Chapter - V

Summary, Conclusions and Recommendations
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SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY

Training induces physical and physiological changes in almost every system of the body. The changes resulting from training are influenced by the frequency, the duration and particularly, the intensity of the training program. The effects of training are specific according to the types of exercise performed, muscle groups involved and the training program used.

Bicycle ergometer training is one of the trainings very commonly used among the athletes for the development of speed, power, strength and endurance. Though many methods prevail to develop physiological, kinanthropometric, and performance variables, the role of Bicycle ergometer training is an undisputed one.

Many research studies have been carried out on the effect of bicycle ergometer training, but still the bone of contention is about the varied intensities and frequencies of bicycle ergometer training to get the maximum benefit. Hence, the investigator has made an attempt to study the effects of varied intensities and frequencies of bicycle ergometer training on physiological, kinanthropometric and performance variables. To achieve this purpose four experimental groups were selected by adopting random method.
The experimental group I underwent 50 revolutions per minute for 3 days per week of bicycle ergometer training, experimental group II underwent 50 revolutions per minute for 5 days per week, experimental group III underwent 60 revolutions per minute for 3 days per week and experimental group IV underwent 60 revolutions for 5 days per week of bicycle ergometer training.

One hundred and twenty college men students with age ranging from 18 to 25 years served as subjects. They were divided into four equal groups consisting of 30 each and called experimental groups I, II, III and IV.

The influence of varied intensities (revolutions) and frequencies (days) of bicycle ergometer training was assessed on selected physiological, kinanthropometric and performance variables.

The following dependent variables were assessed by using standard tests.

1. **Physiological variables**

   Resting pulse rate was measured by bio monitor and unit of measurement was number of beats per minute.

   Anaerobic power was measured by Margaria – Kalamen test and the unit of measurement was kilogram / meter / seconds.

   \( \text{VO}_2\text{Max} \) was measured by bench step test and “Astrand nomogram” and the unit of measurement was liters / Kg / minute.

2. **Kinanthropometric variables**

   Body weight was measured by standard weighing machine and the unit of measurement was kilogram.
Fat was measured by skinfold caliper and the unit of measurement was in millimeters and thereafter it was converted into body fat by using standard procedure.

Lean body mass was calculated by subtracting body fat from total body weight and the unit of measurement was kilograms.

3. **Performance variables**

100, 400 and 800 metres runs were conducted as per rules and regulations of International Amateur Athletic Federation and the unit of measurement was 1/100 of the seconds.

The reliability of data was established by test and retest method.

The subjects were trained 3 days and 5 days per week at the Department of Physical Education Health Education and Sports, Ayya Nadar Janaki Ammal College, Sivakasi. The load was fixed based on the ability of each subject prior to the training. Proper warming up and warm down exercises were given on the days of training. The intensity was increased by 5 % constantly every week throughout the training period by adopting overload principle. The experimental groups underwent training for 8 weeks. Subjects were tested on selected dependent variables before the commencement of training and also after the completion of training.

The experimental design used in this study was 2 x 2 factorial design. The obtained data were statistically analysed by using two-way analysis of variance for the mean gain scores of each dependent variable. Whenever the
interaction was significant, simple effects test was used to find out whether there existed significant differences among the dependent variables for different intensities and frequencies. No post hoc test was used, even though the simple effects test showed significant difference, since each cell consists of only two groups.

5.2 CONCLUSIONS

Based on the results of the study, the following conclusions have been arrived at.

1. Cadence of 60 revolutions per minute of bicycle ergometer training significantly improved anaerobic power, VO$_2$ Max, 100 metres and 400 metres running performance of college men students than 50 revolutions of bicycle ergometer training.

2. Fifty and sixty revolutions intensities of bicycle ergometer training did not improve resting pulse rate, body weight, body fat, lean body mass and 800 metres running performances of college men students.

3. Five days per week of bicycle ergometer training significantly improved resting pulse rate, anaerobic power, VO$_2$ Max, Fat, Lean body mass. 100, 400 and 800 metres running performances greater than three days per week of bicycle ergometer training.

4. Three days and five days frequencies of bicycle ergometer training did not improve the body weight of college men students.
Sixty revolutions for five days frequencies of bicycle ergometer training significantly improved, the resting pulse rate, anaerobic power, VO$_2$ Max and 100 metres running performance greater than sixty revolutions for 3 days, fifty revolutions for 5 days and fifty revolutions for 3 days of bicycle ergometer training.

5.3. RECOMMENDATIONS

The following recommendations have been made based on the results of the present study.

1. The sixty revolutions for five days of bicycle ergometer training is appropriate for improving physiological, kinanthropometric variables and performance in athletic events, such as 100, 400 and 800 metres running performance.

2. Similar study may also be conducted for female subjects.

3. Similar study may also be conducted for particular game and sports at various levels of participation.

4. Similar study may be conducted using varied intensities and frequencies by employing more experimental groups.

5. Studies of similar nature may also be conducted by changing the dependent variables.

6. Bicycle ergometer training may be given to improve the performance of athletic events.