

## **CHAPTER III**

### **METHODOLOGY**

This chapter describes the selection of subjects, selection of variables, selection of tests, instruments reliability, competence of the tester, reliability of the data, orientation to the subjects, pilot study, training programme, collection of the data, administration of the tests, experimental design and statistical procedures.

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

The purpose of the study was to find out the effect of asanas, aerobics and proprioceptive training on selected motor fitness, physiological and performance variables among football players. To achieve this purpose of the study, eighty intercollegiate men football players from four different colleges in Chennai city namely in Alpha Arts and Science College, Porur, Sindhi College of Arts and Science, Tiruverkadu, Hindustan College of Arts and Science, Padur and Guru Nanak College, Vealachery, Chennai, Tamil Nadu, India were randomly selected as subjects. The age of the subjects were ranged between 18 to 28 years. The selected subjects were divided in to four equal groups of twenty subjects each. Group I underwent asanas training for twelve weeks (for three days per week). Group II underwent aerobic training for twelve weeks (for three days per week). And Group III underwent proprioceptive training for twelve weeks (for three days per week). Group IV acted as control that did not participate in any special training programme apart from their regular routine football training. The subjects were free to withdraw their consent in case they felt any discomfort during the period of the training programme. But, there were no such drop out in the study.

## **3.2 SELECTION OF VARIABLES**

### **3.2.1 Independent Variables**

Asana is a body position, typically associated with the practice of Yoga, originally identified as a mastery of sitting still, with the spine as a conduit of biodynamic union. In the context of Yoga practice, asana refers to two things: the place where a practitioner sits and the manner (posture) in which he/she sits. In the Yoga sutras, Patanjali suggests that asana is "to be seated in a position that is firm, but relaxed" for extended, or timeless periods.

Aerobics is a form of physical exercise that combines aerobic exercise with stretching and strength routines with the goal of improving all elements of fitness (flexibility, muscular strength, and cardio-vascular fitness). It is usually performed to music and may be practiced in a group setting led by an instructor (fitness professional). With the goal of preventing illness and promoting physical fitness, practitioners perform various routines comprising a number of different exercises. Formal aerobics classes are divided into different levels of intensity and complexity. Aerobics classes may allow participants to select their level of participation according to their fitness level.

Proprioception from Latin proprius, meaning "one's own" and perception, is the sense of the relative position of neighbouring parts of the body and strength of effort being employed in movement. It is distinguished from exteroception, by which we perceive the outside world, and interoception, by which we perceive pain, hunger, etc., and the movement of internal organs. Hence, asana, aerobic and proprioceptive training were selected as independent variables.

### **3.2.2 Dependent Variables**

The following motor fitness, physiological and performance variables such as speed, explosive power, agility, reaction time, vital capacity, resting pulse rate, cardio vascular endurance, breath holding time, passing ability, dribbling ability and shooting ability were selected as dependent variables.

### **3.3 SELECTION OF TESTS**

The present study was aimed to find out the effect of asanas, aerobics and proprioceptive training on selected motor fitness variables variables such as speed, explosive power, agility and reaction time, physiological variables such as vital capacity, resting pulse rate, cardio vascular endurance and breath holding time, and performance variables such as passing, dribbling and shooting ability among football players. The investigator had analyzed various literatures, had consulted with the physical education professionals and selected the following test items, which were standardized and most suitable to serve the purposes of the study. The details of the test items were presented in Table I.

**Table - I**  
**SELECTION OF TESTS**

S. No.	Criterion Variables	Test Items
<b>Motor fitness variables</b>		
1.	Speed	50 mts Run
2.	Explosive power	Vertical jump
3.	Agility	Shuttle run
4.	Reaction time	Reaction timer
<b>Physiological variables</b>		
5.	Vital capacity	Wet Spirometer
6.	Resting pulse rate	Radial Pulse
7.	Cardio vascular endurance	Cooper's 12 min run/walk test
8.	Breath holding time	Holding the Breath for Maximum Time
<b>Performance variables</b>		
9.	Dribbling	F-MARC Test Battery
10.	Passing	F-MARC Test Battery
11.	Shooting	F-MARC Test Battery

### **3.4 INSTRUMENTS RELIABILITY**

The required instruments like spirometer, stethoscope, stop watches, and measuring tape were procured from the Department of Physical Education, Tamilnadu Physical Education and Sports University, Chennai, Tamil Nadu, India. All the instruments used for testing the dependent variables were in good condition and purchased from the reputed and reliable companies. Their calibrations were tested and found to be accurate enough to serve the purposes of the study.

### **3.5 COMPETENCE OF THE TESTER**

While testing the criterion variables, the researcher was assisted by Ph.D., and M.Phil., scholars studying in the Tamilnadu Physical Education and Sports University, Chennai, Tamilnadu, India. The researcher and scholars were learnt the procedures and methods to administer the test items and had a number of practice sessions to familiarize the test items.

### **3.6 RELIABILITY OF THE DATA**

The reliability of the data were established by test-retest method. Ten subjects were selected in the Tamilnadu Physical Education and Sports University, Tamilnadu, India, and they were tested twice by the same tester under the similar conditions on each criterion variable. The intra class correlation was used to find out the reliability of the data with test-retest scores on each criterion variable separately and they were presented in Table II.

**Table - II**  
**INTRACLASS CORRELATION CO EFFICIENT OF VALUES ON**  
**SELECTED CRITERION VARIABLES**

S.No	Tests / Variables	‘R’ Value
<b>Motor fitness variables</b>		
1.	Speed	0.89*
2.	Explosive power	0.91*
3.	Agility	0.92*
4.	Reaction time	0.88*
<b>Physiological variables</b>		
5.	Vital capacity	0.87*
6.	Resting pulse rate	0.86*
7.	Cardio vascular endurance	0.88*
8.	Breath holding time	0.90*
<b>Performance variables</b>		
9.	Passing Ability	0.86*
10.	Dribbling Ability	0.85*
11.	Shooting Ability	0.87*

\* Significant at .05 level of confidence.  
 (The table value required for significance at .05 level of confidence was 0.767).

### 3.7 ORIENTATION TO THE SUBJECTS

For the collection of data, the investigator explained the purpose of training programme to the subjects and their part in the study. The investigator explained the procedures of test on selected criterion variables and gave instructions about the points and procedures to be followed by the subjects for measuring.

Three sessions were spent to familiarize the subjects with the techniques used to execute the asana, aerobics and proprioceptive training programme. It was used to them while performing the asana, aerobics and proprioceptive training programme correctly and to avoid injuries. The subjects were verbally motivated to attend the training session regularly. Further control group was specially instructed to avoid any special training programme till the end of the experimental period. The subjects of all the groups were motivated adequately to perform their maximum during the training and testing periods.

### **3.8 PILOT STUDY**

A pilot study was conducted to assess the initial capacity of the subjects to fix the load and also to design the training programme. For this purpose, fifteen football players were randomly selected and they were divided into three equal groups of five subjects each. Group I was given different asana practice, Group II was given different aerobic exercises and Group III was given different proprioceptive exercises. Some asana, aerobic and proprioceptive exercises, which are very closely associated to develop the criterion variables, were located to design the training programme during the pilot study. The initial loads of the subjects were fixed according to the performance during pilot study. The initial load of the experimental groups was more or less similar. During the designing of the training programme, the individual differences were also taken into consideration.

### **3.9 TRAINING PROGRAMME**

During the training period, Group I, Group II and Group III underwent asana, aerobic and proprioceptive training respectively for three days per week for twelve weeks of the training programme. The overload principle was adopted. In every day

training session, the work out lasted approximately between 45 minutes and an hour, which included warming up and limbering down. Group IV acted as control that did not participate in any special training programme apart from their regular routine football training.

The experimental groups underwent their respective training programmes under the supervision of the researcher. The subjects were carefully monitored and questioned about their health status throughout the training programme. None of the subjects have reported any injury. However, in the early weeks of the training period, muscle soreness appeared and subsided in due course. The training schedules for the experimental groups were designed as per the results of the pilot study separately.

### **3.9.1 YOGASANA EXERCISES**

Under yogasanas, a batch of 12 count asanas, which are commonly called of Suryanamaskar was given to the subjects, followed by selected twelve asanas in the indoor hall at morning session.

The physical base of the practice links together twelve asanas in a dynamically performed series. These asanas are ordered so that they alternately stretch the spine backwards and forwards. When performed in the usual way, each asana is moved into with alternate inhalation and exhalation (except for the sixth asana where the breath is held in external suspension). A full round of Surya namaskara is considered to be two sets of the twelve poses with a change in the second set to moving the opposite leg first through the series. The asanas training procedure well explained and detailed in 3.9.1 to 3.9.1.25.

Each stage of Surya Namaskar was accompanied by regulation of breath. The twelve steps of the Surya Namaskar were as follows:



### 3.9.1.1 DESCRIPTION OF SURYA NAMASKAR

#### 3.9.1.2 Pranamasana

Keep the eyes closed.

Remain standing upright with the feet together. Slowly bend the elbows and place the palms together in front of the chest in namaskara mudra, mentally offering homage to the sun, the source of all life. Relax the whole body.

**Breathing:** Breathe normally.

**Awareness:** Physical — on the chest area.

Spiritual — on anahata chakra.

**Benefits:** This pose establishes a state of concentration and calmness in preparation for the practice to be performed.

**Mantra:** Om Mitraya Namaha, salutations to the friend of all

#### 3.9.1.3 Hasta Utthanasana

**Position 2: Hasta Utthanasana (raised arms pose)** Separate the hands, raise and stretch both arms above the head, keeping them shoulder width apart.

Bend the head, arms and upper trunk slightly backward.

**Breathing:** Inhale while raising the arms.

**Awareness:** Physical — on the stretch of the abdomen and expansion of the lungs.

Spiritual — on vishuddhi chakra.

**Mantra:** Om Ravaye Namaha, salutations to the shining one

#### 3.9.1.4 Padahastanasana

Bend forward from the hips until the fingers or palms of the hands touch the floor on either side of the feet. Bring the forehead as close to the knees as is comfortable. Do not strain. Keep the knees straight.

**Breathing:** Exhale while bending forward. Contract the abdomen in the final position to expel the maximum amount of air from the lungs.

**Awareness:** Physical — on the back and pelvic region. Spiritual — on swadhisthana chakra.

**Contra-indications:** People with back conditions should not bend forward fully. Bend from the hips, keeping the spine straight, until the back forms a ninety degree angle with the legs, or bend only as far as is comfortable. Cautions for inverted postures apply.

**Mantra:** Om Suryaya Namaha, salutations to he who induces activity.

### 3.9.1.5 Ashwa Sanchalanasana

Place the hands on the floor beside the feet. Stretch the right leg back as far as is comfortable and grasp the floor with the toes. At the same time, bend the left knee, keeping the left foot on the floor in the same position. Keep the arms straight. In the final position, the weight of the body should be supported on both hands, the left foot, right knee and toes of the right foot. The head should be tilted backward, their back arched and the inner gaze directed upward to the eyebrow centre.

**Breathing:** Inhale while stretching the right leg back.

**Awareness:** Physical — on the stretch from the thigh through the lower back, and on the eyebrow centre while balancing. Spiritual — on ajna chakra.

**Contra-indications:** The full stretch is not advised for people with knee or ankle problems.

**Mantra:** Om Bhanave Namaha, salutations to he who illumines.

### 3.9.1.6 Parvatasana

Keep the hands and right foot still, and take the left foot back beside the right foot. Simultaneously, raise the buttocks and lower the head between the arms so that the back and legs form two sides of a triangle. The legs and arms straighten in the final position and the heels come down towards the floor in the final pose. Bring the head and shoulders towards the knees. Do not strain.

**Breathing:** Exhale while taking the left leg back.

**Awareness:** Physical—on the stretch through the Achilles tendons, the back of the legs, shoulders and throat region, and on relaxing the hips.

Spiritual — on vishuddhi chakra.

**Contra-indications:** Cautions for inverted postures apply.

**Benefits:** This pose strengthens the nerves and muscles in the limbs and back. It helps to increase height by stretching muscles and ligaments, enabling growing bones to grow longer. Circulation is stimulated, especially in the upper spine between the shoulder blades.

**Mantra:** Om Khagaya Namaha, salutations to he who moves quickly in the sky.

### 3.9.1.7 Ashtanga Namaskara

Keep the hands and feet in place. Lower the knees, chest and chin to the floor; the feet will come up on to the toes. In the final position only the toes, knees, chest, hands and chin touch the floor. The knees, chest and chin should touch the floor simultaneously. If this is not possible, first lower the knees, then the chest, and finally the chin. The buttocks, hips and abdomen should be raised.

**Breathing:** The breath is held out in this pose. There is no respiration.

**Awareness:** Physical — on the arch in the lower back and on the abdominal region.

Spiritual — on manipura chakra.

**Contra-indications:** People with serious back problems, high blood pressure or heart conditions should not do this practice.

**Benefits:** This pose strengthens the leg and arm muscles, develops the chest and exercises the region of the spine between the shoulder blades.

**Mantra:** Om Pushne Namaha, salutations to the giver of strength.

### **3.9.1.8 Bhujangasana**

Keep the hands and feet in place. Slide the chest forward and raise first the head, the shoulders, then, straightening the elbows, arch the back into the cobra pose. This will lower the buttocks and hips to the floor. Bend the head back and direct the gaze upward to the eyebrow centre. The thighs and hips remain on the floor and the arms support the trunk. Unless the spine is very flexible the arms will remain slightly bent.

**Breathing:** Inhale while raising the torso and arching the back.

**Awareness:** Physical - on relaxation of the spine. Spiritual - on swadhisthana chakra.

**Contra-indications:** Not advised for people suffering from peptic ulcer, hernia, intestinal tuberculosis or hyperthyroidism.

**Mantra:** Om Hiranya Garbhaya Namaha, salutations to the golden, cosmic self.

### **3.9.1.9 Parvatasana Position**

### **3.9.1.10 Ashwa Sanchalanasana Position**

### **3.9.1.11 Padahasthasana Position**

### **3.9.1.12 Hasta Utthanasana Position**

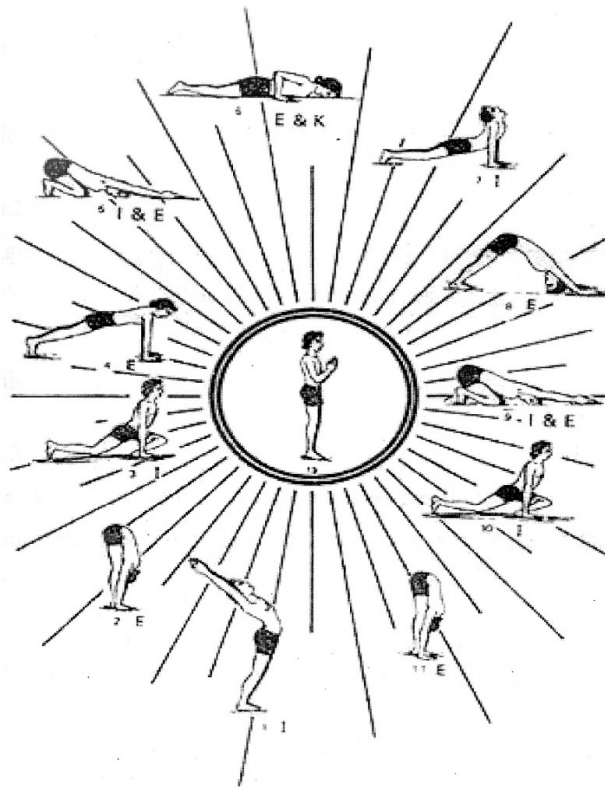
### **3.9.1.13 Pranamasana Position**

**Figure – 1**  
**Showing the Time of Asanas Training**



The twelve positions of surya namaskara are practised twice to complete one round. Positions I to 12 constitute half a round. In the second half, the positions are repeated with two small changes related to ashwa sanchalanasana: a) In position 16, instead of stretching the right foot backward, stretch the left foot back.

b) In position 21, bend the right leg and bring the right foot between the hands



I - INHALATION

E - EXHALATION

E&K - EXHALE AND HOLD BREATH

**3.9.1.14 Padmasana (the lotus pose)**

Sit with the legs extended forward, fold one leg and place its foot on the top of the opposite thigh. The sole of the foot must be upward and the heel should touch the pelvic bone. Fold the other leg and place its foot on top of the other thigh.

Breath: Normal breathing.

**3.9.1.15 Vajrasana (the thunderbolt pose)**

Stand on the knees with the feet stretched backward and big toes crossed. The knees should be together, heels apart. Lower the buttocks on to the insides of the feet, the heels at the sides of the hips. Place the hands on the knees, palms downward. Practice vajrasana as much as possible, especially straight after meals for at least 5 minutes to enhance digestive function.

Breath: Normal breathing.

**3.9.1.16 Navasana (The Boat pose)**

From a seated position bent the knees and tilt the upper body back.

Straighten the legs. Point the heels, toes or ball points of the toes.

Apply a little pressure inward so the legs stay together and lengthen the inner legs.

Raise the chest up and allow weight to fall upon the sacrum. Or balance on the very end of the tailbone. (The Coccyx)

Lengthen the torso.

Keep space around the front of the neck. Push through the top of the head to balance the energy that moves through the toes

**3.9.1.17 Trikonasana (the triangle stretch pose)**

Stand erect with the feet about 3 feet apart. Raise the arms sideways to form one straight line. Turn the body to the left while bending the knees slightly. Bring the

left hand to the left foot, keeping the two arms in line with each other. Return to the standing position, keeping the arms in a straight line. Repeat to the opposite side. Practice 5 times.

Breath : Inhale while raising the arms. Exhale while bending. Inhale straightening to the vertical position.

### **3.9.1.18 Pada Hastasana (the forward bending pose)**

Stand with the trunk erect and the hands beside the body. Slowly bend the head forward, then the upper trunk and the lower trunk. The body should bend forward as though there are no muscles in the back. Place the fingers underneath the toes or touch the ground with the palms to the fingertips. If this is not possible then bring the fingertips as near to the ground as possible. Try to bring the forehead to the knees. Maintain this pose up to 1 minute then slowly return to the starting position.

Breath: Exhale as you bend forward. Breathe slowly and deeply in the final pose. Inhale as you return to the starting point.

### **3.9.1.19 Matsyasana (the fish pose)**

Sit in padmasana. Bend backward, supporting the body with the arms and elbows, until the crown of the head touches the ground. Hold the big toes and rest the elbows on the floor. Arch the back as much as possible. Remain in the final pose up to 5 minutes. Do not strain.

Breath: Breathe deeply and slowly in the final pose.

### **3.9.1.20 Bhujangasana (the cobra pose)**

Lie on the stomach with the legs straight and the feet extended. Place the palms flat on the floor under the shoulders. Rest the forehead on the ground and relax the body. Slowly raise the head and shoulders off the ground, bending the head as far back as it will go. Try to raise the shoulders without using the arms, only utilizing the back muscles. Now bring the arms into action and slowly bend the back as much as



possible without strain until the arms are straight. Keep the navel as near to the ground as possible. Hold as long as comfortable. Practice upto 5 times.

Breath: Inhale while raising the body from the ground. Breathe normally in the final pose. If the final pose is held for a short time, retain the breath inside.

### **3.9.1.21 Halasana (the plough pose)**

Lift flat on the back with the arms straight and beside the body, palms facing downward. Keeping the legs straight, slowly raise them to the vertical position above the body. Only use the stomach muscles to raise the legs. Do not use the arms. Simultaneously bend the trunk upward, hips first. Slowly lower the legs over the head and touch the floor with the toes of both feet. Keep the leg straight, bend the arms and place the hands on the back as in sarvangasana. Relax the body.

Breath: Retain the inside while assuming and returning from the pose. Breathe slowly and deeply in the final pose.

### **3.9.1.22 Pashimottanasana (the back stretching pose)**

Sit on the floor with the legs straight in the front of the body, the lower arms on the thighs. Relax the whole body, especially the back muscles. Slowly bend the body forward. Try to grasp the big toes with the fingers and the thumbs. If this is impossible then hold the heels, the ankles or the legs as near to the feet as possible. Again, consciously relax the back and leg muscles. Keeping the legs straight and without utilizing the back muscles, only using the arms, pull the trunk a little lower toward the legs. This should be a process without any sudden movement or excessive strain anywhere in the body. If possible, without strain, touch the knees with the forehead. Remain in the final pose for a comfortable length of time, trying to further relax the whole body, and then slowly return to the starting position.

Breath : Breathe normally in the sitting position. Exhale slowly while bending forward. Inhale while holding the body motionless. Exhale as you pull the trunk

further forward with the arms. Breathe slowly and deeply in the final pose. Inhale while returning to the starting position. If the final pose is not held for a long time the breath may be retained outside.

### **3.9.1.23 Dhanurasana (the bow pose)**

Lie flat on the stomach and inhale fully. Bend the knees and hold the ankles with the hands. Tense the leg muscles and arch the back. Simultaneously raise the head, chest and thighs as high as possible. Keep the arms straight. Hold for as long as is comfortable. Practice up to 5 times.

Breath: The breath may be retained inside in the final pose or slow, deep breathing may be practiced.

### **3.9.1.24 Vipareeta Karani (the inverted attitude)**

The method is the same as for sarvangasana, expect the chin is not pressed against the chest in the final pose. The trunk is held at a 45 degree angle to the ground instead of at a right angle.

Breath: Retain inside which assuming and returning from this asana. Practise normal breathing when the body is steady in the raised position.

### **3.9.1.25 Savasana (the corpse pose)**

Lie flat on the back with arms beside and in line with the body, palms facing upward. Move the feet slightly apart to a comfortable position and close the eyes. Relax the whole body. Do not move any part even if discomfort occurs. Let the breath become rhythmic and natural. Become aware of the inhalation and exhalation. Count the number of respirations : I in, I out, and so on, Continue to count for a few minutes. If the mind starts to wander bring it back to the counting. If you can keep the mind on the breath for a few minutes, the mind and body will relax.

Breath: Normal Breathing.

### **3.9.2 AEROBIC EXERCISES**

After the warm up, aerobic exercises were given for the players, The overload principle was adopted. In every day training session, the work out lasted approximately between 45 minutes and an hour, which included warming up and limbering down, along with in football field at morning session. To start with the exercises, the subject stood with both feet at shoulder width distance and the arms were kept on either side of the body in a relaxed position, then the following aerobics exercises comprising of note consumption of four counts and 8 counts were continued. The aerobic training procedure well explained and detailed in 3.9.2 to 3.9.2.10.

**Figure – 2**  
**Showing the Time of Aerobic Training**



### **3.9.2.1 Marching on the Spot**

#### **Starting Position**

The subject stood with both feet at shoulder width distance and the arms were bent on either side of the body in a relaxed position.

Marching on the spot was performed by the subject raising the legs alternatively with the slight flexion at the knees, along with alternate arm movements.

On the spot marching was performed for 32 counts with alternate arm movements.

### **3.9.2.2 Touch Out**

1. The left leg was stretched two feet to the left side and touched the ground, simultaneously both the arms were stretched at shoulder level.
2. The left leg was brought back to the starting position
3. Counts 3 and 4 were repetition of 1 and 2 with right leg and arms.

#### **Number of Sets**

Eight sets were performed continuously for a total of 32 counts.

### **3.9.2.3 Step Touch**

1. The left leg was placed one step to the left and simultaneously both the hands were placed on the hip.
2. With the side ward movement, the right leg was placed near the left leg.
3. The right leg was brought back to the starting position
4. The left leg was brought back to the starting position.
5. Counts 5 to 8 were repetitions of 1 to 4 on the right side.

**Number of Sets**

Four sets were performed continuously on left and right side alternatively for a total of 32 counts.

**3.9.2.4 Double Step Touch**

1. The left leg was placed one step to the left and simultaneously both the hands were placed on the hip.

2. With the sideward movement the right leg was placed near the left leg simultaneously the hands were brought back to the position.

3. Count 1 was repeated further towards the left side.

4. Count 2 was repeated.

5. Counts 5 to 8 were repetitions of 1 to 4 towards the right side to return to the starting position.

The same procedure was followed for the double step touch starting with the right leg for counts 9 to 16.

**Number of Sets**

Two sets were performed continuously on left and right side alternatively for a total of 32 counts.

**3.9.2.5 Grapevine**

1. The left leg was placed one step to the left and simultaneously both the hands were placed on the hip.

2. The right leg was placed behind the left leg with the heels raised.

3. The right leg was brought back to the starting position

4. The left leg was brought back to the starting position
5. The same procedure was followed on the right side for counts 5 to 8.

#### **Number of Sets**

Four sets were performed continuously for a total of 32 counts.

#### **3.9.2.6 Cross Over Step**

1. Raised the left heel up and swung the right arm forwards
2. The same step was repeated with right leg and left arm
3. Stepped side wards with a cross over step with the right leg simultaneously the right arm was swung along with right leg by twisting the trunk downwards towards left side.
4. The subject returned to the starting position
5. Counts 5 to 8 were repetitions of 1 to 4 with left leg and left arm

#### **Number of Sets**

Four sets were performed continuously on left and right side alternatively for a total of 32 counts.

#### **3.9.2.7 Jump on the Spot**

1. The subject jumped slightly upwards simultaneously both arms were stretched forward and upward upto either side of the head.
2. The subject performed one more additional jump
3. The legs were brought back to the starting position simultaneously with a downward movement of the arms upto the shoulder level.
4. The arms were brought back to the starting position

**Number of Sets**

Eight sets were performed continuously for a total of 32 counts.

**3.9.2.8 Ham Curl**

1. The left leg was placed one step to the left side and simultaneously both the hands were placed on the hip.
2. The right leg was lifted diagonally towards left side with the knee flexed.
3. The right leg was brought back to the starting position
4. The left leg and arms were brought back to the starting position.
5. The above steps were repeated on the right side for counts 6 to 8.

**Number of Sets**

Four sets were repeated continuously for a total of 32 counts.

**3.9.2.9 Front Kick**

1. With a jump the left thigh was raised to hip level and simultaneously both the hands were placed on the hip.
2. After landing again with a jump the left leg was kicked forwards.
3. After landing again with a jump the left leg was brought back to the count 1 position.
4. The left leg and arms were brought back to the starting position
5. Counts 5 to 8 were repetitions of 1 to 4 on the right leg.

**Number of Sets**

Four sets were repeated continuously for a total of 32 counts.



### **3.9.2.10 Knee and Arm Lift**

1. The left foot was placed one step to the front and simultaneously the left arm flexed at elbows with clenched hand was raised side wards at right angle to the shoulder level. The right hand was placed on the hip.

2. The right knee was lifted forward at right angle to the hip and flexed left arm was moved forward from the sideward position

3. The right foot and left arm were brought back to count 1 position

4. The left foot and arms were brought back to the starting position.

### **Number of Sets**

Four sets were repeated continuously for a total of 32 counts.

### **3.9.3 PROPRIOCEPTIVE TRAINING**

After the warm up, proprioceptive training were given for the work out lasted approximately between 45 minutes and an hour, along with in football field at evening session. To start with the exercises most of basic activity you can use to determine a players' level of proprioception is the tandem stance balance. Have your player stand on a level floor surface with one foot in front of the other, heel to toe. Arms are at sides or raised whichever is easier. He should be able to stand still in this position for 30 seconds with his eyes open. next, have the player close his eyes and stand still in the same position for 30 seconds. The stork stance is also a good test of basic proprioception skills. Have the player stand still on one leg for 30 seconds with both eyes open and arms at his sides or raised, without allowing the elevated foot to touch the ground. Once he can accomplish this, have him close his eyes while maintaining the same position and stand still for another 30 seconds. The proprioceptive training procedure well explained and detailed in 3.9.3 to 3.9.3.12.

**Figure – 3**

**Showing the Time of Proprioceptive Training**



### **3.9.3.1 One-leg balance.**

Stand on your left foot with relaxed, upright posture and with your right leg flexed at the knee so that the right foot is off the floor or ground. Your left, weight-bearing leg should be lightly flexed at the knee, hip, and ankle, as they would be when your left foot is on the ground during the act of running. Simply hold this position for one minute, rest for 10 to 20 seconds, and then repeat twice more. After a brief rest, complete three similar reps with your right leg as the weight-bearing limb.

### **3.9.3.2 Forward-backward leg swings with knee flex.**

Rest for a moment after completing the one-leg balances, and then stand with your weight fully supported on your left leg. Begin by flexing your right hip and raising your right knee up to waist height (so that your right thigh is parallel to the ground), with your right knee flexed to approximately 90 degrees or a little more. Perform this action reasonably quickly so that your leg 'swings up' to this top position - rather than being slowly lifted (if necessary, you may place your right hand on a wall or other support to maintain balance as you do this).

Continue the exercise by swinging your right leg downwards and backwards until your right leg is extended behind your body (as if following through on a running stride). Your right knee should be completely extended at the end of this backswing, eg, your right leg should be nearly straight at the back of the swing - just as it would be after take-off during a sprint stride. Once you have reached full extension, drive your right leg forward, flexing your right knee as you do so, until your right thigh is once again in front of you and parallel with the floor or ground. Repeat this forward and backward action 30 times while gradually increasing the speed and range of motion of the movement (for those with insecure balance, it sometimes is helpful to start with 'baby swings' in which the thigh does not reach the

parallel-with-ground position, nor does full leg extension occur on the backswing). Rest briefly, and then repeat 30 more times with your right leg. Make sure you are sustaining a relaxed posture, with your upper body upright and your gaze directed ahead of you, not at your feet. You should try to achieve the same posture you would utilize during running. If you lose balance and must touch down with your right foot momentarily, relax, support body weight on your left leg again, and resume the exercise.

Finally, be sure to coordinate arm activity with your leg swings. That is, as your right leg swings forward and up, your left arm should also swing ahead, as it would do during running. As your right leg moves backward, your left arm also retreats. Try to keep the overall feeling of the exercise as close to the sensation of running as possible.

### **3.9.3.3 Forward-backward leg swings with knee extend.**

After you have completed your forward-backward leg swings with knee flexed on both legs, rest momentarily and then stand with your weight fully supported on your left leg (once again, you may initially place your right hand on a wall or other support to maintain balance). Begin the exercise by flexing your right hip and raising your right knee up to waist height (with right thigh parallel to the ground), but this time extend the lower part of your leg so that your right knee is near fully extended (you will be almost 'straight-legged'). As with the previous exercise, perform this action reasonably quickly so that your leg 'swings up' to this top position rather than being slowly lifted.

Continue the exertion by swinging your right leg downwards and backwards until right hip and leg are extended behind your body (as if following through on a running stride). Your right knee should remain nearly fully extended throughout the entire movement, eg, your leg remains straight at all times. Once

again, coordinate leg and arm activity (as right leg moves forward, left arm does also, and so on).

Repeat this back-and-forth action 30 times with as much coordination as you can muster while gradually increasing the speed and range of motion of the movements. Rest, carry out one more set with your right leg, and then repeat the same movements with your left leg (two sets of 30 reps).

#### **3.9.3.4 Toe walk.**

Once you have rested from your knee-extended, forward-backward leg swings, walk for 20 metres high up on your toes with your toes pointing straight ahead, walk for 20 metres high up on your toes but with your toes pointing outwards, and then walk for 20 metres with your toes pointing in.

When you point your toes out or in, be sure to turn your legs outward or inward from the hips; don't try to achieve all the turning at your ankles. Rest for a moment and then repeat the straight-ahead, toes-out, and toes-in pattern of toe walking once more (20 metres for each version of toe walking).

#### **3.9.3.5 Heel walk.**

Walk for 20 metres on your heels with toes pointing straight ahead, walk 20 metres on your heels with toes pointing out, and then walk 20 metres with toes pointing in. As before, make sure you rotate your legs, not just your ankles, when you complete the toes-out and toes-in versions of this exercise. After a very short rest, complete this routine once more.

#### **3.9.3.6 Cross-body leg swing.**

Leaning just slightly forward with your hands on a wall or other support and your weight on your left leg, swing your right leg to the left in front of your body, pointing your toes upwards as your foot reaches its farthest point of motion. Then swing the right leg back to the right as far as comfortably possible, again pointing

your toes up as your foot reaches its final point of movement. Repeat this overall motion 15 times with erect body posture and good balance, rest for a few seconds, and then repeat. Complete the same routine - two sets of 15 reps - with your left leg as the 'swing' leg.

### **3.9.3.7 Advanced one-leg balance.**

These are just like the one-leg balances from week one, except that you should swing your arms back and forth vigorously, mimicking the arm action associated with running, as you stand one-footed. Complete the same number of sets and reps you used for regular one-leg balances.

### **3.9.3.8 Maximum forward-backward leg swings with knee extend.**

There's nothing major to learn here; you're simply carrying out the forward-backward leg swings with knee extended which we described previously, but there is one new 'wrinkle'. As your leg swings forward, instead of merely shooting for a parallel-with-the-ground position for your swing leg, try to elevate the swing leg as high as possible as it moves forward (of course, maintain good balance and coordination as you do so; do not let yourself get out of control). Think of yourself as punting a rugby ball and trying to achieve the maximum-possible follow-through.

### **3.9.3.9 One-leg squat.**

Stand with your left foot forward and your right foot back, with your feet roughly one shin-length apart (they should be hip-width apart from side to side). Place the toes of your right foot on a block or step which is six to eight inches high. All of your weight should be directed through the mid-foot region of your left foot. Now, bend your left leg at the knee and lower your body until your left knee reaches an angle of about 90 degrees between the thigh and lower leg. As you carry out this squat, your right arm should swing forward. Then, return to the starting position, maintaining upright posture with your trunk and returning your right arm to your side.

### **3.9.3.10 Runners' poses.**

To do these, stand relaxed with erect body posture, with your feet roughly under your shoulders. Then, swing your right thigh ahead and upward until it is parallel with the floor (your leg should be flexed at the knee as you do this, so that the lower part of the leg should be pointing almost directly at the ground, ie, it should be nearly perpendicular with the ground); as you swing your thigh ahead and up, simultaneously bring your left arm forward, as you would do during a normal running stride). Hold this position for a couple of seconds, while maintaining relaxed stability and balance, and then bring your right foot back to the ground and your left arm back to a relaxed position at your side (that completes one 'pose').

### **3.9.3.11 Bicycle leg swings without resistance.**

Stand with your weight fully supported on your left leg (you may place your right hand on a wall or other support to maintain balance). Then, flex your right hip and raise your right knee up to waist height (your right thigh should be parallel with the ground); as you do this, your right knee should be flexed to 90 degrees or more. Once your thigh is parallel to the ground, begin to extend your right knee (swing the lower part of your right leg forward, unflexing the knee) until your knee is nearly fully extended (eg, your leg is nearly straight), with your right thigh still parallel to the ground.

As your right knee nears full extension, allow your right thigh to drop downwards and backwards until the entire thigh and leg are extended behind your body (as if following through on a running stride). Your right knee should be near full extension (your leg should be straight) until it reaches the peak of the backswing. As your right hip nears full extension (eg, as you approach the end of the backswing), raise your right heel by bending your right knee; your heel should move closely towards your buttocks as you do this. As this happens, move your right knee forward

until it returns to the appropriate position in front of your body, with your right thigh parallel to the ground.

### **3.9.3.12 Partial squat**

Stand with your left foot directly under your left shoulder, keeping your left knee just slightly flexed and maintaining relaxed, fairly erect posture. Hold a barbell (initially with no weight attached) so that it rests on the top-back of your shoulders just behind your neck; you may incline your upper body just slightly forward for balance. Most of your body weight should be directed through the heel to mid-portion of your left foot. Your right leg should be flexed at the knee so that the foot is not touching the ground at all - your right foot is literally suspended in air (however, you may occasionally need to 'spot-touch' the floor for balance with your trailing leg).

From this position, if you were carrying out a traditional one-leg squat you would ordinarily bend your left leg at the knee and lower your body until your left knee reached an angle of about 90 degrees between the backs of your thigh and lower leg (usually at this point your thigh would be almost parallel with the ground). However, for the partial squat you should just go down about half-way - so that the angle between the back of your thigh and lower leg is just 135 degrees or so then, return to the starting position, maintaining upright posture with your trunk. That's one rep continue in the manner described above until you have completed 10 reps (10 partial squats). Then - without resting - descend into the 11th partial squat, but instead of rising back up hold the partial-squat position (the 135-degree position) for 10 full seconds. We'll call your body alignment during this 10-second period the 'static-hold' position.

After completing 10 seconds in the static-hold position, immediately - without resting - rattle off 10 more reps, maintain the static hold for 10 seconds again, hit 10 more reps, and then hold statically for 10 more seconds.



Here is a summary of the overall sequence:

- (1) 10 partial squats
- (2) 10 seconds of holding your leg and body in the down position
- (3) 10 partial squats
- (4) 10 seconds of holding
- (5) 10 partial squats
- (6) 10 seconds of holding

### **3.10 COLLECTION OF THE DATA**

The data on speed, explosive power, agility, reaction time, vital capacity, resting pulse rate, cardio vascular endurance, breath holding time, passing, dribbling and shooting ability were collected by using the standardized test items such as 50 metres run, vertical jump, shuttle run, reaction timer, wet spirometer, stethoscope, cooper's 12 min run/walk test, holding the breath for time, and F-MARC Test Battery respectively. The pre test data were collected two days before the training programme and post test data were collected two days after the last training session.

### **3. 11 ADMINISTRATION OF THE TESTS**

#### **3.11.1 50 Metres Run**

##### **Purpose**

To assess speed.

##### **Equipments used**

Measuring tape, starting clapper and stopwatch.

**Procedure**

The standing start method was adopted for this purpose. The time elapsed from the 'clap' to the runner crossing the finish line was taken as the test score. The fractions were rounded to the next largest one tenth of a second. For this purpose digital electronic watch was used. Two trials were conducted with sufficient rest in between.

**Scoring**

The best of two trials was recorded as test score. **(Harold M. Barrow, 1964)**

**3.11.2 Vertical Jump****Purpose**

To assess the elastic strength of the subjects.

**Equipment**

A plywood board as suggested by Sargent was used to obtain the data.

**Procedure**

To obtain the data for vertical jump, Sargent jump was administered to the subjects. Before the execution of the tests all the subjects were directed by the tester regarding the test performance. The subjects were taught how to perform the test perfectly by the investigator. Before the execution of the vertical jump test, subjects were directed to practise for a few minutes.

A plywood board (blackened 1 cm thick, 1.50 metres long and 50 cm wide) with lines marked horizontally 1 cm apart was used. This board was placed vertically the zero point of the scale being at the reaching height of the shortest subject tested. The subject stood with his side towards the wall and reached as high as possible with heels on the floor and made a mark on the wall with chalked fingers. The subject then, swung his arm downward and backward assuming a crouched position with the knees bend at about right angle. The subject then jumped as high as possible, swing the arms upward as the highest point of the jump was reached; another mark was made above the initial one. Three trials were allowed with one minutes rest in between.

### **Scoring**

The score was recorded to the nearest centimeter, between the standing reach and jump mark. The best of the three trails was recorded as test score. (**Michael Kent, 1994**)

### **3.11.3 Shuttle Run (4 x 10 yds)**

#### **Purpose**

The purpose of the test was to measure the agility.

#### **Procedure**

To lines parallel to each other was marked on the floor 30 feet apart the subject shall stand behind one of the lines with the blocks at the other line on the signal 'start' the subject runs to the blocks takes on block, and returns to starting line and takes obn block which was carried across the starting line on the way back. Two trails were given and to best trail was taken into account.

## Scoring

The score was the elapsed time recorded in seconds and one tenth of seconds for the better of 2 trails. (Clarke and Clarke, 1976)

### 3.11.4 Reaction Time

#### Purpose

To measure reaction time, hand-eye quickness and attentiveness.

#### Equipment Required

1 meter long ruler or Yardstick, calculator

#### Procedure

The person to be tested stands or sits near the edge of a table, resting their elbow on the table so that their wrist extends over the side. The assessor holds the ruler vertically in the air between the subject's thumb and index finger, but not touching. Align the zero mark with the subjects fingers. The subject should indicate when they are ready. Without warning, release the ruler and let it drop - the subject must catch it as quickly as possible as soon as they see it fall. Record in meters the distance the ruler fell. Repeat several times (e.g. 10 times) and take the average score.

#### Scoring

Calculate the average distance the meterstick fell. Use the table below to determine how long it took the ruler to fall the measured distance (distance in cm, time in seconds). The table is based on the following formula, where  $d$  = the distance the ruler fell in meters,  $g$  = the acceleration of gravity ( $9.8 \text{ m/s}^2$ ), and  $t$  = the time the ruler was falling (seconds)  $t = \sqrt{2d / g}$

### **3.11.5 Vital Capacity**

#### **Purpose**

Purpose of this test was to find out the maximum quantity of air that can be exhaled after a full inhalation.

#### **Facilities and Equipments**

A wet spirometer, mouthpieces and nose clips were used for measuring the vital capacity.

#### **Procedure**

Vital capacity was measured by means of the wet spirometer in cubic millimeters. The spirometer was fitted with a long rubber nose. The spirometer was filled with water up to one inch from the top and was placed at a height whereby all subjects could stand erect at the beginning of the test.

Each subject was asked to take a deep breath before the test and after the fullest possible inhalation the subject exhaled slowly and steadily and forcefully expelled all the possible air. Care was taken to prevent air from escaping through the nose by using the nose clip. The point of the indicator at the top of the drum indicated the volume of air expelled in cubic centimeter. It was ensured that the subject did not take a second breath during the test. Care was taken to lower the drum without spilling the water each time after use. The best of three consecutive trials with a rest of one minute after each trial was recorded.

#### **Scoring**

The reading in the dial of the spirometer was noted against each subject as vital capacity in cubic milliliters. **(Michael Kent, 1994)**

### **3.11.6 Resting Pulse Rate**

#### **Purpose**

The purpose of the test was to assess the number of pulse rate per minute.

#### **Facilities and Equipments**

For assessing the resting pulse rate, a stopwatch 1/10<sup>th</sup> of a second and stethoscope were used.

#### **Procedure**

The resting pulse rate was taken from the laboratory, where the subjects stayed between 6 am and 7 am. A calibrated stopwatch and a stethoscope were used for checking the pulse rate for one minute. The subjects were asked not to move from their bed in early morning in the laboratory. One-minute was counted and recorded.

**(Harold M. Barrow, 1964)**

### **3.11.7 Cooper's 12 minutes Run / Walk**

#### **Purpose**

To assess the cardio vascular endurance.

#### **Equipment**

To conduct this test, 400 meter track, stop watches, a whistle and score sheets were used.

#### **Procedure**

The 400 meter track was kept ready with marking at every fifty meters. The subjects were divided into two groups. When one group was running, the designated patterns from the other group acted as lap scores. The subjects were instructed to run, jog or walk according to their capacity without stopping for 12 minutes. The subjects of the first group started running for the whistle and continued to run, jog or walk and covered as much as possible distance during the 12 minutes period. When the 12

minutes was over the whistle was blown and the subjects stopped progressing forward but they should stand on the spot. The partners helping as lap scores kept the record of the number of laps completed.

### **Scoring**

The number of completed distance was recorded. **(Harold M. Barrow, 1964)**

### **3.11.8 Breath Holding Time**

#### **Purpose**

To assess the sensitivity of the breathing centre.

#### **Facilities and equipment**

A stop watch calibration of 1/10 seconds, score sheet and a pencio wee used to administer the test.

#### **Procedure**

The subjects stood at ease and inhaled deeply after which he held his breath for a length of time possible to him. The index finger of the respondent served as an indicator for the investigator to know the start and the recording time. The thumb and center finger were used to hold the breath and not to allow the air to pass through nostrils. The subjects were requested not to let the air out by opening the month while recording the breath holding time.

#### **Scoring**

The time of holding the breath till the subject let the air out was recorded by using the stopwatch to the nearest one tenth of a second and breath holding time. **(Michael Kent, 1994)**

### 3.11.9 DRIBBLING ABILITY (F-MARC Test Battery)

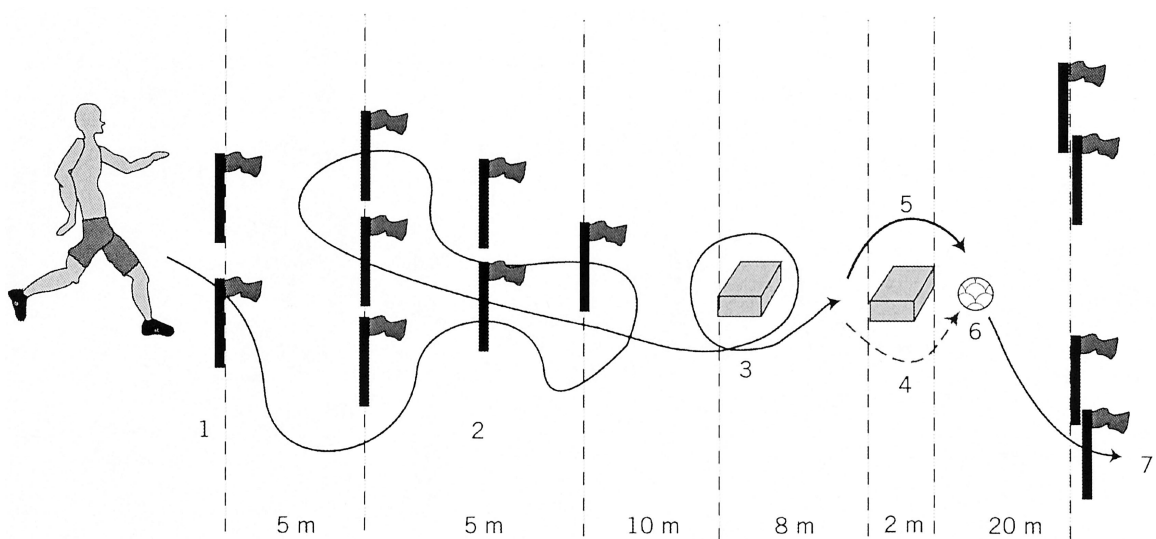
#### Purpose:

This test allows assessment of coordinated dribbling under time pressure and assessment of speed.

#### Equipments Used:

Football, cones, pencil and score sheet.

#### Procedure:



On the signal “Ready-Go,” the player starts with the ball from behind the line. After 5 meters he dribbles to the right, around the first post of a triangle (2). Following the set order, he dribbles around the other posts. After 10 meters he dribbles around a block (3). Then after 8 meters he plays the ball around one side of a square (4) and runs around the other side (5) to collect it (6). Then he sprints through a gate and puts his foot on the ball (7).

#### Scoring:

The examiner measures the time taken from the “Go” signal until the player has the ball under his foot. Measurement is made with a stopwatch in units of 0.1 seconds.



### 3.11.10 PASSING ABILITY (F-MARC Test Battery)

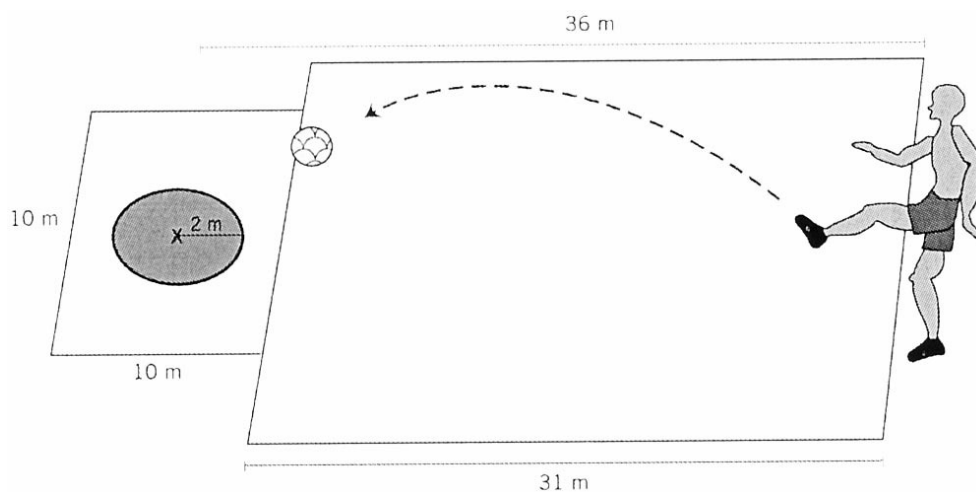
#### Purpose:

This test allows assessment of passing accuracy and shooting power over a long distance.

#### Equipments Used:

Football, cones, pencil and score sheet.

#### Procedure:



The subject passing accuracy the player passes the ball from its dead position on the line into a circle (radius, 2 meters; distance, 36 meters) marked in the middle of a square target area (10 x 10 meters). The player has a trial attempt first.

#### Scoring:

The examiner measures a total of five attempts. The measurement unit is points; 3 if the ball lands in the circle or touches its circumference and 1 point if the ball lands elsewhere in the square.

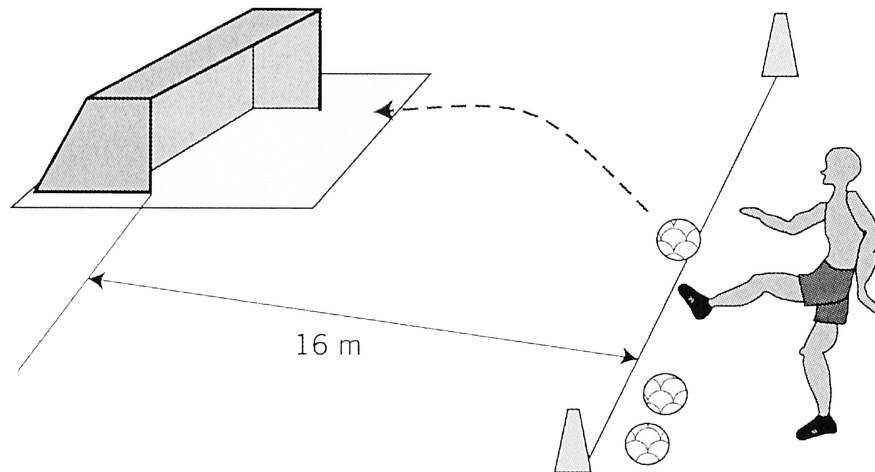
### 3.11.11 SHOOTING ABILITY (F-MARC Test Battery)

#### Test Objective:

To measure shooting ability.

#### Equipment Used:

3 soccer balls and stopwatch.



#### Procedures:

The test allows assessment of accuracy and coordination in shooting from a dead ball. A ball is placed 16 meters from the middle of the goal. The player shoots into the goal, which is divided into six segments. He aims first for the top right, then for the top left segment. The examiner measures a total of three attempts each at the top right and top left segments.

#### Scoring:

Three points are scored if the player shoots into the correct segment, 1 point if the player hits the crossbar or goalpost of this segment, 1 point if the player shoots into the top middle segment, and 0 points for shooting into the lower segments.

### **3.12 EXPERIMENTAL DESIGN AND STATISTICAL PROCEDURES**

The pre and post test random group design was used as experimental design in which eighty football players were divided into four groups. Each group consists of twenty subjects. Group I underwent asana training twelve weeks (for three days per week). Group II underwent aerobic training for twelve weeks (for three days per week). Group III underwent proprioceptive training for twelve weeks (for three days per week). And Group IV acted as control who did not participate any special training programme apart from their regular routine football training. The data were collected for all the groups on selected criterion variables such as speed, explosive power, agility, reaction time, vital capacity, resting pulse rate, cardio vascular endurance, breath holding time, passing, dribbling and shooting ability by using the standardized test items such as 50 metres run, vertical jump, shuttle run, reaction timer, spirometer, radial pulse, cooper's 12 min run/walk test, holding the breath for time, and F-MARC Test Battery respectively. The data were collected from the four groups two days prior to and two days after the training programme on selected dependent variables and were statistically analyzed. The analysis of covariance (ANCOVA) was used to determine the differences, if any, among the adjusted post test means on selected dependent variables separately. Whenever the obtained 'F' ratio for adjusted post test was found to be significant, the Scheffe'S test was applied as a post hoc test to find out the paired mean differences, if any. The .05 level of confidence was fixed as the level of significance to test the 'F' ratio obtained by the analysis of covariance, which was considered as an appropriate.