

## Effect of Muscular Endurance Training on Asana Holding Capacity in 10 To 12 Year Girls

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### Abstract

Yogasana coaches directly begin the skill training part and do not give any fitness training. Can fitness training help to increase performance in Yogasanas? The researcher conducted this study with the objective to examine the effects of the Muscular Endurance training program on the asana holding capacity. Pre-test post-test true experimental design was used for this study. 28 students of age 10 to 12 years girls were selected as sample using the convenient sample technique. The sample was given 6 weeks muscular endurance training program. The tools used for data collection were four asana holding test, squats, sit-ups and push-ups tests. The procedure included the pre test, followed by the 6 weeks training program and then the post test. The researcher at the end of the study found that the muscular endurance training was effective in all four asana holding tests. The researcher concluded that six weeks of Muscular Endurance Training was significantly effective for Asana Holding Capacity of 10 to 12 years girls. Thus during yoga training, fitness training should be conducted before the skill training part.

**KEYWORDS:** - asana holding capacity, muscular endurance training.

### Introduction

In the existing literature, it has been reported that in all fields of a human being's attempt, organized objectives and scientific practices were followed in accordance with the principles based on knowledge, understanding and application of knowledge of science. The field of games and sports was also no exemption to this. Nations like U.S.A., Germany, Russia, Australia, Britain and others have made progress in games and sports like track and field, soccer, hockey, basketball and so on. This progress and the international attainments have been possible due to the research trailing and application of scientific knowledge.(William, 1980). Sport is accepted as an educational phenomenon. There are constant efforts taken to achieve higher standards of performance. As a consequence, sport demands optimum physical fitness and highest degree of performance. Many people take part in sports activities for the fun of it or for health and fitness reasons. Sports have become a profession to some with high skills, giving financial benefits linked with high degree of reputation. (Sergio, 1976)

It is accepted almost across the world that routine physical exercise facilitates one to be physically fit to carry out the usual daily activities. But anybody who wishes to take part effectively in sports and games and aspires to be a campaigner or to attain the top level must go beyond the undemanding rule of routine exercises. He must be abundant in intense and recurrent physical qualities, most necessary for accomplishment in his meticulous sports venture.(Ghosh, 1980)

Yoga is found very effective with reference to high level performance in sports. (www.lifepositive.com, 2009) Yogic practices have shown tremendous effect and are

used as training means for an athlete. Basically Asanas and Pranayama techniques are proved to be more effective of the other limbs of Yoga. Most Asanas mean holding the body in a particular position to bring stability to the body and poise to the mind. Yoga is one of the most ancient cultural heritages of India. (www.lifepositive.com, 2009) It was invented by Hindu yogis over 2500 years ago. The word yoga means 'unity' or 'oneness' and is derived from the Sanskrit word 'yuj' which means 'to join'. Yoga literally means union. (www.lifepositive.com, 2009) The whole system of yoga was developed to attain the highest state of *Chitta* (i.e. mind) or consciousness where everything is merged into absolute consciousness. Patanjali, the father of classical Yoga, has explained the eight angas (eight limbs) of Yoga to advance oneself on the spiritual path, while Hath yoga explored the bodily postures of Asanas as well as Pranayam, to prepare oneself for the highest Yogic practices like Dharana, Dhyana and Samadhi.

### **Statement of the problem**

In Yogasana event, coaches are directly imparting skill training to the athletes. This is true for early age athletes like those 10 to 12 years old. Nowadays, coaches give training only in competitive asanas. Very few coaches go for basic fitness training in all other competitive sports like Gymnastics, Basket Ball, Athletics, Kho - Kho etc. In these games, coaches try to develop the physical fitness like Health Related Physical Fitness (HRPF) & Skill Related Physical Fitness (SRPH).

The researcher thought that Fitness Training should apply in yoga coaching also. So the researcher chooses the problem, "**Effect of muscular endurance training on asana holding capacity in 10 to 12 year Girls.**"

### **Objectives :-**

1. To find current status of asana holding capacity of under 10 to 12 years age girls.
2. To compare effects of Muscular Endurance training program on asana holding capacity of under 10 to 12 years age girls.

### **Hypotheses :-**

**H<sub>0</sub>** – There will be no significant effect of muscular endurance training on asana holding capacity of the 10 to 12 years girls.

### **Assumptions :-**

- 1 Researcher assumed that school authority will give permission to conduct the program.
- 2 Researcher assumed that Parents and students will cooperate to conduct the program.
- 3 It is assumed that students have not received the muscular endurance training before.

### **Delimitations :-**

1. Geographical Area- Subjects are from Pimpri Chinchwad area
2. Class – Subjects studying in the V standard
3. Age – Chronological age is Ten to Twelve years.
4. Gender – Female.

### **Limitations :-**

1. There would be no control on heredity aspects with respect to the psychological makeup of the individual.
2. There would be no control on the subject's practising in the other competitive games.
3. There would be no control on the psychological environment of the family of the subject.
4. There would be no control on the socio-economic status of the subject.

**Definitions of the terms: -**

- 1 **Yogasana:** - Yoga is a physical, mental and spiritual practice or discipline which originated in India. The researcher chooses following four asana namely Vrikshasana, Tolasana, Chakrasana and Uttanpadasana.
- 2 **Muscular Endurance Training:** - It is the ability of a muscle or group of muscles to repeatedly exert force against resistance.
- 3 **Asana holding capacity:-** Capacity of muscles to hold a particular Asana for a specific time will be termed Asana holding capacity.

**Reviews related to Yogasana**

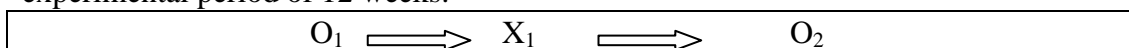
The study about ‘effects of Yoga training on cardio-respiratory functions of school children of Pondicherry’ (Madanmohan & Gopalkrushnapal, 2002) was done with objective to study the effects of six months training in yogic breathing and postures on cardio-respiratory functions of school children of Pondicherry and to study the effects of six months training in Suryanamaskar on cardio respiratory functions of school children of Pondicherry. 84 students from 8<sup>th</sup> standard were the sample and they were randomly divided into four groups. One group was doing Yoga and Pranayama, second was doing fast Suryanamaskar, third was doing slow Suryanamaskar and the last group was control group. Different parameters were tested for cardiovascular function; anthropometric measurements, heart rate, strength and blood pressure before and after six months study period. Yoga as well as Suryanamaskar training produced significant improvement in strength, endurance and pulmonary function. This study showed that yoga training of six months improves endurance, pulmonary function and cardiovascular system to survive stressful stimuli.

The purpose of the study was to find out the effects of Asanas and Pranayama on selected physical and physiological component. (Lohan, 2002) The study has been conducted on 120 boy students between age group 12 to 16 years. Four groups consisting of 30 students each were formed. This study examines which type of yogic group had the maximum effect on the physical and the physiological fitness of subjects. Results showed that every type yogic exercise improves the physical and physiological fitness but training of Asanas and Pranayama collectively can produce the best results.

**Ganguly and Gharote** conducted a research with a view to assess the effects of selected Yogic practices on the variables of endurance and flexibility which are the important factors of physical fitness.(Ganguly & Gharote, 1989) The study involved 70 subjects who were the trainees of the regional police training centre, Khandala. The subjects were equally assigned to two groups; experimental group and control group. The results revealed that sitting pulse rate of the subjects of experimental group was low as compared to that of the control group. Moreover, the cardiovascular endurance as judged by Harvard Step Test improved significantly in the subjects of the experimental group. Similarly, the improvement in flexibility among the subjects of experimental group was statistically significant.

**Design of the study**

The present study was experimental in nature. (Thomas, Nelson, & Silverman, 2005) Pre-test post-test true experimental design was used to identify the effect of the muscular endurance training on the asana holding capacity of the subjects. The researcher has chosen a signal group design for conducting experiment in the present study. Pre-test and post-test programs were organized before and after an experimental period of 12 weeks.



**Figure 1 Design of the study**

Where, X is treatment and  $O_1, O_2$ , are observations

As the nature of the study was experimental, the study was to implement 2 x 1 design to identify the effect of muscular endurance training program on Girls only.

### **Population and Sample**

28 students were pooled as sample from the population of 100 by using the convenient sample technique. Experimental group was given specific selected practice training program of 6 weeks to observe the performance of yoga girls asana holding capacity of age ranging between 10 to 12 years.

### **Variables of the study**

**Independent Variables:-** In this study, Muscular endurance training was the independent variable.

**Dependent Variables:-** In the present study, dependent variable was the asana holding capacity.

Intervening Variables for this study are yoga girls' feelings and psychological status.

In this study, the extraneous variables are diet of students, parental guidance and the fitness level of the yoga girls.

### **Tools used for the study**

1. **Name of the test:** Asana holding capacity.

**Purpose of the test:** - To measure Asana holding capacity

**Equipment:** - A stop watch, whistle, score cards or recording sheets and pencil.

**Scoring:** - The total time elapsed between the start and the moment the student finished the asana was known as Asana Holding capacity. Time is reported to the nearest second.

2. **Name of the test:** - Squats

**Purpose of the test:** - To measure Leg strength.

**Scoring:** - Total number of squats completed in one minute.

3. **Name of the test:** - Push ups

**Purpose of the test:** - To measure Hand strength.

**Scoring:** - Total number of Push ups completed in one minute.

4. **Name of the test:** - Sit ups

**Purpose of the test:** - To measure Core strength.

**Scoring:** - Total number of Sit ups completed in one minute

### **Procedure of the study**

The Yoga Girl students (N=28) were conveniently selected by the researcher for the present study. Their name, birth date and age was collected and confirmed from the school register. After discussing with the experts, the duration and repetitions of muscular endurance training and asana holding capacity, the training program was planned.

**Pre test:-** Prior to the actual test, the subjects were demonstrated how to perform the Asana holding test and then they were asked to act according to the instructions. The purpose of the study was to see the effect of Muscular Endurance training on Asana holding capacity. All the subjects of control and experimental group underwent health related fitness tests of muscular endurance to record the pre test data. On the day of the pre-test, the Asana holding capacity and fitness test performance of all subjects was tested. The researcher gave all information about the test. Demonstration of the test item was shown once. Warm up trial was given to the subjects. All the subjects gave this test and the score was recorded.

**Training Program:-** After the pre test, all the subjects of experimental group underwent a practice of Yogasana, followed by warm-up, specific training to improve muscular endurance and cooling down exercises. The training was imparted to the

group for 40 minutes two days in the week. Finally, when the treatment or training period of 6 weeks was over, the posttest on all the selected variables were assessed for all the subjects of the group. The students underwent training in Muscular Endurance for six weeks duration from January to February, 2016.

**Daily Routine**

The new muscular endurance training, Asana holding postures training program was conducted step by step. One or two of new postures were introduced per day depending upon the complexity of the posture. Generally the steps in teaching were as follows

- Introduction and Demonstration of the new posture
- Practice of the previous posture
- Trials by the students and Corrections

In the first week of intervention, frequency was low, as the demonstration of each variable was given followed by its actual practice. In second week, practice of each training variable was carried out and corrections were made. From third week onwards till last week, practice and repetition of each variable was carried out with the number of repetitions increased. Each class of training was for 40 to 50 minutes and all subjects underwent swimming training regularly. Every subject was trained for five days a week for six weeks continuously.

**Post-test**

After the completion of six weeks practice training program, the post-test was conducted on all the subjects as per the pre-test. The data was collected and recorded carefully.

Statistical tools used were mean, standard deviation and Pearson coefficient of correlation and t test.

**Analysis and Interpretation of Data**

**1. Descriptive Analysis of Pre and Post Test of the students**

Table 1 showed the descriptive analysis of the squats, push ups and sit ups

**Table 1 Mean and standard deviation of Squats, Push ups and Sit ups**

Fitness Test	Squats		Push ups		Sit ups	
	Pre	Post	Pre	Post	Pre	Post
<b>Mean</b>	30.79	44.57	25.21	36.32	14.79	28.50
<b>SD</b>	7.17	11.40	6.84	9.59	5.01	8.78
<b>N</b>	28	28	28	28	28	28

Table 1 shows mean and standard deviation of Squats, push ups and sit ups. Pre test mean was 30.79 repetitions of squats having 7.17 standard deviation. Average Squats increased from pre test to post test. The post test mean was 44.57 repetitions of squats and standard deviation was 11.40. This increase was very significant

Pre test mean of push ups was 25.21 repetitions having 6.84 standard deviation. Average Push ups was increased to 36.32 repetitions and standard deviation was 9.59. This increase was very significant.

Pre test mean of sit ups was 14.79 repetitions of having 5.01 standard deviation. Average Sit ups were increased to 28.50 repetitions and standard deviation of 8.78. This increase was very significant.

**Table 2 Mean and standard deviation of Asana Holding Time**

Asanas	Vrikshasana		Tolasana		Chakrasana		Uttanpadasana	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
<b>Mean of</b>	22.57	39.57	5.75	18.79	29.14	43.39	20.11	40.54



<b>time in seconds</b>								
<b>SD</b>	19.90	18.25	5.45	8.27	24.85	18.12	11.90	14.80
<b>N</b>	28	28	28	28	28	28	28	28

Table 2 shows mean and standard deviation of different Asanas. Pre test mean of Vrikshasana was 22.57 seconds having 19.90 of standard deviation. Average Asana Holding time increased from pre test to post test. The post test mean was 39.57 sec and standard deviation of 18.25. This increase was very significant.

Pre test mean of Tolasana was 5.75 seconds having 5.45 of standard deviation. Average Asana Holding time was increased from pre test to post test, which was 18.79 sec and standard deviation of 8.27. This increase was very significant.

Pre test mean of Chakrasana was 29.14 seconds having 24.85 of standard deviation. Average Asana Holding time was increased from pre test to post test, which was 43.39 sec and standard deviation of 18.12. This increase was very significant.

Pre test mean of Uttanpadasana was 20.11 seconds having 11.90 of standard deviation. Average Asana Holding time was increased from pre test to post test, which was 40.54 sec and standard deviation of 14.80. This increase was very significant.

### Testing of Hypothesis

**Table 3 Students “t” test and Pearson’s “r” of Squats, Push ups and Sit ups**

<b>Fitness Test</b>	<b>Squats</b>	<b>Push ups</b>	<b>Sit ups</b>
<b>t value (two tailed paired sample ‘t’ test)</b>	6.83*	5.82*	9.63*
<b>r</b>	0.41	0.28	0.52

\* at Significance level 0.05, (df 27)

Table 3 described the “t” test and Pearson’s correlation coefficient “r” between pre and Post Test of the three Physical Fitness test data. Pre and Post test were calculated using two tailed Paired Sample Student’s “t” test. The level of significance was set to 0.05.

Table 3 stated that Squats test data of ‘t’ value between Pre and Post test were calculated and it was 6.83. Table value of ‘t’ for df = 27 at 0.05 level of significance was 2.052. As 6.83 > 2.052 that is calculated ‘t’ value were more than table ‘t’ value. The researcher concluded that null Hypothesis H<sub>0</sub> should be rejected.

**H<sub>0</sub>, there will no significant effect of Muscular Endurance Training of Leg (Squat test) on Asana Holding capacity was rejected** and Researcher concluded that Muscular Endurance Training of Leg (Squat test) had significant effect on Asana Holding capacity.

Also r value between pre and post Squats test was 0.41, which denoted that there exist positive but low level of correlation ship.

Table 3 stated that statistical data for Push ups test. ‘t’ value between Pre and Post Push ups test were calculated and it was 5.82. Table value of ‘t’ for df = 27 at 0.05 level of significance was 2.052. As 5.82 > 2.052 that is calculated ‘t’ value were more than table ‘t’ value, researcher concluded that null Hypothesis H<sub>0</sub> should be rejected.

**H<sub>0</sub>, there will no significant effect of Muscular Endurance Training of Hand (Push ups test) on Asana Holding capacity was rejected** and Researcher concluded that Muscular Endurance Training of Hand (Push ups test) had significant effect on Asana Holding capacity.

Also r value between pre and post push ups test was 0.28, which denoted that there exists positive but very low level of correlation.

Sit ups test data of 't' value between Pre and Post test were calculated and it was 9.63. Table value of 't' for df = 27 at 0.05 level of significance was 2.052. As 9.63 > 2.052 that is calculated 't' value were more than table 't' value. The researcher concluded that null Hypothesis H<sub>0</sub> should be rejected.

**H<sub>0</sub>, there will no significant effect of Muscular Endurance Training of core (Sit ups test) on Asana Holding capacity was rejected** and the researcher concluded that Muscular Endurance Training of core(Sit ups test) had significant effect on Asana Holding capacity.

Also r value between pre and post Sit ups test was 0.52, which denoted that there exists positive but low level of correlation.

Thus, from the table 3, the researcher summarises that the scores of all three Physical Fitness tests had significant difference due to Muscular Training Program.

**Table 4 Students "t" test and Pearson's "r" of four Asanas**

Asana	Vrikshasana	Tolasana	Chakrasana	Uttanpadasana
t value (two tailed paired sample 't' test)	5.74 *	10.10 *	4.54 *	9.13 *
r	0.67	0.57	0.74	0.63

\* at Significance level 0.05 (df 27)

Table 4 described the "t" test and Pearson's correlation coefficient "r" between pre and post test of the data of four Asana holding capacity. Pre and Post test scores were calculated using two tailed Paired Sample "t" test. The level of significance was set at 0.05.

Vrikshasana test data of 't' value between Pre and Post test were calculated 5.74. Table value of 't' for df=27 at 0.05 level of significance was 2.052. As 5.74 > 2.052 that is calculated 't' value was more than table 't' value. The researcher concluded that null Hypothesis H<sub>0</sub> should be rejected.

**H<sub>0</sub>, there will be no significant effect of Muscular Endurance Training of Leg (Vrikshasana) on Asana Holding capacity was rejected** and the researcher concluded that Muscular Endurance Training of Leg (Vrikshasana) had significant effect on Asana Holding capacity.

Also r value between pre and post Vrikshasana test was 0.67, which denoted that there exists positive and high level of correlation.

Statistical data of Tolasana test, 't' value between Pre and Post test were calculated 10.10. Table value of 't' for df=27 at 0.05 level of significance was 2.052. As 10.10 > 2.052 that is calculated 't' value was more than table 't' value. The researcher concluded that null Hypothesis H<sub>0</sub> should be rejected.

**H<sub>0</sub>, there will be no significant effect of Muscular Endurance Training of Hand (Tolasana) on Asana Holding capacity was rejected** and Researcher concluded that Muscular Endurance Training of hand (Tolasana) had significant effect on Asana Holding capacity.

Also r value between pre and post Tolasana test was 0.57, which denoted that there exists positive but low level of correlation.

Chakrasana test data of 't' value between Pre and Post test were calculated 4.54. Table value of 't' for df=27 at 0.05 level of significance was 2.052. As 4.54 > 2.052 that is

calculated 't' value was more than table 't' value, Researcher concluded that null Hypothesis  $H_0$  should be rejected.

**$H_0$ , there will no significant effect of Muscular Endurance Training of Leg (Chakrasana) on Asana Holding capacity** was rejected and Researcher concluded that Muscular Endurance Training of Leg (**Chakrasana**) had significant effect on Asana Holding capacity.

Also r value between pre and post **Chakrasana** test was 0.74, which denoted that there exists positive and very high level of correlation ship.

Utthanpadasana test data of 't' value between Pre and Post test were calculated 9.13. Table value of 't' for  $df=27$  at 0.05 level of significance was 2.052. As  $9.13 > 2.052$  that is calculated 't' value was more than table 't' value, Researcher concluded that null Hypothesis  $H_0$  should be rejected.

**$H_0$ , there will no significant effect of Muscular Endurance Training of Leg (Utthanpadasana ) on Asana Holding capacity** was rejected and Researcher concluded that Muscular Endurance Training of Leg (**Utthanpadasana**) had significant effect on Asana Holding capacity.

Also r value between pre and post **Utthanpadasana** test was 0.63, which denoted that there exists positive and high level of correlation ship.

Thus, from the table 4, researcher summarises that the entire four Asana Holding tests had significant difference due to Muscular Training Program.

### **Findings**

Researcher, at the end of the study had some major findings as follows

1. Researcher in the study found that, the muscular endurance training was effective in all three physical fitness tests namely Squats, Push ups and sit ups.
2. Researcher in the study found that the muscular endurance training was effective in all four asana holding tests namely Vrikshasana, Tolasana, Chakrasana and Utthanpadasana.
3. All the null hypothesis ( $H_0$ ) were rejected at the significance level of 0.05 ( $df$  27) and so researcher found that Muscular Endurance Training was significantly effective for Asana Holding Capacity.
4. Duration of muscular endurance training was six weeks. It was sufficient for making significant effect on Asana Holding capacity.

### **Conclusion**

Researcher concluded that six weeks of Muscular Endurance Training was significantly effective for Asana Holding Capacity of 10 to 12 years girls and thus, for the age group of 10to 12 years girls, Skill training part should be taken after fitness training during Yoga training.

### **Recommendations**

1. This study was only for female population. So researcher recommended that this type of study could be taken for male population.
2. Researcher recommended that this type of study could be with other games like Mallakhamb, Rope Mallakhamb and Swimming also.
3. Researcher recommended that this type of study could be conducted regarding other fitness abilities.

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