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## EDITORIAL

'Exercise for all' and 'Sport for all' slogan should be displayed in each and every schools, colleges and Universities in our country. Everyday there must be a period for exercise/ sport in all the educational institutes. Economically we may be stronger than other nations but in health and wellness we are far behind the others. Our society is moving faster than the time ignoring the health. First priority should be given on physical and wanted health. All the persons belong to this noble profession should take responsibility to build and develop our nation. Research is very important but most important is to implement this in the ground situation. I strongly believe that exercise and sport for all will become a life style through my professional friends.

Editor

# EFFECTS OF YOGASANA AND OTHER RESTORATIVE MODALITIES ON CARDIO VASCULAR RECOVERY AND SUBSEQUENT RUNNING TREADMILL PERFORMANCE

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## Abstract

The present study investigated the effects of yogasana and other restorative modalities (RM) on cardiovascular recovery and repeated maximal treadmill (TM) running performance. In a repeated measure design fifty active sportsmen aged 18-20 years completed five experimental trials, each separated by one week. Each experimental trial consisted of a treadmill running to maximal work load to exhaustion, followed by one of the five 10-minutes RM - Yogasana (Y), Whirlpool bath (WP), Contrast bath (CB), Sauna bath (SB), Steam bath(ST) and Control group (C), before repeating the maximal TM running performance. Recovery strategy effectiveness was assessed via mean heart rate (HR) per minute and subsequent maximum TM running performance in seconds. Following 10-minutes recovery, the mean HR were found to be significantly differ as F-ratio found to be 72.009 P>.05. ANOVA result shows a significant difference of Y with WP (10.8765), CB (9.3789), SB (57.3881), ST (53.4936), and C (298.3717). But, no significant differences in any experimental groups were found after subsequent maximal TM running performance score. However there is a significant difference found between all RM with C (20.464). In conclusion, we observed positive effects of Y was found to be more effective in reducing the HR, but WP is found to be more effective in subsequent maximal TM running performance than other RM used in this study.

**Keywords:** Yogasana, Whirlpool Pool bath, Contrast bath, Sauna bath, Steam bath, Cardiovascular recovery, Restorative modalities

**Introduction:** In competitive sports player requires to return from physiological and psychological fatigue to his or her normal body condition as soon as possible. Intense exercise in hot environmental conditions can raise core temperature by up to 1°C every 5 – 7 min of exercise (Kay et al., 1999). When core body temperature exceeds 39°C, the ability to maintain maximal muscle activation may become impaired and eventually result in the premature termination of exercise (Gonzalez-Alonso et al., 1999;Marino, 2002). Additionally, similar muscle and core temperatures have been observed at the point of fatigue, suggesting that fatigue primarily responds to signals initiating in the active muscles and internal organs as well as the central nervous system (Gonzalez-Alonso et al., 1999).

Athlete who recovers quickly from fatigue has potential to provide a competition edge (Cochrame, 2004; Hamlin, 2001). Recovery strategies during tournament are more challengeable for sports supporting staffs as there can be inadequate time available before the next bout of exercise (Hamlin 2001). To speed up the recovery active and passive recovery modalities are in practice for quick recovery from strenuous activities. Different restorative modalities such as hydrotherapy, compression garments and exercises (Gill et al., 2006 &Tessitore et. al., 2007) are now routinely implemented for quick recovery. These restorative modalities increase blood circulation, improve the removal of waste products, delays onset of muscle soreness (Vaile et al., 2007) and bring a new energy supply to the body parts. In passive recovery athlete sitting idle for the duration of the recovery time (Monedero& Donne, 2000; Vaile et al., 2004) and no attempt is made for the physiological or psychological recovery of the body.

Active recovery normally consist of post-exercises at intensities less than the onset of blood lactate accumulation performed for duration of 5 - 20 minutes (Monedero&Donne, 2000; Vaile et al., 2004). Active recovery increases the ability to metabolize muscle lactate and maintain power outputs (Ahmaidi et al., 1996) and has a beneficial effect on psychological recovery too. While active recovery has been shown to enhance the removal of blood lactate (Gupta et al., 1996; Hayashi et al., 2004), the effect of active recovery on subsequent performance remains inconclusive, with some studies suggesting active recovery can result in the maintenance of performance (Bogdanis et al., 1996; Monedero and Donne, 2000; Thiriet et al., 1993), whereas others have suggested that subsequent performance is not maintained or enhanced by active recovery (Weltman& Regan, 1983). The conflicting findings

may be attributed to differences in methodologies, exercise protocols/ modalities, and markers of recovery.

Yogasana is widely practiced as an effective means of post-exercise active recovery strategy. Yogasana performed between exercise tasks may enhance decrease in heart rate (Bera et al., 1998; Takahashi et al., 2000) thus the cardiovascular recovery. Depending on timing, it may also provide a pre-cooling stimulus for the next exercise performance. During or after competition players are not psychologically ready to accept water immersion immediately after performance. However, it is important to ensure a comparison of the yogasana interventions with the commonly implemented practice of active and passive recovery. Despite not many scientific research and understanding about yogic method and its effects, Yogasana remains effective and economic mode of recovery strategy following high-intensity exercise has increasingly popular in India and other parts of the world. We are not aware of any studies that have investigated the effect of Yogasana and other restorative modalities on cardiovascular recovery and subsequent TM running exercise task.

**Methods:** A total of 50 active sportsmen age group was ranging from 18-20 years completed 5 RM experimental trials. Prior to participation all subjects were informed of the requirement and risks associated with the study and collected informed written consent. Subjects were required to refrain from any strenuous exercise, consuming caffeine or alcohol 24 hours prior to testing.

**Experimental study design:** This study was designed to compare the effects of 5 different RM on cardiovascular recovery and subsequent maximal TM running performance. To investigate the cardiovascular recovery and subsequent maximal TM running performance repeated measures design with Latin Square arrangement was utilized. The 5 RM were as follows: Yogasana (Y) Whirlpool Bath (WP), Contrast Bath (CB), Sauna Bath (SB), Steam Bath (ST) and Control Group (C). Subjects were divided into six groups of 08 subjects each and 10 subjects were kept in the C. The groups were randomly designated to eliminate the effect of any particular treatment. Subjects were given two familiarization trials before the actual testing began on the TM prior to the administration of the RM. The identical TM running comprised of a speed of 8 Kmph at an elevation of 4 percent for duration of 10 minutes at a work load HR response of above 150 beats per minutes. The cardio-vascular recovery was measured by recording the post recovery HR after 10 minutes of maximal

TM running (speed 16 km/ hr, elevation 8% to complete exhaustion). TM test was conducted in a temperature - controlled room in which ambient temperature were maintained at 18 - 20°C and at the same time of the each day to avoid the effect of any diurnal variations. Participants had access to time information and were required to produce as much work as possible in that time, but no other information or encouragement was provided to subject.

**Recovery strategies and Physiological assessment:** After the cessation of the maximal TM Running to complete exhaustion, participants with minimum dress performed one of the 5 RM for duration of 10 minutes each wearing polar heart monitor (Polar Electro Oy, Finland) fitted to the participant for the duration of the session. HR was recorded after 10 minutes of post exercise recovery in a randomized crossover design; the participants completed a total of 5 experimental trials, each separated by one week. The RM methodologies were: i) Subjects performed yogasana under supervision of Yoga Instructor continuously in order as – Shavasana, Vajrasana, Paschimotasana, Bhujangasana and Yognidra. ii). Subjects immersed their entire body (excluding the neck and head) seated in 39°C water in a Whirlpool tub with jets switched on. iii). Subjects immersed their entire body (excluding the neck and head) while seated in tub at 38°C for a duration of 4 minutes followed by cold water tub for 2 minutes and finally again hot tub for 4 minutes(continuous exposure). iv). Subjects were asked to sit comfortably in the Sauna room (average temperature 85°C to 90°C). v). Subjects were asked to sit comfortably in the Steam room (average temperature 40°C). vi). Subjects of controlled group were asked to sit for 10 minutes without any recovery modalities as such.

**Statistical analyses:** The statistical treatment of data comprised of analysis of variance (ANOVA) was used to determine the overall significance of the difference between the effects of various restorative modalities. This was followed by Post- hoc comparison of paired treatment means (Geoffrey and William, 1980). The significance of the F-ratio as well as significance of the differences between paired treatment means were also calculated and tested at .05 level.

**Results:** After 10 min TM running exercise, the recovery mean HR of different restorative modalities were: SB (87.18 beats $min^{-1}$, ST (87.02 beats $min^{-1}$; WP (84.56 beats $min^{-1}$); CB (84.62 beats $min^{-1}$); Y (82.54 beats $min^{-1}$) & C (93.12 beats $min^{-1}$) as shown in the

Fig. 1. The result of analysis of variance of 10-min post TM running recovery HR was found to be significant F ratio 72.009; $P < 0.05$.

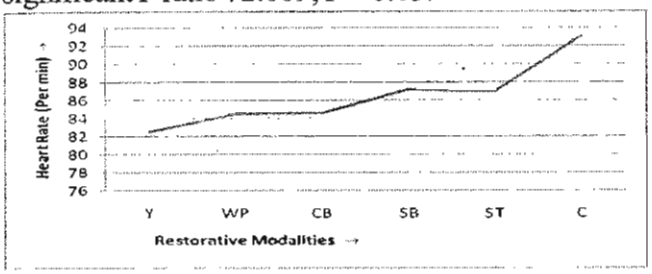


**Fig.1**

**Table-1:Analytical Comparisons Of Post Exercise Recovery Heart Rate Under Different Restorative Modalities**

| | Y | WP | CB | SB | ST | C |
|---|---|---|---|---|---|---|
| **Y** | | 10.8765* | 9.3789* | 57.3881* | 53.4936* | 298.3715* |
| **WP** | | | 0.0096 | 18.2974* | 16.1308* | 195.3142* |
| **CB** | | | | 17.4689* | 15.3535* | 99.185* |
| **SB** | | | | | 0.0682 | 94.05* |
| **ST** | | | | | | 192.586* |
| **C** | | | | | | |

*significant at F.05 (1,245) = 3.754

The subsequent maximal TM performance mean after administration of different RM were calculated in seconds were SB (206.40), ST (207.14), WP (216.22), CB (212.98), Y (214.36) &C (190.20). The calculated analysis of variance of maximal TM exercise performance was found to be significant F ratio 6.351 > tabulated value of 2.124.

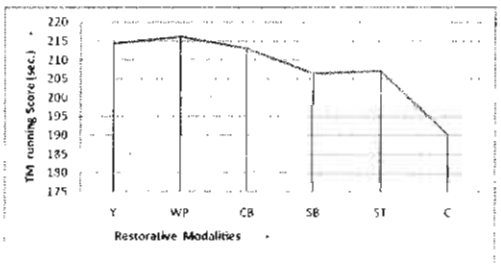


**Fig.2**

**Table-2: Analytical Comparisons Of Subsequent Tm Running Performance Score Of Different Groups**

| | Y | WP | CB | SB | ST | C |
|---|---|---|---|---|---|---|
| **Y** | | 0.121 | 0.067 | 2.221 | 1.828 | 20.464* |
| **WP** | | | 0.368 | 3.381 | 2.890 | 23.737* |
| **CB** | | | | 1.518 | 1.195 | 18.193* |
| **SB** | | | | | 0.019 | 9.201* |
| **ST** | | | | | | 10.061* |
| **C** | | | | | | |

*significant at $F.05\,(1, 245) = 3.754$

**Discussion:** The finding of the present study was that all active RM are effective in reducing the Heart rate following maximal TM running as compared to the control group. There was a significant difference (P>0.05) among all groups. The present study showed that control group did not recover at par with active RM. It is also observed that Y group shows maximum decrease in heart rate (Bera, et al., 1998; Vempati&Telles 2002), due to fact that some yogasanas were performed in supine lying position as supported by other results (Kenny, et al., 2008) and is found to be superior among all active restorative modalities. Y was significantly effective and better than WP, CB, SB, ST and C. The various RM used in the present study was intermittent and short (10-minutes) compared with a typical recovery session that might last for 15 minutes or more (Mondero& Donne, 2000; Wingernaes et al., 2000). A decreased HR following pre-cooling strategies has been observed (Hayashi et al., 2004; Wilson et al., 2002) and the results of the present study support such a decrease in HR.

A consistent finding within this study was that there were significant reductions in mean HR following all active restorative modalities, suggesting that changes in blood distribution occurred, likely to be from the peripheral circulation to the central circulation, enhance blood delivery to the working muscles (Marsh &Sleivert, 1999). This increase in central blood flow may be beneficial for subsequent performance and therefore may have played a role in the participants' TM running performance more successfully following WP and Y. Indeed, it has been suggested that a critical limiting temperature results in the termination or decline of exercise performance and this is thought to occur due to a reduced efferent command to the skeletal muscles via the central nervous system (Marino, 2004). A possible

explanation of the findings could be due to increased metabolic rate with exposure to cold and theoretically, the high metabolic rate might accelerate the process of recovery.

In the subsequent maximal TM running performance result was found to be insignificant among experimental groups (Vaile et al., 2008). It is acknowledged that all the RM group Shows better TM running performance score than the C and also found significant difference (P>0.05). Subsequent TM running performance score shows that overall WP is better than Y than CB appears to improve recovery from high-intensity TM running when compared to SB, ST and C. Hot treatment exposures shows to increase in HR, blood flow and cardiac output and decrease in peripheral resistance (Wilcock et al., 2006). TM running performance is considered one of the lower limbs aerobic activity especially needed for any games and sports. Effects of RM on different experimental group on repeated maximum TM running performance were small to trivial and authors are unclear about the result. The results of this study suggest that the practice of yogasana exposures assisted in an enhanced ability to maintain performance compared with other active recovery. Other authors have observed similar findings, reporting various pre-cooling strategies to similarly enhance performance (Armada-da-Silva, et al., 2004; Marsh &Sleivert, 1999).

The findings of the present study support the best use of yogasana in various sports at times when two training sessions a day may be performed in different environmental conditions and during prolonged competitions where other restorative modalities are not available or can be used. Compared to C active restorative modalities decreases HR but has little effect on subsequent maximum TM running performance score. We did not observe any significant TM performance score. In contrast however findings (Crowe, et al., 2007; Kinugasa, &Kilding, 2009) suggested that there is decrease in maximum repeated sprint cycling performance after hydrotherapy. Future research should attempt to investigate alternative modes of asana, varying temperatures and durations of Y. The present series of studies has contributed to the limited knowledge base investigating the effect of Y and other RM on cardiovascular recovery and subsequent TM running performance. The findings indicate Y, WP and CB are more effective in reducing HR when compared to SB, ST and C. While in subsequent TM running WP, Y and CB was found to be almost similar performance.

We acknowledge some potential limitations of this present study. First the study dealt with only adult active sportsmen and thus the outcomes of the study may not be applicable to

women, children and veteran athletes. Second, we chose only heart rate as measure to assess cardiovascular recovery. Other recovery indicators such as blood lactate concentration, delayed onset of muscle soreness, blood pressure could have been used. Such measures could be incorporated into future studies. Finally we have used treadmill running test as a cardiovascular endurance in a laboratory set up; field like set up could have been more akin to sports like.

**Conclusion:** In summary, Y as a RM found to have a substantial effect to lower the HR than other active RM and C. However in subsequent TM running performance score WP, Y and CB shows similar positive effects despite identical duration of treatment than SB, ST and C. It is suggested that Y as a restorative modality will be beneficial in any form of intense sports activities in different environmental climate if altered and modified accordingly.

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# EFFECT OF UJJAYI AND BHASTRIKA PRANAYAMA ON SELECTED PHYSIOLOGICAL VARIABLES OF PHYSICALLY CHALLENGED STUDENTS

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## Abstract

The attitude of the modern society towards the handicapped population has changed and they are receiving fair treatment to some extent in educational, vocational and social sectors. Sixty students of Amar Jyoti School Gwalior and Roshini Rehabilitation centre were selected as the subjects for the study. The age ranged between 15-20 years. The students were randomly assigned as experimental and controlled group; each group consisted of 30 students. The following variables were selected for the study-Respiratory variables; 1. Vital capacity, 2. Breath holding time. Physiological variables; 1. Resting pulse rate, 2. Blood pressure. The Criterion measures employed; 1) Vital capacity was measured in liters with the help of dry Spiro meter, 2) Breath holding capacity was measured with the help of stop watch and was recorded in seconds, 3) Resting pulse rate was measured in numbers for one minute, 4) Blood pressure was measured with the help of sphygmomanometer and it was recorded in mm/hg. The study was conducted for a period of 6 weeks. The data for respiratory variables were collected two times, once prior to the start of the training program and after the training program. The students went through a program me of bhastrika pranayama and ujjayi prayanama five days a week. To find out the effect of 6 weeks pranayama training program me on selected physiological variables independent t-test was carried out for the two groups and the level of significance was set at 0.05 . The study reveals that vital capacity and positive breath holding time had significant results after 6 weeks training program of ujjayi and bhastrika pranayama.

**Keywords:** Ujjayi, Bhasttrika, Pranayama, Vital Capacity.

## Introduction

In the olden days upto the time of second world war most of the people and children who were physically disabled spent their lives at home or in hospitals, their status was that they were considered as incapable members of the society. In the past, handicapped person had been considered as social deviants. If we go through history we find that in the Spartan civilization, handicapped children did not have any right to lead their life. A new born baby was left on Mount Taygetus for a week and the village elders went to inspect him, if he showed any signs of weakness he was rolled down the mountain and left to die or else he was brought home and given a very disciplined life. But the attitude of the modern society towards the handicapped population has changed and they are receiving fair treatment to some extent in educational, vocational and social sectors. The handicapped individuals have been identified as mentally retarded, emotionally disturbed, hearing impaired, visually impaired, orthopedically impaired, learning disabled, multi impaired or healthimpaired. Actually the need of disabled in a democratic society is not different from those of normal children, such a child wants acceptance for recognition from his fellow students in the school. He wants the security that grows out of acceptance in the process of growing up and living with the social groups.

Some researchers believe that the entire science of yoga produced the desired results. When one looks at the tradition of yoga one finds that concept of pranayama has much greater width and its techniques includes vast array of very suitable elements apart from the simple manipulation of breathing activity. The pranayama is an art and has techniques to make the respiratory organs to move and expend intentionally, rhythmically and intensively. It consists of long sustained subtle flow of inhalation exhalation and retention of breath.

## Methodology

Sixty students of Amar Jyoti School Gwalior and Roshini Rehabilitation centre were selected as the subjects for the study. The age ranged between 15-20 years. The students were randomly assigned as experimental and controlled group; each group consisted of 30 students.

The following variables were selected for the study-

**Physiological variables**

1) Resting pulse rate
2) Blood pressure.
3) Vital capacity
4) Breath holding time

**Criterion measures**

1) Resting pulse rate was measured in numbers for one minute
2) Blood pressure was measured with the help of sphygmomanometer and it was recorded in mm/hg.
3) Vital capacity was measured in liters with the help of dry Spiro meter.
4) Breath holding capacity was measured with the help of stop watch and was recorded in seconds.

The study was conducted for a period of 6 weeks. The data (vital capacity, breath holding time, resting pulse rate and blood pressure) for physiological variables were collected two times, once prior to the start of the training program and after the training program. The students went through a program me of bhastrika pranayama and ujjayi prayanama five days a week.

In order to find out the effect of 6 weeks pranayama training program me on selected physiological variables independent t-test was carried out for the two groups and the level of significance was set at 0.05 .

**Findings**

In order to determine the significant differences between experimental group and control group, after administering the training treatment, and its effect on physiological variables, the pre and post test scores were collected and analyzed by using t ratio. The results of the study are presented in tabular form for each variable separately.

**Table -1**

**SIGNIFICANCE OF DIFFERENCE BETWEEN PRE-TEST AND POST MEANS OF CONTROL AND EXPERIMENTAL GROUP IN VITAL CAPACITY**

| No of subjects | Group | Means (lit) | | DM | T ratio | Tab Value |
|---|---|---|---|---|---|---|
| | | Pre | Post | | | |
| 30 | Control | 1.56 | 1.59 | 0.03 | 1.08 | 1.699 |
| 30 | Experimental | 1.156 | 1.423 | 0.267 | 4.24* | 1.699 |

*significant difference at 0.5 level of significance t.05(29)=1.699

Table-1 reveals that there was significant difference in the pre-means and post means of vital capacity of physically challenged students after the completion of 6 weeks of Ujjayi and Bhastrika Pranayama training program as the t-ratio (4.24) was greater than the tabulated "t" value(1.699) at 0.05 level of significance. It was also evident from the same table there was no significant difference in the initial and final means of vital capacity of vital capacity of the subjects of the control group as the obtained "t" value (1.08) was less than the tabulated value(1.699) at 0.05 level of significance

**Table-2**

**SIGNIFICANCE OF DIFFERENCE BETWEEN PRE-TEST AND POST TEST MEANS OF CONTROL AND EXPERIMENTAL GROUP IN DIASTOLIC BLOOD PRESSURE**

| No of subjects | Group | Means (mm Hg) | | DM | T ratio | Tab Value |
|---|---|---|---|---|---|---|
| | | Pre | Post | | | |
| 30 | Control | 93.56 | 93.3 | 0.26 | 0.93 | 1.699 |
| 30 | Experimental | 93.13 | 92.7 | 0.43 | 1.32 | 1.699 |

*significant difference at 0.5 level of significance t. 05(29) =1.699

Table-2 reveals that there was significant difference in the pre-means and post means of diastolic blood pressure of physically challenged students after the completion of 6 weeks of Ujjayi and Bhastrika Pranayama training program as the t ratio (1.32) was less than the tabulated "t" value(1.699) at 0.05 level of significance.

It was also evident from the same table there was no significant difference in the initial and final means of diastolic blood pressure of the subjects of the control group as the

obtained "t" value (0.93) was less than the tabulated value(1.699) at 0.05 level of significance. The present study revealed that calculated value "t" was less than tabulated 't' ,hence the study was not significant.

**Table-3**

SIGNIFICANCE OF DIFFERENCE BETWEEN PRE-TEST AND POST TEST MEANS OF CONTROL AND EXPERIMENTAL GROUP IN POSITIVE BREATH HOLDING TIME

| No of subjects | Group | Means (count) | | DMT | ratio | Tab Value |
|---|---|---|---|---|---|---|
| | | Pre | Post | | | |
| 30 | Control | 23.70 | 23.74 | 0.04 | 0.678 | 1.699 |
| 30 | Experimental | 19.953 | 23.822 | 3.869 | 6.9* | 1.699 |

*significant difference at 0.5 level of significance t.05 (29) = 1.699

Table 3 reveals that there was significant difference in the pre-means and post means of positive breath holding time of physically challenged students after the completion of 6 weeks of Ujjayi and Bhastrika Pranayama training program as the t ratio (6.9) was greater than the tabulated "t" value(1.699) at 0.05 level of significance.

It was also evident from the same table there was no significant difference in the initial and final means of positive breath holding time of the subjects of the control group as the obtained "t" value (0.687) was less than the tabulated value(1.699) at 0.05 level of significance.

**Table- 4**

SIGNIFICANCE OF DIFFERENCE BETWEEN PRE-TEST AND POST TEST MEANS OF CONTROL AND EXPERIMENTAL GROUP IN RESTING PULSE RATE

| No of subjects | Group | Means (B/M) | | DM | T ratio | Tab Value |
|---|---|---|---|---|---|---|
| | | Pre | Post | | | |
| 30 | Control | 72.8 | 72.5 | 0.3 | 0.12 | 1.699 |
| 30 | Experimental | 75.36 | 75.33 | 0.03 | 0.19 | 1.699 |

*significant difference at 0.5 level of significance t.05 (29) = 1.699

Table 4 reveals that there was no significant difference in the pre-means and post means of resting pulse rate of physically challenged students after the completion of 6 weeks of

Ujjayi and Bhastrika Pranayama training program as the t-ratio (0.19) was greater than the tabulated "t" value(1.699) at 0.05 level of significance.

It was also evident from the same table there was no significant difference in the initial and final means of resting pulse rate of the subjects of the control group as the obtained "t" value (0.12) was less than the tabulated value(1.699) at 0.05 level of significance. The calculated 't' value was- 0.19 and the tabulated 't' was 1.699 so the difference is 1.509.

It was observed from the findings that 6 weeks of Ujjayi and Bhastrika Pranayama training were effective on vital capacity and positive breath holding for the experimental group. The analysis of data revealed that there was no significant difference between pre and post means of diastolic blood pressure(1.32) and resting pulse rate(0.19)

**Conclusions**

The present study concluded that vital capacity and positive breath holding time improved after 6 weeks training program of ujjayi and bhastrika pranayama in the physically challenged student.

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# Relaxation Therapies for the Management of Hypertension

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## ABSTRACT

The literature on the use of relaxation therapy in the treatment of hypertension was critically reviewed. Relaxation-like therapies shared the features of muscular relaxation, regular practice, mental focusing, and task awareness. Research on the relative contributions of these components indicated that task awareness adds to the treatment effect and that, regular practice is necessary for optimal results. It is concluded that the relaxation therapy becomes a useful adjunct to medication in the management of hypertension, especially for individuals whose blood pressures remain high, despite pharmacological treatment and lowering of blood pressure.

## Introduction

Yoga is a complete science, focusing on breathing, movement, posture and meditation. Specific exercises are taught consisting mainly of simple stretching, breathing and relaxation. There is a wealth of scientific research available confirming that advanced yogis have remarkable control over the functioning of their nervous system, heart and lungs. Yoga is beneficial for the health in ways that modem science is just beginning to understand. Even though it has been applied with therapeutic intention for thousands of years, Yoga Therapy is only just now emerging as a discipline in itself. Yoga therapy is that facet of the ancient science of Yoga that focuses on health and wellness at all levels of the person: physical, psychological, and spiritual. Yoga therapy focuses on the path of Yoga as a healing journey that brings balance to the body and mind.

Blood Presure is the pressure exerted by the blood on the walls of the arteries (blood vessels). In other words, it is the force that our heart produces in the arteries as it pumps blood around the body. When talking about blood pressure, it means the blood pressure in

the large arteries, such as the brachial artery in the arm. Blood pressure varies from one heart beat to another throughout the day. It is not static. When the arteries become obstructed with plaque and cholesterol, they constrict making the circulation of blood difficult. As a result, blood pressure becomes elevated. Hypertension is caused when there is sustained higher pressure put on vessel walls by circulating blood (Saladin, 2007).Hypertension is the most common risk factor for cardiovascular and cerebrovascular disease across the world (McCaffrey et al, 2005). As a result of the adverse side effects associated with conservative pharmacological treatments for hypertension (Jayasinghe 2004), the practice of yoga is being used ever more commonly as an alternative or complementary treatment.

The blood pressure is measured by a sphygmomanometer. Two readings of the blood pressure in the arteries during the cardiac cycle are usually taken. The higher value is the systolic pressure and the lowest pressure of the cardiac cycle is the diastolic pressure. The systolic pressure measures the pressure in the arteries when the heart beats. The diastolic pressure measures the pressure in the arteries when the heart muscle is resting between beats.

Blood pressure monitors measure the blood pressure readings (values) in millimeters of mercury (mmHg).

| **Systolic Blood Pressure Range** mm Hg | **Diastolic Blood Pressure Range** mm Hg | **Condition** |
|---|---|---|
| 90-120 | 60-80 | Blood pressure normal range |
| 140-160 | 90-100 | Mild Hypertension |
| 160-180 | 100-110 | Moderate Hypertension |
| 180-210 | 110-125 | Severe Hypertension |
| Above 210 | Above 125 | Very Severe Hypertension |

Average blood pressure for young people: 120/80 mmHg

Average blood pressure for old people: 140/90 mmHg

The normal readings for blood pressure should be around 120/80 mmHg (systolic / diastolic) but if higher pressure is maintained – this is termed as hypertension (Betterhealth, 2008). Higher readings of blood pressure in the older people are linked to increasing stiffness of large arteries and build-up of plaque. In children the normal blood pressure readings are

lower. Blood pressure readings in the lower end of the above values are considered good for cardiovascular (heart) health.

**Risk Factors for developing High Blood Pressure**

1. Family history
2. Lack of physical activity
3. A diet high in high salt.
4. Overweight / Obesity
5. Diabetes
6. Drinking too much alcohol
7. Smoking
8. Stressed
9. Advanced age

**Treatment**

The goal of treatment is, to reduce blood pressure and to have a lower risk of complications. In addition of taking medicines, many things can be done, to help in controlling the blood pressure, including:

1. Eat a heart-healthy diet, including potassium and fiber, and drink plenty of water.
2. Exercise regularly — at least 30 minutes a day.
3. Stop smoking / Alcohol
4. Limit the amount of sodium (salt) — aim for less than 1,500 mg per day.
5. Remain at a healthy body weight
6. Reduce stress — try to avoid things that cause stress. Try to practice relaxation techniques.

**Relaxation therapies**

Yoga is the ancient cultural heritage of India and has been accepted by all schools of thought as an absolute of final achievement in life. In fact, it is that which makes it possible to achieve anything, including the real needs of man. Uses of relaxation techniques to reduce blood pressure are one of the best ways introduced by many health professionals and doctors. With a relaxed body and mind, the heart rate will start to drop and the blood will flood more smoothly through the blood vessel, lowering the blood pressure and strengthening

one's overall health situation. Below are some of the commonly used relaxation techniques, based on literature survey with regard to its effectiveness on reducing blood pressure or hypertension.

**Effective relaxation techniques that reduce blood pressure:**

1) Deep breathing
2) Regular exercise to relax the muscle and help blood regulation which includes :
3) Quick Relaxation Technique – Breathing and Feeling
4) Long Term Relaxation Technique
5) Progressive Muscle Relaxation
6) Visual Relaxation
7) Yoga Nidra – Psychic Sleep

Many relaxation techniques are very effective to reduce blood pressure, below are some of the less common relaxation techniques. What really important is the methods are to be practiced regularly without fail. The following are some recent and upcoming methods.

**Deep Breathing**

Deep breathing is a simple, yet powerful, relaxation technique, it is easy to learn, can be practiced almost anywhere, and provides a quick way to get the stress levels in check. Deep breathing is the corner stone of many other relaxation practices, and can be combined with other relaxing elements such as aromatherapy and music.

Deep breathing forces use of the diaphragm as the chest cavity can only fill to a certain extent, and this is beneficial as deep breathing transports air into the lungs that is oxygen rich. As a result, gas exchange in the lungs is more efficient, because of the high availability of oxygen; the heart will not have to pump as fast to supply tissues with adequate oxygen (Saladin, 2007). Length and depth of breath has also been found to influence barorecptor regulation of heart rate and sympathetic arousal (Van de Borne et al, 2000).

The key to deep breathing is to breathe deeply from the abdomen, getting as much fresh air as possible in the lungs. While taking deep breaths from the abdomen, rather than shallow breaths from the upper chest, inhale more oxygen. The more oxygen inhaled, the less tense, short of breath, and anxiousness will be felt. So the next time when felt stressed, take a minute to slow down and breathe deeply:

- Sitting comfortably with back straight, place a hand on the chest and the other on the stomach.
- While breathing in through the nose, the hand on the stomach should rise and the hand on the chest should move very little.
- Exhaling through the mouth, while contracting the abdominal muscles, much air can be pushed out. While exhaling, the hand on the stomach should move inside but the other hand should move very little.
- Continuing to breathe in through the nose and out through the mouth, try to inhale enough so that the lower abdomen rises and falls. Count slowly while exhaling.

If had a hard time breathing from the abdomen while sitting up, try lying on the floor. Put a small book on the stomach, and try to breathe so that the book rises while inhaling and falls during exhalation.

**Quick Relaxation**

- Loosen the clothing and get comfortable.
- Tighten the muscles of the toes. Hold for a count of 10. Relax and enjoy the sensation of release from tension.
- Flex the muscles in the feet. Hold for a count of 10. Relax.
- Move slowly up through the body- legs, abdomen, back, neck, face- contracting and relaxing muscles in motion.
- Breathe deeply and slowly.

**Long-Term Relaxation**

Get in a comfortable position. Minimally tighten the right fist so that the amount of tension felt is small. Hold it at this level. Be sure to continue breathing... Now let go and relax... Observe the difference in feelings between the right and left arm and fist.

- Now minimally tighten the left fist. Hold it, at this level, so that the tightening can be felt. Slowly let go and relax. Let the relaxation spread through the arms and the rest of the body.
- Now tighten ever so slightly the parts of the body one by one.
- (Each time tighten only to the point where tension can be observed and also where one becomes conscious of, or can "feel" the tension. Hold the tensions at that

level, and be sure to tighten only the intended muscle while the rest of the body stays quiet and relaxed. Do not stop and continue to breathe. Each time when let go, those parts relax further and further.) Tighten ever so slightly the scalp... let go and relax... Let the face become smooth and soft... Let the eyes sink into their sockets... Now slightly tighten the throat and neck. Hold it for sometime and then let go and relax.

- While continuing to breathe, minimally tighten the triceps. Be sure the neck, eyes and tongue are relaxed... Let go.
- Raise the shoulders to the ears minimally. Be sure the neck stays loose. Observe how the shoulders feel different from the rest of the body... Let go and relax. Feel the relaxation sinking through the body... Minimally tighten the stomach. Keep breathing... Let go and relax. Minimally tighten the buttocks... Let go and relax. Minimally tighten the feet, calves, and thighs... Let go and relax. Let it reach an even deeper level of relaxation, a calmness and serenity.
- Now minimally tense every muscle in the body so that a minimal level of tension is felt ... jaws... eyes... shoulders... arms... chest... back... legs... stomach... Be sure to keep breathing. Feel the minimum tension in every part... Let the whole body relax. Feel a wave of calmness while stopping to tense.

Now, with the eyes closed, take a deep breath and hold it. Note all the minimum tensions... Exhale and feel the relaxation and calmness developing... Note the feeling of heaviness.

**Progressive Muscle Relaxation**

Progressive muscle relaxation is another effective and widely used strategy for stress relief. It involves a two-step process in which the systematically tense and relax different muscle groups in the body. Begin with the toes, make fist with it and tense for 5 seconds. Then, open and relax the toe muscles for 30 seconds. Next, move the focus on the following sequence.

**Progressive Muscle Relaxation Sequence**

- Right foot
- Left foot
- Right calf
- Left calf

- Right thigh
- Left thigh
- Hips and buttocks
- Stomach
- Chest
- Back
- Right arm and hand
- Left arm and hand
- Neck and shoulders
- Face

**Visual Relaxation**

This amazing relaxation technique to reduce blood pressure teaches one to visualize mental images of a peaceful and calm situation or place. Try to exercise as many of the senses as one can observe the sounds, sights, textures and smells. The best way to do this would be, to sit at a quiet and calm place, wearing loose cotton clothing and should be able to close the eyes and focus on the peaceful visions for optimum effect.

**Autogenic Relaxation**

Autogenic refers to "something that originates within oneself." Both body awareness and visual imagery are used in this technique, to reduce stress. Muscle tension in the body is reduced by repeating self help words or suggestions in the mind to. One has to develop an active imagination system, where, one needs to imagine peaceful surroundings to develop a relaxed breathing and focusing on it. Or, imagining other physical sensations like relaxing the body parts one after the other.

**Yoga Nidra**

It is a state of conscious deep sleep. During the practice of yoga nidra, one appears to be sleeping, but the consciousness is functioning at the deeper level of awareness. This state of mind is placed in between the wakefulness and dream. Normally while sleeping, one looses the track of self and cannot utilize the capacity of mind. Yoga nidra enables the person to be conscious in this state, nurture the seed of great will power, inspire the higher self and enjoy the vitality of life.

Yoga nidra restructures and transforms the whole personality form within oneself. With every session of yoga nidra one is actually burning the old habits and tendencies, in order to be born a new. This process is quicker than other systems that work on an external basis. In yoga nidra, sowing of seeds of change, is found in sankalpa, which one makes during each practice. Sankalpa is a Sanskrit word, which can be translated as resolve or resolution. It is the most powerful method for reshaping your personality.

Most people think that relaxation is simply reclining and closing of eyes. When one is tired he/she simply goes to bed .But unless free from muscular, mental and emotional tensions, he/she is never relaxed. That is the reason why many wake up in the morning with a feeling of fatigue, restlessness and inadequate rest. In order to relax completely, the inner tensions, emotions and mind must be released. This complete state of relaxation can be achieved through yoga nidra.

**Conclusion**

High blood pressure will damage the arteries, which lead to complications like stroke and heart attack. Using relaxation techniques to reduce blood pressure is the best way to maintain an healthy body. Lowering the blood pressure will help to maintain one's mental and physical health. Relaxation lowers blood pressure in many people and decreases the likelihood of stroke and heart attack. This gives a 'break' from things and lowers activity within the limbic system of the brain, the emotional centre. The brain has a regular need for more pronounced right-hemispheric activity and these relaxation therapies help to meet this need. It improves the energy levels, sleep, creative ability and more.

Of all relaxation techniques, the authors are impressed that, yoga nidra has widespread application in the management of diseases of all kinds, and promises to play a far greater role in the future. Yoga nidra can be utilized either by itself or in conjunction with other conventional forms of medical therapy. It has been found useful in both acute and chronic conditions, especially in degenerative and stress related conditions such as hypertension and heart diseases.

Furthermore, Jayasinghe (2004) state that specifically, it is the exercise and relaxation experiences that come with the practice of yoga that produced its 'beneficial effects on the autonomic neurological function'. That is, its promotion of parasympathetic dominance in

which heart rate and blood pressure are naturally reduced in order to 'rest and digest'. Henceforth relaxation in combination with breathing practices (pranayama) may lessen the blood pressure to restore normal life after a reasonable period of consistent practice.

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# IMPACT OF FIELD TRAINING WITH AND WITHOUT YOGIC PRACTICE ON SELECTED PSYCHOLOGICAL AND PERFORMANCE VARABLES AMONG CRICKET PLAYERS

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## ABSTRACT

The objective of the study was to investigate the impact of field training with and without yogic practice on selected psychological and performance variables among college level Cricket players. For this study Forty eight male college level Cricket players were randomly selected from various Colleges in Madurai Kamaraj University and their age ranged between 18 and 25 years. Initially the cricket playing ability of the subjects were subjectively rated by three qualified coaches. By using matching procedure on the basis of their cricket playing ability the subject were classified into three matched groups, each having sixteen subjects. Group I was involved in game-specific field training, Group II was given game-specific field training combined with yogic practices and Group III (Control) was not exposed to any specific training / conditioning. The game-specific field training schedule was specifically designed to improve the Cricket playing ability and fitness levels of the Cricketers. The game-specific training packages designed by the investigators of the study was administered for a period of twelve weeks, five days a week, two sessions each day, each session lasted two hours. The selected asanas, pranayama and meditation practices were meted out for 45 minutes to group II either before or after the game-specific field training. The psychological variables namely anxiety, sports achievement motivation and cricket playing ability subjectively rated by three qualified judges on batting, bowling and fielding performance . The pre and post test were conducted one day before and after the experimental treatment. Analysis of covariance was used to analyse the collected data. Scheffe's test was used as a post hoc test to determine which of the paired mean differ

significantly. The results of the study reveal that both field training and field training combined with yogic practice produced positive impacts on the selected psychological and performance variables among cricket players.

**Introduction**

Yoga is the oldest known science of self development as it gives mental, physical and spiritual control. It was developed thousands of years ago in India. Yoga literally means joining, the joining of the individual self with the universal self. This joining is achieved through the practice and mastering of specific physical postures, called asanas, breathing exercise called pranayama, and meditation. The Patanjali's yoga sutras (the first) written synthesis of yoga from the second century (B.C.) describes the system of yoga in eight stages. 1. Yama which gives moral, ethical and health guidelines. 2. Niyama deals with observances that encourage positive qualities such as purity and contentment. 3. Asanas depict physical postures, exercise to facilitate concentration. 4. Pranayama teaches breathing through control of breath. 5. Pratyahara deals with control of senses, sense withdrawal. The mind is withdrawn from the outside world, from the object of the sense. A fine preparation for meditation, the above mentioned stages are dealing with the body and the senses. They are basic external preparations for Hatha yoga. 6. Dharana stresses the need for concentration on one object or idea at a time. 7. Dhyana deals with meditation, steady concentration on one object or idea. 8. Samadhi is a state of super-consciousness. The individual self is united with the universal self.

Asanase are special patterns of postures that stabilize the mind and the body through stretching. Their aim is to establish the proper rhythm in the neuromuscular tonic impulses and improve the general muscle tone.

Pranayamas practices bring control over the respiratory impulses which one of the channels of the follow of autonomic nerve impulses. The main purpose of Pranayam is to gain control over the autonomic nerve system and through it influence the mental function.

Meditation is the practice involving control of the mental function which start from the initial withdrawal of the senses from external objects to the complete oblivious of the external environment. Meditation is a great tranquilliser. The basic principle of meditation is to develop internal awareness.

Yogicasana strengthen one's body and make it more flexible. Yoga also calms mind and gives energy. Tara (2002) found that yoga improves fitness, lowers blood pressure, promotes relaxation & self-confidence and reduces stress & anxiety.

In sports 'training' is generally understood to be synonym of doing exercise. In a narrow sense training is physical exercise for the improvement of performance. Training involves constructing an exercise program to develop an athlete for a particular event.

Modern sports have become highly competitive and challenging as various factors – physical, physiological, sociological and psychological play a vital role in influencing and shaping the sportsmen and their sports activities. The top performers in the sports field are found and required to be the sound and healthy both mentally and physically to face the extraordinary physical and mental demands and succeed in their efforts.

Cricket, nowadays, is becoming a mind game. Despite excellent physical condition, techniques and tactics, some players/ teams perform very badly, the reason being of mental fitness. In cricket, several psychological parameters play decisive role in performance. To name a few are self confidence, anxiety, concentration, motivation, etc.

Botham (1980) opined that concentration is the most vital quality for a Cricketer. And self-confidence will enhance the cricketers performance. He further says that pre-game preparation (physical, technical and mental) will facilitate consistent results. Sivaramakrishnanand Kalidasam (1998) observe that visualization, relaxation and mental preparation help the cricketer to perform better. They also observed that field training along with yogic practice improves the technical skill level among cricketers. Sisodiya et al. (2005) found that physical fitness training programme improves the cricket playing ability.

Mental skills training is an area that is untapped or neglected in cricket. Every international cricketer is capable of playing certain strokes, bowling certain balls, but are they capable of doingthe right things at the right time particularly when under pressure. The skill that separates champions from mediocre is mental skill. Mental skills to cope with pressure and the self confidence consistently for a long time, are major factor. Steve Waugh, that former Aussie skipper and a modern great has often mentioned it takes more than just skills to play cricket at the highest level.Anxiety plays an important role in the acquisition of motor skills as well as in athletic performance. Anxiety can either enhance or inhabit

performance whether its effect is positive or negative depends on how an individual athlete perceives the situation.

Sachin Tendulkar and team-mates are learned the ancient art of yoga in on attempt to improve their mental and physical agility. Omkar S.N. (2003) says that yoga has to do with the way you handle things. If applied to a cricketer it helps him beat stressful conditions on the ground and off the ground. It makes player calmer and helps in achieving harmony of the entire body, which is so essential to modern sportsmen.

Kalidasan et.al.(1998) observed that field training along with yogic practice improves the technical skill level among cricketers.

Kirsten (2010)Yoga is meant to relax one's mind and body he is looking at this ancient Indian practice to rejuvenate the side in time for the Cricket World Cup in 2011. The thinking is that in 30 minutes session you could do your stretching, recovery, stability, as well as helping the guys with mental stuff. Yoga brings in multi-disciplinary fitness and mental approach to a very busy schedule. I'll make specific for every player depending on their fitness. If you want to tone a muscle, it can take hours in the gym. In yoga it takes you half an hour to get the same effect.

**Methodology**

To achieve the purpose of the study 48 cricket players from Madurai District, in the age group of 18-25, were chosen as subject.

**Experimental design and treatment**

Three group designs was used. By using the matching procedure on the basis of their initial test performance scores on Cricket playing ability, the subjects will be divided into three equal groups, in the each group consisting of sixteen subjects.

| | |
|---|---|
| **Experimental Group – I** | **Field training group** |
| **Experimental Group – II** | **Field training group combined with Asanas, Pranayama & Meditation** |
| **Group – III (control)** | **No specific training / conditioning (control)** |

The game specific field training schedule was specifically designed to improve the Cricket playing ability and fitness level of the Cricketers, the Game-Specific training package designed

by the investigators of the study was administered for a period of twelve weeks, five days a week, two sessions each day each session lasted two hours. The yogic practices were meted out for 45 minutes to group II either before or after the game-specific field training. Asanas,Pranayama and Meditation technique consist of

(A) Asana: (i) Padmasana (ii) Sarvangasana (iii) Matsyasana (iv) Ardha-Matsyendurasana (v) Chakrasana (vi) Halasana. (vii) Vajrasana (viii) Vakrasana (ix) Bujangasana (x)Salabasana (xi) Sarvangasana (xii) Dahnurasana (xiii) Savasana (xiv) Yogamudra

(B) Pranayama : (i) Ujjai (ii) Sitali

(C) Meditation: (i)Breath counting meditations (ii) Mantra meditation

ThePsychological variables namely Anxiety using Rainer Marten's Sports Competition Anxiety Questionnaire, Sports Achievement Motivation using M.L.Kamlesh Sports Achievement Motivation Questionnaire were used to collect psychological parameters of the subject, three qualified coaches subjectively rated the Cricket playing ability each player before and after the treatment. The guideline for subjective rating was given by the investigator. The pre and post test were conducted one day before and after the experimental treatment.

**Statistical Analysis**

Analysis of covariance was used to analyse the collected data. Scheffe's test was used as a post hoc test to determine which of the paired mean differ significantly.

**Findings and Discussions**

The analysis of covariance on the obtained scores in pre, post and adjusted post-test of the experimental group I & II and control group for Psychological variables namely Anxiety and Sports Achievement Motivation have been presented in Table No. I

**Table - I**

ANALYSIS OF COVARIANCE FOR PRE,POST AND ADJUSTED POST TEST DATA ON ANXIETY, SPORTS ACHIEVMENT MOTIVATION AND CRICKET PLAYING ABILITY OF GAME-SPECFIC FIELD TRAINING GROUP, GAME-SPECFIC FIELD TRAINING COMBINED WITH YOGIC PRACTICE GROUP AND CONTROL GROUP

| Variables | Test | Experimental Group-I | Experimental Group-II | Group - III (Control Group) | Source of variance | df | Sum of square | Mean square | 'F' ratio |
|---|---|---|---|---|---|---|---|---|---|
| ANXIETY | Pre-test | 19.0000 | 19.3750 | 20.4375 | B.M | 2 | 17.792 | 8.896 | 1.856 |
| | MeanSD | 2.28035 | 2.02896 | 2.2500 | W.G | 45 | 215.688 | 4.793 | |
| | Post-test | 18.8125 | 16.6875 | 20.7500 | B.M | 2 | 132.125 | 66.063 | 17.196* |
| | MeanSD | 2.16699 | 1.49304 | 2.14476 | W.G | 45 | 172.875 | 3.842 | |
| | Adjusted Post-test Mean | 19.105 | 16.859 | 20.126 | B.S<br>W.G | 2<br>44 | 89.958<br>51.762 | 44.979<br>1.176 | 38.234* |
| SPORTS ACHIEVEMENT MOTIVATION | Pre-test | 27.2500 | 26.3750 | 25.2500 | B.M | 2 | 32.167 | 16.083 | 2.156 |
| | MeanSD | 2.72029 | 2.09364 | 3.25576 | W.G | 45 | 335.750 | 7.461 | |
| | Post-test | 28.3750 | 29.1250 | 25.6250 | B.M | 2 | 108.667 | 54.33 | 9.149* |
| | MeanSD | 2.33452 | 1.92787 | 2.94109 | W.G | 45 | 267.250 | 5.939 | |
| | Adjusted Post-test Mean | 27.618 | 29.059 | 26.448 | B.S<br>W.S | 2<br>44 | 53.497<br>57.697 | 26.749<br>1 311 | 20.399* |

B.M - Between the Means B.S – Between sets * Significant at 0.05 level

W.G - Within Group W.S – Within sets

The table values required for significant at 0.05 level with df (2, 45) and (2, 44) are 3.21 and 3.23 respectively

**Sports Competitive Anxiety**

The table- 1 shows that the pre-test mean values on sports competitive anxiety test of game-specific field training group, game-specific field training group combined with yogic

practice group and control groups are 19.0000, 19.3750 and 20.4375 respectively. The obtained 'F' ratio 1.856for pre-test scores was less than the table value 3.21 for df 2 and 45 required for significance at 0.05 level of confidence on sports competitive anxiety test. The post-test mean values on sports competitive anxiety test of Experimental group I &II and control groups are 18.8125, 16.6875 and 20.7500respectively. The obtained 'F' ratio 17.196 for post-test scores was greater than the table value 3.21 for df 2 and 45 required for significance at 0.05 level of confidence on sports competitive anxiety test. The adjusted post-test means of Experimental group I &II and control groups are 19.105, 16.859 and 20.1260respectively. The obtained 'F' ratio of 38.234 for adjusted post-test means was greater than the table value of 3.23 for df 2 and 44 required for significance at 0:05 level of confidence on sports competitive anxiety test. The results of the study indicated that there was a significant difference among the adjusted post-test means of Experimental group I &II and control groups on sports competitive anxiety test.

Since the obtained 'F' ratio value was significant further to find out the paired mean difference, the Scheffe's test was employed and presented in table-2.

**TABLE – II**

**THE SCHEFFE'S TEST FOR THE DIFFERENCE BETWEEN PAIRED MEANS ON SPORTS COMPETITIVE ANXIETY TEST**

| Experimental Gr-I | Experimental Gr-II | Experimental Gr-III | Mean Difference | Confidence Interval |
|---|---|---|---|---|
| 19.105 | | 20.126 | 1.021* | 0.97 |
| | 16.859 | 20.126 | 3.267* | |
| 19.105 | 16.859 | | 2.246* | |

*Significant at 0.05 level of confidence

From the table- II, it is clear that the adjusted post test means are 19.265, 16.859 and 20.126respectively. The mean differences in sports competitive anxiety are numerically presented in the above table, which were significant at 0.05 level of confidence. The analysis revels that there was considerable difference between adjusted post-test means of Game-Specific field training group, Game-Specific field training group combined with Yogic practice and Control group in sports competitive anxiety among cricket players.

From the results obtained, it may be concluded that both the experimental groups improved their sports competitive anxiety level after the respective experimental treatment. The group-II (Game-Specific field training group combined with Yogic practice) showed noticeable improvement in sports competitive anxiety after 12 weeks of field training with Yogic training. The data of sports competitive anxiety level of Game-Specific field training group, Game-Specific field training combined with Yogic practice group and Control group are presented in Figure -1

**Sports Achievement Motivation**

The table- 1 shows that the pre-test mean values on sports achievement motivationscores of game-specific field training group, game-specific field training group combined with yogic practice group and control groups are 27.2500,26.3750and 25.2500respectively. The obtained 'F' ratio 2.156for pre-test scores was less than the table value 3.21 for df 2 and 45 required for significance at 0.05 level of confidence on sports achievement motivation test. The post-test mean values on sports achievement motivationtest scores of Experimental group I &II and control groups are 28.3750, 29.1250 and25.6250respectively. The obtained 'F' ratio 9.149 for post-test scores was greater than the table value 3.21 for df 2 and 45 required for significance at 0.05 level of confidence on sports achievement motivation. The adjusted post-test means of Experimental group I &II and control groups are 27.618, 29.059 and 26.448respectively. The obtained 'F' ratio of 20.399for adjusted post-test means was greater than the table value of 3.23 for df 2 and 44 required for significance at 0.05 level of confidence on sports achievement motivation. The results of the study indicated that there was a significant difference among the adjusted post-test means of Experimental group I & II and control groups on sports achievement motivation.

Since the obtained 'F' ratio value was significant further to find out the paired mean difference, the Scheffe's test was employed and presented in table-3.

**TABLE – III**

**THE SCHEFFE'S TEST FOR THE DIFFERENCE BETWEEN PAIRED MEANS ON SPORTS ACHIEVEMENT MOTIVATION**

| Experimental Gr-I | Experimental Gr-II | Experimental Gr-III | Mean Difference | Confidence Interval |
|---|---|---|---|---|
| 27.618 | | 26.448 | 1.17* | 1.02 |
| | 29.059 | 26.448 | 2.61* | |
| 27.618 | 29.059 | | 1.44* | |

*Significant at 0.05 level of confidence

From the table- III, it is clear that the adjusted post test means are 27.618, 29.059and 26.448 respectively. The mean differences in sports achievement motivationare numerically presented in the above table, which were significant at 0.05 level of confidence. The analysis revels that there was considerable difference between adjusted post-test means of Game-Specific field training group, Game-Specific field training group combined with Yogic practice and Control group in sports achievement motivationamong cricket players.

From the results obtained, it may be concluded that both the experimental groups improved their sports achievement motivationlevel after the respective experimental treatment. The group-II (Game-Specific field training group combined with Yogic practice) showed noticeable improvement in sports achievement motivationafter 12 weeks of field training with Yogic training. The data of sports achievement motivationlevel of Game-Specific field training group, Game-Specific field training combined with Yogic practice group and Control group are presented in Figure -2

**Table - IV**

**ANALYSIS OF COVARIANCE FOR PRE,POST AND ADJUSTED POST TEST DATA ON CRICKET PLAYINGABILITY OF GAME-SPECFIC FIELD TRAINING GROUP, GAME-SPECFIC FIELD TRAINING COMBINED WITH YOGIC PRACTICE GROUPAND CONTROL GROUP**

| Variables | Test | Experimental Group-I | Experimental Group-II | Group - III (Control Group) | Source of variance | df | Sum of square | Mean square | 'F' ratio |
|---|---|---|---|---|---|---|---|---|---|
| CRICKETPLAYINGABILITY | Pre-test | 6.0313 | 6.1875 | 5.7813 | B.M | 2 | 1.344 | .672 | **1.156** |
| | MeanSD | .80558 | .68007 | .79517 | W.G | 45 | 26.156 | .581 | |
| | Post-test | 6.4063 | 7.4375 | 6.0625 | B.M | 2 | 16.385 | 8.193 | **14.467*** |
| | MeanSD | .82095 | .68007 | .7500 | W.G | 45 | 25.484 | .566 | |
| | Adjusted | | | | B.S | 2 | 10.462 | 5.231 | |
| | Post-test Mean | 6.384 | 7.302 | 6.221 | W.S | 44 | 11.751 | .261 | **19.588*** |

B.M - Between the Means B.S – Between sets * Signifieant at 0.05 level

W.G - Within Group W.S – Within sets

The table- 4 shows that the pre-test mean values on cricket playing abilityof game-specific field training group, game-specific field training group combined with yogic practice group and control groups are 6.0313,6.1875and 5.7813respectively. The obtained 'F' ratio 1.156for pre-test scores was less than the table value 3.21 for df 2 and 45 required for significance at 0.05 level of confidence on cricket playing ability. The post-test mean values on cricket playing ability of Experimental group I & II and control groups are 6.4063,7.4375 and 6.0625 respectively. The obtained 'F' ratio 14.467 for post-test scores was greater than the table value 3.21 for df 2 and 45 required for significance at 0.05 level of confidence on cricket playing ability. The adjusted post-test means of Experimental group I & II and control groups are 6.384, 7.302 and 6.221respectively. The obtained 'F' ratio of 19.588for adjusted post-test means was greater than the table value of 3.23 for df 2 and 44 required for significance at 0.05 level of confidence on cricket playing ability. The results of the study indicated that there was a significant difference among the adjusted post-test means of Experimental group I & II and control groups on cricket playing ability.

Since the obtained 'F' ratio value was significant further to find out the paired mean difference, the Scheffe's test was employed and presented in table-5.

**TABLE – V THE SCHEFFE'S TEST FOR THE DIFFERENCE BETWEEN PAIRED MEANS ON CRICKET PLAYING ABILITY**

| Experimental Gr-I | Experimental Gr-II | Experimental Gr-III | Mean Difference | Confidence Interval |
|---|---|---|---|---|
| 6.384 | | 6.221 | 0.92* | |
| | 7.302 | 6.221 | 1.08* | 0.46 |
| 6.384 | 7.302 | | | 0.92* |

* Significant at 0.05 level of confidence

The adjusted post test means of playing ability for experimental and control groups are 6.384, 7.302 and 6.221 respectively when the experimental groups compared with control group, the mean difference were 0.92 and 1.08 which were significant at 0.05 level of confidence. Hence there was a significant difference between experimental and control groups in playing ability among Cricketers. However, the means of game-specific field training group, game-specific field training group combined with yogic practice groups was 0.92 which is also significant at 0.05 level of confidence.

From the results obtained, it may be concluded that the experimental groups I and II had significantly increased playing ability after the experimental treatment.

A relevant study has already been done by some of the researchers. PownRadha (1991) conducted study on psychological variables and soccer performance of south Indian University players. Mann and Bala (1989) examined pre competition anxiety in footballers of various stages of competition, which supports the present study results.

The analysis revels that the field training with and without yogic groups showed significant improvement in all the selected Psychological variables when compared with control group. Hence, the Cricketers of experimental groups showed noticeable improvement in sports competitive anxiety and sports achievement motivation which may be due to 12 weeks of field training with and without yoga practice.

At the same time, when the experimental groups were compared, the field training with yogic practice group showed improvement in sports competitive anxiety. The other variables namely sports achievement motivation and cricket playing ability had also gained

some improvement, when it was compared to the field training without yogic practice group. These results by and large in conformity with the findings of Kalidasan (1998)

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# EFFECT OF SELECTED PRANAYAMAS ON VITAL CAPACITY OF SENIOR CITIZEN

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## ABSTRACT

*The study consisted of twenty (20) male subjects were selected from SwasthLabhcentre of Yavatmal city, Maharashtra. Ages of the subjects were ranging 60-70 years. The selected subjects were asked to practice five selected pranayamas (viz. NadiSudhan, Kapalbhati, Bhastrika type-1, Ujjai, and Bhramori) of six days in a week for the period of eight weeks with direct supervision of the experimenter. The treatment program was conducted in SwasthLabh center at AmolochandMahavidyalaya, Yavatma, Maharashtra. Before and after the pranayamas practices their vital capacity were tested as per standard procedure with the help of 'dry spirometer'. The data obtained were statistically analyzed. The finding of the results concluded that pranayama may significantly improve vital capacity of senior citizens.*

## INTRODUCTION

Every one has to follow good health practices in his / her routine life. Yoga is important tool for people of all ages to improve their quality of life. Yoga is a systematic and methodical process to control and develop the mind and body to attain good health. Pranayama is an yogic breathing exercise. Pranayama is the only exercise which affects the inmost parts of the body. The health of our body and mind depends on the soundness of the health of our internal organs the heart, lungs, digestive systems, glands, and the nervous systems etc.

The function of the human body is very complex and it involves mechanical laws as well as psychophysiological principles. Psychophysiological functions generally improve rapidly in childhood and reach its high upto 30 years of age. Functional capacity then declines with age. But regular exercise produces psychophysiological improvement regardless

of age. The functional changes depend on several factors that include fitness status, age, food habits, and types of the specific exercise and physical training.

The purpose of the study was to find out the effect of selected pranayamas on vital capacity of senior citizens.

**METHODOLOGY :**

For this study twenty (20) male subjects were selected from Swasth Labh centre of Yavatmal city, Maharashtra. The subjects those who are willing to take part in scheduled practices of pranayamas and residing nearest to the place of practice were selected for this experimental study. Ages of the subjects were ranging 60-70 years. The selected subjects were asked to practice five selected pranayamas (viz; NadiSudhan, Kapalbhati, Bhastrika type-1, Ujjai, and Bhramori) six days in a week for the period of eight weeks with a direct supervision of the experimenter. The pranayama program was conducted in SwasthLabh center at AmolockchandMahavidyalaya, Yavatmal. Common weekly off day, Sunday was allowed them for rest. The pranayama was administered on the basis of the following practice schedule (Table-1) and the practice was given in the morning between 6.00 to 7.00 am.

Before and after the eight weeks of pranayamas practice their vital capacity were tested as per standard procedure with the help of 'dry spirometer'. The obtained data were statistically analyzed by using paired 't' test to see whether any significant differences between the mean scores of pre and post vital capacity of senior citizens.

**Table-1 :**Schedule for practices of pranayamas for senior citizen

| S. No. | Name of pranayamas | Week 1-2 | Week 3-4 | Week 5-6 | Week 7-8 |
|---|---|---|---|---|---|
| 1 | NadiSudhan | 3 Repetitions | 4 Repetitions | 5 Repetitions | 6 Repetitions |
| 2 | Kapalbhati | 3 Repetitions | 4 Repetitions | 5 Repetitions | 6 Repetitions |
| 3 | Bhastrika type-1 | 3 Repetitions | 4 Repetitions | 5 Repetitions | 6 Repetitions |
| 4 | Ujjai | 3 Repetitions | 4 Repetitions | 5 Repetitions | 6 Repetitions |
| 5 | Bhramori | 3 Repetitions | 4 Repetitions | 5 Repetitions | 6 Repetitions |

N.B. : Two (2) minutes rest after practice each pranayama.

**OBESRVATION AND DISCUSSION :**

On the basis of collected data on vital capacity before and the eight weeks of pranayamas practices presented in the Table no. 2.

**Table-2 :** The mean, S.D. and t-value of pre and post test score of vital capacity

| Parameter | Test | N | Mean (Liter) | SD | 't' value |
|---|---|---|---|---|---|
| Vital capacity | Pre test | 20 | 3.76 | 0.75 | 4.07* |
| | Post test | 20 | 3.86 | 0.79 | |

* Significant at 0.05 level of confidence.

The mean vital capacity score of pre and post test were 3.76 lit ± 0.75 and 3.86 lit ± 0.79. The calculated 't' value is 4.07 which is higher than the tabulated value of 't' 2.09 at 0.05 (19 dot) level of confidence. The reason for the finding might be attributed to the fact that the selected pranayamas has got significant influence on functional capacity of lungs. This was positively effect on the vital capacity of senior citizens.

Administration of the prescribed pranayamas was limited to eight weeks only. This period seemed very limited for such experiment. For good and satisfactory results experiment for longer period would be necessary. In spite of the limitations it could be said that the selected pranayamas have significant good effect on vital capacity of senior citizens. It is also evident that prescribed pranayamas has significant influence on functional capacity of lungs among senior citizens. Thus, if practice correctly and scientifically, pranayama may improve the functional capacity of lungs in the senior citizen of rapid declining ages also.

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# EFFECT OF ISOTONIC AND ISOMETRIC TRAINING ON STRENGTH AND POWER PARAMETERS

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**Abstract**

The purpose of the study was to investigate the effect of isotonic and isometric training on strength and power parameters. Forty five (N = 45) male students were randomly selected as subjects and their age group ranged from 17 to 22 years. The selected subjects were randomly assigned into three equal groups: two experimental groups : group I, isotonic training group (N = 15) (ITTG), group II, isometric training group (N = 15) (IMTG) and one control group (N = 15)(CG). The experimental groups underwent training for eight weeks with three sessions per week and control group did not undergo any special training. The collected data were statistically analysed by using analysis of covariance (ANCOVA) and Scheffe's test was applied as post hoc test to determine the significant differences among the paired mean. The study showed that isotonic and isometric training produced significant differences ($P \leq 0.05$) in leg strength (LS) and explosive power (EP) as compared to control group (CG). The result revealed that isotonic training was better than isometric training to improve the selected strength and power variables.

**Keywords:** Isotonic, Isometric, Strength, Power.

## Introduction

Strength is the basic quality that influences power performance (Komi, 1992). Power performance is affected by the interaction between agonist, antagonist and synergic muscles involved in joint movements. Explosive power is the ability to maintain an initial quick explosive contraction of a muscle and it can be generated using little, moderate or maximum resistance and it is a combination of eccentric isometric and concentric strength (Moran et al., 1996).

Muscles are contract but joint do not move and muscle fibers maintain a constant length in isometric training. The exercises are typically performed against an immovable surface. It is

effective for developing total strength of a particular muscle or group of muscles. It is often used for rehabilitation because the exact area of muscle weakness can be isolated and strengthening exercises can be administered at the proper joint angle (Dick *et al., 1978* & Corbin et al., 1985).

Body parts are moved and the muscle shortens on length in isotonic training. Isotonic exercise differs from isometric exercise in that there is movement of a joint during the muscle contraction (Pihlman, 1998). Lifting free weights, like dumbbells, barbells, chin-ups, push-ups etc. are considered the form of isotonic exercises. The eccentric contraction is also a key for preparing a muscle for an explosive concentric contraction. Eccentric strength play a role in all dynamic movements, especially maximal resistance and speed movements (Berger et al., 1963).

The aim of this study was to evaluate effect of isometric and isotonic training on strength and power development in the Indian population.

**Methodology**

Forty five male students at the age group of 17-22 years were recruited as subjects (height 1.72 ± 0.8 mts, body weight 69 ± 6.5 kgs) from the Department of Physical Education, Annamalai University Tamilnadu for this study. The selected subjects were randomly assigned into three equal groups of 15 subjects each. The experimental group I underwent isotonic training; group II underwent isometric training and group III acted as control. Both experimental groups were underwent their respective training programme for three days in a week for eight weeks (every alternative days), where the control group did not participate in any specific training in addition, to their regular physical education activities. The selected dependent variables were assessed by using standard testing procedure such as leg strength was assessed by leg lift with dynamometer and explosive power was assessed by standing broad jump. In isotonic training, after the selection of resistance exercises 1 RM was found for each subjects of the experimental group for each exercises separately by increasing and decreasing the resistance (Bompa,1999). In isometric training more amount of weight at which the subject can hold the load for 10 second was found out. Data collected from each subjects before and after the training and the data were analysed using analysis of covariance (ANCOVA). If the 'F' ratio was found to be significant for adjusted post test mean, Scheffe's

test was applied as post hoc test to determine the significant difference between the paired mean. The level of confidence was fixed at 0.05.

**Results**

The table 1 shows that the pre test mean of leg strength for isotonic, isometric and control groups are 89.20, 90.00 and 91.20 respectively. The obtained 'F' ratio 0.41 is lesser than the table value 3.22 required for significance at 0.05 level of df 2 and 42. It is inferred statistically that there is no significant variation in leg strength among the three groups before the commencement of training (base line). The obtained 'F' ratio of post test mean is 9.75 and the adjusted post test mean is 84.80. These values are higher than the table value of 3.22 and 3.23 respectively. It reveals that there was a significant difference in leg strength among post test mean and adjusted post test mean of experimental groups and control group.

**Table 1. Analysis of covariance for pre, post and adjusted post test data on leg strength of isotonic, isometric and control group**

| Test | Isotonic Group | Isometric Group | Control Group | SOV | SS | df | MS | F Ratio |
|---|---|---|---|---|---|---|---|---|
| Pre-testMean | 89.20 | 90.00 | 91.20 | BG | 30.40 | 2 | 15.20 | 0.41 |
| S.D (±) | 5.89 | 5.29 | 7.00 | WG | 1564.80 | 42 | 37.26 | |
| Post-test Mean | 100.13 | 98.00 | 91.33 | BG | 632.18 | 2 | 316.09 | 9.75* |
| S.D (±) | 6.39 | 4.96 | 5.64 | WG | 1361.07 | 42 | 32.41 | |
| Adjusted Post-test Mean | 100.93 | 98.11 | 90.42 | BG | 872.07 | 2 | 436.03 | 84.80* |
| | | | | WG | 210.83 | 41 | 5.14 | |

*Significant F = (df 2, 42) (0.05) = 3.22 ($p \leq 0.05$), and (df 2, 41) (0.05) = 3.23; ($p \leq 0.05$).

Table 2 indicates that the adjusted post test mean difference of leg strength between isotonic group and isometric group, isometric group and control group and isometric group and control group are 2.82, 10.51 and 7.69 respectively, which are higher than the confidence interval value of 2.11. It is inferred that the eight weeks of isotonic and isometric training have significantly increased the leg strength as compared to the control group.

**Table 2. Scheffe's test for the adjusted post test paired mean differences on leg strength**

| Isotonic Group | Isometric Group | Control Group | Mean Difference | CI |
|---|---|---|---|---|
| 100.93 | 98.11 | | 2.82* | |
| 100.93 | | 90.42 | 10.51* | 2.11 |
| | 98.11 | 90.42 | 7.69* | |

*Significant, $p \leq 0.05$.

The table 3 shows that the pre test mean of explosive power for isotonic, isometric and control groups are 2.22, 2.20 and 2.24 respectively. The obtained 'F' ratio 1.14 is lesser than the table value 3.22 required for significance at 0.05 level of df 2 and 42. The obtained 'F' ratio value 11.48 for post test data is higher than the required table value 3.22 and the F-ratio value 50.51 of adjusted post test mean is also higher than the table value of 3.23 required for significance at 0.05 level of confidence with df 2, 42 and 2, 41 respectively. It reveals that there was significant change in explosive power performance among the three groups at the end of training programme.

**Table 3. Analysis of covariance for pre, post and adjusted post test data on explosive power of isotonic, isometric and control group**

| Test | Isotonic Group | Isometric Group | Control Group | SOV | SS | df | MS | F Ratio |
|---|---|---|---|---|---|---|---|---|
| Pre-testMean | 2.22 | 2.20 | 2.24 | B G | 0.014 | 2 | 0.007 | 1.14 |
| S.D (±) | 0.69 | 0.95 | 0.69 | W G | 0.261 | 42 | 0.006 | |
| Post-test Mean | 2.36 | 2.29 | 2.24 | B G | 0.11 | 2 | 0.055 | 11.48* |
| S.D (±) | 0.063 | 0.080 | 0.063 | W G | 0.20 | 42 | 0.0047 | |
| Adjusted Post-test Mean | 2.36 | 2.31 | 2.23 | B G | 0.14 | 2 | 0.068 | 50.51* |
| | | | | W G | 0.055 | 41 | 0.0013 | |

*Significant $F = (df\,2, 42)\,(0.05) = 3.22\,(p \leq 0.05)$, and $(df\,2, 41)\,(0.05) = 3.23; (p \leq 0.05)$.

Table 4 indicates that the adjusted post test mean difference of explosive power between isotonic group and isometric group, isometric group and control group and isometric and control groups are 0.05, 0.13 and 0.08 respectively which are higher than the confidence interval value of 0.033 at 0.05 level of significance. It is inferred that the eight weeks of isotonic and isometric training have significantly improved the explosive power performance as compared to control group.

**Table 4. Scheffe's test for the adjusted post test paired mean differences on explosive power**

| Isotonic Group | Isometric Group | Control Group | Mean Difference | CI |
|---|---|---|---|---|
| 2.36 | 2.31 | | 0.05* | |
| 2.36 | | 2.23 | 0.13* | 0.033 |
| | 2.31 | 2.23 | 0.08* | |

*Significant, $p \leq 0.05$.

## Discussion

Any systematic and scientific training programme for a period of eight weeks may definitely produce significant improvement in body related variables (Thomis et al., 1998). In the present study, systematic isotonic and isometric strength training programmes produced significant improvement in leg strength and explosive power.

The study shows that isotonic training produced more improvement in leg strength and explosive power as compared to isometric training. The results of Ayalon (1995), Weir (1995), Maji (1996) and Kapoor & Sgnihotri (2010) support this findings

## Conclusion

The present investigation observed a significant improvement in the leg strength and explosive power as a result of isotonic and isometric strength training programme. The isotonic training produced more improvement in strength and power when compared to isometric training. It also reveals that isotonic training is better than isometric training to improve sports performance.

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# EFFECT OF RESISTEDAEROBIC, UNRESISTED ANAEROBIC ANDMIXED TRAINING ON THE RESTING STATE PLASMA FIBRINOGEN AND HDL CHOLESTEROL AMONG PREVIOUSLY UNTRAINED WOMEN

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## ABSTRACT

Atherosclerosis of the Coronary arteries causes for the Coronary HeartDisease. Resting state Plasma fibrinogen is considered as a powerful precipi-tating marker of Coronary Heart Disease. But, the total HDL cholesterol is considered as the scavenger of the bad cholesterol i.e. LDL cholesterol. Dif-ferent physical activity protocols with different metabolic pathway cascades show different effects on these two variables. Sixty subjects ran-domized to four groups participated in this study aimed to understand the ef-fect of three different exercise types on the resting plasma fibrinogen and rest-ing total HDL cholesterol. Three groups participated as exercising groups and they are Resisted aerobic, unresisted anaerobicand Combined. The groups exercised with moder-ate intensity resisted aerobicprotocol, unresisted anaerobicprotocol and combined resisted aerobicand unresisted anaerobicprotocol respectively. Baseline values and post intervention values of the variables were measured and analysed. Analysis ofCovari-unce revealed that all the three protocols caused significant variance for both variables when compared to the control group. Combined moderate resisted aerobicand unresisted anaerobicprotocol caused significant decrements (MY.X-MX=8.75) in resting Plasma fibrinogen than resisted aerobic(8:64) and unresisted anaerobic(4.14) exercises. Resisted aerobicexercises brought significant increases in resting total HDL choles-terol (-58.72) when compared to combined (-45.26) and unresisted anaerobic(-36.93). Moderate combined resisted aerobicand unresisted anaerobicexercises are effective in controlling the resting state Plasma fibrinogen whereas moderate resisted aerobicexercises are effective in increasing the resting total HDLcholesterol in individuals.

Key words: Atherosclerosis, Coronaryheartdisease,Plasma Fibrinogen, Total HDL cholesterol, Resisted aerobicand Unresisted anaerobicexercises.

## INTRODUCTION

Cross sectional studies proved statistically positive correlation, between the Health Related Physical Fitness scores of an individual and health of the individual. This under-standing in general lead to further exploration to identify exact reasons not to be affected by degenerative and chronic disorders that are prone to inactivity of individuals. Cardio Vascular Diseases (CVDs) are going to be major threat to the human kind in the forthcoming decades as per the World Health Organisation's projections in the "Global Burden of Disease: 2004 update". Decreasing physical activity trends has been identified as the main factor respon-sible for this future global phenomenon.

There have been many responsible precipitating factors for this degenerative health conditions. Hypertension, Atherosclerosis and Heart attack precipitated by the precondition of Atherosclerosis are recognized as the CVDs. Physical activity has been postulated to re-duce the risk of developing CVDs through various mechanisms like increasing the dilatory capacity of the coronary arteries, reducing the rate of progression of Coronary Artery Athero-sclerosis Atherosclerotic condition of the Coronary artery leads to the Heart attack and this condition is called as Coronary Heart Disease (CHD). Atherosclerosis starts as an injury to Arterial endothelium because of the factors like chronic hypertension, wear and tear and toxic chemical effects and this injury allows the inundation of blood fats like cholesterol into this injury site. This condition is further aggravated by the clustering of blood platelets and monocytes at the injury site and makes the size of the lesion increased. Eventually, the plaque calcines and connective tissue forms producing a narrowed or blocked blood vessel leading to impaired blood supply .

Hyperlipidemia or higher level of circulating lipids in blood than normal levels is also a significant factor in precipitating the atherosclerotic condition of the blood vessels. Among these circulating lipids the High Density Lipoproteins (HDLs) which contains an enzyme called 'Lecithin Cholesterol Acid Transferase (LCAT) retards the development of atherosclerosis by gathering free cholesterol and transporting it to the liver and which will be released as cholesterol in the bile or is converted to bile salts. HDL acts as a reverse cholesterol trans-fer system that resists the development of atherosclerosis . Overall leisure

time physical activity was showh to be inversely associated with several composite lipoprotein-lipid markers indicative of the atherogenic lipoprotein phenotype'.

Pamophystological mechanisms through which a high level of plasma fibrinogen pro contribute to the progression of atherosclerosis by increasing platelet-vessel wall interactions and/or by aggravating haemodynamic disturbances affecting plasma viscosity. Plasma fibrinogen levels, which depend on the relevant determinants like age, gender and other, are important risk factor in CAD precipitation. A significant association between plasma viscos-ity and the clustering of metabolic risk factors was found. Independent inverse associations were evident between physical activity and/or Cardio Respiratory Function with haematocrit concentration, plasma viscosity modulated by the factors like the concentration of plasma fi-brinogen , Associating with conventional cardiovascular risk factors and genetic polymor-phisms fibrinogen has been identified as an important additional marker of cardiovascular risk, though the causal involvement of fibrinogen in atherothrombogenesis is still not clear .

**PHYSICAL ACTIVITY, HDL CHOLESTEROL AND PLASMA FIBRINOGEN**

Habitual physical activity has been postulated as a significant preventive factor to prevent Atherosclerosis of arteries and can prevent CHD. But, the type and intensity of the exercise program has different effects on physiological risk factors of Coronary Heart Disease. The type and intensity of stimulus may show influence in deciding the response mechanism in the physiological environment of the human being and hence, detailed investi-gations and research studies have been taken up across the globe with different types of exer-cise programs in different protocols. Intensity of exercise or difficulty of exercise in general determines the outcomes like metabolites consumed, hematological changes occurred, mus-cular adaptations and many. Different physical exercises like resistance training, unresisted anaerobictraining, resisted aerobictraining and yoga may show different impact on the physiological markers of the CHD.

Dose-response relationship between the exercise type, intensity, volume and lipid and plasma fibrinogen need to be understood precisely to identify the schematic exercise proto-cols to derive positive benefits from exercise. In many instances it has been reported about the positive effect of medium intensity of resisted aerobictraining in controlling the lipid markers of the CHD. Some studies have also examined the relationship between the amount of total

energy spent through moderate exercise programs in a week and the effect of such exercise programs on lipid markers like High Density Lipoproteins(HDL), Total Cholesterol to High Density Lipoprotein ratio(TC/HDL) , Non HDL-C changes. A moderate amount of energy spent over a week through moderate exercise program may elevate the HDL fractions

## METHODS

Study involved with the female volunteers for the program who were explained about the program and the importance of the program. Sixty volunteer individuals in the age group of 25 to 30 years were assigned in random to four different groups of the research program making fifteen individuals in each group. Among the four groups three groups participated as activity groups and one group cooperated as control group. One group regularly participated in the moderate intensity resisted aerobicrunning activity, another group participated in the moderate intensity unresisted anaerobicrunning program and another group participated in a combined running program consisting of both resisted aerobicrunning and unresisted anaerobicrunning of moderate intensity. All the three groups practiced as per the protocol prepared at the start of the program for a period of four months. But, during the first month the groups were under orientation and slowly the participants improved their tackling capacity in their respective programs and from the second month onward the participants took the exercise program more precisely and con-structively. The control group did not exercise during the period of experimentation. Though it is difficult to equate the groups in their baseline values of resting HDL total, resting Plasma Fibrinogen, effort was done to reduce the gap by only taking those volunteers who never had any regular physical training previously. Statistical technique of Analysis of Covariance was used to offset these baseline differences by further extent. All the subjects were informed about the physical activity during the experimentation, and they were explained clearly about the effects of the running program.

All the safety precautions were taken that individuals will not suffer in any way as per the regulations formed in the Helsinki Declaration of Human subject experimentation and written acknowledgements were obtained from all the partici-pants in this study. It is also that the ethics committee regulations were followed in collecting the blood samples of the individuals of the study and was done at the renowned and well established medical laboratory.

## RESULTS

Analysis for resting total HDL cholesterol:

Table I elicits that the obtained F value is 23.072 and this value is higher than the critical value of F i.e. 2.76 and hence the experimental physical activity protocols brought variance among the groups in their resting total HDL cholesterol.

**TABLE I**

**ANALYSIS OF COVARIANCE FOR RESTING TOTAL HDL CHOLESTEROL**

| Source | Df | SS | MS | F | Cr.F |
|---|---|---|---|---|---|
| Total | 59 | 1372.52 | | | |
| Between | 3 | 752.686 | 250.8954 | 23.072 | 2.76 |
| Within | 57 | 619.833 | 10.874 | | |

Further analysis through the Scheffe's Post Hoc individual comparison (table II) re-vealed that all the three types of physical activity intervention groups experienced significant variance in the resting HDL cholesterol levels when compared to the control or inactivity! group. The variance between the Resisted aerobicgroup and unresistedanaerobicgroup is significant but the variance between the Resisted aerobicgroup and combined group is not significant. But, the variance between the combined group and the unresistedanaerobicgroup is also not significant.

**TABLE II**

**SCHEFFE'S POST HOC INDIVIDUAL COMPARISON TEST FORRESTING TOTAL HDL CHOLESTEROL**

**(Comparison Difference Obtained = 3.46)**

| Groups and Values | Resisted aerobicGr 51.64 | Combined Gr 50.15 | Unresisted anaerobicGr 46.81 |
|---|---|---|---|
| Combined Gr 50.15 | 1.49 N.Sig | | |
| Unresisted anaerobicGr 46.81 | 4.83 Sig | 3.34 N.Sig | |
| Control Gr 42.4 | 9.24 Sig | 7.75 Sig | 4.41 sig |

The results indicate that all the three physical activity interventions are equal and not sig-nificantly different among themselves in eliciting the significant variance in the total HDL cholesterol of the individuals. Only Resisted aerobicgroup could experience significant variance in the total HDL cholesterol when compared to another experimental group ieunresistedanaerobicgroup. Table III indicates that the combined activity group has maximum difference between the baseline and post physical activity intervention adjusted mean values with 8.75 when com-pared to the resisted aerobicgroup (8.64) and combined group (4.14).

**TABLE III**

**BASELINE, POST EXPERIMENTAL, ADJUSTED POST EXPERIMENTAL MEAN VALUES OF TOTAL HDL CHOLESTEROL**

| Groups | N | MX | MY | MY.X | MY.X-MX |
|---|---|---|---|---|---|
| Aero Gr | 15 | 43 | 52.4 | 51.64 | 8.64 |
| Anaero Gr | 15 | 42.67 | 47.2 | 46.82 | 4.14 |
| Comb Gr | 15 | 41.4 | 49.07 | 50.14 | 8.75 |
| ConGr | 15 | 42.27 | 42.33 | 42.41 | 0.13 |

The mean gain whencompared to the baseline value in the total HDL cholesterol favors the combined ac-tivity group than the resisted aerobicgroup in bringing significant increase in the resting total HDL cholesterol levels.

**ANALYSIS FOR RESTING PLASMA FIBRINOGEN**

Table IV elicits that the obtained F value is 52.015 and this value is higher than the critical value of F i.e. 2.76 and hence the experimental physical activity protocols brought variance among the groups in their resting Plasma fibrinogen.

**TABLE I**

**ANALYSIS OF COVARIANCE FOR RESTING TOTAL HDL CHOLESTEROL**

| Source | Df | SS | MS | F | Cr.F |
|---|---|---|---|---|---|
| Total | 59 | 27059.15 | | | |
| Between | 3 | 19819.52 | 6606.505 | 52.015 | 2.76 |
| Within | 57 | 7239.636 | 127.0112 | | |

the three types of physical activity intervention groups experienced significant variance in the resting Plasma Fibrinogen levels when compared to the control or inactivity group. The variance between the Resisted aerobicgroup and unresisted anaerobicgroup is significant but the variance between the Resisted aerobicgroup and combined group is not significant. And the variance between the combined group and the unresisted anaerobicgroup is also significant. The Resisted aerobicand Combined groups experienced significant variance in the resting Plasma Fibrinogen values vhen compared to the unresisted anaerobicactivity group.

**TABLE II**

**SCHEFFE'S POST HOC INDIVIDUAL COMPARISON TEST FOR RESTING PLASMA FIBRINOGEN**

**(Comparison Difference Obtained = 11.84)**

| Groups and Values | Resisted aerobicGr 228.14 | Combined Gr 235.2 | Unresisted anaerobicGr 253.94 |
|---|---|---|---|
| Combined Gr 235.2 | -7.06 N.Sig | | |
| Unresisted anaerobicGr 253.94 | -25.8 Sia | -18.74 Sia | |
| Control Gr 275.91 | -47.77 Sig | -40.71 Sig | -21.97 Sig |

Results indicate that the Resisted aerobiactivity group and combined activity groups are equal in controlling their resting Plasma Fibrinogen values when compared to the unresisted anaerobicactivity group.

Table VI indicates that the Resisted aerobicactivity group has maximum difference between the baseline and post physical activity intervention adjusted mean values in resting plasma fibrinogen with -58.72 when compared to the combined group (-45.26) and unresisted anaerobicgroup (-36.93).

**TABLE III**

**BASELINE, POST EXPERIMENTAL, ADJUSTED POST EXPERIMENTAL MEAN VALUES OF TOTAL HDL CHOLESTEROL**

| Groups | N | MX | MY | MY.X | MY.X-MX |
|---|---|---|---|---|---|
| Aero Gr | 15 | 286.86 | 235.2 | 228.14 | -58.72 |
| Anaero Gr | 15 | 290.87 | 264.33 | 253.94 | -36.93 |
| Comb Gr | 15 | 280.53 | 237.07 | 235.27 | -45.26 |
| ConGr | 15 | 255.20 | 256.67 | 275.91 | 20.71 |

The mean loss, when compared to the baseline means values in theresting Plasma Fibrinogen favors the Resisted aerobicactivity group and combined activity groups than the unresisted anaerobicgroup in bringing significant decrease in the resting Plasma Fi-brinogen levels. Resisted aerobicactivity group has more decrements in resting Plasma nbrinogen levels when compared to even the combined activity group.

**DISCUSSION**

Combined resisted aerobicand unresisted anaerobicrunning at moderate intensity has brought signifi-cant increments in the resting total HDL cholesterol levels in the individuals, when compared to the individuals participated in resisted aerobicrunning alone or unresisted anaerobicrunning alone. But, the effect of resisted aerobicrunning has also brought significant increments in the resting total HDL cholesterol in individuals and the variance observed in the resting total HDL cholesterol in the individuals through the combined running and Resisted aerobicrunning alone has no significant difference. Hence, resisted aerobicrunning may be useful in reducing significantly the resting total HDL cholesterol levels if practiced at moderate intensity, but it would be better to undergo the combined resisted aerobicand unresisted anaerobicrunning at moderate intensity since the

combination running also has brought significant increases and in fact more significant mean gain of total HDL cholesterol. Moreover, it would be ideal to practice the combination running to de-rive the other unresisted anaerobicadaptations along with the resisted aerobicadaptations, leading to increased muscle strength, muscle power, unresistedanaerobicthreshold level, lactic acid tolerance and lactate rotation. It may be good to practice resisted aerobicrunning at moderate intensity to bring positive changes in resting total HDL cholesterol, but the combined resisted aerobicand unresisted anaerobicrunning at moderate intensity has more advantages.

Moderate intensity resisted aerobicrunning and moderate intensity combined resisted aerobicand unresisted anaerobicrunning have brought significant decrements in the resting Plasma Fibrinogen of the individuals of the study. But the an decrements from the baseline mean to the adjusted post physical activity intervention mean indicate that the moderate intensity Resisted aerobicrunning alone has brought more significant decrement when compared to the moderate intensity com-bined resisted aerobicand unresisted anaerobicrunning. Since, the resting Plasma Fibrinogen has been recently considered as one of the powerful markers of the CHD precipitation, it would be ideal to involve in moderate intensity resisted aerobicrunningactivity to derive more benefits with respect to the resting Plasma Fibrinogen values.

**CONCLUSION**

Moderate intensity resisted aerobicrunning for at least twenty five minutes for four times in a week can bring significant increments in the resting total HDL cholesterol in the individuals. But, the moderate intensity combined resisted aerobicand unresisted anaerobicrunning for four times in a week may be better than the moderate intensity resisted aerobicrunning alone in increasing significantly the resting total HDL cholesterol and hence moderate intensity combined resisted aerobicand unresistedanaerobicrunning is more effective in this regard and also this kind of running gives an additionalbenefit of increasing the muscle strength, lactic acid tolerance. Moderate intensity resisted

aerobicrunning is more beneficial in decreasing significantly the resting Plasma fibrinogen levels of the individuals than the moderate intensity unresisted anaerobicrunning alone or moderate intensity combined resisted aerobicand unresisted anaerobic running.

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# EFFECT OF HIGH INTENSITY AEROBIC TRAINING AND REPEATED SPRINT ABILITY TRAINING ON SELECTED PHYSIOLOGICAL VARIABLES OF MEN FOOT BALL PLAYERS

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## ABSTRACT

The purpose of the study was to find out the effect of high intensity aerobic training and repeated sprint ability training on selected physiological variables of men foot ball players. To achieve this purpose of the study 45 men foot ball players were selected from Bachelor's degree in Department of Physical Education and Sports Sciences, Annamalai University, Tamil nadu, India at randomly. They were divided into three equal groups of each fifteen players. Group I high intensity aerobic training, Group II repeated sprint ability training group and Group III act as control group who did not underwent any special training programme apart from their regular physical education curriculum. Group I and II were underwent their respective training programme for three days per week for twelve weeks. The following physiological variables such as Resting pulse rate and Vital capacity were selected as criterion variables. The Resting pulse rate was assessed by Radial pulse rate and vital capacity was assess by using wet spirometer. All the subjects of three groups were tested on selected criterion variables at prior to and immediately after the training programme. Analysis of covariance (ANCOVA) was used to find out the significant difference if any, among the groups on each selected criterion variables separately. In all the cases, .05 level of confidence was fixed to test the significance, which was considered as an appropriate.

## INTRODUCTION

In general, no studies have compared the effects of aerobic interval training and (RSA) expansion repeated sprint ability based training in football players. Therefore, the aim of this study was to compare the changes induced by these two training modalities on aerobic power, football-specific endurance, sprint and jumping ability, and RSA. The author compared to aerobic interval training; RSA training would induce similar positive changes in

$Vo_2$max and football-specific endurance but greater improvements in jumping, sprinting and RSA.

For the physiological systems of the body to be fit, they must function well enough to support the specific activity that the individual is performing. Moreover, different activities make different demands upon the organism with respect to circulatory, respiratory, metabolic and neurological processes which are specific to the activity.

Physiological systems are highly adoptable of exercise. Each task has major physiological components and fitness for the task requires effective functioning of appropriate systems. Much research has been conducted in this area and specific principles of training have been established of the basis of scientific findings for developing these aspects of physical process.

Involvement in systematic and scientific programmes of conducting the graining will bring about desirable changes in physical and physiological variables, contributing to the development of strength, speed and endurance, besides marked changes in resting pulse rate, blood pressured, hemoglobin and such other physiological variables. Through training stroke volume and cardiac output are increased, maximal oxygen and ventilatory efficiency is improved, lung volume becomes larger and diffusion capacities increase. (www.seniorjournal.com)

Normal body temperature does not change significantly with aging. Temperature regulation, however, is more difficult. Because of changes in the heart, the resting heart rate may become slightly slower. It takes longer for the pulse to speed up when exercising, and longer to slow back down after exercise. The maximum heart rate reached with exercise is lowered. Blood vessels become less elastic. The average blood pressure increases from 120/70 mm Hg to about 150/90 mm Hg and may remain slightly high even if treated. The blood vessels also respond more slowly to a change in body position. Although lung function decreases slightly, changes are usually only in the reserve function. The rate of breathing usually does not change. (www.pennhealth.com)

Physical and physiological developments determine ones abilities, capacities and potentialities that an individual does exhibit. There are various physiological factors such as vital capacity, resting pulse rate, vo2max etc., which determine the physiological development as a whole. (www.nbc10.com)

## METHODOLOGY

To achieve this purpose of the study 45 men foot ball players in the Department of Physical Education and Sports Sciences, Annamalai University, Tamil Nadu, India were selected by random method as subject for this study. It was ensured that all of them were medically fit enough to withstand the training programme. The age of the subjects ranged from 18 to 24 years. The selected subjects were divided in three equal groups of fifteen subjects each such as high intensity aerobic training group, repeated sprint ability training group and control group. The group I and II underwent special training programme for three days per week for twelve weeks. Group III acted as control who did not participate any special training programmes apart from their regular physical activities as per their curriculum. The following variables namely resting pulse rate and vital capacity were selected as criterion variables. All the subjects of three groups were tested on selected dependent variables at prior to and immediately after the training programme. The analysis of covariance (ANCOVA) was used to analysis the significant differences, if any among the groups. The level of significance to test the "F" ratio obtained by the analysis of covariance was tested at .05 level of confidence which was considered as an appropriate.

## TRAINING PROGRAMME

During the training period, group I underwent high intensity aerobic training group, group II underwent repeated sprint ability training programme, for three days per week for twelve weeks in addition to their regular physical education activity, every day workout lasted about 30-45 minutes including warm-up and warm down exercises. Group III acted as control who did not participate any specific training, however, they per -form regular physical education programme.

## STATISTICALANALYSIS

The data was collected from three groups at prior to and after completion of the training period on selected criterion variables, were statistically examined for significant different if any, by applying analysis of covariance (ANCOVA). Scheffe's post hoc test was applied to know the significant difference between groups, if they obtained 'F' ratio was significant. In all cases 0.05 level of confidence was utilized to test the significance.

**Result**

The analysis of covariance of the data obtained for Resting pulse rate of pre-test and post-test of high intensity aerobic training group and repeated sprint ability training group and control group have been presented in Table I.

**TABLE I**

**ANALYSIS OF COVARIANCE FOR THE PRE AND POST TEST ON RESTING PULSE RATE OF HIGH INTENSITY AEROBIC TRAINING GROUP REPEATED SPRINT ABILITY TRAINING GROUP AND CONTROL GROUP**

| Test | High Inteusity Aerobic Training Group | Repeated Sprint Ability Training Group | Control group | Source of Variance | Sum of Squares | df | Mean Squares | Obtained 'F' Ratio |
|---|---|---|---|---|---|---|---|---|
| Pre Test | | | | | | | | |
| Mean | 71.26 | 71.33 | 71.46 | Between | 0.31 | 2 | 0.15 | 0.17 |
| S.D. | 0.88 | 0.89 | 1.06 | Within | 38.00 | 42 | 0.90 | |
| Post Test | | | | | | | | |
| Mean | 67.66 | 65.06 | 71.06 | Between | 271.60 | 2 | 135.80 | 96.34* |
| S.D. | 1.29 | 1.27 | 0.96 | Within | 59.20 | 42 | 1.41 | |
| Adjusted Post Test | | | | | | | | |
| Mean | 67.67 | 65.06 | 71.05 | Between | 268.94 | 2 | 134.47 | 93.99* |
| | | | | Within | 58.69 | 41 | 1.43 | |

* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 2 and 42 and 2 and 41 are 3.22 and 3.23 respectively).

Table I shows that the pre-test means on high intensity aerobic training group, repeated sprint ability training group and control group are 71.26 ± 0.88, 71.33 ± 0.89 and 71.46 ± 1.06 respectively. The obtained 'F' ratio value 0.17 is less than the required table value 3.22 for 2 and 42 at 0.05 level of confidence on Resting pulse rate.

The post-test means on high intensity aerobic training group, repeated sprint ability training group and control group are 67.66 ± 1.29, 65.06 ± 1.27 and 71.06 ± 0.96 respectively. This obtained 'F' ratio value 96.34 is greater than the required table value 3.22 for 2 and 42 at 0.05 level of confidence on Resting pulse rate.

The adjusted post-test means on high intensity aerobic training group, repeated sprint ability training group and control group are 67.67, 65.06 and 71.05 respectively. This obtained 'F' ratio value 93.99 for adjusted post-test is greater than the required table value 3.23 for 1 and 42 at 0.05 level of confidence on Resting pulse rate.

The results of the study indicated that there was a significant difference between the adjusted post-test means of high intensity aerobic training group, repeated sprint ability training group and control group on Resting pulse rate.

Since, three groups were compared, whenever the obtained 'F' ratio for adjusted post test was found to be significant, the Scheffe's test to find out the paired mean differences and it was presented in Table II.

**TABLE II**

**THE SCHEFFE'S TEST FOR THE DIFFERENCE BETWEEN PAIRED MEANS ON RESTING PULSE RATE**

| High Intensity Aerobic Training Group | Repeated Sprint Ability Training Group | Control group | Mean Differences | Confidence Interval Value |
|---|---|---|---|---|
| 67.67 | 65.06 | - | 2.61* | 0.55 |
| 67.67 | - | 71.05 | 3.38* | 0.55 |
| - | 65.06 | 71.05 | 5.99* | 0.55 |

*Significant at 0.05 level of confidence.

The table II shows that the mean difference values between high intensity aerobic training group and repeated sprint ability training group, high intensity aerobic training group and control group, repeated sprint ability training group and control group are 2.61, 3.38 and 5.99 respectively on breath holding time which were greater than the required confidence interval value of 0.55 significance.

The results of this study showed that there was a significant difference between high intensity aerobic training group and repeated sprint ability training group,

high intensity aerobic training group and control group and repeated sprint ability training group and control group on resting pulse rate.

The analysis of covariance of the data obtained for vital capacity of pre-test and post-test of high intensity aerobic training group and repeated sprint ability training group and control group have been presented in Table III.

**TABLE III**

**ANALYSIS OF COVARIANCE FOR THE PRE AND POST TEST SCORES ON VITAL CAPACITY OF HIGH INTENSITY AEROBIC TRAINING GROUP REPEATED SPRINT ABILITY TRAINING GROUP AND CONTROL GROUP**

| Test | High Intensity Aerobic Training Group | Repeated Sprint Ability Training Group | Control group | Source of Variance | Sum of Squares | df | Mean Squares | Obtained 'F' Ratio |
|---|---|---|---|---|---|---|---|---|
| **Pre Test** | | | | | | | | |
| Mean | 3.49 | 3.49 | 3.52 | Between | 0.005 | 2 | 0.003 | 1.63 |
| S.D. | 0.03 | 0.04 | 0.03 | Within | 0.066 | 42 | 0.002 | |
| **Post Test** | | | | | | | | |
| Mean | 3.66 | 3.81 | 3.51 | Between | 0.64 | 2 | 0.32 | 148.10* |
| S.D. | 0.04 | 0.05 | 0.04 | Within | 0.09 | 42 | 0.00 | |
| **Adjusted Post Test** | | | | | | | | |
| Mean | 3.66 | 3.81 | 3.51 | Between | 0.63 | 2 | 0.31 | 147.49* |
| | | | | Within | 0.08 | 41 | 0.02 | |

* Significant at .05 level of confidence.

(The table values required for significance at .05 level of confidence for 2 and 42 and 2 and 41 are 3.22 and 3.23 respectively).

Table III shows that the pre-test means on high intensity aerobic training group, repeated sprint ability training group and control group are 3.49 ± 0.03,

3.49 ± 0.04 and 3.52 ± 0.03 respectively. The obtained 'F' ratio value 1.63. is less than the required table value 3.22 for 2 and 42 at 0.05 level of confidence on vital capacity.

The post-test means on high intensity aerobic training group, repeated sprint ability training group and control group are 3.66 ± 0.04, 3.81 ± 0.05 and 3.51 ± 0.04 respectively. This obtained 'F' ratio value 148.10 is greater than the required table value 3.22 for 2 and 42 at 0.05 level of confidence on vital capacity.

The adjusted post-test means on high intensity aerobic training group, repeated sprint ability training group and control group are 3.66, 3.81 and 3.51 respectively. This obtained 'F' ratio value 147.49 for adjusted post-test is greater than the required table value 3.23 for 1 and 42 at 0.05 level of confidence on vital capacity.

The results of the study indicated that there was a significant difference between the adjusted post-test means of high intensity aerobic training group, repeated sprint ability training group and control group on vital capacity.

Since, three groups were compared, whenever the obtained 'F' ratio for adjusted post test was found to be significant, the Scheffe's test to find out the paired mean differences and it was presented in Table IV.

**TABLE - IV**

**THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS ON VITAL CAPACITY**

| High Intensity Aerobic Training Group | Repeated Sprint Ability Training Group | Control group | Mean Differences | Confidence Interval Value |
|---|---|---|---|---|
| 3.66 | 3.81 | - | 0.15* | 0.07 |
| 3.66 | - | 3.51 | 0.15* | 0.07 |
| - | 3.81 | 3.51 | 0.30* | 0.07 |

* Significant at 0.05 level of confidence.

The table IV shows that the mean difference values between high intensity aerobic training group and repeated sprint ability training group, high intensity aerobic

training group and control group, repeated sprint ability training group and control group, 0.15, 0.15 and 0.30 respectively on vital capacity which were greater than the required confidence interval 0.07 significance.

The results of this study showed that there was a significant difference between high intensity aerobic training group and repeated sprint ability training group, high intensity aerobic training group and control group, repeated sprint ability training group and control group on vital capacity.

## CONCLUSIONS

The following conclusions were drawn based on the analysis of the study,

1.Significant difference was found among high intensity aerobic training group, repeated sprint ability training group and control group on Breath holding time and vital capacity.

2.Significant improvement was on selected criterion variables such as resting pulse rate and vital capacity due to high intensity aerobic training group, repeated sprint ability training programmes.

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# EFFECT OF DIFFERENT PHASES OF TRAINING ON BODY COMPOSITION AMONG UNIVERSITY MEN KABADDI PLAYERS

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## ABSTRACT

In physical fitness, body composition is used to describe the percentages of fat, bone and muscle in human bodies. Because muscular tissue takes up less space in our body than fat tissue, our body composition, as well as our weight, determines leanness. Two people at the same height and same body weight may look completely different from each other because they have a different body composition. The aim of this study is to find out the effect of changes during different phases of training on body composition variables such as body mass index and percent body fat. 30 University level men kabaddi players were selected and given resistance training under different phases, conditioning, intensive, in-season, and off season by manipulating the load, intensities and frequencies of selected weight training exercises. Results proved that different phases of training altered body mass index and there was significant differences between initial and in-season phase. Though percent body fat showed reduction they were not significant at 0.05 level at any stage. It was concluded that the different phases of training can be utilized for improving body composition variables by university level men kabaddi players.

**Key Words**: Resistance Training, Conditioning Phase, Intensive Phase, In-season Phase, Off-season Phase, Body Mass Index, Percent Body Fat.

## INTRODUCTION

The National Institute of Health recommends that a healthy adult male's body should have between 6 and 24 percent fat and a female should have 14-31%. Levels significantly above these amounts may indicate excess body fat. Athletes, leaner individuals, and more muscular individuals will have a body fat percentage lower than these levels. In general, most athletes

experience greater performance benefits at body fat percentages between 7 and 19 percent for men, and 10 and 25 percent for women, depending on the sport. Training methods includes weight training, interval training, fartlek training, circuit training, isotonic training, isometric training and isokinetic training. The heart activity is accelerated by exercise and strengthens its fibers. Exercise also stimulates growth, and strengthens the bones, muscles, ligaments and tendons (Hardayal Singh, 1991). Different activities can be carried out with different intensities which may have different effect in organism. It is better to start gradually and take more time reaching the objectives than to start at a high level drop out because of injury caused by either the intensity or frequency of the programme. (Morehouse and Gross, 1975). Thus, training programmes forms different phases.

The body mass index (BMI) is a heuristic proxy for human body fat based on an individual's weight and height. BMI does not actually measure the percentage of body fat. It was invented between 1830 and 1850 by the Belgian polymath Adolphe Quetelet during the course of developing "social physics". Body mass index is defined as the individual's body weight divided by the square of his or her height. The formulae universally used in medicine produce a unit of measure of $kg/m^2$.

A person's body fat percentage is the total weight of the person's fat divided by the person's weight and consists of essential body fat and storage body fat. Essential body fat is necessary to maintain life and reproductive functions. The percentage for women is greater than that for men, due to the demands of childbearing and other hormonal functions. Essential fat is 3%–5% in men, and 8–12% in women. Storage body fat consists of fat accumulation in adipose tissue, part of which protects internal organs in the chest and abdomen. The minimum recommended total body fat percentage exceeds the essential fat percentage value reported above Sports training program phases revolve around peaking for major competitions, phases generally progress as follows, the first phase of training prepares the athlete for more intensive weight training with heavier weight loads. It is referred to as the conditioning phase, the hypertrophy phase, or the starter phase. Fitness training programs typically advance to a more intensive training phase where weight loads are consistently increased until fitness training goals are met under intensive training phase. Then the athlete performs a maintenance or in-season phase in which the athlete stabilize the level of performance which enables for major competition at the right time. The off season phase permits for an active rest so that

the athlete can gain recovery in preparation for the next season phase. To phase at the desired level of strength, (Fleck and Kraemer,1996; Powers et al.,2006; Schmidt and Wrisberg, 2000) different phases of training progress from low intensity and high volume, to high intensity and low volume. In other words, do more repetitions with lighter weights early in training, and fewer repetitions with heavier weights later in training. Testing after each of the phases of training will help one make sound decisions for adjusting the training programme in subsequent phases. This is how one personalize the training programme to promote continuous improvement toward the goals.

Sanchez-Medina L, et.al. (2010) analyzed the contribution of the propulsive and braking phases among different percentages of the one-repetition maximum (1RM) in the concentric bench press exercise and highlighted the importance of considering the contribution of the propulsive and braking phases in isoinertial strength and power assessments. Delecluse C et.al. (1995) analyzed the effect of high-resistance (HR) and high-velocity (HV) training on the different phases of 100-m sprint performance and by means of a principal component analysis on all speed variables, three phases were distinguished: initial acceleration (0-10 m), building-up running speed to a maximum (10-36 m), and maintaining maximum speed in the second part of the run (36-100 m). Padilla et al. (2001) evaluate exercise intensity and load during mass-start stages in professional road cycling, using competition heart rate (HR) recordings and found load zones reflected the physiological demands of different mass-start cycling stage categories. which could be useful for planning precompetition training strategies. Padilla ,et al. (2008) examined the exercise intensity and load of the mountain passes of the major 3-week races according to their difficulty (length and slope) and position within the stage and reported that mountain passes are highly demanding and that their intensity is related not only to the difficulty of the ascents but also to the position within the stage.

The investigator found very few attempts were made to find out the effect of different phases of training on selected body composition variables of university level men kabaddi players.

The purposes of this research was to find out the "body composition changes during different phases of training among university men kabaddi players"

## METHODOLOGY

To achieve the purpose of this study, 30 men kabaddi players, who represented the Annamalai University at inter-university tournaments were selected and tested of their body composition variables such as body mass index, percent body fat which formed the initial scores of the subjects. The subjects underwent resistance training under four phases, namely, conditioning, intensive, in-season and off-season phases. Each phase of training lasted for 3 weeks and the subjects were tested of their selected body composition on completion of each phase of training. The investigator selected five resistance (weight training) exercises namely Military Press, Barebell Rows, Squats, Standing Calf Raises and Leg Press and determined the 1 RM for each resistance exercise using Brzycki Formula (Brzycki, 1998). The aim of conditioning phase, was to make the body to adjust to the stress of weight training, for this purpose the subjects were given 40% to 50% of 1 RM with different repetitions. The intensive phase was to gain greater levels of strength, power and other qualities that transfer from weight training to sport skills, hence the subjects were trained with resistance training of 50% to 70% of 1 RM with different repetitions and varied frequencies. The in-season phase aimed at stabilizing the level of performance on the fitness components built during the previous phases and gain a competitive edge for peaking for major competitions at the right time, hence the subjects were trained with resistance training of 70% to 80% of 1 RM with increased repetitions and varied frequencies. The off-season phase would permit the subjects for an active rest to get recovery in preparation for the next pre-season phase, which would be otherwise called the detraining phase. The obtained data of initial (1st day of the training session), end of the 3rd week (conditioning phase), end of 6th week (intensive phase), end of 9th week (in-season phase) and end of 12th week (off-season phase) on selected criterion variables were subjected to statistical treatment using repeated ANOVA and the results arrived at.

## RESULTS

**Tab: 1: Results on Repeated Analysis of Variance on Body Composition Variables**

| Calculation of Repeated Analysis of Variance on Body Mass Index (In Index Numbers) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Means on Completion of Different Phases | | | | | Source of Variance | Sum of Squares | df | Means Squares | F |
| Initial | Conditioning | Intensive | In-season | Off Season | | | | | |
| 21.39 | 20.78 | 20.25 | 19.34 | 19.89 | Subjects | 294.11 | 29.00 | | 3.00* |
| | | | | | Trials | 75.54 | 4.00 | 18.89 | |
| | | | | | Residuals | 914.31 | 145.00 | 6.31 | |
| | | | | | Total | 544.66 | 149.00 | | |
| **Calculation of Repeated Analysis of Variance on Percent Body Fat (In Percentage)** | | | | | | | | | |
| 14.65 | 14.10 | 14.00 | 14.06 | 14.10 | Subjects | 48.83 | 29.00 | | 0.86 |
| | | | | | Trials | 8.52 | 4.00 | 2.13 | |
| | | | | | Residuals | 361.11 | 145.00 | 2.49 | |
| | | | | | Total | 401.42 | 149.00 | | |

Required $F_{(0.05),\,(4,145)} = 2.35$ *Significant

**Tab 2: Scheffe's Post Hoc Analysis Results on Body Mass Index**

| Means on Completion of Different Phases | | | | | Mean Difference | Reqd C. I |
|---|---|---|---|---|---|---|
| Initial | Conditioning | Intensive | In-season | Off Season | | |
| 21.39 | 20.78 | | | | 0.61 | 2.00 |
| 21.39 | | 20.25 | | | 1.15 | 2.00 |
| 21.39 | | | 19.34 | | 2.06* | 2.00 |
| 21.39 | | | | 19.89 | 1.50 | 2.00 |
| | 20.78 | 20.25 | | | 0.53 | 2.00 |
| | 20.78 | | 19.34 | | 1.44 | 2.00 |
| | 20.78 | | | 19.89 | 0.89 | 2.00 |
| | | 20.25 | 19.34 | | 0.91 | 2.00 |
| | | 20.25 | | 19.89 | 0.36 | 2.00 |
| | | | 19.34 | 19.89 | -0.55 | 2.00 |

* Significant

## DISCUSSIONS

The results presented in Table I proved that the obtained F value of 3.00 was greater than the required table value of 2.35 with degrees of freedom 4, and 145 at 0.05 level, and it was proved that different phases of resistance training significantly altered the body mass index of the university kabaddi players. Results were subjected to statistical post hoc analysis using Scheffe's confidence interval test and the results presented in Table 2 proved that there was significant difference between initial scores and in-season phase scores as the obtained value of 2.06 was greater than the required confidence interval value of 2.00. The results proved that due to different phases of resistance training, the body mass index was gradually altered at every phase of the training comparing to initial scores. Though there was reduction in all the phases comparing to initial scores, the difference between initial and in-season phase alone was significant.

The results on percent body fat proved that the obtained F value of 0.86 was less than the required table value of value of 2.35 with degrees of freedom 4, and 145 at 0.05 level. This proved that there was no significant alteration in percent body fat due to different phases of resistance training.

In this study, the investigator arranged the training schedule as suggested by Powers et al.,2006; Schmidt and Wrisberg, 2000 different phases of training progress from low intensity and high volume, to high intensity and low volume, this significantly altered the weight of the subjects which resulted in significant reduction in body mass index. However, the weight reduction has not be observed on the percent body fat, which may take some more time, that is why, though it was noted reduction in percent body fat among the subjects, the differences was not significant. The results of this study is in agreement with the findings of the Padilla et al. (2001) Padilla ,et al. (2008) who found load zones reflected the physiological demands of different mass-start cycling stage categories. This could be useful for planning precompetition training strategies. And the findings of this study are in agreement with the findings of Sanchez-Medina L, et.al. (2010) analyzed the contribution of the propulsive and braking phases among different percentages of the one-repetition maximum (1RM) in the concentric bench press exercise and highlighted the importance of considering the contribution of the propulsive and braking phases in strength and power assessments

## CONCLUSIONS

It was concluded that different phases of resistance training can be better utilized for improving body composition variables by university level men kabaddi players.

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# EFFECT OF WEIGHT TRAINING PROGRAM ON STRENGTH ENDURANCE IN PREADOLESCENT GIRLS.

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**Abstruct**

Strength endurance is the ability of a muscle or group of muscles to sustain repeated contractions against a resistance for an extended period of time Muscular endurance is dependent upon the quality of the muscles, the extensiveness of their capillaries Resistance training for children has been a debated topic for many years. Coaches, parents and the general public alike have been very cautions regarding this topic. The majority of current evidence indicate that prepubescent and adloscent resistance training is not only safe, but effective in developing muscular strength and endurance.

The purpose of the present study was to observe the effect of weight training program on strength endurance development of preadolescent girls. 30 school girls of 11+ years but less than 12 years were selected for the study. Total girls were divided into two groups. Experimental group (EG); n=15 and control group(CG); n=15. The strength endurance of different muscles groups (Deltoid, Abdomen, and Quadriceps) were measured by the flex, arm hang, sit ups, and half squat test respectively for both the groups. The experimental group underwent a weight training regimen twice per week for 12 weeks. It was observed that after 12 weeks of weight traing programme the level of strength endurance improved in the in the preadolescent girls group.

**Introduction**

Resistance training for children has been a debated topic for many years. Coaches, parents and the general public alike have been very cautions regarding this topic. Previous arguments stated that if any one under the age of 16 years engages in strength training, he or she will develop serious growth problem and overall development set backs. Despite evidence of poor strength level in children, the idea of children participating in strength and resistance training program has gained support from the physician and physical educators. In many research report in the past indicated that strength training for prepubescent boys and girls is not effective due to lack of sufficient level of testosterone. Further it was indicated that strength training may affect bone growth plate and a potential hazard for musculoskeletal development. However, Faigenbaum et al (1999) have clearly shown overall muscle strength

development following resistance training among 10 years boys and girls. American Academy of Pediatric have also revised their positional statement on resistance training in children and made recommendations of its use in children's fitness. Resistance training can enhanced strength and muscle hypertrophy in adolescent (Webb 1990), bone mineral density (Morris et al 1997) and have long lasting effect on children (Faigenbaum et.al 1996). The majority of current evidence indicates that prepubescent and adolescent resistance training is not only safe, but effective in developing muscular strength and endurance.The purpose of the present study was to observe the effect of weight training program on strength endurance in preadolescent girls.

**Methods:**

The study was designed to assess the effects of weight training program on the strength endurance development in prepubescent girls. 30 school girls of 11+ years but less than 12 years were selected for the study. The subjects belong to the colliery belt of Burdwan District, West Bengal. Both the participants and their parents were informed about the nature of the study. Total girls were divided into two groups. Experimental group (EG); n=15 and control group (CG); n=15. The strength endurance of different muscles groups (Deltoid, Abdomen, and Quadriceps) were measured by the flex arm hang, sit ups, and half squat test respectively for both the groups. The experimental group underwent a weight training regimen twice per week for 12 weeks. Each training session lasted 100 min. and the weight training consisted of 5 exercises. These were front press, barbell curl, bench press, leg press and hamstring curl. Before the training, the strength of the different muscles groups were determined by 1RM test. The exercises were started with 50% of 1RM. The load were increased by 5% after 3 weeks of training. The detail training program is given in table 1.

**Table 1 : The Weekly Schedule for Experimental Group.**

| Day | Duration | Schedule |
|---|---|---|
| **Tuesday** | 100 min. | 1. Warming up- 10 min.<br>2. Main exercise with 50% of 1RM<br>.Set 1- 10 rept.<br>Set 2- 12 rept.<br>Set 3 12 rept.<br>Density: 3 min. in each set<br>For each exercise 15 min.<br>For 5 exercises 15*5=75 min.<br>3. cooling down 15 min. |
| **Friday** | 100 min. | Repetition of the same schedule |

*The progressive resistance training method followed during the total training period
* 5% load increased after each 3 weeks of training.

**Results:**

The result between the pre and post test for strength endurance scores in both groups presented in the table 2.

Table 2 : Post Hoc test for significance difference between mean in different test.

| Tests | Group | Pre mean | Post mean | Mean difference | Level of significant |
|---|---|---|---|---|---|
| Flex arm hang | E.G. | 19 | 36.08 | 17.08 | .000 |
| | C.G. | 17.05 | 18.60 | 1.55 | .680 |
| Sit ups | E.G. | 4.93 | 10.07 | 5.13 | .021 |
| | C.G | 4.33 | 5.50 | 1.46 | .126 |
| Half squat | E.G | 24.67 | 43.33 | 18.67 | .000 |
| | C.G | 23.67 | 26.13 | 2.46 | .019 |

**Fig 1. Graphical presentation of pre and post mean value of Flex Arm Hang test.**

Sec.

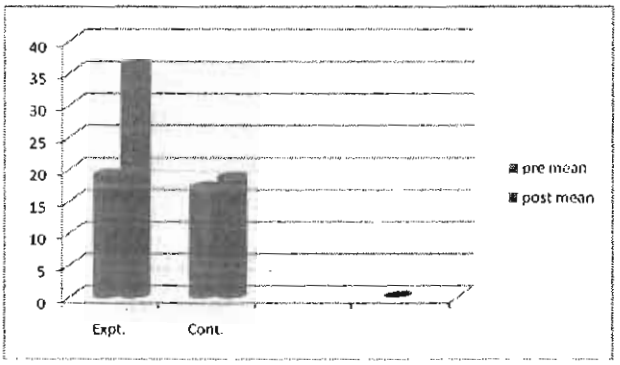



**Fig 2. Graphical presentation of pre and post mean value of Sit Ups Test.**

Count

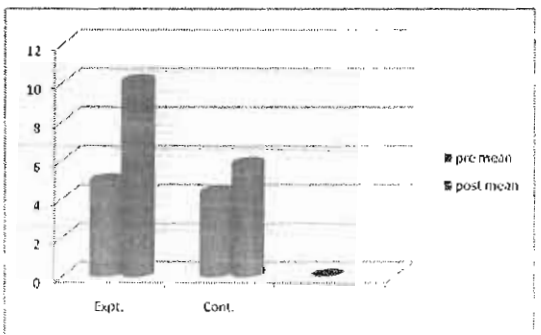
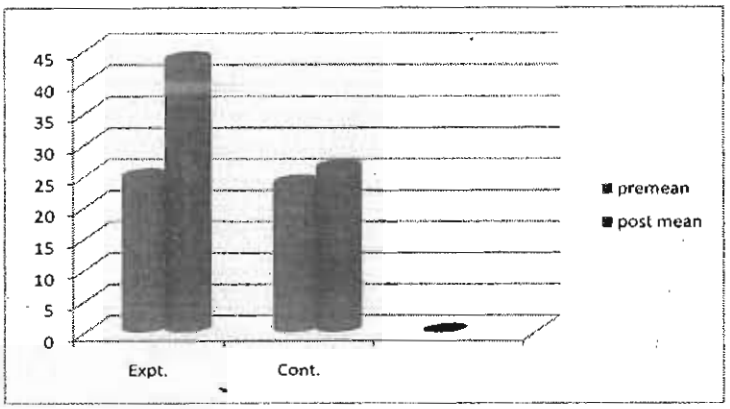


**Fig 3. Graphical presentation of pre and post mean value of Half Squat Test.**




**Discussion:**

From the table it appears that the experimental group improves significantly due to training in all the variables. The control group on the other hand showed a increase in the half squat test only. In this study the training program was designed to improve muscular strength endurance level focusing on flex arm hang, sit ups and half squat test. Researcher used weight training method for the development of strength endurance in preadolescent girls which enable the coaches to supervise resistance training program for female athletes. The improvements in muscular strength endurance in the present study support the observations of Ramsay et al 1990, who reported increases in muscular strength endurance in children after 20 week progressive resistance training program. The physiological aspects of strength and strength endurance developments attributed to length and diameter of the muscle fibers, increased total amount of proteins, more vascularisation, thickness of the sarcholema and other membranes, increase in motor unit activation etc. In the present study strength endurance improvement may also be attributed to such development. Mersch and Stoboy, (1989) showed an increase in strength and muscle size in preadolescent, following a strength training program. Fukunaga et al. (1992) showed muscle hypertrophy in preadolescents. There are some studies which have examined neuromuscular changes in strength training intervention studies in children. Blimkie (1989) showed 9% increase in motor unit activation following 10 weeks of strength training program. Ozmun et al. (1994) showed a 17% increase in muscle activation in prepubertal boys and girls following a training program of 8 weeks. Thereby the findings of this study are in close proximity with the finding of leading researchers.

Resistance training method stimulates the neuromuscular system. It activates the muscular fibers and nervous system. Further more resistance training increases motor neuron excitability and reflex action, which may lead to better training conditions for subsequent exercises. This fact may contribute to the improvement observed in this study. On the other hand, with the beginning of puberty and through out the maturation process, there is an increase in boys muscular proportion from 27% to 40% of body mass with increases in muscular strength (Israil, 1992). Kraemer et al. 1993 reported that hormonal factors like increase in circulating androgens and level of testosterone may help in this process.

From this study the researcher concluded that weight training may be beneficial for strength endurance development in the preadolescents girls.

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# EFFECT OF EIGHT WEEKS PLYOMETRIC TRAINING ON BROAD JUMP PERFORMANCE OF SCHOOL GOING STUDENTS

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## ABSTRACT

Everyday the standard of performance rises due to improvement of skill, conditional ability and scientific coaching. Each sports strength is required and strength is developed by training. The purpose of our study was to find out the effect of eight weeks plyometric training on broad jump performance of school going boys. For the study 200 boys' subject were randomly selected from the total strength of 982 students of class V to X standard of M.U.H. School, Machatora, Bankura, W.B., of 2008-09 sessions, age of the subjects were ranging between 10 to 16 years and they were equalized into two groups : Experimental Group-A and Control Group-B, according to their pre-training performance. Then they were administered plyometric training that includes following exercises (i) Double leg hopping, (ii) Squat jumps, (iii) Bounding, (iv) Box-drill with rings, (v) Nateral Hurdle jumps of thirty five minutes per day, twice a week, up to eight weeks. After the end of the training session post training data were collected and satistically calculated. On the basis of the analysis of data, within the limitations imposed on the experimental conditions, researchers came to the following conclusions that plyometric training improves broad jump performance of the school going children.

**Key Words :**Plyometric, training, broad jump performance

## INTRODUCTION :

Sport performance rises due to conditional ability and scientific coaching. We all know that the strength is the key to success in modern sports and games. Different training procedures we adopt to increase strength. Like that plyometric training is a specific exercise for the enhancement of explosive power that includes strength and speed. It improves the relationship between maximum strength and explosive power. Strength comes from muscles of our body those the composed of contractile elements and elastic elements which are parallel and action in series. The neuromuscular system accepts and expels rapid loading at high velocity through the coordination of both reflexes and these elastic and contractile components of muscle. Due to these facts the definition of elastic strength occurred (the ability of neuromuscular system to overcome resistance with a high speed of contraction). Athletes have a combination of the two and their resultant technique in long jumping has laid to the descriptive terms such as speed flapper and strength or power flapper. The reason is that the approach speed, the mechanics leading up to and observed in the plant and the take off time differ between the speed and strength flapper. The purpose of the study was to find out the effect of eight weeks plyometric training on broad jump performance of school going boys.

## Method :

### Subject :

For the study 200 male subject were selected randomly from the total strength of 982 students of class V to X standard of M.U.H. School. Machatora, Bankura of 2008-09 sessions, age of the subjects were ranging between 10 to 16 years.

## DESIGN OF THE STUDY :

First an initial test of 200 subjects were administered and recorded. Then the subjects were divided into two homogeneous groups, that is Group-'A' and Group-'B', were designated as 'Experimental Group' and 'Control Group' respectively.

Then the Plyometric training was applied on Group-A, for thirty five minutes, two days in a week for eight weeks. Instruction for the control group that is Group-B was leading staying simple daily life.

**ADMINISTERING THE TEST :**

Board jumps were measured from the nearest break in the landing area made by any part of the body or limbs to the nearer end of take off line. The subjects have given three chances and average scores were taken in meters. The measurement was taken perpendicular to the take-off line or its extension in the unit of meters.

The following exercises were applied – (i) Double leg hopping, (ii) Squat Jumps, (iii) Bounding, (iv) Box drill with rings, (v) Lateral Hurdle Humps.

After completion the experimental period of eight weeks, the final test of Group-'A' and Group-'B' were conducted to measure the effect of the Plyometric training programme on broad jump performance of the subjects.

**STATISTICAL PROCEDURE :**

The paired 't' test was calculated to find out the difference between the initial test and final test. The Criterion measure chosen for compare the two groups that is Grout-'A' and Group-'B' was tested at 0.01 and 0.05 level of significance.

**RESULTS :**

| Group | Pre-test | | Post-test | | 't' |
|---|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. | |
| Experimental Group | 4.0023 | 0.614 | 4.28 | 0.63 | 3.16* |
| Control Group | 3.9401 | 0.623 | 3.9652 | 0.627 | 0.28 |

**RESULTS POST TEST SCORES**

| Experimental Group | Control Group | 't' |
|---|---|---|
| $M_1 = 4.2795$ | $M_2 = 3.9652$ | 3.54* |
| $S_1 = 0.63$ | $S_2 = 0.62$ | |
| N=100 | N=100 | |

*Significant at 0.01 and 0.05 level of confidence and 198 degree of freedom.

$T_{0.05}(198)=1.97$ $T_{0.01}(198)=2.60$

**DISCUSSION OF FINDINGS :**

The investigators found from the result that Plyometric training with weight and without weight improves and increases the muscular strength, when it is administered. In final test, it was found that the group 'A' performed much better than the group 'B' in the broad jump. Thus the hypothesis is formulated earlier that there would be no difference in broad jump performance due to plyometric training is rejected as truly it has significance due to plyometric training on broad jump performance.

**CONCLUSION :**

On the basis of the analysis of data, within the limitations imposed on the experimental conditions, the following conclusion may be drawn. By applying plyometric training on certain subjects, the researchers have found that plyometric training may improves broad jump performance.

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# EFFECT OF STATIONARY CIRCUIT TRAINING ON SELECTED PHYSICAL FITNESS COMPONENTS AMONG UNIVERSITY PLAYERS

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## ABSTRACT

The purpose of the study was to find out the effect of stationary circuit training on selected physical fitness components among university players. Thirty male students studying in various faculty of Annamalai University, Annamalai Nagar, Tamil Nadu, India were randomly selected as subjects. Their age ranged between 18 to 24 years. The selected subjects were divided into two equal groups of fifteen each namely stationary circuit training group and control group. The experimental group has undergone twelve weeks training programme whereas the control group maintained their daily routine activities and no special training was given. The subjects of the two groups were tested on selected physical fitness variables namely muscular strength endurance, agility and explosive power using standardized tests before and after the training period. The results of the study showed that stationary circuit training group improved significantly on muscular strength endurance, agility and explosive power when compared to control group.

**Key Words :** Stationary circuit training; Strength endurance, Agility, Explosive power.

## INTRODUCTION

Training denotes the process of preparation for some task. This process invariably extends to a number of days and even months and years. Means and measure from several sports scheme disciplines significantly support the training of an advanced sports person. Sports training is the basic form of an athlete's training. It is the preparation systematically organised with the help of exercises which in fact is a pedagogically organised process of controlling the development of an athlete. Sports training is a basic preparation of the sportsmen for better performance through physical exercise. It is based on scientific principles of aiming at perfonmance enhancement. Sports activities consist of motor movement and action and their success depends to a great extend on how correctly they are performed. Circuit training is a form of conditioning combining resistance training and high-intensity aerobics. It is designed to be easy to follow and target strength building as well as

muscular endurance. Traditionally, the time between exercises in circuit training is short, often with rapid movement to the next exercise. The aim of the present study was to observe the fitness changes after circuit training.

## METHODOLOGY

To achieve this purpose of the study, thirty male students studying in various faculty of Annamalai University, Annamalai Nagar, Tamil Nadu, India were randomly selected as subjects. Their age ranged between 18 to 24 years. The selected subjects were divided into two equal groups of fifteen each namely stationary circuit training group and control group. The stationary circuit training group underwent stationary circuit training for three days a week and for twelve weeks whereas no special training was given for control group. There were eight stations and different exercises were given.

Among physical fitness components, the following variables such as muscular strength endurance, agility and explosive power were selected as criterion variables. Muscular strength endurance, agility and explosive power were evaluated by using standard tests namely bend knee sit-ups, shuttle run and standing broad jump, prior to and after the training period. The collected data were analyzed statistically through analysis of covariance (ANCOVA) to find out the significant difference, if any between the groups. The .05 level of confidence was fixed to test the level of significance.

## Results and Discussions

The descriptive analysis of data collected on selected physical fitness variables before after twelve week of stationary circuit training was presented table I.

**TABLE I : MEAN AND SD OF PHYSICAL FITNESS COMPONENTS**

| Variables | Groups | Pre Test | | Post Test | |
|---|---|---|---|---|---|
| | | Mean | S.D | Mean | S.D |
| Muscular strength | Experimental group | 24.87 | ±2.29 | 28.33 | ±3.68 |
| | Control group | 24.67 | ±2.28 | 25.07 | ±3.08 |
| Agility | Experimental group | 8.43 | ±1.12 | 7.23 | ±1.43 |
| | Control group | 8.11 | ±1.21 | 8.10 | ±1.22 |
| Explosive power | Experimental group | 45.68 | ±2.68 | 57.36 | ±3.71 |
| | Control group | 46.73 | ±2.78 | 48.13 | ±2.18 |

The data collected from two groups prior to and after experimentation on muscular strength, agility and explosive power were statistically examined for significant differences, if any, by applying the analysis of covariance (ANCOVA) with the help of SPSS package and presented in table-II

**TABLE-II : ANALYSIS OF COVARIANCE OF PHYSICAL FITNESS COMPONENTS**

| Variables | Groups | Adjusted Post Test Mean | SOV | Sum of Squares | df | Mean Square | F" Ratio |
|---|---|---|---|---|---|---|---|
| Muscular strength | Experimental group | 28.13 | B | 248.83 | 1 | 248.83 | 45.57* |
| | Control group | 24.93 | W | 147.47 | 27 | 5.46 | |
| Agility | Experimental group | 7.31 | B | 4.98 | 1 | 4.98 | 17.17* |
| | Control group | 8.10 | W | 7.88 | 27 | 0.29 | |
| Explosive power | Experimental group | 55.42 | B | 831.54 | 1 | 332.62 | 89.88* |
| | Control group | 47.69 | W | 57.46 | 27 | 1.75 | |

*Significance at .05 level

(Required table value for significance at .05 level of confidence for df of 1 and 27 is 4.21)

The findings of the study showed that significant difference exist between stationary circuit training and control group on muscular strength endurance, agility and explosive power since the obtained 'F' ratio of 45.57, 17.17, and 189.88 respectively were greater that the required table value of 4.21 for significance at .05 level of confidence for df of 1 and 27.

The literature supports the present evidence that stationary circuit training produces greater increases in strength and power parameters. Studies have shown improvement in aerobic capacity from participation in circuit training. Kass & Castriotta, 1994; Kaikkonen et al (2000). observed significant improvement on cardiovascular and muscular fitness due to the effect of a 12-week low resistance stationary circuit training. Gettman et al (1978) conducted a study to determine the changes elicited by stationary circuit training programs. They concluded that the stationary circuit training program was most effective in improving strength and changing body composition and aerobic capacity.

**Conclusions**

The results of this study demonstrated that stationary circuit training may improve strength endurance, agility and explosive power in the university level sportsperson.

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# PATTERN OF BLOOD LACTIC ACID ACCUMULATION AFTER A SHORT TERM HIGH INTENSITY AND A LONG TERM LOW INTENSITY EXERCISE PROTOCOL

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## Abstract

Blood Lactic Acid (BLA) is generally considered as metabolic indicator due to exercise stress. Depending of the nature of activities and intensity of work, i.e. anaerobic workout BLA appears in the blood accordingly. In the present study an attempt has been made to identify this metabolic indicator in two different workouts:

(1) High intensity short term exercise
(2) Low intensity long term exercise

The pattern of change of BLA at rest, immediately after exercise and during recovery have been observed.

For this study twenty subjects in the age group 23 years, mean body weight 62.00 kg were the volunteers. All the subjects maintained a good standard of physical fitness. Subjects were asked to a run 50m all out dash on a specified day. Similarly they were asked to run 12 min continuously (Cooper Test) run. Blood sample were collected before, immediately after and during recovery for both the exercises. Heart Rate was recorded during each time when Blood Lactic Acid was also measured. The data collected were statistically analysed.

HR and BLA records formed a strong relationship particularly during recovery. The pattern of change of Lactic Acid was highly related to anaerobic load. A wide range of variation was noted in the recovery BLA accumulation which is in all probability due to variation in anaerobic capacity. Following 12 min run BLA reduced significantly within 10 mins of recovery where as after 50m dash the sharp decrease was not observed. It means following high intensity short term activity the BLA accumulation will remain at a higher value for a considerable period of time during recovery in comparison to low intensity long term exercise. BLA during recovery may be considered as a metabolic index of exercise stress.

**Key word :** Blood Lactic Acid, Heart Rate

## Introduction

During exercise when hydrogen oxidation does not keep pace with its production lactate forms and pyruvate temporarily binds hydrogen. It's simply means that some blood lactate accumulates continuously even under resting condition. In the body there is a mechanism by which excess lactate is also removed. When lactate removal does not match production, blood lactate begin to accumulate.

The identification of lactic acid as a product of muscle activity was discovered at early in 20th century. It has been shown that short-term high intensity exercise produces high levels of arterial lactate.

At rest the normal range for blood lactate is 0.5- 2.2 mmol per litre. It is thought that complete exhaustion occurs some where in the range of 20-25 mmol/L for most individuals.

Blood lactate concentration reaches its peak about 5 minutes after the cessation of intense exercise (assuming cessation is due to exhaustion from acidosis). The delay is attributed to the time required to buffer and transport lactic acid from the tissue to the blood. A return to pre-exercise levels of blood lactate usually shown to accelerate this clearance. Training can also increase the rate of lactate clearance in both aerobically and anaerobically trained athletes compared to untrained individuals.

## Purpose:

Purpose of the study was to observe pattern of Blood Lactic Acid (BLA) accumulation following a short-term high intensity and a long-term low intensity exercise protocol.

## Methodology :

Twenty two young male active university students ( Age : 23.0 yrs) undergoing Bachelor of Physical Education course were the volunteers for the study. The mean height of the subjects was 170.18 cm and the mean weight was 62.0 kg.

After collecting Heart Rate (HR) and Blood sample before exercise subjects were asked to run a 50m or all -out sprint (Type-1) run. 10 min preparatory or warming-up was allowed. In a separate other day again the pre- exercise Heart Rate (HR) and Blood Lactate (BL) was measured and the subjects were asked to participate in 12-min continuous run (Type-2).

Immediate after cessation of exercise the subjects were asked to sit on a chair for collection of blood samples for Blood Lactate and also Heart Rates were recorded.

Subjects Heart Rate (HR) and Blood Lactic Acid (BLA) were measured at rest (pre-exercise), just after completion of the exercise (post-exercise) and during recovery period at 5th, 10th, 20th, 30th & 60th minutes.

For the accurate measurement of Heart Rate (HR) Polar FS1, FS2, FS3, Heart Rate Monitor, Finland, used. There are three unit : (i) Wrist Unit- displays Heart Rate, Exercise Time and the time of day, it is used as wrist watch. (ii) Polar Transmitter- it has to wear while exercising. The electrodes areas are on the back of the transmitter and Elastic Strap- which helps to holds the transmitter around chest. For measuring HR- Transmitter have to put just below the chest muscles in such a way that wet electrode areas are firmly attached against skin of the subjects. The wrist unit was as good a watch. Before starting the exercise initial information had to put in the units. Then during exercise current Heart Rate, Exercise Duration, Exercise Time Indication etc. will displayed and kept within the memory. After completion of the exercise from the memory of the transmitter Hear Rate was read with the help of computer.

For accurate measuring Blood Lactate 'Lactate Pro' Test Meter (™) instrument was used. For measuring Blood Lactae- three items are required : (i) Lactae Pro Test Meter (ii) Lactae Pro Test Strip and (iii) Lancing Device and Lancets. At the time of BL measurement- after startup the test meter through specified procedure, a drop of blood have to collect using a lancing device, then the tip of the strip have to touch to the drop of blood. The measurement will automatically start from the Test Meter.

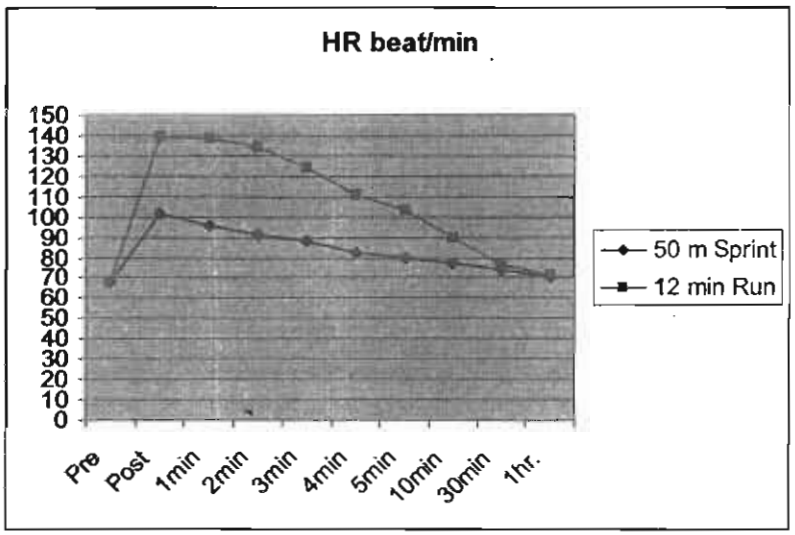
**Results and Discussions :**

The data obtained from two separate protocol of exercise, i.e. (50m Sprint and 12 min Run) of Mean Heart Rate (HR) at resting, immediate after cessation of exercise, during 1 min, 2min, 3 min, 4 min, 5 min, 10 min, 30 min and 60 min (1 hr) of recovery are presented in the Table no. -1. It has been observed that in Case-1 resting mean HR was 67.90, post- ex HR was 101.25. During recovery HR was decreased from the post-ex. At 1st min of recover HR was 95.6 and after 1 hr it was 70.05 beats / min i.e. almost to resting level. In Csae-2 it appears from the table that mean Resting HR was 67.90 and post- ex HR was 139.25 beats / min. HR was decreased during recovery from 138.0 (1st min recovery) to 70.85 beats / min after 1 hr.

**Table – 1 :** Mean Heart Rate (HR) beats / min for 50 m Sprint and 12 min run

| Type of Ex. | Resting | Post Ex. | Recov 1min | Recov 2min | Recov 3min | Recov 4min | Recov 5min | Recv 10min | Recov 30min | Recv 1hr. |
|---|---|---|---|---|---|---|---|---|---|---|
| 50m Sprint (Case-1) | 67.90 | 101.25 | 95.6 | 91.65 | 87.85 | 82.10 | 80.0 | 77.30 | 73.95 | 70.05 |
| 12min Run (case-2) | 67.90 | 139.25 | 138.0 | 133.90 | 124.10 | 110.65 | 102.80 | 89.95 | 76.15 | 70.85 |

**Fig. 01:** Mean Heart Rate (HR) beats / min for 50 m Sprint and 12 min run




The figure no.-1 indicated the same pattern as the Table no. 01. In Case no. 1 i.e. after 50 m sprint HR was increased sharply from that of resting condition. Similarly recovery HR also decreased sharply till 10th min of recovery, and in case no. 2 recovery pattern was almost identical only difference noted was gradual decrease of HR till 30th min. The stress response of two separate pattern of exercise (may be identified from) recovery pattern of the Sprint Run and 12 min run..

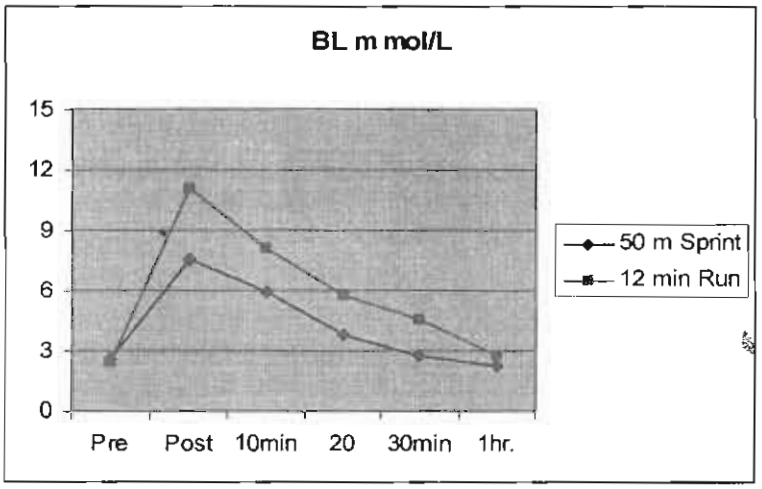
**Table – 2 :** Mean Blood Lactate Acid (BLA) m mol / l for 50 m Sprint and 12 min run

| Typeof Ex. | Resting | Post Ex. | Recv10min | 20 | Recv 30min | Recv1hr. |
|---|---|---|---|---|---|---|
| 50 m Sprint (Case-1) | 2.53 | 7.55 | 5.89 | 3.81 | 2.73 | 2.22 |
| 12 min Run (Case-2) | 2.39 | 11.02 | 8.03 | 5.76 | 4.54 | 2.77 |

The data obtained from two separate protocol of exercise i.e. (50m Sprint and 12 min Run)of Mean Blood Lactate (BLA) at resting, immediatly after cessation of exercise, during 10 min, 20 min 30 min and 60 min (1 hr) of recovery are presented in the Table no. -2. It has been observed that in Case-1 resting Mean BLA 2.53 m mol, post- ex BLA was 7.55m mol. During recovery BLA was decreased from the post-ex. At 10th min of recover

BLA was 5.89 and after 1 hr it was 2.22 i.e. almost that of resting level. In Csae-2 it appears from the table that mean Resting BLA was 2.39 and post- ex BLA was 11.02. BLA was decreased during recovery from 8.03 (10th min recovery) to 2.77 m mol after 1 hr.

**Fig. 02:** Mean Blood Lactate (BLA) m mol / L for 50 m Sprint and 12 min run




Heart Rate (HR) is the indicator of the exercise stress and Blood Lactate (BLA) is reflecting the metabolic adjustment. In post-exercise analysis the magnitude of difference between two sets of exercise is clearly envisaged. The post-exercise Heart Rate (HR) of the two sets of exercises were 101.25 and 139.25 b/min where as for BLA it was 7.55 m mol after 50 m sprint and 11.02 m mol after 12 min run. Recovery pattern till 30$^{th}$ min was almost identical in two sets of exercise. It simply means that Lactic Acid removal of first 10 mins was very fast but the pattern of disappearance of BLA was almost identical in both the 50 m and 12 min run exercise protocol. Analysing the data of both HR and BLA it is clearly indicated that both the data are reflection of body's adaptation to exercise stress. More the stress of the exercise more was the HR and BLA level. But the recovery is the indicator of adjustment of homeostatic mechanism or adaptation. Since the subjects were trained to a large extent the recovery was faster in both HR and BLA parameters. Short-term high intensity exercise had much less impact on both HR and BLA than that of long-term low intensity protocol.

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# A STUDY ON GENDER DIFFERENCE IN COMPETITIVE ANXIETY OF KHO-KHO PLAYERS

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## ABSTRACT

The present study was conducted to investigate the possible differences of anxiety level among male and female Kho-kho players. The sample comprised of 30 ((15 male, 15 female) university level Kho-kho players between 19 to 25 years of age who represented the Visva-Bharati University in the Inter-varsity Kho-Kho tournaments. The research tool used for the study was 'Sports Competitive Anxiety Test (SCAT) Questionnaire' developed by Martens, Vealey, and Burton (1990) to measure the anxiety level of the players who participate in the competitive sport. The result indicated that the anxiety level of male and female sport performers under study was average in the SCAT score. However, statistically no significant difference in anxiety levels between male and female players was observed.

**Key Words:** Anxiety, Gender difference, Kho-Kho

## Introduction

Anxiety is one of the main psychological attribute that influence athletes during competition. Research has established that the ability to cope with intense anxiety is integral to success in competitive sport, particularly at the highest levels (Gould, Eklund, & Jackson, 1992; Scanlan,Stein, & Ravizza, 1991). In response to anxiety distinct ambiguities are there in gender difference too as found in works of Krane & Williams (1994); Wark & Wittig (1979); Campen & Roberts (2003); Thatcher et al. (2004) etc.

Kho-kho seems to be a simple 'run and touch' game but it demands a good physical fitness and at the same time a good power of mind. Performance in sports primarily depends upon physical ability and skill, but the mind set and the interactive quality between anxiety level and performance are of prime importance.

Anxiety plays a major role in the literature of Sports Psychology. Numerous questions arise regarding the dynamics of competitive anxiety and it is essential to pay much attention to

understand the anxiety status of sportsmen or sportswomen during, before and after competition days.

Majority of athletes anxiety is considered to weaken the performance (Hanin, 2002). Thus, anxiety is a negative emotion that affects perceptions in sport competitions. This negative emotional state is characterized by nervousness, worry, and apprehension associated with activation or arousal of the body (Weinberg & Gould, 2007).

In general, the athletes are focused on winning and beating others. Athletes anxiety is an experience of whether or not they believe they can demonstrate competence in achievement situations (Roberts, 2001). According to Hanton, O'Brien and Mellalieu (2003), the level of anxiety before and during competition is not clear because of contradictory findings of their study, while Raglin and Hanin (2000) found that different athletes reported different levels of anxiety, i.e. from high to low. According to Hackfort & Schwenkmezger (1989) the intensity and duration of the anxious state varies according to the amount of stressful stimuli that the player encounters and the period of subjective threat created by the stimuli.

Research ambiguity is there on the gender differences concerning state anxiety levels. Krane & Williams (1994); Wark & Wittig (1979); Scanlan & Passer (1979) revealed that male athletes typically display lower levels of anxiety and higher self-confidence than female athletes. Campen & Roberts (2003) revealed that women are more prone to emotion-focused strategies, particularly seeking emotional social support, while men are socially reinforced for using more problem-focused approaches to coping. Thatcher et al. (2004) found a significant time by gender interaction for cognitive and somatic anxiety intensity. He proclaimed that male self-reported anxiety levels in relation to their adrenalin and noradrenalin responses, had no significant changes over time. For females the anxiety responses increased, and were accompanied by decreases in adrenaline and noradrenalin. They also demonstrated that the more experienced college player would show lower levels of cognitive and somatic anxiety than the less experienced player. It is beneficial to test gender coping strategies for physical educators, coaches and other practitioners so that they can use the information to develop athletes and help maximizing their abilities to cope with competitive stress more successfully (Hammermeister & Burton, 2001).

Therefore, the present study intended to compare the competitive anxiety level of male and female Indian players who participated in the Inter-varsity Kho-kho tournaments.

**Methodology**

For the purpose of the study a total of 30 varsity Kho-kho players (15 male and 15 female) ranging the age between 19 to 24 years were selected as subjects. The subjects represented Visva-Bharati University in the North-East Zone Inter-varsity Kho-kho tournaments.

The instrument used in obtaining data of each player's anxiety level was the questionnaire of Sport Competition Anxiety Test (SCAT) developed by Rainer Martens et.al (1990). The SCAT consists of 15 questions. The questions were in the form of statements that the subjects used to describe themselves.

**Collection of data :** All participants were asked to take 2 min to read out each statement of the questionnaire and decide if he or she "Rarely", "Sometimes" or "Often" feels when they compete in Kho-Kho competitions, and then tick in the appropriate box to indicate their response.

**Scoring :** The score for the response to each question according to the situation is 1, 2 and 3. The sum of score of each question is the SCAT score.

Norm of SCAT Score:

- Less than 17 : a Low level of Anxiety.
- 17 to 24 : an Average level of Anxiety
- More than 24 : a High level of Anxiety.

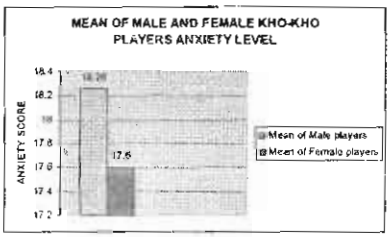
In order to find out the significant difference, if any, between the two group means independent 't'-test was applied. The level of significance was set at 0.05.

**Findings and Results**

The mean score of anxiety level and p-value of the female and male kho-kho players under study are given in the Table- 1.

**Table – I**

**THE MEAN AND P VALUE OF ANXIETY LEVEL OF MALE AND FEMALE KHO-KHO PLAYERS**



| Male | Female | p-value obtained | Tabulated value |
|---|---|---|---|
| Mean & SD | Mean & SD | | |
| 18.26 ± 3.63 | 17.6 ± 3.52 | 0.6139 | 2.048 (at 0.05 level) |

In Table I, the comparison of mean of the two groups indicated that the mean anxiety level of the Male Kho-kho players' group (x=18.26) was higher than that of the Female group (x=17.6). It was apparent observation that the competitive anxiety level was lower in females than their male counterparts.

As the SCAT score indicates that the Anxiety level may be considered 'average' in case of obtained scores ranging between 17 to 24. It appears that both the groups, i.e. male and female Inter-varsity kho-kho players were average in sports competition anxiety level.

Table -I also presents the p-value comparing the anxiety level of the female and male players of Inter-university level and shows that no significant difference exists between the groups $p = 0.6139 < 0.05$ level. Thus, statistically no significant difference in anxiety levels of male and female players were recorded.

The reason for average anxiety level of the male and female subjects under study might be due to moderate exposure of the subjects in the competitive sport. Further, the male and female groups' insignificant difference in anxiety level might be due to homogeneity in experience level and personality characteristics, or due to higher skill level. Elite athletes with higher skill level have been found to report low levels of anxiety (Sade, Bar-Eli, Bresler and Tenenbaum, 1990).

This result is supported by the findings of many other researchers such as Hammermeister and Burton (2001); Seeley, Storey, Wagner, Walker and Watts (2005); Ramella-DeLuca (2003); Ampongan (2001) who also found that there is no significant difference in the level of anxiety between male and female athletes.

**Conclusion**

Within the limitations of the study it may be concluded that there was no gender difference in the anxiety levels of Inter-varsity kho-kho players and both the groups, male and female, were found average in levels of sports competition anxiety.

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# A STUDY OF CONCENTRATION AND RELAXATION ABILITY BETWEEN INTER-COLLEGE AND INTER-UNIVERSITY SOFTBALL PLAYERS

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## ABSTRACT

The purpose of the present study was to compare the concentration ability and relaxation ability between inter- college and inter-university Softball Players. The subjects consist of 50 (inter-college :25 and inter-university:25) female softball players between the age group of 18 to 25 years, studying at the colleges affiliated to Guru Nanak Dev University, Amritsar and Panjab University, Chandigarh. The purposive sampling technique was used. For data collection the Mental Skills Questionnaire was used. The t-test indicated there was no significant difference on the concentration ability and relaxation ability between inter-college and inter-university Softball Players.

**Keywords:** Softball, concentration, relaxation,

## INTRODUCTION

Thinking affects an individual's behavior and performance in training and competition. It focuses on teaching practical skills to athletes to enable them to develop their mental abilities. The increased stress of competitions causes the athletes to react both physically and mentally in a disturbed manner that affect negatively their performance abilities, they become tense and find it hard to concentrate on the task in hand. Irrespective of the sports, an athlete's success and failure is dependent on a combination of physical and mental abilities (Nideffer, 1976). Concentration is recognized as a vital psychological ability and it is the ability to direct one's thinking in whatever directions one would intend. Relaxation is of great importance athlete striving for peak performance. Relaxation can help athlete reduce mental (self-doubts, worry etc) and physical anxiety (nausea, shaking etc) while increasing concentration and performance at the sametime.

PURPOSE OF THE STUDY

To find out the differences on the variables concentration ability and relaxation ability between inter-college and inter-university Softball Players.

## METHODS

SUBJECTS - The subjects consist of 50 (inter-college:25 and inter-univarsity:25) female softball players between the age group of 18 to 25 years, studying at affiliated colleges of Guru Nanak Dev University, Amritsar and Panjab University, Chandigarh. The purposive sampling technique was used.

SELECTION OF VARIABLES

a) Concentration ability b) Relaxation ability

SELECTION OF TOOL

Mental Skills Questionnaire (Nelson and Hardy's, 1990).

PROCEDURE

The mental skills questionnaire consists of a number of statements about experiences associated with competitive sports. Each subject was asked to read each statement very carefully and circle the appropriate number to indicate the extent to which one agrees with the statement on the rating scale from strongly disagree to strongly agree. The subjects were asked to answer honestly to each question in relation to their own sporting experience.

SCORING

The encircled responses to each of the test items are added to get a score. The lower score represents weaker whereas the higher score represents stronger level of mental ability.

STATISTICAL ANALYSIS

Mean, SD, and independent samples t test was used to test if population means estimated by two independent samples differed significantly. A significance level of $P<0.05$ was considered significantly different. Data was analyzed using SPSS Version 16.0.

## RESULTS AND DISCUSSION

Table -1 :Comparison of Scores on the variable of 'Concentration Ability' between inter college and inter-university softball players

| Variable | Inter-College Players (N=25) | | | Inter-University Players (N=25) | | | 't'-value |
|---|---|---|---|---|---|---|---|
| | Mean | SD | *SEM* | *Mean* | SD | *SEM* | |
| Concentration Ability | 13.44 | 5.64 | 1.13 | 15.92 | 5.00 | 1.00 | 1.64 |

**tabulated 't'=2.00 (df=48)**

Table-1 shows the comparisons on the variable of 'concentration ability' between inter college and inter-university softball players . The mean value of inter college and inter-university softball players were found to be 13.44 and 15.92 respectively. The standard deviation of inter college and inter-university softball players were 5.64 and 5.00 respectively and standard error of mean scores were 1.13 and 1.00 respectively. The 't' value 1.64 was found to be non significant as the tabulated value of 't' was 2.00 at 0.05 level of significance with degree of freedom 48 and the table values showed that there were no significant difference between Inter-university and inter-college softball players on the variable 'concentration ability'.

**Table -2: Comparison of Scores on the variable of 'Relaxation Ability' between inter college and inter-university softball players.**

| | Inter College Players (N=25) | | | Inter-University Players (N=25) | | | |
|---|---|---|---|---|---|---|---|
| **Variable** | **Mean** | **SD** | *SEM* | *Mean* | **SD** | *SEM* | **'t'-value** |
| Relation Ability | 17.92 | 4.12 | 0.82 | 19.12 | 3.50 | 0.70 | 1.11 |

tabulated 't'=2.00 (df=48)

Table-2 shows the comparisons on the variable of 'relaxation ability' between inter college and inter-university softball players. The mean value of inter college and inter-university softball players were found to be 17.92 and 19.12 respectively. The standard deviation of inter college and inter-university softball players were 4.12 and 3.50 respectively and standard error of mean scores were 0.82 and 0.70 respectively. The 't' value 1.11 was found to be non significant as the tabulated value of 't' was 2.00 at 0.05 level of significance with degree of freedom 48 and table values showed that there were non significant difference between inter college and inter-university softball players on the variable 'relaxation ability'.

It has been observed from the above findings that the result on the variable of comparison between inter-college and inter-versity softball players were found to be non significant. The findings are in contrast on the concentration variable with the study on superior and non-superior male karate players conducted by Mohammadzadeh et al (2009). Moreover findings are in conformity with those reported by Neil et al (2006) conducted on elite and non-elite rugby union players, on the variable of relaxation ability. Similarly the results of

present study are in conformity with the findings of the study conducted by Huddleston and Thiese (1999) on female collegiate swimmers.

## CONCLUSION

In the era of competitive sports the psychological preparation itself becomes a prerequisite for success. It was concluded that the intervesity softball players were higher mean (not significant) concentration and relaxation than the inter college players.

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# RELATIONSHIP OF PERSONALITY TRAITSAND SOCIO-ECONOMIC STATUS OF THE ENGINEER COLLEGE SPORTS PERSON

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## Abstract

The research was conducted to observe the relationship of personality and socio-economic status of the engineering students. The sample consisted of 300 sports person selected randomly from different engineering colleges affiliated to Punjab Technical University. The main objective of the study was to find out the relationship of personality and socio-economic status of sports person. Eysenck Personality Inventory test and Rajbirsingh, RadheyShyam and Satishkumar's Socio-economic status Scale Questionnaire was administered. On the basis of Chi-square and Karl Pearson's correlation coefficient analysis it was found that the sportsperson's personality is not affected by the socio economic status of their family.

**Key words:** Personality, Extroversion, Introversion, sports person.

**Introduction**

Sports yield an enormous range of individual differences, which are so important to understand for purpose of selection and training and also sensitive to social control, group effort and competitive atmosphere. Such differences pertain to talent for varying kind of sporting activity as well as to variations within a particular sport.

Most of us at one point or another have played or participated in a sport, whether it is volleyball, tennis, karate or pole-vaulting. Recent studies have shown that the complex of multiple personality traits that composes each individual may be a significant factor in which sport you prefer to play. The broadest category of personality traits involves extraversion and introversion. People reflecting traits of extraversion tend to be excitable, outgoing, lively, sociable and impulsive. People reflecting traits of introversion tend to be reserved, reclusive, thoughtful, calm, and rational. They are more interested in their own mental self,

work better alone, and are controlled in social situations, preferring closer, more personal relationship.

History of personality assessment is as old as man on the earth. In primitive age people informally attempted to test the personality of their fellow being with the help of crude methods, mostly involving the use of physical strength. There was no formalized technique of personality assessment in those days. With the development of civilization, new methods were evolved. There are numerous instances of personality assessment with the help of different puzzles, physical feats and other means in literature. Psychologist identified that all individuals can be classified into four categories (i)Pyknic (ii) Asthenic, (iii)Athletic (iv)Dyplastic.For some time these classifications were considered very significant from the point of view of personality study. Sportsmen, as a separate category have been given no place in the hierarchy. In fact it has been recently confirmed that a sportsman has a more complete personality structure than any of the types mentioned above. Certain personality traits have been identified which predominate in an athletic personality. Sociability, dominance, extraversion, self-concept, conventiality, mental toughness, emotional stability etc. are some of the traits which have been identified in the personality of sportsman in general.

The strength and direction of the individual's interests, attitudes, motives, values and related variable represent an important aspect of his personality. These characteristics materially affect his vocational pursuits and other major phases of daily living.

In recent years, physical educators have become increasingly aware of the intimate relationship between the personality of the individual and the culture of the social class to which he belongs. The importance of the socio-economic stratification for the development of achievement motivation arises in the context of the similar early life experiences, same attitudes value, and training practices which help similar configuration of motives in the same sub group of society. Similar kind of later life experiences in particular kind of situations after childhood makes people in a specific group homogenous.The results of various studies in the past have indicated that middle class subjects are highly motivated than their working class counterparts.Concerning the relationship between social class and an achievements in India, Mehta (1967) has found that subjects coming from different social classes (social class based on fathers education, occupation and income) do not differ significantly in their

achievement levels. The aim of the present study was to collect information about personality trait and socio economic status of the engineering college students.

## Method

Three hundred sports person were selected randomly from different engineering colleges affiliated to PunjabTechnical University.

## Measures

Psychological Questionnaire of Personality by Eysenck Personality Inventory test andRajbir Singh, RadheyShyam and Satishkumar's Socio-Economic status scale questionnaire was administered on sports person to get the data.

## Statistical techniques

To study the personality and socioeconomic status; Chi- square was implemented as well as Karl Pearson's correlation coefficient was applied.

## Result

**Table No 1 :Frequency Distribution of Personality (Extroversion/ Introversion) of Engineering Sports Person and Socio-Economic Status of their Family**

| Group | | SES | | | | | Total |
|---|---|---|---|---|---|---|---|
| Sports Person Personality | | Low SES | Middle LSES | Middle ASES | Middle USES | High SES | |
| Extrovert | Count | 5 | 7 | 10 | 7 | 6 | 35 |
| | % within EXTCATE | 14.3% | 20.0% | 28.6% | 20.0% | 17.1% | 100.0% |
| | % within SES | 8.9% | 11.5% | 12.8% | 11.3% | 14.0% | 11.7% |
| Average | Count | 28 | 34 | 49 | 32 | 27 | 170 |
| | % within EXTCATE | 16.5% | 20.0% | 28.8% | 18.8% | 15.9% | 100.0% |
| | % within SES | 50.0% | 55.7% | 62.8% | 51.6% | 62.8% | 56.7% |
| Introvert | Count | 23 | 20 | 19 | 23 | 10 | 95 |
| | % within EXTCATE | 24.2% | 21.1% | 20.0% | 24.2% | 10.5% | 100.0% |
| | % within SES | 41.1% | 32.8% | 24.4% | 37.1% | 23.3% | 31.7% |
| Total | Count | 56 | 61 | 78 | 62 | 43 | 300 |
| | % within EXTCATE | 18.7% | 20.3% | 26.0% | 20.7% | 14.3% | 100.0% |
| | % within SES | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

**Table2 :Chi-Square Test of Personality (Extroversion/Introversion) of Engineering Sports Person and Socio-Economic Status of their Family**

| Group | | Value | d.f. | Asymp. Sig.(2-Sided) |
|---|---|---|---|---|
| Sports person | Pearson Chi-Square | 6.626(a) | 8 | .577* |

* p- value insignificant (0.05)

The scores of the table 1 indicate that highly motivated sportsperson students belong to middle socio-economic status group i.e.201 students (67%) fall in middle socio-economic status. In other ways 35 students (11.7%) were extrovert, 95 students (31.7%) were Introvert and 170 students (56.7) falls in average category.

Table 2 indicates that the Sportsperson Personality (Extrovert/Introvert) is not affected by the socio economic status of their family.

**Table 3 :Relationship of Personality Traits and Socio-Economic Status of Engineering Sports Person**

| | | Extrovert | Neuro. | SESS |
|---|---|---|---|---|
| Extrovert | Pearson Correlation | 1 | .050 | .042 |
| | Sig. (2-tailed) | . | .391 | .467 |
| | N | 300 | 300 | 300 |
| Neuro | Pearson Correlation | .050 | 1 | .067 |
| | Sig. (2-tailed) | .391 | . | .249 |
| | N | 300 | 300 | 300 |
| SESS | Pearson Correlation | .042 | .067 | 1 |
| | Sig. (2-tailed) | .467 | .249 | . |
| | N | 300 | 300 | 300 |

Table 3 shows the Karl Pearson's correlation coefficient and their significant p-value between all pairs of socio-economic status, extroversion and neuroticism. The researchers observed that Karl Pearson's correlation coefficient values are poor between the all pairs of the above mentioned parameters. The finding of the Chi-Square test shows that the socio economic status of the family did not have any influence on personality trait (extroversion/Introversion) of engineering sports person.

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# ANALYSIS OF SPORTS COMPETITION ANXIETY BETWEEN MALE HANDBALL AND VOLLEYBALL PLAYERS

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## ABSTRACT

The purpose of the investigation was to find out the sports competition anxiety in the inter moral tournaments. The study conducted on 60 male inter moral tournaments players; 30 from Handball and 30 from Volleyball, who were selected randomly from different course of Mahadev Desai Sharirik Shikshan Mahavidyalaya, Gujarat Vidyapith, Sadra, Gandhinagar Ahmedabad, Gujarat Anxiety levels were obtained by administering Sports Competition Anxiety (SCAT) questionnaire of Renier Martens, a day before their matches. We observed that there was significant difference between handball and volleyball players tournaments in sport competition anxiety.

**Key Words :** sports competition anxiety, hand ball, volley ball

## INTRODUCTION

In the modern sports, psychological preparation of a team is as important as teaching them the different skills of a game with scientific methods. Most of the coaches agree that the physical characteristics, skills physical fitness training of the players are extremely important but they also feel that good psychological preparation for competition is a necessary component for success. The development and acceptance of any scientific discipline requires an ever-expanding and maturing empirical base. Yet despite vast scientific progress in allied domains of professional psychology, the field of sport psychology has remained fairly stagnant in its research progress and has overlooked major advances that could aid in the advancement of the discipline particularly in India.

Anxiety plays a paramount role in sports. It is the challenge in sports participation which produces anxiety. Anxiety is likely to be grater in higher competitive sports, than in relatively non competitive sports. Because in the competitive sports participants are expected to win, the great demands made them anxious. An offensive player need more aggressiveness then a defensive player. Defensive player requires calm and cool approach while defending. Anxiety of the players is to be optimum for better performance. Efficient player with good

physique and fitness and mastery over all the skills but lacking in psychological qualities is not been able to play effectively for a longer duration. Therefore, an attempt has been made to find out the competition anxiety (SCAT) of handball and volleyball players.

## METHODOLOGY

The subjects were of male inter moral tournaments players, who participated in the handball and volleyball tournament organized by Mahadev Desai Sharirik Shikshan Mahavidyalaya Sadra, Gandhinagar run by Gujarat Vidyapith, Ahmadabad Gujarat in the year 2008-09. The subjects were selected randomly from different physical education course (30 Handball and 30 Volleyball players) and those who were qualified in the quarter final of that tournament. The age ranged from 18 to 25 years (Mean-21 yrs). The data were collected by employing Sports Competition Anxiety Test (SCAT), one day prior to the competition.

To compare the sports competition anxiety of handball and volleyball inter moral mean, so and unpaired t-test was applied.

## RESULT

**Table-I : Sports Competition Anxiety**

| Group | Mean (Score) | 't'-value (unpaired) |
|---|---|---|
| Handball Players | 12.07 | 19.84* |
| Volleyball Players | 14.23 | |

Significant at 0.05 level

Table- I shows that there is a significant difference between the handball and volleyball players before the inter moral tournaments in their anxiety level.

The researchers only observed the competition anxiety of volleyball and handball players. From his study it may concluded that this area should be unexplored in future for better performance of Indian sport person.

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# A STUDY ON INFLUENCE OF SPRINTING SPEED AND LEG EXPLOSIVE STRENGTH ON LONG JUMP TAKE-OFF

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## ABSTRACT

The purpose of this study was to analyse the influence of leg explosive strength and sprinting speed on the take-off velocity of long jump. For this study four state level male long jumpers were selected with the performance of six meter and above. The leg explosive strength was measured by the standing broad jump and the sprinting speed was measured by the velocity at the distance between 50-60m of a 100m race sprint by the subjects. The dependent variable was the take-off velocity obtained by the jumpers during their take-off. The subject's take-off velocity was measured by the video graphic technique during their jumps. From the results it was found (i) the Jumpers having good sprinting speed have better horizontal velocity at take-off phase, (ii) leg explosive strength exhibited positive correlation with horizontal take-off velocity, though insignificant (iii) Long Jumpers with good sprinting speed had low vertical velocity of centre of gravity during take-off and (iv) the athletes having good leg explosive strength had better vertical velocity during take-off in long jump.

**Key Words:** Sprinting Speed; Leg Explosive Strength; Take-off Velocity

***Introduction*:** Long jump is a field event of Track and Field in which athletes combine speed, strength, and agility in an attempt to leap as far from the take-off point as possible. The general purpose of Biomechanical analysis of long jump technique is to help the individual athlete and coach to pinpoint weaknesses in the technique and sometimes the physical qualities that influence the athlete's current performance level.The long jump is an event that combines speed and spring. Long jump event is divided into the following components: 1)Approach, 2)Takeoff, 3)Flight (step or hang style), 4)Landing. In biomechanical terms, the long and triple jumps are rapid accelerations followed by a vertical impulse in order to achieve the greatest possible distance in flight. The takeoff phase is by far the most critical of all the four phases to the success of the performance (Linger, 1980; Stewart, 1981; Ramey, 1982). This study, therefore, had three purposes. The first was to identify the most

important mechanical variables that occur during the takeoff phase. The second was to identify the takeoff actions used by horizontal jumpers in order to optimize the takeoff variables. The third was to present a step by step teaching progression designed to teach the flight distance and the landing distance (Hay and Reid, 1982). The horizontal and vertical velocities are continuously changing throughout the takeoff phase. Effective force application is ultimately a result of muscle actions associated with the movements of the body segments (Hay and Reid, 1982).

**Methodology:** Four male long jumpers of age ranged from 17-23 years were selected as subjects for the present study. All the subjects were state level performers and above 6mt jumpers. Leg explosive strength was measured by standing long jump and expressed as the length of the jump in centimetre. Sprinting speed was measured by the velocity between 40-60m of race run by the athlete with a flying start. Take-off Velocity was measured by Video graphic technique. At first the Take-off action was recorded by a video camera operated with a camera speed of 25 fps and in the second phase the recorded movement was analyzed by using appropriate movement analysis software.

**Results and Discussion:** Table-I shows the horizontal sprinting velocity of the subjects while running at maximum speed and their mean values. It is noted that the mean sprinting speed of the jumpers was lower than that the sprinters. This result is, however, supported by other authors (Lisa abnicholas pl, 2006).The table also shows the performance of the subjects and the mean value. The mean value was 268.25 cm.

**Table-I Performance of Sprinting Speed and Standing Broad Jump**

| Name | Sprinting speed | Standing Broad Jump |
|---|---|---|
| S- 1 | 9.66 m/s | 266 cm |
| S- 2 | 9.40 m/s | 253 cm |
| S- 3 | 9.67 m/s | 265 cm |
| S- 4 | 10.52m/s | 289 cm |
| Mean | 9.81 m/s | 268.25 cm |
| SD | ±0.48 | ±15.04 |

The take-off velocity was analyzed in three different phases of take-off action. These were identified as Touch down (Phase-I), Absorption (Phase-II) and Active stretching (Phase-III). The horizontal velocities at these phases of take-off of different subjects and their mean vaiues have been presented in Table-II.

**Table-II Horizontal Velocity (m/s) of Cg in Different Phases of Take-Off**

| Subject | Phase-I | Phase-II | Phase-III |
|---|---|---|---|
| S- 1 | 9.87 | 8.33 | 8.04 |
| S- 2 | 9.73 | 8.39 | 8.46 |
| S- 3 | 10.16 | 8.96 | 9.46 |
| S- 4 | 8.96 | 8.88 | 9.39 |
| Mean | 9.68 | 8.39 | 8.84 |
| SD | 0.70 | 0.37 | 0.69 |

It is clearly seen from the table values that the mean horizontal velocity gradually decreased from phase-I to phase-II and again increased from phase-II to phase-III. This is because of the mechanics of take-off action.

The change in horizontal velocity during take-off phases was further analyzed. Table –III shows the change of horizontal velocity.

**Table-III Change in Horizontal Velocity (m/s) of Cg in between Phases**

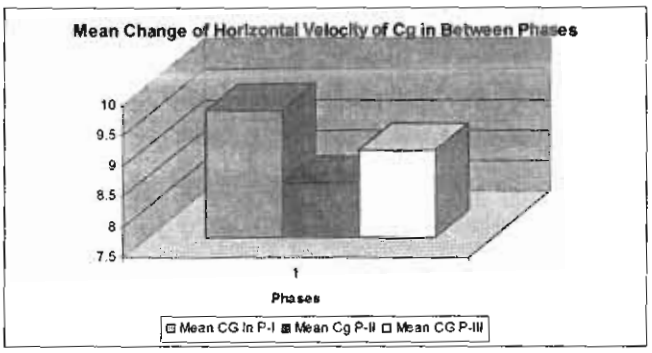
| C.G Horizontal | Phase-I | Phase-II | Phase-III | Change of VelocityIn P-I &P-II (%) | Change of VelocityIn P-II &P-III (%) |
|---|---|---|---|---|---|
| S- 1 | 9.87 | 8.33 | 8.04 | 15.60 | 0.84 |
| S- 2 | 9.73 | 8.39 | 8.46 | 13.77 | 0.89 |
| S- 3 | 10.16 | 8.96 | 9.46 | 11.81 | 5.51 |
| S- 4 | 8.96 | 8.88 | 9.39 | 0.89 | 5.73 |
| Mean | 9.68 | 8.64 | 8.84 | 10.52 | 3.24 |
| SD | 0.51 | 0.32 | 0.70 | | |

The above table shows the mean decrease of Horizontal Velocity of Cg from Phase-I to Phase-II was 10.52%and the increase of horizontal velocity from Phase-II to Phase-III was only 3.24%. Further, it is interesting to note that the reduction in horizontal velocity during the process of take-off – between phase –I and Phase –III, was 8.67%.

The phenomenon has been shown in Fig.-1 it can be seen that the velocity at touch down was decreased in absorption phase and then the velocity was slightly increased in active stretching phase. But in spite of this there was a loss in horizontal velocity during take-off.

**Figure-1**

**Change in Mean Horizontal Velocity of Cg**




The figure-1 which shows the mean change of horizontal velocity of Cg indicated that there exists a definite loss of velocity from the initial horizontal velocity to active stretching i.e. the touch-off phase.

Similar results have been reported by Cizaoskas et al (2006) in their study. This may be due to the fact that the jumper gains optimum horizontal velocity at the end of approach run. But during take-off the horizontal velocity decreases for generating vertical velocity. This transition reduces horizontal velocity.

After analyzing the change in horizontal velocity it was tried to analyze the vertical velocity of Cg during the total action of take-off. Table – IV shows the vertical velocity at different phases of take-off for different subjects and their mean values.

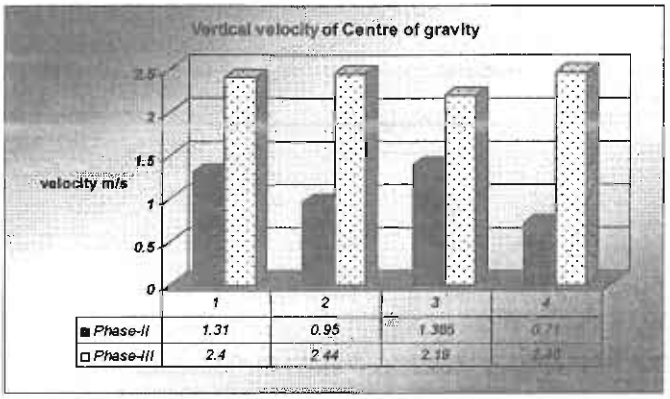
**Table-IV Vertical Velocity (m/s) of Cg Phase-II & Phase-III**

| Subjects | Phase – II | Phase - III |
|---|---|---|
| S- 1 | 1.31 | 2.40 |
| S- 2 | 0.95 | 2.44 |
| S- 3 | 1.38 | 2.19 |
| S- 4 | 0.71 | 2.46 |
| Mean | 1.09 | 2.37 |
| SD | ±0.31 | ±0.12 |

The table values indicate that the vertical velocity was increased from second phase of absorption to the final phase of active stretching for all the subjects. The Mean values indicate that the vertical velocity of the Phase-III was increased about 117% than the velocity in Phase-II.

The Figure-2 clearly shows the change in vertical velocity of Cg from Phase-II to Phase-III for different subjects.

**Figure-2 Vertical velocity of Cg in Different Phases**




After confirming the loss in horizontal velocity and gain in vertical velocity during take-off in long jump, the relation of the independent variables with the dependent variable was studied. Table-V shows the results.

**Table-V Correlation between Horizontal Velocity of Cg with Sprinting Speed and Leg Explosive Strength of the subjects**

| Subjects | Horizontal Velocity Of Cg at take-off (m/s) | Sprinting Speed (m/s) | Standing Broad Jump (m) Performance | Correlation Between velocity of Cg (Horizontal.)& S.Speed | Correlation BetweenCg & Leg Explosive Strength |
|---|---|---|---|---|---|
| S- 1 | 8.4 | 9.4 | 253 | 0.71 | 0.28 |
| S- 2 | 8.46 | 9.66 | 265 | | |
| S- 3 | 9.46 | 10.52 | 266 | | |
| S- 4 | 9.38 | 9.67 | 289 | | |
| Mean | 8.92 | 9.81 | 268.25 | | |
| SD | ±0.57 | ±0.48 | ±15.04 | | |

The presented table (V) indicates that the correlation between the horizontal velocity of centre of gravity and sprinting speed was very much high but the correlation between the Centre of gravity and the leg explosive strength, measured by

standing broad jump was low. That indicated that more the sprinting speed more would be the horizontal velocity of the jumper in the final phase of take-off.

The table-VI shows the correlation between the Vertical velocity of Centre of gravity with the Sprinting Speed and leg explosive strength of the subjects.

**Table-VI Correlation between Vertical velocity of Cg with Sprinting Speed and Leg Explosive Strength of the subjects**

| Subject | Vertical Velocity Of Cg (m/s) | Sprinting Speed (m/s) | Standing Broad Jump (m) | Correlation Between V.V of Cg & S.Speed | Correlation Between Cg & Leg Explosive Strength |
|---|---|---|---|---|---|
| Subject 1 | 2.40 | 9.40 | 253 | 0.89 | 0.69 |
| Subject 2 | 2.44 | 9.66 | 265 | | |
| Subject 3 | 2.19 | 10.52 | 266 | | |
| Subject 4 | 2.46 | 9.67 | 289 | | |
| Mean | 2.37 | 9.81 | 268.25 | | |
| SD | ±0.12 | ±0.49 | ±15.04 | | |

The table-VI indicates that, there is a negative correlation between the Vertical velocity of centre of gravity at take-off and the sprinting speed. This clearly indicates that the higher sprinting speed during approach makes difficult for the jumpers to gain higher vertical height during the jump.

In case of correlation between vertical velocity of centre of gravity and the performance of standing broad jump it is noted that the relation was positive and significant. This indicates jumpers having good leg explosive strength may have a good vertical velocity of Cg at take-off and they will achieve a greater vertical height.

**Conclusion:**

1. Long Jumpers having good sprinting speed have better horizontal velocity at take-off.
2. Long jumpers with good leg explosive strength may have a slight better horizontal velocity at take-off.
3. Long Jumpers with good sprinting speed have low vertical velocity of centre of gravity during take-off.
4. Athletes having good leg explosive strength have better vertical velocity during take-off in long jump.

5. During take-off in long jump a reduction of horizontal velocity and increase of vertical velocity takes place. This increase of vertical velocity may be caused by the loss of horizontal velocity.

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# PHILOSOPHY OF OLYMPISM

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**Abstract**

In competitive sports over the last few decades the ethos of fair play has declined and greater emphasis has been placed upon winning. As a result, fair play has been all but pushed into the background. The goal of the Olympic movement is to building a peaceful and better world by educating youth through sports participation without discrimination of the Olympic spirit, which requires mutual understanding, friendship, solidarity and fair play. Olympism is a social philosophy which emphasizes the role of sports for world development, international understanding, peaceful co-existence, and social and moral education. This is important, showing concern for the whole person; the relation between sports and moral education; and the role of properly designed physical activity in character development. Researchers, leader and practitioners in the field of physical education should recognize the importance of Olympic sports in the building of personal ethics

Key words: Olympism, Philosophy, Sport.

**Origin of the Olympics**

The Olympic Games began in Olympia in the region of Elis, Greece, and originated from war games, e.g. wrestling, boxing, chariot racing which was core elements of Greek military training. The games were of such importance that tens of thousands of people spectated and even when wars were occurring in the region there was a form of pax olympica which allowed competitors to travel safely and without hindrance to attend the Games. The Games were held every four years from 776 BC to at least 261 AD and then continued occasionally until 393 AD when they were banned.

The modern Olympic Games were reintroduced by Baron Pierre de Coubertin in 1896 in Athens, Greece. In 1894, he stated: "*Why did I restore the Olympic Games? To enable and strengthen sports, to ensure their independence and duration, and to*

*enable them better to fulfill the educational role, incumbent upon them in the modern world. For the glorification of the individual athlete, whose muscular activity is necessary for the community, and whose prowess is necessary for the maintenance of the general spirit of competition."*

Olympic movement have a number of fundamental aims:

1. To promote the development of those physical and moral qualities which are the basis of sports
2. To educate young people through sport in a spirit of better understanding between each other, and of friendship, thereby helping to build a better and more peaceful world
3. To spread the Olympic principles throughout the world, thereby creating international goodwill
4. To bring together the athletes of the world in the great four-yearly sports festival, the Olympic Games.

**Sports and Ethics**

Argument about ethics is difficult, especially when to describe ethics as: to have legal behavior in every condition and situation. Ethics is topic that had ranked in sport from long time ago. In competitive sports over the last few decades the ethos of fair play has declined and greater emphasis has been placed upon winning. As a result, fair play has been all but pushed into the background. Part of the reason for this transformation is historical. Sports have become a means of upward mobility for individual and even entire families. In the midst of this social transformation, there has been a transformation of values from principles of fairness to principles of achievement. As a result, the values that children are learning from competitive sports are very different from those of fair play. This must be recognized and changed because in sports. Under appropriate pedagogical conditions there are lots of opportunities for shaping the norms and relations of behavior that society approves and expects.

Ethic universally controls human behavior, it cannot be narrowed down to private life/family, conjugal fidelity, etc. or certain spheres of public life. As a consequence, ethic necessarily appears in sports activity and thus at the Olympic Games as well. It is therefore

justifiable to speak about a relatively independent sports ethic, as a branch of ethics or as professional ethic. The ethical code of sport in various historical periods were subordinating to other fundamental moral principles. In ancient Greece it was constructed on a directive of bravely which should be implemented at all moments- in contest, on the battlefield and in daily life. In the middle ages it was expressed by honor and similar concepts, it was the principle of fair play.

In attempting to describe the ethic content of the ancient Olympic Games we have to start from the specific educational ideal of the ancient Greeks that is form *kalokagathia*. The word itself is well-known, being the compound of the word *kalos*, beauty, and the word *agatos*, good.

Now putting these together it is obvious that we are dealing with a problem deeply rooted in ethics, as generosity and goodness in them belong to moral problems. Although beauty is of aesthetic nature, the current ethic and aesthetic quality are closely related in human action. The interesting thing is that kalokagathia combine's beauty with goodness, morality with beauty, that is, the ethic with aesthetic quality. The essence of the subject is, after all, that kalokagathia implied the perfection of body and physique, the purity of ethic, and the knowledge of moral standards.

For most people the world "Olympic" will conjure up images of the Olympic Games, either ancient or modern. The focus of their interest will be a two-week festival of sports held once in every four years between elite athletes representing their countries in competition.

Most people, too, will have heard of an "Olympiad". "Olympism", the philosophy developed by the founder of the modern Olympic movement, Baron Pierre de Coubertin (1863-1937), a French aristocrat. This philosophy has as its focus of interest not just the elite athlete, but everyone; not just a short truce period, but the whole of life; not just competition and winning, but also the values of participation and cooperation; not just sports as an activity, but also as a formative and developmental influence contributing to desirable characteristics of individual personality and social life.

For Olympism is a social philosophy which emphasizes to role of sports in world development, international understanding, peaceful co-existence, and social and moral education. A universal philosophy by definition applies to everyone, regardless of nation, race, gender, social class, religion or ideology, and so the Olympic movement has worked

for a coherent universal representation of itself. De Coubertin, being a product of late nineteenth-century liberalism, emphasized the values of equality, fairness, justice, respect for persons, rationality and understanding, autonomy, and excellence.

**Concepts of Olympism**

Olympism is a philosophy of life, exalting and combining in a balanced whole the qualities of body, will and mind; blending sports with culture and education, Olympism seeks to create a way of life based on the joy. The goal of the Olympic movement is to contribute to building a peaceful and better world by educating youth through sports without discrimination. Olympic spirit requires mutual understanding with a spirit of friendship, solidarity and fair play.

In referring to this goal, the former president of the International Olympic Committee, J.A. Samaranche, appeals to six basic elements of Olympic ethics; tolerance, generosity, solidarity, friendship, non-discrimination, and respect for others. Later, in the same editorial, he says that the principles which inspire the Olympic movement are based on: justice, democracy, equality, tolerance.

De Coubertin's pedagogical concept of Olympism which, he says, was based on five points:

1. Unity of mind and body: however, de Coubertin has a more differentiated viewed: ... there are not two parts to a man- body and soul: there are three- body, mind and character; character is not formed by the mind, but primarily by the body. The men of antiquity knew this, and we are painfully relearning it. This is important, showing concern for the whole person; the relation between sport and moral education; and the role of properly designed physical activity in character development. De Coubertin often made the point that Olympism seeks to promote moral sport and moral education through sport.
2. Self- improvement (developing ones ability)
3. Amateurism- with its connotations of nobility and chivalry.
4. Fairness and fair play.
5. Peace.

Some Philosopher pointed out that the Olympic motto "*citius, altius, fortius*" (faster, higher, stronger) may lead us astray, given the dangers for humaneness of the constant striving for records and the attendant dangers of cheating, political exploitation and

commercialism. Now let us remind ourselves of the considered ideas of the founder of the modern Olympic movement, Pierre de Coubertin. His mature article "the philosophical foundation of Modern Olympism" clarifies the idea of Olympism. It is:

1- A religion of sport (the religion athlete)

2- An aristocracy, an elite (but egalitarian and meritocratic)

3- Chivalry (comradeship and rivalry suspension of exclusively national sentiments)

4- Truce (the temporary cessation of quarrels, disputes and misunderstanding)

5- Rhythm (the Olympiad)

6- The young adult individual.

7- Peace, promoted by mutual respect based on mutual understanding

8- Let us also add: participant and competition.

**Globalization and Ethics of Olympics**

Despite the overall economic benefits of globalization, the social impact of open markets and increased competition has led to a widening of the gulf between rich and poor nations. However, it soon became apparent that globalization was a two-edged sword. The widening gap between rich and poor – even in the wealthiest countries – triggered a backlash against globalization involving a diverse collection of interest groups and protest movements. Apart from fundamental challenges to national sovereignty, cultural tradition and human rights, globalization has unleashed a huge range of complex and unprecedented ethical challenges in areas as diverse as foreign investment, education, medicine, poverty, environmental sustainability, immigration, marketing, intellectual property, the Internet and sports. And, because the Olympics are a truly global phenomenon – in many ways a uniquely global event – they manifest all of the ethical issues and dilemmas which have accompanied the process of globalization in recent years. The backlash against the Olympic Games reflects the failure of the major global institutions in dealing with the social and ethical consequences of globalization in areas such as the environment, poverty, terrorism and natural disasters.

**Why Focus on the Olympics?**

There are three main reasons for focusing on the Olympic Games as a case study in global ethics. The first is that they are a unique global institution and are widely seen to celebrate – or potentially celebrate – certain values and aspirations which have universal currency and power. Second and a corollary of the first, failure to live up to the so-called

Olympic ideals have produced a number of major crises involving intense public debate on ethical issues and dilemmas. These crises appear to mirror and confirm the breakdown of fundamental values such as honesty, integrity, dependability, and commitment in organizations and societies around the world. And, third, given the increasing disparity between Olympic rhetoric and reality, the Games provide an excellent opportunity to explore fundamental aspects of leadership, market positioning and culture-building.

**Conclusion**

Sports recognized long time ago as means for educate athletic values, fair play and trust. Athletes are as symbols and patterns. To keep aloof sports, athletes and coaches from results and goal of education attributed more emphasize to winning at any cost. International Olympic Committee concern of about to abuse of ethical and education and encourage experts for compare with these abuses. Although programs of physical education and sports present opportunity of values education, but for the purpose of optimum will be achieved must winning indicated lateral subject and accurate designing situation that cause to optimum values development. Program of professional preparing should be emphasis on ethics principles and to consider importance of professional athletes as symbol of athletes and students. Researcher, practitioners and managers in the field of physical education should recognize the importance of sports in the building of personal ethics and that sports leaders should place a greater emphasis upon the enculturation of sound ethical behavior through sports.

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