Chapter III

PROCEDURE

In this chapter the procedure adopted for the Selection of Subjects, Criterion Measures, Experimental Design, Reliability of Data, Collection of Data, Training Programme and Statistical Techniques for analysing the data have been described.

**Selection of Subjects**

Ninty six male students in the age group 14 to 16 years, studying in standard nine of the Kendriya Vidyalaya No. 1, Gwalior, were selected as the subjects for the study. The total number of male students in all the three sections of the class was 103. Students who did not play basketball game were eliminated from the list. The investigator asked the subjects to undergo medical test at the L.N.C.P.E. Health Centre to ensure that the subjects selected were medically fit to undergo the vigorous training programme prescribed as the experimental process for the study.

The subjects selected for the study belonged to different states and union territories, and they may be considered as representation sample of children from nationwide cross section of middle class and upper middle class educated families as the policy of Kendriya Vidyalaya was to give priority for admission to the children of defence personnals or central government emplo-
yees. All the subjects had fairly well developed physique and all of them had good acquaintance and appreciation for sports and games as they had been taking part in the required physical education programme as part of the school curriculum.

Before the pre-test, a meeting of all the subjects was arranged in which the Principal and the Physical Education Teacher of the School were also present. The requirements of the project testing procedures as well as training schedule 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 would have to put in. All the subjects agreed to cooperate in the experimental procedures which was explained to them. The Principal and the Physical Education Teacher also exhorted them to put in their best efforts in the interest of the scientific investigation and in order to enhance their own performance and achievement standards. Though no special motivational techniques were used to enhance their performance, the subjects were very enthusiastic and cooperative throughout the project.

**Criterion Measure**

The criterion measures adopted in this study for testing the hypothesis were as follows:

1. Front Shot
2. Side Shot
3. Foul Shot
4. Under the Basket Shot
5. Speed Pass
6. Jump and Reach
7. Over Arm Pass for Accuracy
8. Push Pass for Accuracy

**Experimental Design**

Random group design was used for this experimental study because it was considered the most appropriate. The subjects, ninety-six in number were equally and randomly divided into three experimental groups and one control group and each group consisted of twenty four subjects. The experimental treatment, to each of the three groups, was assigned at random by drawing lots. The experimental group was given specific circuit training (Group E ct). The second group performed specific weight training (Group E wt.) and third group performed specific circuit training and specific weight training combined (Group E ct wt.) (combination). The fourth group served as the control group (Group C). The training for the three experimental groups was given ten weeks. Per week 3 days training, two days basketball game and two days rest were given to the all subjects.
Tester Competency

To ensure that the investigator was well versed in the techniques of conducting the tests, the investigator and his assistants had a number of practice sessions in the testing procedures, under the guidance of an expert Dr. (Mrs.) T. Mall, Reader in Physical Education (Test and Measurement), Lakshmibai National College of Physical Education, Gwalior. All the measurements were taken by the investigator with the assistance of Dr. (Mrs.) T. Mall. To ensure tester-reliability the readings taken on five students in AAHPER Basketball skill test items by the investigator and assistants were correlated with those taken by Dr. (Mrs.) T. Mall under similar conditions. The co-efficient of Correlation of the measurements taken by the investigator and the expert have been shown in Table 1. Since very high correlation from 0.97 to 1.00 were obtained the investigator's and assistants' competency to administer the tests was established.
TABLE 1
TESTER COMPETENCY FOR TESTS IN AAHPER BASKETBALL
SKILL TEST ITEMS

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Coefficient of Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Shot</td>
<td>1</td>
</tr>
<tr>
<td>Side Shot</td>
<td>1</td>
</tr>
<tr>
<td>Foul Shot</td>
<td>1</td>
</tr>
<tr>
<td>Under the Basket Shot</td>
<td>1</td>
</tr>
<tr>
<td>Speed Pass</td>
<td>.98</td>
</tr>
<tr>
<td>Jump and Reach</td>
<td>.97</td>
</tr>
<tr>
<td>Over Arm Pass for Accuracy</td>
<td>1</td>
</tr>
<tr>
<td>Push Pass for Accuracy</td>
<td>1</td>
</tr>
<tr>
<td>Dribble</td>
<td>.98</td>
</tr>
</tbody>
</table>

Reliability of Data

Reliability of data was established by the test re-test process where by consistency of results were obtained by Product Moment Correlation.

The data collected from a random selection of 7 subjects in various test items were computed and obtained correlations have been shown in Table 2.


## TABLE 2

RELIABILITY OF DATA

<table>
<thead>
<tr>
<th>Test Items</th>
<th>Coefficient of Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Shot</td>
<td>.97</td>
</tr>
<tr>
<td>Side Shot</td>
<td>.96</td>
</tr>
<tr>
<td>Foul Shot</td>
<td>.98</td>
</tr>
<tr>
<td>Under the Basket Shot</td>
<td>.96</td>
</tr>
<tr>
<td>Speed Pass</td>
<td>.95</td>
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<tr>
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<td>.98</td>
</tr>
<tr>
<td>Dribble</td>
<td>.96</td>
</tr>
</tbody>
</table>

Since very high correlation from .95 to .98 were obtained, the data collected was considered to be reliable for the study.

**Instrument Reliability**

Stop watches, scale, measuring tape, standard basketball used in the study were obtained from reputed suppliers of standard equipment. Stop watches, measuring tape and scale used were purchased by the Research Laboratory of the Lakshmibai National College of Physical Education, Gwalior and were new and, therefore, their calibrations were accepted as accurate enough for
the purpose of the study. Basketballs manufactured by addidas company approved by Basketball Federation of India were used and were considered reliable for the purpose of this study.

Administration of Test and Collection of Data

The necessary data was collected by administering the test for the chosen variables, before and after the experimental period of ten weeks. All the tests were administered in the four cage basketball courts of Lakshmibai National College of Physical Education, Gwalior.

Before the administration of pre-tests the subjects were given a chance to practice the prescribed tests to familiarise them with the tests and know exactly what was to be done. All the test items were explained to them prior to the administration of tests. Two days were utilized for conducting the pre-test, before the experimental period, and another two days for the post-test, at the end of the experimental period. To ensure uniform testing conditions the subjects were tested only during the specific time between 12.00 and 14.00 hrs. The AAHPER Basketball Skill Test for boys covers the fundamental skills of basketball. It has got nine test items. Each test is designed to measure a single basic skill - several types of shooting, ball handling, dribbling, jumping, and passing. The nine test items are front shot,
side shot, foul shot, under basket shot, speed pass, jump and reach, over arm pass for accuracy, push pass for accuracy and dribble. The detailed description of the administration of the test items is given below:

**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 basketball, standard goals.

**Description:**

The player shoots from a spot just outside 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 Figure 1. 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 taking the next series of 5 shots. A practice shot is allowed before starting the test.
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 back-board. Balls which hit the back-board 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.

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 centre 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 the next ten shots. A practice shot is allowed. (Figure 2)

Rules:

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

2. Ten shots from each side are taken.

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. Score each shot, and then total the points for the final score. The maximum score possible is 40 points on the 20 shots.

Foul Shot

Purpose:

To measure the skill in shooting free throws (shooting fouls) from the free throw line.

Equipment:

Standard inflated balls, standard goals.
Description:

The player shoots from behind the centre of the free throw line. The player may shoot by any method preferred. Twenty shots are taken in series of five at a time. The player must leave the foul line at the end of each five shots and move around or let another player take his shots before taking the next series of shots. A practice shot is allowed.  (Figure 3)

Rules:

1. Twenty shots are taken in all.
2. The player may place his feet in any position, behind the line.

Scoring:

Score one point for each goal made, regardless of how the ball goes in. Count each shot as 1 or 0, recording the points on the score card. Record the total score made. The maximum possible score is 20 points.

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, and 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. 4).*

**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.
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. *(Figure 5).*

**Rules:**

1. All passes must be made from behind the line.
2. The ball can not 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 it 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 player starts on the signal "go", but the watch is not started until the ball hits the wall). Record the time to one tenth of a second. Two complete trials should be recorded. The score is the best time required to complete ten passes against the wall.

**Jump and Reach**

**Purpose:**

To measure the height of a player's highest reach after his highest jump.

**Equipment:**

A level floor and a smooth wall surface upon which chalk marks can be made, pieces of chalk three-fourth inches long, yard stick.

**Description:**

The player, holding a small piece of chalk in his fingers, stand with his side to the wall with knees straight and feet flat on the floor. He reaches up as far as possible and make a mark on the wall. The player then crouches, swings his arms, jumps as high as possible, and makes a second mark on the wall as
high as possible. The distance between the first and second marks on the wall is measured with a yard stick to the nearest inch. A practice jump is allowed. (Figure 6).

**Rules:**

1. The player must stand flat-footed with knees straight in making the first mark.

2. The jump must be made from both feet without a hop.

3. Two trials are given.

**Scoring:**

The score is the distance between the mark at the top of the standing reach and the mark at the top of the jumping reach. Yard stick must be kept perpendicular to the floor when measuring the distance between marks. Record the distance to the nearest inch. The height of the jump and reach on two separate trials is recorded. The score is the best of the two trials.

**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 marked on a wall
chalk and measuring tape. The floor should be properly measured and marked, as in Figure 7.

**Description:**

The player, with a basketball, stands behind a line parallel to and 35 feet from the target marked on the wall. The player throws the ball with one hand using the over arm pass 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 middle circle is 38 inches in diameter and the outer circle is 58 inches in diameter. The bottom of the outer circle is 3 feet above the floor. A practice pass is allowed.

**Rules:**

1. The ball can be held in both hands prior to the throw but thown by single arm.

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 throw line.

4. Ten passes are taken.

**Scoring:**

Three points are scored for balls hitting in the centre circle, two points for balls hitting in the middle circle, and one
FIGURE 7
OVERARM PASS FOR ACCURACY
point for balls hitting in the outer circle. Balls hitting on a line 
count as hitting in the area of higher score. Points as made on 
each throw should be recorded, and the total is the score. The 
maximum possible score is 30 points.

**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 basketball, a target marked on a wall, 
chalk and measuring tape. The floor should be properly measured 
and marked, as in **Figure 8**.

**Description :**

The player with a basketball stands behind a line 25 feet 
from and parallel to the face of the target, similar to the one 
used in the over arm pass for accuracy. The player uses a two-
hand push pass (chest pass) and endeavour to hit the centre of 
the target. A practice pass is allowed.

**Rules :**

1. Passes must be made with both feet behind the passing 
   line.

2. The two-hand push, or chest, pass must be used.
FIGURE 8: PUSH PASS FOR ACCURACY
3. Ten passes are taken.

**Scoring**:

Three points are scored for balls hitting in the centre circle, two points for balls hitting in the outer circle and for hits on a line the higher score is recorded. Points as made on each pass should be recorded, and the total is the score. The maximum possible score is 30 points.

**Dribble**

**Purpose**:

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

**Equipment**:

Standard inflated basketball, stop watch, six chairs arranged as in **Figure 9**.

**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 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.
FIGURE-9 Dribble
All chairs have backs towards the starting line. The overall distance from the starting line to the far edge of the sixth chair is 45 feet. A practice trial is allowed.

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 taken in seconds to dribble between the chairs and back. Stopwatch is started on the signal "go" and stopped the instant the player crosses the starting line at the end of the trial. Two trials are timed and recorded. The best time of the two trials is the player's score on the test.

Selection of Circuit Training Exercises

The research scholar, after going through the available literature pertaining to the training of basketball players using circuit training and also after having a discussion with experienced physical educationists and basketball coaches, selected the following exercises:
1. Passing
2. Hurdle Jumping
3. Shooting drill
4. Rebounding drill
5. Defensive drill
7. Reverse dribble
8. Shuttle Run

**Description of Circuit Training Exercise Programme:**

**Passing:**

The subject will stand 10 feet away from the wall and start passing the ball against the wall using the chest pass continuously for one minute. The number of correct passes made in one minute will be the maximum dose. *(Figure 10).*

**Hurdle Jumping:**

The subject will stand close to a hurdle. From here the subject will start jumping latterally, side to side over the hurdle continuously for one minute. The height of the hurdle will be adjusted according to the ability of the subject. The number of jumps in one minute will be the maximum dose. *(Figure 11).*
FIG. 11 HURDLE JUMPING
Shooting Drill:

Two balls will be placed at the ends of the free throw line. The subject will stand behind one of the balls. On the signal he will collect the ball, dribble, shoot, collect the rebound and place the ball at the original spot. Now he will run, collect the other ball, and repeat the dribble, shoot and place the ball at its original spot. This continuous for one minute. The number of baskets made in one minute will be the maximum dose. (Figure 12).

Rebounding Drill:

The subject will stand in front of the back board and start tapping the ball against the back board above the ring level. He has to jump off the ground and collect the ball and tap it on the back board before landing. This is continued for one minute. The number of taps made in one minute will be the maximum dose. (Figure 13).

Defensive Drill:

A starting line is marked at a distance of 1.20 meter from the middle of the end line of the court and two medicine balls are kept on the three point line at an angle of 45° from the mid point of the end line.

The subject stands behind the starting line and on the command, shuffles to the right side up to 3 point line, touches
the medicine ball, retreats back with the same movements, and then shuffles to the left side and this continues for one minute. The number of zones covered in one minute will be the maximum dose. (Figure 14).

Power Lay-ups:

The player stands with the ball on point A. Using one dribble the subject will come and stop closer to the basket. He gives a pumping fake and then jumps and shoots. Then he collects the rebound, goes dribbling to point B and repeats the dribble stop, fake, jump and shoot. This is continued for one minute. The number of power lay-ups made in one minute will be the maximum dose. (Figure 15).

Reverse Dribble:

The court is divided into 4 zones. The subject stands on the end line and on the signal, starts dribbling forward, he takes three reverse dribble on the first free throw line, centre line and the second free throw line and then continues dribbling up to the end line, touches it and moves back in the same path with reverse dribbles at the free throw line, centre line and the free throw line and touches the starting point. This is continued for one minute. The number of zones covered in one minute is the maximum dose. (Figure 16).
FIG. 15  POWER LAY-UPS

Subject

A

B
FIG. 16 REVERSE DRIBBLE
Shuttle Run:

On the signal the subject will run from one side line to the other and back continuously. One foot has to cross the side line each time. This is continued for one minute. The maximum dose is the number of times the side line has been crossed on either side, in one minute. (Figure 17).

Selection of Weight Training Exercises

The research scholar, after going through the available literature pertaining to the training of basketball players using weight training, and also after having a discussion with experienced physical educationists and basketball coaches selected the following exercises:

1. Jump squats.
2. Triceps curl
3. Upright rowing
4. Press behind the neck
5. Reverse wrist curl
6. Heel raise
7. Bench press
8. Good morning.
Description of Weight Training Exercise Programme:

Jump Squats:

**Starting Position**: Place the barbell across the back of the neck and shoulders, hands grasping the bar at slightly more than shoulder width, feet shoulder width apart.

**Movement**: By flexing the knees leap-upward taking as much force as possible from the drive of the legs. Be sure to land on the toes. Bend the knees to neutralise the shock of landing. (Figure 18).

**Purpose**: This develops an explosive leg action, and also develops the muscles of the hips, quadriceps and calf muscles, mainly responsible for jumping.

Triceps Curl:

**Starting Position**: Using an over-hand grip, grasp the bar with the hands spaced not more than 10 inches apart. Clean and press the bar positioning it across the back of the neck and shoulders.

**Movement**: The elbows should point directly from this position press the bar to a full over-head extension and return to the starting position. Keep the head slightly forward to avoid

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1Al Murray, *Modern Weight Training* (Nicholas Kay Ltd., 1963), p. 120.
contacting the bar. (Figure 19).

**Purpose**: To develop the muscles of triceps\(^2\), which are arm extensors and very important muscles involved in shooting.

**Upright Rowing**:

**Starting Position**: Bend down, grip the bar knuckles to the front hand approximately 8 inches apart and stand-up. The bar should now be hanging at arm's length against the top of the thighs.

**Movement**: Pull the bar-up the front of the body until it reaches the height of the chin. (Figure 20).

**Purpose**: To develop the muscles surrounding the shoulders and upper back\(^3\), and also the muscle which flexes the elbow involved in dribbling, shooting, and rebounding.

**Press Behind Neck**:

**Starting Position**: Place the barbel across the back of the neck and shoulders, the hands grasping the bar at slightly more than shoulder width. Feet shoulder width apart.


\(^3\)Murray, *Modern Weight Training*, p. 93.
FIG. 19 TRICEPS CURLS
FIG. 20  UPRIGHT ROWING
Movement: Press the barbell straight to arm length over head and repeat. (Figure 21).

Purpose: To develop the upper back muscles, muscles of the shoulder and those at the rear of upper arm\(^4\) responsible for rebounding and passing.

Reverse Wrist Curl:

Starting Position: Grasp the bar using an over-hand grip, and sit on the bench. Again place the feet flat on the floor with the forearms resting on the thighs. Allow the weight of the bar to carry the wrist to a fully flexed position.

Movement: Raise the bar in an arc by contracting the extensor muscles of the forearm, keeping the forearms resting on the thighs. Allow the bar to return in the same arc and repeat. (Figure 22).

Purpose: To develop the extensor carpi muscles of forearm\(^5\) which are essential in shooting.

Heel Raise:

Starting Position: Place the barbell across the back of the neck and shoulders, the hands grasping the bar at slightly

\(^4\) Ibid.,

\(^5\) Ibid., p. lll.
FIG. 21  Press Behind the Neck
more than shoulder width. Place the toes on a 2 to 3 inch high board.

**Movement**: Raise the heels to full height taking full force from the toes. Lower to the original position and repeat. Make sure that you do not lose balance. *(Figure 23).*

**Purpose**: To strengthen the plantar flexers\(^6\), which are very indispensable for vertical jump.

**Bench Press**:

**Starting Position**: Assume a supine position on the bench with the head, shoulders and hips contacting it and the legs straddling it and feet flat on the floor. Take the barbell off the rack in a straight arm supporting position.

**Movement**: Use an over-hand grip and grasp the barbell at slightly wider than shoulder width. Lower the bar to the chest and press it to the straight arm position and repeat inhale while pressing and exhale as the arms are locked. *(Figure 24).*

**Purpose**: To develop the muscles of anterior deltoid, pectoralis major and triceps\(^7\) which helps in passing and shooting.

\(^{6}\)ibid., p. 111

\(^{7}\)ibid., p. 98.
FIG. 23  HEEL RAISE
FIG. 24  BENCH PRESS
Good Morning:

**Starting Position**: Place the bar in a shoulder rest position, starting with the feet shoulder width apart and the hands grasping the bar at slightly more than shoulder width.

**Movement**: Bend at the hips until the upper body is parallel to the floor, then return to the erect position. *(Figure 25)*.

**Purpose**: To develop the back extensors and stretch the hamstrings.

**Administration of Training Programme**

The training schedule prepared by the investigator was imparted to three experimental groups namely specific circuit training; specific weight training and combination training groups and training was carried out at the four cage basketball court and gymnasium of Lakshmibai National College of Physical Education, Gwalior. The total duration of the training period was ten weeks, three days a week i.e. Monday, Wednesday and Friday. The training was personally supervised by the investigator. The details of all the three training programme are mentioned as under:
FIG. 25 GOOD MORNING
Specific Circuit Training Programme

Eight exercises have been selected for the specific circuit training programme and these exercises were arranged in the circuit to avoid exercising the same body position in succession. To apply the overload principle and give recognition to individual differences, loads, repetitions, and target time were determined by the students. At the first session score cards were provided to all the students. The exercises were demonstrated and the circuit arrangement was explained. The group was divided into eight sub-groups. The subjects proceeded through the circuit, determining and scoring the maximum load repetitions for each exercise in the circuit. Intervening rest was taken after each exercise. Maximum repetitions for each exercise in one minute was marked on the score card. This was the maximum dose. The training dose was determined by reducing the maximum dose by one half. The individual target time was established at the second session. Number of laps were three which was determined by the investigator. The player completed the laps of the circuit, executing the training dose at each station and resting if needed. The total time for completing the circuit was recorded. The target time was one forth reduction of the total time and this was designated on the score card. Each participant performed their individual programme with the established training dose and target time.
A duration of 15 days was considered sufficient for adaptation of the body system to the exercise load. This is based on the conclusion of Harre Dietrick et al. who have indicated that a load can not be raised in a linear way i.e. from day to day.\(^8\) Therefore, load was increased after every two weeks in terms of newly established training dose and target time. The subject performed the work-outs on the prescribed days, i.e. Monday, Wednesday and Friday.

**Specific Weight Training Programme**

In the case of weight training exercises the maximum weight which a subject could lift in one single effort was recorded and fifty per cent of the maximum lift was lifted by the subject in each of the weight training exercises. Each subject performed three sets each consisting of 10 repetitions, a rest period ensuring complete recovery was provided between two sets.

Load was increased after every two weeks in terms of 50 per cent of maximum lift at the end of every two weeks. The subjects performed the work-out on the prescribed days i.e. Monday, Wednesday and Friday.

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Combined Circuit Training and Weight Training Programme

The subjects in this group did circuit training on the first day, the exercises and procedure being the same as in the case of specific circuit training programme. On the second day this group did weight training, the exercises and procedure being the same as in the case of specific weight training programme. The group alternately participated in the circuit training and weight training programmes till the end of the experimental period.

Statistical Procedure

In order to test the effectiveness of the three treatments viz. specific circuit training, specific weight training and combination training, in all the test items, after the ten weeks of training programme paired 't' test (one tailed) was applied between the pre-test and post-test means of each group.

To find out which training programme was best among the three experimental groups for all the nine test items, analysis of variance and covariance was carried-out. Analysis of covariance was carried-out because initial performance in the three experimental and one control group had not been equated for all the nine test items. Least significance difference (LSD) was applied as post-hoc comparison between the difference of means in all the groups for all the test items, for testing the hypothesis at .05 level of significance.