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**DEPARTMENT OF PHYSICAL EDUCATION  
BHARATHIAR UNIVERSITY  
COIMBATORE-641046**

## **From the Editors' Desk**

The Department of Physical Education, Bharathiar University with societal responsibility towards raising standards of research in sports sciences, proudly runs this journal in the name of the Great Indian poet 'Bharathiar'. This is the first issue of 2023, the 14th volume of 'The Bharathiar National Journal of Physical Education and Sports Sciences'. Coping up the post pandemic effects the editorial team had put in tremendous efforts to bring out this volume of research works and articles.

The **Bharathiar National Journal of Physical Education and Exercise Sciences (BNJPEES)** is an open access quarterly journal, double blind refereed journal with ISSN- 0976-3678 which publishes original articles, commentary, editorials, review articles and case reports covering recent innovative high quality researches on sports published by the Department of Physical Education, Bharathiar University Coimbatore since June 2010. The purpose of this journal is to enrich the field of physical education and sport with literary base dynamic latest research and articles. The field of sport and physical education with its dynamic nature needs a literary back up to keep the masses informed of the latest changes that are happening across this field. Since the Sports Climate is experiencing a wide range of change and is very much essential that we stretch ourselves to meet the key challenges on sports and games. Since the inception of the new editorial team from 2019, the journal has been upgraded online to increase the vicinity across the globe and provide a wider citation opportunity scaling up research heights. The journal has been indexed with google scholar, world cat, core and road.

We appreciate the research scholars for stepping forward to get their works published in our university journal. The submitted articles are subjected to a double blind referee system for review. Based on the reviewers report the articles are accepted. We are also working hard towards quality control of the articles in par with the international standards.

From the editorial desk we submit to you that BNJPEES, with immense pleasure is working for the development of research in the field of Physical education and sports sciences which is the need of the hour. We encourage the authors to submit evidence based real time research results which would benefit the society.



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### **The Editorial Office**

Bharathiar National Journal of Physical Education and Exercise Sciences  
Department of Physical Education, Bharathiar University  
Coimbatore - 641046, Tamil Nadu, India.

### **Contact**

**Email:journalbudpe@gmail.com**

Dr. M. Rajkumar, Editor: **+91 9842520099**

Dr. S. Akila, Managing Editor: **+91 9894077744**

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## **EFFECTS OF CIRCUIT TRAINING ON SELECTED MOTOR FITNESS VARIABLES AMONG SCHOOL PLAYERS**

**\*Dr.A. Mahaboobjan and \*\*Mr. E.Rajasekar**

\*Professor, Department of Physical Education and Yoga, Bharathidasan University, Tiruchirappalli, Tamilnadu, India.

\*\*Ph.D. Research Scholar, Department of Physical Education and Yoga, Bharathidasan University, Tiruchirappalli, Tamilnadu, India.

### **ABSTRACT**

The purpose of the study was to find out the effects of circuit training on selected motor fitness variables among school boys. To achieve the purpose of this study thirty school boys were randomly as selected subjects from Govt. Hr. Sec. School, Ponmalaipatti, Tiruchirappalli. The age of the students ranged from 15 to 19 years. The selected subjects were divided into two equal groups. Group A underwent circuit training, Group B acted as control group. The experimental group was subjected to the training for three days in a week for a period of 6 weeks. The motor fitness variables namely speed and agility were measured by 50 yards dash and shuttle run. The data were collected from each subject before and after the training period and statistically analyzed by dependent 't' test which is used to find out the significant improvement on selected criterion variables and Analysis of Covariance (ANCOVA) was used to find out the significant difference between the experimental and control groups on each variables separately. All the cases 0.05 level of confidence was fixed as a level of confidence to test the hypotheses. The final result shows that there was a significant improvement on speed and agility due to the effects of the circuit training among school boys.

### **INTRODUCTION**

Circuit training can increase fitness which is related to health and involves aerobic and anaerobic power, hence very suitable to be applied for school pupils. The circuit training can be

made as a main instrument in physiological exercise program by a trainer who wants to train their teams at primary school level. Circuit training in the form of sports skills will increase fitness and

excitement for players. It will encourage continuous players' participation. The sequence of challenging sports skill circuit training will encourage players to complete all circuits by employing all skills in a set. Circuit training must be arranged so that all body muscles can be used in a circuit to provide optimum effect (Foster and Overholt (1994).

Circuit training is a training program that was developed by Morgan and Adamson in the year 1953 in the University of Leeds, England. This type of training program is appropriate for the short term preparatory phase. Stone (2007) further said that circuit training is more suitable for novice groups who want to be involved in weight lifting based sports training.

## **METHODOLOGY**

The purpose of the study was to find out the effects of circuit training on selected motor fitness variables among school boys. To achieve the purpose of this study thirty school boys were randomly as selected subjects from Govt. Hr. Sec. School, Ponmalaiatti, Tiruchirappalli. The age of the students ranged from 15 to 19 years. The selected subjects were divided into two equal groups. Group A underwent circuit

training, Group B acted as control group. The experimental group was subjected to the training for three days in a week for a period of 6 weeks. The motor fitness variables namely speed and agility were measured by 50 yards dash and shuttle run. The data were collected from each subject before and after the training period and statistically analyzed by dependent 't' test which is used to find out the significant improvement on selected criterion variables and Analysis of Covariance (ANCOVA) was used to find out the significant difference between the experimental and control groups on each variables separately. All the cases 0.05 level of confidence was fixed as a level of confidence to test the hypotheses.

## **STATISTICAL TECHNIQUE**

The effects of independent variables on selected speed and agility were determined through the collected data by using appropriate statistical techniques and the results are presented below. The analysis of dependent 't' test on the data obtained for speed and agility of the pre-test and post-test means of ladder training and control groups have been analysed and presented in table I.

## RESULTS

**Table 1: Mean and 'T' Test for the Pre and Post Tests on Speed and Agility of Circuit Training and Control Groups**

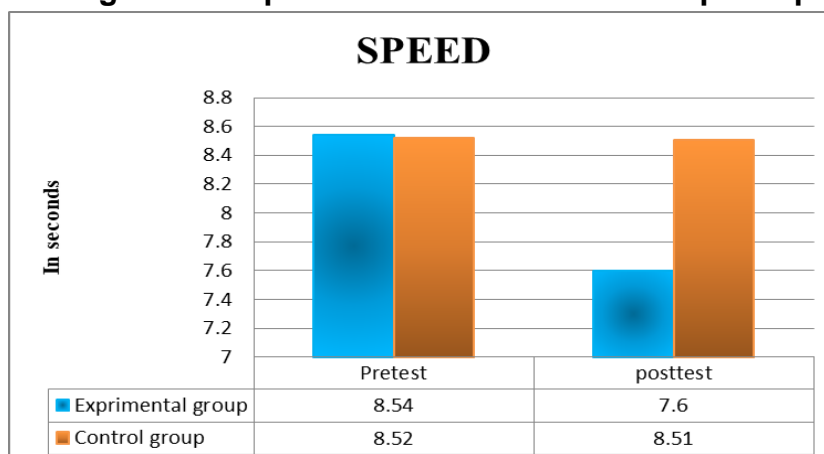
Variables	Name of the Test	Circuit Training Group	Control Group
Speed	Pre test mean	8.54	8.52
	Post test mean	7.60	8.51
	't'test	<b>7.12*</b>	0.62
Agility	Pre test mean	12.42	12.47
	Post test mean	11.53	12.44
	't'test	<b>9.24*</b>	0.22

\*Significant at 0.05 level. (The table value required for .05 level of significance with df 9 is 2.15).

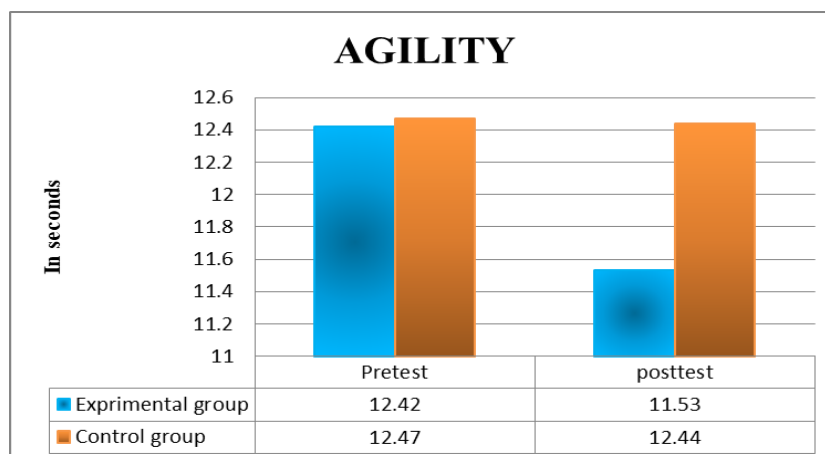
**Table 1** reveals that the pre-test mean value of motor fitness variables namely speed and agility in circuit training group and control group are 8.54 & 8.52 and 12.42 & 12.47 respectively and the post test means are 7.60 & 8.51 and 11.53 & 12.44 respectively. The obtained dependent t-ratio values between the pre and post-test means of speed and agility in circuit training group are 7.12 and 9.24. The obtained dependent t-ratio values between the pre and post-test means of speed and agility

in control group are 0.62 and 0.22 respectively. The table value required for significant difference with df 9 at 0.05 level is 2.15. Since, the obtained 't' ratio value of experimental group is greater than the table value, it is understood that circuit training group had significantly improved the speed and agility. However, the control group has not improved significantly because the obtained 't' value is less than the table value, as they were not subjected to any specific training.

**FIGURE –I**  
**Bar Diagram of Experimental and Control Group on speed**



**FIGURE –II**  
**Bar Diagram of Experimental and Control Group on Agility**



**Table 2:**  
**Analysis of Covariance on Speed and Agility of Circuit Training and Control Groups**

Variables	Adjusted Post Test Means		Source of Variance	Sum of Squares	DF	Mean squares	Obtained 'F' Ratio
	Circuit Training Group	Control Group					
Speed	7.62	8.53	Between	9.015	1	9.015	<b>15.28*</b>
			Within	0.035	17	0.59	
Agility	11.56	12.46	Between	16.20	1	16.20	<b>25.08*</b>
			Within	0.038	17	0.646	

\*Significant at 0.05 level. (The table values required for significance at .05 level of confidence with df 1 and 17 is 4.21)

**Table 2** reveals that the adjusted post test means of speed and agility of circuit training and control groups are 7.62 & 8.53 and 11.56 & 12.46 respectively. The obtained 'F' ratio value of speed and agility are 15.28 and 25.08 which are higher than the table value of

4.21 with df 1 and 17 required for significance at 0.05 level. Since the value of F- ratio is higher than the table value, it indicates that there is significant difference among the adjusted post test means of circuit training and control groups on selected variables.



## DISCUSSION ON FINDINGS

The results of the study showed that there was a significance difference between the adjusted post test mean of agility circuit training group and control group on speed and agility among school boys.

## CONCLUSIONS

1. There was a significant improvement on speed and agility due to the effects of the circuit training among school boys.
2. There was a significance difference between circuit training group and control group on speed and agility among school boys.
3. Finally it was concluded that circuit training group is better than control group. Hence I recommended that physical education experts and coaches should give due to the importance of circuit training which helps the athlete to do better performance in sports events.

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## **Analysis of Total Body Water distribution in Athletes Based on their BMI**

**Dr. Sanjay Kumar Prajapati\***, **Mr. Ravi Prakash D\*\***, **Dr. Sudhir Malik\*\***

\*Assistant Professor, Sports Authority of India, Lakshmibai National College of Physical Education, Trivandrum, Kerala, India.

\*\*Anthropometrist, Sports Authority of India, Lakshmibai National College of Physical Education, Trivandrum, Kerala, India.

\*\*Assistant Professor, Department of Physical Education, Meerut College, Meerut

### **ABSTRACT**

The aim of this study was to find out the relationship between body mass index and percentage of total body water of athletes. The research was conducted between September and October 2021. A total number of 100 male and female athletes were selected for this study. For the purpose of the study, Height, Weight, BMI, and percentage of Total Body Water were measured by seca digital height and Seca Bioelectrical impedance analysis (BIA). All the participants underwent measurements of Height, Weight, BMI, and percentage of Total Body Water. Results of Pearson product moment correlation analysis have shown that the percentage of total body water is moderately negatively correlated with the body mass index as  $p < .05$ . From the results of the study, we can conclude that there is significant correlation between BMI and percentage of Total Body Water of athletes.

Keywords--- Total Body Water, Sports, Analysis, Body Mass Index.

### **INTRODUCTION**

Water is essential for the proper functioning of the body. It is crucial to maintain a perfect balance of body water. The human body loses body water via its skin, through sweat, through urine, and through breathing (Body Water: What Is It and Why Is It Important? (Tanita, n.d.). The total water in the body comprises both intracellular and extracellular com-

ponents and it makes up 60 percent of its weight. Hydration is well known for its benefits and importance for health and performance. Total body water (TBW) is both intracellular (ICW) and extracellular (ECW) in nature (Matias et al., 2015). An increasingly popular method of estimating total body water involves bioelectrical impedance analysis (BIA). The method is

based on the assumption that the body is a cylindrical-shaped ionic conductor in which the extracellular and intracellular respectively (Kotler et al., 1996). In general, BIA is cheaper and easier to maintain than more laboratory-based methods for measuring body composition. The body mass index (BMI) is a measure of fat in the body based on height and weight which applies to both men and women. Overweight and obese women are more likely to have lower levels of total body water (TBW) per unit of weight (Wt) than normal-weight (Sartorio et al., 2005). Lean body mass or fat-free body weight can be predicted from total body water. Lean body mass and total body water are closely related (Hume & Weyers, 1971).

## METHODOLOGY

The main objective of the study was to find out the relationship between percentage of total body water and body

mass index of athletes. The study was conducted on 100 male and female athletes between the age group of 18-25 years from Sports Authority of India, Lakshmbai National College of Physical Education, Kerala, India. Necessary data were collected for total body water, Height and Weight. Height was measured to the nearest .001 m using an electronic scale (Seca Instruments Ltd., Hamburg, Germany). percentage of Total body water and BMI was measured with the help of Seca Bioelectrical Impedance Analysis (BIA). All subjects were given a chance to familiarize themselves with the proposed test. Relationship between percentage of total body water and BMI was calculated by Pearson product moment correlation with the help of SPSS software and to find out the relationship between percentage of total body water and body mass index of athletes the level of significance was set at 0.05 level.

## RESULTS

The Mean and Standard deviation of the data was summarized in table-1.

**Table 1:**  
**Correlation between percentage of Total Body Water and Body Mass Index of athletes.**

Variable	N	Mean	Standard deviation	r-value	p-value
Percentage of Total Body Water	100	59.76	4.85		

<b>Body Mass Index</b>	100	22.15	2.70	-0.38*	.000
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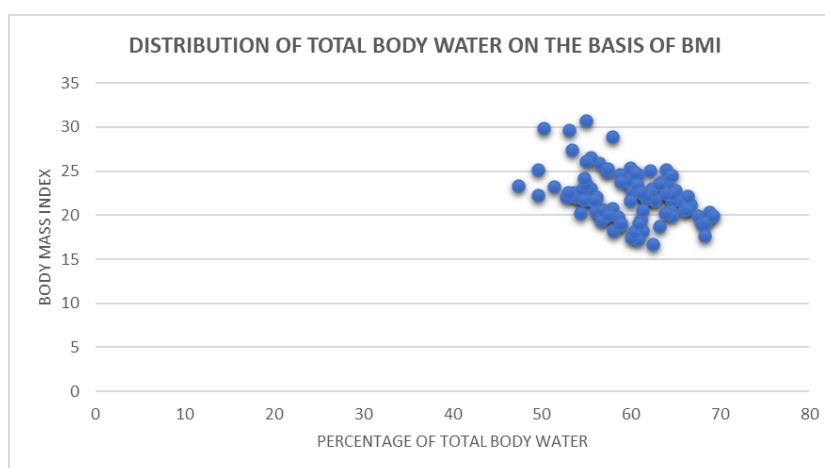
\*Significant at 0.05 level of confidence.

**Table 1** revealed that the mean value of percentage of Total Body Water and Body Mass Index is 59.76 and 22.15 and standard deviation is 4.85 and 2.70. It also shows the percentage of Total

Body Water and Body Mass Index were found to be significant correlation as  $r(198) = -0.138, P=.000$ .

**Figure 1.**

**The relationship between the percentage of Total Body Water and Body Mass Index of athletes. ( $r = -0.38, P = .000$ ).**



## DISCUSSION ON FINDINGS

The relationship between percentage of Total Body Water and Body Mass Index of athletes is illustrated in Fig 1. The distribution of percentage of total body water concentration was significant correlation with Body Mass Index. A Pearson product moment correlation analysis of percentage of total body water and Body Mass Index showed a significantly correlation of the two variables ( $r = -0.38, P = 0.000$ ). The Results are consistent with the studies of

(Matias et al., 2015). TBW and its compartments play an important role in fitness and athletic performance. It is more likely for men with a high BMI to have lower levels of percentage of total body water (TBW) and men with a low BMI to have high levels of percentage of water. There is a close relationship between lean body mass and percentage of total body water. The estimate of ECW may be affected total body by obesity (Sartorio et al., 2005).

## CONCLUSIONS

In conclusion, the percentage of total body water is distributed based on the BMI of a athletes as the distribution of total body water concentration was significantly correlated with Body Mass Index. A coach/teacher/expert's role is to promote the reduction of body fat and to maintain the percentage of total body water for optimum health.

## RECOMMENDATION

1. When identifying potential players, BMI and total body water should be considered
2. It is important to focus on a player's BMI and total body water when developing his training plan.
3. The present study may be conducted on female players.
4. The present study may be repeated selecting other variables Extracellular, Intracellular, Fat Mass and Fat Free Mass.

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## **Effect of Gross Motor Activities on School Children's Balance and Coordination Ability**

**\*Dr.M.Senthilkumar and \*\*Dr.G.Vigneshwaran**

\*Assistant Director of Physical Education, Agricultural College and Research Institute, Killikulam, Tuticorin District, Tamilnadu, India

\*\*Teaching Assistant (Physical Education), Agricultural College and Research Institute, Kudumiyamalai, Pudukkottai District, Tamilnadu, India.

### **ABSTRACT**

The present study aim was to find out the effect of gross motor activities on school children's balance and coordination ability. To attain the purpose of this study, 20 school boys were selected as subjects at randomly from Sara Matriculation School, Killikulam, Tuticorin, Tamilnadu State and the subject age were ranged from of 7 to 9 years and they were divided into two group and each group ten number of subjects. The selected participants were randomly divided into two groups such as group 'I' underwent gross motor activities (n=10) and group II act as control (n=10). Group 'I' underwent gross motor activities for three alternative days per week and one session per day for six weeks period. Group 'II' was not exposed to any specific training but they were participated in regular activities. The data on selected criterion variables such as balance and coordination ability; it was assessed by Stork Stand Balance Test and Alternative Hand wall-toss test respectively. The collected data were statistically analyzed by using dependent-'t' test and Analysis of Covariance (ANCOVA) was fixed at 0.05 level of confident. All the data were analyzed by used SPSS-22 version statistical package. It was concluded that the gross motor activities group were significantly improved on balance and coordination ability when compared than control group and also made significant differences among experimental and control groups.

Key Words: Gross Motor Activities, Balance Ability, Coordination Ability.

### **INTRODUCTION**

Physical stimulation is essential and motor skills that determine children's for progressive acquisition of the mental development. An active lifestyle during

childhood is beneficial for physical, cognitive, and mental health. Child psychomotor development seeks to provide children with the necessary skills to guarantee good school achievement. Reilly et al. [3] noted that improved 24 week physical activity with three 30 min lessons per week plus nutritional training for families to reduce children's BMI improved fundamental movement skills scores. Gross motor (physical) skills are those which require whole body movement and which involve the large (core stabilising) muscles of the body to perform everyday functions, such as standing, walking, running, and sitting upright. It also includes eye-hand coordination skills such as ball skills (throwing, catching, kicking). Gross motor skills are important to enable children to perform every day functions, such as walking, running, skipping, as well as playground skills (e.g. climbing) and sporting skills (e.g. catching, throwing and hitting a ball with a bat). These are crucial for everyday self-care skills like dressing (where you need to be able to stand on one leg to put your leg into a pant leg without falling over). Gross motor abilities also have an influence on other everyday functions. For example, a child's ability to maintain table top posture (upper body support) will affect their ability to participate in fine

motor skills (e.g. writing, drawing and cutting) and sitting upright to attend to class instruction, which then impacts on their academic learning. Gross motor skills impact on your endurance to cope with a full day of school (sitting upright at a desk, moving between classrooms, carrying your heavy school bag).

Balance is the ability to distribute your weight in a way that lets you stand or move without falling, or recover if you trip. Coordinative abilities are those abilities which stabilized and generalized pattern of motor control. These abilities help the sportsman to do a group of movements with better quality and effect. All the coordinative abilities are important for learning of sports techniques and for their continuous refinement and modifications during long term training process. The motor learning ability depends to a large extent on the level of coordinative abilities

## **METHODOLOGY**

The current study was conducted on the effect of gross motor activities on school children's balance and coordination ability. To attain the purpose of this study, purpose of this study, 20 school boys were selected as subjects at randomly from Sara Matriculation School, Killikulam, Tuticorin, Tamilnadu State. The selected subject's age were

ranged from of 7 to 9 years and they were divided into two groups and each group ten number of subjects. The selected participants were randomly divided into two groups such as group 'I' underwent gross motor activities (n=10) and group II act as control (n=10). Group 'I' underwent gross motor activities for three alternative days per week and one session per day for six weeks period. Group 'II' was not exposed to any specific training but they were participated in regular activities. The data on

### Results

**Table 1: Means and Dependent 'T'-Test for the Pre and Post Tests on Balance and coordination ability of Experimental and Control Groups**

Criterion variables	Mean	Experimental Group	Control Group
Balance Ability	Pre test	6.43	6.35
	Post test	7.86	6.36
	<b>'t'test</b>	<b>12.02*</b>	1.24
Coordination Ability	Pre test	5.47	5.24
	Post test	5.81	5.27
	<b>'t'test</b>	<b>10.14*</b>	0.82

\*Significant at 0.05 level of confidence (Table value required for significance at .05 level for 't'-test with df 9 is 2.26)

From the table I the dependent-'t'-test values of balance and coordination ability between the pre and posttests means of experimental group were greater than the table value 2.26 with df 9 at 0.05

selected criterion variables such as balance and coordination ability; it was assessed by Stork Stand Balance Test and Alternative Hand wall-toss test respectively.

### STATISTICAL TECHNIQUE

The collected data were statistically analyzed by using dependent-'t' test and Analysis of Covariance (ANCOVA) was fixed at 0.05 level of confident. All the data were analyzed by used SPSS-22 version statistical package.

level of confidence, it was concluded that the experimental group had significant improvement in the balance and coordination ability between while compared to control group.

Figure-1

Pre Test, Post Test and Adjusted Post Test Mean Values of Experimental Group and Control Group on Balance Ability.

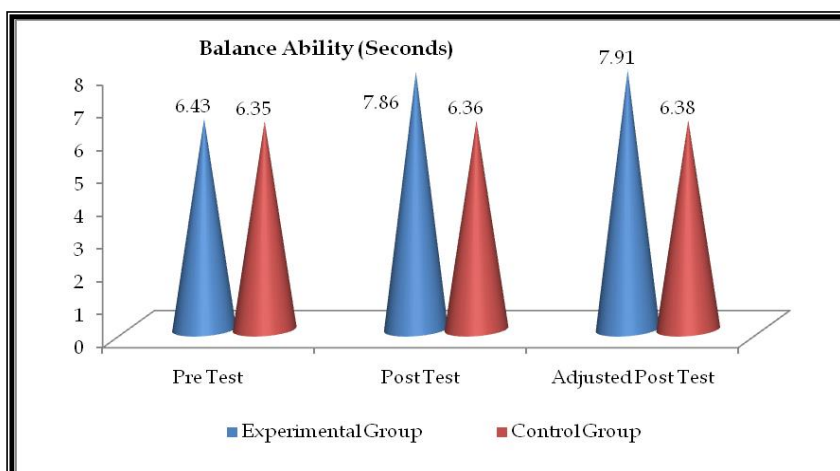


Table 2:

Computation of Mean and Analysis of Covariance on Balance and Coordination Ability of Experimental and Control Groups

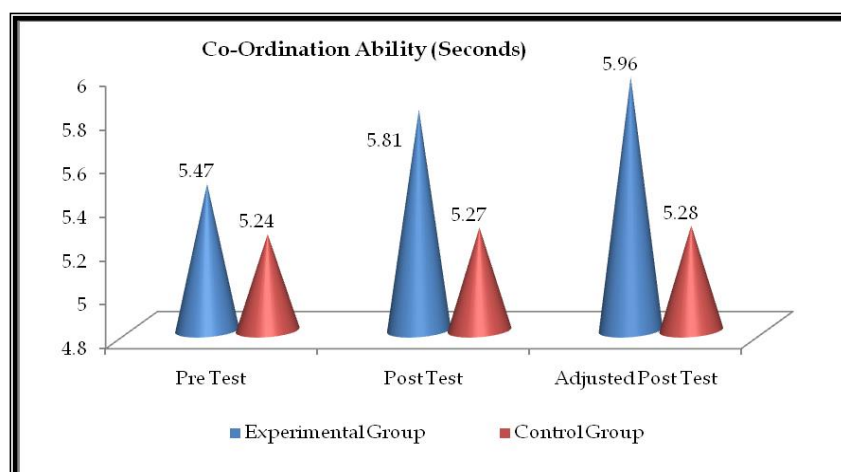
	Experimental Group	Control Group	Source of Variance	Sum of Squares	df	Mean Square	F
Balance Ability (Adjusted Post Mean)	7.91	6.38	BG	16.95	1	16.95	8.27*
			WG	34.85	17	2.05	
Coordination Ability (Adjusted Post Mean)	5.96	5.28	BG	6.16	1	6.16	12.08*
			WG	8.67	17	0.51	

\*Significant at 0.05 level. Table value for df 1, 17 was 4.45

**Table-2** The above table indicates the adjusted mean value on balance and coordination ability of experimental and control groups were 7.91 & 6.38 and 5.96 & 5.28 respectively. The obtained F-ratio of 8.27 and 12.08 for adjusted mean was greater than the table

value 4.45 for the degrees of freedom 1 and 17 required for significance at 0.05 level of confidence. The result of the study indicates that there was a significant difference among experimental and control groups on balance and coordination ability.

**FIGURE- II**  
**Pre Test, Post Test and Adjusted Post Test Mean Values of Experimental Group and Control Group on Coordination Ability.**



## DISCUSSION On FINDINGS

**Kosari, (2013)** conducted the effect of physical exercise on the development of gross motor skills in children with attention deficit/hyperactivity disorder. **Sorgente, (2021)** analysed the Crosstalk between gross and fine motor domains during late childhood that the influence of gross motor training on fine motor performances in primary school children. Rosenbaum, (2002) evaluated the prognosis for gross motor function in cerebral palsy students. **Sutapa & Suharjana, (2019)** conducted the study to improving gross motor skills by gross kinesthetic and contemporary-based physical activity in early childhood. **Saeed, (2013)** evaluated the effect of physical exercise on the development of gross motor skills

in children with attention deficit/hyperactivity disorder. From above these both supportive study intent to conduct this study the result of the my study indicates that there was a significant improvement on balance and coordination ability due to the effect of gross motor activities among school children when compared to control group.

## CONCLUSIONS

1. There was significant improvement on balance ability due to the effect of gross motor activities among school children.
2. There was significant improvement on coordination ability due to the effect of gross motor activities among school children

3. There was a significant difference between experimental and control groups balance and coordination
4. However the control group had not shown any significant improvement on any of the selected variables.

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## **Effects of Asanas and Pranayama on Flexibility and Vital Capacity among School Level Boys**

**Dr.S.Yoganandan**

Physical Education Teacher, Government Higher Secondary School, R.N. Puthur, Erode.

### **ABSTRACT**

This study evaluated the Effects of Asanas and Pranayama on Flexibility and Vital Capacity. The current research was conducted at the Government Higher Secondary School, R.N. Puthur, Erode, and Tamil Nadu. The age of the subjects was ranged between 13 to 16 years. The subjects active were randomly assigned to two equal groups. Group - I (n=20) underwent yogic training group and Group - II (n=20) control group. Tools and Technique i.e., flexibility and vital capacity were used and measured in this study to know the effects of asanas and pranayama on its. Measurements for the variables were taken at the pre-test and at the end of the treatment period, after eight weeks post-test the data were collected for all the variables from treatment group, for three days. During this period the subject were not allowed to participate in any training. The information was analysed using paired' test to compare the before and after yogic training programme values of treatment group. P value of less than 0.05 was accepted as indicating significant difference between the compared values. The results of this investigation indicate that eight weeks of asanas and pranayama practice can significantly improve flexibility and vital capacity in school level boys.

Keywords: Asanas, Pranayama, Flexibility, Vital Capacity and School level boys.

### **INTRODUCTION**

Yoga treatment can include a variety of approaches or a grouping of techniques. These can include the use of asanas, pranayama's, meditation techniques, stress reduction and entertainment techniques (Anithya bhava), and

mindfulness. Depending on the health condition or the basic cause of illness, yoga can be used with specific techniques or a arrangement of methods to repair balance in the body and mind. yoga helps people make conscious move-

ments or positional changes in their body, also known as proprioception or kinaesthesia, to find the areas of limitation and build energy and strength there. In turn, this will help balance the way the body moves and functions to relieve stress, pain and tension in areas that are stale.

## **FLEXIBILITY**

Flexibility is the ability to complete a wide range of progress in the joints while for repetition of work done in natural speed. Flexibility is most important. Flexibility helps to move bodily parts easily, takes less time, energy to perform a task. stretch in muscle reduces tension and provides greatest length, thus yielding passive physical' stretch.

## **VITAL CAPACITY**

The total volume of air that can be willingly moved in one breath, from full inspiration to maximum expiration or vice versa, is termed the forced vital capacity. This consists of the tidal volume plus the aspiratory and expiratory reserve volume. Although' values for vital capacity vary considerably with body size as well as 15 with the position of the body during the measurement. Average values are usually 4 - 5 liters in young women. Vital capacities of 6 - 7 litres are not rare for

tall individuals and values of 7.6, 8, 8.1 litres have been reported for a comparative football player and an Olympic gold medal list in cross country race and skipping respectively. Swimming and diving may be more conducive to the development of larger than normal vital capacities.

## **METHODOLOGY**

The current investigation was conducted at the Government Higher Secondary School, R.N. Puthur, Erode, Tamil Nadu. The age of the subjects was ranged between 13 to 16 years. The subjects active were randomly assigned to two equal groups. Group - I (n=20) underwent yogic training group and Group - II (n=20) control group. Tools and Technique i.e. flexibility and vital capacity were used and measured in this study to know the effects of asanas and pranayama on its. Measurements for the variables were taken at the pre-test and at the end of the treatment period, after eight weeks post-test the data were collected for all the variables from treatment group, for three days. During this period the subject were not allowed to participate in any training.

## SELECTION OF VARIABLES AND TESTS

The subjects were tested on the following variables.

**Table 1**

Name of the variables	Test	Units
Flexibility	Sit and Reach Test	Centimetres
Vital Capacity	Spiro Meter test	Litters

## RESULTS

**Table 2: RELATIONSHIP OF MEAN, SD AND 'T'-VALUES OF THE FLEXIBILITY BETWEEN PRE & POST TEST OF THE YOGIC TRAINING GROUP AND CONTROL GROUPS OF SCHOOL LEVEL BOYS**

\*Significant at 0.05 level of confidence.

	Groups	Test	Mean	S.D	't' Values
<b>Flexibility</b>	Control Group	Pre Test	17.50	1.31	1.68
		Post Test	17.90	1.49	
	Yogic Training Group	Pre Test	18.00	1.45	10.37*
		Post Test	21.80	0.89	

**Table 2** reveals that the mean values of pre test and post-test of control group for flexibility were 17.50 and 17.90 respectively; the obtained t ratio was 1.68 respectively. The tabulated t value is 1.73 at 0.05 level of confidence for the degree of freedom 19. The calculated t ratio was lesser than the table value. It is found to be insignificant change in flexibility of the school level boys. The obtained mean and standard deviation values of pre test and post test scores of

yogic training group were 18.00 and 21.80 respectively; the obtained t ratio was 10.37. The required table value is 1.73 at 0.05 level of confidence for the degree of freedom 19. The obtained t ratio was greater than the table value. It is found to be significant changes in flexibility of the school level boys. The mean values on yogic training group and control group are graphically represented in figure-1.

FIGURE-1:

**BAR DIAGRAM SHOWING THE PRE TEST & POST TEST ON FLEXIBILITY OF CONTROL AND YOGIC TRAINING GROUPS**

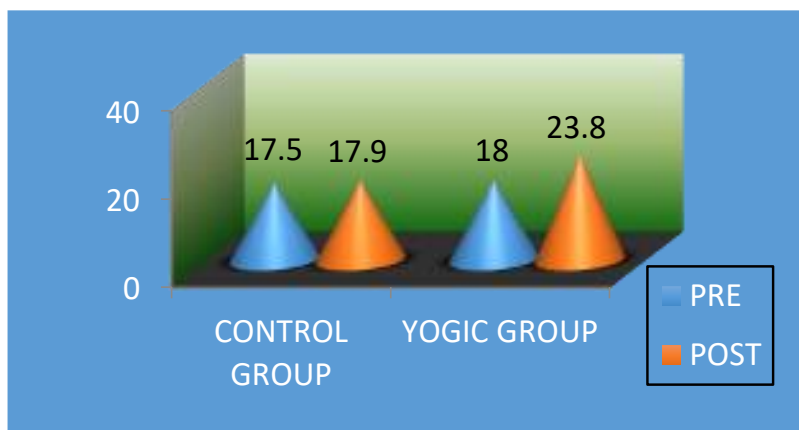


Table 3

**RELATIONSHIP OF MEAN, SD AND 'T'-VALUES OF THE VITAL CAPACITY BETWEEN PRE & POST TEST OF THE YOGIC TRAINING GROUP AND CONTROL GROUPS OF SCHOOL LEVEL BOYS**

	Groups	Test	Mean	S.D	't' Values
VITAL CAPACITY	Control Group	Pre Test	2.00	0.14	1.08
		Post Test	2.14	0.21	
	Yogic Training Group	Pre Test	2.15	0.19	9.41*
		Post Test	3.22	0.38	

\*Significant at 0.05 level of confidence.

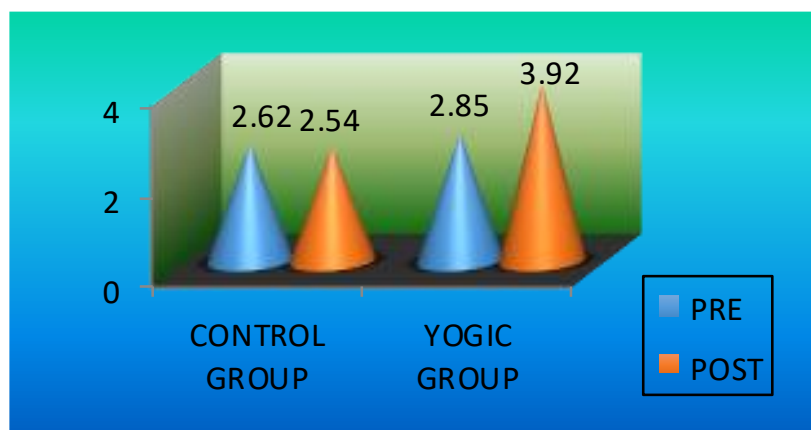
**Table 3** reveals that the mean values of pre test and post-test of control group for vital capacity were 2.00 and 2.14 respectively; the obtained t ratio was 1.08 respectively. The tabulated t value is 1.73 at 0.05 level of confidence for the degree of freedom 19. The calculated t ratio was lesser than the table value. It is found to be insignificant change in vital capacity of the school

level boys. The obtained mean and standard deviation values of pre-test and post test scores of yogic training group were 2.15 and 3.22 respectively; the obtained t ratio was 16.41. The required table value is 1.73 at 0.05 level of confidence for the degree of freedom 19. The obtained t ratio was greater than the table value. It is found to be significant changes in vital capacity of the school

level boys. The mean values on yogic training group and control group are graphically represented in figure-2.

**FIGURE-2:**

**BAR DIAGRAM SHOWING THE PRE TEST & POST TEST ON VITAL CAPACITY OF CONTROL AND YOGIC TRAINING GROUPS**



## DISCUSSION ON FINDINGS

The results of the study indicate that the experimental group namely yogic training group (asanas and pranayama) had shown significant improvement in flexibility and vital capacity among the school level boys. The control group school level boys had not shown significant changes in any of the flexibility and vital capacity. The analysis of the study indicates that the yogic training group (asanas and pranayama) had shown significant level difference in flexibility and vital capacity among school level boys.

It is conditional from the literature and from the result of the current study. That systematically considered training develops dependent variables are very

Importance quilts for superior performance in almost all sports and games. Hence it is concluded that systematically designed training may be programmes of all the discipline in order to achieve highest given due recognition and implemented properly in the training performance. These findings are in accordance with the findings of **Eswari et al (2021)**, **Senthil Kumaran (2018)**, **Bandi Hari Krishna (2014)**, **Jaya-chandran (2014)** and **Sree (2012)**.

## CONCLUSIONS

From the analysis of the data, the following conclusions were drawn.

1. The school level boys of control group had not shown significant

- changes in any of the flexibility and vital capacity.
2. The yogic training group (asanas and pranayama) shown significant enhancement in flexibility and vital capacity among school level boys.
  3. Their school level boys who had undergone eight weeks of yogic training (asanas and pranayama) showed significant enhancement in flexibility and vital capacity when compared with control group.

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## **Convincingness of Brisk Walking and Suryanamaskar Protocol on Body Mass Index of Corpulent Women**

**\*Dr. L. Karuppiah and \*\*Dr. N.S.Gnanavel,**

\*Hostel Superintendent cum Physical Training Officer, Government Industrial Training Institute, Viralimalai, Pudukkottai, Dt, Tamilnadu, India.

\*\*Assistant Professor, Mother Terasa College of Physical Education, Mettusalai, Illuppur, Pudukkottai, Tamilnadu, India.

### **ABSTRACT**

In this present study were examined for the convincingness of brisk walking and suryanamakar protocol on the body mass index of corpulent women. The researcher has to execute the investigation, There are forty five (n=45) corpulent women selected from in and around Viralimalai Union, Pudukkottai Dt, Tamilnadu, India, during the year 2021-2022. Their age ranged from 35 to 40 years. The subjects were randomly divided into three equal groups, Group-I brisk walking, Group-II Suryanamaskar protocol and Group-III Control each group consisting of 15 subjects. The two experimental groups were participated in two different training programmes such as brisk walking and suryanamaskar protocol for six weeks for five days a week in the morning hours between 6.30 am to 7.30 am and control group did not participate in any training except their normal daily routine works. The data were collected before and after the training programme. Analysis of covariance (ANCOVA) and Scheffe's Post- hoc test were applied to find out the significance of the mean difference among three groups. The result shows that the obtained 'f' ratio value of body mass index 6.31 was significantly higher than the table value of 3.23 ( $p \geq 0.05$ ). There was statistically significant decrease in body mass index by both groups. Finally, the result of the study also revealed that there was a significant reduction in body mass index for the Suryanamaskar protocol group was better than the brisk walking group. But both the groups have revealed beneficial effects when compared to control group.

Keywords: Body Mass Index, Brisk walking and Suryanamaskar.



## INTRODUCTION

The present scenario of women has been slowly changing in the recent years. We could see a slow and steady rise their status of women in every fields of importance. Today, Women are not just restricted to cooking and taking care of their households work, they have to step out their comfort zones to create their own images in the outside world as well. This is in short, could be termed as women empowerment. Society is now changed its stand and the way it looks at women, due to the progress achieved by women in all spheres of life.

The women is completely transformed in the current day, women have specially changed from being a mere homemaker to the modern day multitasking women, handling responsibility without fear. They were taken on the world with a confidence. Women of today handle their duties and household tasks at home, manage a career outside their home, nurture their children and balance their family living with their professions. A modern day woman is independent, takes right decisions with strongly, stands up for their rights and walks the path of success. In recent times, obesity is becomes a global phenomenon which has been increasing rapidly and also seen more in women. Presently, there were about 1.6 billion over weight and

400 million corpulent people in the universe. In the developing country like India, abdominal obesity is an emerging health problem. Indians are genetically susceptible to fat accumulation especially around the waist.

Now a day, there is no woman appreciates any negative comment about her appearance. At presently, be it common women or in the celebrity women, they all have been subject to this uncool culture of "body shaming". Hence, a woman is becoming more careful and conscious about their appearance and health aspects. We are all known, how women struggle and multi-task in order to keep their work life balance. However, with the fight against time, they end up; do not take into account their health. Consequently, leading to lifestyle related diseases like as obesity, hypertension, stress etc. Let's understand now why there are increased incidences of obesity in women. Walking and suryanamaskar activity doesn't need to be complicated. Something as simple as a daily brisk walk with suryanamaskar can help women live a healthier life. Almost all women face health issues in their life. However, the majority of the women are the habit of ignoring their health issues. The complications are faced by them in different age groups from adolescent age

to adulthood.

## METHODOLOGY

In the present study, there are recruited forty-five (N=45) corpulent women from in and around Viralmalai Union, Pudukkottai Dt, Tamilnadu, India, during the year 2021-2022 were selected as subjects randomly. The age of the subjects was ranged from 35 to 40 years. The subjects were informed regarding the purpose and nature of the study. The selected subjects were divided into three equal groups of fifteen subjects each namely experimental group (EG)-1, experimental group (EG)-2 and control group (CG). Experimental group-I consisted of the subjects who practiced brisk walking, experimental group-II consisted of the subjects who practiced suryanamaskar protocol and group-III was control group. Experimental group-I has been administrated the brisk walking for five days per week for six weeks. Experimental group-II undergoes suryanamaskar protocol for five days per week for six weeks. Group-

III acted as control which did not undergoes any special training programme other than the regular routine work.

## STATISTICAL TECHNIQUE

The analysis of covariance (ANCOVA) was used to analyze the significant difference if any in between the groups. Scheffe's test was used to find out the differences between the adjusted post-test paired mean of body mass index. The level of significance was tested at a 0.05 level of confidence.

## RESULTS

The analysis of covariance on body mass index of the initial test and final-test scores of brisk walking group, suryanamaskar protocol group and control group have been analysed and presented in the table-1 Standing height was measured with an individual in stocking feet, fully erect and stretched to full height while keeping the heels flat on the floor. The body mass index was determined as follows.  $BMI = \text{Body weight (kg)} / \text{Height (m)}^2$  (Gorsuch Scarisbrick, 1989).

**Table 1:**  
**Analysis of Covariance on Body Mass Index of Initial Test and Final-Test Scores of Brisk Walking Suryanamaskar Protocol and Control Groups**

Test	Suryanamaskar Group	Brisk Walking Group	Control Group	Source of Variance	Sum of Squares	df	Mean Square	'F'
Initial-Test								2.64
Mean	44.31	44.58	43.50	Between	15.64	2	7.82	

SD	9.32	9.43	7.58	Within	124.24	42	2.96	
<b>Final-Test</b>								<b>6.31*</b>
Mean	41.49	42.55	43.80	Between	20.19	2	10.10	
SD	8.42	7.54	7.82	Within	67.20	42	1.60	
<b>Adjusted Post -Test</b>								<b>7.45*</b>
Mean	42.10	43.28	44.19	Between	17.72	2	8.86	
				Within	48.70	41	1.19	

\*Significant at 0.05 level of confidence with 2 and 42 were 3.23 respectively.

**Table 1** examined that the Initial-test mean of brisk walking group, Suryanamaskar protocol group and control group were 44.31, 44.58 and 43.50 respectively. The obtained 'F' ratio of 2.64 for Initial-test score was less than the table value of 3.23 at 0.05 level of confidence on body mass index. The Final-Test mean of brisk walking group, suryanamaskar protocol group and control group are 41.49, 42.55 and 43.80 respectively. The obtained 'f' ratio of

6.31 for the Final-Test score was greater than the table value of 3.23 at 0.05 level of confidence on body mass index.

The adjusted Final - Test mean of brisk walking group, suryanamaskar protocol group and control group is 42.10, 43.28 and 44.19 respectively. The obtained 'f' ratio of 7.45 for the adjusted post-test score was greater than the table value of 3.23 at 0.05 level of confidence on body mass index..

**Table 2:**  
**Scheffe's Test for the Difference between the Adjusted Post-Test Paired Mean of Body Mass Index**

Suryanamaskar Protocol Group	Brisk walking Group	Control Group	Mean Difference	Confidence Interval
42.10	43.28	-	1.18*	0.89
42.10	-	44.19	2.09*	0.89
-	43.28	44.19	0.91*	0.89

\*Significant at 0.05 level of confidence.

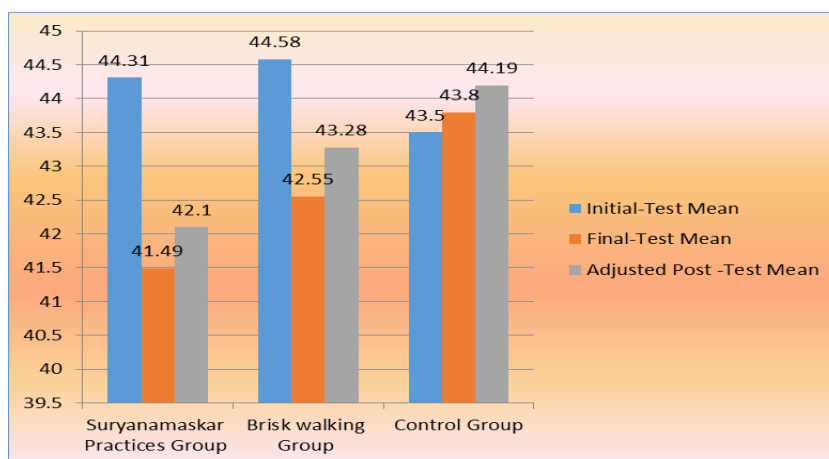
**Table 2** shows that the adjusted mean difference values between group and control group; brisk walking group and control groups are 1.18, 2.09 and 0.91 respectively on body mass index, which are greater than the confidence interval value 0.89 at 0.05 level

suryanamaskar protocol group and brisk walking group; suryanamaskar protocol of confidence. The results of the study showed that there was significant difference between the adjusted mean values of Suryanamaskar Protocol Group and control group brisk walking

Group and control groups. The present study clearly indicates the suryanamaskar protocol group is better than the other two groups. The pre-test, post-test and adjusted post-test mean

values of Suryanamaskar Protocol Group, Brisk walking Group and control group on body mass index agility are graphically resented in the figure -1

FIGURE -1



## DISCUSSION ON FINDINGS

The purpose of the study was to investigate the convincingness of brisk walking and Suryanamaskar protocol on body mass index among corpulent women. It was observed from the initial test results, that there were no significant differences between experimental groups and control while the final-test results of experimental groups and control had been analysed statistically and revealed that, there was a significant mean difference in favour of experimental groups. In the analysis of co-variance of the body mass index among experimental groups and control group a significant difference was perceive and which shows light on the

positive effect of six weeks of brisk walking and suryanamaskar protocol on body mass index. From the statistical analysis, it was clear indicates for the both training programmes had their significant effects arises. Surya-namaskar protocol group showed more effects in decreasing the body mass index when compared to brisk walking group and control group. The result of the study brisk walking and surya-namaskar protocol showed that there was a significant reduction in body mass index in corpulent women. The above findings were corroborated with the earlier studies conducted by the following researchers. The present study was also supported by the various

studies of Murugavalavan and Jayanthi (2019) found that there was a significant decrease in BMI after the surya-namaskar among obese working women. In a study the obese person has lost their body weight for four kilograms when compared with the control group. (Bhardwaand Bhardwaj, 2015) they are proved that the effects of surya namaskar, yoga nidra and pranayama was achieved a significant decrease in selected criterion variables such as anxiety and BMI among the children with alexithymia. Previous studies have been suggested that yoga may impact on health reducing in body mass and anxiety among varied clinical population (Shirley, Vaishali and Balkrishna, 2009). Some previous studies also have shown that systolic and diastolic blood pressure decreased after aerobic exercise (Sohn, 2007, Gordon, 1997; Ghai, 2007). A researcher found 5-month multi component behavioral intervention with yoga was associated with significant decreases in BMI it is also reported that there was a decrease in anxiety (Adam, 2014).

## CONCLUSIONS

Based on the reviews and results the following conclusions were drawn within limitations of the present study. The result of the study also proved that

there was a significant decrease in body mass index for women the Surya-namaskar protocol group was better than the brisk walking group. But both the groups have proved beneficial effects when compared to control group on body mass index of corpulent women.

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## **Effect of Proprioceptive Training with Strength Training on Agility in Table Tennis Players**

**\*Dr. J. Suresh, \*\*Dr. S. Rameshkumar, and \*\*\*M. Sri Shankar**

\*Director of Physical Education, KG college of Arts and Science, Affiliated to Bharathiar University Coimbatore, Tamilnadu, India .

\*\*Director of Physical Education, Sri Ramakrishna Mission Vidyalaya College of Arts and Science, Affiliated to Bharathiar University Coimbatore, Tamilnadu, India

\*\*\*Associate Professor, KG college of Physiotherapy, Affiliated to The Tamilnadu Dr. M.G.R Medical University, Chennai, Tamilnadu. India.

### **ABSTRACT**

Table tennis also known as Ping-Pong is a sport in which success depends on many interconnected factors with motor co-ordination abilities indicated as the most important. Being one of the fastest ball games is characterized by perceptual uncertainty and time pressure hence requires a short reaction time and change of direction. Proprioception is an important sensory and motor function for all mobility actions. Proprioceptive training is defined as a series of exercise or situations that will produce a reaction by the nervous system in response to an external stimulus. Strength training involves the performance of physical exercise which is designed to improve strength and endurance. Agility is the ability to move and change the direction and position of the body quickly and effectively while under control. A total of 20 players were included based on the selection criteria of the study with 10 players each group. Group A received proprioceptive training along with strength training, where group B received strength training alone for a period of six weeks. Total study duration six months. Agility T test Drill was used as outcome measure the data were analysed using student t test. The results of the analysis revealed that proprioceptive training along with strength training improved the agility in table tennis players.

Keywords:-Table Tennis Players, Proprioceptive training, Strength training and Agility.

### **INTRODUCTION**

Table tennis also known as Ping-Pong and whiff-whiff is a sport in which two or



four players hit a lightweight ball, back and forth across a table using small rackets. The game takes place on a hard table divided by a net. Play is fast and demands quick reactions. Spinning the ball alters its trajectory and limits an opponent's option, giving the hitter a great advantage. Table tennis is a sport in which success depends on many interconnected factors with motor co-ordination abilities indicated as the most important. Table tennis is a dynamic sport. Table tennis being one of the fastest ball games, is characterized by perceptual uncertainty and time pressure hence requires a short Reaction time and agility.

Proprioception is an important sensory and motor function for all mobility actions. Proprioception plays an important role in sports and contributes greatly to the performance of athletes. Proprioceptive training is defined as a series of exercise or situations that will produce a reaction by the nervous system in response to an external stimulus. Strength training or resistance training involves the performance of physical exercise which is designed to improve strength and endurance. It is often associated with the use of weights. It incorporates a variety of training techniques such as calisthenics, isometrics, and plyometric. When properly performed,

strength training can provide significant functional benefits and improvement in overall health and well-being. Agility is the ability to move and change the direction and position of the body quickly and effectively while under control. It requires quick reflexes, coordination, balance, speed, and correct response to the changing situation. When you are agile, it means you are moving to the best position to take the next action, such as catching a ball or making a tackle. Agility ensures that your body and sports equipment are in the right position to take the next action effectively.

## **METHODOLOGY**

The study was experimental study design with twenty table tennis players of KG institutions, saravanampatti, Coimbatore who were selected by Convenient sampling method with selection criteria of inclusions as of age 18-25 years, only male players, Healthy active players for at least one year and willing to participate. The total study duration was six months and individual training duration is six weeks. Agility as used as outcome measure with Agility T drills. The pre training and post training data were collected and documented.

## **STATISTICAL TECHNIQUE**

The collected data were analyzed with application of 't' test to find out the

individual effect from base line to post- test if any. 0.05 level of confidence was fixed to test the level of significance.

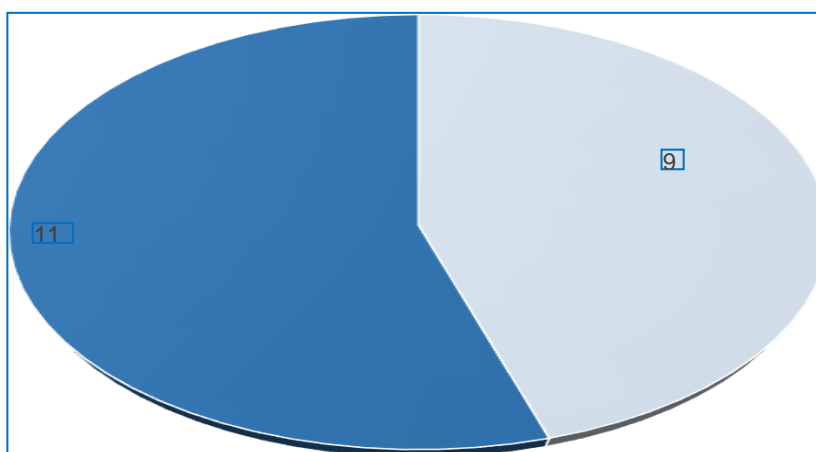
**RESULTS**

**Table 1:  
Age Group Classification of the Players**

Age	Distribution
18-21	09
22-25	11

**GRAPH 1:**

**AGE GROUP CLASSIFICATION OF THE PLAYERS**



**TABLE – II:**

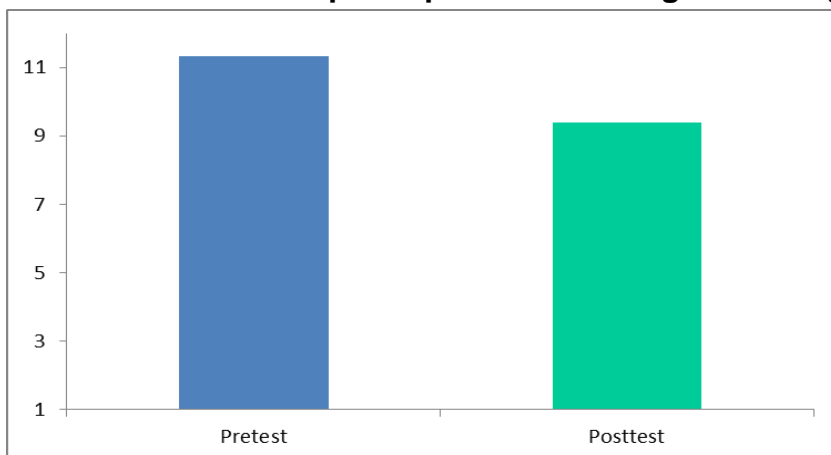
**Group- A Comparison of Pre & Post- Test Means of Agility T- Test by Proprioceptive Training and Strength Training**

GROUP A	MEAN	MEAN DIFFERENCE	CALCULATED 't' value	'P' value
Pre test	11.33	1.95	7.8000	0.0001
Post test	9.38			

Table II, shows that the test value of Group-A is 7.8000 which is greater than the tabulated 't' value 2.145 at 0.05% level of significance hence the results shows that there were marked difference between pre & post-test.

**GRAPH – II**

**Group A – Comparison Of Pre & Post-Test Means Of Agility T- Test Values Who Underwent Proprioceptive And Strength Training**



**Table – III**

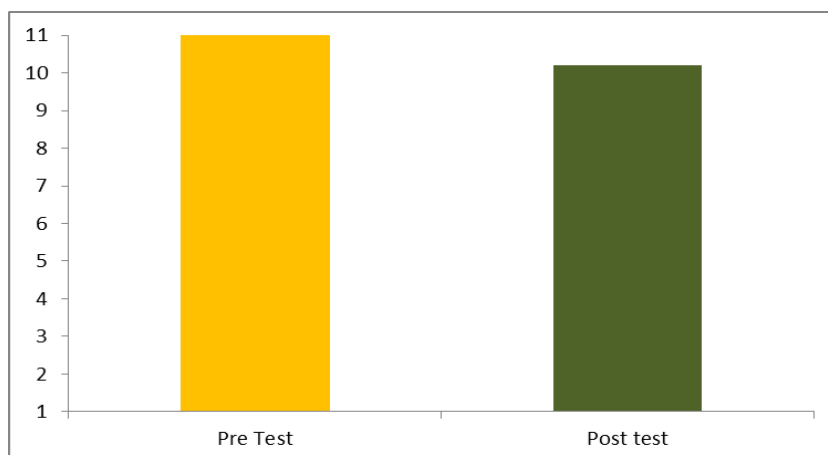
**Group B – Comparison of Pre & Post-test means of Agility T- Test by Strength Training.**

GROUP B	MEAN	MD	't' value	'p 'value
Pre-test	11.45	1.25	8.3333	0.0001
Post-test	10.20			

Table – III shows that the test value of level of significance hence the results Group-B is 8.3333 which is greater than shows that there were marked difference the tabulated 't' value 2.145 at 0.05% ence between pre & post-test.

**GRAPH – III**

**GROUP B – COMPARISON OF PRE & POST-TEST MEANS OF AGILITY T-TEST BY STRENGTH TRAINING.**

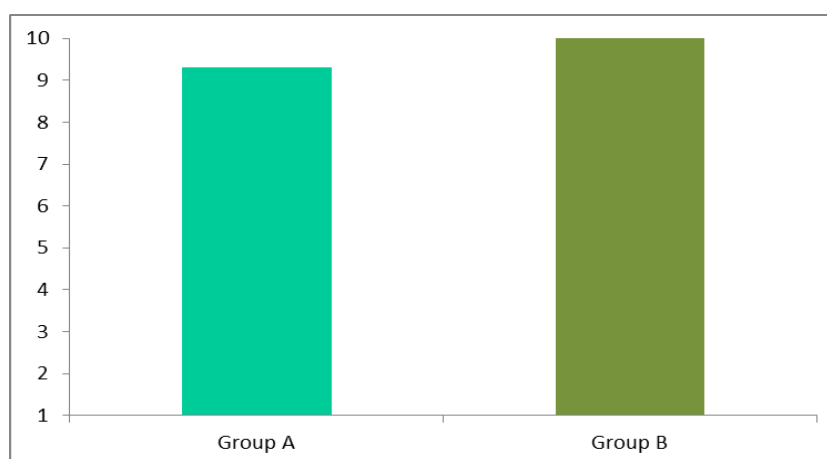


**TABLE – IV**  
**COMPARISON OF PRE & POST-TEST MEANS OF AGILITY T- TEST VALUES**  
**OF BOTH THE GROUPS (A & B).**

S.NO	Agility T-TEST	POST MEAN	STANDARD DEVIATION	UNPAIRED 't' value
1	GROUP -A	9.38	0.55	3.1405
2	GROUP-B	10.20	0.60	

Table – IV shows that the post-test values of Group A & B is 3.1405 which is greater than the tabulated 't' value 2.048 at 0.05% level of significance, hence the results shows that there were marked difference between post-test.

**GRAPH – IV**  
**COMPARISON OF POST-TEST MEANS OF AGILITY T- TEST**  
**VALUES OF BOTH THE GROUPS (A & B)**



## RESULTS

The study was conducted to find out the Effect of proprioceptive training and Strength training on agility for Table tennis players. When comparing the mean values of both the post test mean values Proprioceptive training (N=10 subjects) are as follows (Agility- 9.38). Strength training (N=10 subjects) are as

follows (Agility- 10.20). Which confirms that proprioceptive training with strength training groups shows a significant improvement in Agility than the Strength training group? Effect of Proprioceptive training and strength training group was elicited by comparing the pre and post-test values of Proprioceptive training groups using Paired 't' test, the calculated 't' value are 7.8000. Effect of Strength

training groups as elicited by comparing the pre and post -test values of Strength training groups using Paired 't' test, the calculated 't' value are 8.3333. When comparing the 't' values of both, the 't' value of Proprioceptive training group is

## DISCUSSION ON FINDINGS

The study was conducted to find out the Effect of proprioceptive training with strength training on agility for Table tennis players. In many fast movement sports, the success depends on the speed of the athlete in deciding the counter movements and the speed of the reaction. Table tennis being one of the fast ball games, is characterized by perceptual uncertainty and time pressure and hence requires a short reaction time for success. Proprioception is an important sensory, motor function for all mobility action. Another study stated that the improvement in reaction time may be associated with the development in the process skills of the sensory- motor performance and central neural system due to the training. The results of this study show a significant statistical difference between the pre- test and post-test RT of the experimental group after 6 weeks of upper extremity proprioception training. This is in accordance with many studies which proved that proprioception is an im-

greater than the 't' value of Strength training group. This confirms that the Proprioceptive training with strength training group shows a significant improvement in Agility for Table tennis players.

portant sensorimotor function for all mobility actions. Another study stated that the improvement in reaction time may be associated with the development in the process skills of the sensory-motor performance and central neural system due to the training .This study used upper extremity proprioception training as an intervention for 6 weeks to improve the RT in table tennis players. The results obtained are similar to a study which used an alternate hand wall toss training for 5 weeks to improve RT. A research done on biofeedback reaction time training supported the findings of this research by proving that a 5 weeks training program showed a positive improvement in RT. A study that observed no changes in RT after a 4 weeks' racket sport visual training program. The unsupportive result observed maybe caused by the shorter duration of the training. Hence, a minimum of 5 weeks of training seems to be required to observe a significant clinical improvement RT As of the previous literatures the proprioceptive training and

strength showed significant improvement in agility, on comparing both groups the proprioceptive training with strength training group showed a more significant improvement than of the strength training group.

## CONCLUSIONS

Thus study rejected the null hypothesis and the alternate hypothesis is accepted which therefore states that there is a significant improvement in Proprioceptive training with strength training for Agility comparing with Strength training alone in table tennis players.

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## **Impacts of Specific Shadow Training on Reaction Time and Agility among Volleyball Players**

**Dr. A. SenthilKumar**

Director of Physical Education, NIFT-Tea College of Knitwear Fashion, Tiruppur, Tamil Nadu.

### **ABSTRACT**

This study aimed to find out the influences on reaction time and agility response to specific shadow training among volleyball players. To achieve the purpose of the study thirty college level volleyball players were selected from The NIFT-Tea College of Knitwear Fashion at Tiruppur, Tamil Nadu. Their age ranged between 21-23 years. They were divided into two equal groups consists of fifteen each. No attempt was made to equate the groups. Group I acted as Experimental Group underwent Specific Shadow training (SST) for the period of eight weeks and Group II acted as control group (CG), the subjects in control group was not engage in any training programme other than their regular activity The agility was assessed by 4x10mts shuttle run test and Reaction Time was assessed by Penney Cup Test. The data collected from the subjects was statistically analysed with 't' ratio to find out significant improvement if any at 0.05 level of confidence. The result of the agility and reaction time improved significantly due to effects specific shadow training with the limitations of (diet, climate, life style ) status and previous training the results of the current study coincide findings of the investigation done by completely different specialists within the field of sports sciences. Specific Shadow training significantly improved agility and reaction time of college level volleyball players.

Keywords: Volleyball Players, Agility and Reaction Time.

### **INTRODUCTION**

Shadow training is a form of physical training specifically designed for volleyball players. It is used to improve the physical and mental performance of athletes by simulating game-like situations and providing feedback to the athlete on their performance. Shadow training focuses on developing the specific

skills necessary for volleyball, such as agility, coordination, and reaction time. It also works to improve the athlete's overall physical conditioning and mental focus. Shadow training is used to supplement a player's regular practice routine. It can be done in groups or individually, depending on the availability of the coach and the athlete's needs. During shadow training, the athlete will practice a specific skill or drill and then receive feedback from the coach on their performance. This feedback can be verbal or visual, depending on the type of drill being performed. Shadow training can be used to improve a variety of skills, including passing, setting, serving, blocking, and spiking. It can also help with the development of agility, coordination, and reaction time. By focusing on specific skills in a controlled environment, athletes can gain an edge over their competition. Shadow training is an effective way to improve a volleyball player's overall performance. It provides the opportunity for athletes to practice specific skills in a controlled environment and receive feedback from a coach on their performance. By focusing on specific skills and providing feedback, athletes can gain an edge over their competition and improve their overall physical and mental performance.

## **METHODOLOGY**

To address the hypothesis presented herein, we selected thirty college level volleyball players. Their age ranged between 21 and 23 years. The selected subjects were divided into two equal groups consisting of 15 each. No attempt was made to equate the groups. Experimental group I (n = 15) underwent specific shadow training for 8 weeks and group II (n = 15) acted as a control group (CG), the subjects in the control group were not engaged in any training programme other than their regular work. The evaluated parameters were agility (4x10m shuttle run) and reaction time (Penney Cup Test). The parameters were measured at baseline after 8 weeks of SST and the effects of the training were examined. In each training session the training was imparted for a period 45 minutes. The Shadow practices, which included warming up and relaxation procedure after training programme for three days per week for a period of 8 weeks.

## **STATISTICAL TECHNIQUE**

The collected data were analyzed with application of 't' test to find out the individual effect from base line to post-test if any. 0.05 level of confidence was fixed to test the level of significance.

## RESULTS

**Table 1:**  
**Relationship of Mean, SD and 't' Values of the Reaction Time between Pre & Post Test of the Specific Shadow Training and Control Groups of Volleyball Players**

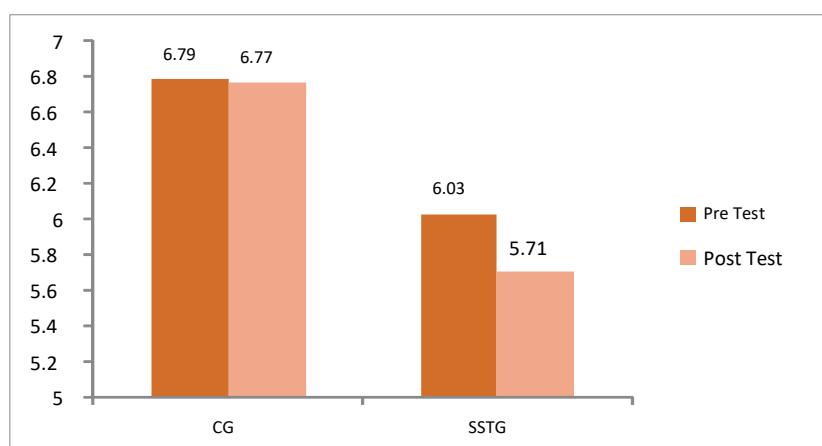
	Groups	Test	Mean	S.D	't' Values
Reaction Time	Control Group	Pre Test	6.79	1.17	0.52
		Post Test	6.77	1.20	
	Specific Shadow Training Group	Pre Test	6.03	0.75	7.30*
		Post Test	5.71	0.75	

\*Significant at 0.05 level of confidence (2.145), 1 & 14.

**Table-I** reveals that the mean values of per test and post-test of control group for reaction time were 6.79 and 6.77 respectively; the obtained t ratio was 0.52 respectively. The tabulated t value is 2.14 at 0.05 level of confidence for the degree of freedom 14. The calculated t ratio was lesser than the table value. It is found to be insignificant change in reaction time of the volleyball players. The obtained mean and standard deviation values of pre-test and post

test scores of specific shadow training group were 6.03 and 5.71 respectively; the obtained t ratio was 7.30. The required table value is 2.14 at 0.05 level of confidence for the degree of freedom 14. The obtained t ratio was greater than the table value. It is found to be significant changes in reaction time of the volleyball players. The mean values on specific shadow training group and control group are graphically represented in figure-1.

**Figure-1**



**Table 2:**  
**Relationship of Mean, SD and 't'-Values of the Agility between Pre & Post Test of the specific shadow training and Control group of volleyball players**

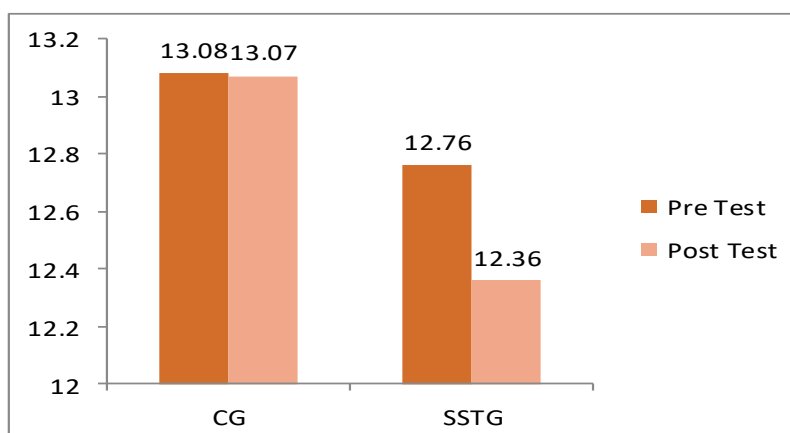
	Groups	Test	Mean	S.D	't' Values
Agility	Control Group	Pre Test	13.08	1.14	0.91
		Post Test	13.07	1.08	
	Specific Shadow Training Group	Pre Test	12.76	0.71	10.31*
		Post Test	12.36	0.67	

\*Significant at 0.05 level of confidence (2.145), 1 & 14.

**Table-2** reveals that the mean values of pre test and post-test of control group for agility were 13.08 and 13.07 respectively; the obtained t ratio was 0.91 respectively. The tabulated t value is 2.14 at 0.05 level of confidence for the degree of freedom 14. The calculated t ratio was lesser than the table value. It is found to be insignificant change in agility of the volleyball players. The obtained mean and standard deviation values of pre-test and post test scores of shadow

training group were 12.76 and 12.36 respectively; the obtained t ratio was 10.31. The required table value is 2.14 at 0.05 level of confidence for the degree of freedom 14. The obtained t ratio was greater than the table value. It is found to be significant changes in agility of the volleyball players. The mean values on specific shadow training group and control group are graphically represented in figure-2.

**Figure-2**



## DISCUSSION ON FINDINGS

The shadow training is an incredible training which has been found to be beneficial of the volleyball players. To study the shadow training on reaction time and agility of college level men volleyball players, it was tested under to difference between specific shadow training group and control group. The shadow training includes on reaction time and agility. The shadow training is namely front run, backward run, side to side, cross run. It also improves the reaction time, agility and other than some physical fitness components are namely speed, speed endurance. The obtained result proved positively the specific shadow training group significantly improved. The result of the present study showed that the shadow training has significant improvement on reaction time and agility of college Level men volleyball players. The results of the study are in line with the studies of **Babar et al., (2021)**, **Isha et al (2020)** & **Mehmet Fatih Yuksel, latif Aydos, (2017)** the result of the study showed that the control group was not significantly improved on reaction time and agility of college level men volleyball players.

## CONCLUSIONS

Based on the findings and within the limitation of the study it is noticed that practice of specific shadow training helped to improve reaction time and agility of volleyball players at college level. It was also seen that there is progressive improvement in the selected criterion variables of specific shadow training group of volleyball players after eight weeks of specific shadow training programme. Further, it also helps to improve reaction and agility.

1. It was concluded that individualized impacts of specific shadow training group showed a statistically significant positive sign over the course of the treatment period on reaction time and agility of volleyball players at college level men.
2. It was concluded that individualized impacts of control group showed a statistically insignificant positive sign over the course of the period on reaction time and agility of volleyball players at college level.
3. The results of comparative effects lead to conclude that specific shadow training group had better significant improvement on reaction time and agility of volleyball players at college level men as compared to their performance with control group.

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## Impact of Footwork Training on Selected Physical Fitness Variables among Basketball Players

**Dr. S. Rajesh Karthi**

Director of Physical Education, Sri Subramaniya Swamy Government Arts College, Tiruttani

### ABSTRACT

The purpose of the study was to find out footwork training on selected physical variables among basketball players. To achieve the purpose of the study 30 men basketball players were selected from Chennai, Tamil Nadu. The selected subject age ranged between 17 to 23 years. Further they were classified at random in two equal groups of 15 (n=15) subjects each. Group - I (Experimental Group) underwent footwork training for thrice a week for six weeks of training programme, in the morning from 6.00 am and the Group – II - acted as a control group (CG) they did not participate in any kind of training programme part from the daily activities. The selected criterion variables such as speed, and agility were measured 50meter dash and illinois test were used. The subjects of two groups were tested on selected variables prior and immediately after the training period. The collected data were analysed statistically through analyze of covariance (ANCOVA) to find the significance difference. The 0.05 level of confidence was fixed to test the level of significance difference, the result of the study showed that systematic practice of 6 weeks of footwork training significance differences on selected

Keywords: Footwork Training, Speed and Agility

### INTRODUCTION

The Basic training procedures will serve better when utilized with modification suited to individuals or a group dealt with. The training programme should

look into improving the performance of the athletes and at the same time should prevent injury from taking place (Birch. K. 2005).

Speed is the capacity to travel or move very quickly. Like all biomotor abilities speed can be broken down into different types. It may mean the whole body moving at maximal running speed, as in the sprinter. It may involve optimal speed, such as the controlled speed in the approach run of the jumping events. Or, it may include the speed of a limb, such as the throwing arm in the shot or discus, or the take-off leg in the jumps. Speed training involves development of a skill so that the technique is performed at a faster rate. To develop speed the skill must be practiced on a regular basis at a maximum or close to maximum rate of movement. Maximal running speed, for example, is developed by runs over short distances at maximum effort. The skill of moving at speed should, like all skills, be practiced before the athlete becomes fatigued. For this reason recovery times between repetitions and sets should be long enough to recover from any fatigue **(Davis, B. 2000)**.

Nearly all sports are feats of hand-eye coordination, endurance, strength, technique, or a combination of various physical skills. Whether its hockey, soccer, rugby, boxing, kho kho, basketball, volleyball or even golf that you are playing, all of these games re-

quire a certain degree of footwork to ace your moves. There are plentiful examples of athletes overcoming their opponents due to a greater grasp on their footwork. The legendary Muhammad Ali dominated his opponents with impeccable footwork executed with masterful finesse but footwork is a necessary component of pretty much all sports. Proper footwork grants you with speed, agility, and quickness that can take your game to the next level **(Josh Lewis, 2018)**. Footwork is a activity of moving from place to place **(Merriam Webster dictionary, 2020)**

The importance of footwork is obvious. The footwork develops foot speed, control, landing coordination, balance, and forward and backward movement, all of which make a better player on the court. The sport of basketball requires many changes in direction, quick movements and explosive jumping. To ensure the players can perform these skills properly and handle the stresses that come with the sport, footwork training will be an important training component to include in the training regimen. The foot work training can be incorporated into any basketball training program for players across all levels to help maximize performance and decrease the risk of injury. Proper footwork is the

foundation of the game of basketball players.

## METHODOLOGY

To achieve the purpose of the study 30 men basketball players were selected from Chennai, Tamil Nadu. The selected subject age ranged between 17 to 23 years. Further they were classified at random in two equal groups of 15 (n=15) subjects each. Group - I (Experimental Group) underwent footwork training for thrice a week for six weeks of training programme, in the morning from 6.00 am and the Group – II

- acted as a control group (CG) they did not participate in any kind of training programme part from the daily activities. The selected criterion variables such as speed, and agility were measured 50meter dash and Illinois test were used. The subjects of two groups were tested on selected variables prior and immediately after the training period.

## STATISTICAL TECHNIQUE

The collected data were analysed statistically through analyze of covariance (ANCOVA) to find the significance difference.

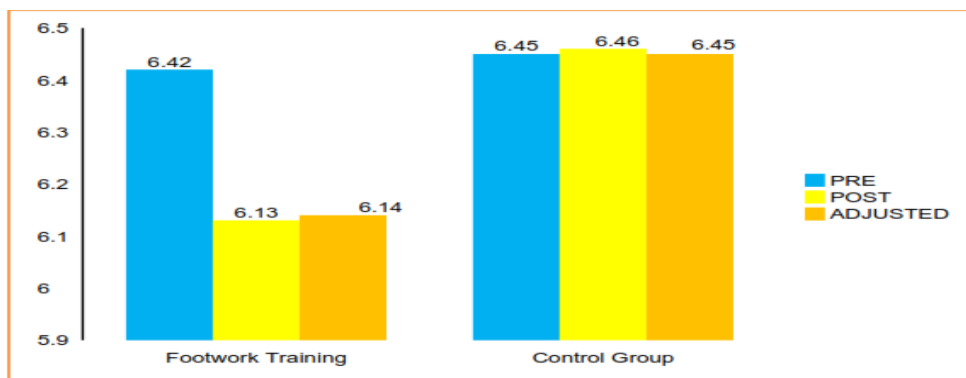
## RESULTS

**Table 1:**  
**ANALYSIS OF COVARIANCE FOR PRE AND POST DATA ON SPEED**

Test	Footwork Group	Control Group	Source of variance	Sum of Squares	df	Mean square	F
Pre-test mean	6.42	6.45	Between	.007	1	.007	0.19
			Within	1.05	28	.037	
Post-test mean	6.13	6.46	Between	0.83	1	0.83	<b>14.07*</b>
			Within	1.66	28	0.59	
Adjusted mean	6.14	6.45	Between	0.71	1	0.71	<b>19.59*</b>
			Within	0.97	27	0.36	

\*Significant at 0.05 level of confidence. (The table value required for significance at 0.05 level of confidence with df 1 and 28 and 1 and 27 were 4.19 and 4.21 respectively).

**Figure-1**  
**PRE, POST AND ADJUSTED POST TEST DIFFERENCES OF THE FOOTWORK TRAINING GROUP AND CONTROL GROUP ON SPEED**

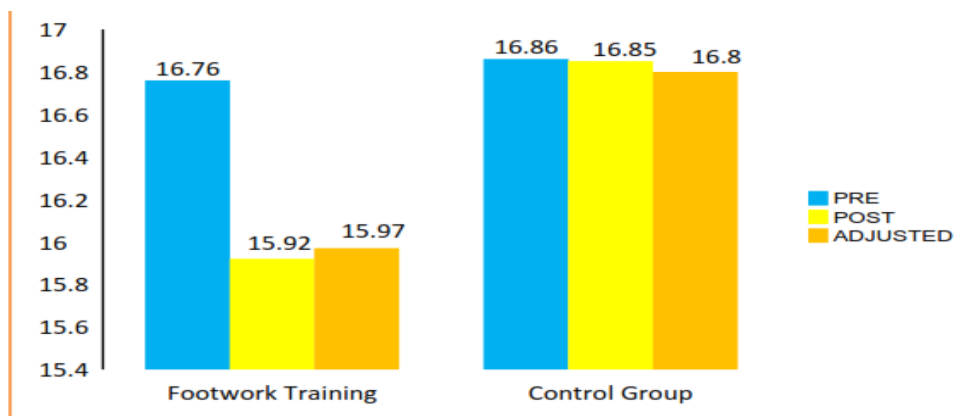


**Table 2:**  
**ANALYSIS OF COVARIANCE FOR PRE AND POST DATA ON AGILITY**

Test	Footwork Training Group	Control Group	Source of variance	Sum of Squares	df	Mean square	F
Pre-test mean	16.76	16.86	Between	0.06	1	0.065	0.39
			Within	4.60	28	0.165	
Post-test mean	15.92	16.85	Between	6.53	1	6.53	21.36*
			Within	8.56	28	0.30	
Adjusted mean	15.97	16.80	Between	5.07	1	5.07	49.70*
			Within	2.75	27	0.10	

\* Significant at 0.05 level of confidence. (The table value required for significance at 0.05 level of confidence with df 1 and 28 and 1 and 27 were 4.19 and 4.21 respectively).

**Figure- II**  
**PRE, POST AND ADJUSTED POST TEST DIFFERENCES OF THE FOOTWORK TRAINING GROUP AND CONTROL GROUP ON AGILITY**



## **DISCUSSION ON FINDINGS OF SPEED**

The obtained F value on pre test scores 0.19 was lesser than the required F value of 4.41 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomization at the initial stage was equal. The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 14.07 was greater than the required F value at 4.41. This proved that the differences between the post test mean at the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 19.59 was greater than the required F value at 4.45. This proved that there was Significant differences among the means due to six weeks of footwork training on speed.

## **DISCUSSION ON FINDINGS OF SPEED**

The obtained F value on pre test scores 0.19 was lesser than the required F value of 0.31 to be significant at 0.05 level. This proved that there was no significant difference between the groups at initial stage and the randomi-

zation at the initial stage was equal. The post test scores analysis proved that there was significant difference between the groups as the obtained F value at 21.36 was greater than the required F value at 4.41. This proved that the differences between the post test mean at the subjects were significant. Taking into consideration the pre and post test scores among the groups, adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value at 49.70 was greater than the required F value at 4.45. This proved that there was Significant differences among the means due to six weeks of footwork training on agility.

The above findings in line with the Yu (2022) revealed that twelve weeks of body weight support-Tai Chi training may enhance dynamic balance and walking function in stroke survivors with hemiplegia. Zushi, (2006) suggested that plyometrics by using the drop jump and medicine ball throw, are effective training methods for improving jump, footwork and chest pass ability in competitive basketball players. Kumar, (2014) basketball specific foot work training for twelve weeks is more effective in increasing the shooting ability and defensive movement of male basketball players.

Ali (2021) Training program foot work has the greater impact physical abilities speed, dribble speed, Reaction, agility, Coordination and Balance through the application of the program for a period of eight weeks. Yuksel (2019) proved that badminton footwork training has positive effects on strength and agility performance parameters in children aged 8-10 years. Donie (2019) supported footwork as one aspect of the techniques in badminton game if manipulated in such a way by using the principles of interval training, especially HIIT (High-Intensity Interval Training) can increase VO<sub>2</sub>max in badminton athletes. Chen, (2016) determined that the footwork training method can enhance students' interest in badminton sport; also will improve students' heart and lung function. Marheni (2018) proved that there is an influence of agility exercises through circuit training on footwork ability of badminton athletes. Astrawan, (2020) footwork with 10 repetitions 2 sets was proven to be more effective in improving the students' agility than the footwork with 5 repetitions 4 sets. Taddei, (2020) analyzed and proved that intrinsic muscle strengthening affects running mechanics and suggests that it may improve running performance. Fraser, & Hertel, (2019) re-

vealed the 4-week Intrinsic foot muscle exercise intervention resulted in improved motor performance and decreased perceived difficulty. Xu & Chen, (2010) determined that the coordinated balanced development of speed strengthening and endurable quality is the future development trend of tennis training footwork.

## CONCLUSIONS

1. The physical fitness variable speed was significantly increased due to six weeks of footwork training among men basketball players while comparing to the control group.
2. The physical fitness variable endurance was significantly increased due to six weeks of footwork training among men basketball players while comparing to the control group

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## **Circuit Training With Yogic Practice: An Experimental Study**

**Dr. S. Kanaka Vishnumoorthi**

Director of Physical Education, Velalar College of Engineering and Technology,  
Thindal, Erode, Tamil Nadu.

### **ABSTRACT**

This study was planned to examine the impacts of circuit training with yogic practice on selected physical fitness variables among athletes. Thirty men athletes were randomly selected from Velalar College of Engineering and Technology, Thindal, Erode, Tamil Nadu. The subjects' age ranged from 21 to 25 years. They were divided into two equal groups. Group 1 is considered as the experimental group (circuit training with yogic practice) and group 2 was considered as the control group. Pre-test was conducted on Speed, Agility and leg explosive power for both the groups and the readings were carefully recorded in their respective units as pre-test scores. After the pretest, the experimental group was treated with specific circuit training and yogic practice, for a duration of 45 minutes, three days per week for a period of twelve weeks. The control group was not treated with any special training. After twelve weeks of training, a post-test was conducted and the readings were carefully recorded in their respective units as post-test scores. The pre and post-test were taken for analysis. The collected data on physical fitness variables due to twelve weeks of circuit training with yogic practice was analysed by dependent 't' test with 0.05 level of confidence. From the results of the study, it was found that there was a significant improvement in physical fitness variables among athletes.

Keywords: Yogic Practice, Circuit training, Physical Fitness Variables, Athletes.

### **INTRODUCTION**

Circuit training is an efficient and challenging form of conditioning. It works well for developing strength, endurance (both aerobic and anaerobic), flexibility and coordination. Its versatility has made it popular with the general public right

through to elite athletes. For sports men and women, it can be used during the closed season and early pre-season to help develop a solid base of fitness and prepare the body for more stressful subsequent training. Circuit training is an ef-

fective organizational form of doing physical exercises for improving all physical fitness components. Before and after training, the initial and final tests were conducted for the variables such as speed agility, power, co-ordination, static balance and dynamic balance for the experimental and control groups. Circuit training is an exercise program that develops overall fitness. Circuit training is an effective and quick way to fit your workout into your busy day. Circuit training provides a high intensity cardio workout, along with resistance training. This is designed to target fat loss and lean muscle building. A Circuit is designed with a series of exercises performed in succession of each other. When one Circuit is complete you start these quinces over again with little to no break. To start you want to perform each exercise for 10reps and 3 times through each Circuit. Remember to perform reps quickly and keep breaks assort as possible. The purpose of Circuit training is to keep moving, which pushes your body aerobically, while still challenging your strength.

## **METHODOLOGY**

The selected thirty subjects were randomly divided into two equal groups consist of 15 each such an experimental group and control group. Pre-test was

conducted on Speed, Agility and leg explosive power for the two groups and the reading were carefully recorded in their respective unit as pre-test score. After pretest, experimental group was treated with specific circuit training, for duration of 45 minutes, three days per week for a period of twelve weeks. The control group was not treated with any special training. After twelve weeks of training post test was conducted and the reading were carefully recorded in their respective units as post test score. The pre and post-test were taken for analysis.

The training program is design for 60 minutes per session in a day, three days in weeks for a period of twelve weeks duration these 60 minutes included 10 minutes warm up and 10 minutes warm down remaining 40 minutes allotted for circuit training program. Every two weeks 10% intensity is increase from 50% to 60% of work load. The training load is increased from the maximum working capacity of the subjects. The collected data on physical fitness variables due to twelve weeks circuit training analyzed by using means and standard deviation. In order to find out the significant changes if any dependent 'T' test will be applied 0.05 level of confidences fixed to level of significant.

## RESULTS

**Table 1:**  
Computation of 't' ratio between pre and post-test means  
of Experimental group on physical fitness variables

Experimental Group					
Physical Fitness Variables	Pre/Post test	Mean	Std. Deviation	Std Error Mean	't' Ratio
Speed	Pre-Test	7.73	0.57	0.02	13.88*
	Post-Test	7.38	0.63		
Agility	Pre-Test	11.14	0.61	0.03	5.17*
	Post-Test	10.95	0.60		
Leg Explosive power	Pre-Test	2.23	0.11	0.35	22.06*
	Post-Test	2.58	0.12		

\*Significant at 0.05 level of confidence (2.145), 1 & 14.

**Table 1** reveals that the Computation of 't' ratio between pre and post-test means of experimental group on Physical fitness variables. The 't' ratio on Speed, Agility and Leg Explosive power are 13.88, 5.17 and 22.06

respectively. The required table value was 2.14 for the degrees of freedom 14 at 0.05 level of significance. Since the obtained 't' ratio values were greater than the table value, it was found statistically significant.

**Table 2:**  
Computation of 't' ratio between pre and post-test means of  
Control group on Physical Fitness variables

Control Group					
Physical Fitness Variables	Pre/Post test	Mean	Std. Deviation	Std Error Mean	't' Ratio
Speed	Pre-Test	7.63	0.58	0.55	1.12
	Post-Test	7.73	0.57		
Agility	Pre-Test	10.95	0.60	0.03	1.17
	Post-Test	11.14	0.61		
Leg Explosive	Pre-Test	2.26	0.12	0.89	1.04

power	Post-Test	2.23	0.11		
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\*Significant at 0.05 level of confidence (2.145), 1 & 14.

**Table 2** reveals that the Computation of 't' ratio between pre and post-test means of control group on Physical fitness variables. The 't' ratio on Speed, Agility and Leg Explosive power are 1.12, 1.17 and 1.04 respectively. The

required table value was 2.14 for the degrees of freedom 14 at 0.05 level of significance. Since the obtained 't' ratio values were lower than the table value, it was found statistically insignificant.



## DISCUSSION ON FINDINGS

The effects of circuit training with yogic practice are a fantastic training which has been found to be beneficial for the athletes. To study the circuit training on physical fitness variable of college level men athletes, it was tested under, to differentiate between circuit training with yogic practice group and control group. The circuit training includes on pull ups, medicine ball throw, burpee, speed squats, skipping, depth jump, abdominal crunch. It also improves the dribbling ability, game tactics, anaerobic capacity, quickness and eye hand coordination and

other than some physical fitness components are namely speed, agility, and power. The following studies were revealed that **Dr. Jatinder Kumar (2017)** Impact of circuit training on selected physiological variables of hand ball players. The result of the study supports the result of the present study. **Dr. Praveen Kumar (20218)** Impact of circuit training on selected physical fitness among college level athletes. The result of the study supports the result of the present study. These finding had not been previously replicated for a sample of college students. The result of

the study showed that the control group was not significantly improved.

## CONCLUSIONS

Based on the findings and within the limitation of the study it is noticed that practice of circuit training with yogic practice helped to improve physical fitness variable among athletes. It was also seen that there is progressive improvement in the selected criterion variables of circuit training group of college level men athletes after twelve weeks. Further, it also helps to improve speed, agility and leg explosive power. It was concluded that individualized circuit training with yogic practice group showed a statistically significant over the course of the treatment period on physical fitness variables of among men athletes.

It was concluded that individualized effect of control group showed a statistically insignificant over the course of the period on selected physical fitness variables of men athletes.

The results of comparative effects lead to conclude that the circuit training with yogic group had better significant improvement on selected physical fitness variables (speed, agility and leg explosive power) of athletes as compared to their performance with control group.

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## Effect of Core Strength Training on Selected Physical Fitness Variables of Male Badminton Players

**Dr.J.Nirendan**

Director of Physical Education, Vivekananda College, Tiruvedakam West, Madurai.

### ABSTRACT

The study was designed to investigate the effect of core strength training on selected physical fitness variables of male badminton players. To investigate the study, thirty male badminton players were randomly selected from SNS badminton academy Coimbatore and their age were ranged between 18 and 25 years. The subjects were randomly assigned to two equal groups (n=15). All the subjects were divided in to two groups with 15 subjects each as experimental and control group. Group-I underwent core strength training for a period of twelve weeks and group-II acted as control who did not participate in any special training other than the regular routine. The physical fitness variables such as muscular strength and muscular endurance were selected as dependent variables. Pre and post-test random group design was used for this study. The dependent t-test was applied to determine the difference between the means of two groups. To find out whether there was any significant difference between the experimental and control groups. To test the level of significant of difference between the means 0.05 level of confidence was fixed. The result of the study shows that, there was a significant changes takes place on muscular strength and muscular endurance of male badminton players due to the effect of twelve weeks of core strength training. And also concluded that, there was a significant difference exists between experimental and control groups in muscular strength and muscular endurance.

Keywords: Core strength training, physical fitness variables and badminton players.

### INTRODUCTION

The muscles of the core region act as a link between the upper and lower body. The stronger and more ale

they are, the greater the synergy of movement can be. Core strength is essential for top badminton players. Core strength training mainly includes



balance exercises that are performed regularly can improve core stability. Stabilize the spine is the primary function of the core muscles. The ultimate aim of core strength training is not to develop muscle hypertrophy but to promote functional capability of physical activity. This training leads to improve synchronization of participating muscles. The aim of the present study was to investigate effect of core strength training (CST) on core endurance, dynamic balance and agility in adolescent badminton players. There were significant increases in ( $p < 0.05$ ) directions of SEBT and core endurance tests ( $p < 0.05$ ). However, no significant change was observed for agility ( $p > 0.05$ ). The CST resulted in significant gains in directions of the SEBT and core endurances in adolescent badminton players, but not in agility Tarik (2015). To study the effect of core strengthening and to study the effect of conditioning program on 25 players, aged between 12-19 years were given core strengthening and conditioning protocol for 4 weeks. Players were assessed at 0, 2nd and 4th week through 60 degree curl up test and modified Sorensen test players showed improvement in their core strength after 4 weeks of core training Intern (2020). To find out the effect of core strength and agility in badminton players. The result showed the effect of

core strength and agility. The result showed that there is a perfect negative correlation between core strength and agility in relation to time as the  $r$  values of ventral core strength test, left and right lateral core strength test and dorsal core strength test with agility. This study suggests that there is a correlation seen between the core strength and agility in badminton players Heli (2020).

## **METHODOLOGY**

The purpose of the study was to find out the effect of core strength training on selected physical fitness variables of male badminton players. To achieve the purpose of the study, thirty male badminton players were from SNS academy, Coimbatore. The subjects were randomly assigned in to two equal groups namely, core strength training group ( $n=15$ ) and Control group ( $n=15$ ). A pilot study was conducted to assess the initial capacity of the subjects in order to fix the load. The respective training was given to the experimental group the 3 days per weeks (alternate days) for the training period of twelve weeks. The control group was not given any sort of training except their routine.

## **DESIGN**

To evaluate physical fitness variable muscular strength in plank test measured in seconds. The parameters

were measured at baseline and after twelve weeks of core strength training were examined. To evaluate physical fitness variable muscular endurance in burpee test measured in counts. The parameters were measured at baseline and after twelve weeks of strength training were examined.

## TRAINING PROTOCOL

The training programme was conducted for 45 minutes for session in a day, 3 days in a week for a period of twelve

weeks duration. These 45 minutes included 10 minutes warm up, Plyometric training for 25 minutes and 10 minutes warm down. Every three weeks of training 5% of intensity of load was increased from 65% to 80% of work load. The volume of strength prescribed based on the number of sets and repetitions. The equivalent in strength training is the length of the time each action in total 3 day per weeks (Monday, Wednesday and Friday).

## RESULTS

**Table 1: Computation of 'T' Ratio on experimental group and Control group selected physical variables of male badminton players**

Group	Variables		Mean	N	Std. Deviation	Std. Error Mean	t-ratio
Experimental Group	Muscular Strength	Pre	59.12	15	3.66	0.28	9.15*
		Post	62.0	15	3.18		
	Muscular endurance	Pre	15.80	15	1.26	0.14	8.29*
		Post	17.0	15	1.33		
Control Group	Muscular Strength	Pre	58.12	15	3.18	0.15	2.07
		Post	58.43	15	3.34		
	Muscular endurance	Pre	15.73	15	1.33	0.10	1.87
		Post	15.93	15	1.16		

\*Significant level 0.05 level degree of freedom (2.14, 1 and 14)

Table I reveals the computation of mean, standard deviation and 't' ratio on selected physical fitness variables namely muscular strength and muscular endurance of experimental group. The obtained 't' ratio on namely muscular strength and muscular endurance were 9.15 and 8.29 respectively. The required table value was 2.14 for the degrees of freedom 1 and 14 at the 0.05 level of significance. Since the

obtained 't' values were greater than the table value it was found to be statistically significant. Further the 't' ratio on selected physical fitness variables namely muscular strength and muscular endurance of control group. The obtained 't' ratio on muscular strength and muscular endurance were 2.07 and 1.87 respectively. The required table value was 2.14 for the degrees of freedom 1 and 14 at the 0.05 level of

significance. since the obtained 't' values were found to be statistically significant. were lesser than the table value it was

Figure-1

The bar diagram shows the mean values of pre-test and post test on muscular strength of experimental group and control group.

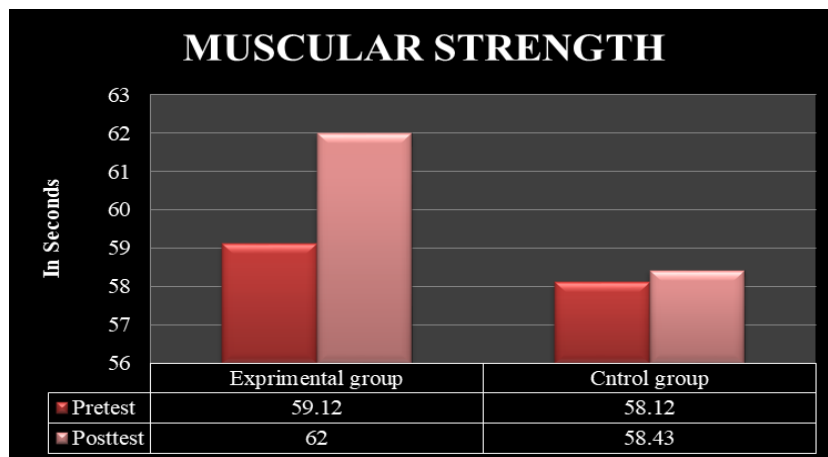
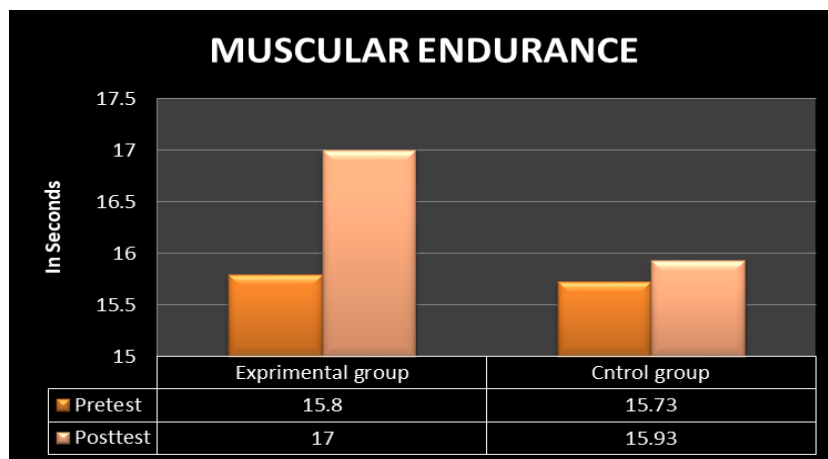


Figure-2

The bar diagram shows the mean values of pre-test and post on muscular endurance of experimental group and control group.



### DISCUSSION ON FINDINGS

The present study was experimented the effect of core strength training on physical fitness variables of male badminton players. The result of this study indicated that the core

strength training improved the muscular strength and muscular endurance. The findings of the present study had similarity with the findings of investigations referred in this study. **Seied (2012)** evaluate the effect of Strength and Core Stabilization Training on Physical

Fitness Factors among Elderly People. **Sekendiz (2012)** examined Swiss- ball core strength training on strength, endurance, shoulder strength, and balance in sedentary women. **Subramanian (2014)** reported that core strength training induced adaptations on selected physical and physiological parameters of cricket players. The result of the present study indicates that the core strength training programme is effective method to improve muscular strength and shoulder strength of male badminton players.

## CONCLUSIONS

The findings of this study have resulted in the conclusion that's also presented below.

1. Male badminton players' muscular strength and endurance were significantly improved after twelve weeks of core strength training.
2. For badminton players' physical fitness variables, such as muscular strength and muscular endurance on core strength training is the best type of physical activity to execute as a training program.

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