CHAPTER III

METHODOLOGY

Research methodology involves the systematic procedure by which researcher starts from the initial identification of the problem to its final conclusion. The role of the methodology is to carry on the research work in a scientific and valid manner. The purpose of the study is to find out whether there would be any significant combined effect of circuit training and resistance training on physical, physiological and performance variables of football players.

This chapter provides an overview of the method used in the study for the selection of subjects, selection of variables, experimental design, pilot study and reliability of data, training schedule, training program, collection of data and statistical technique which has been explained in detailed.

3.1. SELECTION OF SUBJECTS

For the present investigation 60 men football players were selected randomly from various colleges Tirupathi, their age ranged from 18 to 20 years. Twelve weeks training was given for all the Experimental groups, the selected subjects were divided into four equal groups Experimental group I acted as circuit training group II acted as resistance training group III acted as combined circuit & resistance training and IVth group acted as control group. The Experimental groups were participated twelve weeks training program except control group.

1. Experimental Group 'I' - (Circuit Training)
2. Experimental Group 'II' - (Resistance Training)
3. Experimental Group 'III' - Combined (Circuit & Resistance Training)
4. Control Group - No training

3.2. SELECTION OF VARIABLES

The investigator were review the available scientific literature pertaining to the study from books, journals, periodicals, magazines, research papers and available sources Tamilnadu Physical Education and Sports University, Tirupathi University libraries and also with help of experts in selected physical variables, physiological variables, performance variables to identify most suitable variables. The selected variables are furnished below.

3.2.1. Dependent Variables

(a) Physical Variables

1. Speed
2. Endurance
3. Agility
4. Strength
5. Flexibility

(b) Physiological Variables

1. Vo2 max
2. Resting Heart Rate

(c) Performance Variables

1. Dribbling
2. Shooting
3. Passing
4. Playing Performance

3.2.2. Independent Variables

a. Experimental Group I - Circuit Training

b. Experimental Group II – Resistance Training

c. Experimental Group III – Combined training (Circuit and Resistance training).

d. Group 'IV' - (Control group, No training was provided).

3.3 JUSTIFICATIONS OF THE VARIABLES SELECTION

During training period there should be proper combination among training load, diet and rest period. Circuit, Resistance and Combined training may influence selected health related physical fitness, physiological variables and performance variables By considering the purpose of the study availability of equipment above mentioned selected health related physical fitness, physiological variables and performance variables were selected in the present study.

3.4 JUSTIFICATION OF CRITERIAN VARIABLES SELECTION

SL.No	Variables	Test	Unit of Measurements
Physical Variables			
1	Speed	50 mts dash	Seconds
2	Endurance	Cooper's 12 minutes run/walk	Meters
3	Agility	Semo agility run	Seconds
4	Strength	Push ups	Counts
5	Flexibility	Sit and reach test	Centimeters
Physiological variables			
6	Resting Heart Rate	Citizen Make digital B.P monitor.	Number of beats
7	VO_2 Max	Queens college step test	ml//kg/min
Performance Variables			
8	Dribbling	Zig Zag dribbling test	Seconds
9	Shooting	Penalty Kick Test	Points
10	Passing	Passing with the inside and outside foot.	Points
11	Playing Performance	The subjects were subjectively rated by three experts.	Marks

3.5 SELECTION OF TESTS

TABLE I

LIST OF SKILL AND THE TEST ITEMS

Skill	Name of Test Item
Passing	Passing with the inside of the foot
	Passing with the outside of the foot
Dribbling	Zig Zag Dribbling
	Dribbling for Speed
Shooting	Penalty Kick
	Shooting from 25 meters
Playing Performance	Heading for accuracy
	Heading for distance
	Chest trapping
	Instep trapping
	Chipping for accuracy

3.5.1. RELIABILITY OF THE TESTS

Tester's competency was evaluated with the reliability of the tests. Reliability of the test was established by test-retest method whereby the consistencies of results were obtained by intra-class correlation. The repeated measurement of individuals on the same test was to determine reliability, as it was univariate not a bivariate situation. It is the distribution of a single variable. It makes sense, then to use a univariate statistics like Intra-class correlation co-efficient.

3.5.2. SUBJECT'S RELIABILITY

The Intra-class correlation co-efficient of test-retest values also determined that subject reliability was adequate as the same tester used the same subjects under similar condition. Motivation techniques were not used. In order to get uniform results from the subjects the subjects were oriented about the study prior to the conduct of the test. The test-retest methods were used to find out the subject reliability.

3.5.3. TESTER'S COMPETENCY

The investigator learnt procedure and methods to handle and operate the instruments to administer the tests. The services of qualified assistance were used while taking the measurements.

3.5.4. TESTER'S RELIABILITY

The repeated measurement of individuals on the same test is done to determine reliability, is either a univariate or a bivariate situation. It is the distribution of a single variable like an intra Class correlation co-efficient Baumgarter and Jocker (2004). The Intra Class correlation co-efficient obtained for test-retest are presented in Table – II.

TABLE - II

INTRA CLASS CORRELATION CO-EFFICIENT OF TEST

S.NO	Test	Instruments	r
1	Speed	50 mts. dash	0.92*
2	Endurance	Cooper's 12 minutes run/walk	0.96*
3	Agility	Semo agility run	0.97*
4	Strength	Push ups	0.93*
5	Flexibility	Sit and reach test	0.95*
6	Vo2 max	Queens college step test	0.91*
7	Resting Heart Rate	Citizen Make digital B.P monitor	0.97*
8	Dribbling	Zig Zag Dribbling	0.95*
9	Shooting	Shooting for 25 meters	0.91*
10	Passing	Passing with inside & outside of the foot	0.97*
11	Playing Performance	Individual Performance	0.95*

* Significant at 0.05 level

3.6. ORIENTATION OF THE SUBJECTS

At the commencement of the training programme, the subjects were assembled and were given a thorough orientation on the requirements and objectives of the research.

3.7. INSTRUMENT RELIABILITY

All the equipments which were used in the study all that equipments had been obtained from standard firms which cater to need of various research laboratory in India and abroad and their calibrations were accepted as enough for the purpose of the study.

3.8. RELIABILITY OF DATA

The reliability of data in this study was ensured by establishing the instruments reliability, tester's competency and the reliability of the tests.

3.9. PILOT STUDY

The Pilot study was conducted before finalizing the training programme to ensure that the intensity of the exercise included in circuit training and resistance training we gives are within the limits of the subjects.

3.10. EXPERIMENTAL DESIGN

The study was formulated as a true random group design, consisting of a pre-test and post-test. The Sixty subjects were randomly assigned to four equal groups of fifteen each men football players. The groups were assigned as circuit training group, resistance training group, combined group and control group respectively. Pre-test was conducted for all the sixty subjects on selected physical, physiological and performance variables the performance of men football players.

Circuit training was given to the Experimental Group - I for three days per week twelve weeks program, Resistance training was given to Experimental Group - II three days per week twelve weeks program, the same way the Combined training group that is circuit training and resistance training has been given for Experimental Group - III for alternative days in a week twelve weeks program. The fourth group control group was restricted from the training.

As well as the post test was conducted for all the four groups after twelve weeks training.

TABLE - III
TRAINING PROGRAMME FOR EXPERIMENTAL GROUPS

GROUPS	PROGRAMMES
Experimental Group - I	Circuit Training
Experimental Group - II	Resistance Training
Experimental Group - III	Combined Training (Circuit and Resistance Training)
Control Group - IV	No training

3.10.1. Experimental Group - I (Circuit Training)

The idea of circuit training is to train several physical fitness abilities at the same time, such programmes consists of 10 stations different exercise to be performed at each stations. The basic philosophy of circuit training appears dubious. It is well known that the mechanisms of biological adaptation to speed, strength and endurance types of physical activity are different. The muscles are not able to optimally adapt to physical fitness type of exercise at the same time combining, speed, strength and endurance exercises interferes with ability to gain overall development.The exercises included in the circuit training programme were selected by the investigator consultated with experts in the field of physical education and coaches. The exercises are Rope Skipping, Push- up, Running on the spot, Bent – Knee sit-ups, Hopping, Jump Squat, Tuck Jumps, Lateral raises, Jump and reach, High – Knee action .

Circuit Training

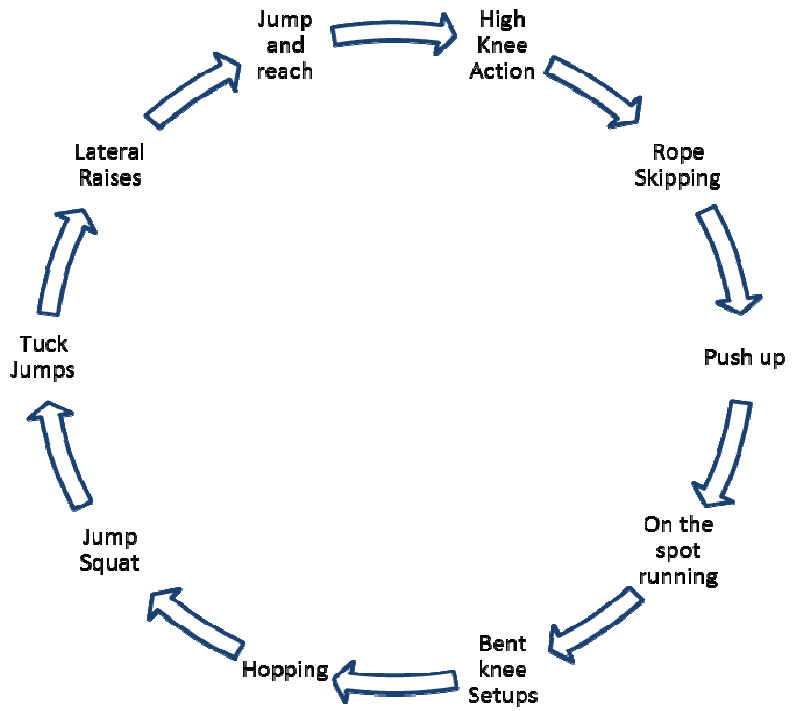

Figure - 1

3.10.2 Training Program – Experimental Group – I (Circuit Training)

The circuit training group underwent their training programme for 12 weeks. Alternative days the work out was given for 45 to 60 minutes including warm-up and warm-down exercises. Control group did not participate in specific training; however they performed their regular physical activities, which is part of their physical education curriculum. The subjects underwent their training program. All the subjects involved in the training program. None of them reported any injuries. However muscle soreness was reported in the early weeks but it subsided later. Attendance was taken before the commencement of each training session. All the subjects were present for more than 90% of the total training session.

3.10.3 Training Schedule

Each training session was started with light warm-up and ended with warm down exercise.

1. Duration of the program 12 weeks.
2. Load 40 – 70%
3. Number of stations 10.
4. Total time of circuit training session 45-60 minutes.
5. Number of repetitions in one station 10-15.
6. Rest interval between the exercises 30 seconds.
7. Time for each exercise 60 seconds.

Suggested Load Increments

1. Week ≠ 1-2 = 40%
2. Week ≠ 3-4 = 50%
3. Week ≠ 5-6 = 60%
4. Week ≠ 7-8 = 50%
5. Week ≠ 9-10 = 60%
6. Week ≠ 11-12 = 70%

3.10.4 Explanation of the Stations

3.10.4.1 Rope Skipping

With the suitable ropes the subjects were asked to perform forward skips in a continuous, rhythmic style. When they are performing the skips they were asked to keep their feet together this exercise should be contained for one minute.

3.10.4.2 Jump and Reach

The subjects were instructed to stand in standing position and try to jump at the maximum height for a period of one minute.

3.10.4.3 Push-Ups

The subjects were instructed to take the front support position with arms at shoulder width apart. Arms were bent to lower the chest to the floor and return to the front support position for a period of one minute.

3.10.4.4 Jump Squat

The subjects were instructed to clasp their hands behind the neck in full squat position with one foot forward and the other behind. From that position jump with changing their leg position. This was performed for one minute.

3.10.4.5 Running on the Spot

The subjects were asked to run on the spot by raising the knees up to the hip level that is high knee action for one minute.

3.10.4.6 Lateral Raises

Subjects were instructed to stand with feet hip-width apart. Hold a dumbbell in each hand, bend slightly and bring the dumbbells in front of the thighs, hands should face each other, than the dumbbells upward rise. This was performed for one minute.

3.10.4.7 Bent Knee Sit Ups

The subjects were asked to take supine position with knees bent to an angle less than 90 degree and hands clasped behind neck. The performer lift his trunk touched his knees with forehead and then lowered his trunk touching the mat with his elbow. This procedure was repeated for one minute.

3.10.4.8 Hopping

The subjects were instructed to hop continuously on the spot alternately with both the legs for one minute.

3.10.4.9 Tuck Jump

The subjects were asked to take standing position then jump on the same place at that time thigh muscle touch the chest. This procedure was repeated for one minute.

3.11. EXPERIMENTAL GROUP - II (RESISTANCE TRAINING)

The Resistance Training programmer differs in the land, number of repetition, sets, rest interval and is based on the individuals' physical fitness. Some individual training for bulk, and others for definitions. Some train for strength and others for speed. In the case of football strength is needed in the form of speed. This is known as power and can be defined as force ties distance or the rate of which work is done. In other words explosive type movements are desirable in a weight

programme for football players. Though major muscle groups of the body are involved in football players since the hips and legs are responsible for jumping and running, they get first priority. Muscle groups involved include the quadriceps, hamstrings, gastrocnemius and those associated with the hips such as gluteus and adductor muscles. The smaller muscles of the upper body which are used are the deltoids, triceps, biceps forearm and pectoral's groups.

The Resistance Training for football should be as specific to the sports as possible. Each exercise movement should correlate highly with the movements involved in the sports. Since football is a very quick and powerful game, the exercises chosen, for this program is of powerful in nature. At the same time the training programme should be well rounded and geared towards total body strengthening. Keeping this in mind the above concepts the following Resistance Training exercises were given to the Resistance Training group. The Resistance Training Exercises are given below.

1. Power Clean
2. Front Press
3. Back Press
4. Power Snatch
5. Leg Curls
6. Inclined Bench Press
7. Biceps Curl
8. Pull Over
9. French Curl
10. Half Back Squat

3.11.1 Procedure of Training

The Resistance Training exercises were given to the subjects three days per week 40 minutes period of 12 weeks. The warming up time ten minutes was not included in the training programme. The subjects were asked to do stretching exercise initially for five minutes and three warm up repetitions were carried out before the start of the training schedule. After 40 minutes training, subjects were advised to warm down by jogging and stretching their body for eight to ten minutes. Exercises were arranged in such a way that the exercises the same muscle group were not stressed consecutively.

TABLE – IV

TWELVE WEEKS RESISTANCE TRAINING PROGRAMME WITH TARGET PERCENT 1 RM

Weekly Schedule	Muscle	Set	Repetition	Target 91 Rep.) % of Maximum
1 to 3	A. Major Muscle Group Exercises 1, 2, 3, 4, 10	3	8 to 10	60 - 70
	B. Exercises 5, 6, 7, 8, 9	1	6 to 7	30 - 35
4 to 6	A. Major Muscle Group Exercises 1, 2, 3, 4, 10	4	8 to 10	70 - 75
	B. Exercises 5, 6, 7, 8, 9	2	7 to 8	35 - 40
7 to 9	A. Major Muscle Group Exercises 1, 2, 3, 4, 10	5	8 to 10	75 - 80
	B. Exercises 5, 6, 7, 8, 9	3	8 to 9	40 - 45
10 to 12	A. Major Muscle Group Exercises 1, 2, 3, 4, 10	5	10	80 - 85
	B. Exercise 5, 6, 7, 8, 9	4	10	45 -50

The Modified Training Programme Designed by E. German Booklet, Pune India (2004)

The subjects performed Resistance Training exercises three days per week with one to three sets per exercise. Each exercise routine consisted eight to ten repetitions. The one repetition maximum strength was tested for at the beginning of the training programme. During training

60 - 70 percent of 1 RM were used as load of the subjects, with a minimum of three sets. Every third weeks the percentage of 1 RM was increased according to Oxford Method of Resistance Training with further progression by trial and error.

The groups of 60 subjects were divided into equal pairs with all the pairs allotted each one of the ten stations. The first subject on each pairs did the exercises and moved to the next station, thus completing exercises at all stations within one hour duration including warming up and warming down. The same process was repeated for the second subject of all the pairs. The subjects were instructed to perform each of the exercise with correct technique at fast pace. In the tenth to twelfth week period the group did Resistance Training at about the maximum level of performance in each exercise in each station.

TABLE - V

RESISTANCE TRAINING EXERCISE DURATION 40 MINUTES

Sl. No	Exercise	Muscle Group	Illustrations
1	Power Clean	Thighs, Back Muscles, Arms and Shoulder	-
2	Front Press	Shoulder Muscles	-
3	Back Press	Back Shoulder Muscles	-
4	Power Snatch	Strength Development of Whole Body as excise No. 1 Muscle Groups	-
5	Leg Curl	Hamstring	-
6	Incline Bench Press	Deltoids. Pectrolis Major	-
7	Biceps Curls	Biceps Muscles	-
8	Pull Over	Latissimus Dorsi Chest and Shoulder	-
9	French Curl	Triceps Muscles	-
10	Half Back Squat	Thigh Muscles (Hamstring & quadriceps Muscles)	-

3.11.2. Experimental Group - III - Combined Training (Circuit and Resistance Training) - Alternative Days

The circuit training and resistance training group underwent their training programme for 12 weeks. Alternative days the work out was given for 45 to 60 minutes including warm-up and warm-down exercises. However they performed their regular physical activities, which is part of their physical education curriculum. The subjects underwent their training program. All the subjects involved in the training program. None of them reported any injuries. However muscle soreness was reported in the early weeks but it subsided later. Attendance was taken before the commencement of each training session. All the subjects were present for more than 90% of the total training session.

3.12. TEST ADMINISTRATION

The administration of the test and the method of collecting the data were explained.

3. 12.1. PHYSICAL VARIABLES

3.12.1.1. SPEED - 50 mts Dash

Purpose

To measure the speed of the subjects

Equipments

Stopwatch, score sheet, chunnam, wooden clappers (or) whistle.

Procedure

The subject was allowed to take starting position behind the starting line. The starter used the command “are you ready” and “go”, simultaneously with the command “ready go” (or) clapper (or) whistle sound the timer starts the watch. The timer who standing in at the finishing line were stop the watch when the runner crosses the finishing line.

Scoring

The score was the elapsed time between the starters signal and the instant the subject crossed the finishing line. Score was recorded in seconds to the nearest tenth of a second.

3.12.1.2. ENDURANCE (Cooper's 12 Min Run/ Walk)

Purpose

To measure the cardio vascular endurance of the subjects

Equipment

A track with markings, stop watch

Procedure

Subjects were instructed to run, jog or walk about the course. The test continued until they complete 12 minutes.

Scoring

The distance covered by the subjects for 12 minutes was recorded in meters.

3.12.1.3 AGILITY – (SEMO AGILITY RUN)

Purpose

To measure the agility of the subjects

Equipment

This test has to be performed on a smooth area 12 by 19 feet with adequate running space around it. Four plastic cones and a stopwatch are needed. The cones are placed squarely in each corner of the square.

Procedure

The player should start running from A zone, lines up at A and starts when ready thus eliminating the reaction time. The player should side step from A to B and passes outside the

corner cone. From there he should backpedal from B to D and pass to inside of the corner cone. then sprint forward from D to A and pass outside the corner cone. He should then sprint forward from C to B and pass outside of the corner cone. He should then side step from B to the finish line at A.

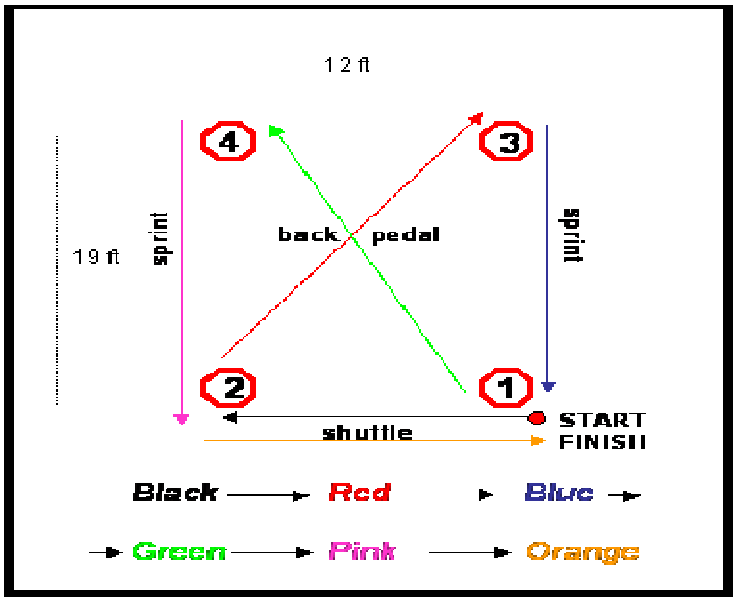

Figure - 2

Additional Points:

1. In performing the side step, the crossover step cannot be used.
2. In performing back-pedal; the subject must keep his back perpendicular to an imaginary line connecting the corner cones.
3. Although incorrect procedure constitutes an un-scored trial, the subject tested until he completes one legal trial.
4. At least one practice trial was given.

Scoring

The score is the elapsed time should be given accurately to the nearest tenth of a second. Each player must allowed two trials and the best score was selected. The watch was started on the signal “Go” and stopped when crosses the starting line. Players who fall or slip significantly should be given another trial.

3.12.1.4. STRENGTH (PUSH UPS)

Purpose

To measure the strength of the subjects

Equipments

Gymnastic Mats, Stopwatch, Whistle.

Procedure

The subject being tested took prone lying position on the ground with the hands under the shoulders and fingers stretched legs straight and parallel with comfortably apart and the toes tucked under the feet. On the command 'go' the subject perform push ups with the arms and extended it completely. The legs and the back were kept straight through out the test. Then the subject lower her body using the arm until it came to 90 degree angle and upper arms were parallel to the ground. The action was repeated as many time as possible.

Scoring

Total number of correct push-ups was recorded as the score of the test.

3.12.1.5. FLEXIBILITY (SIT AND REACH)

Purpose

To measure the trunk flexibility of the subjects.

Equipments

Yardstick and measuring steel tape, stop watch.

Procedure

Place the yardstick on the floor and put an 18 inch piece of tape across the 15 inch mark on the yard stick. The tape should secure the yardstick to the floor. The subject sits with the zero end of the yardstick between the legs. The subject heel should almost touch the tape at the

15 inch mark and be about 12 inch apart with the legs held straight. The subject bends forward slowly and reaches with parallel hand as far as possible and touches the yardstick. The subject should hold this reach long enough for the distance to be recorded

Scoring

Three trials has been given. The best score recorded in cm.

3.12.2. PHYSIOLOGICAL VARIABLES

3.12.2.1. VO_2 MAX

Purpose

To measure VO_2 Max of the subjects,

Equipments

16.25 inches or 41.3 cm step bench, stop watch, metronome.

Procedure

The subject as asked to step up and down on 14.3 centimeter height step bench at the rate of24 steps per minute for males. The subjects are ased to use a four-step cordance, 'up-up-down-down for 3 minutes The subject stops immediately on completion of the test and the heart beats are counted for 15 sec from 5-20 sec of recovery, multiply this 15 sec reading by 4 beats per minute (BPM) **Katch, Mc Ardle 1983**

Scoring

The estimated VO2 Max can be calculated in ml//kg/min

Men: VO2 Max (ml/kg/min) = 11133-0.42xheart rate (bpm)

3.12.2.2. RESTING HEART RATE

Purpose

To measure the resting heart rate of the subjects.

Equipment

Citizens make digital portable blood Pressure monitor.

Procedure

When the subjects were in rest the resting heart rate was recorded at the beginning and end of the training periods using the equipment when the subject sitting in relaxation position, since the equipment was fully automatic, the value were recorded accordingly. The heart rate was determined at radial artery (the frequency of pulse wave per minute propagated along the peripheral arteries is usually identical to heart rate. The heart rate was counted for 35 seconds and multiplied by two to get for one minute value

Scoring

The resting heart rate is indicated in the digital monitor. The number of heart beats.

3.12.3. PERFORMANCE VARIABLES

3.12.3.1. DRIBBLING

The dribbling skill of the subjects were measured objectively by administering (a) zig zag dribbling test and (b) dribbling for speed test.

Purpose

To evaluate the dribbling ability of the player to dribble the ball in a zigzag path

Equipment

Measuring tape, marking materials, flag poles, balls and stopwatch

Procedure

Ten flags are fixed in a straight line at an distance of 2.00 meters. A starting line is marked at a distance of 5.00 meters from the first flag and a finishing line is marked 5.00 meters from the last flag.

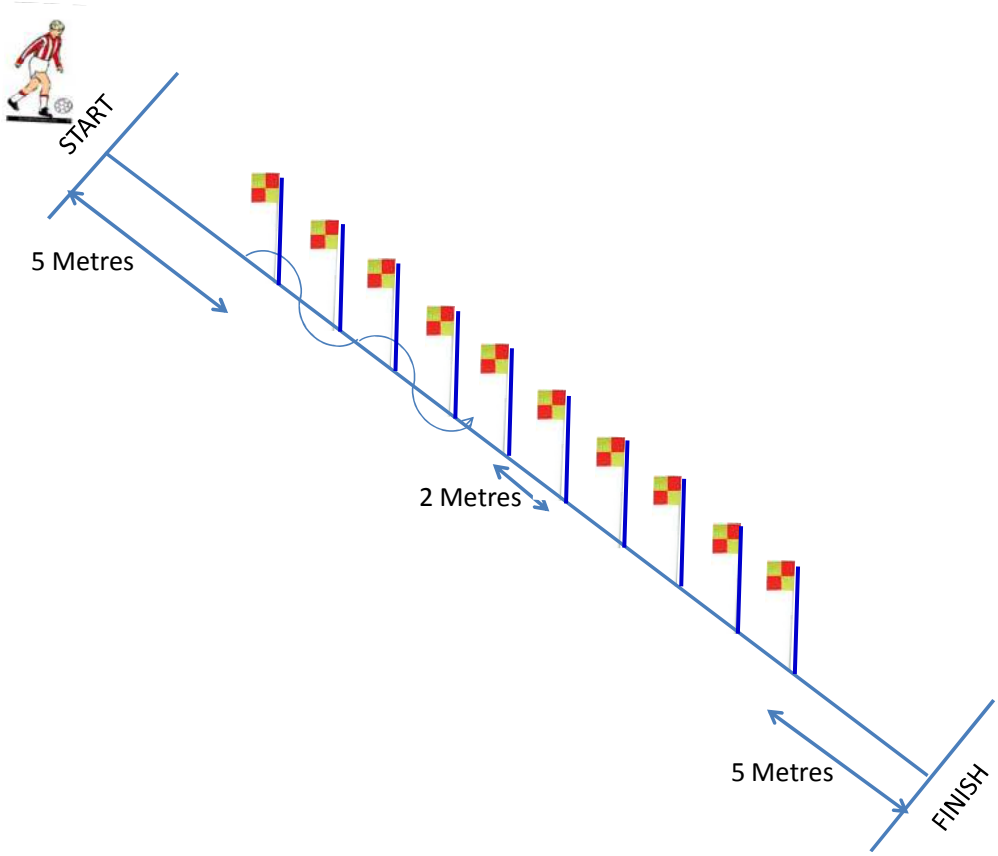

Figure - 3

ZIGZAG DRIBBLING

Direction

The subject stands behind the starting line with the ball. On the command, the subject dribbles the ball through the flags in zig zag manner and using any part of the foot and crosses the finishing line. The time taken to dribble the ball from the starting line to the finishing line is recorded .Two chances are given, and the best time is recorded.

Scoring

The best timing is recorded to $1/10^{th}$ of a second which was taken as the score of this test.

3.12.3.2. SHOOTING

The shooting ability of the subjects were measured using (a) penalty kick test and (b) shooting from 25 meters tests.

(a) Penalty kick

Purpose

The purpose of the test is to measure the shooting ability of subjects (penalty kick).

Equipment

Measuring tape, marking material, white tape and balls.

Procedure

The whole goal is divided into seven areas as shown in the figure. The portion of the posts is included in the area.

PENALTY KICK

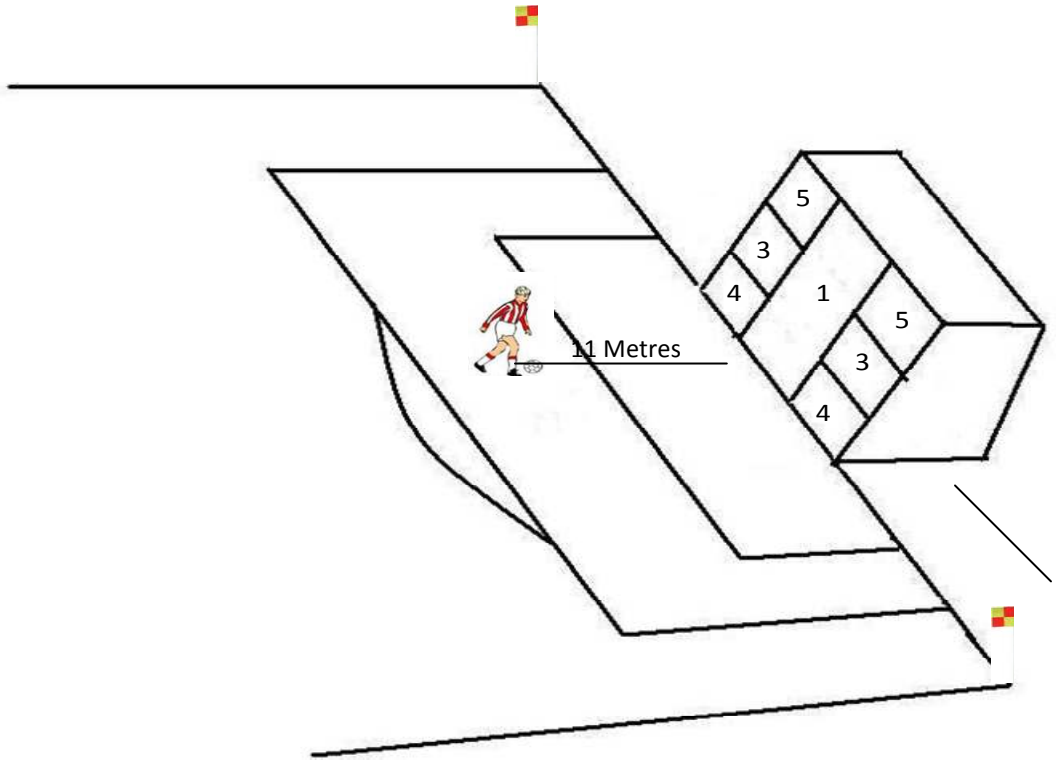

Figure - 4

Direction

The subject is asked to take penalty kicks from the penalty spot using any part of the foot. Two chances are given one by left and one by right foot.

Scoring

If a goal is scored points are awarded as shown in the figure. If the ball hits the rope, corresponding higher point is given. Points scored out of two chances are the score of the individual.

(b) Shooting from 25 Meters

Purpose

To evaluate the ability of the player to shoot from long distance.

Equipment

Measuring tape, marking materials, white tape and balls

Procedure

The whole goal is divided into seven areas as shown in the figure. The portion of the posts is included in the area. Two straight lines are drawn one from each post which passes through the upper corner of the penalty box as shown in the figure. Two arcs with a radius of 25 and 28 meters are drawn from the centre of the goal line cutting the straight lines drawn from the goal posts. The portion of the area between the arcs in front of the 10 yards arc is the central area and the portion between the arcs on the left and right side of the central area is the left and right areas.

SHOOTING FROM 25 METRES

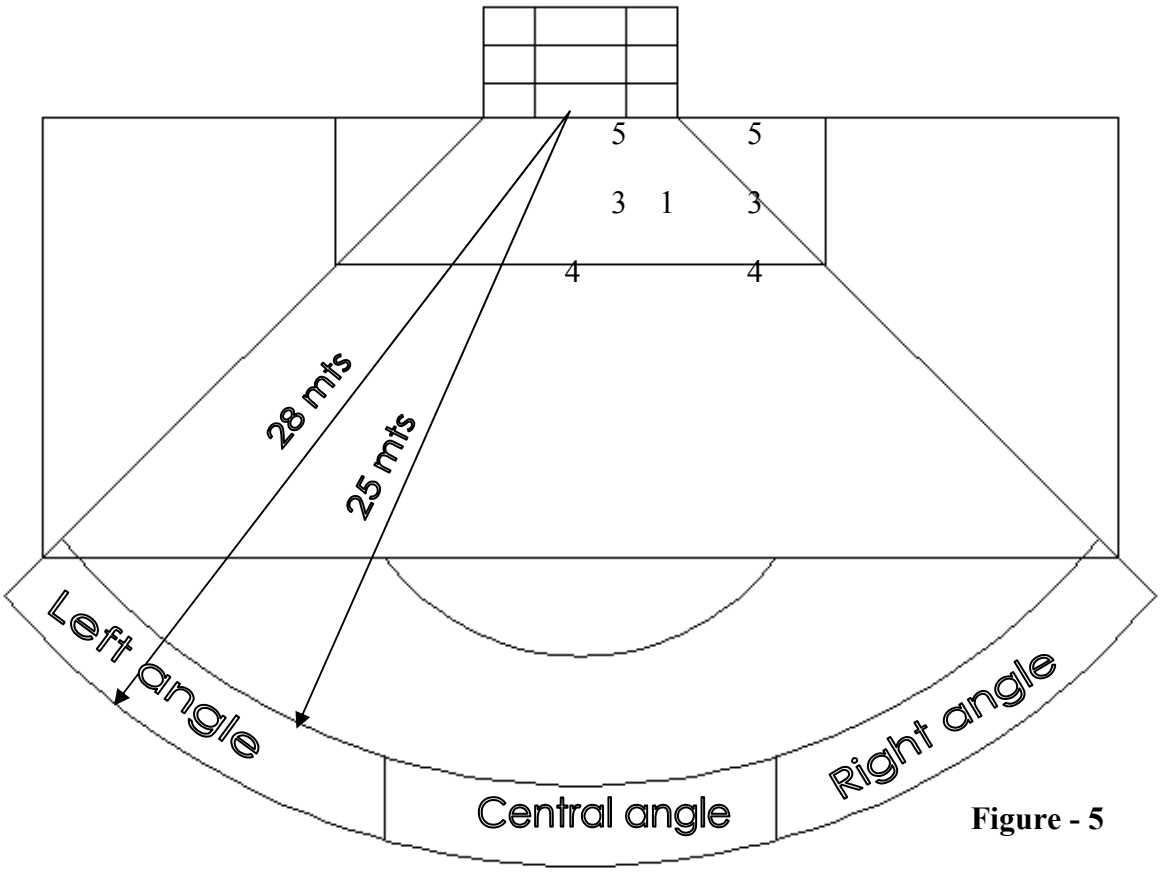

Figure - 5

Direction

The subject is asked to shoot a moving ball from each area one by right foot and one by left foot. Six chances are given.

Scoring

If a goal is scored points are awarded as shown in the figure. If the ball hits the rope, corresponding higher point is given. Points scored out of six chances are the score of the individual.

The overall shooting ability of the subject was the average of the scores of penalty shooting and shooting accuracy from 25 meters.

3.12.3.3 PASSING (INSIDE OF THE FOOT)

The objective assessment of passing skill of the subjects were determined through administration of (a) passing with the inside of the foot and (b) passing with outside of the foot.

(a) Passing with the inside of the foot

Purpose

To evaluate the ability to pass a moving ball to a given target using inside of the right and left foot

Equipments

Measuring tape, marking materials, flag poles and balls.

Procedure

Six flag poles are fixed in a straight line, the distance between two flags being 1.00 meters. From the flag poles two lines are drawn at a distance of 15 and 18 meters parallel to the flag poles as shown in the figure.

The subjis asked to stand between the 15 and 18 meters lines with the ball. On command he should push the ball towards the flags and before it crosses the 15 meters line, he should make a pass to the target which is the gap between the two middle flags. The player should use only the inside of the foot. Totally two chances, one by left and one by right foot are given.

Scoring

For every successful pass between the flags in the middle 5 points are awarded. If the ball passes in the gap between the other flags, points are given as shown in the figure. If the ball hits the flag the higher point is given. If the ball goes out of flags no point is given. Points scored out of two chances are the score of the individual.

(b) Passing with the outside of the foot

PASSING (OUT SIDE OF THE FOOT)

Purpose

To evaluate the ability of the player to pass a moving ball to a given target using outside of the right and left foot.

Equipment

Measuring tape, marking materials, flag poles and balls.

Procedure

Six flag poles are fixed in a straight line, the distance between two flags being 1.00 meters. From the flag poles two lines are drawn at a distance of 15 and 18 meters parallel to the flag poles as shown in the figure.

PASSING WITH THE OUT SIDE OF THE FOOT

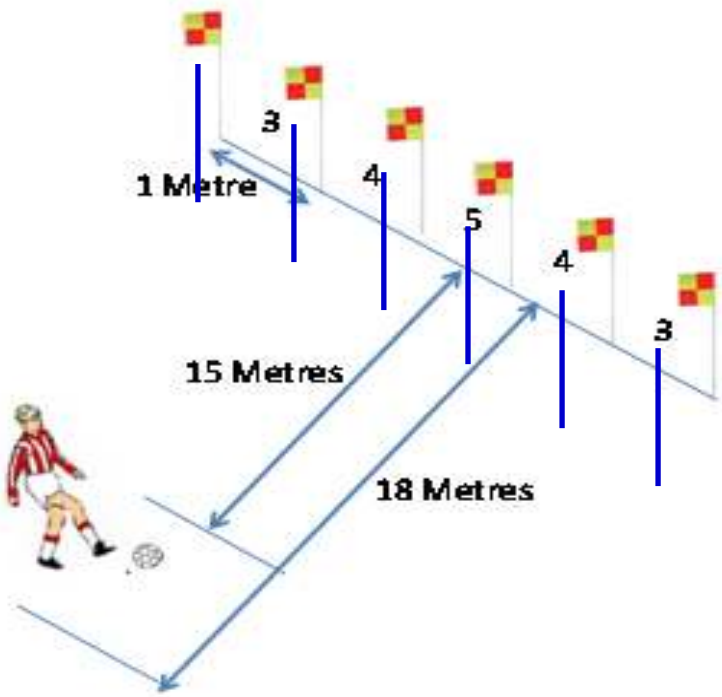

Figure - 6

Direction

The subject is asked to stand between the 15 and 18 meters lines with the ball. On the command he should push the ball towards the flags and before it crosses the 15 meters line, he should make a pass to the target which is the gap between the two middle flags. The subject should use only the outside of the foot. Totally two chances one by the left and one by the right foot are given.

Scoring

For every successful pass between the flags in the middle 5 points are awarded. If the ball passes in the gap between the other flags, points are given as shown in the figure. If the ball hits the flag the higher point is given. If the ball goes out of flags no point is given. Points scored out of two chances are the score of the individual.

The overall passing ability test was the average of scores of 'passing with the inside of the foot' and 'passing with outside of the foot'.

3.12.3.4 PLAYING PERFORMANCE

To determine the playing ability of the football players, the performance of the subjects were subjectively rated by three experts, that is by three qualified coaches cum officials. The individual and team performance related football skills were selected as criteria for subjective ranking of football playing ability by the experts. The criterion score were classified into two parts, viz., five individual skills (50 marks) and five situations where the individual player contributes to the team (50 marks) for a total of 100 marks (Table I). The average of the marks of the three experts was taken as the criterion score.

3.13. STATISTICAL TECHNIQUE

The data obtained were analyzed by Analysis of Covariance (ANCOVA) to assess the significant difference among the groups between the pre test and post test on physical, physiological and performance variables to find out the combined effect of circuit and resistance training on physical, physiological and performance variables of football players. The normality of the data collected was tested through F test (ANCOVA). The data and the regression were plotted and found to be in the standing straight line and thus tested for normality of data and found the data are normal. The adjusted post test mean differences among the experimental groups were tested and if the adjusted post test result was significant the Scheffe's post hoc test was used to determine the significance of the paired means differences.

The investigator has analyzed scientific results obtained by application of various methodologies discussed above and the results are analyzed and presented in form of detailed discussion graphs and various tables in the next chapter.

Photos showing the adapting the studies






Flow Chart Showing the Methodology adapted in the Study