COMPARATIVE EFFECT OF ISOTONIC AND ISOMETRIC EXERCISES ON THE PERFORMANCE OF CRICKET PLAYING SKILLS

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ABSTRACT

The purpose of the study was to investigate and Isometric exercise on cricket playing ability. The criterion measure selected for cricket playing abilities were batting, bowling and fielding performances. The subjects were 90 male school and college cricket player of Jodhpur. The age of the player ranged from 16 to 22 years. All the subjects and training treatments were assigned to the groups using random group design. The two experimental groups participated in the training for a period of Eight weeks. The first group (A) performed Isotonic exercises, the second group (B) performed Isotonic exercises and the third group (C) Which was not allowed to do any exercise served as the control group. All the three groups, however, kept participating in the school & college/ University physical education programme. Each subjects of all the experimental groups and control groups were tested at the beginning and at the conclusion of an experimental period of eight week to obtain pre-test and post-test scores. Training was carried out thrice a week on Mondays, Wednesdays, and Fridays. The analysis of covariance for batting, bowling and fielding skills indicated the resultant F-ratio in the case of pre-test means and post-test means were significant. The difference between the adjusted final means for groups was however, significant. The critical difference for adjusted means revealed that the mean gain made by all experimental groups showed statistically significant difference between experimental group and control group in bating and bowling performance. In fielding performance the critical differences for adjusted means showed that the mean gain made by experimental groups showed statistically significant difference among experimental group and control group.

Key Words: *Cricket, Isotonic, Isometric and Performance.*

INTRODUCTION:

Cricket is a game that would appear to require little muscular strength. Viewed from a distance, cricket is such a seemingly gentle pursuit that the notion of strength training and exercises would seem to have a limited application. However, as with many sports that involve relatively lengthy periods of low activity punctuated by intervals of extreme muscular focus, cricket is deceptively difficult and it also presents significant

physical training challenges for the athlete, especially at an elite level.

For batsmen, bowlers, and fielders, the primary energy system utilized during competition is the anaerobic lactic and alactic processes. In the acts of bowling, batting, and fielding, the intervals of activity requiring energy generation to power the athletes' muscles will almost certainly be fewer than 40 seconds. As all players in cricket are at some stage of a match called on to bat and field, much basic fitness training will be common to all players.

Isometric Contractions, on the other hand, are situations where the muscle TRIES to contract, but cannot. An example of this is if you tried to lift an immoveable object. Holding a weight at arm's length would be another. Actually, the legendary Bruce Lee, who was famous for his isometric workouts, did an exercise like this. He would hold a 3 pound steel ball in front of him with a straight arm for as long as he could. When he couldn't stand it anymore, he would drop the weight into the opposite hand and repeat the movement. He would alternate back and forth like this for 8 hours. This is obviously an extreme example, but that's also why the Dragon was the Dragon.

Isometric contractions Exercises based on Isometric-Isotonic contractions have their benefits. However, isotonic movements typically are much more vigorous, which is better for the heart. Isometrics only work the heart indirectly. Due to their vigorous nature, isotonic exercises are usually better at burning calories and therefore greatly aid in weight reduction. Most people don't realize that if you eat an extra 100 calories a day that can add up to 10 pounds a year. Walking for an hour (an isotonic exercise) will burn this off.

The primary benefit of isometric contractions is that they work muscle fibers that would otherwise remain idle. They are able to do this as isometric exercises (when done properly) force ALL of the muscle fibers to become fatigued. In weightlifting terms, they "allow you to get to the last rep first." They also take less time to perform those isotonic exercises and may also do a more efficient job of building and toning muscles. They are also safer can be done anywhere, which makes them more convenient.

Isometric-Isotonic contractions have their benefits. In the end, you will have to decide

what your fitness goals are to determine which one is best for you. In my opinion, a balanced exercise program should contain both contractions, which is what I do.

SELECTION OF SUBJECTS:

Ninety male cricket players, their age ranging between 16 to 22 years and studying in higher secondary school, college and university were randomly selected as subjects from Jodhpur region.

All subjects were then randomly assigned to two experimental group (A &B) and one control group(C), each consisting of 30 subjects. The experimental treatments were also assigned to the groups at random. The group A & B were treated as experimental groups and were given training programme of resistance exercises of isotonic and isometric in nature. The group (C) served as a control group and continued attending the normal programme of school, college and university physical education.

CRITERION MEASURE:

The criterion measure chosen for testing the hypothesis was performance of batting, bowling and fielding skill ability in cricket constituted the final score for each player. The criterion measure was used for collecting pre-test and post-test scores before and after the experimental period. The performance were recorded on the basis of execution of the skill evaluated by three qualified judges on the bases of following guidelines supplied to the judges in the table given below.

Batting skill test: (Front Foot & Back Foot Drive)

- Set out the playing area and equipment and mark the creases and target area.
- Position the players. Wicketkeeper (W), Fieldsman (F), Servers (S) and assessors (A) as indicated. No protective equipment is needed for the batsmen.
- The batsmen (B) each face six balls thrown by the server. He plays the off, straight and on drives.
- The server throws six deliveries on the marked full length area on the pitch and the batsman must drive the ball of the front foot through the target areas.

- For the Back-foot Drive test throws six deliveries on the marked area short of length on the pitch and the batsman must drive the ball off the back foot through the target area.
- The batsman receives five points every time he hits the ball with the correct stroke, along the ground and through the target area. (30 points per stroke maximum).

Bowling Skill test: The Run-up Action, Follow-through, Accuracy of Length and Line.

- Mark the run-up area, bowling creases and follow-though area.
- The bowlers each bowl an over.
- The assessors give one point for the bowler: Remaining within the in his run-up, Jumping into his action from the same spot, Not bowling a no-ball, Following through in the designed corridor. The bowlers can score a maximum 24 points.
- Mark the bowling crease and the accuracy grid on the pitch in front of the batting crease, as indicated.
- Use a new ball for the test of fast and swing bowling. An older ball can be used for spin bowling tests.
- The bowlers each bowl an over of six balls.

Fielding Skill test: Ball Collection & throwing accuracy.

- The fielder collects the ball from different angles from stumps & throw properly (use technique under arm and over arm throw) towards the target.

Salient features:

- Above all the components show the cricket ability (batting, bowling & fielding) Subjects were given to bowl one over each for every skill.
- The judges were supplied these details and requested to grade accordingly.
- Each cricket skills marks-100
- The average score of three qualified judges were taken as the final score for the study.

SELECTION OF EXERCISES:

After going through the available literature, findings of research studies and expert opinion the following exercises were selected by the scholar for the training programme.

Isotonic Exercise	Isometric Exercise
Pelvic Tilt 	**Plank Bridge** 
Back Erector 	**Side Bridge** 
Angry Cat Stretch 	**Hundred Breaths Exercise** 
Double Knee pull 	**Push Ups** 
Half Sit Ups 	**Shoulder Raises** 
Hip Kicker 	**Palm Press** 
Half Squat 	**Calf Raises** 
liotibial band 	**Leg Extensions** 
Stair Climbing 	**Hip Extensions** 
Thoracic Extension Stretch 	**Hip Abductions** 

FINDINGS:

To find out the significance differences between the pre-test and post-test means of the two experimental and control groups on the performances of the subjects in the Cricket skills i.e., batting, bowling and fielding. The 'F' ratio was applied. The findings pertaining to it are presented in Table 1 to 7.

Table -1

COMPARISON OF PRE-TEST MEANS AND POST-TEST MEANS OF THE PERFORMANCE OF CRICKET PLAYERS

		Sum of Squares	df	Mean Square	F
BattingPre	Between Groups	1344.467	2	672.233	10.178
	Within Groups	5745.933	87	66.045	
	Total	7090.400	89		
BattingPost	Between Groups	4374.067	2	2187.033	25.003
	Within Groups	7609.933	87	87.470	
	Total	11984.000	89		
BowlingPre	Between Groups	1941.800	2	970.900	13.509
	Within Groups	6252.600	87	71.869	
	Total	8194.400	89		
BowlingPost	Between Groups	4710.867	2	2355.433	27.532
	Within Groups	7443.133	87	85.553	
	Total	12154.000	89		
FieldingPre	Between Groups	4514.756	2	2257.378	62.313
	Within Groups	3151.700	87	36.226	
	Total	7666.456	89		
FieldingPost	Between Groups	9292.867	2	4646.433	131.215
	Within Groups	3080.733	87	35.411	
	Total	12373.600	89		

In the entire above variable, it was noted that the comparison between pre-test and post-test mean existed and the experimental groups improved. As the experimental groups showed a significant increase the data were analysed by applying analysis of co-variance to find out if there were significant difference among the groups. The analysis of co-variance for batting ability performance is shown is Table-2.

Table - 2

ANALYSIS OF COVARIANCE OF THE ADJUSTED MEANS OF TWO EXPERIMENTAL GROUPS AND THE CONTROL GROUP IN BATTING ABILITY PERFORMANCE.

	Groups		Control	Sum of Squares	Df	Mean Square	F Ratio
	Isotonic	Isometric					
Adjusted means	63.763	63.986	58.251	B 514.937 W 395.316	2 86	257.467	56.011*

* Significant at 0.05 level of confidence

N = 90, B = between group variance, W = Within group variance

'F' = ration needed for significance at 0.05 level of confidence = 3.101.

The analysis of covariance for batting performance indicated that the differences between the adjusted final means for three groups were found significant, the obtained F ratio was 56.011, F ratio being 3.101.

Since the difference between the adjusted Final means for three groups were found significant, the critical difference for adjusted mean was applied to find out with of the differences between the paired adjusted final means were significant. Differences between the paired adjusted final means are shown in Table-3.

Table - 3

PAIRED ADJUSTED FINAL MEANS & DIFFERENCES BETWEEN MEANS FOR THE TWO EXPERIMENTAL & THE CONTROL GROUP IN BATTING PERFORMANCE.

Mean			Difference bet-ween Means	Critical difference for adjusted mean
Isotonic	Isometric	Control		
63.763	63.986		.222*	
63.763		58.251	5.512*	1.716
	63.986	58.251	5.735*	

* Significant at .05 Level

It is evident from table-3 that means differences of isotonic and isometric, isotonic and control group, isometric and control group were found to be significant.

The mean gains made by the two experimental group were significantly greater than the control group in the performance of batting.

Table -4

ANALYSIS OF COVARIANCE OF THE ADJUSTED MEANS OF TWO EXPERIMENTAL GROUPS AND THE CONTROL GROUP IN BOWING ABILITY PERFORMANCE

	Groups			Sum of squares	df	Mean square	F Ratio
	Isotonic	Isometric	Control				
Adjusted Means	63.829	61.942	57.229	B 595.365	2	297.682	45.427*
				W 563.558	86	6.553	

* Significant at 0.05 level of confidence

N= 90,B= Between group variance, W= Within group variance

'F'= Ratio needed for significance at .05 level of confidence=3.101

The analysis of covariance for bowling performance indicated that the differences between the adjusted final means for three groups were found significant as the obtained F-ratio was 45.427, F ratio being 3.101.

Since the difference between the adjusted final means for three, groups were found significant, the critical difference for adjusted means was applied to find which of the differences between the paired adjusted final means were significant. Differences between the paired adjusted final means are shown in Table-5.

Table - 5

PAIRED ADJUSTED FINAL MEANS & DIFFERENCES BETWEEN MEANS FOR THE TWO EXPERIMENTAL AND & CONTROL GROUP IN BOWLING PERFORMANCE.

Mean			Difference between Means	Critical difference for adjusted mean
Isotonic	Isometric	Control		
63.829	61.942		1.887	
63.829		57.229	6.6*	2.049
	61.942	57.229	4.713*	

It is evident from table-5 that means differences of isotonic and isometric and control group, isometric and control group were found to be significant.

The mean gains made by the two experimental groups did not show statistically significant differences amongst them. However, the mean gains made by the two experimental group were significantly greater than the control group in the performance of bowling.

Table -6

ANALYSIS OF COVARIANCE OF THE ADJUSTED MEANS OF TWO EXPERIMENTAL GROUPS AND THE CONTROL GROUP IN FIELDING ABILITY PERFORMANCE.

Groups				Sum of squares	df	Mean square	F Ratio
	Isotonic	Isometric	Control				
Adjusted Means	71.723	68.537	62.540	B 765.008 W 212.172	2 86	382.504 2.467	155.041*

* Significant at 0.05 level of confidence

N= 90, B= between group variance W= within group variance

'F'= Ratio needed for significance at .05 level of confidence=3.101

The analysis of covariance for fielding performance indicated that the differences between the adjusted final means for three groups were found significant as the obtained F-ratio was 155.041, F ratio being 4.85.

Since the difference between the adjusted means for three, groups were found significant, the find critical difference for adjusted means was applied to find which of the differences between the parried adjusted final means were significant. Differences between the parried adjusted final means are shown in Table-8.

Table - 7

PAIRED ADJUSTED FINAL MEANS & DIFFERENCES BETWEEN MEANS FOR THE TWO EXPERIMENTAL & THE CONTROL GROUP IN FIELDING PERFORMANCE.

Mean			Difference between Means	Critical difference for adjusted mean
Isotonic	Isometric	Control		
71.723	68.537		3.186*	
71.723		62.540	9.183*	1.257
	68.537	62.540	5.997*	

It is evident from table-8 that means differences of isotonic and isometric, isotonic and control group, isometric and control group were found to be significant.

The mean gains made by the two experimental group were significantly greater than the control group in the performance of fielding.

DISCUSSION OF FINDINGS:

The analysis of data using ANCOVA showed that there was significant difference between experimental group and control group in performance on batting, bowling and fielding significantly better as compared to the control group.

The Experimental group showed better performance as compared to the control group may be due to the feet that experimental group have undergone a systematic progressive resistance training programme thrice a week where as control group the not participate in any kind of format training programme specifically for developing strength endurance. Clarks concluded in his study pertaining to the development of muscular strength endurance that different training exercises 4 to 5 days in a week may be less effective for increasing dynamic strength than training 2 to 3 days in a week. This may to attribute to the fact that the more frequent strength training may prevent sufficient recovery period between training sessions. The possibility could retard progress in neuro-muscular adaptation and strength development. In the present study, the three types of training programme were administered to the subjects only thrice in a week. Further, explanation and support for the findings may be as follows.

Under taking strength load regularly brings about the listed changes in the muscle, which lead to the development of the strength.

1. Increased number and size of myofibrils/muscle fiber.
2. Increased total amount of contractile protein, particularly in the myosin filament.
3. Increased capillary density per fiber.
4. Increased amount and strength of connective tendinous and leguminous tissues.
5. Increased number of fiber resulting from longitudinal fiber splitting.

Some of the above mentioned changes might have been induced in the muscles

due to different type of strength training exercises, which resulted in improved muscular strength & endurance of the experimental groups. On the other hand control group subjects even though did not participate in strength training programms but also showed improvement in strength which was much less in comparison to experimental groups, simply reflects that these subjects were also engaging in normal play and school/college physical education programme.

The results of the study indicate that the muscular strength & endurance is improved by different mode of resistance training i.e. by Isotonic and Isometric exercises. The changes observed in muscular strength & endurance is attributed to the progressive resistance training programme which was administered every alternate day for eight weeks.

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