CHAPTER III

METHODOLOGY

In this chapter, the methodology engineered in the selection of subjects, selection of variables, pilot study, collection of data, the orientation procedures, collection of data, tools used, and statistical procedure have been presented.

The purpose of the study was to find out the effect of functional training and grid training on selected performance related fitness components, and play performance among interschool football players among West Bengal.

3.1. SELECTION OF SUBJECTS

To achieve the purpose of the study, the investigator randomly selected 120 football players who had represented their schools in inter school level competitions in football from different schools in West Bengal. The age of subjects for the study was between 14 to 16 years. The selected subjects were divided into four groups, three experimental groups and control group consisting of 30 subjects in each group.

The subjects were oriented on the purpose of the study and the usefulness in improving performance related fitness variables. All the subjects voluntarily participated in the study.
3.2 SELECTION OF VARIABLES

Based on the experience gained by the investigator through review of related studies, journals and books on different training methods on functional training and grid training, the following variables were selected for this study.

3.2.1 Dependent Variables

**Performance Related Fitness Components**

1. Speed
2. Agility
3. Leg Explosive Power
4. Flexibility
5. Cardiovascular Endurance
6. Upper body explosive power

**Play Performance Variables**

1. Overall Football Playing ability

3.2.2 Independent Variables

1. 12 weeks Functional Training
2. 12 weeks Grid Training
3. 12 weeks Combined training
3.3 EXPERIMENTAL DESIGN

Random group pre and post test research design was followed in this study. Randomly selected subjects (N=120) drawn from the universal pool of football players who represented their schools in inter school level competitions. The selected subjects were divided into four groups, experimental group I, experimental group II, experimental group III and control group consisting of 30 football players in each group. Experimental group I was assigned as functional training group and experimental II was assigned as Grid Training Group, experimental group III was assigned combination of Functional Training and Grid Training and control group was not given any special treatment and were under strict supervision of the investigator. Prior to experimental treatment, all the subjects were measured of their performance related fitness components, such as, agility, speed, leg explosive power, flexibility, cardiovascular endurance and upper body explosive power and play ability which formed pre test scores. After 12 weeks experiments to the experimental groups on respective training, all the three groups were tested on criterion variables selected, which form post test scores. The difference between pre and post test scores was considered as the effect of selected experimental treatments. To test the statistical significance of the difference, the obtained pre and post test scores of all the four groups using ANCOVA. In all cases 0.05 level was fixed to test the hypothesis.
3.4 CRITERION MEASURES

By glancing the literature, and in consultation with professional experts the following measures were applied to collected data on selected criterion and independent variables.

1. Speed was measured through 50 M sprint test
2. Agility was measured using Shuttle Run Test
3. Leg explosive power was measured through standing broad jump test
4. Flexibility was measured using sit and reach test
5. Endurance was measured using 600 M run test
6. Upper body explosive power was used using putting shot test.
7. Overall football playing ability was measured objectively by three experts.

Table I
TEST SELECTION

<table>
<thead>
<tr>
<th>S.No</th>
<th>Variables</th>
<th>Tests</th>
<th>Unit of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Speed</td>
<td>50 M Run</td>
<td>Seconds</td>
</tr>
<tr>
<td>2</td>
<td>Agility</td>
<td>Shuttle Run</td>
<td>Seconds</td>
</tr>
<tr>
<td>3</td>
<td>Leg Explosive Power</td>
<td>Standing Broad Jump</td>
<td>Meters</td>
</tr>
<tr>
<td>4</td>
<td>Flexibility</td>
<td>Sit and Reach</td>
<td>Centimeters</td>
</tr>
<tr>
<td>5</td>
<td>Endurance</td>
<td>600 M Run</td>
<td>Seconds</td>
</tr>
<tr>
<td>6</td>
<td>Upper body Explosive power</td>
<td>Shot put</td>
<td>Meters</td>
</tr>
<tr>
<td>7</td>
<td>Playing Ability</td>
<td>Subjective Rating</td>
<td>Scores</td>
</tr>
</tbody>
</table>
3.5 PILOT STUDY

The investigator conducted a pilot study with ten players who were not subjects of the research study to determine work loads for training, feasibility of conducting the selected training, the methods of testing, evaluate the competency of the investigator testing, recording the timings and scores and field equipments used in the present investigation.

3.6 RELIABILITY OF DATA

The reliability of the data was ensured by establishing the instrument reliability, subject reliability and tester's reliability.

3.6.1 INSTRUMENT RELIABILITY

Six electronic stop watches, non stretchable steel tapes, were used in this study. The instruments used were from standard companies and their calibrations were accepted as reliable at par with international standards. The measurements were collected twice and correlated for reliability.

The intra class correlation coefficient obtained by test, retest method is presented in Table II.
Table II

THE RELIABILITY COEFFICIENT OF THE TESTS AND SUBJECTS
BY TEST AND RETEST METHOD

<table>
<thead>
<tr>
<th>S.No</th>
<th>Test Items</th>
<th>Coefficient of Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Speed</td>
<td>0.86*</td>
</tr>
<tr>
<td>2</td>
<td>Leg Explosive Power</td>
<td>0.88*</td>
</tr>
<tr>
<td>3</td>
<td>Cardiovascular Endurance</td>
<td>0.86*</td>
</tr>
<tr>
<td>4</td>
<td>Agility</td>
<td>0.83*</td>
</tr>
<tr>
<td>5</td>
<td>Flexibility</td>
<td>0.87*</td>
</tr>
<tr>
<td>6</td>
<td>Shot put</td>
<td>0.88*</td>
</tr>
<tr>
<td>7</td>
<td>Plying Ability</td>
<td>0.81*</td>
</tr>
</tbody>
</table>

Table value \(r = (0.01) (1,7) = 0.798\)

* Significant at 0.01 level

3.6.2 TESTER'S RELIABILITY

The tester's competency was established together with reliability of test. To determine the reliability of the test, the performance of ten subjects were recorded twice under similar conditions by the investigator. This was done by the test and retest method on consecutive days. The repeated measurement of subjects was conducted on the selected predictor variables to determine reliability in an univariate situation.
3.6.3 RELIABILITY OF THE SUBJECTS

The co-efficient of Correlation in Table II also indicated the subject reliability because the same subjects were used under similar conditions by the same test. No motivation techniques were used at the time of the testing periods.

3.7 ORIENTATION OF THE SUBJECTS

In order to get the full co-operation from the subjects, the investigator explained to the subjects the purpose of the study, tests to be administrated and procedure to be followed in the administration of the test. Practice trials were conducted to help the subjects to understand the method of testing.

3.8 TRAINING METHODS

The purpose of the study was to find out the effect of functional training and grid training on selected performance related physical fitness and playing ability among interschool football players of West Bengal.

The randomly selected 90 intercollegiate level football players divided into three groups, consisting of 30 players in each group was given a common warm up session for 5 minutes detailed below:
Warm Up

Football field size 50 yards long and 44 yards width was marked with goal at each end with a goal keeper in each. The warm up session was based on having 16 players and 2 goalkeepers. The players in the field were organized into four groups, coloured with different bibs. The subjects were passing the ball with short passes. When either goalkeeper called the team colour, the subject on the ball stroke the ball easily to reach into the goalkeeper’s arms. The keeper then threw the ball out to another in the same group and the passing continued. This was asked to continue for first three minutes then four minutes stretching and then followed by the long passes, strikes with more power for three minutes. And thus, the warm up session continued for ten minutes for each of the experimental group.

After the warm up the experimental group I which underwent Functional Training was provided with the following training

3.9 FUNCTIONAL TRAINING

Training for a specific position or area of the field (like forwards, outside midfield, etc). Functional training involves training or practicing the specific demands of a position or a role. This can be for an individual player, or for a unit (i.e. defense). For example, A soccer coach may run a functional training session for forward play, dealing specifically how two forwards work
together in the attacking third. Functional training should take place in the area of the field where that scenario would occur in a real game. The subjects were trained both defending and attacking functional skills training as detailed below.

3.9.1 DEFENDING FUNCTIONAL SKILLS

Functional soccer training for specific defending positions in soccer (like centre defenders, outside backs, etcetera). Functional training involves training or practicing the specific demands of a position or a role. This can be for an individual player, or for a unit (such as, defense). Examples of defending functional practice were 'Defending Wide Areas' or 'Coach Central Defenders to Defend Direct Play'. Functional training took place in the area of the field where that scenario would occur in a real game

3.9.1.1 OBJECTIVES

1. Prepared players for a game by increasing core body temperature.
2. Active warm up stretches to prepare muscles for activity. Developed a players dribbling ability and control.
3.9.1.2 ORGANISATION

Used the quarter of the pitch closest to either goal mark out an area slightly larger than the penalty area (approx. 35x35yrd). The attacking team had five players in a 3-2 formation and the defending team had four players and a goal keeper in a 3-1 formation. Drill can be played using the offside rule depending on how the investigator wanted his defenders to play.

3.9.1.3 START POSITION

There was generally one start position for this drill with the player at the back of the area playing the ball in and then joining the play for the attacking team.
The attacking team scored by scoring in the full size goal. The defending team scored a goal by dribbling or passing the ball through the two smaller gate goals at the back of the 35x35yrd area.

3.9.1.4 COACHING POINTS

1. Nearest player to the ball applied immediate pressure.
2. Communication and Organisation.
3. Cover and Support (such as, Mark your man and half of someone elses).
4. Track forward ran.
5. Individual defending technique (slow on approach, sideways on, show outside)
6. Offside Trap

3.9.1.5 PROGRESSION

1. Added an extra attacker to challenge the defence more.
2. Increased the area of play to create more space for the attackers.

Progress on to perform the drill 1 touch when the players were confident. Also the cones can be moved back to increase difficulty. The option to introduce aerial driven passes on the long pass is also an option. (Darren Pitfield, 2012)
3.9.2 ATTACKING FUNCTIONAL DRILLS

Functional soccer training for specific attacking positions (like centre forwards, wingers, attacking mid-fielders etc). Functional training involves training or practicing the specific demands of a position or a role. This can be for an individual player, or for a unit (such as attack). Examples of attacking functional soccer practices would be 'Running With the Ball' or 'Coach wide flank players on driving inside'. Functional training should take place in the area of the field where that scenario would occur in a real game.

3.9.2.1 OBJECTIVES

1) Coached how to create space in wide areas.
2) Coached how to exploit space in wide areas.
3) Coached how develop 1vs1 attacking scenarios wide.

3.9.2.2 ORGANISATION

2/3 Field (25mins).

- 16 (15+Gk)
- Mark out 2/3 of a full size pitch as on diagram. Prepare min. 4 spare footballs.

The teams play in specific formations. Provide tactical instructions for each team: **Formations**

Attacking team:

1. 9 players (8+GK).
2. 1-4-4 formation.

3. Defended full sized goal with the goalkeeper.

4. After gaining possession scored into one of the three small goals as soon as possible.

5. Zonal/mixed defending. Encouraged counter-attack when in possession (set 6 passes and score rule).

**Defending team:**

1. 7 players (red) + goalkeeper (yellow)

2. 1-4-3 formation

3. Defended full sized goal

4. After losing possession team defended three mini goals and tries to regain possession as soon as possible.

5. Encouraged to use wide areas. Introduced conditions (goal scored after cross/dribble/shoot from wide area counts twice, use wide area before scoring).

**3.9.2.3 INSTRUCTIONS**

Starting position of player no.8 was behind the red line (can be varied).

Game started when the ball was played in by player no.8. Two teams competed and attempted to score.
Scoring

The attacking team scored in the full sized goal. After gaining possession defending team attacked three mini goals as soon as possible.

### 3.9.2.4 PROGRESSIONS

Added more defending players. Instructed defending team to play in 1-4-4-1/1-4-4-2 formation. Created underload situation which often occurs when attacking in the final third.

Moved into 11v11 game. Played in a given formation and introduce different tactics of the defending team (man to man marking/doubling up in wide areas/midfielder dropping to defence when ball wide).

Set more difficult challenges for individuals, units and team.

Set more progressive challenges for players
3.9.2.5 COACHING POINTS

1) Principle of play – Created space as a team. Spread wide and long to create space on and off the ball.

2) Horizontal movement to inside. Player in wide area moved towards the centre of the pitch in order to create space wide.

3) Horizontal movement to outside. Player positioned centrally moved towards free space in wide areas to receive the ball. Made sure the movement was quick and curved (player should see the ball and face opponent).
4) Creating 1v1 situations by isolating players in wide areas. Most of the attacking players positioned centrally in order to unbalance defending team and created dangerous situation in wide areas.

5) Creating overload situations. When the ball was wide midfield player supported player in possession by quick movement towards the ball. Prerequisite for that was to drag nearest central defender off the ball.

6) Switching play. Transferred the ball from one side to another quickly in order to create 1v1 situation on the wing.

7) Communication. Players observed where their partners were and communicated both verbally and non-verbally. Introduced verbal triggers to different patterns of play (switching play/creating 1v1 or 2v1 situations etcetera.)

8) End product. Took opportunity to cross or shoot. Exploit 1v1 and 2v1 situations when possible.

3.9.2.6 VARIATIONS

1) Introduced Neutral players if the players struggle at first. Also restricted the movements of defenders to certain areas.
Coach when the football was in different positions (centrally/wide/throw-in/set-plays etc.). Manage defending team, coached attacking team. Challenge attacking team by encouraging defenders to adapt their tactics to the opposition. Encouraged to exploit 1v1 and overload situations when possible. (Darren Pitfield, 2012)
Fig 3: FLOW CHART SHOWING THE FUNCTIONAL TRAINING ADOPTED TO EXPERIMENTAL GROUP I

FUNCTIONAL TRAINING 12 WEEKS

SPECIFIC WARMING UP AND CONDITIONING
3 Mts Passing  4 Mts Stretching  3 Mts Passing & Shooting

MONDAY TO SATURDAY

<table>
<thead>
<tr>
<th>DEFENDING FUNCTIONAL SKILL DRILLS</th>
<th>TIME</th>
<th>ATTACKING FUNCTIONAL DRILLS</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area : 35 x 35 Yd. 3 x 2 (A) Vs 3 +1 GK(D)</td>
<td>10 mts</td>
<td>Court 2/3 Size (8+1GK) Attacking Vs (7 + 1GK) Defending</td>
<td>10 mts</td>
</tr>
<tr>
<td>Area : 36 x 45 Yd. 3 x 3 (A) Vs 3 +1 GK(D)</td>
<td>10 mts</td>
<td>Court 2/3 Size (4 + 4+ 1) Attacking Vs (4+3+1GK) Defending</td>
<td>10 mts</td>
</tr>
</tbody>
</table>

SKILLS
- Defending from Immediate Pressure
- Communication and Organisation
- Cover and Support
- Track Forward Runs
- Individual Defending Techniques
- Off side Trap

SKILLS
- Principle of Play –Create Space as a team
- Horizontal Movement to inside & Outside
- Creating 1 v 1 situations
- Creating overload situations
- Switching Play
- Communication
- Gain opportunity to Cross or Shoot

WARM DOWN - 5 Minutes
3.10 GRID TRAINING

Experimental group II underwent Grid Training as detailed below.

3.10.1 Experimental Protocol for 2 v 2 Grid Training

For the purpose of experimenting with 2 v 2 grid training a small sided grid 30 yards long and 20 yards rectangular was drawn. In the place of goal posts, one subject who was not under the practice session then was asked to serve as target. The subjects being trained were asked to wear two different colour bibs, namely, yellow and dark. First the dark team was asked to play against the yellow team. The team in possession tried to work the ball from one end target subject to the other. If the dark team played the ball to one target player then they should not play back to that target, they were asked to try and get the ball through the other target player. If the yellow team won the ball they keep the ball and tried to move from one the ball from one target to other. After two minutes, the other subject in the team would work with the ball from one target to other target for one minute. Alternatively all the subjects of both the team would be asked to be forwards and defenders. The practice would focus on the turning, fast running, dribbling techniques, feinting, short kicks, passes, shooting at target with a high level of intensity so that each subject could work towards the target only for two minutes and the session would last for 20 minutes. The practice session is illustrated through a diagram below. (Darren Pitfield, 2012)
3.10.2 Experimental Protocol for 3 v 3 Grid Training

For the purpose of experimenting with 3 v 3 grid training a small sided grid 40 yards long and 36 yards rectangular was drawn. In the middle of both side goal area were marked. The subjects being trained were asked to form four teams consisting of three in each. The teams in play would wear two different colour bibs, namely, yellow and dark. Of the three subjects in a team one would serve a goal keeper. First the dark team was asked to play against the yellow team. The goal keeper would throw the ball to the team mates, who would try to
strike goal against the opposition, while the opposition would try to defend. If one team scored, they got another ball from their goalkeeper and attacked again. All restarts would come from the goal keeper who would release the ball within five seconds. Subjects were asked to practice the skills and movements at full speed, finish quickly and fast transition. For every two minutes, the other team was asked to start the ball into play. The practice would focus on the turning, fast running, dribbling techniques, feinting, short kicks, passes, shooting at target with a high level of speed and quickness and lasted for 20 minutes. The practice session is illustrated through a diagram below. (Darren Pitfield, 2012)

Fig 5: Diagram Showing 3 v 3 Grid Training
3.10.3 Experimental Protocol for 4 v 4 Grid Training

For the purpose of experimenting with 4 v 4 grid training a small sided grid 44 yards long and 36 yards rectangular was drawn (twice the size of penalty box). In the middle of both side goal area were marked. The subjects being trained were asked to form three teams consisting of four in each. The teams in play would wear two different colour bibs, namely, yellow and dark. Of the four subjects in a team one would serve a goal keeper. First the dark team was asked to play against the yellow team. The goal keeper would throw the ball to the team mates, who would try to strike goal against the opposition, while the opposition would try to defend. If one team scored, they got another ball from their goalkeeper and attacked again. All restarts would come from the goal keeper who would release the ball within five seconds. Subjects were asked to practice the skills and movements at full speed, finish quickly and fast transition. For every four minutes, the other team was asked to start the ball into play. The practice would focus on the turning, fast running, dribbling techniques, feinting, short kicks, passes, shooting at target with a high level of speed and quickness and lasted for 20 minutes. The practice session is illustrated through a diagram below. (Darren Pitfield, 2012)
Fig 6: Diagram Showing 4 v 4 Grid Training
**Fig 7: FLOW CHART SHOWING THE GRID TRAINING ADOPTED TO EXPERIMENTAL GROUP II**

**GRID TRAINING 12 WEEKS**

**SPECIFIC WARMING UP AND CONDITIONING**
- 3 Mts Passing
- 4 Mts Stretching
- 3 Mts Passing & Shooting

**MONDAY TO SATURDAY**

<table>
<thead>
<tr>
<th>VARIED GRIDS</th>
<th>AREA</th>
<th>FORMATIONS</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 V 2 GRID</td>
<td>30 x 20 YARDS</td>
<td>2 Plus one to serve as Goal Post</td>
<td>12 mts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Every 2 mts Attacker become defender</td>
<td></td>
</tr>
<tr>
<td>3 V 3 GRID</td>
<td>40 x 36 YARDS</td>
<td>2 + 1GK Vs 2 + 1GK</td>
<td>12 mts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Every 2 mts Attacker become defender</td>
<td></td>
</tr>
<tr>
<td>4 V 4 GRID</td>
<td>44 x 36 YARDS</td>
<td>3 +1GK Vs 3+1GK</td>
<td>16 mts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Every 4 mts Attacker becomes defender</td>
<td></td>
</tr>
</tbody>
</table>

**SKILLS**
- Focus on the turning, fast running, dribbling techniques, feinting, short kicks, passes, shooting at target with a high level of speed and quickness

**WARM DOWN - 5 Minutes**
3.11 COMBINED TRAINING GROUP

The experimental group III underwent combined training, functional training on Mondays, Wednesdays and Fridays and grid training on Tuesdays, Thursdays and Saturdays for 12 weeks. Thus for combined group functional training and grid training were given on alternate days.
**Fig 8: FLOW CHART SHOWING THE COMBINED TRAINING ADOPTED TO EXPERIMENTAL GROUP III**

**COMBINED TRAINING - FUNCTIONAL TRAINING 12 WEEKS**

**SPECIFIC WARMING UP AND CONDITIONING**
3 Mts Passing 4 Mts Stretching 3 Mts Passing & Shooting

**MONDAY, WEDNESDAY AND FRIDAY**

<table>
<thead>
<tr>
<th>DEFENDING FUNCTIONAL SKILL DRILLS</th>
<th>TIME</th>
<th>ATTACKING FUNCTIONAL DRILLS</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Area</strong>: 35 x 35 Yd. 3 x 2 (A) Vs 3 +1 GK(D)</td>
<td>10 mts</td>
<td><strong>Court 2/3 Size</strong> (8+1GK) Attacking Vs (7 + 1GK) Defending</td>
<td>10 mts</td>
</tr>
<tr>
<td><strong>Area</strong>: 36 x 45 Yd. 3 x 3 (A) Vs 3 +1 GK(D)</td>
<td>10 mts</td>
<td><strong>Court 2/3 Size</strong> (4 + 4+ 1) Attacking Vs (4+3+1GK) Defending</td>
<td>10 mts</td>
</tr>
</tbody>
</table>

**SKILLS**
- Defending from Immediate Pressure
- Communication and Organisation
- Cover and Support
- Track Forward Runs
- Individual Defending Techniques
- Off side Trap

**SKILLS**
- Principle of Play – Create Space as a team
- Horizontal Movement to inside & Outside
- Creating 1 v 1 situations
- Creating overload situations
- Switching Play
- Communication
- Gain opportunity to Cross or Shoot

**WARM DOWN - 5 Minutes**
Fig 9: FLOW CHART SHOWING THE GRID TRAINING ADOPTED TO EXPERIMENTAL GROUP III

COMBINED TRAINING - GRID TRAINING 12 WEEKS

SPECIFIC WARMING UP AND CONDITIONING
3 Mts Passing 4 Mts Stretching 3 Mts Passing & Shooting

TUESDAY, THURSDAY AND SATURDAY

<table>
<thead>
<tr>
<th>VARIED GRIDS</th>
<th>AREA</th>
<th>FORMATIONS</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 V 2 GRID</td>
<td>30 x 20 YARDS</td>
<td>2 Plus one to serve as Goal Post Every 2 mts Attacker become defender</td>
<td>12 mts</td>
</tr>
<tr>
<td>3 V 3 GRID</td>
<td>40 x 36 YARDS</td>
<td>2 + 1GK Vs 2 + 1GK Every 2 mts Attacker become defender</td>
<td>12 mts</td>
</tr>
<tr>
<td>4 V 4 GRID</td>
<td>44 x 36 YARDS</td>
<td>3 +1GK Vs 3+1GK Every 4 mts Attacker becomes defender</td>
<td>16 mts</td>
</tr>
</tbody>
</table>

SKILLS
- Focus on the turning, fast running, dribbling techniques, feinting, short kicks, passes, shooting at target with a high level of speed and quickness

WARM DOWN - 5 Minutes
3.12 TEST ADMINISTRATION

3.12.1 SPEED (50 M Sprint)

Purpose

To measure the speed

Facilities and Equipments

An area on a running track, a 50 meter and a finish line. Two stop watches.

Procedure

After a short warm up period the subject took a position behind the starting line. To get best results two were asked to run at the same time for competition. The starter used the command, “Are you Ready?” and “Go”. The latter was accompanied by a downward sweep of the arm as a signal to the timer. The subject ran across the finish line. One trial was permitted.

Score

The score is the elapsed time to the nearest one hundred of a second recorded from starting signal to the time the subject crossed the finish line. (Yobu, A. 2000).
3.12.2 LEG EXPLOSIVE POWER (Standing Broad Jump test)

**Purpose**

To assess the Leg explosive power.

**Equipments Used**

Jumping pit and measuring tape.

**Procedure**

The subject was asked to stand with the feet parallel to each other and behind the starting mark, then the subject bent the knees and swings the arms and jumps far forward as possible. Three trials were given with adequate rest.

**Fig. 10 Diagram Showing Speed Test**
Scoring

The distance between the starting mark and the nearest landing point was measured as score. The best of three trials was the final Score (Johnson and Nelson, 1982).

Fig. 11 Diagram Showing Standing Broad Jump Test
3.12.3 AGILITY (Shuttle Run Test)

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 60 meter and recorded to nearest one tenth of a second. (Yobu, A. 2000)
3.12.4 FLEXIBILITY (SIT AND REACH TEST)

Purpose

To estimate the trunk flexibility

Equipments

Yard stick and measuring steel tape

Procedure

Place the yardstick on the floor and put an 18 inch piece of tape across the 15 inch mark on the yard stick. The tape should secure the yardstick to the floor. The subject sits with the O end of the yardstick between the legs. The subject heel should almost touch the tape at the 15 inch mark and be about 12 inch apart with the legs held straight. The subject bends forward slowly and reaches with parallel hand as far as possible and touches the yardstick. The subject should hold this reach long enough for the distance to be recorded.
Scoring

The best score recorded out of the three trials was the score in flexibility.

(Yobu, A. 2000)
3.12.5 CARDIOVASCULAR ENDURANCE (600 M RUN TEST)

Purpose

To measure the cardiovascular endurance of the subjects

Equipment

Whistle, stopwatch, 400 meters track.

Description

The 400 M track was marked with starting point and the end of 600 M point. Subjects were asked to assemble behind the starting line. At the starting signal, they began to run and at the same time, stopwatch was made to start by the time keeper. The subjects were asked to cross the 600 M finish point at their earliest. The time when the subject crosses 600 M point was recorded. Ample time should be given for stretching and warm-up as well as cool down.

Scoring

The time taken to complete 600 M run was recorded and considered as the cardiovascular endurance level of the subjects. (Yobu, A. 2000)
3.12.6 SHOT PUT

Purpose

To measure the upper body explosive strength

Equipments

1. Shot  
2. Steel Tape  
3. Score Sheets

Administration

The subject was allowed to get into the 2.135 meter circle with the shot weighing 7.263 kg, in his hands and put it to the maximum distance that he would throw it and landing within the marked sector with the angle of 33.92°. He should not touch any part of his body outside the circle in the process of putting or after completing it. The subjects were allowed to retrieve from the rear of the circle only after gaining complete balance and after the shot landed on the ground. The measuring steel tape was then held from the place where the
shot fell (the nearest break to the circle) to the center of the putting circle. The
distance was then read on the tape from the place where the shot landed to the
inner edge of the stop board. Three trials were allowed and the best of the three
was recorded. All measurements were made immediately after each trial.

**Rules Followed**

1. The shot should be put from the shoulder with one hand only. At the
time the subject has taken a stance in the ring to commence a put the
shot shall not be dropped below this position during the action of
putting. The shot must not be brought behind the line of the shoulder.

2. After the landing of the shot within the sector, the subject should come
out of the circle not sideward but from the rear half of the circle.

3. The put shall be made from a circle 2.135 meter in diameter at the
middle of the circumference in the front half of the circle. A stop board
shall be placed firmly to the ground.

4. For any foul made, a rethrow will be given till the subjects perform the
put correctly. (Johnson and Nelson, 1982)
3.12.7 PLAYING ABILITY

To determine the playing ability of the football players, the performance of the subjects were subjectively rated by three experts, that is by three qualified coaches cum officials. The individual and team performance related football skills were selected as criteria for subjective ranking of football playing ability by the experts. The criterion score were classified into two parts, viz., five
individual skills (50 marks) and five situations where the individual player contributes to the team (50 marks) for a total of 100 marks (Table III). The average of the marks of the three experts was taken as the criterion score.

3.12.7.2 INDIVIDUAL SKILLS

The following individual skills were selected, namely, passing, dribbling, shooting goals, defensive and offensive moves. Ten marks were awarded for each skill for a total of 50 marks.

Testing Arrangements

To determine the subjects playing ability in actual playing situation, the subjects were required to play in a regulation football ground.

Test Administration

The experts ranked the individual skills of the subjects in a eleven versus eleven playing situations. In this way ten subjects were subjectively rated on the five individual skills.

Scoring

Three experts gave marks according to the playing ability of the subjects as detailed in table III.
3.12.7.3 INDIVIDUAL’S CONTRIBUTION TO THE TEAM

The following individual contribution to the team were selected, namely, positional play, adapting the principles of play, fitness, awareness of the rules/violation/ fouls of the game and situational awareness. Ten marks were awarded for each skill for a total of 50 marks (Table III).

Testing Arrangements

To determine the subjects playing ability in actual playing situation, the subjects were tested during actual game situation in matches organised by the investigator.

Test Administration

The experts ranked the individual contribution to the team in a eleven vs eleven playing situation. In this way twenty two subjects were subjectively rated on the five individual contribution to the team during match situations.

Scoring

Three experts gave marks according to the playing ability of the subjects for a total of 50 marks as shown in Table III.
Table III

CRITERIA FOR SUBJECTIVE RANKING OF FOOTBALL PLAYING ABILITY

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>VARIABLES</th>
<th>MARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Individual Skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Dribbling</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2. Passing</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>3. Shooting</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>4. Defensive Moves</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>5. Offensive Moves</td>
<td>10</td>
</tr>
<tr>
<td>II</td>
<td>Individual Contribution to Team</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. Positional Play</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2. Adapting Principles of Play</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>3. Awareness of the Rules</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>4. Fitness</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>5. Situational Awareness</td>
<td>10</td>
</tr>
</tbody>
</table>
3.13 STATISTICAL ANALYSIS

In this study random group design was used. The selection of subjects, allotment of groups as control and experimental group were done randomly. Data were collected before and after sports loading training, namely, functional training, grid training and combined training on the selected dependent variables. No attempt was made to equate the groups before the commencement of training. Thus, to nullify the differences in the initial means on the post data, analysis of covariance was used. The level of significance was set at 0.05 level. The data obtained were analysed by analysis of variance (ANOVA) and analysis of covariance (ANCOVA). The analysis of variance was used to assess the significance of difference between the pre-test and post-test, for each of the variables on the functional training and grid training groups separately.

Analysis of covariance was computed for any number of experimental groups, the final means were adjusted for differences in the means were tested for significance. The analysis of variance was first computed to find out the difference between the initial means. The obtained ‘F’ ratio compared with critical F value for significance, will provide confidence that the critical samples came from the same population and are devoid of sampling bias.
When the F ratio was found to be significant, Scheffe’s post hoc test was used to find out the paired mean significant difference. (Thirumalaisamy, 1998).

Scheffe post hoc test has the greatest power and is the most conservation with respect to Type 1 error: this method loads to the smallest number of significance differences. The difference between two means would be significant if it exceed Scheffe F. In order to be significant, F’ must equal \( (k - 1) (F_{.05} \text{ or } F_{.01}) \). Thus, the necessary F’ ratios for the difference between paired adjusted mean \( (k-1) \) would be computed and compared for significance.
EFFECT OF FUNCTIONAL TRAINING AND GRID TRAINING ON THE SELECTED PERFORMANCE RELATED FITNESS AND PLAYING ABILITY AMONG INTERSCHOOL FOOTBALL PLAYERS OF WEST BENGAL

INTER SCHOOL FOOTBALL PLAYERS (N=120)

Experimental Group I Functional Trg (n=30)
Experimental Group II Grid Trg (n=30)
Experimental Group III Combined Trg (n=30)
Control Group I No Exposure (n=30)

PRE & POST TESTS

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>TESTS</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Speed</td>
<td>50 M Run</td>
<td>Seconds</td>
</tr>
<tr>
<td>2. Agility</td>
<td>Shuttle Run</td>
<td>Seconds</td>
</tr>
<tr>
<td>3. Leg Explosive Power</td>
<td>Standing Broad Jump</td>
<td>Meters</td>
</tr>
<tr>
<td>4. Flexibility</td>
<td>Sit and Reach</td>
<td>Centimeters</td>
</tr>
<tr>
<td>5. Endurance</td>
<td>600 M Run</td>
<td>Seconds</td>
</tr>
<tr>
<td>6. Upper body explosive power</td>
<td>Shot put</td>
<td>Meters</td>
</tr>
<tr>
<td>7. Playing Ability</td>
<td>Subjective Assessments</td>
<td>Scores</td>
</tr>
</tbody>
</table>

STATISTICAL ANALYSIS
Descriptive Statistics, ANCOVA & Scheffe’s Post Hoc Test

RESULTS, DISCUSSIONS AND CONCLUSIONS