Chapter III

PROCEDURE

In this chapter, the selection of subjects, criterion measures, administration of training programme and conducting of the tests, collection of data (for initial and post test), reliability of data, experimental design and statistical procedure employed for analysing the data have been described.

Selection of Subjects

Ninety girl students were selected randomly from different Goan schools, who used to play football regularly for their school team. The age group of the subjects selected for study were between the age of 14 to 16 years of age. The subjects were divided into three groups', each consisting of thirty subjects. Group A practiced on wet sand, Group B on dry sand and Group C was the control group. All the subjects were residing at different places.
Criterion Measures

The criterion measures chosen for testing of the hypothesis in this study were as follows:

Explosive Strength

Maximum distance jumped (by using standing broad jump) to the nearest centimeter (then converted into meter) was recorded to measure explosive strength of leg.

Speed

It was studied in respect to time taken in second (to the nearest 1/100th of a second) to cover a distance of 50 yards.

Agility

Time was recorded to the nearest 1/100th of a second to shuttle a distance of 10 yards four times, to measure agility.
Endurance (Cardio Vascular Endurance)

It was measured in distance covered in 12 minutes run/walk test in meters/then converted into kilometers.

Resting Pulse Rate

To measure the resting pulse rate, total number of heart beats per minute was recorded.

Blood Pressure

To measure both systolic and diastolic blood pressure of the performer, sphygmomanometer and stethoscope were used.

Vital Capacity

To measure the lungs capacity of the performer wet Spirometer was used and was recorded in litres.
Respiratory Rate

Resting respiratory rate, total number of exhalations and inhalations per minute were recorded.

Administration Training Programme and Conducting of the Tests

The training programme was administered to the subjects at Cansaulim ground in Goa. Prior to the actual administration of the training programme, all the subjects were properly instructed regarding the procedure of the tests and the necessary number of practice trials were provided to each subject to familiarise with the actual conduct of the test. The research scholar took the help of some experienced Physical Education Teachers for conducting the training programme and the tests were well oriented by the research scholar himself a few days prior to the test administration.

In order to motivate the students to put in best performances, the significance of this study was clearly explained to them and an element of competition was introduced.
The training programme were administered in the evening sessions. The tests were conducted in the morning session from 7.30 a.m. to 9.30 a.m.

### Training Programme

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Exercise</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Warm up (stretching and running)</td>
<td>7 minutes</td>
</tr>
<tr>
<td>(For 1(^{st}) 2 weeks)</td>
<td>Skill</td>
<td>8 minutes</td>
</tr>
<tr>
<td></td>
<td>Play</td>
<td>10 minutes</td>
</tr>
<tr>
<td></td>
<td>Limbering down</td>
<td>5 minutes</td>
</tr>
<tr>
<td>2.</td>
<td>Warm up (stretching and running)</td>
<td>9 minutes</td>
</tr>
<tr>
<td>(For 2(^{nd}) 2 weeks)</td>
<td>Skill</td>
<td>10 minutes</td>
</tr>
<tr>
<td></td>
<td>Play</td>
<td>15 minutes</td>
</tr>
<tr>
<td></td>
<td>Limbering down</td>
<td>8 minutes</td>
</tr>
<tr>
<td>3.</td>
<td>Warm up (stretching and running)</td>
<td>12 minutes</td>
</tr>
<tr>
<td>(For 3(^{rd}) 2 weeks)</td>
<td>Skill</td>
<td>15 minutes</td>
</tr>
<tr>
<td></td>
<td>Play</td>
<td>20 minutes</td>
</tr>
<tr>
<td></td>
<td>Limbering down</td>
<td>8 minutes</td>
</tr>
<tr>
<td>S.No.</td>
<td>Exercise</td>
<td>Duration</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>4.</td>
<td>Warm up (stretching and running)</td>
<td>12 minutes</td>
</tr>
<tr>
<td>(For 4&lt;sup&gt;th&lt;/sup&gt; 2 weeks)</td>
<td>Skill</td>
<td>15 minutes</td>
</tr>
<tr>
<td></td>
<td>Play</td>
<td>25 minutes</td>
</tr>
<tr>
<td></td>
<td>Limbering down</td>
<td>8 minutes</td>
</tr>
<tr>
<td>5.</td>
<td>Warm up (stretching and running)</td>
<td>10 minutes</td>
</tr>
<tr>
<td>(For 5&lt;sup&gt;th&lt;/sup&gt; 2 weeks)</td>
<td>Skill</td>
<td>10 minutes</td>
</tr>
<tr>
<td></td>
<td>Play</td>
<td>40 minutes</td>
</tr>
<tr>
<td></td>
<td>Limbering down</td>
<td>10 minutes</td>
</tr>
</tbody>
</table>

**Strength (Explosive)**

*Name of the Test: Standing Broad Jump*

*Purpose:* Standing broad jump was administered to obtain data on explosive strength.

*Procedure:* A take off line was drawn near one edge of the jumping pit. The subject was asked to take her position with toes
just behind the take off line and feet slightly apart. Taking off with both feet simultaneously, she jumped as far as possible and landed on both feet. In jumping, the jumper crouched slightly and swung the arms forward to aid the jump. Three trials were given to each subject. The best out of them was recorded.

Score: The best of the three distances covered by the jumper was recorded in centimeters and then converted into meters as score of the subjects.

Speed

Name of the Test: 50 yards dash

Purpose: 50 yards dash was administered to obtain data on speed.

Procedure: Two subjects ran at a time. Both of them took the starting position behind the starting line. The start was given by sounding the clapper using the command “On your mark”, “set” followed by the clap. The time for
each subject was recorded by the time -keepers who had been stationed at the finishing line.

Score: The period of time taken between the starters signal and the instant the subjects crossed the finishing line was recorded to the nearest one hundredth of a second, as the score of the subject.

Agility

Name of the Test: 4 x 10 yards shuttle run.

Purpose: To measure agility, 4 x 10 yards shuttle run test was administered.

Procedure: Two blocks of wood of 2 inches x 2 inches x 4 inches and a stopwatch were the equipment required for conducting the test. Two parallel lines were marked on the ground 10 yards apart. The wooden blocks were placed behind one of the line. The subject started from behind the other line on signal “go”. The subject ran to the blocks and picked one block, ran back to the starting
line and placed the block behind the line. She then ran back and picked up the second block which he carried back across the starting line.

The timing of each runner was recorded by two time-keepers. The lower timing to the nearest hundredth of a second was noted down. Two trials were given with sufficient interval of rest.

Score: Better timing of the two trials was recorded to the nearest one hundredth of a second as the score of the subject in agility.

Endurance

Name of the Test: 12 Minute Run/Walk

Purpose: To measure the cardio-vascular endurance of the subject, 12 minutes run/walk test was administered.

Procedure: The test was administered in the 400 meters track. The track was marked in ten meters segments. The subjects were divided into two groups. One lap scorer was
assigned for each subject. A starting signal by sounding a clapboard was given and simultaneously a stop watch was started by the time-keeper. The subjects were asked to run and when running was not possible resort to walking as far as possible within the 12 minutes time limit. At the signal of the time-keeper's whistle was blown at the end of the 12 minutes, at which the subjects stopped in their places. The lap scorers noted down the distance covered by each subject to the nearest ten meters.

Score: The distance covered by the subject in 12 minutes run/walk was recorded in meters, then converted into kilometers, as the score of the subject.

Resting Heart Rate

Purpose: The purpose of the test was to measure the number of heartbeats of the subjects in a minute.
Procedure: Heart rate was obtained in the morning. The scholar approached the subject in the morning and used a calibrated stopwatch and a stethoscope for counting heart rate. The subjects were requested to remain calm for 30 minutes prior to the recording of the heart rate.

Score: Total number of heart beats per minute for each subject was recorded as her score.

**Blood Pressure**

Purpose: The purpose of the test was to measure the blood pressure (systolic and diastolic) of the subject.

Procedure: A sphygmomanometer (dial type) and a stethoscope were used to measure the blood pressure (systolic and diastolic) of the subjects. Each subject was asked to sit relaxed in a chair. It was taken on all subjects in the morning hours. The cuff of the sphygmomanometer was wrapped around the left upper arm of the subject first above the elbow. The cuff was then connected to the
pump and the manometer. After closing the outlet valve of the pressure pump, the pressure in the inflatable rubber bag was rapidly raised to 180 mmHg by pumping air which was sufficient to obliterate completely the bronchial artery, so that the flow of blood through the artery was asserted and radial pulse disappeared. The sound of pulsation was monitored by keeping the chest piece of the stethoscope over the bronchial artery and listening to the sound through the ear piece of the stethoscope as the pressure over the artery was being manipulated. The pressure was then gradually lowered by opening the valve.

As soon as the pressure in the cuff fell first below the systolic pressure, it allowed the passage of small amount of blood through the compressed artery into the distal segment. This produced a clear tapping sound and the pressure shown on the dial was noted as soon as this sound was heard. This denoted the measure of systolic
blood pressure as the cuff pressure was lowered still further, more blood flowed through due to rebound relaxation of the arterial vessel and this was indicated by a louder sound. The pressure at which sound could be muffled by manipulating the pressure pump was read on the manometer scale. This denoted the measure of diastolic blood pressure. These measurements were repeated twice for each subject and the better one was recorded as her score in these variables.

**Score:** The better reading was recorded in mmHg as the subject’s scores in systolic and diastolic blood pressure.

**Vital Capacity**

**Procedure:** Vital capacity was measured with the help of wet spirometer. It was ensured that the pointer of the scale was at the zero mark at the beginning of the test. The subject took a deep breath before starting the test and then after the fullest inhalation the subject placed the
mouth piece attached to the hose connected to the air which had escaped through the edges of the mouth piece. The subject exhaled slowly and steadily while slightly bending forward until the maximum volume of air could be expelled without taking a second breath. The subjects were instructed that they should blow out only through the mouth not by nose even partially. The nose of each subject was clipped by the nose clip to prevent the air from escaping through the nose.

**Scoring:** The score was recorded in litres as indicated by the scale attached with the wet Spirometer.

**Respiratory Rate**

**Procedure:** The subjects were asked to rest in supine lying position on the mat. The respiratory rate was felt by placing the hand just below the thoracic cavity. The total number of exhalations and inhalations per minute was recorded for each subject.
Collection of Data Initial and Post Test

A Ten weeks training programme was undertaken on different surfaces for the collection of data. The training was conducted on the sea shore of Goan beaches. The practice was held everyday (5 days in a week). The training programme was prepared with the help of the guide. For conducting the training programme, help was also taken from the physical education teachers.

A pre-test of subjects were taken on physical and physiological variables before commencement of the training programme.

After the completion of 10 weeks training programme, the collection of data of all the three groups were retaken on physical and physiological variables.

Collection of data was made during the morning hours on three different grounds from 7.30 a.m. to 9.30 a.m.
Reliability of Data

To establish the reliability of the data, test-retest method was used. The performances of all the subjects before the ten weeks training programme and after the ten weeks training programme on the selected items (speed, strength, endurance, agility, pulse rate, blood pressure, vital capacity, respiratory rate) were taken each time twice on two different days under identical conditions. Pearson’s product moment correlations were computed to correlate both days performance of subjects on each items separately.

The reliability co-efficient obtained for each test items on speed, strength, endurance, agility, pulse rate, blood pressure, vital capacity and respiratory rate before and after the ten weeks training programme are presented in Table 1.
Table 1

RELIABILITY CO-EFFICIENTS OF TESTS, RETESTS SCORES

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Co-efficient of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>.97</td>
</tr>
<tr>
<td>Strength</td>
<td>.98</td>
</tr>
<tr>
<td>Endurance</td>
<td>.97</td>
</tr>
<tr>
<td>Agility</td>
<td>.96</td>
</tr>
<tr>
<td>Pulse Rate</td>
<td>.96</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>.95</td>
</tr>
<tr>
<td>Vital Capacity</td>
<td>.98</td>
</tr>
<tr>
<td>Respiratory Rate</td>
<td>.97</td>
</tr>
</tbody>
</table>

**Experimental Design**

To compare the effects of training on dry sand and wet sand on physical and physiological variables of Goan soccer players, random group design was used. Ninety subjects were selected randomly and
were divided into three groups i.e. Group A – wet sand, Group B – dry sand, Group C – control group.

**Statistical Procedure**

In order to compare the effects of training on wet sand and dry sand on speed, strength, endurance, agility, pulse rate, blood pressure, vital capacity, respiratory rate of female soccer players analysis of Co-Variance (F ratio) was applied. The level of significance was set at .05 level of confidence.