Chapter III

PROCEDURE

In this chapter the selection of subjects, selection of variables, criterion measures, reliability of data, collection of data, administration of tests, statistical model have been described.

Selection of Subjects

The subjects for this study were one hundred and thirty five male school volleyball players between the age of 14 to 19 years. The students were studying in Government High and Senior Secondary Schools of Himachal Pradesh. All the players participated in male state level school tournament held at District Bilaspur (Himachal Pradesh) in November 1987. All the Volleyball players were listed district wise. It was ensured from the health record of the subjects maintained as a part of regular school procedure that all the subjects were medically fit for going through the testing programme.

Prior to the administration of tests, a meeting of
the subjects was held in the presence of PET/Coaches, APTs and other tournament organizers. The requirements of the testing procedure were explained to them in detail so that there was no ambiguity in their minds regarding the efforts required of them and the hard work they had to endure in addition to their regular participation in the competition. All the students and other officials agreed voluntarily to co-operate in testing procedure explained to them in the interest of scientific investigation and enhancing their own performance. Though no special techniques were used to motivate the subjects to put in their best efforts, the subjects were very enthusiastic and co-operative throughout the project.

Selection of Variables

The physical, physiological and motor skill that influence the performance in the game of volleyball, as is revealed from a review of professional literature and consultation with experts of this game, were taken into consideration.

A feasibility analysis as to which of the variables mentioned above could be taken for investigation in keeping with the availability of equipment, acceptability to the subjects and the legitimate time that could be devoted for tests requirements was decided after consultation with
experts.

Keeping the above criteria into consideration the following physical, physiological and motor skill were selected as they are directly related to the performance of volleyball players in competitive situation.

Physical Variables

1. Speed
2. Arm Strength
3. Explosive Power
4. Dynamic Balance
5. Agility
6. Wrist Flexibility
7. Ankle Flexibility
8. Trunk Hyper Extension
9. Shoulder Flexibility
10. Age
11. Height
12. Weight

Physiological Variables

1. Pulse Rate
2. Systolic Blood Pressure
3. Diastolic Blood Pressure
4. Pulse Pressure
5. Body Fat
6. Lean Body Weight
7. Cardiovascular Endurance

Motor Skill

1. Volleying
2. Serving
3. Passing
4. Set up

Criterion Measures

The criterion measures chosen for this study were:

1. The average score of the three experts to judge volleyball playing ability.

2. Time taken by an individual to run a distance of 50 yards and recorded to the nearest 1/10th of a second.

3. Arm strength computed with the help of pull-ups, push-ups, weight and height of the subject using the Roger's Arm Strength Formula.

4. Vertical distance jumped by using Sargent Vertical Jump and recorded in centimeters.
5. Points scored out of hundred in Modified Bass Dynamic Balance Test.

6. Time taken in Semo Agility Test and recorded to the nearest 1/10th of a second.

7. The measurement of the angle through which the wrist (hand) moved from flexion to extension and recorded in degrees.

8. The measurement of the angle through which the ankle moved from dorsi flexion to planter flexion and recorded in degrees.

9. The best score of the trunk extension subtracted from the subject's standing height and recorded to the nearest half an inch.

10. Subtracting the shoulder width from the minimum distance reached between hands after executing shoulder rotation and recorded to the nearest half an inch.

11. The chronological age recorded in years from the school records.

12. The standing height recorded to the nearest inch with the help of a marked scale on a wall.
13. Weight recorded to the nearest pounds on a lever type laboratory anthropometric machine.

14. Number of heart beats per minute recorded at the radial artery under basal condition.

15. Pressure exerted by the walls of the arteries on the circulating blood in terms of milimetres of mercury.

16. Skinfold measurements taken and expressed in metres using skinfold caliper at biceps, triceps, sub-scapular and supra iliac sites.

17. Time taken in Cooper's 1.5 mile run test and recorded to the nearest 1/10th of a second.

18. Motor skills (volleying, serving, passing and t up) recorded in point after administering AAHPER volleyball skill test.

**Reliability of Data**

The reliability of data was ensured by establishing the instrument reliability, tester competency and reliability of tests and subject reliability.
Instrument Reliability

The stop watches, goniometer, flexomètre, leaver type laboratory anthropometric machine, sphygmomanometer, stethoscope, skinfold caliper were obtained from standard firm which cater to the needs of various research laboratories in India and abroad. The reliability of these instruments was ensured and calibrated by their manufacturers.

Thus all the instruments used in this study to measure the performance of the subject on different variables were considered reliable and precise.

Tester Competency and Reliability of Tests

To ensure that the investigator was well versed with the techniques of conducting the tests, the investigator had a number of practice sessions in testing procedures under the expert Dr. A.K. Datta, Lecturer, Lakshmibai National College of Physical Education, Gwalior.

The tester competency was evaluated together with the reliability of the tests. To determine the reliability
of tests, the performances of 10 subjects selected at random on the selected variables were recorded twice under identical conditions by the scholar. A Pearson's Product Moment Correlation was computed between the two measures of each variables and these reliability co-efficients are shown in Table 1.

**TABLE 1**

**RELIABILITY COEFFICIENTS OF TEST-RETEST SCORES**

<table>
<thead>
<tr>
<th>Tests</th>
<th>Co-efficients of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 yard Dash</td>
<td>.79*</td>
</tr>
<tr>
<td>Roger's Arm Strength</td>
<td>.82*</td>
</tr>
<tr>
<td>Sargent Vertical Jump</td>
<td>.91*</td>
</tr>
<tr>
<td>Modified Bass Test of Dynamic Balance</td>
<td>.78*</td>
</tr>
<tr>
<td>Semo Agility Test</td>
<td>.87*</td>
</tr>
<tr>
<td>Wrist Flexibility</td>
<td>.79*</td>
</tr>
<tr>
<td>Ankle Flexibility</td>
<td>.77*</td>
</tr>
<tr>
<td>Bridge up Test</td>
<td>.85*</td>
</tr>
<tr>
<td>Shoulder Rotation Test</td>
<td>.77*</td>
</tr>
<tr>
<td>Resting Heart Beat Per Minute</td>
<td>.92*</td>
</tr>
<tr>
<td>Resting Systolic Blood Pressure</td>
<td>.79*</td>
</tr>
</tbody>
</table>
Continued TABLE 1

<table>
<thead>
<tr>
<th>Tests</th>
<th>Co-efficients of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resting Systolic Blood Pressure</td>
<td>.84*</td>
</tr>
<tr>
<td>Pulse Pressure</td>
<td>.82*</td>
</tr>
<tr>
<td>Skinfold Calipers</td>
<td>.88*</td>
</tr>
<tr>
<td>1.5 Mile Run</td>
<td>.79*</td>
</tr>
<tr>
<td>Volleying</td>
<td>.87*</td>
</tr>
<tr>
<td>Serving</td>
<td>.81*</td>
</tr>
<tr>
<td>Passing</td>
<td>.84*</td>
</tr>
<tr>
<td>Setup</td>
<td>.89*</td>
</tr>
</tbody>
</table>

N = 10

\[ r_{.01(8)} = .765 \] Significant at .01 level of confidence.

From the test retest co-efficient of correlation (Table I) it was obvious that the tester reliability was significantly high at .01 level, establishing the competency of the scholar to administer the tests.

The correlation co-efficients also indicated the reliability of the tests selected, as very high correlations
were obtained when the tests were repeated.

Subject Reliability

The above test-retest co-efficients of correlation method also established that subject reliability was significant at .01 level of confidence, as the same subjects were used under similar conditions by the tester and no motivational techniques were used nor any training given.

Collection of Data

The necessary data was collected by administering the tests for the chosen variables. All the tests were administered during state level school tournament at IJalaspur (K.P.) in November 1987.

The subjects were given a chance to practice the prescribed test so that they might become familiar with the tests and knew exactly what was to be done. All the tests were conducted in seven days. To ensure uniform testing conditions the subjects were tested only during the morning and evening sessions.
Administration of Tests

Playing Ability

Five-Point Rating Scale.

The purpose of this test was to judge the playing ability of volleyball players.

Equipment: Volleyball and Net.

Description: The volleyball playing ability was judged in the light of the five point rating scale by a panel of three judges who had sufficient experience in the game of volleyball. (Five point Rating Scale is given in the appendix). For this, the total twelve subjects were divided into two equal teams. They were put in a real game situation and the experts on the basis of five point rating scale, assessed each individual according to their performance of the techniques and tactics during play.1,2


Scoring: The score was the average of the three experts ratings.

**Speed**

50 Yard Dash

The purpose of the test was to measure the speed of the subjects in running.

**Equipment:** Clapper and Stop watches.

**Description:** On the track, a 50 yard distance was marked with starting and finishing lines. After a short warm up, the subjects took their position behind the starting line. On the sound of the Clapper, the subjects started their race and ran as fast as possible up to the finishing line.³

Scoring: The time was recorded to the nearest 1/10th of a second.

Arm Strength

Roger's Arm Strength Test

The purpose of this test was to measure strength of both arms of the subjects.

**Equipment:** Metal double bar, metal single bar.

**Description:** Arm strength was computed by the help of Roger's Arm Strength Formula as-

\[ \text{Pull-ups} + \frac{\text{Push-ups} + \text{H} - 60}{10} \]

Where \( W \) = Weight in pounds

\( H \) = Height in inches (disregard \( H-60 \) if height is less than 60 inches).

The pull-up test was administered on the metal horizontal bar of three centimetre diameter fixed at a height so that subject's feet might not touch the floor while he was hanging with arms straightly. From this hanging position he pulled himself up until the chin

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above the bar and lowered himself until his arms were fully extended. The subject was instructed to avoid kicking and jerking movements. Maximum number of correctly executed pull-ups was considered as subject's score.

The push-up test was administered on the double bars. The height of bars was adjusted at approximately shoulder height. The subject stood at the end of parallel bars, grasping one bar in each hand and jumped to the front support with arms straight. From this position he lowered his body down until the angle of the upper arm and forearm was less than a right angle and then pushed up to the straight arm position. This was counted as one push-up. The subject was instructed not to jerk or kick or stop and rest while executing the push-ups. Maximum number of correctly executed push-ups was recorded as subject's score.

Scoring: The total points computed with the help of Roger's Arm Strength Formula were regarded the final score. A trial in each pull-ups and push-ups was given. Pull-ups and push-ups partly executed were not counted.

**Explosive Power.**

**Sargent Vertical Jump**

The purpose of this test was
measure explosive power of legs.

**Equipment**: Measuring tape, Chalk.

**Description**: The subject stood with his side towards wall, reached as high as possible with heels on the floor and made a mark on the wall with a piece of chalk or chalked finger. The subject then swung arms downward and backward, taking a crouch position with the knees bent about to a right angle. The subject paused in this position in order to eliminate the possibility of a double jump. Then, he jumped as high as possible, swinging the arms forward and upward. As the highest point of the jump was reached, another mark was made above the initial one.\(^5\)

**Scoring**: Three successive trial were given and the best of the three between reach and jump marks was recorded to the nearest centimetre for final score.

Modified Bass Test of Dynamic Balance

The purpose of this test was to measure the dynamic balance of the subjects.

**Equipment:** Stop Watch

**Description:** To take the test, the subject stood with his right foot on the starting mark. He then jumped to the first mark and landed on the left foot, balancing on the ball of the foot as long as possible up to a maximum of five seconds. Then he jumped to the next mark, landing on the right foot and balanced again for five seconds. He continued this procedure balancing on each mark as long as possible up to five seconds. Scoring for modified Bass Test of Dynamic Balance is illustrated in Fig. 1.

**Scoring:** The subject scored five points each time he landed successfully on the mark, plus one point for each second he maintained balance on the

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mark up to five seconds. The total points made by the subject were regarded as the final score. Five points are deducted for each occurrence of any of the following landing errors:

1. Failure to stop upon landing.
2. Touching the heel or any part of the body other than the ball of the supporting foot to the floor.
3. Failure to cover the mark completely with the ball of the foot.

Agility

Semo Agility Test

The purpose of this test was to measure the total agility of the subject while running.

Equipment: Four wooden cones 9x9 inch base with 12 inch height, stop watch, measuring tape.

Description: Four lines AB, BC, CD and DA on smooth area in the form of a parallel rectangle of 12 by 19 feet with adequate running space around it, was marked. Four wooden cones 9 by 9 inch base with 12 inches
height were put in every corner inside of the court. The subject stood on starting point A and on signal started side step from A to B and passed outside the corner cone and back pedal from B to D and passed to the inside of the corner cone. Then he sprinted forward from D to A outside the corner cone. He made back pedal from A to C and passed to the inside of the corner cone. Then he made sprint forward from C to B and pass outside of the corner cone. In the last, he took side step from B to the finishing line at A.\textsuperscript{7} Marking area for semo Agility Test is illustrated in Fig. 2.

Scoring: The score was the time taken in the best of two trials recorded to the nearest 1/10th of a second.

\textit{Wrist Flexibility}

The purpose of this test was to measure the wrist flexibility of the subjects.

FIG. 2. Marking for Semo_Agility Test.
**Equipment:** Double armed goniometer, bench, table.

**Description:** The subject was asked to sit on a bench putting his fore arm forward on the table with hand in the 'shake hand' position, with fingers and thumb close together. The elbow was kept flexed. The fixed arm of the goniometer was placed on the radial bone and moving arm in line with the thumb so that axis of the goniometer fell on the wrist joint.

The subject was asked for complete flexion his wrist and then extension his wrist to the maximum. Moving arm of the goniometer moved along with the thumb on the protector.\(^8\)

**Scoring:** The angle through which the wrist moved from flexion to extension was measured of the both hands of subject separately and the average score was recorded in degree.

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Ankle Flexibility

The purpose of this test was to measure the ankle flexibility of the subjects.

Equipment: Double armed goniometer, bench.

Description: The subject was asked to sit on a bench putting his leg straight and easy on the bench. The fixed arm of the goniometer was placed on the shin bone (tibia) and moving arm in line with the greater toe of the foot so that the axis of the goniometer fell on the ankle joint.

The subject was asked to dorsi flexion and then planter flexion the foot to the maximum. Moving arm of the goniometer moved along with the foot on the protector.9

Scoring: The angle through which the foot moved from dorsi flexion to planter flexion was measured of the both feet of the subject separately and the average score was recorded in degrees.

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9Ibid.
Trunk Hyper Extension

Bridge-Up Test

The purpose of this test was to measure hyper extension of the spine.

**Equipment:** Flexomeasure case with yardstick.

**Description:** The subject performed back-lying position on the floor and tilted his head back as he pushed upward, arching his back while walking the hands and feet as close together as possible. The zero end of the yard stick was placed on the floor and the flexomeasure case was slided vertically upward until the rule guide touched the highest point of the subject arched spine. The reading was taken in case window at the lower line.\(^10\) (Diagram for Trunk Hyper Extension is shown in Fig.3).

**Scoring:** The best score of three trials was recorded to the nearest half of an inch and then substracted from the standing height (floor to navel) of the subject.

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FIG. 3 Diagram for Trunk Hyper Extension Test.
Shoulder Flexibility

Shoulder Rotation Test.

The purpose of this test was to measure the flexibility of the subjects' shoulder.

**Equipment:** Measuring tape and Rope.

**Description:** The subject grasped one end of the rope with his left hand and grasped the rope with his right hand in a like manner a few inches away. Then he extended both arms to full length in front of his chest and rotated the rope over his head. The subject was asked to keep loose the grip of his right hand so that arm could spread. Then he lowered his arms with elbows locked until the rope was resting across the back, keeping his arms locked, he rotated again to starting position.¹¹

**Scoring:** Minimum distance reached (between hands) was recorded to the nearest half an inch. The shoulder width of the subject was subtracted from the best of three trials for the final score.

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**Age**

The purpose of this test was to record the chronological age of the players.

**Equipment:** School Records.

**Description:** The age of the subject was taken from the entry form of their concerning district which was presented to the school state tournament authority.

**Scoring:** Age of the subjects was recorded in years in round figures.

**Height**

The purpose of this test was to measure the standing height of players.

**Equipment:** Tape, card board.

**Description:** A upright wall was used to measure the standing height of the subjects. On the wall marking were done in inches. After removing the shoes, the subject stood erect with his heels, buttocks and upper back in contact with the scale, the arms were
hanging naturally at the side. A stiff hard board was held horizontally (Level) on his head, slightly pressing the head and touching the scale marked on the wall at a right angle. The subject was asked to step out by lowering the head and reading indicated by the hard board lower end was read on the scale.\textsuperscript{12}

Scoring: Height was recorded to the nearest half of an inch.

\textbf{Weight}

The purpose of this test was to measure the weight of the subjects.

\textbf{Equipment}: Lever type laboratory anthropometric machine.

Description: The weight of the subject was taken by a lever type anthropometric machine.

\textsuperscript{12}Clarke, Application of Measurement to Health and Physical Education, p. 75.
The subject wearing short and T-shirt only stood on the weighing machine.¹³

Scoring: The weight of the subject was recorded to the nearest half of a pound.

Physiological Variables

Pulse Rate

Resting Heart Beat Per minute

The purpose of this test to measure the resting heart/pulse of the subjects in a minute.

Equipment: Stop Watch.

Description: Pulse rate of each subject was recorded in the morning. Fifteen minutes before taking the pulse rate, the subjects were asked to lie down in a supine position and rest themselves on the bed. The scholar, using the stop watch recorded the heart

¹³Ibid,
beat for one minute at the radial artery under basal condition.\textsuperscript{14}

Scoring: Total number of pulse beats per minute for each subject was recorded as the score.

**Systolic and Diastolic Blood Pressures**

The purpose of this test was to measure the resting systolic and diastolic blood pressures.

**Equipment:** A sphygmomanometer and a stethoscope.

**Description:** A dial type sphygmomanometer and a stethoscope were used for measuring the systolic and diastolic blood pressure. Before the measurements were taken each subject was given 30 minute to

\textsuperscript{14}Ross and Wilson, *Foundation of Anatomy and Physiology*, p. 66.
relax in a chair. It was ensured that each subject was placed in a comfortable position and adequate time was allowed for the circulatory systems to stabilize the normal functioning. While taking blood pressure the subject's left arm was completely bared to make certain that the clothing did not constrict the blood vessels. The blood pressure measurement was taken with the subject in a sitting position, his forearm supported on a table. The cuff was wrapped around the arm, evenly, with the lower edge approximately one inch above the antecubital space. The stethoscope receiver was placed firmly over the artery antecubital space. It was made sure that stethoscope was free from contact with the cuff. The cuff was inflated until the artery was fully collapsed to the extent that no pulse beat could be heard.

Pressure was then slowly released as the investigator watched the gauge. When the first sound of the pulse became audible the reading in millimeters of mercury (mm. Hg.) at that instant was recorded as the systolic blood pressure. The pressure was further released gradually, as the sounds of the pulse changed in intensity and quality. The index of diastolic pressure was noted in
mm. Hg. when the heart sounds completely ceased.\textsuperscript{15}

**Pulse Pressure**

The purpose of this test was to measure the resting pulse pressure of the subject.

**Equipment:** A sphygmomanometer and a stethoscope.

**Description:** Pulse pressure was obtained after taking systolic blood pressure and diastolic blood pressure as explained in previous test.\textsuperscript{16}

**Scoring:** The difference between the resting systolic and diastolic blood pressure was obtained and recorded in mm. Hg.\textsuperscript{17}

\textsuperscript{15} Mathews, *Measurement in Physical Education*, p. 234.

\textsuperscript{16} Ibid.

\textsuperscript{17} Morehouse and Miller, *Physiology of Exercise*, p. 116.
Body Fat and Lean Body Weight

Skinfold Measurements

The purpose of this test was to measure the body fat and lean body weight of the subject.

*Equipment:* Lange skinfold caliper.

*Description:* A lange skinfold caliper was used at specified sites of the body for measuring the fat component. The skin at a specific site was held between the thumb and index finger and pulled out to form a fold so as to include two thickness and subcutaneous fat in between them. The subject was asked to make appropriate movement to ensure the skinfold enclosing the subcutaneous fat only was pinched and the muscle tissue which freely contracted and relaxed with movements was not included in the fold. The caliper was applied about one centimetre from the spot pinched with thumb and finger to a depth equal to the fold approximately. The measurement was read nearest to one tenth of a millimetre. Three readings were taken and the average of the three readings was recorded as the thickness of the skinfold at that site. All measurements were
taken on right side of the body. The anatomical sites which were utilized were given below:

1. Biceps: The skinfold was taken midway on front of upper arm over biceps. Skinfold was lifted parallel with the long axis. The method of measuring skinfold measurement (Front of the arm) is illustrated in Fig. 4.

2. Triceps: The skinfold was taken over the triceps muscle at a point halfway between the tip of the shoulder (acromial process) and the tip of elbow (Olecranon process). The point was located with forearm flexed to 90 degrees; in making the measurement, however the arm was hanging free. The fold was lifted parallel to the long axis of the arm. The method of measuring skinfold measurement i.e. Triceps is illustrated in Fig. 5.

3. Sub-Scapular: The skinfold was taken at the tip of the right scapula on a diagonal plane at about 45° from the horizontal when the subject remained in a relaxed standing position. The method of measuring skinfold measurement i.e. inferior angle of scapula is illustrated in Fig. 6.

4. Supra-iliac: The skinfold was lifted diagonally, following the natural line of the iliac crest, just above
the crest of the illum at the mid axillary line. The method of measuring skinfold measurement i.e. suprailiac is illustrated in Fig. 7.

Scoring: The readings of the four sites were recorded in millimetres and added up. The raw score was converted into standard score from the percent body fat conversion chart for boys.\textsuperscript{18}

After skinfold measurement the body fat and lean body weight were calculated as under.

Total Weight of Fat:

Total weight of fat was recorded by multiplying body weight with obtained percentage of body fat and divided by constant 100. It was recorded in Kilograms.\textsuperscript{19}

Lean Body Mass (Weight):

Lean body mass was obtained by subtracting total weight of fat from total body weight and recorded


\textsuperscript{19} Shaver, Essential of Exercise Physiology, p.190.
in kilograms.

Cardiovascular Endurance

1.5 Mile Run

The purpose of this test was to measure the cardiovascular endurance of the subjects.

Equipment: Stop watches, measuring tape, clapper.

Description: 1.5 mile distance was measured with starting and finishing lines. Five time keepers with stop watches stood on the finishing line. After short warm-up, five subjects took position on the starting line. On the sound of the clapper, the subjects started their race and ran fast as possible up to the finishing line.

Scoring: The time was recorded to nearest 1/10 of a second.

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20 Ibid.

Volleying

The purpose of this test was to measure ability and speed with which a player could volley a volleyball against a wall.

Equipment: A solid smooth wall with a one-inch wide line marked on it which was five feet long and 11 feet above and parallel to the floor and vertical lines extending upward from each and of the line that were four feet long, volleyball, stop watch and scoring sheet.

Description: The player with volleyball in hand stood facing the wall. On signal "go" the ball was tossed against the wall into the area bounded by the lines. On the rebound the ball was then volleyed into the marked area and was continued to be volleyed consecutively for one minute. On a miss or a catch the test continued by the player again tossing the ball against the wall and volleying on the rebound. Marked area for volleying is illustrated in Fig. 8.

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Scoring: Scoring was the total number of legal volleys executed within one minute. Tosses did not count in the score. Scores above 50 were not recorded.

Serving

The purpose of this test was to measure the player's skill in serving as in an actual game.

Equipment: Volleyball, Volleyball net and marked court.

Description: Server X stood opposite the marked court in the proper serving position. He used any legal serve in hitting the ball over the net into the opposite court. The server was given ten trials. When the ball hit the net and did not go over, it counted as a trial but no points were given. Marked court for serving test is illustrated in Fig. 9.

\[23\text{Ibid.}, \text{pp. 20-21.}\]
FIG. 8 Wall Marking for Volleying Test.

FIG. 9 Court Marking for Serving Test.
Scoring: The score was the total number of points made, determined by where the ball landed in the opposite court. For all ball that struck on a line, the higher score of areas concerned was awarded with 40 the maximum.

Passing

The purpose of this test was to measure the player's skill in passing a volleyball from the rear of the court toward the net.

Equipment: Volleyball, Volleyball net and standards, four foot by six-foot marked areas on floor, 30 foot rope and two standards eight feet high.

Description: Passer X player being tested - stood in centre back position of court, received a high throw (similar to two-hand basketball shot) from thrower T, and executed a pass so that it went over the rope and onto the marked area. Passer was given 20 trials performed alternately to the right and to the left. The trial counted but no points were
recorded if ball touched rope or net, or did not fall on target area.\textsuperscript{24} Marked area for passing test is illustrated in Fig. 10.

**Scoring:** One point was scored for each pass going over the rope and landing on or hitting any part of the target area (including lines) with 20th maximum.

**Set up**

The purpose of this test was to measure the player's ability to set up the volleyball toward the net.

**Equipment:** Volleyballs, volleyball net and standards, four-foot by six-foot marked areas on floor, 30 foot rope and a standard ten feet high.

\textsuperscript{24}Ibid., pp. 22-23.
Description: Set-up player X stood in mid-court position within the six foot by five foot area. He received a high throw (similar to two-hand basketball shot) from thrower T, and executed a set-up so that it went over the rope and out the target area. Two subjects were tested simultaneously, one setting up the ball to the right and the other to the left. Throws from T which did not fall into the six-foot by five foot area were repeated again. Set-up player took ten trials to the right and ten to the left. The trial counted but no point were recorded if the ball touched rope or net, or did not fall on the target area.  

Scoring: One point was scored for each set-up that went over the rope and landed on or hit any part of the target area (including lines) with a maximum. The method of marking area for set up is illustrated in Fig.11.

\[\text{Ibid.}, \text{ pp. 24-25.}\]
FIG. 10 Court Marking for Passing Test.

FIG. 11 Court Marking for Setup Test.
Statistical Analysis

The relationship between dependent variable (Volleyball playing Ability) and Independent variables (Physical, Physiological and Motor Skill) was established by computing Pearson Product Moment Correlation (Zero order) and the combined effect or contribution of physical variables to Volleyball playing ability, physiological variables to volleyball playing ability and motor skill variables to volleyball playing ability were obtained through Multiple Correlation respectively. 't' ratio was applied to find out the significant difference between successful and unsuccessful volleyball players in each of the physical, physiological and motor skill variables. Significant difference among all rounders, spikers and setters in each of the physical physiological and motor skill variables was obtained by 'F' ratio. Where the value was found to be significant Scheffe post hoc tests were used to establish which of the paired means were most significant.

The level of confidence was set at .05.