



P-ISSN: 2394-1685  
E-ISSN: 2394-1693  
Impact Factor (RJIIF): 5.38  
IJPESH 2023; 10(3): 316-319  
© 2023 IJPESH  
[www.kheljournal.com](http://www.kheljournal.com)  
Received: 11-02-2023  
Accepted: 15-03-2023

**Dhruv Arora**

TGT, Physical Education  
Teacher, Government Girls  
Senior Secondary School,  
Nathupura, Delhi, India

**Dr. Sanjib Kumar Bhowmik**

Assistant Professor, Department  
of Physical Education, Tripura  
University, A Central  
University, Suryamaninagar,  
Agartala, Tripura, India

**Dr. Saon Sanyal Bhowmik**

Assistant Professor, Lakshmbai  
National Institute of Physical  
Education, North East Regional  
Center, Guwahati, Assam, India

**Corresponding Author:**

**Dr. Sanjib Kumar Bhowmik**

Assistant Professor, Department  
of Physical Education, Tripura  
University, A Central  
University, Suryamaninagar,  
Agartala, Tripura, India

## Analytical effect of calisthenic exercises on explosive strength among racket sports players

**Dhruv Arora, Dr. Sanjib Kumar Bhowmik and Dr. Saon Sanyal Bhowmik**

### Abstract

The purpose of conducting this study was to find out the comparative effect of calisthenics exercises on the explosive strength among various racket sports players. The study was conducted by randomly selecting 30 male racket game players from sports specialization of badminton, table tennis and tennis with their age ranging between of 18 to 22 years from Lakshmbai National Institute of Physical Education, North East Regional Centre and Guwahati, Assam. The total subjects (N = 30) were further divided into two groups with 15 subjects experimental & control group each. The experimental group was given 6-week calisthenic training program thrice a week for 45 minutes a session whereas the control group was not given any calisthenic training. Pre-test and post test was conducted for all 30 subjects selected prior to and after the implementation of the calisthenics training, the data was analysed using mean and SD as descriptive statistics. To reveal the result on comparative effect of the training two-way ANOVA was employed and tested at 0.05 level of significance. The results revealed that in the variable of explosive strength there was no significant differences seen in the test scores as well as between the experimental and control group.

**Keywords:** Calisthenic exercises, physical fitness component, explosive strength, two-way anova, test scores, experimental & control group

### Introduction

Racket sports bargain to some degree other fitness sports do not that is lateral movement. In our life we majorly perform exercises moving forward, racket sports forces us to move both back and forth and side to side which enhances balance ability and weight shifting promptly lowering the risk of falling. Racket sports also exercises our mind which means the sharpens the cognitive processes involving planning and decision-making skills continuously and promptly.

Racket sports are considered as idyllic form of exercises for children and adults irrespective of any age groups. Participating in racket sports enhances all the major physical fitness components especially the cardiovascular fitness and strength to the upper and lower extremities. Racket sports shows high level of technical and mental skills, physical fitness, power and accuracy, mental attitude and mental toughness, footwork, agility and precision. The popular forms of racket sports are badminton, table tennis, tennis, squash rackets, etc.

Physical fitness leads to sound mental makeup. Physical fitness is attached with component of total fitness for active living. Fitness links the intellectual, emotional as well as physical factors. Explosive strength is the ability to exert maximal force in minimal time. In order to develop explosive strength and reaction ability one need to do two things. Firstly, one must build the speed strength and secondly, in the same time frame, one must raise the absolute strength. The majority of the training combines maximum effort exercises increases the strength potential of the muscles, while training with light weights leads to improving speed.

Since racket sports are physically demanding at times especially when the players are involved at an advanced or elite level of playing, to maintain proper harmony between the physical and the mental components proper exposure of training is required. The players often seem to lose the match even if being physically fit because of the weaker mental attitude and toughness. Keeping this view in mind, the present experiment was designed to explore the effects of calisthenic exercises on explosive strength among the major racket games players.

## Methodology

### Selection of Subjects

For fulfilling the purpose of the study, thirty (N=30) male players were selected as subjects from Lakshmibai National Institute of Physical Education, North East Regional Centre, Guwahati, Assam, with their age ranging between 18 to 22 years. The total number of subjects were further divided into two groups with 15 subjects in each group i.e., experimental & control group. The selection of subjects was done randomly from three racket sports specialization groups of badminton, tennis, table tennis. The experimental group was exposed to calisthenic training program for six weeks whereas the control group continued with their daily routine activities but was not exposed to plan calisthenic training.

### Selection of Variables

Basically, keeping in mind, the purpose of the study the physical fitness component of explosive strength was selected as the variable for this present investigation.

### Criterion Measures

The description of the test item for testing and collecting the pre and post data on the selected physical fitness variable of explosive strength is as follows:

### Explosive strength: Standing long jump test (Broad Jump)

The Standing long jump, also called the Broad Jump, is a common and easy to administer test of explosive leg power. The purpose of the test is to measure the explosive power of the lower extremities (legs). Equipment required to conduct the test- tape measure to measure distance jumped, non-slip floor for takeoff, and soft-landing area preferred. The take off line should be clearly marked.

The subjects stood 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 attempted to jump as far as possible, landing on both feet without falling backwards. Three attempts were allowed.

The measurement was taken from take-off line to the nearest point of contact on the landing (back of the heels). Record the longest distance jumped, out of the best of three attempts.

### Administration of test and collection of data

Prior to the administration of the test, the researcher contacted the subjects of three racket sports specialization groups, viz., badminton, table tennis and tennis. The purpose of the study and the tests were made clear to the subjects so that they were aware of what they are expected to do. After that the subjects were randomly assigned to two groups i.e., experimental and control (N=15 each). A pretest was conducted on the subjects of both the designated groups for collecting data and testing the variable of explosive strength by standing broad jump. After the pretest the groups were separately exposed to assigned calisthenic exercises training and no training conditions for the period of 6 weeks for thrice a week with a session duration of 45 minutes. Posttest was conducted using same parameters as was done in the pretest for both the groups, i.e., experimental group and control group (N=15 each).

### Statistical Procedures

The data thus collected were put to statistical computerization for analysis, two-way ANOVA was employed as a measure

for present data and tested at 0.05 level of significance along with descriptive statistics of mean and standard deviation.

## Results

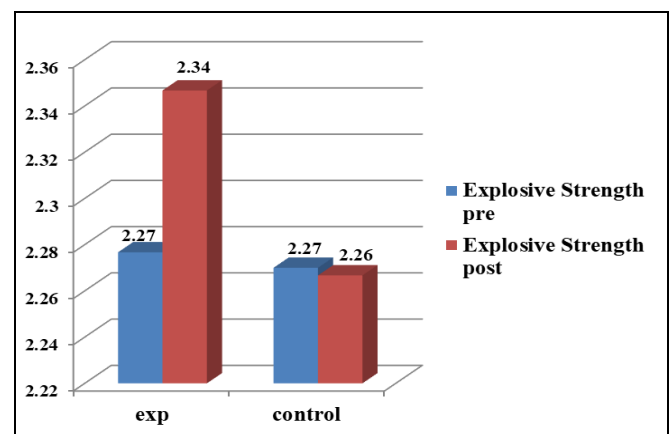
To start with, the result of the total sample (N = 30) in experimental (N = 15) and control group (N = 15) investigated on the basis of pre-test and post-test scores, their descriptive statistics and the univariate analysis on their physical fitness variable of explosive strength has been presented in the following tables.

**Table 1:** Descriptive statistics of explosive strength in pretest and posttest of the experimental and control group

Test	Treatment groups	Mean	Std. Deviation	N
pre-test	experimental	2.27	.09	15
	control	2.27	.18	15
	Total	2.27	.14	30
post-test	experimental	2.34	.11	15
	control	2.26	.20	15
	Total	2.30	.16	30
Total	experimental	2.31	.12	30
	control	2.26	.18	30
	Total	2.29	.15	60

Descriptive statistics on table 1 showed that the total mean score of explosive strength was  $2.29 \pm 0.15$ . The total mean and SD of the pretest was  $2.27 \pm 0.14$ . In pretest of experimental and control group, the mean and SD of explosive strength was  $2.27 \pm 0.092$  &  $2.27 \pm 0.18$  respectively.

The total mean score and SD of explosive strength in posttest was  $2.30 \pm 0.16$  where, the mean and SD of posttest of experimental group was  $2.34 \pm 0.11$  and of control group was  $2.26 \pm 0.20$ . The mean scores of explosive strength for both the groups and tests are illustrated graphically in figure 1.



**Fig 1:** Means scores of tests and groups in the variable of explosive strength

**Table 2:** Univariate analysis of pre-test and post-test in the variable of explosive strength

	Sum of Squares	DF	Mean Square	F	Sig.
Contrast	.017	1	.017	0.692	0.409
Error	1.349	56	.024		

Significant at .05 level  $F_{0.05}(1, 56) = 4.01$

The 'F' Value tested for significance for the present findings was at 0.05 level with 1, 56 DF. The required value was 4.01. Table 2, showed that the obtained 'F' Value of pretest and posttest scores in Explosive strength was 0.692 which was less than the tabulated value. This indicated there was no

significant difference between the pre and posttests in the factor of explosive strength. As there was no significant difference seen in the test scores, further calculations for tests were not performed.

**Table 3:** Univariate Analysis of Experimental and Control Groups in the Variable of Explosive Strength

	Sum of Squares	DF	Mean Square	F	Sig.
Contrast	.028	1	.028	1.169	.284
Error	1.349	56	.024		

\*Significant at .05 level  $F_{.05}(1, 56) = 4.01$

The 'F' Value tested for significance for the present findings was at 0.05 level with 1, 56 DF. The required value was 4.01. Table 3, showed that the obtained 'f' value of experimental and control group in explosive strength was 1.169 which was less than the tabulated value. This indicated that there was no significant difference between the groups in the factor of explosive strength. As there were no significant differences seen further calculations are not performed for the groups. The interactions between the dependent variables are shown in table 4.

**Table 4:** Interaction of test and treatment groups in the variable of explosive strength

Test	Treatment groups	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Pre-test	Experimental	2.27	0.040	2.196	2.357
	Control	2.27	0.040	2.190	2.350
Post-test	Experimental	2.34	0.040	2.266	2.427
	Control	2.26	0.040	2.186	2.347

Table 4, showed the interaction of test and treatment groups where in pretest the experimental group in explosive strength (Mean = 2.27) and control group (Mean = 2.27) revealed that the mean score of experimental group was higher than the control group.

Whereas, in posttest the mean score of experimental group (Mean = 2.34) and the control group (Mean = 2.26) was higher than the control group. In overall context of interaction among the tests and treatment groups in the dependent variable of explosive strength it can be said that there was no improvement in pre & posttest among both the groups.

## Discussion

From the analysis, it was evident that in the variable of explosive strength there was no significant differences seen in between the tests and groups scores. Today science has made tremendous progress; we often call it the era of technology and science. We almost see everything through the eyes of science may it be in our diet, health and lifestyle. In the area of health and wellness or games and sports the most remarkable and popular word these days is the word 'Fitness'. Numerous research work and investigations are going on in the field of games and sports and fitness. Different means, methods equipments are being introduced to enhance the status of fitness and sports. Despite all the advancement we often see or hear from health practitioners that any forms of

physical activities are necessary to maintain optimum health condition, especially walking, brisk walking, calisthenic exercises (free hand exercises) and yoga. That's the reason there is a huge increase in the fitness awareness among individuals of all classes and profession.

The purpose of this study was to find out the effects of calisthenic exercises on the selected physical fitness component of explosive strength among players of racket game. The variable tested in this study showed result by getting enhanced after the subjects were exposed to six-week calisthenic exercises training but the statistical result of the variables was found insignificant in most of the cases when compared between tests and treatments.

A similar natured study was conducted by Barik and Banerjee where they studied the effect of six-week conditioning programme on some performance variables among tribal students by random sampling where 17 tribal school boys of 14-16 years were selected. All the subjects had undergone a six-week conditioning programme. The standard fitness test comprised of 50 meters dash for speed, vertical jump for strength, squat thrust for agility and Cooper's 12-minute run and walk for endurance, T' ratio was computed and analysis of data revealed that speed, endurance and strength increased significantly after training.

The statistical insignificance of this present findings owing to some reasons as expected to be the limitations of this study. The training schedule designed for the subjects needed few markers or changes from time to time especially by increasing the time duration of the training session. There was certain gap in the implementation of training program as the subjects were unavailable from time to time because they were engaged in other activities in the curriculum as well. Another reason may be that the subjects were not mentally prepared or under mental pressure to participate in the training and testing situations which hindered them to be part of this study wholeheartedly, the mental pressure situations were different types of exams and competitions, etc.

## References

1. Barik, Kumar Athindra, Banerjee AK. Effect of 6 weeks conditioning programme on some performance variables among Tribal students, Journal of Physical Education and Sports Sciences. 1990;2(2):37-40.
2. Hamilton, John. Developing Racquet Sport Skills. study.com; c2010. Retrieved 21/03/2019 from: <https://study.com/academy/lesson/developing-racquet-sport-skills.html>
3. Karesn S Young. Physical Fitness of Secondary School Boys and Girls: A Comparison of two programmes of physical education. Completed research in health, physical education and recreation. 1980;21:76.
4. Solan, Matthew. Racket sports serve up health benefits Harvard health published Retrieved; 2017. 21/03/2019 from: <https://www.health.harvard.edu/blog/racket-sports-serve-up-health-benefits-2017060911780>.
5. Thomas R Jerry, Nelson K Jack, Silverman J Stephen. Research methods in Physical Activity. Human Kinetics; c2005.
6. Wood, Robert. Speed Fitness; c2010. Topendsports.com,

Retrieved 21/03/2019 from:

<https://www.topendsports.com/fitness/speed.htm>.

7. Wood, Robert. List of Racket Sports; c2015. Topendsports.com, Retrieved 21/03/2019 from: <https://www.topendsports.com/sport/racquet-sports.htm>