Chapter III

PROCEDURE

In this chapter, the procedure for the selection of the subjects, criterion measure, reliability of data, design of the study, procedure for administering the test, administration of training programme and statistical techniques used for analysing of data have been discussed.

Selection of Subjects

Sixty male students from different colleges of Ranchi University, Ranchi were selected as subjects for the study. On the basis of best performance in 100 metres sprinting. The average age of the subjects was nineteen years ranging between eighteen to twenty three years.

In order to ensure medical fitness of the subjects their medical examinations were conducted by the qualified doctors. The examination indicated that all the subjects were medically fit to undergo the testing and training requirements of this investigation.

The requirements of the research study were explained to all the subjects in the presence of the coaches of the college concerned and all of them agreed voluntarily to undergo the testing and training programmes. A thorough orientation of the requirements
of the experimental procedures, testing as well as exercise schedules were explained to the subjects so that there was no ambiguity regarding the effort required on their part and what hardship they might have to endure. Coaches of the respective colleges urged the subjects to cooperate in the study even though they might have to work hard in the interest of new scientific findings and improvement in their own performance levels. No special technique was used to motivate the subjects to put in their best efforts, but the subjects were very enthusiastic and cooperative throughout the project.

The subjects were oriented to testing and training procedure for two weeks to eliminate the learning effect. The subjects were exempted from attending the required programme of the college and were asked not to take part in any voluntary sports programmes or unusual physical exertions.

The subjects were, at random, assigned to three experimental groups and one control group, each consisting of fifteen subjects. The experimental groups were uphill running group (Group A), weight training group (Group B) and Harness running group (Group C).

Performance of the subjects in 100 metres run was taken at the beginning and after an experimental period of 10 weeks.
**Criterion Measures**

The criterion measure chosen to find out the effect of up-hill running, weight training and Harness running, was the time taken by the subject to run a distance of 100 metres as fast as possible and recorded to the nearest 1/100th of a second. The time was clocked with the help of stop watches which were properly calibrated and synchronised.

**Reliability of Data**

The reliability of data was ensured by establishing instrument reliability and tester competency.

**Instrument Reliability**

The stop watches used in this study were supplied to R.D.A.A.A. by Raj Sports, a well known and reputed dealer of Bihar, and these watches were also used in the 5th East Zone Junior Athletic Meet 1993 held at Ranchi.

Therefore, all the stop watches used for measuring the performance of the subjects were considered reliable and precise enough for the collection of data needed for the study.

**Tester Competency and Reliability of the Tester**

The tester competency was evaluated together with the reliability of the test. To determine the reliability of test, data on 100 metres sprint performance were recorded twice with a
gap of one day in between, under identical conditions, on fifteen subjects selected at random. The scores thus obtained on two occasions were correlated using Pearson's Product Moment Correlation Method. The correlation of coefficient of .887 thus obtained showed that data were reliable and also verified the competency of the tester.

**Design of the Study**

For the present study the experimental design adopted was random group design. Equal number of subjects were assigned randomly to four groups of fifteen subjects each. The experimental treatments were also assigned randomly to the three experimental groups (A, B and C) and control group D. The three experimental groups were administered three different kinds of training programmes for the development of sprinting speed One group was trained with the method of up-hill running (Group A), the second group with the weight training (Group B), and the third group with harness running (Group C). The distance chosen for each of the training was 80 metres. The training sessions were conducted thrice a week i.e. on Mondays, Wednesdays and Fridays. Timing for 100 metres was taken before and after an experimental period of 10 weeks. The subjects were advised not to take part in any voluntary sports programmes or unusual physical exertions so that physical activities remained uniform for all the groups chosen for the study.
Procedure for Administering the Test

All the subjects were assembled on the track of the Birsa Stadium, SAI Centre, Ranchi. They were briefed on the objectives and the requirements of the test.

The test was conducted on the 400 metres track of Birsa Stadium. All the eight lanes of 100 metres straight were properly marked. The subjects were instructed to warm-up on their own in order to gain best performance and avoid possible injuries. The subjects were started in groups of four and assigned chest numbers for identification by the judges and time keepers.

Sprinting Speed Test (100 Metres Dash)

Equipment Used and Marking.

Clapper and Stop watches.

100 metres distance was measured with eight parallel lines with a gap of 1.22 metres in between each two consecutive lines.

Description of Test

All the subjects ran with running shoes and crouch start was adopted by all. The starting command used by the research scholar "on your marks", "set" and in place of "go" the clapper was sounded. Time keepers at the finishing line recorded the time.
Rules.

The conduct of the test and recording the official timing of each subject was as per the rules and regulation prescribed by the I.A.A.F.

Scoring.

The elapsed time from the starting signal until the runner's torso crossed the finish line was recorded to the nearest 1/100th of a second for each subject.

Administration of Training Programme

The experimental groups met thrice a week for a period of 10 weeks. The first two weeks training for all the experimental groups was for physical conditioning, determining the starting weight, practice of weight training exercises and resistance running, so that physical and physiological system of the subjects were ready to undertake the specific load.

In case of weight training the maximum weight which a subject lifted in one single effort was recorded and fifty percent of the maximum was lifted by the subject in each of the weight training exercises.

The load in respect of harness running was fixed according to the pulse rate reached at the end of the 80 metres of hill running. Each subject performed three sets in weight training and 6 to 8 repetition in up-hill running and harness running. A
rest period of ensuring complete recovery was provided between the two sets.

**Up-hill Running**

The subject was asked to run distance of 80 metres on a up-hill track with a gradient of 15 to 30°. Subject performed 6 to 8 repetition with complete recovery between the two sets. Subject covered this distance as fast as possible.

**Harness Running**

The subject ran a distance of 80 metres with weights in his drag making a proper body lean and running action. He ran as fast as possible and performed 6 to to 8 repetitions with complete recovery between the sets.

It was one of the important training method employed during the strength buildup period. The athletes performed the movement with a belt secured about the waist. The belt was attached to ropes which were connected to a drag made of wood weighing nine kilograms including the ropes attached to the drag. Three weight plates of ten kilograms were used so that the total weight of one drag was thirtynine kilograms. Harness runs were performed by the subjects over a distance of 80 metres. An interval of three minutes was provided between the successive repetitions. The load of resistance was set with the pulse rate of up-hill running of 80 metres.
Selection of Exercises for Weight Training

The research scholar went through the available literature pertaining to training of the sprinters using weight training and also after a discussion with the expert of athletic training, Dr. A.K. Uppal, Dean, Lakshmibai National College of Physical Education, Gwalior, the following exercises were chosen:

1. Half squat
2. Leg press
3. Step-up
4. Heel raise
5. Bench press.

Half Squat

The barbell rested across the shoulder and back of the neck with hands grasping the bar with over grip somewhat greater than shoulder width. The subject went down to the half squat position and came back to starting position. Again the same was repeated.

Leg Press

The athlete was asked to lie on his back and press the barbell up with his feet by extending his legs and thighs and lowering down up to squat position. Same exercise was repeated.
Step-up

From standing position stepping was done with weight (50 per cent of maximum weight) in four counts on a bench of 12 to 18 inches in height - (i) stepped up with one foot, (ii) stepped up with second foot body erect legs straight on the bench, (iii) stepped down with the same foot, (iv) stepped down with other foot maintained the four count. The subject was asked to take lead with same foot each time or change feet as desired.

Heel Raise

Using a block of wood about 2 inches thick, the subject stood in a way that the toes just rested on the edge with the heels on the floor. A barbell was placed across the back of the shoulders. The body was raised upward as high as possible by raising on the toes. The heels were lowered back to the floor and the same was repeated. ¹

Bench Press

The subject assumed supine - position on a bench and started with the barbell at straight arm length directly above the chest. An over grip with hand spaced slightly wider than

shoulder width was used. The barbell was lowered straight down until it touched the mid chest and pressed back to arms length. Same exercise was repeated.\textsuperscript{2}

Physical Conditioning Programme for the Experimental Groups

\textbf{Monday.}

20 minutes warm-up.

Calisthenic exercises.

80 metres sprint x 8 rept.

Limbering down.

\textbf{Tuesday.}

20 minutes warm-up.

80 metres Acceleration Runs x 6 rept.

Dips.

Sit-ups bent knees.

Hopping

Skipping

Limbering down.

\textbf{Wednesday.}

20 minutes warm-up

Calisthenic exercises

Fortleg - 30 minutes

Limbering down.

**Thursday.**

Same as Monday.

**Friday.**

Same as Tuesday.

**Saturday.**

Same as Wednesday.

Same programme was repeated for two weeks.

**Group A**

**Training Programme for Up-hill Running**

(Third and Fourth Week)

**Monday.**

a) 15 – 20 minutes warm-up.

b) 80 metres acceleration run x 4 rept.

Intensity 80 – 100 per cent.

c) Up-hill run 80 metres 6 – 8 rept. x 2 sets.

d) Limbering down.

**Tuesday (Active Rest)**

**Wednesday.**

a) 15 – 20 minutes warm-up

b) 120 metres Ins and Outs Runs x 4 rept.

Intensity 80 – 100 per cent.
c) Up-hill run 80 metres 6 - 8 rept. x 2 sets.

d) Limbering down.

Thursday - Active Rest.

Friday.

a) 15 - 20 minutes warm-up.
b) 60 metres acceleration run x 6 rept.
Intensity 80 - 100 per cent.
c) Up-hill run 80 metres 6 - 8 rept. x 2 sets.
d) Limbering down.

Saturday - Active Rest

(Fifth and Sixth Week)

Monday.

a) 15 - 20 minutes warm-up
b) 80 metres Acceleration Run x 5 rept.
Intensity 80 - 100 per cent.
c) Up-hill run 80 metres 8 - 10 rept. x 2 sets.
d) Limbering down.

Tuesday - Active Rest.

Wednesday.

a) 15 - 20 minutes warm-up
b) 120 metres Ins and Outs Run x 4 rept.
Intensity 80 - 100 per cent.
c) up-hill run 80 metres 8 - 10 rept. x 2 sets.
d) Limbering down.

Thursday - Active Rest.

Friday.

a) 15 - 20 minutes warm-up.
b) 60 metres Acceleration Run x 6 rept.
   Intensity 80 - 100 per cent.
c) Up-hill run 80 metres 8 - 10 rept. x 2 sets.
d) Limbering down.

Saturday - Active Rest.

(Seventh and Eighth Week)

Monday.

a) 15 - 20 minutes warm-up.
b) 80 metres acceleration run x 6 rept.
   Intensity 80 - 100 per cent.
c) Up-hill run 80 metres 8 - 10 rept. x 3 sets.
d) Limbering down.

Tuesday - Active Rest.

Wednesday.

a) 15 - 20 minutes warm-up.
b) 120 metres Ins and Outs Run x 5 rept.
   Intensity 80 - 100 per cent.
c) Up-hill run 80 metres 8 - 10 rept. x 3 sets.
d) Limbering down.

Thursday - Active Rest.

Friday.
a) 15-20 minutes warm-up.
b) 60 metres acceleration run x 7 rept.
Intensity 80 - 100 per cent.
c) Up-hill run 80 metres 8 - 10 rept. x 3 sets.
d) Limbering down.

Saturday - Active Rest.

(Ninth and Tenth Week)

Monday.
a) 15 - 20 minutes warm-up.
b) 80 metres acceleration run x 6 rept.
Intensity 80 - 100 per cent.
c) Up-hill run 80 metres 10 - 12 rept. x 3 sets.
d) Limbering down.

Tuesday - Active Rest.

Wednesday.
a) 15 - 20 minutes warm-up.
b) 120 metres Ins and Outs run x 5 rept.
Intensity 80 - 100 per cent.
c) Up-hill run 80 metres 10 - 12 rept. x 3 sets.
d) Limbering down.

Thursday - Active Rest.

Friday.

a) 15 - 20 minutes warm-up.
b) 60 metres acceleration run x 7 rept.
Intensity 80 - 100 per cent.
c) Up-hill run 80 metres 10 - 12 rept. x 3 sets.
d) Limbering down.

Saturday - Active Rest.

Group B

Training Programme for Weight Training
(Third and Fourth Week)

Monday.

a) 15 - 20 minutes warm-up.
b) 80 metres acceleration run x 4 rept.
Intensity 80 - 100 per cent.
c) Weight training with 40% of weight of maximum load.
Half squat - 6 - 12 rept. x 2 sets.
Leg Press - 6 - 12 rept. x 2 sets.
Heel Raise - 6 - 12 rept. x 2 sets.
Step-up - 6 - 12 rept. x 2 sets.
Bench Press - 6 - 12 rept. x 2 sets
d) Limbering down.

**Tuesday - Active Rest.**

**Wednesday.**

a) 15 - 20 minutes warm-up.

b) 120 metres Ins and Outs run x 3 rept.

Intensity 80 - 100 per cent.

c) Weight training with 40% of weight of maximum load.

- Half Squat - 6 - 12 rept. x 2 sets.
- Left Press - 6 - 12 rept. x 2 sets.
- Heel Raise - 6 - 12 rept. x 2 sets.
- Step-up - 6 - 12 rept. x 2 sets.
- Bench Press - 6 - 12 rept. x 2 sets.

d) Limbering down.

**Thursday - Active Rest.**

**Friday.**

a) 15 - 20 minutes warm-up.

b) 60 metres acceleration run x 6 rept.

Intensity 80 - 100 per cent.

c) Weight training with 40% of weight of maximum load.

- Half Squat - 6 - 12 rept. x 2 sets.
- Left Press - 6 - 12 rept. x 2 sets.
- Heel Raise - 6 - 12 rept. x 2 sets.
- Step-up - 6 - 12 rept. x 2 sets.
- Bench Press - 6 - 12 rept. x 2 sets.
d) Limbering down.

Saturday - Active Rest.

(Fifth and Sixth Week)

Monday.

a) 15 - 20 minutes warm-up.

b) 80 metres acceleration run x 5 rept.

Intensity 80 - 100 per cent.

c) Weight training with 50% of weight of maximum load.

Half Squat  -  8 - 12 rept. x 2 sets.

Leg Press  -  8 - 12 rept. x 2 sets.

Heel Raise  -  8 - 12 rept. x 2 sets.

Step-up  -  8 - 12 rept. x 2 sets.

Bench Press  -  8 - 12 rept. x 2 sets.

d) Limbering down.

Tuesday - Active Rest.

Wednesday.

a) 15 - 20 minutes warm-up.

b) 120 metres Ins and Outs run x 4 rept.

Intensity 80 - 100 per cent.

c) Weight training with 50% of weight of maximum load.

Half Squat  -  8 - 12 rept. x 2 sets.

Leg Press  -  8 - 12 rept. x 2 sets.

Heel Raise  -  8 - 12 rept. x 2 sets.
Step-up  -  8 - 12 rept. x 2 sets.
Bench Press - 8 - 12 rept. x 2 sets.
d) Limbering down.

Thursday - Active Rest.

Friday.

a) 15 - 20 minutes warm-up.
b) 60 metres acceleration run x 6 rept.
Intensity 80 - 100 per cent.
c) Weight training with 50 % of weight of maximum load.
Half Squat  -  8 - 12 rept. x 2 sets.
Leg Press - 8 - 12 rept. x 2 sets.
Heel Raise - 8 - 12 rept. x 2 sets.
Step-up     - 8 - 12 rept. x 2 sets.
Bench Press - 8 - 12 rept. x 2 sets.
d) Limbering down.

Saturday - Active Rest.

(Seventh and Eighth Week)

Monday.

a) 15 - 20 minutes warm-up.
b) 80 metres acceleration run x 6 rept.
Intensity 80 - 100 per cent.
c) Weight training with 60% of weight of maximum load.
Half Squat  -  8 - 10 rept. x 3 sets.
Leg Press - 8 - 10 rept. x 3 sets.
Heel Raise - 8 - 10 rept. x 3 sets.
Step-up - 8 - 10 rept. x 3 sets.
Bench Press - 8 - 10 rept. x 3 sets.

d) Limbering down.

**Tuesday - Active Rest.**

**Wednesday.**

a) 15 - 20 minutes warm-up.

b) 120 metres Ins and Outs run x 5 rept.

Intensity 80 - 100 per cent.

c) Weight training with 60% of weight of maximum load.

Half Squat - 8 - 10 rept. x 3 sets.
Leg Press - 8 - 10 rept. x 3 sets.
Heel Raise - 8 - 10 rept. x 3 sets.
Step-up - 8 - 10 rept. x 3 sets.
Bench Press - 8 - 10 rept. x 3 sets.

d) Limbering down.

**Thursday - Active Rest.**

**Friday.**

a) 15 - 20 minutes warm-up.

b) 60 metres acceleration run x 7 rept.

Intensity 80 - 100 per cent.

c) Weight training with 60% of weight of maximum load.

Half Squat - 8 - 10 rept. x 3 sets.
Leg Press - 8 - 10 rept. x 3 sets.
Heel Raise - 8 - 10 rept. x 3 sets.
Step-up - 8 - 10 rept. x 3 sets.
Bench Press - 8 - 10 rept. x 3 sets.

d) Limbering down.

Saturday - Active Rest.

(Ninth and Tenth Week)

Monday.

a) 15 - 20 minutes warm-up.

b) 80 metres acceleration run x 6 rept.

Intensity 80 - 100 per cent.

c) Weight training with 60% weight of maximum load.

Half Squat - 10 - 12 rept. x 3 sets.
Leg Press - 10 - 12 rept. x 3 sets.
Heel Raise - 10 - 12 rept. x 3 sets.
Step-up - 10 - 12 rept. x 3 sets.
Bench Press - 10 - 12 rept. x 3 sets.

d) Limbering down.

Tuesday - Active Rest.

Wednesday.

a) 15 - 20 minutes warm-up.

b) 120 metres Ins and Outs Run x 5 rept.

Intensity 80 - 100 per cent.

c) Weight training with 60% weight of maximum load.
Half Squat - 10 - 12 rept. x 3 sets.
Leg Press - 10 - 12 rept. x 3 sets.
Heel Raise - 10 - 12 rept. x 3 sets.
Step-up - 10 - 12 rept. x 3 sets.
Bench Press - 10 - 12 rept. x 3 sets.
d) Limbering down.

Thursday - Active Rest.

Friday.

a) 15 - 20 minutes warm-up.

b) 60 metres acceleration run x 7 rept.

Intensity 80 - 100 per cent.

c) Weight training with 60% weight of maximum load.

Half Squat - 10 - 12 rept. x 3 sets.
Leg Press - 10 - 12 rept. x 3 sets.
Heel Raise - 10 - 12 rept. x 3 sets.
Step-up - 10 - 12 rept. x 3 sets.
Bench Press - 10 - 12 rept. x 3 sets.
d) Limbering down.

Saturday - Active Rest.

Group C

Training Programme of Harness Running

(Third and Fourth Week)

Monday.

a) 15 - 20 minutes warm-up.
b) 80 metres acceleration run x 4 rept.
Intensity 80 - 100 per cent.
c) Harness run 80 metres 6 - 8 rept. x 2 sets.
d) Limbering down.

**Tuesday - Active Rest.**

**Wednesday.**

a) 15 - 20 minutes warm-up.
b) 120 mètres Ins and Outs run x 3 rept.
Intensity 80 - 100 per cent
c) Harness run 80 metres 6 - 8 rept. x 2 sets.
d) Limbering down.

**Thursday - Active Rest.**

**Friday.**

a) 15 - 20 minutes warm-up.
b) 60 metres acceleration run x 6 rept.
Intensity 80 - 100 per cent.
c) Harness run 80 metres 6 - 8 rept. x 2 sets.
d) Limbering down.

**Saturday - Active Rest.**

(Fifth and Sixth Week)

**Monday.**

a) 15 - 20 minutes warm-up.
b) 80 metres acceleration run x 5 rept.
Intensity 80 - 100 per cent.

c) Harness run 80 metres 8 - 10 rept. x 2 sets.

d) Limbering down.

**Tuesday - Active Rest.**

**Wednesday.**

a) 15 - 20 minutes warm-up.

b) 120 metres Ins and Outs run x 4 rept.

Intensity 80 - 100 per cent.

c) Harness run 80 metres 8 - 10 rept. x 2 sets.

d) Limbering down.

**Thursday - Active Rest.**

**Friday.**

a) 15 - 20 minutes warm-up.

b) 60 metres acceleration run x 6 rept.

Intensity 80 - 100 per cent.

c) Harness run 80 metres 8 - 10 rept. x 2 sets.

d) Limbering down.

**Saturday - Active Rest.**

(Seventh and Eighth Week)

**Monday.**

a) 15 - 20 minutes warm-up.

b) 80 metres acceleration runs x 6 rept.

Intensity 80 - 100 per cent.
c) Harness run 80 metres - 8 - 10 rept. x 3 sets.

d) Limbering down.

**Tuesday - Active Rest.**

**Wednesday.**

a) 15 - 20 minutes warm-up.

b) 120 metres Ins and Outs run x 5 rept.

Intensity 80 - 100 per cent.

c) Harness run 80 metres 8 - 10 rept. x 3 sets.

d) Limbering down.

**Thursday - Active Rest.**

**Friday.**

a) 15 - 20 minutes warm-up.

b) 60 metres acceleration run x 7 rept.

Intensity 80 - 100 per cent.

c) Harness run 80 metres 8 - 10 rept. x 3 sets.

d) Limbering down.

**Saturday - Active Rest.**

(Ninth and Tenth Week)

**Monday.**

a) 15 - 20 minutes warm-up.

b) 80 metres acceleration run x 6 rept.

Intensity 80 - 100 per cent.
c) Harness Run 80 metres 10 - 12 rept. x 3 sets.
d) Limbering down.

Tuesday - Active Rest.

Wednesday.

a) 15 - 20 minutes warm-up.
b) 120 metres Ins and Outs run x 5 rept.
Intensity 80 - 100 per cent.
c) Harness run 80 metres 10 - 12 rept. x 3 sets.
d) Limbering down.

Thursday - Active Rest

Friday.

a) 15 - 20 minutes warm-up.
b) 60 metres acceleration run x 7 rept.
Intensity 80 - 100 per cent.
c) Harness run 80 metres 10 - 12 rept. x 3 sets.
d) Limbering down.

Saturday - Active Rest.

Statistical Analysis

To find out the effects of training, the following statistical techniques were adopted:

1. To find out the significance of differences between pre-test and post-test means 't' test was employed.
2. To find out the significance of mean differences among pre-test and post-test and adjusted mean analysis of variance and covariance techniques were employed, whereas ANCOVA was used to analyse the significance of differences among the training effects brought by different training means. Critical difference was applied to study the significance of differences between the ordered paired means in case where significant $F$-ratio was obtained.