means are not significantly different. Thus it may conclude that 6 weeks Weight training program has no positive effect onSit & Reach test of young cricketers.

Table: 7-Mean, S.D. and 't' Test Value of12 Minute Run and Walk Test

	Pre-test 12 min.	Post-test 12 min.
Mean	2273.75	2272.1
S.D.	230.27	233.92
't' value	0.750	

*the critical value is **2.093**.

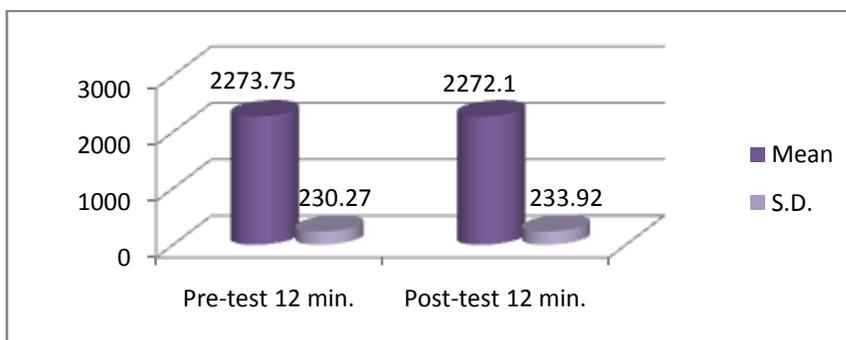


Figure: 7-Graphical representation of Mean & S.D of pre and post-test Test Value of 12 Minute Run and Walk Test

The Table-7and Figure-7 showed that the pre-test mean & S.D of 12 minute run and walk test of the group of subjects were 2273.75 & 230.27 and the post-test mean & S.D of 12 minute run and walk test of the group of subjects were 2272.1 & 233.92. It may observe that the Mean was lower but the S.D. was higher in Post-test than Pre-test of 12 minute run and walk test. The calculated 't' value was smaller than critical value ($0.750 < 2.093$) at 0.05 level of significance, so the means are not significantly different. Thus it may conclude that 6 weeks Weight training program has no positive effect on 12 minute run and walk test of young cricketers.

Raoet. al (2013) showed in their study "Combined Effect of High Intensity Intermittent Training and Weight Training on Aerobic Capacity Anaerobic Capacity and Fatigue Index of Male Handball Players" and concluded that 8 weeks combined training was efficient enough to improve aerobic capacity, anaerobic capacity and fatigue index

of male handball players. Velusamy (2013) in his study “Effect of Varied Methods of Resistance Training on Selected Physical Fitness Components of Inter-Collegiate Male Volley Ball Players” concluded that resistance without circuit training program was more effective than the resistance with circuit training program on cardio-respiratory endurance.

The above mentioned studies and the present study were not showing the same results, it may be due to the specific load; frequency and particular exercise of training which applied for the improvement of cardio-vascular endurance were not enough. So, in future it can be verified again.

Table:8-Mean, S.D. and ‘t’ Test Value of Match Performance (score)

	Pre-test Match Performance	Post-test Match Performance
Mean	5.87	6.09
S.D.	0.88	0.95
‘t’ value	8.64	

*the critical value is **2.093**.

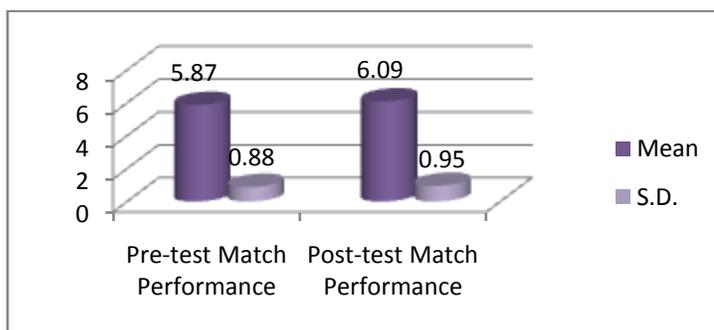


Figure: 8-Graphical representation of Mean & S.D of pre and post-test Test Value of Match Performance

From the Table-8 and Figure-8 showed that the pre-test mean & S.D of match performance of the group of subjects were 5.87 & 0.88 and the post-test mean & S.D of match performance of the group of subjects were 6.09 & 0.95. It may be observed that both the Mean and S.D were higher in Post-test than Pre-test of match performance which was determined by three experts and also the absolute value of the calculated ‘t’ exceeds the critical value ($8.6446 > 2.093$) at 0.05 level of significance, so the means are significantly different. Thus it may be concluded that 6 weeks Weight training program has a positive effect on performance of young cricketers.

Mondal & Banerjee (1988) in their study the “Effect of Six Weeks Multigym Conditioning Program on Young Soccer Players” concluded that multigym conditioning program not only improved the performance in physical fitness variables, but also can influence in improving skills in soccer. Treiber et al. (1998) showed in their study that 4 weeks resistance training using Theraband tubing and lightweight dumbbells may have beneficial effects on strength and functional performance in college-level tennis players. R. Muthu Eleckuvan (2013) suggested that the 8 weeks concurrent strength and plyometric training program has a statistically significant influence in developing the selected criterion variables as well as on motor fitness. Subramanian (2014) have studied that, “Investigation of Core Strength Training Induced Adaptations on Selected Physical and Physiological Parameters of Cricket” revealed that eight weeks of core strength training had significant impact on selected physical and physiological parameters.

From the above mentioned reviews the researcher may conclude that 6 weeks weight training program has a positive effect on performance of young cricketers, as all the results also show the same trend.

IV. DISCUSSION OF FINDINGS:

The score obtained from physical fitness components were also compared accordingly and observed in all the components like 50 yard dash, Pull-ups, Sit-ups, Standing broad jump except Sit and reach test and 12 min run-walk test all the post-test score significantly higher than the pre-test score of the group. All these results justify the

overall improvement in motor capacity following weight training program. So far cricket performance in match situation were concerned the result shows that the overall performance in batting, bowling and fielding have improved significantly. As the group of subjects was practicing weight training program along with their normal practice improvement has been seen in various parameters.

V. CONCLUSION

The present investigation has its own limitations but within these limitations following specific conclusion may be drawn from the present study:

- i. Significant improvement observed in speed, muscular strength (dynamic) and muscular endurance of arm and shoulders, Abdominal Strength Endurance, Leg explosive strength which were measured by 50 yard dash, Pull-ups, Sit-ups, Standing broad jumps respectively.
- ii. But there was no significant improvement observed in flexibility and Cardio-vascular Endurance which were measured by Sit and reach test and 12 min run-walk or Cooper test.
- iii. So far the performance was tested by three experts, following the six weeks weight training program, the significant improvement was observed.

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