Chapter III

METHODOLOGY

In this chapter, selection of subjects, sources and selection of test items, criterion measures, reliability of data, collection of data, administration of the tests and statistical procedure are described.

Selection of Subjects

For the construction of Soccer Talent Search Test Battery, 120 school students between 12 and 14 years, who showed interest and regularly playing the game ‘Soccer’, at least at Inter-School or District levels, and local tournaments, were randomly selected as the subjects of this study. The subjects were selected from High Schools and Senior Secondary Schools with the permission of Principals/Head Masters. The schools were from different places of India as – Delhi, Gwalior (M.P.), Goa, Thiruvananthapuram (Kerala) and Imphal (Manipur). Only the boy-students acted as the subjects of the study.

Sources and Selection of Test Items

In the modern world of total football, not only skills, different motor abilities, psychological and physiological parameters were all indispensable performance-limiting factors to become a world-class
player. On the basis of fundamental skills, motor abilities, psychological and physiological parameters, to develop and select the reliable and valid test items of soccer players, the researcher looked up and got through various literatures, websites, soccer training VCDs, consultant coaches and experts of respective fields for the same.

After a close discussion and critical analysis with the consultant coaches and experts, the parametric tests for construction of talent search test battery were narrowed down to 44 skill test items, 20 motor ability test items, 10 psychological and 10 physiological parameters standard test items at the preliminary stage of the study and decided the criterion measures for evaluation.

**Modification of Kamlesh’s**

**Sports Achievement Motivation Test (SAMT)**

The researcher had to write and rewrite on the twenty statements of Kamlesh’s “Construction and Standardization of a Sports Achievement Motivation Test” (NIS, 1990), specifically in relation to soccer interested schoolboys, and adjusted on the basis of Kamlesh’s test administration and scoring key. The statements were administered on 10 boys student between 12 and 14 years, who were interested in playing soccer regularly from different schools of Gwalior. By the test-retest method, the
reliability co-efficient of the modified statements was set on 0.97 by using Pearson’s Product Moment Method of Correlation and entitled as “Self-Modified Sports Achievement Motivation Test”.

**Modification of Carron’s Group Environment Questionnaire (GEQ)**

The researcher had the same procedure as “Self-Modified Sports Achievement Motivation Test”. The reliability co-efficient was set on 0.98 and entitled as “Self-modified Group Environment Questionnaire”.

**Preliminary Test Investigation**

To set-up of all the test items of fundamental/basic skills, motor abilities, psychological and physiological parameters in a systematic and appropriate manner, preliminary test of all test items of each area was conducted on 10 schoolboys who were interested and playing soccer regularly from different schools of Gwalior.

**Final Selection of Specific Test Items**

After the preliminary test, for the final selection of test items, 44 fundamental skill test items, 20 motor abilities, 10 psychological and 10 physiological parameters standard test items were discussed with three different experts who have deep knowledge of research in soccer. They were requested to select the most appropriate test items for each area and
they were further requested to suggest more suitable test items also. According to the experts’ opinion and suggestion, 18 specific soccer skill test items, 10 specific motor ability test items, 4 psychological and 4 physiological parameters standard test items were identified as the final selection test items for the objective measurement on construction of talent search test battery in soccer. The selected test items of specific soccer skills, motor abilities, psychological and physiological parameters were systematized under as follows:

**Specific Soccer Skill Test Items**

The specific soccer skill test items were selected on the basis of their relevance to the game of soccer. These test items are presented below:

1. **Passing for Accuracy**
   
   (i) Ground Pass Stationary Ball for Accuracy
   
   (ii) Ground Pass Rolling Ball for Accuracy

2. **Kicking for Distance**

   (i) Kicking Stationary Ball for Distance (except toe)

   (ii) Kicking Rolling Ball for Distance (except toe)
3. **Shooting in the Goal**
   
   (i) Shooting Stationary Ball in the Goal
   
   (ii) Shooting Rolling Ball in the Goal

4. **Dribbling**

   (i) Diagonal Shuttle Dribbling

   (ii) Figure “8” Dribbling

5. **Receiving**

   (i) Receiving Ground Pass with Foot

   (ii) Receiving Aerial Pass with Foot

6. **Feinting**

   (i) Zig-Zag Feinting Dribbling

   (ii) Angular Feinting with Ball

7. **Heading**

   (i) Standing Heading for Distance

   (ii) Jumping Heading for Distance

8. **Tackling**

   (i) Tackling “One vs One” in Limited Area

   (ii) Tackling “One vs One” on the Spot (Basic tackle)
9. **Ball Sense**

   (i) Juggling the Ball
   
   (ii) Forward Dribbling and Dragging Back

**Specific Motor Ability Test Items**

The specific motor ability test items were selected on the basis of their relevance to the game of soccer. These test items are presented below:

1. **Muscular Strength**

   (i) Leg-lift Dynamometer
   
   (ii) Standing Broad Jump

2. **Muscular Endurance**

   (i) Bent Knee Sit-up
   
   (ii) 20 Metre Shuttle Run

3. **Flexibility**

   (i) Sit and Reach
   
   (ii) Fleishment Extent Flexibility (Twist and Touch)

4. **Speed**

   (i) Sprint with Flying Start
   
   (ii) Sprint with Forward Roll Break
5. **Agility (Coordinative Abilities)**

   (i) Agility Run on Unknown Course

   (ii) Illinois Agility Run

**Specific Psychological Test Items**

The following psychological test items were selected in relation to

standard of soccer playing schoolboys:

1. **Personality Inventory**

   Porter and Cattell – Children’s Personality Questionnaire (CPQ)

2. **Test of Intelligence**

   Pramila Ahuja – Group Test of Intelligence (PGTI)

3. **Sports Achievement Motivation Test**

   Self-Modified Sports Achievement Motivation Test (SAMT)

4. **Test of Group Cohesion**

   Self-Modified Group Environment Questionnaire (GEQ)

**Specific Physiological Test Items**

The following physiological test items were selected in relation to

standard of soccer playing schoolboys:

1. **Resting Heart Rate**

   Measure of Resting Heart Rate by Pulpatory Method
2. **Vital Capacity**

Measure of Vital Capacity by using Wet Spirometer

3. **Aerobic Capacity**

Cooper's 12 Minutes Run-Walk Test

4. **Anaerobic Capacity**

Sargent Jump- Lewis Nomogram

**Criterion Measures**

**Criterion Measures for Specific Soccer Skill Test Items**

The following criterion measures were set-up for the administration of specific soccer skill test items:

1. **Kicking**

Passing for Accuracy and Shooting in the goal were recorded in numbers of score. And the kicking for distance was recorded in metres.

2. **Dribbling**

The dribbling tests for speed and agility were recorded in the nearest \(1/100^{th}\) of a second.
3. **Receiving**

   All the receiving skill tests were recorded in numbers of score or points measured.

4. **Feinting**

   The feinting skill tests were recorded in the nearest 1/100\(^{th}\) of a second.

5. **Heading**

   The tests of heading for distance were recorded in meters.

6. **Tackling**

   The tackling ability tests were recorded in numbers of successful attempts.

7. **Ball Sense**

   Juggling the ball test was recorded in numbers of score and the Forward Dribbling and Dragging Back was recorded in the nearest 1/100\(^{th}\) of a second.

**Criterion Measures for Motor Ability Test Items**

The criterion measures for the administration of Motor Ability Test Items are as follows:
1. **Strength**

The leg lift dynamometer was used to measure the strength of the lower extremity (leg strength) and was recorded in kilogram. And to measure the explosive strength (power) Standing Broad Jump was administered and measured the distance in metres.

2. **Endurance**

To determine the abdominal muscular endurance Bent Knee Sit-up was administered and recorded the correct numbers of sit-ups as score. But to measure the multistage endurance capacity, 20 Metre Shuttle Run Test was administered and recorded in the nearest 1/100\(^{th}\) of a second.

3. **Flexibility**

Sit and Reach and the Fleishment Extent Flexibility tests were administered to measure the back and leg, and trunk flexibility respectively. It was recorded to the nearest of an inch at the farthest point reached.

4. **Speed**

To measure the speed and movement speed of subjects, Sprint with Flying Start and Sprint with Forward Roll Break tests were administered and recorded in the nearest 1/100\(^{th}\) of a second.
5. **Agility (Coordinative Abilities)**

Agility Run on Unknown Course and Illinois Agility Run tests were administered and recorded in the nearest 1/100th of a second.

**Criterion Measures for Psychological Parameters**

The standard criterion measures to be followed for the administration of psychological tests were developed by the reputed authors as shown below:

1. **Personality Inventory**

   Porter and Cattell – *Children's Personality Questionnaire* (CPQ) was used to measure the 14 personality traits of soccer playing students. The score of the test was collected by using scoring keys (stencils).

2. **Test of Intelligence**

   Pramila Ahuja – *Group test of Intelligence* (PGTI) was used to measure the scores on the Intelligence of soccer playing students. The score of the test was collected by using the scoring keys (stencils).
3. **Sports Achievement Motivation Test (SAMT)**

Self-modified *Sports Achievement Motivation Test* (SAMT) was made according to the status of the students, based on the M.L. Kamlesh’s “Sports Achievement Motivation Test”. The score of the test was collected by using the scoring key of Sports Achievement Motivation Test (SAMT).

4. **Test of Group Cohesion**

Self-modified *Group Environment Questionnaire* (GEQ) was made according to the status of students, based on the Carron’s “Group Environment Questionnaire”. The score of the test was collected by using the scoring key of Group Environment Questionnaire.

**Criterion Measures for Physiological Parameters**

The criterion measures for the administration of Physiological tests are as follows:

1. **Resting Heart Rate**

Pulpatory method (Pulse rate count) was used to measure the Resting Heart Rate. Score was recorded in the numbers of pulse per minute.
2. **Vital Capacity**

To determine the vital capacity of subjects Wet-Spirometer was used and the reading was recorded in litres.

3. **Aerobic Capacity**

To determine the aerobic capacity, Cooper’s 12 Minutes Run-Walk Test was conducted and recorded the distance covered in metres and converted into miles. The aerobic capacity (VO$_{2max}$) was expressed in ml.kg$^{-1}$min$^{-1}$.

4. **Anaerobic Capacity**

To determine the anaerobic capacity, Sargent Jump- Lewis Nomogram was employed, and anaerobic capacity was expressed in Kg-m.sec$^{-1}$.

**Playing Ability Test**

All the specific test items of fundamental soccer skills, motor abilities, psychological and physiological parameters were validated by a criterion measure called “Playing Ability” for the identification of talent in playing soccer. The scoring of the playing ability was graded by 3 experts/judges independently. The maximum mark of each judge was
fixed at 50 with the comments and suggestions of experts. The average of
the three experts/judges was taken as the score of Playing Ability.

**Reliability of Data**

The reliability of data was ensured by establishing instrument
reliability and tester’s competency on the test administration.

**Instrument Reliability**

All the instruments (digital stopwatch-Handhart Profile, weighing
machine, wet-spirometer, leg-lift dynamometer and synthetic measuring
tape-Freemans) were calibrated and synchronized. These instruments
were hired from Sports Research Laboratory of LNIPE, Gwalior and
accepted to be valid and reliable enough with absolute precision for the
purpose of data collection.

**Tester’s competency and reliability of the test**

It is of great importance to have the correct knowledge and
technique of handling the instruments and their applications while
administering the test items to avoid and reduce the degree of error during
the collect of data.
The tester’s competency was evaluated together with reliability of the test items by test-retest method under the identical conditions. The test items were administered on randomly selected 10 schoolboys between the 12 to 14 years who were interested and regularly playing the game ‘soccer’ in the football ground of LNIPE, Gwalior. The scores thus obtained on two occasions were correlated, computed by using Microsoft Excel for reliability coefficient and presented at table 1.
Table 1

RELIABILITY OF TEST ITEMS BY TEST-RETEST METHOD

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of test items</th>
<th>Co-efficient of ( r )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ground Pass Stationary Ball for Accuracy</td>
<td>0.86*</td>
</tr>
<tr>
<td>2</td>
<td>Ground Pass Rolling Ball for Accuracy</td>
<td>0.96*</td>
</tr>
<tr>
<td>3</td>
<td>Kicking Stationary Ball for Distance (except toe)</td>
<td>0.96*</td>
</tr>
<tr>
<td>4</td>
<td>Kicking Rolling Ball for Distance (except toe)</td>
<td>0.91*</td>
</tr>
<tr>
<td>5</td>
<td>Shooting Stationary Ball in the Goal</td>
<td>0.85*</td>
</tr>
<tr>
<td>6</td>
<td>Shooting Rolling Ball in the Goal</td>
<td>0.86*</td>
</tr>
<tr>
<td>7</td>
<td>Diagonal Shuttle Dribbling</td>
<td>0.93*</td>
</tr>
<tr>
<td>8</td>
<td>Figure ‘8’ Dribbling</td>
<td>0.98*</td>
</tr>
<tr>
<td>9</td>
<td>Receiving Ground Pass with Foot</td>
<td>0.82*</td>
</tr>
<tr>
<td>10</td>
<td>Receiving Aerial Pass with Foot</td>
<td>0.91*</td>
</tr>
<tr>
<td>11</td>
<td>Zig-Zag Feinting Dribbling</td>
<td>0.81*</td>
</tr>
<tr>
<td>12</td>
<td>Angular Feinting Dribbling</td>
<td>0.86*</td>
</tr>
<tr>
<td>13</td>
<td>Standing Heading for Distance</td>
<td>0.79*</td>
</tr>
<tr>
<td>14</td>
<td>Jumping Heading for Distance</td>
<td>0.82*</td>
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<td>15</td>
<td>Tackling “One vs One” in Limited Area</td>
<td>0.68*</td>
</tr>
<tr>
<td>16</td>
<td>Tackling “One vs One” in Limited Spot</td>
<td>0.82*</td>
</tr>
<tr>
<td>17</td>
<td>Juggling the Ball</td>
<td>0.99*</td>
</tr>
<tr>
<td>18</td>
<td>Forward Dribbling and Dragging Back</td>
<td>0.67*</td>
</tr>
<tr>
<td>19</td>
<td>Leg-lift Dynamometer</td>
<td>0.97*</td>
</tr>
<tr>
<td>20</td>
<td>Standing Broad Jump</td>
<td>0.85*</td>
</tr>
<tr>
<td>21</td>
<td>Bent Knee Sit-up</td>
<td>0.71*</td>
</tr>
<tr>
<td>22</td>
<td>20 Metres Shuttle Run</td>
<td>0.75*</td>
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<tr>
<td>23</td>
<td>Sit and Reach</td>
<td>0.92*</td>
</tr>
<tr>
<td>24</td>
<td>Fleishment Extent Flexibility</td>
<td>0.98*</td>
</tr>
<tr>
<td>25</td>
<td>Sprint with Flying Start</td>
<td>0.76*</td>
</tr>
<tr>
<td>26</td>
<td>Sprint with Forward Roll Break</td>
<td>0.96*</td>
</tr>
<tr>
<td>27</td>
<td>Agility Run on Unknown Course</td>
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<tr>
<td>28</td>
<td>Illinois Agility Run</td>
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<tr>
<td>29</td>
<td>Self-Modified Sports Achievement Motivation Test (SAMT)</td>
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<td>30</td>
<td>Self-Modified Group Environment Questionnaire (GEQ)</td>
<td>0.98*</td>
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<td>31</td>
<td>Resting Heart Rate</td>
<td>0.99*</td>
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<tr>
<td>32</td>
<td>Vital Capacity</td>
<td>0.91*</td>
</tr>
<tr>
<td>33</td>
<td>Cooper’s 12minutes Run-Walk Test (Aerobic Capacity)</td>
<td>0.83*</td>
</tr>
<tr>
<td>34</td>
<td>Sergeant Jump-Lewis Nomogram (Anaerobic Capacity)</td>
<td>0.97*</td>
</tr>
</tbody>
</table>

Significant at 0.05 level of confidence.

\(^*\)Significant at 0.05 level of confidence.

\(r_{0.05(8)} = 0.632, (N=10)\)
Porter and Cattell’s Children Personality Questionnaire (CPQ)-Form A and Pramila Ahuja’s Group Test of Intelligence (PGTI) are the established and standard tests. These two tests were provided by National Psychological Corporation, Kacheri Ghat, Agra (India).

**Collection of Data**

The data pertaining to this study were collected on 120 schoolboys between 12 and 14 years of age, who showed interest and regularly playing the game ‘soccer’, at least at Inter-School or District level, and local tournaments. 65 students from the schools of Delhi, 27 students from schools of Gwalior (M.P.), 30 students from the schools of Goa, 30 students from the schools of Thiruvananthapuram (Kerala) and 60 students from the schools of Imphal (Manipur), a total of 212 students were available as the subjects for the collection of data. Nevertheless, some of the students were irregular to attend all the test items. As such their scores were not considered for the study. Therefore, the performance of only 120 students, who appeared in the entire test items were considered for analysis of data. The data were collected on four areas of Fundamental Soccer Skills, Motor Abilities, Psychological and Physiological parameters.
The data were collected in two sessions i.e. in the morning from 6:30 am to 8:30 am and in the evening from 4:00 pm to 6:00 pm from all the selected schools. But, the psychological test items were administered during the school hours in the classrooms of their respective schools. The fundamental soccer skills, motor abilities and physiological test items were conducted at their respective schools’ playground.

Before starting the administration of specific test items of four areas i.e. fundamental/basic skills, motor abilities, physiological and psychological parameters, for getting better performance and results, the objective of the study was explained to all the students in detail. The importance of different areas and its contribution in talent search were introduced and discussed to convince the students. Above all, the test items of different areas were explained one by one with its specific purpose and then demonstrated the procedure on the spot. The doubts and confusions were cleared during explanation and demonstration explicitly. After demonstration and explanation the subjects were allowed to practice trials in skills and motor abilities. The subjects appeared in full soccer playing kits with high motivation. A great assurance and assistance with full-cooperation were also available from the schools’ Principals, Physical Education Teachers and students. Administering the
test items of the specific skills, the motor abilities and the physiological parameters, the data were collected in numbers of score, 1/100th of a second and distance in meters. For the psychological parameters, the standard test items were administered and had the score of data by using the scoring stencils and scoring keys along with the respective test manual and score sheets.

**Administration of Tests**

**Administration of Test Items for Specific Soccer Skills**

1. **Ground Pass Stationary Ball for Accuracy**

**Objective:** To measure the accuracy of passing with foot.

**Facilities & Equipments:** Soccer Balls, 10 Flag Posts and marking for the test.

**Procedure:** 10 flag posts were fixed in straight line as the target. The distance between the two middle flag posts is 1 metre. The remaining 8 flag posts were fixed equally on either side of the middle flag posts with a gap of 50 cm in between. 15 metres away and opposite to the middle flag posts, a line was marked from where the balls were kicked towards the target as shown in Fig. No. 1.
To start the test, the subject was asked to pass the ball with the foot (any ground pass) lying behind or on the restraining line to the target along the ground. 10 trials were given to each subject.

**Instruction**: If the ball did not pass between the two extreme flags i.e. off-target, 0 point was given to the subject. If the ball did not roll along the ground, another trial was given.

**Scoring**: Five different points as 1, 2, 3, 4 and 5 were given according to the area where the ball passed through, as shown in Fig. No.1. If the ball hit any of the flag posts; the adjacent higher point was given. The total point of 10 trials was taken as the score of the subject.
Ground Pass Rolling Ball for Accuracy

Same as Tag No.1 (Ground Pass Stationary Ball with Foot); e
the subject kicked the ball towards the target with the par
is
Kicking Stationary Ball for Distance

Objective: To measure the kicking ability for distance.

Facilities & Equipments: Soccer Balls, Measuring Tape and markers
for the test.

Procedure: A restraining line was drawn on one end of the ground
shown in Fig. No. 2.

To start the test, the subject placed a ball behind or on the re
line. After that the subject ran forward and kicked the ball in the as he could. The distance between the restraining line and the ball landed was measured. The subject might use any part of his foot
except toe. 3 trials were given.

Scoring: The distance between the restraining line and the spot where
the ball landed was measured in the nearest metre and the best distance of 3 trials was recorded as the score of the subject.

Fig. No. 1. Ground Pass for Accuracy.
2. **Ground Pass Rolling Ball for Accuracy**

   Same as Test No.1 (Ground Pass Stationary Ball with Foot), except that rolling balls were served horizontally along the restraining line and the subject kicked the ball towards the target with any part of foot.

3. **Kicking Stationary Ball for Distance**

   **Objective**: To measure the kicking ability for distance.

   **Facilities & Equipments**: Soccer Balls, Measuring Tape and marking for the test.

   **Procedure**: A restraining line was drawn on one end of the ground, as shown in Fig. No. 2.

   To start the test, the subject put a ball behind or on the restraining line. After that the subject ran forward and kicked the ball in the air as far as he could. The distance between the restraining line and the spot where the ball landed was measured. The subject might use any part of his foot except toe. 3 trials were given.

   **Scoring**: The distance between the restraining line and the spot where the ball landed was measured in the nearest metre and the best distance of 3 trials was recorded as the score of the subject.
Kicking Rolling Ball for Distance

Same as Test No. 3 (Kicking Stationary Ball for Distance), except that rolling balls were served toward the restraining line from 5 metres away by a server and the subject kicked the ball before crossing the restraining line.

Shooting Stationary Ball in the Goal

Objective: To measure the accuracy of shooting the ball in the goal.

Facilities & Equipments: Soccer Balls, Soccer Goal (Goal Posts), Rope and marking for test.

Procedure: The whole Goal was divided into 5 parts with rope as shown in Fig. No. 3. A restraining line was drawn 15 yards away from the goal line.

To start the test, the subject was asked to kick the ball, which was placed behind the restraining line (5s), to the goal. The subject was given a total of 10 kicks. He was not allowed to touch any part of his body while taking the kick.

Scoring: Three different points as 5, 3 & 1 were given according to the area where the ball had gone through, as shown in Fig. No. 3. If the ball went outside the rope and rebounded back, the adjacent higher point was given. But, if the ball went outside or rebounded from post or bar, 0 point was awarded.

The total number of points from 10 kicks was recorded as the score of the subject.

Distance measured in metres

<table>
<thead>
<tr>
<th>Distance</th>
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<tbody>
<tr>
<td></td>
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<td>5</td>
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</tbody>
</table>

Fig. No. 2. Kicking for Distance
4. **Kicking Rolling Ball for Distance**

   Same as Test No.3 (Kicking Stationary Ball for Distance), except that rolling balls were served toward the restraining line from 5 metres away by a server and the subject kicked the ball before crossing the restraining line.

5. **Shooting Stationary Ball in the Goal**

   **Objective**: To measure the accuracy of shooting the ball in the goal.

   **Facilities & Equipments**: Soccer Balls, Soccer Goal (Goal Posts), Rope and marking for test.

   **Procedure**: The whole Goal was divided into 5 parts with rope as shown in Fig. No.3. A restraining line was drawn 15 yards away from the goal line.

   To start the test, the subject was asked to kick the ball, which was placed behind the restraining line (15 yards), to the goal. The subject was given a total of 10 kicks. The subject was permitted to use any part of his foot while taking the kick.

   **Scoring**: Three different points as 5, 3 & 1 were given according to the area where the ball had gone through, as shown in Fig. No.3. If, the ball hit the rope and rebound back, the adjacent higher point was given. But, if the ball went outside or rebounded from post or bar, 0 point was awarded. The total number of points from 10 kicks was recorded as the score of the subject.
6. **Shooting Rolling Ball in the Goal**

Same as Test No. 5 (Shooting Stationary Ball in the Goal), but in this test, the ball was rolled toward the restraining line from 5, 3, or 1 yd away and the subject kicked the ball before crossing the restraining line.

7. **Diagonal Shuttle Dribbling**

**Objective**: To measure the speed and agility of dribbling.

**Procedure**: A square of 10x10 meters was drawn. Four cones 1, 2, 3 and 4 were placed at each corner of the square. The 5th cone was placed exactly in the middle of the square, which was the start and finish point as shown in Fig. No. 4.

The subject assumed starting position by the side of cone 5. On the starting signal, the subject dribbled the ball toward cone 1. After taking the ball around cone 1, he returned back to cone 5. Then he did the same at cone 2, cone 3 and cone 4 and returned back to cone 5 for the finish. 3 trials were given to each subject.

**Instruction**: If the ball went out of the field, the subject was asked to retrieve the ball and resume dribbling from where the ball went out.

**Scoring**: The best timing of 3 trials was recorded in the nearest 1/100th of a second as the score of the subject.

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**Fig. No. 3. Shooting Ball in the Goal**
6. **Shooting Rolling Ball in the Goal**

Same as Test No.5 (Shooting Stationary Ball in the Goal), but in this test, the ball was rolled toward the restraining line from 5 metres away and the subject kicked the ball before crossing the restraining line.

7. **Diagonal Shuttle Dribbling**

**Objective**: To measure the speed and agility of dribbling.

**Facilities & Equipments**: Stopwatch, 5 cones, soccer balls, and marking for the test.

**Procedure**: A square of 10x10 metres was drawn. Four cones 1, 2, 3 and 4 were placed at each corner of the square. The 5th cone was placed exactly in the middle of the square, which was the start and finish point as shown in Fig. No. 4.

The subject assumed starting position by the side of cone 5. On the starting signal, the subject dribbled the ball toward cone 1. After taking the ball around cone 1, he returned back to cone 5. Then he did the same at cone 2, cone 3 and cone 4 and returned back to cone 5 for the finish. 3 trials were given to each subject.

**Instruction**: If the ball went out of control, the subject was asked to retrieve the ball and resume dribbling from where the ball went out.

**Scoring**: The best timing of 3 trials was recorded in the nearest 1/100th of a second as the score of the subject.
Objective: To measure the ability of controlling the ball with feet during dribbling the ball.

Facilities & Equipments: Five flag posts, soccer balls, stopwatch, and marking for the test.

Procedure: A starting line was drawn and 5 flag posts (A, B, C, D & E) were fixed in a straight line with 3 metres apart in between. The line of flag posts was perpendicular to the starting line, which is shown in Fig.

On the signal “Go” the subject dribbled the ball from the starting line to the right and left of the flag posts alternately. But, he made a ‘U’ turn around E and turned back in the same manner until he crossed the starting line with the ball at the same time as shown in Fig. 10. 3 trials were made for each subject.

Instruction: If the ball went out of control, the subject was asked to retrieve the ball and throw it back into the game. The best timing of 3 trials was recorded in the nearest 1/100th of a second and taken as the score of the subject.

Fig. No. 4. Diagonal Shuttle Dribbling
8. **Figure “8” Dribbling**

**Objective**: To measure the ability of controlling the ball with feet during dribbling the ball.

**Facilities & Equipments**: Five flag posts, soccer Balls, stopwatch and marking for the test.

**Procedure**: A starting line was drawn and 5 flag posts (A, B, C, D & E) were fixed in a straight line with 3 metres apart in between. The line of flag posts was perpendicular to the starting line, which is shown in Fig. No.5.

On the signal “Go” the subject dribbled the ball from the starting line to the right and left of the flag posts alternately. But, he made a ‘U’ turned around E and returned back in the same manner till he crossed the starting line with the ball at the same time as shown in Fig. No. 5. 3 trials were given to each subject.

**Instruction**: If the ball went out of control, the subject was asked to retrieve the ball and resume dribbling from where the ball went out.

**Scoring**: The best timing of 3 trials was recorded in the nearest 1/100th of a second and taken as the score of the subject.
9. Receiving Ground Pass with Foot

Objective: To measure the ability of receiving the ball with foot.

Facilities & Equipment: Soccer Balls, Measuring Tape and marking for this test.

Procedure: The test was started with passing a ball along the ground by a server to the subject, who was standing 10 metres away from the server. The subject received the ball by using any part of his foot. The server recorded the time taken by the subject to receive the ball from the server. The subject then dribbled the ball back to the server in a figure '8' pattern, the distance where the ball was brought under control measured in the nearest metres and given points according to the distance.

Instruction: The server passed the ball to the subject, in the same time and manner to all subjects as done in normal passing in game situation.

Scoring: If the distance between the place where the ball had been received and the place where the ball was brought under control was less than 1 m - 5 points, 1 to 1.5 m - 3 points, 1.5 to 2 m - 1 point and more than 2 m - 0 point was awarded. The total point of 10 trials was recorded as the score of the subject.

Fig. No. 5. Figure '8' Dribbling

9. Receiving Ground Pass with Foot

**Objective**: To measure the ability of receiving the ball with foot.

**Facilities & Equipments**: Soccer Balls, Measuring Tape and marking for this test.

**Procedure**: The test was started with passing a ball along the ground by a server to the subject, who was staining 10 metres away from the serving line. The subject received the ball by using any part of his foot. The distance between the places where the ball had been received and the place where the ball was brought under control measured in the nearest metres and given points according to the distance.

**Instruction**: The server served the ball in the similar speed and manner to all subjects as done in normal passing in game situation.

**Scoring**: If the distance between the place where the ball had been received and the place where the ball was brought under control was less than 1m– 5 points, 1 to 1.5m – 3 points, 1.5 to 2m – 1 point and more than 2m – 0 point was awarded. The total point of 10 trials was recorded as the score of the subject.¹

10. Receiving Aerial Pass with Foot

Same as Test No.9 (Receiving Ground Pass with Foot), but here, the subject received aerial pass with any part of his foot before the ball touched the ground.

11. Zig-Zag Feinting Dribbling

**Objective:** To measure the feinting ability in dribbling.

**Facilities and Equipments:** Soccer balls, Six cones, whistle, stopwatch and marking for the test.

**Procedure:** Two 9 metre long lines A and B were drawn parallel to each other 3 metres apart. Both the lines were connected at both ends and these connecting lines were called the start/finish line and the other line was called end line. On line ‘A’ three cones were placed at a distance of 2 metres, 4 metres, and 6 metres from the starting line. On line ‘B’ also three cones were placed at 3 metres, 5 metres and 7 metres from the starting line. The cones were numbered from 1 to 6 as shown in Fig. No. 6.

The subject took starting position just behind the junction of line ‘A’ and starting line with the ball. On the command “Go” the subject dribbled
around cone 1 and continued to dribble around cone 2. He continued dribbling around 3, 4, 5 and 6 in a zig-zag manner. As soon as he crossed the end line, he dribbled back by the same course till he crossed the start/finish line with the ball. 3 trials were given to each subject.

**Instruction**: If the ball went out of control, the subject was asked to retrieve the ball and resume dribbling from where the ball went out.

**Scoring**: The best timing of three trials was recorded in the nearest 1/100\(^{th}\) of a second and taken as the score of the subject.
Objective: To measure the feinting ability.

Requirements: Soccer balls, stopwatches, flag posts and

Procedure: 5 flags (A, B, C, D & E) were fixed in an angular formation with a distance of 2m between each flag as shown in Fig. 6. A starting line was drawn 10m meters from the first flag post (A). An end line was drawn 4m away from the last flag post (E) parallel to the start line.

At the signal of "Go", the subject started dribbling the ball from the starting line and dribbled with feinting towards each flag in angular manner to end dribbling back in the same manner and in the same course again the start/finish line. 3 trials were given to each subject.

Instruction: If the ball went out during the test, the subject was asked to retrieve the ball and resume dribbling from where the ball went out.

Scoring: The best timing of 3 trials was recorded in the nearest 1/100th of a second and taken as the score of the subject.

Fig. No. 6. Zig-Zag Feinting Dribbling.
12. Angular Feinting with Ball

**Objective**: To measure the feinting ability with ball.

**Facilities & Equipments**: Soccer balls, stopwatch, 5 flag posts and marking for the test.

**Procedure**: 5 flag posts (A, B, C, D & E) were fixed in an angular formation with a distance of 1 metre in between each flag as shown in Fig. No. 7. A starting line was drawn 10 meters away from the first flag post (A). And an end line was drawn 5 meters away from the last flag post (E) parallel to the starting line.

At the signal of “Go”, the subject started dribbling the ball from the starting line and dribbled with feinting through the flag posts in angular manner up to end line, and dribbled back in the same manner and in the same course again to the start/finish line. 3 trials were given to each subject.

**Instruction**: If the ball went out of control, the subject was asked to retrieve the ball and resume dribbling from where the ball went out.

**Scoring**: The best timing of 3 trials was recorded in the nearest 1/100\textsuperscript{th} of a second and taken as the score of the subject.
13. Standing Heading for Distance

**Objective**: To measure the heading ability for distance.

**Facilities & Equipments**: Soccer Balls, Measuring Tape and marking for the test.

**Procedure**: A restraining line was drawn on one side of the ground as shown in Fig. No. 2.

The test was started by throwing a ball to the head of the subject at a comfortable height from a distance of 10 meters by the thrower. The subject was asked to head the ball and throw it behind the restraining line. The distance between the place from where he headed and the spot where the ball landed was measured in the nearest of a metre. 3 trials were given to each subject.

**Instruction**: If the subject was not satisfied with the height and manner of the served ball, he was given another chance. But, once he touched the ball with his head, the trial was counted.

**Scoring**: The distance between the spot from where he had headed and the spot where the ball had landed was recorded in the nearest of a metre. The best of 3 trials was taken as the score of the subject.

*Fig. No. 7. Angular Feinting with Ball*
13. **Standing Heading for Distance**

**Objective**: To measure the heading ability for distance.

**Facilities & Equipments**: Soccer Balls, Measuring Tape and marking for the test.

**Procedure**: A restraining line was drawn on one side of the ground as shown in Fig. No. 2.

The test was started throwing a ball to the head of the subject at a comfortable height from a distance of 10 meters by a server. The subject was asked to head the ball from behind the restraining line as far as he could. The distance between the place from where he headed and the spot where the ball landed was measured in the nearest of a metre. 3 trials were given to each subject.

**Instruction**: If the subject was not satisfied with the height and manner of the served ball, he was given another chance. But, once he touched the ball with his head, the trial was counted.

**Scoring**: The distance between the spot from where he had headed and the spot where the ball had landed was recorded in the nearest of a metre. The best of 3 trials was taken as the score of the subject.
14. Jumping Heading for Distance

Same as the test No.13 (Standing Heading for Distance). But, in this case, the heading was done with jump from behind the restraining line.

15. Tackling “One vs One” in Limited Area

**Objective:** To measure the tackling ability:

**Facilities & Equipments:** Soccer Balls, Stopwatch and marking for the test.

**Procedure:** A 20 metres wide and 30 metres long rectangular court was drawn. A centre line was drawn parallel to the 20m lines, which divided the court into two halves. The subject (defender) stood on this line facing the attacker who stood behind the opposite 20m line with the ball as shown in Fig. No. 8.

At the starting signal, the attacker moved forward inside the court with the ball. The task of the attacker was to dribble past the subject within the court and cross the opposite 20m line (end line) with the ball within 30 seconds, whereas the task of the defender was to foil the attempt of the attacker and put the ball outside the court. 10 trials were given to each subject with different opponents (attackers).
**Scoring**: 1 point was given to the subject, if he could tackle, successfully i.e. sending the ball outside the court within 30 seconds. If the attacker crossed the opposite 20m line with the ball or kept the ball possession within the court for 30 seconds or more, the subject was awarded 0 point. The total point of 10 trials was recorded as the score of each subject.
16. Tackling “One vs One” on the Spot (Basic Tackle)

**Objective:**
To measure the ability of the players to tackle opponents in limited space.

**Facilities & Equipments:** Soccer ball and marking for the test.

**Procedure:**
One spot was marked and placed the ball on that spot properly.

Two subjects took position a metre apart facing each other. A ball was placed on the ground exactly in the middle of the two subjects. The right feet of both the subjects were placed behind the ball (the inside foot facing the ball) as shown in Fig. No. 9. On the signal “Go,” both the subjects tried to tackle the ball away from his opponent. The subject who got possession of the ball first was awarded one point. The other subject was awarded zero points. 10 trials were given to each subject.

**Instruction:**
If the ball went or bounced away, both the subjects had to chase and bring the ball under control.

**Scoring:**
1 point was given to the subject who possessed the ball first. The total point of 10 trials was recorded as the score of each subject.

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**Fig. No. 8. Tackling “One vs One” in Limited Area**
16. Tackling “One vs One” on the Spot (Basic Tackle)

**Objective**: To measure the tackling ability.

**Facilities & Equipments**: Soccer Ball, and marking for the test.

**Procedure**: One spot was marked and placed the ball on that spot properly.

Two subjects took position a metre apart facing each other. A ball was placed on the ground exactly in the middle of the two subjects. The right feet of both the subjects were placed behind the ball (the inside of the feet facing the ball) as shown in Fig. No. 9. On the signal “Go” both the subjects tried to tackle the ball away from his opponent. The subject who got possession of the ball first was awarded one point. The other subject was awarded zero point. 10 trials were given to each subject.

**Instruction**: If the ball went or bounced away, both the subjects had to chase and bring the ball under control.

**Scoring**: 1 point was given to the subject who possessed the ball first. The total point of 10 trials was recorded as the score of each subject.
Fig. No. 9. Tackling “One vs One” on the Spot
17. Juggling the Ball

**Objective**: To measure the ball sense.

**Facilities & Equipments**: Soccer balls and proper plane area.

**Procedure**: On the command “Start”, the subject scooped-up the ball and kept the ball in the air with repeated touches by any part of the body other than his hands and arms, till the ball touches the ground. The number of touches made with any part of the body was counted. 3 trials were given to each subject.

**Scoring**: The number of touches for the best of 3 trials was recorded as the score of each subject.

18. Forward Dribbling and Dragging Back

**Objective**: To measure the ball sense.

**Facilities & Equipments**: Soccer Balls, Stopwatch and marking for the test.

**Procedure**: Two parallel lines were drawn 10 metres apart, named as “A” and “B” as shown in Fig. No. 10.

At the signal “Go”, the subject started dribbling from line A toward line B. As soon as the ball crossed line B, he dragged the moving
ball with the sole of his foot. Then he changed the direction and dribbled toward line A. When he crossed line A, one round was completed. Without loosing time he completed the second round following the same course in the same manner. The time required for completing the two rounds was recorded. 3 trials were given to each subject.

**Instruction**: If the ball did not cross the line, that trial was retaken. And, if he lost control of the ball, he was asked to retrieve the ball and restart from there only.

**Scoring**: The best timing of 3 trials was recorded in the nearest 1/100<sup>th</sup> of a second and taken as the score of the subject.
Objective: To measure the strength of the lower extremity.

Facilities & Equipments: Leg-lift dynamometer.

Procedure: The subject was asked to stand with feet 6 inches apart. The bar of the dynamometer was held at the centre at the level of the pubis with palms facing downward. The knees were flexed between 115 and 125 degrees. The subject was asked to lift the bar or dynamometer upward so as to make his knees nearly straight at the end of the lift. The chain was adjusted so that a maximum lift was obtained. Three trials were given to each subject.

Scoring: The highest of the three trials attempted was recorded in the nearest of a kilogram as the score of the subject.

Fig. No. 10. Forward Dribbling and Dragging Back

Objective: To measure the explosive strength (power) of the lower extremity.

Facilities & Equipments: Long jump pit, and measuring tape.
Administration of Specific Test Items for Motor Abilities

1. Leg-Lift Dynamometer

**Objective**: To measure the strength of the lower extremity.

**Facilities & Equipments**: Leg-lift dynamometer.

**Procedure**: The subject was asked to stand with feet 6 inches apart. The bar of the dynamometer was held in the centre at the level of the pubis with palm facing downward. The knees were flexed between 115 and 125 degrees. The subject was asked to lift the bar or dynamometer upward so as to make his knees nearly straight at the end of the lift. The chain was adjusted so that a maximum lift was obtained. Three trials were given to each subject.

**Scoring**: The highest of the three lifts attempted was recorded in the nearest of a kilogram as the score of the subject.

2. Standing Broad Jump

**Objective**: To measure the explosive strength (power) of the lower extremity.

**Facilities & Equipments**: Long jump pit, and measuring tape.
**Procedure** : The subject was asked to stand behind the take-off line with the feet parallel to each other. He was instructed to jump as farthest as possible by bending knees and swinging arms to take off for the broad jump in the forward direction. Each subject was given 3 trials.

**Instruction** : If the subject failed to make a valid jump, another trial was given.

**Scoring** : The distance between the take-off line and the nearest point of landing was measured in the nearest of a metre. The best of 3 trials was the final score of the test.

3. **Bent Knee Sit-ups**

**Objective** : To measure the dynamic endurance of abdominal muscles.

**Facilities & Equipments** : Stopwatch, whistle and mat or dry turf or clean floor.

**Procedure** : The subject was asked to lie down on the back (supine position) with knees bent at 90° and to put his hands crossed in front of the chest. A companion was asked to hold his feet so that the feet were kept firm on the surface. Then at the signal of “start” the subject sat-up till the back of the hand touched the knees. After that he laid down to the
initial position before sitting up again. It was continued for 60 seconds. Only one trial was given to each subject.

**Instruction**: If any mistake/fault was committed that particular sit-up was not counted in the score.

**Scoring**: The total number of correct sit-ups completed within 60 seconds was counted as the score of the subject.

4. **20 metre Shuttle Run**

**Objective**: To measure the multistage endurance (aerobic).

**Facilities & Equipments**: 10 cones, stopwatch, whistle, measuring tape and marking for the test.

**Procedure**: Two parallel 10 metres long lines A and B were drawn 20 metres apart. On each line, 5 cones were kept 2 metres apart. Those cones on line A, they were named as A₁, A₂, A₃, A₄ and A₅, and on the line B, they were also named as B₁, B₂, B₃, B₄ and B₅ as shown in the Fig. No. 11. The subject assumed starting position behind A₁. On the signal of start, the subject ran toward B₁ and turn around it; then he ran toward A₂. This was continued till the subject reached B₅. From there he returned
back via A₅ following the same route till he reached A₁, which was also the finish line. The total distance to be covered was 360.8 metres.

**Instruction**: If the subject committed any mistake/fault he was called back to the place where he committed the mistake and asked him to continue from there only. But if he wanted another trial, it was given after sufficient rest.

**Scoring**: The time taken in covering the distance was recorded in the nearest 1/100th of a second and this score was considered as the score of the subject.
5. Sit and Reach

Objective: To measure the flexibility of back and leg (hamstring) muscles.

Facilities & Equipment: Testing box or a flexometer and a yardstick.

Procedure: The subject was asked to place his bare feet against the testing box while sitting on the floor with straight knees. The subject was asked to place one hand over the other so that the middle fingers of both hands were together at the same length. The tester kept his thumb in the subject's knees to keep them straight not allowing any bending of the knees. The subject was instructed to lean forward and place his hands on the measuring scale lying on the top of the box with its 10 cm marks at the back of the testing box. Then, the subject was asked to slide his hands along the measuring scale as far as possible without bouncing and to hold this position for at least one second. 3 trials were given to each subject.

Scoring: The best of the 3 trials was recorded to the nearest inch at the farthest point reached as the score of the subject.

6. Flexibility Extent Flexibility (Twist and Touch) Test

Objective: To measure the trunk flexibility/rotation of the subject along with the shoulder extension.

Fig. No. 11.

20 Metre Shuttle Run.
5. **Sit and Reach**

**Objective** : To measure the flexibility of back and leg (hamstring) muscles.

**Facilities & Equipments** : Testing box or a flexomeasure and a yardstick.

**Procedure** : The subject was asked to place his bare feet against the testing box while sitting on the floor with straight knees. The subject was asked to place one hand over the other so that the middle fingers of both hands were together at the same length. The tester kept his hand on the subject’s knees to keep them straight not allowing any bending of the knees. The subject was instructed to lean forward and place his hands over the measuring scale lying on the top of the box with its 10 inches mark coinciding with the front edge of the testing box. Then, the subject was asked to slide his hands along the measuring scale as far as possible without bouncing and to hold the farthest position for at least one second. 3 trials were given to each subject.

**Scoring** : The best of the 3 trials was recorded to the nearest inch at the farthest point reached as the score of the subject.

6. **Fleishment Extent Flexibility (Twist and Touch) Test**

**Objective** : To measure the trunk flexibility/rotation of the subject along with the shoulder extension.
**Facilities, Equipments and Construction of the Test:** A measuring scale of 30 inches (76.2 cm) long was drawn on a wall and marked off in half-inch (1.27 cm) intervals from 0 - 30 inches (0 - 76.2 cm) as shown in Fig. No. 12. The scale was sufficiently wide to accommodate differences in heights of subjects. A line was drawn on the floor, perpendicular to the wall and in the line with the 12 inches (30.48 cm) mark on the scale.

**Procedure:** A right-handed subject was asked to stand with the left side toward the wall, toes touching the line on the floor, and feet together and perpendicular to the line. The subject was instructed to stand far enough from the wall so that he can just touch the wall with left fist when the arm is held horizontally from the shoulder. The feet was kept in place and extended the right arm to the side (abducted), to shoulder height. The palm faced downward, with fingers extended together and wrist in straight. The subject twisted clockwise as far as possible, so that the scale on the wall was touched with the right hand while an assistant assured that the subject’s right foot remained in place. This position was held at least for two seconds.

**Scoring:** One practice trial was given and the second trial was scored to the nearest inch at the farthest point reached as the score of the subject.
7. Sprint with Flying Start

**Facilities & Equipments:** Stopwatch, whistle and marking for the test.

**Procedure:** Starting and finishing lines were drawn 40 metres apart. On the runway 10 m. from the starting line, another line (Timing Mark) was drawn as shown in Fig. No. 13. On the word of "Go", the subject started sprinting. As soon as he crossed the Timing Mark, a judge signaled by swinging a colorful flag. This was the signal for the timekeeper to start the stopwatch. Although the subject ran 40 m, his timing was recorded for 30 m only. 3 trials were given with complete recovery.

**Instruction:** If any fault/mistake was committed, another trial was awarded.

**Scoring:** The first timing of 3 trials was recorded in the nearest 1/100th of a second and was considered as the score of the subject.

8. Sprint with Forward-Roll Break

**Objective:** To measure the speed and flexibility of the subject.

**Facilities & Equipments:** Stopwatch, whistle and marking for the test.

**Fleishment Extend Flexibility (Twist and Touch)**

Fig. No. 12.
7. **Sprint with Flying Start**

**Objective**: To measure pure/absolute sprinting speed of the subject.

**Facilities & Equipments**: Stopwatch, whistle and marking for the test.

**Procedure**: Starting and finishing lines were drawn 40 metres apart. On the runway 10 m. from the starting line, another line (Timing Mark) was drawn as shown in Fig. No. 13. On the signal of “Go”, the subject started sprinting. As soon as he crossed the Timing Mark, a judge signaled by swinging a colorful flag. This was the signal for the timekeeper to start the stopwatch. Although the subject ran 40m, his timing was recorded for 30m only. 3 trials were given with complete recovery.

**Instruction**: If any fault/mistake was committed, another trial was awarded.

**Scoring**: The best timing of 3 trials was recorded in the nearest 1/100th of a second and that was considered as the score of the subject.

8. **Sprint with Forward-Roll Break**

**Objective**: To measure the speed and movement speed of the subject.

**Facilities & Equipments**: Stopwatch, whistle and marking for the test.
**Procedure**: The 30 metres runway was equally divided into three equal parts of 10m each as shown in Fig. No.14.

The subject was asked to take position behind the starting line. On the starting signal of “Go”, the subject sprinted toward the finish line and made a forward roll in between the two lines indicating the middle 10m section. The subject continued running toward the finish line. 3 trials were given to each subject with complete recovery.

**Instruction**: If any fault/mistake was committed, another trial was awarded.

**Scoring**: The best timing of 3 trials was recorded in the nearest $1/100^{th}$ of a second and that was considered as the score of the subject.
Fig. No. 13. Sprint with Flying Start

Fig. No. 14. Sprint with Forward Roll Break
9. Agility Run on Unknown Course

**Objective**: To measure the dynamic agility of the subject.

**Facilities & Equipments**: Whistle, stopwatch, direction sets, and marking for the test.

**Procedure**: A square of 20 x 20m was drawn and it was divided by two perpendicular lines from the middle of each four sides, making four equal squares of 10 x 10m. as shown in Fig. No.15.

The subject was asked to take position at the centre, i.e. starting point and a commander was ready to give command to run in different directions. There were four directions, such as ‘Right’, ‘Left’, ‘Front’, and ‘Back’. Front = Ordinary Running; Back = Backward Running; Left/Right = Side Running (shuffling). That means, throughout the test the subject faced the same direction. Along with the starting signal, the starter indicated the direction to be run. When the subject was about to reach the 10m marks, the next direction was given. In this way each subject had run 80m with changing direction as indicated at every 10m. 3 trials were given to each subject with complete recovery.
In order to unable the subject to anticipate the command, the following four sets of commands were used randomly –

1\textsuperscript{st} Set : L – R – B – F – L – B – R – F

2\textsuperscript{nd} Set : R – L – F – R – B – F – L – B

3\textsuperscript{rd} Set : F – B – R – F – L – B – R – L

4\textsuperscript{th} Set : B – L – F – R – B – L – F – R

\textbf{Instruction} : The subject was told to be attention to the indication of the direction. The commander gave direction at the right time, so that the subject did not loose time while waiting for another signal.

\textbf{Scoring} : The best timing of 3 trials was recorded in the nearest \(1/100\)\textsuperscript{th} of a second and was the score of the subject.
Objective: To measure the running agility of the subject.

Facilities & Equipments: Four chair, stopwatch, measuring tape and marking for the test.

Procedure: Four chairs were placed in a straight line, 10ft apart. The starting and finishing points were marked 6ft apart to the left and right sides from the first chair respectively. Then, two turning points were marked 30ft apart from the starting and finishing points parallel to the line of chairs. The directions of starting and finishing were shown in the Fig. No. 16.

The test was started from a prone position, hands at the sides of the body on the starting line. On the command "GO", the subject leaped to the feet and sprinted 30ft, stopped and reversed (at least one foot touched or crossed the line), and moved back toward the starting line. A left turn was made around the first chair, followed by a zig-zag around each chair. A right turn was made around the fourth chair, followed by a zig-zag around each chair toward the starting line. A left turn is made around the last chair followed by a 30ft sprint. A stop and reverse was

Fig. No. 15. Agility Run on Unknown Course
10. *Illinois Agility Run*

**Objective**: To measure the running agility of the subject.

**Facilities & Equipments**: Four chair, stopwatch, measuring tape and marking for the test.

**Procedure**: Four chairs were placed in a straight line, 10ft apart. The starting and finishing points were marked 6ft apart to the left and right sides from the first chair respectively. Then, two turning points were marked 30ft apart from the starting and finishing points parallel to the line of chairs. The directions of starting and finishing were shown in the Fig. No. 16.

The test was started from a prone position, hands at the sides of the chest and on the starting line. At the command “Go”, the subject jumped to the feet and sprinted 30ft, stopped and reversed (at least one foot touched or crossed the line), and sprinted back toward the starting line. A left turn was made around the first chair, followed by a zig-zag around each chair. A right turn was made around the fourth chair, followed by a zig-zag around each chair toward the starting line. A left turn is made around the first chair, followed by a 30ft sprint. A stop and reverse was
repeated as above, and the subject ran full speed across the finish line. 3 trials were given to each subject.

**Instruction**: If the subject committed any fault/mistake, the subject was given another trial after sufficient rest.

**Scoring**: The best of 3 trials was recorded in the nearest 1/100 of a second and it was considered as the score of the subject.
Fig. No. 16. Illinois Agility Run.
Administration of Test Items for Psychological Parameters

1. Children’s Personality Questionnaire (CPQ)

Objective: To measure the personality traits of soccer playing schoolboys.

Facilities & Equipments: Questionnaire, Answer-Sheets, Stop Watch and Pencils.

Description: To obtain the scores on the personality traits of soccer playing students, the research scholar used the Children’s Personality Questionnaire (CPQ) Form A, which was consisting of 140 items, developed by Rutherford B. Porter and Raymond B. Cattell, supplied by National Psychological Corporation, Agra. The CPQ measured 14 primary traits useful in understanding and evaluating the course of personal, social and academic development, plus traits related to creativity. It was meant for the age groups of below 14 years. Time required was 30 to 60 minutes.

Procedure: The subjects were gathered in a classroom of their respective schools during school hours. Before starting the test, the tester/scholar instructed and explained about the test and its objective to
understand the subjects. Then, the questionnaires and answer sheets were distributed to all the subjects. If the subjects got confuse any question or statement, the tester/scholar explained it again. The subjects were instructed to complete the questionnaire within the stipulated duration.

**Scoring**: Two cardboards 1 and 2 of scoring stencil keys, which were consisting of Part $A_1$ and $A_2$ each, were used. Stencil cardboard 1 covered factors $A$, $B$, $E$, $G$, $I$, $N$, $Q3$ and cardboard 2 covered the factors $C$, $D$, $F$, $H$, $J$, $O$, $Q4$. Before using the scoring stencil cardboards, each answer sheet was checked to ensure that there was no odd, unsociable response. The raw scores were collected and adjusted for 14 personality factors on the score sheet with the help of scoring stencil keys.

2. **Group Test of Intelligence**

**Objective**: The measure the intelligence of soccer playing schoolboys.

**Facilities and Equipments**: Test booklets, Answer-Sheets, Stop Watch and Pencils.

**Description**: To obtain the scores on the Intelligence, the research scholar used the Group Test of Intelligence (PGTI), which was consisting of 110 questions, developed by Dr. Pramila Ahuja and supplied by National Psychological Corporation, Agra. This test was developed for
the age group of 9 to 13 years for both sexes. This test was consisting of seven sub-tests-scrambled words, analogies, classification, disarranged sentences, same opposite, series and best answers. Time limit was 35 minutes.

**Procedure**: Same as test no. 1, Children’s Personality Questionnaire (CPQ).

**Scoring**: Four stencil scoring keys consisting of all seven sub-tests were used. The total of the stencil scores of seven sub-tests was recorded as the score of the subject.

3. **Self-Modified Sports Achievement Motivation Test (SAMT)**

**Objective**: To measure the achievement motivation level of soccer playing schoolboys.

**Facilities and Equipments**: Questionnaire, Stop Watch and Pencils.

**Description**: To obtain the scores on the Sports Achievement Motivation, Self-Modified Questionnaire was administered made from M.L. Kamlesh’s “Construction and Standardization of a Sports Achievement Motivation Test” (NIS, 1990), in respect of soccer playing schoolboys’ standard, between 12 and 14 years of age.
**Procedure**: Same as test no. 1, *Children's Personality Questionnaire* (CPQ).

**Scoring**: The scoring method given by the M.L. Kamlesh in “Sports Achievement Motivation Test” was followed. When the subject ticks the high pole part, he was given 2 points and when he ticks low pole, no score was awarded i.e. 0 (zero).

**Scoring Key**

1. a 2. b 3. a 4. a 5. b 6. b 7. b 8. b 9. a 10. a

11. a 12. a 13. a 14. b 15. b 16. a 17. a 18. a 19. b 20. b

**Criteria Base on Percent and Points**

<table>
<thead>
<tr>
<th>Raw/Mean Score</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-24</td>
<td>Low</td>
</tr>
<tr>
<td>24-30</td>
<td>Moderate</td>
</tr>
<tr>
<td>30 and above</td>
<td>High</td>
</tr>
</tbody>
</table>

4. **Self-Modified Group Environment Questionnaire**

**Objective**: To measure the Group Cohesiveness of the soccer playing schoolboys.
**Facilities and Equipments**: Questionnaire, Stop Watch and Pencils.

**Description**: To obtain the scores on Group Cohesiveness, Self-Modified Group Environment Questionnaire was administered made from Carron’s “Group Environment Questionnaire” in respect of soccer playing schoolboys’ standard, between 12 and 14 years of age. The questionnaire was consisting of 18 statements. These 18 statements were divided into four different aspects:

1. Attraction to Group Task - 4 statements
2. Attraction to Group Social - 5 statements
3. Group Integration Task - 5 statements
4. Group Integration Social - 4 statements

These four aspects were resolved from the Carron’s conceptual model, where group cohesion is divided into group integration and individual attraction to group, and each of them divided into social and task aspects of cohesion.

**Procedure**: Same as test no. 1, Children’s Personality Questionnaire (CPQ).
Scoring: Each item had a seven points scale. The subjects were asked to encircle any of the points from 1 to 7. The scoring was done according to the directions given in the scoring key for this questionnaire.

Scoring key

Each item had a seven-point scale. The subjects are asked to encircle any of the points from 1 to 7. The score was given according to the directions given as follows:

1. The first aspect is Attraction to Group Task (four statements):
   For Item 2, 4, 6 and 8, scored from
   Strongly disagree – 7 to 1
   Strongly agree - 1 to 7

2. The second aspect is Attraction To Group Social (five statements):
   For Item 1, 3, and 7, scored from-
   Strongly disagree – 7 to 1
   Strongly agree - 1 to 7
   For Item 5 and 9, scored from-
   Strongly disagree – 1 to 7
   Strongly agree - 7 to 1
3. The third aspect is **Group Integration Task** (five statements):

For Item 10, 12 and 16, scored from-

- Strongly disagree – 1 to 7
- Strongly agree - 7 to 1

For Item 14 and 18, scored from-

- Strongly disagree – 7 to 1
- Strongly agree - 1 to 7

4. The fourth aspect is **Group Integration Social** (four statements):

For Item 15, scored from-

- Strongly disagree – 1 to 7
- Strongly agree - 7 to 1

For Item 11, 13 and 17, scored from-

- Strongly disagree – 7 to 1
- Strongly agree - 1 to 7

The total of the points of all 18 statements was considered as the final score of the subject.
Administration of Test Items for Physiological Parameters

1. Resting Heart Rate

**Objective**: To measure the Resting Heart Rate.

**Facilities & Equipments**: Stopwatch and comfortable place.

**Procedure**: The resting heart rate of each subject was recorded between 6:00 am to 7:00 am. 10 minutes before recording the heart rate, the subjects were instructed to remain take rest in laying position in the ground. By using the pulpatory method (pulse rate count) on the wrist of the subject the pulse was counted. Three trials of pulse count were recorded for 10sec, 15sec and 1minute.

**Scoring**: The lowest or the best of 3 trials was recorded as the heart rate score of the subject.

2. Vital Capacity

**Objective**: To measure the vital capacity.

**Facilities & Equipments**: Wet Spirometer, Nose Clip and proper place.

**Procedure**: The Spirometer was set up in a proper position. The subject was asked to take maximum inhalation and clipped the nose, and introduced the mouthpiece to the mouth. Then the subject had maximum
exhalation as intensely as possible through the mouthpiece. Three trials were given for each subject.

**Scoring** : Score was recorded as denoted by the indicator to the reading dial in millilitres and converted into litres. The best or highest one out of three trials was recorded as the score of the subjects.

3. **Cooper’s 12 Minutes Run-Walk Test**

**Objective** : To measure the aerobic capacity.

**Facilities & Equipments** : 400m Standard Track or suitable ground, whistle stopwatch and marking for the test.

**Procedure** : Two running groups were divided and made partner of each subject. While one group was running, the partners of another group was instructed to count the number of laps and extra distance covered by their respective partners ran within the allotted time.

**Scoring** : The number of laps and extra distance covered distance in metres was recorded as the score of the subject. The total distance covered was converted into miles. And the aerobic capacity was calculated for every subject by using the formula:
\[ VO_2\text{max (ml.kg}^{-1}\text{min}^{-1}) = 35.9712 \text{ (distance in miles for 12 minutes Run-Walk)} - 11.2878 \]

4. **Sargent Jump – Lewis Nomogram**

**Objective**: To measure the anaerobic capacity.

**Facilities & Equipments**: 12ft high smooth wall, measuring tape, weighing- machine and marking for the test.

**Procedure**: The subject was asked to take the standing reach of hand against the wall and taking the knee bent position had an explosive vertical jump to cover maximum jump reach by hand. Three trials were given to each subject.

**Scoring**: The best distance between the standing reach and 3 trials of jump reach was recorded as the score of the subject.

Anaerobic capacity (power) was recorded by using the Lewis Nomogram in Kg-m.sec\(^{-1}\) on the basis of Sargent jump and body weight of the subject as shown in Fig. No. 17.
THE LEWIS NOMOGRAM FOR DETERMINING ANAEROBIC POWER FROM JUMP-REACH SCORE AND BODY WEIGHT

The objective of the study was to conduct a reliable talent search test battery to trace out and spot the soccer potential among schoolboys on the basis of selected specific soccer skills, motor abilities, psychological and physiological parameters. Therefore, in the present study, Pearson's Product Moment Method of Correlation was employed to find out the relationship of all the specific skills, motor abilities, psychological and physiological test items with the playing the performance of the subjects in soccer and established the correlation between all the test items.

Secondly, Factor Analysis (Statistical technique was employed as the most suitable) was carried out to identify the various factors among the specific skills, motor abilities, psychological and physiological test items for the purpose of identification. From the Factor Analysis (Unrotated Factor Loadings and Principal Axis Factoring with Promax Rotation) were used. Then, different factors were identified and the best suited identified test items with highest loadings were selected. Factors were given appropriate names based on characteristics and nature of the variables contained in it. Finally, picking up the highest loading variables from each factor of four areas of specific soccer skills, motor abilities,
Statistical Analysis and Interpretation of Data

The objective of the study was to construct reliable talent search test battery to trace out and spot the soccer talent among schoolboys on the basis of selected specific soccer skills, motor abilities, psychological and physiological parameters. Therefore, in the first, Pearson’s Product Moment Method of Correlation was employed to find out the relationship of all the specific skills, motor abilities, psychological and physiological test items with the playing ability performance of the subjects in soccer and established the correlations of all the test items.

Secondly, Factor Analysis statistical technique was employed as the most suitable technique to select and establish the best-suited test items among specific skills, motor abilities, psychological and physiological test items for talent identification. In the Factor Analysis the extraction methods as Principle Component Analysis (Unrotated Factor Loading), and Principal Axis Factoring (Varimax Rotation) were used. Then, different factors were extracted that had carried the best-suited identified test items with highest loading. The selected factors were given appropriate name according to the characteristics and nature of the variables contained in it. Finally, picking up the highest loading variables from each factor of four areas of specific soccer skills, motor abilitie
psychological and physiological parameters, a series of dominant factors was compiled, and the most suitable test battery for talent search was developed. Thus, for further advantage, establishment and comfortability of utilization, a single soccer talent search test battery was developed on the basis of specific soccer skills, motor abilities, psychological and physiological parameters.

Further, for developing the norms of each test item of the talent search test battery, Hull Scale method was employed. Again, on the basis of the developed norms, all the raw scores of the selected test items of talent search test battery for 120 subjects were converted into norms score and single norm was developed by employing the Hull-Scale for the single Soccer Talent Search Test Battery. Finally, 6-Sigma Scale method was applied for developing grading scale and further interpretation of talent ability performance.