Chapter III

PROCEDURE

In this chapter the design of the study, selection of subjects, selection of variables, criterion measures, reliability of data, collection of data, procedure for administering the tests and the statistical techniques employed for analysing the data have been described.

Design of the Study

The major objectives of the study were to assess the physical, physiological variables and skill proficiency of four different levels of Indian male basketball players (College, University, district and state). Fifty basketball players from each category were selected randomly.

Selection of Subjects

The subjects for this study have been selected from the inter-college, inter-university, inter-district and national level basketball competitors of the year 1989-91.

Fifty subjects each from college, university, district and state level basketball players have been selected
randomly (by lots) for the purpose of this study. In this way 200 basketball players (50 from each level) formed the subjects of the study. The average age of the subjects was 21.5 years ranging from 18 to 25 years at the college and university levels and 25 years ranging from 20 - 30 years at district and National levels.

In order to ensure full co-operation from the subjects, the investigator had a meeting with them in the presence of their respective coaches and managers. The purpose of this meeting was made clear in advance and there was no ambiguity among the subjects regarding the efforts which they had to put in for successful completion of the investigation.

All subjects voluntarily agreed to extend full co-operation and coaches of respective teams ensured that the subjects would be made available for the collection of data, as and when required. The collection of data was done prior to and after the competition.

Selection of Variables

The research scholar reviewed the available scientific literature pertaining to the game of basketball from
books, journals, periodicals, magazines and research papers. According to the discussion with experts, feasibility, criteria, availability of instruments, equipments and the relevance of the variables to the present study, the following variables were selected.

**Physical Fitness Tests**

In basketball game, a player must jump vigorously several times for a jump shot and rebound, play the game for a long period of time, run fast frequently and change his paths abruptly in playing situations. Hence the following test items were selected as physical fitness tests for this study:

<table>
<thead>
<tr>
<th>Physical Fitness Variables</th>
<th>Tools of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Speed:</td>
<td>50 Yard Dash Run (sec.)</td>
</tr>
<tr>
<td>2. Strength:</td>
<td>Grip Dynamometer (kg.)</td>
</tr>
<tr>
<td>3. Agility:</td>
<td>Semo Agility Test (sec.)</td>
</tr>
<tr>
<td>4. Flexibility:</td>
<td>Trunk Flexion (cm.)</td>
</tr>
<tr>
<td>5. Power:</td>
<td>Sargent Jump (cm.)</td>
</tr>
<tr>
<td>6. Endurance:</td>
<td>2.4 kilo metres Run/Walk (min.)</td>
</tr>
</tbody>
</table>
Physiological Variables

After having gone through the pertinent literature and also after having a discussion with the experts and the advisor, the following test items were selected for the purpose of this study:

<table>
<thead>
<tr>
<th>Physiological Variables</th>
<th>Tools of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pulse Rate</td>
<td>Palpation of radial artery (Beats/min.)</td>
</tr>
<tr>
<td>2. Blood Pressure</td>
<td>Sphygmomanometer (mm. Hg)</td>
</tr>
<tr>
<td></td>
<td>a) Systolic</td>
</tr>
<tr>
<td></td>
<td>b) Diastolic</td>
</tr>
<tr>
<td>3. Peak Flow Rate</td>
<td>Peak Flow Meter (Lit./min.)</td>
</tr>
<tr>
<td>5. Body Composition</td>
<td>Skinfold caliper (Fat %)</td>
</tr>
</tbody>
</table>

Basketball Proficiency Skill Tests

The objective basketball skill performance of subjects has been assessed with the help of basketball proficiency skill tests consisting of eight items:

1. Front shot
2. Side shot
3. Under basket shot
4. Dribble shot
5. Dribble
6. Speed pass
7. Push pass
8. Over arm pass.

Reliability of Data

The reliability of data was ensured by establishing the instrument reliability, tester reliability, reliability of the tests and the subjects reliability.

Instrument Reliability

Stop watches, measuring tapes, scales, grip strength dynamometer and peak flow meter were used in measuring all items of the study and the reliability of instruments was ensured by their manufacturers.

Speed was recorded by stop watches which were calibrated to 1/100th of a second. They were Swiss made and supplied by M/s. Krishna Watch Company, Bombay. The grip dynamometer and peak flow meter were calibrated by M/s. Anand Agency, Pune, Sphygmomanometer was calibrated
by Technical Corporation Private Limited, Lucknow and skinfold caliper was calibrated and supplied by Anand Agency, Pune.

Thus the instruments used for assessing the subjects on all different variables were considered reliable and precise enough for the purpose of this study.

Tester's Reliability and Reliability of Tests

The tester's reliability was established together with the reliability of the tests. To determine the reliability of the tests, the performance of 10 students, selected at random on the chosen variables, was recorded twice under identical conditions. The scores thus obtained were correlated using Pearson's product moment method. The two co-efficient of co-relations are presented in Table 1.
<table>
<thead>
<tr>
<th>#</th>
<th>Test</th>
<th>Reliability Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Speed</td>
<td>0.939</td>
</tr>
<tr>
<td>2</td>
<td>Strength</td>
<td>0.932</td>
</tr>
<tr>
<td>3</td>
<td>Agility</td>
<td>0.907</td>
</tr>
<tr>
<td>4</td>
<td>Flexibility</td>
<td>0.893</td>
</tr>
<tr>
<td>5</td>
<td>Power</td>
<td>0.958</td>
</tr>
<tr>
<td>6</td>
<td>Endurance</td>
<td>0.921</td>
</tr>
<tr>
<td>7</td>
<td>Pulse Rate</td>
<td>0.955</td>
</tr>
<tr>
<td>8</td>
<td>Blood Pressure (Systolic)</td>
<td>0.934</td>
</tr>
<tr>
<td>9</td>
<td>Blood Pressure (Diastolic)</td>
<td>0.925</td>
</tr>
<tr>
<td>10</td>
<td>Peak Flow Rate</td>
<td>0.926</td>
</tr>
<tr>
<td>11</td>
<td>Body Composition</td>
<td>0.835</td>
</tr>
<tr>
<td>12</td>
<td>Front Shot</td>
<td>0.822</td>
</tr>
<tr>
<td>13</td>
<td>Side Shot</td>
<td>0.818</td>
</tr>
<tr>
<td>14</td>
<td>Under Basket Shot</td>
<td>0.852</td>
</tr>
<tr>
<td>15</td>
<td>Dribble Shoot</td>
<td>0.831</td>
</tr>
<tr>
<td>16</td>
<td>Dribble</td>
<td>0.837</td>
</tr>
<tr>
<td>17</td>
<td>Speed Pass</td>
<td>0.854</td>
</tr>
<tr>
<td>18</td>
<td>Push Pass</td>
<td>0.926</td>
</tr>
<tr>
<td>19</td>
<td>Over Arm Pass</td>
<td>0.793</td>
</tr>
</tbody>
</table>
Collection of Data

The data pertaining to the selected physical fitness tests of speed, strength, power, agility, flexibility and endurance and selected physiological variables of pulse rate, blood pressure, peak flow rate and body composition on percentage) and basketball skill proficiency test front shot, side shot, under basket shot, dribble shoot, dribble, speed pass, push pass, over arm pass were collected by administering standard tests and measurement techniques.

Procedure for Administering Tests

Physical Fitness Variables

50 Yard Dash

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

Equipment:

Clappers and stop watches.

Description:

On a 400 metre 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 in pairs and ran as fast as possible up to the finishing line.

Scoring:

The time was recorded to the nearest 1/100th of a second.

Strength

To measure the grip strength of the subject.

Equipment:

Grip dynamometer.

Procedure:

The concave edge of the dynamometer was placed between the first and second joints of the fingers, with the dial towards the palm. The subjects were allowed any type of movement while squeezing the instrument, provided they did not hit any object with their fists. The right grip was tested first and thereafter the left grip.
Scoring:

The score of grip strength was recorded to the nearest kilogram from the indicating needle of the dynamometer dial.

Agility (Semo Agility Test)¹

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

Equipment:

Four wooden - cones 9 x 9 inch base with 12 inch height, stop watch, measuring tape.

Description:

Four lines AB, BC, CD and DA on smooth basketball court in the form of a rectangle of 12 by 19 feet with adequate running space around it, (I took the basketball restricted area) was marked. Four wooden cones 9 x 9 inch base with 12 inches height were put in every corner inside the court. The subject stood on the 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 out side of the corner cone. In the end he took side step from B to the finishing line at A. Marking area for semo agility test is illustrated in the Fig. 1.

**Power (Sargent Jump)**

**Equipment:**

Marked black board, chalk powder.

**Description:**

The subjects were assembled in batches and apprised of the objectives of the test and the test was fully described. A black board was fixed on the wall and was marked in segments of measuring from the ground upward. In this jump, the individual swings his arm downward and backward taking a crouch position with knees bent approximately to a right angle. The subject pauses in this position to eliminate the possibility of a double jump and leaps upward as high as possible, swinging the arms forcefully forward and
upward. As the subject reaches the highest point of the jump he swings the arm forward and downward, motion being timed to coincide with the height of the jump. The specified movements in executing the jump are extremely important. Each subject was given three chances. The subjects were asked to stand close to the wall with heels on ground and touch the board with fully stretched hand and reading of height was recorded. He then put chalk powder on fingers as he touched and touched the blackboard, the powder left a mark on the board and this mark was recorded (Fig. 2).

The difference between the initial reading (standing) and final reading (jump) was calculated and this was considered the height of vertical jump.

Trunk flexion was measured in the standing position.

- Side step

**FIG. 1. SEMO AGILITY TEST.**
upward. As the subject reaches the highest point of the jump he swings the arm forward and downward, motion being timed to coincide with the height of the jump. The specified movements in executing the jump are extremely important. Each subject was given three chances. The subjects were asked to stand close to the wall with heels on ground and touch the board with fully stretched hand and reading of height was recorded. He then put chalk powder on fingers. As he jumped and touched the blackboard, the powder left a mark on the board and this reading was recorded (Fig.2.).

**Scoring:**

The difference between the initial reading (standing) and final reading (jump) was calculated and this was considered the score of vertical jump.²

**Flexibility (Trunk Flexion)**

Trunk flexion was measured in a standing position. A 30 cm scale, marked in one 10th of cm., was fixed on one side of the bench so that half the scale was above the bench and half below it in a vertical position.

even with the front edge of the bench, and against the side of the scale. The subject then slowly with both hands parallel to each other, reach downward as far as possible. He was not allowed to flex the knees (Fig.3)

Scoring:

Score was taken to the nearest 1/100th cm. indicated by the middle fingers on the scale.

Additional Points:

(a) The test was conducted after a light warming up
(b) the score was taken when fingers rested completely on the scale.

Endurance

This test measures the basic endurance of the subject which is dependent on the maximum aerobic capacity of the individual. The test was administered on a 400 meter

Description:

The subject was asked to stand erect with toes even with the front edge of the bench, and against the side of the scale. The subject then slowly with both hands parallel to each other reach downward as far as possible. He was not allowed to flex the knees (Fig.3).

Scoring:

Score was taken to the nearest 1/10th cm. indicated by the middle fingers on the scale.

Additional Pointer:

(a) The test was conducted after a light warming up
(b) the score was taken when fingers rested completely on the scale.

**Endurance (2.4 km)**

This test measures the basic endurance of the subject which is dependent on the maximum aerobic capacity of the individual. The test was administered on a 400 metre

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track in groups of six to start. Running on best quired to run six rounds. Keeping close to the inner edge of the track, the subjects were instructed to pace the run evenly. If any subject was tired, he was allowed to slow down or even walk for some rest to recover and resume running thereafter. Only one subject for two subjects recorded a time to complete the six rounds of the track.

Scoring:

To complete six rounds for the track, time was recorded in minutes and seconds.

**Physiological Variables**

**Pulse Rate**

The pulse rate was recorded at the wrist (radial artery) for one minute. The score was expressed in terms of number of pulse beats per minute.

The test was conducted in the morning at 0700 hrs. when the subjects were

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Lawrence E. Kendall and Augustus T. Miller, Physiology of Exercise (Saint Louis: C.V. Mosby Co., 1977), p. 82.

**FIG. 3. TRUNK FLEXION.**
track in groups of 8 to 10 persons at a time. The subjects started running on hearing the start signal and were required to run six rounds. Keeping close to the inner edge of the track, the subjects were instructed to pace the run evenly. If any subject was tired, he was allowed to slow down or even walk for some distance, to recover and resume running there after. One time keeper for two subjects recorded the time to complete the six rounds of the track.

**Scoring:**

To complete six rounds for the track, time was recorded in minutes and seconds.

**Physiological Variables**

**Pulse Rate**

The pulse rate was counted by palpating at the wrist (radial artery) for one minute. The score was expressed in terms of number of pulse beats per minute.\(^4\)

The test was conducted in the morning 0700 hrs. when the subjects were at rest.

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Scoring:

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

Blood Pressure

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

Equipment:

Doctor's sphygmomanometer and stethoscope.

Description:

A sphygmomanometer (dial type) and a stethoscope were used to measure the blood pressure (systolic and diastolic) of the subjects. Each subject was asked to sit relaxed in a chair. It was taken on all subjects early in the morning. The cuff of the sphygmomanometer was wrapped around the left upper arm for the subject just above the elbow. The cuff was then connected to the pump and the manometer. After closing the outlet valve of the pressure pump the pressure in the inflatable rubber bag was rapidly raised to 180 mm.Hg by pumping air which was sufficient to obliterate completely the brachial artery so that the flow of blood
through the artery was arrested and radial pulse dis-
appeared. The sound of pulsation was monitored by keeping
the "chest piece" of the stethoscope over the brachial
artery and listening to the sound through the ear piece of
the stethoscope as the pressure over the artery was being
manipulated. The pressure was then gradually lowered by
opening the valve. As soon as the pressure in the cuff
fell just below the systolic pressure, it allowed the pass-
age of small amount of blood through the compressed artery
into the distal segment. This produced a clear tapping
sound and the pressure shown on the dial was noted as soon
as this sound was heard. This denoted the measure of sys-
tolic blood pressure. As the cuff pressure was lowered
still further, more blood flowed through due to rebound re-
 laxation of the arterial vessel and this was indicated by
a louder sound. The pressure at which this sound could be
muffled by manipulating the pressure pump was read on the
manometer scale. This denoted the measure of diastolic
blood pressure. These measurements were repeated twice for
each subject and better was recorded as his scores in
these variables.

Scoring:
The better reading was recorded in mm.Hg as the
subject's score in systolic and diastolic blood pressure.
Peak Flow Rate

Equipment:

Peak flow meter.

Description:

The peak flow rate of the subject was measured by using a mini wright flow meter. The measurement was taken of the subject in a standing position. The tester ensured that when the subject held the instrument in his hands ready for blowing the slot placed away from the hand and the flattened part of the plastic mouth piece was horizontal. The tester also ensured that when the measurement was taken the fingers of the subject did not interfere with the free movement of the marker over the scale. The instrument measured the peak expiratory flow in litres per minute.

The subject was asked to take a maximum deep breath and then air was blown into mini flow meter through the mouth piece.

The subjects were instructed to blow as hard as and as fast as possible into the mouth piece. The action was best described as hard "huff". Best of the three trials
were recorded in lit./min. The mouth piece was sterilized with rectified spirit after every three trials.

**Scoring:**

The best trial recorded in lit./min. was the score of the subject.

**Body Composition**

Body composition was estimated through skin fold measurements of the subjects.

The measurements of skin folds are based on the knowledge that approximately 50 per cent of the depot fat is stored in special cells within the subcutaneous areas. Skin fold is a fold consisting of two layers of skin and subcutaneous structures, which can be picked up with the thumb and index finger. The thickness of the fold will depend upon the amount of stored fat and can be measured with a special instrument called a skin fold caliper; which is calibrated to provide a constant tension throughout the range of motion. The calipers are actually measuring the thickness of a double layer of skin and the interposed layer of fat. When measuring skin fold thickness it is essential to determine precisely the location of the site. Likewise it is important to grasp the skin fold firmly and
maintain a constant distance between the caliper and the 
thumb and finger holding the site. The number of sites at 
which skin fold can be measured is practically limitless, 
but only a few have been found to be of value in estimating 
body composition of the study. In the present study, four 
sites were selected for skin fold measurements: subscapular, 
triceps, biceps and supra-illiac.

Subscapular:

The skin fold was taken at the tip of the scapula 
(interior angle) with the subject in a relaxed standing 
position. The fold was lifted in the diagonal plane at 
about 45 degrees from the vertical and horizontal planes.

Triceps:

The skin fold was taken over the triceps muscle a 
point half way between the shoulder (acromial process) 
and the tip of elbow (Olcecranon process). The point was 
located with the forearm flexed to go degrees. In taking 
the measurement however, the arm was hanging free. The fold 
was lifted parallel to the long axis of the arm.
Biceps:

The skin fold was taken midway on the front of the upper arm over biceps. Skin fold was lifted parallel with the long axis.

Supra-iliac:

The skin fold was lifted diagonally following the natural line of the iliac crest, just above the crest of the ilium at the mid axillary line.

Equipment:

Lange's skin fold calipers.

Description:

The investigator picked up a fold of subcutaneous tissue firmly between the thumb and the index finger of the left hand and pulled away the under lying from the marks marked on the body of the subject. The jaws of the caliper were then applied a little below the fingers of the left hand and allowed to exert their full pressure before taking the reading of the thickness of the fold that the muscular tissue was not included in the fold was assured by asking the subjects to use the muscle in appropriate movement. Measurements were taken on the right side of the body.
Scoring:

The reading of the four sites were recorded in millimetres and added up.  

Basketball Proficiency Skill Test

Front Shot

Purpose:

To measure the player's skill in making shots at the basket from a designated spot at the left front of the basket.

Equipment:

Standard inflated basketballs, standard goals.

Description:

The player shoots from a spot just outside of the free throw circle where the free throw line intersects the circle. This point is on the left facing the basket. A mark should be drawn on the floor, as in the diagram. Any

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5 Clarke, Application of Measurement to Health, Physical Education and Recreation, pp.82-83.
Any method of shooting with one or both hands may be used. The player should try to make the shot without hitting the backboard. Fifteen trials are taken in series of five at a time. The player must leave the spot at the end of each five shots and move around or let another player take his first series of shots before continuing. A practice shot is allowed. (Fig. 4).

Rules:

1. Players must shoot from the shooting spot only.
2. Fifteen shots are taken in all.

Scoring:

Two points are counted for each basket made, regardless of how the ball goes in. One point is counted for shots which hit the rim but do not go in the basket, provided the ball hits the rim before hitting the backboard. Balls which hit the backboard first and do not go in the basket do not count any points. Record the points as made on each shot, and then total the points for the final score. The maximum score that may be made on the 15 shots is 30 points.
FIG. 4. FRONT SHOT.
Side Shot

Purpose:

To measure the player's skill in shooting baskets from the side, near the corners of the court.

Equipment:

Standard inflated basketballs, standard goals.

Description:

The player shoots from a spot near the corner of the court, at the side of the basket, and behind a line 20 feet from the center of the basket. Either one or two-handed shots may be used. The player shoots 10 times from one side of the basket and then moves to the other side for 10 shots. A practice shot is allowed. (Fig. 5).

Rules:

1. Shots must not be taken closer than 20 feet from the basket.

2. Ten shots from each side are taken.
For balls which hit the rim of the basket but do not go in, even though they may have hit the backboard also. Score each shot as made and then total the points for the final score. The maximum score possible is 40 points on the 20 shots.

Purpose:

To measure skill.

Equipment:

Standard basketball court, standard inflated balls, standard goals, stop watch or watch with a second hand.

Description:

The player stands under the basket holding a basketball. At the starting signal, the player starts making one-hand or two-hand lay-up shots, recovering the ball and shooting...
Scoring:

Count two points for each goal made and one point for balls which hit the rim of the basket but do not go in, even though they may have hit the backboard also. Score each shot as made and then total the points for the final score. The maximum score possible is 40 points on the 20 shots.

Under Basket Shot

Purpose:

To measure skill with which a player can shoot, recover, and shoot from a position directly under the basket.

Equipment:

Standard basketball court, standard inflated balls, standard goals, stop watch or watch with sweep-second hand.

Description:

The player stands under the basket holding a basketball. On the signal "go" the player starts making one-hand or two-hand lay-up shots, recovering the ball, and shooting
again as rapidly as possible, trying to make as many goals as possible within 30 seconds. The player is timed from the signal "go" and is stopped on the signal "stop". A practice trial is allowed. (Fig.6.).

Rules:

1. The ball may be shot in any manner.
2. After shots are made or missed the player recovers the ball and continues shooting.
3. If the player loses the ball entirely, he may start over again, but only once.
4. Two complete trials are allowed.

Scoring:

One point is scored for each basket made. The score on the test is the number of baskets made in 30 seconds. Two trials are recorded on the squad card, and the best trial is the player's score.

**Dribble Shoot**

*Purpose:*

To measure the speed with which a player can dribble and make a lay up shot.
The score is the number of seconds required to complete the test. (fig. 7)

Drill: In the first attempt the subject goes over three obstacles straight and then dribbles between to measure the time taken. If he fails to make the ball, he continues to make up the ball and dribbles between three obstacles. Any attempt he makes are arranged as in the diagram.

The subject places the ball on the shots and then shoots, and when the ball and dribbles back to stand the line. The signal "go" the subject starts back to stand and then shoot and comes back to stand with the line. The three obstacles are arranged on the side of the line which holds the ball. The signal "go" the subject starts back to stand and then shoot and comes back to stand with the line.

Standard, unlimited back balls, stop watch timer.

FIG. 6. UNDER BASKET SHOT.
Equipment:

Standard inflated basketballs, stop watch, three chairs arranged as in the diagram.

Description:

Three obstacles are placed at a distance of 15' in between to measure the time taken in zig-zag dribble and then shoot and come back to starting line.

The subject places the ball on the start, finish line and then stands back of it, with hands on knees. With the signal "go" the subject picks up the ball and dribbles around the obstacles and then takes a lay up shot.

Dribbles straight up to 20' and then dribbles between the three obstacles (chairs) placed at a distance of 20' each in the last shoots into basket. If he fails to make basket on his first attempt he must continue shooting until he is successful. Any type of shot may be used. However, the one-handed lay up seems most appropriate.

Scoring:

The score is the number of seconds required to complete the test. (Fig.7).
FIG. 7. KNOX Dribble-Shoot Basketball Test.
Dribble

Purpose:

To measure the speed with which a player can dribble a ball around obstacles.

Equipment:

Standard inflated basketballs, stop watch, six chairs arranged as in the diagram.

Description:

The player stands behind the starting line with a ball in hand and on the signal "go" starts with a dribble on the right of the first chair and continues to dribble in and out alternately around the remaining five chairs and returns to cross the starting line. The chairs are arranged single file in a straight line so that the front of the first chair is 5 feet from the starting line and the following chairs are 8 feet apart, measured from the front of each chair. All chairs have backs toward the starting line. The over-all distance from the starting line to the far edge of the sixth chair is 45 feet. A practice trial is allowed. (Fig.8).
Rules:

1. The ball may be dribbled with either hand.
2. Legal dribbles must be used.
3. The ball must be dribbled at least once as each chair is passed, but need not be dribbled opposite a chair.
4. Each player is allowed two trials.

Scoring:

The score is the time in seconds and tenths that it takes to dribble around between the chairs and back. Time is started on the signal "go" and stopped the instant the player crosses the starting line at the end of the trip. Two trials are timed and recorded. The best time of the two trials is the player's score on the test.

Speed Pass

Purpose:

To measure speed with which a player can continue to pass and catch a ball.

Equipment:

A level floor or ground and a wall with smooth surface, stop watch, standard inflated basketballs.
Description:

The player stands behind a line on the floor parallel to and 9 feet from a solid smooth wall. On the signal "go" the player passes the ball against the wall, about head high, catches the rebound, and continues passing against the wall as rapidly as possible until ten passes have hit the wall. Any method of passing may be used, but the push pass is faster. A practice trial is allowed. (Fig.9).

Rules:

1. All passes must be made from behind the line.
2. The ball cannot be batted, but must be caught and passed.
3. The ball can hit the wall at any height.
4. If the ball is dropped, the player must recover it and continue from behind the line until he has hit the wall ten times.
5. Two complete trials are allowed.

Scoring:

The test is timed from the instant the first pass hits the wall until the tenth pass hits the wall (the
FIG. 9. SPEED PASS.

Recorder

Player

WALL

Purpose

Push Pass for Accuracy

Equipment

Standard inflated basketballs, a target painted or marked on a wall, or on a mat, or on a piece of canvas hung on a smooth wall. Chalk, measuring tape. The floor should be properly measured and marked, as in the diagram.

Description

The player with a basketball stands behind a line 25 feet from and parallel to the face of the target marked or hung on a wall. The player uses a two-hand push pass (chest pass) and endeavor to hit the center of the target. The target is the same size used for the original pass test. A practice pass is allowed. (Fig. 10)
player starts on the signal "go" but the watch is not started until the ball hits the wall). Record the time in seconds and tenths. Two complete trials should be recorded. The score is the best time required to complete ten passes against the wall.

**Push Pass for Accuracy**

**Purpose:**

To measure accuracy with which a player can make a two-hand push pass at a target.

**Equipment:**

Standard inflated basketballs, a target painted or marked on a wall or on a mat, or on a piece of canvas hung on a smooth wall, chalk, measuring tape. The floor should be properly measured and marked, as in the diagram.

**Description:**

The player with a basketball stands behind a line 25 feet from and parallel to the face of the target marked or hung on a wall. The player uses a two-hand push pass (chest pass) and endeavour to hit the center of the target. The target is the same as used for the overarm pass test. A practice pass is allowed. (Fig.10).
FIG. 10. PUSH PASS FOR ACCURACY.
Rules:

1. Passes must be made with both feet behind the passing line.
2. The two-hand push, or chest, pass must be used.
3. Ten passes are taken.

Scoring:

Three points are scored for balls hitting in the center circle, two points for balls hitting in the next circle, and one point for balls hitting in the outer circle. Hits on a line count as in the next higher area. Points as made on each pass should be recorded, and the total is the score. The maximum possible score is 30 points made on ten passes at the target.

Over Arm Pass for Accuracy

Purpose:

To measure the accuracy with which a player can make a single overarm pass at a target.
Equipment:

Standard inflated basketballs: a target painted or marked on a wall or on a mat, or on a piece of canvas hung on a smooth wall, chalk, measuring tape. The floor should be properly measured and marked, as in the diagram.

Description:

The player, with a basketball, stands behind a line parallel to an 35 feet from the target marked or hung on a wall. The player throws the ball single overarm at the target. The target is circular with three concentric circles separated by one-inch wide white or black lines. The inner circle is 18 inches in diameter, the next circle is 38 inches in diameter, and the out circle is 58 inches in diameter. The bottom of the outer circle is 3 feet above the floor. A practice pass is allowed. (Fig.11).

Rules:

1. The ball can be held in both hands prior to the throw.

2. The throw must be made from behind the line.

3. The player may take a step in throwing, but both feet must be behind the throwing line.

4. Ten passes are taken.
FIG. 11. OVER ARM PASS.
Scoring:

Three points are scored for balls hitting in the center circle, two points for balls hitting in the next circle, and one point for balls hitting in the outer circle. Balls hitting on a line count as hitting in the area of the higher score. Points as made on each throw should be recorded, and total is the score. The maximum possible score is 30 points made on ten passes at the target.

Statistical Procedure

To determine the differences in selected physical and physiological variables and skill proficiency of basketball players at different level of participation (viz. state, district, university and college), an analysis of variance ('F' test) was used.