Chapter – III
Research Methodology

In this analytical correlation study, the relation between selected physical fitness variables and selected football skills and between these variables and actual playing ability of college level football players was studied. For this all the subjects were administered the selected physical fitness tests and football skill tests and the relation between the performances of the subjects in the physical fitness tests and football skill tests was analyzed through computing correlation coefficient between these variables and also their relation with the playing ability was analyzed.

3.1 Data Collection:

Sample -

The Study will be conducted by selecting 180 male football players of inter college level of three Universities from Punjab namely, G.N.D.U. Amritsar, Panjab University Chandigarh and Punjabi university Patiala.

The Date of the conducted test and Number of players along with name of their colleges and date are given below.

- Govt. College of Physical Education, Patiala (11), 2 & 4 September, 2009
- M.M.Modi College, Patiala (4), 1 & 2 September, 2009
- Punjabi University Campus players (8), 1 & 3 September, 2009
- Mata Gujri College, Fatehgarhsahib(11), 11 & 12 September, 2010
- Khalsa College, Patiala (8), 1 & 3 September, 2009
- Govt. Ranbir College, Sangrur (5), 1 & 2 September, 2009
- Govt.College, Malerkotla(4) 1 & 3 September, 2009
- Khalsa College, Amritsar (11), 4 & 5 October, 2010
- Sports College, Jalandhar (10), 10 & 11 September, 2009
- Lyalpur Khalsa College, Jalandhar (11), 9 & 10 September, 2009
- DAV College, Jalandhar (10), 10 & 11 September, 2009
- DAV College, Amritsar (9), 3 & 4 October, 2010
- Guru Gobind Singh Khalsa College Sirhali (9) 3 & 4 October, 2010
- Guru Gobind singh Khalsa college MahilPur (11) 21 & 22 September, 2009
- DAV College Hoshiarpur (10) 21 & 24 September, 2009
- DAV College Chandigarh. (7) 14 & 15 September, 2010
- Gurusar College Sudhar.(11) 21 & 22 September, 2009
- Panjab University Campus Player (11) 14 & 15 September,2010

**Procedures:**

The first step in the process of data collection for the study was to establish contact with the Football Team
Managers / Coaches of the inter college's teams of Punjab state. The contacts establish by phone call and personally meet to coaches/Team Managers for seeking their permission to administer the tests on the players. After confirmation of permission from the respective Head, Coaches/Team Managers were informed of the tentative dates of visits of the places. The permission letter is produced by the concerned head.

For the collection of data the playing ability test, soccer skill tests and physical fitness tests were administered at outdoors playing field on two different days. The tests were administered in a station format and not in any specific order. The Playing ability of the Subjects was to be judged by three experts at inter college competition. For the soccer skill tests and physical fitness tests the players were instructed to get warmed-up in the usual manner before a practice session (stretching and jogging), and also rested between tests. All the tests were demonstrated to the subjects once and they were also allowed to have one or two trials to get themselves oriented with the test requirements and the subjects were motivated to give their best performances in the tests.
3.2 **Physical Fitness Tests:**

The following physical fitness tests were selected for this study:

(i) **Five Hops Test:**

Five Hops with Left Foot, Five Hops with Right Foot for assessing Explosive Strength Endurance of legs was administered, and the maximum distance covered by each subject was measured in meter with the accuracy of one hundredth of the meter, as followed by Ostrovsky (1980), Nagerkoti (1989), Bala (2000) and Tarlok (2001).
(ii) **Endurance Test:**

2.4 Kilo-meters run in 400 meters track for assessing the endurance level of the subjects was administered to all subjects, and the time taken to cover this distance was measured in minutes and seconds to the accuracy of one hundredth of the second, as recommended by Malhotra et al (1979), Subramanian (1981), Nagerkoti (1989), Bala (2000),

(iii) **Sprint Test:**

(iv) **Shuttle Run Test:**

6 x 10 meters shuttle run for assessing the agility of the subject was administered to all the subjects observing all precautions and the time was measured in seconds to the accuracy of one hundredth of the second, as followed by Malhotra et al (1979), Subramanian (1981), Nagerkoti (1989), Bala (2000) and Tarlok (2001). Prasanna B K (2013).

(v) **Flexibility Test:**

Bend and reach test for assessing the flexibility of the subjects, which was adopted by Malhotra et al (1979), Subramanian (1981), Nagerkoti (1989), Bala (2000), Tarlok (2001) and Kuldeep Singh (2013) was administered to all subjects and the measurement was carried out in centimeters marked on a scale.
The Reliability of Selected Physical Fitness Tests

The Reliability coefficient \( r \) for all the selected Physical Fitness Tests were calculated by computing correlation coefficient between Test (T-1) and Retest (T-2) for every physical fitness test and presented vide Table-3.1:

**Table 3.1**
Reliability of Physical Fitness Tests
\( (N = 10) \)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the test</th>
<th>Mean +/- S.D.</th>
<th>Value of ‘r’</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40 Meters Sprint</td>
<td>6.1013 +/- 0.235738</td>
<td>0.985042</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>2</td>
<td>6 x 10 Meters Shuttle run</td>
<td>14.8296 +/- 0.44295</td>
<td>0.950234</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>3</td>
<td>5 Hops with Right Leg</td>
<td>11.0628 +/- 0.827128</td>
<td>0.96069</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>4</td>
<td>5 Hops with Left Leg</td>
<td>11.7 +/- 0.542107</td>
<td>0.9060</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>5</td>
<td>2.4 K.M. Run</td>
<td>607.7182 +/- 19.36789</td>
<td>0.972479</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>6</td>
<td>Bend &amp; Reach</td>
<td>11.17 +/- 1.972313</td>
<td>0.993738</td>
<td>p &lt; 0.01</td>
</tr>
</tbody>
</table>
The results presented vide Table – 3.1 reveal that all the physical fitness tests selected for this study are very significantly reliable, as probability of error was less than 1% (P < 0.01).

Validity of selected physical fitness tests:

Since all the physical fitness tests selected for this study were found to be very highly significantly reliable (Table -3.1 refers) and were also used by many researches in our country and proved to be valid, it was accepted for this study also that all these tests are valid tests.

### 3.3 Football Skill Tests:

The tests, which are recommended by the Portuguese Football Federation and are traditionally used in Portugal,
Seabra et al. (2001); Coelho e Silva et al. (2004) were adopted for this study.

(i) **Ball Control With The Body (Skill 1):**

Within a 9 x 9 m square, the subject was to keep the ball in the air without using the arms or hands. The numbers of hits of the ball before it fell to the floor were taken as score of this test. Counting was stopped when the ball hit the floor, or the subject moved out of the square or he touched the ball with the arms or hands. One trial for each subject was administered; however, the subject was allowed to start the trial again if he failed to contact the ball three times in the initial attempt itself.
(ii) **Ball Control With The Head (Skill 2):**

The Subject was to keep the ball in the air using only the head within a 9 x 9 m square. The number of hits of the ball before it fell to the floor was recorded as score of this test. Counting was stopped when the ball hit the floor, or the subject moved out of the square or he touched the ball with any part of the body except the head. One trial was administered to each subject, and the subject was allowed to start the trial again if he failed to contact the ball three times in the initial attempt itself.
(iii) **Dribbling With A Pass (Speed And Accuracy; Skill 3):**

Four cones were placed in a line, 2.25 m apart, within the 9 x 9 m square, and a flat surface such as a bench 1.2 m wide, was placed on the end line as fifth mark. The participant was instructed to dribble the ball around the first four cones in slalom fashion, make a pass to the bench/board, which were fifth mark and receive/ control the ball, and dribble around the four cones back to the starting line. The objective was to complete the drill in the fastest time possible without knocking down the cones and without stepping out of the square, controlling the ball only with the feet. If a cone (mark) was knocked over, the subject was told to place it upright and continue the test. Two stop watches were started by the timers at the starting signal and were stopped when the participant crossed the starting line. The average of the two values was taken as score for this test and used in the analysis.
Dribbling With A Pass
(iv) Dribbling (Speed; Skill 4):

A cone was placed on each corner of the 9 x 9 m square (four cones). A fifth cone was placed midway (4.5 m) on the line of the square where the test was begun. Thus, the near end was having three cones (one on each corner and the third midway) and the far end was having two cones (one at each corner). Beginning at one corner, the subject was instructed to conduct the ball with the feet (dribble) around the three cones (corner directly opposite the starting cone, the cone placed midway, and the cone diagonally opposite the starting cone) in slalom fashion, and then dribble the ball into the fifth cone (i.e. not with a pass). The objective was to complete the drill in the fastest time possible by controlling the ball only with the feet without knocking down the cones. If a cone was knocked over, the participant was to place it upright and continue the test. The overall slalom distance was about 40 m. Two stopwatches were used by the timers at the starting signal and stopped the watches when the ball was dribbled into the fifth cone. The average of the two values was used in the analysis.
Dribbling (Speed)

v) Passing (Skill 5):

Five targets were placed at 2.5 m apart at the end line of the 9 x 9 m square. The subject was instructed to stand outside of the square at the opposite line of the target. Two attempts at each target were allowed for a total of 10 attempts. The objective was to hit the targets with the kicked ball in succession from one to five; two attempts were
permitted for each target. The score was the number of successful target hits; the maximum score possible were 10 points.

(vi) **Shooting (Skill 6):**

A 2 x 3 m goal was set up at the end line of a 9 x 9 m square. The target was divided by ropes into six sections. One rope was tied horizontally between the posts at a height of 1.5 m. Two ropes were dropped from the crossbar, 0.5 m from
each post. Five points were allocated for the upper right and left sections, and two points for the upper middle section. Three points were allocated for the lower right and left sections, and one point for the lower middle section. While standing outside of the square at the opposite line of the goal, the player was to kick the ball into the goal. Total five attempts were allowed and hence the maximum score possible was 25 points.

**Reliability of selected Football Skill Tests:**

The Reliability coefficient (r) for all the selected Football Skill Tests were calculated by computing correlation coefficient between Test (T-1) and Retest (T-2) for every
football skill test and the results obtained are presented vide Table- 3.2:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the test</th>
<th>Mean +/- S.D.</th>
<th>Value of ‘r’</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>T-1</td>
<td>T-2</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Ball juggling with head</td>
<td>96.6 +/- 22.18207</td>
<td>97.5 +/- 21.12003</td>
<td>0.975957</td>
</tr>
<tr>
<td>2</td>
<td>Ball juggling with body</td>
<td>79.4 +/- 20.95604</td>
<td>79.1 +/- 19.54738</td>
<td>0.973114</td>
</tr>
<tr>
<td>3</td>
<td>Zigzag dribble</td>
<td>13.2 +/- 1.813529</td>
<td>13.16 +/- 1.975517</td>
<td>0.97320</td>
</tr>
<tr>
<td>4</td>
<td>Pass</td>
<td>5.255 +/- 0.657626</td>
<td>5.35 +/- 0.593015</td>
<td>0.876821</td>
</tr>
<tr>
<td>5</td>
<td>Dribble &amp; Pass</td>
<td>8.825 +/- 0.41113</td>
<td>8.84 +/- 0.535828</td>
<td>0.938137</td>
</tr>
<tr>
<td>6</td>
<td>Shooting</td>
<td>7.08 +/- 0.63561</td>
<td>7.03 +/- 0.561842</td>
<td>0.919723</td>
</tr>
</tbody>
</table>
It is seen from Table 3.2 that all the football skill tests selected for this study are very significantly reliable, as the reliability coefficient ($r$) obtained for correlation between test ($T_1$) and Retest ($T_2$) was very highly significant and the probability of error was less than 1% ($P < 0.01$) and hence all the tests were accepted as reliable.

**Figure 3.2**  
**Reliability of Selected Football Skill Tests**

Validity of Selected Football Skill Tests:

Since all the Football skill tests selected for this study were found to be very highly significantly reliable (Table 3.2 refers) and were also used by many researches in our country and proved to be valid for Indian Population, it was accepted as valid tests for the population of this study also.
3.4 Assessment of Playing Ability:

The Playing ability of the subject was to be judged by three experts, who have enough knowledge and experience in football coaching on seven point scale and the average of all three scores, was to be taken as playing ability score of the subject for this study. Durai Arokiaraj et al (2013).

To determine the football-playing ability of each player, three coaches (coach of Punjabi University Patiala, Assistant Coach of Punjabi University Patiala and the researcher himself) independently completed the football skill evaluation list. A seven point scale was used for this criterion and subject were assessed as excellent, very good, good, average, below average, poor, very poor. Each coach considered the performance of players at the time of inter college competition.

Test of Playing Ability Comprises of the Following:

1) Kicking for High Drive 6) Kicking for low Drive
2) Heading for Accuracy 7) Long pass for Accuracy
3) Dribbling 8) Short pass for Accuracy
4) Throwing Accuracy 9) Move tactics
5) Ball Receiving 10) Dodging

The Evaluation of the test will be out of seventy marks.
Seven marks for each of the above mentioned abilities after
the assessment of the three experts. The total score of all three experts will be added and further divided by three. Thus the average score will be taken as the performance of the player. The Judgment of the playing ability was also done with help of video recording which was observed by experts as well as by researcher himself.

3.5 **Statistical Method Used:**

The data collected were analyzed through computers to get the Mean score and standard deviation of the score in each test and the correlation coefficient between each physical fitness test and football skill test and also between physical fitness tests and playing ability score and also between football skill tests and playing ability scores were computed and analyzed to know the existence of relationship among the selected component.

The relationship between football skills, physical fitness tests and playing ability were established, for each parameter by computing Pearson’s product moment coefficient of correlation i.e.

\[
r = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{N(\sum X^2) - (\sum X)^2} \sqrt{N(\sum Y^2) - (\sum Y)^2}}
\]
Where X and Y are raw sources for independent and dependent variable, N is the number of Subjects, by analyzing the data through computer. For accepting the results of this study, the significance level of 95% accuracy, i.e. P< 0.05 was fixed.