

## **CHAPTER III**

### **METHODOLOGY**

This chapter describes the methodology and procedure adopted in this study. This chapter includes selection of subjects, experimental design, experimental variables, reliability of data, instrument reliability, tester reliability, subject reliability, criterion measures, design of the study, administration of test items, collection of data, administration of training programmes and the statistical technique employed for analysis of the data.

#### **3.1 SELECTION OF SUBJECTS**

The purpose of this study was to find out the isolated and combined effect of physical training and psychotonic training on selected physical fitness, physiological and psychological variables among college men students. To achieve the purpose of this study the investigator randomly selected 120 college men from different colleges in Vellore. The age group of the subjects were between 19 to 25 years.

In order to ensure the full cooperation from the subjects, the scholar had a meeting with them and explained the purpose of the study. It was made clear by explanation in order to ascertain that there was no ambiguity among the players regarding the effort, which they had to put in for the successful completion of this investigation.

### **3.2 SELECTION OF VARIABLES**

The research scholar reviewed the various scientific literature pertaining to the physical training and psychotonic training on selected physical fitness, physiological and psychological variables from books, journals, periodicals, magazines and research papers. Taking into consideration of feasibility criteria, availability of instruments and the relevance of the variables of the present study, the following variables were selected.

#### **Dependent Variables**

##### **Physical Fitness Variables**

1. Speed
2. Agility
3. Cardiovascular Endurance

##### **Physiological Variables**

1. Resting Pulse Rate
2. Mean Arterial Blood Pressure
3. Vital Capacity

##### **Psychological Variables**

1. Self Concept
2. Achievement Motivation
3. Anxiety

### **Independent Variables**

The following independent variables were selected for this study

1. Twelve weeks Physical Fitness Training
2. Twelve weeks Psychotonic training
3. Twelve weeks combination of both physical and psychotonic training

### **3.3 EXPERIMENTAL DESIGN**

Random group design was used for this study. Randomly selected 120 college men students were divided into four groups, namely, physical training group (PG), psychotonic training group (PTG), combined training group (CTG) and control group (CG). Initial levels of the subjects on their physical fitness, physiological and psychological variables were determined using standard tests. The experimental groups were given the respective treatments, namely, physical exercise, psychotonic and combined training for a period of twelve weeks. The control group was not given any treatment. After the experimental period, final scores of the subjects were collected on selected physical fitness, physiological and psychological variables of the subjects. The difference between the initial and final scores was the effect of experimental treatment. ANCOVA was used to test the statistical significance. In all cases 0.05 level was be fixed to test the hypothesis.

### **3.4 PILOT STUDY**

A pilot study was conducted to assess the initial capacity of the subjects in order to fix the exercise load. For this purpose nine college men, who were not the subjects for this study were selected and physical exercise, psychotonic and combined training were given to them.

Based on the response of the subjects in the pilot study and during the training, the training schedules for group I, group II and group III were constructed. However the individual differences were not considered. This enabled the investigator to adapt suitable training schedule for this study, for the physical exercise, psychotonic and combined groups.

### **3.5 CRITERION MEASURES**

By glancing the literature, and in consultation with professional experts, the following variables were selected as the criterion measures in this study.

1. Speed was measured by 50 M sprint test
2. Agility was measured by 4 x 10 M shuttle run
3. Cardiovascular endurance was measured through Cooper's 12 Minutes Run / Walk test
4. Resting pulse rate was measured through Bio Monitor.
5. Mean arterial blood pressure was measured through sphygmomanometer based on systolic and diastolic blood pressure.
6. Vital capacity was measured by Spiro meter

7. Self Concept was measured through questionnaire developed by Musta Rani Rastogi (1979).
8. Achievement motivation was measured through Sports Competition Achievement Questionnaire authored by Dr. M.L. Kamlesh (1992)
9. Anxiety was measured through standard questionnaire. This questionnaire was developed by Spielberger.

Table I shows the variables selected, tests used for measuring the variables and the unit of measures.

**Table I**  
**Showing Variables, Tests and Units of Scores**

<b>S. NO</b>	<b>VARIABLES</b>	<b>TESTS</b>	<b>UNIT OF MEASURES</b>
1	Speed	50 M run	Seconds
2	Agility	Shuttle Run	Seconds
3	Cardiovascular Endurance	12 Minutes Run / Walk	Meters
4	Resting Pulse Rate	Bio Monitor	Beats/ per minute
5	Mean Arterial Blood Pressure	Sphygmomanometer	mm/Hg
6	Vital Capacity	Spirometer	Milliliters
7	Self Concept	Questionnaire Developed by Mukta Rani Rastogi (1979)	Scores in Numbers
8	Achievement Motivation	Sports Competition Achievement Questionnaire (Kamlesh 1992)	Scores in Numbers
9	Anxiety	Speilberger's Trait Anxiety Questionnaire	Scores in Numbers

### **3.6 RELIABILITY OF DATA**

The reliability of data was ensured by establishing the instrument reliability, tester competency and reliability of test.

#### **3.6.1 Reliability of Instrument**

Instruments such as stop watches, measuring tapes, Bio monitor, sphygmomanometer, spirometer were used for this study. All the instruments were in good condition and workable, purchased from reputed company. The calibrations were tested and found to be accurate enough to serve the purpose of the study.

#### **3.6.2 Testers Competency and Reliability of the Tests**

To ensure that the investigator was well versed with the techniques of conducting the test, the investigator had a number of practice sessions in testing procedure under the guidance of experts. All the measurements were taken by the investigator with the assistance of Directors of Physical Education who were also well acquainted with the tests and their testing procedure.

Tester competency was evaluated together with the reliability of tests. Reliability of tests was established by test – retest process whereby consistency of results was obtained by intra class (univariate correlation) reliability coefficients. The data collected from the pilot study of nine subjects

in test and re-test were compared for each variable and the obtained correlations have been shown in Table II.

**Table II**  
**Intraclass Correlation on the Tests Administered**

<b>S. NO</b>	<b>VARIABLES</b>	<b>TESTS</b>	<b>OBTAINED 'r'</b>
1	Speed	50 M run	0.92*
2	Agility	Shuttle Run	0.91*
3	Cardiovascular Endurance	12 Minutes Run / Walk	0.89*
4	Resting Pulse Rate	Bio Monitor	0.88*
5	Mean Arterial Blood Pressure	Sphygmomanometer	0.86*
6	Vital Capacity	Spirometer	0.87*

\* Significant at 0.01 level

Table value required to be significant at 0.01 level is 0.753.

Since very high correlations were obtained, this established the investigator's competency to administer the tests as well as reliability of tests.

In case of psychological variables, self concept, achievement motivation and anxiety, the authors of the questionnaire had found the reliability and validity of the questionnaires administered and the reliability established by the authors have been considered enough for the purpose of this study.

### **3.7 ADMINISTRATION OF TEST**

#### **3.7.1 SPEED (50 METERS RUN)**

##### **Objective**

To measure the maximum speed of the subjects.

##### **Facilities and Equipments**

An area on a track, with a starting line, a 50 meters course and a finish line, stop watches and whistle were used to collect the data.

##### **Administration**

The subjects were asked to take a position behind the starting line. The subject was asked to start on hearing 'clapper sound' and to cover the fifty meters with maximum effort.

##### **Scoring**

The score was the elapsed time to the nearest tenth of a second between the starting and the instant the subject crosses the finish line.

#### **3.7.2 AGILITY (SHUTTLE RUN 4 X 10 METERS)**

##### **Objective**

To measure the agility of the performer in running and changing direction

**Apparatus used :**

Stopwatch, measuring tape, 2 blocks of wood.

**Procedure :**

Two parallel lines were marked 10 meter apart as starting line and end line

Two blocks were placed behind the end line at the time of start .The performer on the signal go , ran to the blocks , picked up one returned to the starting line and placed the block behind the line .He repeated the same process with second block .

**Scoring:**

The score for each performer was the time required to complete 40 meter and recorded to nearest one tenth of a second.

**3.7.3 CARDIOVASCULAR ENDURANCE TEST****Objective**

To measure the cardiovascular endurance

**Equipments**

A stop watch, whistle and distance markers were used.

**Procedure**

The subjects were positioned behind the line and upon the starting ran/walked as many laps as possible around the track in 12 minutes. The tester and tester assistants maintained the distance covered by the subjects and when the stop signal was given by the investigator by blowing a whistle, the tester assistants ran immediately to the spot where the subject is stopped at the moment the whistle was blown. The scores were recorded in meters.

**Scores**

Score was the distance covered by each subject in 12 minutes and recorded in meters.

**MEASUREMENTS OF PHYSIOLOGICAL VARIABLES****3.7.4 RESTING PULSE RATE****Objective**

To measure the resting pulse rate of each subject per minute

**Equipments**

Digital Heart Rate Measuring Machine, Model No. EW 243, manufactured by National Company, Japan.

**Administration**

The pulse rate of all the subjects were recorded in a sitting position, in the evening between 4 and 5 p.m. Before taking pulse rate the subjects were asked to relax for about 30 minutes.

Then the subjects were instructed to sit in a back supported chair and maintain in a slight incline position and placed his left hand on the table. Next the researcher collected Heart Rate or pulse rate by using Digital Heart Rate measuring machine which was placed in the chest level on a table. In this way the researcher measured the heart rate of the subject.

**Scoring**

The number of pulse beats per minute were recorded as the scores.

**3.7.5 VITAL CAPACITY****Purpose**

The purpose of this test was to find out the maximum quantity of air that can be expired after a full inspiration.

**Equipment**

Spiro meter, mouth pieces and nose clips.

**Procedure**

Vital capacity was measured by Spirometer in liters. The Spiro meter was equipped with a good length of rubber hose. The Spiro meter was placed at a height where by all the subject can stand erect at the beginning of the test. The mouth piece was disinfected by an antiseptic solution after use by each subject.

The subjects were asked to take a deep breath for test: There after the fullest possible inhalation, the subject exhaled slowly and steadily bending forward over the hose till the air within his control was expelled.

Care was taken to prevent air from escaping either through nose or around the edges of mouth piece and was also ensured that a second breath was not taken by the subject during the test. Incase of doubt the test was repeated. Care was taken to lower the drum without spilling the water, each time after use.

**Scoring**

The score was taken from the dial of the Spiro meter which was recorded in liters

**3.7.6 BLOOD PRESSURE (Systolic and Diastolic)****Objective**

The purpose of the test was to measure the systolic and diastolic blood pressure.

**Equipment**

A dial type of sphygmomanometer and stethoscope a chart and a table were used for recording the blood pressure.

**Procedure**

The blood pressure for all the subjects were checked in the morning. The subjects were given adequate time to relax in a chair in a comfortable position so that the normal pressure was restored. While taking the blood pressure the subjects right arm was completely made bare to make certain that the clothes did not compress the blood vessels. The instrument was kept at the level of the heart on the table. The blood pressure measurement was taken with the subject in a sitting positions the fore arm being kept straight in a relaxed positions on the table. The pressure cuff was wrapped around the arm evenly the lower edge being placed approximately one inch above the anticubital space. Care was taken that the stethoscope was not in contact with the cuff. The cuff was inflated until the artery was fully pressed, so that no heart beat could be learned.

When the heart beat was not audible air was released by opening the air valve of the rubber tube and the systolic stroke the heart sent to spurt into artery and at the peak of the systolic stroke the first heart beat become audible at which instant the read in millimeter of measuring (mmhg) was recorded with the gradual release of air, the heart beat become muffled and then

disappeared. This indicated blood pressure at the diastolic stage and the reading was noted in mm Hg.

### **Mean arterial pressure**

Mean arterial pressure also measured by using the formula.

$$P \text{ mean} = \text{Diastolic pressure} + 1/3 \text{ pulse pressure.}$$

Pulse pressure is the difference between systolic pressure and diastolic pressure.

## **MEASUREMENT OF PSYCHOLOGICAL VARIABLES**

### **3.7.7 SELF CONCEPT**

Self concept questionnaire constructed by Mukta Rani Rastogi (1979) was used in this study. The questionnaire consists of twenty statements which included both positive and negative statements, with a response from any five answer namely, strongly agree, agree, undecided, disagree and strongly disagree. The scale was scored with the help of the scoring key. A separate scoring method was followed for positive and negative statements.

<b>S. No</b>	<b>Responses</b>	<b>Scores for Positive Statements</b>	<b>Scores for Negative statements</b>
1	Strongly Agree	5	1
2	Agree	4	2
3	Undecided	3	3
4	Disagree	2	4
5	Strongly Disagree	1	5

Self-concept scale consists of both positive and negative statements. The following are the numbers of the statement that are positive and negative.

Positive Numbers : 1,3,4,9,11,12,17,18,19

Negative Numbers : 2,5,6,7,8,10,13,14,15,16, 20

### **Scoring**

The scores obtained for both positive and negative statements were added to determine the individual score. The total scores reflected the individuals self concept with high scores showing higher self concept level.

### **3.7.8 ACHIEVEMENT MOTIVATION**

Sports Achievement Motivation Questionnaire (SAMQ) developed by Kamlesh (1993) was administered to assess the achievement motivation of the subjects.

The questionnaire consists of twenty statements with response from the subject 'Yes' or 'No' Based on the response of the subject, their achievement motivation was measured using the key of the score of the author.

Total score was the number of correct responses of the subject and it was the achievement motivation of the subject.

### 3.7.9 ANXIETY

Anxiety was measured through the anxiety questionnaire. The anxiety questionnaire was designed to measure the degree of anxiety experience prior to the competition.

It was developed by Spielberger (1979). Spielbergers Trait Anxiety questionnaire was given to all subjects. Twenty items were adopted from Spielbergers Trait Anxiety questionnaire for this investigation. The complete questionnaire is scores as follows:

S.No	Response	Score of Positive statements	Score of Negative statements
1	Not at all	1	4
2	Some what	2	3
3	Moderately so	3	2
4	Very much	4	1

Positive Statements

1,2,5,8,10,11,15,16,19,20

Negative Statements

3,4,6,7,9,12,13,14,17,18

### **3.8. TRAINING PROGRAMME**

The experimental groups underwent the experimental training programme for six days a week (except on Sunday) for a period of twelve weeks. The control group did not involve in any form of experimental training programme, but they were allowed to do their daily routine.

#### **3.8.1 PHYSICAL EXERCISES**

Experimental group I underwent physical exercise for a period of 12 weeks. The following physical exercises were prescribed to be imparted for experimental group

The package of physical training consists of the following sessions:

- ❖ Warming up plus running ABC Game and Stretching Exercises
- ❖ Slow Continuous Run 40 min, 80% effort plus stretching exercises
- ❖ Medium Continuous Run 30 min, 70% effort plus stretching exercises
- ❖ Wall Bar Exercises
- ❖ Weight Training consists of (60 – 70% weight) (1) All body exercise (2) Half squat (3) Bench Press (4) Cough Raise (5) Front press (6) Sit ups (7) Leg split (8) Back Press (9) Leg curl (10) Biceps curl (11) inclined sit ups
- ❖ Resistance Training consists of (1) Beach Run (2) Strides (3) Water Run (4) Water High Knees

- ❖ Interval Training consists of 300 mts run and 150 mts run (60 – 70% effect)
- ❖ Long Warm up plus 80 mts strides with medium intensity.
- ❖ Fartlek training in 400 mts track (1) SET stride run, curve jogging – 4 laps (2) SET Curve run, stride jogging – 4 laps
- ❖ Explosive Strength Training consists of (1) Hurdles jump and (2) Hopping both legs
- ❖ Fast continuous run 20 mts plus stretching exercise
- ❖ Continuous Circuit Training in a Distance 400 mts with 8 Zones. (1) Zone Front press (2) Spot High knee (3) Sit ups (4) Push ups (5) Half squat (6) Sit ups (7) Back press (8) Leg split.
- ❖ Hill Training consists of (1) Warming; up (2) Uphill 200 mts (3) down hill 200 mts (3) Uphill strides 150 mts (4) Uphill sprint 60 mts
- ❖ Speed Training consists of 50 mts 60mts, 80mts with spikes.(intensity 85% to 95% effect)

The training sessions were conducted on all the days, except Sunday both morning and evening. The details of the training sessions, the training given in each sessions, repetitions, intensities and distances are given in Table III.

**TABLE III  
PHYSICAL TRAINING PROGRAME FOR 8 WEEKS**

<b>WEEK</b>	<b>SESSION</b>	<b>DAY 1</b>	<b>DAY 2</b>	<b>DAY 3</b>	<b>DAY 4</b>	<b>DAY 5</b>	<b>DAY 6</b>
1 to IV	MOR	Slow Continuous run for 5 Km in 30minutes with 60% effect and stretching exercises	Warming Up and Running ABC Exercises	Medium Continuous run for 4 Km in 20minutes with 70% effects and stretching exercises	Wall Bar Exercises 10 repetition x 2 sets	Weight Training 1.All body exercise 2.Half squat 3.Bench press 4.Calf raise 5.Front press 6.Sit ups 7.Leg split 8.Back press 9.Leg curl 10.Biceps curl 11.Inclined sit ups  60% weight x 15 Repetition x 3 sets	Beach Run .20 minutes Warming up in sand 100 meters Strides – 4 repetition x 2sets 50 meters water run—4 repetition x 2 sets 10 meters water High knees- 4 repetition x 2 sets 30 meters Hopping and Bounds run-4 repetition x 2 sets

1 to IV	EVE	<p>Weight Training</p> <ol style="list-style-type: none"> <li>1.All body exercise</li> <li>2.Half squat</li> <li>3.Bench press</li> <li>4.Calf raise</li> <li>5.Front press</li> <li>6.Sit ups</li> <li>7.Leg split</li> <li>8.Back press</li> <li>9.Leg curl</li> <li>10.Biceps curl</li> <li>11.Inclined sit ups</li> </ol> <p>60% weight x 15 repetition x 3 sets</p>	<p>Interval Training</p> <p>300meters x 3 repetition – 60 to 70% effect with shoes</p> <p>150meters x 3 repetition x 60 to 70 % effect with shoe</p>	<p>Long warming up and 80meters Strides with 60% effects.</p>	<p>Fartlek training in 400 meters Track</p> <p>I SET- Stride run, curve jogging-4laps</p> <p>II SET- Curve run, stride jogging-4laps</p>	<p>Warming up and Running ABC Exercises Games</p>	<p>Rest</p>
<b>WEEK</b>	<b>SESSION</b>	<b>DAY1</b>	<b>DAY2</b>	<b>DAY3</b>	<b>DAY4</b>	<b>DAY5</b>	<b>DAY6</b>
V to VIII	MOR	<p>Medium Continuous run for 4 Km in 20min with 70% effect and stretching exercises</p>	<p>Explosive Training</p> <ol style="list-style-type: none"> <li>1.Hurdles jump 10 Hurdles x 5 repetition x 2sets</li> <li>2. Hopping both legs 50mts x 5 repetition x 3</li> </ol>	<p>Weight Training Exercises</p> <ol style="list-style-type: none"> <li>1.All body exercises</li> <li>2.Front press</li> <li>3.Half squat</li> <li>4.Back press</li> <li>5.Sitting toe raise</li> <li>6.Sit ups</li> <li>7.Clean and jerk</li> <li>8.Biceps curl</li> <li>9.Leg curl</li> <li>10.Bench press</li> </ol>	<p>Fast continuous run for 2 Km in 8 minutes with 70% effect and stretching exercises</p>	<p>Continuous circuit training in 400meters 8 Zone</p> <p>Zone I-Front press Zone II-Spot High knee Zone III-Sit ups Zone IV-Push ups Zone V –Half squat Zone VI-Sit ups</p>	<p>Hill Training</p> <p>Warming up –</p> <p>Uphill and Downhill run -10 minutes</p> <p>Uphill strides - 150,120.90. meters x each 2 repetition</p> <p>Uphill sprint- 40</p>

			sets	11.Inclined sit ups  70% weight x 10 repetition x 3 sets		Zone VII-Back press Zone VIII-Leg split  Each Exercises 15 repetition x 3 sets	meters x 4 repetition x 2 sets
V to VIII	EVE	Weight Training Exercises 1.All Body exercises 2.Front press 3.Half squat 4.Back press 5.Sitting Toe raise 6.Sit ups 7.Clean and jerk 8.Biceps curl 9.Leg curl 10.Bench press 11.Inclined sit ups 70% weight x 10 repetition x 3 sets	Interval Training  300mts x 3 repetition 60% to 70% effect with shoes  150mts x 3 repetition 60% to 70% effect with shoes	80 meters x 10 repetition strides with 60% intensity	Interval Training  120 meters x 4 repetition with 60% to 70% intensity  150 meters x 4 repetition with 60% to 70% intensity	10 minutes warming up and stretching exercises	Long warming up and Games

WEEK	SESSION	DAY1	DAY2	DAY3	DAY4	DAY5	DAY6
IX to XII	MOR	Long warming –up and Reaction running - 15meters x 2 repetition	Explosive Training 1.Standing Broad jumps 10rep 2. Multiple jumps A. Single hopping and jump, each legs - 5repetition B .Single hopping and single bounds and jump - 5repetition E. Double hopping and single bound and jumps - 5repetition D. Single hopping and double bounds and jump -5 repetition E. Double hopping and double bounds and jump	Warming up for 20minutes and stretching exercises	Track Training  110 meters x 3 repetition , 90 meters x 3 repetition  with spikes 75% intensity	Interval Circuit Training  30 Seconds Exercises and 30 Seconds Recovery  1 Spot High knee run 2.Front press 3.Sit ups 4.Step ups 5.Biceps curl 6.Sit ups	Rest

IX to XII	EVE	<p>Specific weight Training-</p> <ol style="list-style-type: none"> <li>1.All Body exercises</li> <li>2.Front press</li> <li>3.Spot High knee run</li> <li>4.Dumple run</li> <li>5.Leg split</li> <li>6.Biceps curl</li> <li>7.Leg curl (back)</li> <li>8.Back press</li> <li>9.Leg extension</li> </ol> <p>80% Weight x 10 repetition x 2 sets</p>	<p>Track Training</p> <p>120 meters x 3 repetition 75% effect with spikes</p> <p>150 meters x 2 repetition 75% effect with spikes</p>	<p>Specific Weight Training</p> <ol style="list-style-type: none"> <li>1.All Body exercises</li> <li>2.Half squat</li> <li>3.Bench press</li> <li>4.Toe lift</li> <li>5.Clean and Jerk</li> <li>6.Sit ups</li> <li>7.Snatch</li> <li>8.Front press</li> </ol> <p>80% Weight x 10 repetition x 2 sets</p>	<p>Long warming up and stretching exercises</p>	<p>Speed Training With starting block</p> <p>10 meters x 3 repetition</p> <p>20 meters x 3 repetition</p> <p>30 meters x 3 repetition</p> <p>40 meters x 3 repetition</p>	<p>Speed Training 50 ,60,80 meters x 2 repetition</p> <p>With spikes, intensity 85% to 95% effect, full recovery.</p>
-----------	-----	---	---	--	---	---	---

### **3.8.2 PSYCHOTONIC TRAINING GROUP**

Experimental group II underwent psychotonic training protocol for a period of 12 weeks. The psychotonic training imparted in this research consists of meditation (including selected yogasana and transcendental meditation); mental imagery and progressive relaxation techniques. The following are the description of psychotonic training imparted to experimental group II.

#### **3.8.2.1 Meditation**

Meditation is one of the five principles of yoga. It is an important tool to achieve mental clarity and health. Subject started from sitting posture for meditation.

#### **3.8.2.2 ARDHA PADMASANA (Half Lotus Pose)**

With the Half Lotus Pose the subject was asked to practice only one leg placed under the opposite thigh. Generally this pose is used as a warm-up to the full Lotus Pose.

#### **3.8.2.3 PADMASANA**

Padmasana was such a perfect meditation posture. It's a position in which one can sit perfectly straight and be absolutely still, relaxed, comfortable, and alert. The subject sat on the floor in an easy crossed- leg pose. Clapsed hold of the left foot with both hands and bring it high onto the

right thigh, up into the groin. Bring the right leg over the left and place the right foot in the left groin. This is the full Lotus Pose or padmasana. Maintained the posture for some time and slowly relaxed.

#### **3.8.2.4 MEDITATION (AUM)**

The subjects were asked to do the meditation (AUM) by adhering the following sequences:

Select a quiet place, sit down, close your eyes and completely relax your muscles and nerves. Concentrate on the space between your eyebrows and quieten and silence the conscious mind. Begin to repeat "Aum" mentally while associating the ideas of infinity, eternity, immortality, etc. You must repeat Aum with the feeling that you are the infinite and all-pervading. Mere repetition of Aum will not bring the desired result. Keep the meaning of Aum always at heart. Feel Aum. Feel that you are the pure, perfect, all-knowing, eternal, free, Brahman. Feel that you are absolute consciousness and the infinite, unchanging existence. Every part of your body should powerfully vibrate with these ideas. This feeling should be kept up all day long. Practice regularly and steadily with sincerity, faith, perseverance and enthusiasm in the morning, midday and evening.

#### **3.8.2.5 Savasana**

The subjects were asked to do the savasana by adhering the following sequences:

Lie flat on the back full length like a corpse. Keep the hands a little away from the thighs, with the palms up. Close the eyes. If possible, place a black cloth folded four times over the eyes. Keep the heels together and the toes apart. To start with breathe deeply. Later the breathing should be fine and slow, with no jerky movements to disturb the spine or the body. Concentrate on deep and fine exhalations, in which the nostrils do not feel the warmth of breath. The lower jaw should be loose and not be clenched. The tongue should not be disturbed and even the pupils of the eyes should be kept completely passive. Relax completely and breathe out slowly. If the mind wanders, pause without any strain after each slow exhalation. Stay in the pose for 10 minutes.

#### **3.8.2.6 MENTAL IMAGERY**

Among the various psychological strategies available for the performance enhancement, imagery is the fundamental and most often utilized technique. Imagery is generally used as a mental practice or imagery rehearsal intervention with athletes.

Before starting the training programme, the students were explained the objectives of imagery techniques of visualization programme and the importance of concentration in achieving it. On the first day the subjects were asked to lie down in supine lying position, eyes closed and take few deep breath; then normal breathing and trying to be relaxed; to concentrate only on breathing.

After two sessions they were introduced with general imagery like imagining themselves walking along the seashore, enjoy the scenic beauty of sunset, listening to the sound of waves etc.

Then they were asked to create an image of the healthful living and imaging themselves warming up inside a track. They were also asked to think about themselves performing a series of exercises.

Imagery involves the mental visualization of task prior to or while engaging in the task (Wann, 1997). Before beginning the imagery exercise, it was important to provide the student with information on the imagery process. Imagery can be classified in to internal and external. When using internal imagery, students imagine surroundings and behaviours from their own vantage point. Conversely, when they image the situation from the perspective of some one else and see themselves in the image, they are using external imagery. Both external and internal imagery may facilitate to performance, the students were encouraged to use each type. The second classification involves positive and negative imagery. Positive imagery involves visualizing a successful outcome while negative imagery involves imagery can be detrimental to performance. Thus the students were told that simply imagining themselves was not enough to produce the desired effect of enhanced performance. Rather, they would have to develop their imagery skills to the point where they could control the image thereby insuring a positive outcome.

Once the student understood the types of imagery, they were again given an explanation of the potential use of the imagery in sports. They were told that there was at least three important uses for imagery. Imagery can be used prior to one's performance as a form of mental practice. Secondly, imagery can be used to improve one's positive thinking. That is by imagining a successful performance and the students gain self-confidence. Thirdly, imagery can be used immediately prior to a performance. For instance, the student could visualize his movements just prior to the competition.

They were then given information of developing the positive and vivid images. They were told that they should be sharp, include colour and realistically reflex the surroundings. Further the students were told to use as many sense as possible. For example, they should include the crowd noise, feel of the play ground and other such sensations when visualizing. They were told to make the images always positive.

Once the information was presented to the students, the psychological skills training exercises could be practiced. Then the subjects practice the progressive relaxation exercises. When the relaxation exercise complete, the subjects were introduced to the imagery exercise. First they were asked to visualize themselves using an external perspective. That is, they were instructed to imagine the situation from the perspective of someone else and to see themselves in the ground, getting ready for their daily routine energetically. They were told to see others with confidence. They were asked

to imagine the sounds and tactile sensations they would experience, as they got ready. They were then asked to see themselves moving around. They were asked to use all their senses in the image and to develop as vivid an image as possible. They were then asked to see themselves doing the skills and tactics. Finally they were told to keep the image positive, that is, to see themselves winning the competition, successfully performing their perfect skills and tactics. Once the external imagery exercise was complete, the exercise was repeated using an internal perspective.

### **3.8.2.7 JACOBSON'S PROGRESSIVE RELAXATION STEPS**

Subject was asked to sit in a comfortable chair – reclining arm chairs are ideal. Lying on a bed is okay too. Get as comfortable as possible – no tight clothes or shoes and don't cross legs. Take a deep breath; let it out slowly. Again do this alternately tensing and relaxing specific groups of muscles. After tension, a muscle will be more relaxed than prior to the tensing. Concentrate on the feel of the muscles, specifically the contrast between tension and relaxation.

Do the entire sequence once a day until the subject feel he is able to control his muscle tensions.

**Hands.** The fists are tensed; relaxed. The fingers are extended; relaxed.

**Biceps and triceps.** The biceps are tensed (make a muscle – but shake your hands to make sure not tensing them into a fist); relaxed (drop your arm

to the chair). The triceps are tensed (try to bend your arms the wrong way); relaxed (drop them).

**Shoulders.** Pull them back (careful with this one); relax them. Push the shoulders forward (hunch); relax.

**Neck (lateral).** With the shoulders straight and relaxed, the head is turned slowly to the right, as far as you can; relax. Turn to the left; relax.

**Neck (forward).** Dig your chin into your chest; relax. (Bringing the head back is not recommended – you could break your neck.)

**Mouth.** The mouth is opened as far as possible; relaxed. The lips are brought together or pursed as tightly as possible; relaxed.

**Tongue (extended and retracted).** With mouth open, extend the tongue as far as possible; relax (let it sit in the bottom of your mouth). Bring it back in your throat as far as possible; relax.

**Tongue (roof and floor).** Dig your tongue into the roof of your mouth; relax. Dig it into the bottom of your mouth; relax.

**Eyes.** Open them as wide as possible (frown your brow); relax. Close your eyes tightly (squint); relax. Make sure you completely relax the eyes, forehead, and nose after each of the tensings.

**Breathing.** Take as deep a breath as possible – and then take a little more; let it out and breathe normally for 15 seconds. Let all the breath in your lungs out – and then a little more; inhale and breathe normally for 15 seconds.

**Back.** With shoulders resting on the back of the chair, push your body forward so that your back is arched; relax. Be very careful with this one, or don't do it at all.

**Butt.** Tense the butt tightly and raise pelvis slightly off chair; relax. Dig buttocks into chair; relax.

**Thighs.** Extend legs and raise them about 6in. off the floor or the foot rest but don't tense the stomach' relax. Dig your feet (heels) into the floor or foot rest; relax.

**Stomach.** Pull in the stomach as far as possible; relax completely. Push out the stomach or tense it as if you were preparing for a punch in the gut; relax.

**Calves and feet.** Point the toes (without raising the legs); relax. Point the feet up as far as possible (beware of cramps – if you get them or feel them coming on, shake them loose); relax.

**Toes.** With legs relaxed, dig your toes into the floor; relax. Bend the toes up as far as possible; relax.

Now just relax for a while. As the days of practice progress, the subject may wish to skip the steps that do not appear to be a problem for him. After the subject become an expert on his tension areas (after a week), he can concern himself only with those. These exercises will not eliminate tension, but when it arises, he will know it immediately, and he will be able to "tense-

relax" it away or even simply wish it away. Table IV shows the training schedule for psychotonic training

**Table IV**  
**Psychotonic Training Schedule**

<b>WEEKS</b>	<b>METHOD</b>	<b>DURATION</b>	<b>REST</b>
I to IV	Loosening Exercises	3 mts	
	Yogasanas		
	Ardha Padmasana	3 mts	
	Padmasana	3 mts	
	Savasana	3 mts	3 mts
	AUM Meditation	15 mts	3 mts
	Mental Imagery	15 mts	3 mts
	Jacobson Relaxation	15 mts	5 mts
V to VIII	Loosening Exercises	4 mts	
	Yogasanas		
	Ardha Padmasana	4 mts	
	Padmasana	4 mts	
	Savasana	3 mts	3 mts
	AUM Meditation	15 mts	3 mts
	Mental Imagery	15 mts	3 mts
	Jacobson Relaxation	15 mts	5 mts
IX to XII	Loosening Exercises	5 mts	
	Yogasanas		
	Ardha Padmasana	5 mts	
	Padmasana	5 mts	
	Savasana	5 mts	3 mts
	AUM Meditation	20 mts	3 mts
	Mental Imagery	20 mts	3 mts
	Jacobson Relaxation	20 mts	5 mts

### **3.8.3 COMBINED TRAINING**

Experimental group III underwent combined training consisting of physical exercise and psychotonic training. The group was given physical exercise and psychotonic training in alternative days. Thus, the group underwent three days, Monday, Wednesday and Friday physical exercises and Tuesday, Thursday and Saturday psychotonic training for 12 weeks.

### **3.9 COLLECTION OF DATA**

The data pertaining to physical fitness, physiological and psychological variables were collected by administrating the appropriate tests and measurement procedures. All were given a chance to get familiar with the desired test. The apparatus and procedure of the tests were explained prior to the administering of the test. The data were collected before and after the experimental training programme.

### **3.10 STATISTICAL TECHNIQUE**

The data was collected from the four groups prior and after the experimental treatment. The pre test and post test data were statistically examined for significant difference, applying the analysis of covariance (ANCOVA) for each and every variable selected for this study. To make adjustment for difference in the initial means and test the adjusted post test means for significant difference, the analysis of covariance was used.

Whenever the 'F' ratio for adjusted test was found to be significant for adjusted post means, Scheffe's test was followed as a post hoc test to determine which of the paired mean difference was significant.