CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS
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SUMMARY

The resistance training causes both acute and chronic changes in physical, physiological, haematological and bio-chemical parameters of the human body. Important changes occur in muscles, connective tissues, ligaments, tendons, nerves, bone mineral content, body composition, cardiovascular function, carbohydrate metabolism and bio-chemical parameters. (Fleek and Kraemier, 1987)

The present study was conducted to investigate the relative isotonic resistance training on selected physical, anthropometrical, haematological and biochemical variables among the nonathletes, who had no prior experience to any regular resistance training.

Sixty male healthy students of Madras Veterinary College, Chennai who were selected from the age group of 19 to 22 years. The subjects were not previously exposed to any regular resistance training programme. The subjects were randomly selected and assigned to four groups with each group comprising of fifteen subjects and the three experiment groups performed the following isotonic resistance training exercises namely, chest press, leg press
and shoulder press in a multigym and the arm curl exercise was performed by using free weights for a period of 12 weeks. The fourth group was the control group.

The one repetition maximum (1RM) of each subject was determined in the aforementioned isotonic resistance exercises and first, second and third groups trained with 40% of 1RM; 60% of 1RM and 80% of 1RM respectively.

All the initial tests were conducted using the standard methods, to assess the selected physical (muscular strength and muscular endurance), anthropometrical (percent body fat, chest circumference, thigh girth, forearm girth, upper arm relaxed and upper arm flexed girths), haematological (haemoglobin and red blood cells) and biochemical (blood glucose, total protein, albumin, globulin, blood cholesterol and blood lactate) variables. After the completion of 12 weeks training period, the post test scores of the above variables were measured.

The data collected prior to and after training in the selected dependent variables were statistically examined using the Analysis of Covariance (ANACOVA) as recommended by Clarke and Clarke (1972) and Best and Khan (1986). In all the cases, 0.05 was fixed as level of significance, which
was considered as appropriate. To verify the significant difference between the paired adjusted post test means, the Newman Keuls post hoc test was applied.

The 80% of 1 RM group showed maximum percent increase in post test scores when compared to 60% of 1 RM, 40% of 1 RM and control groups in muscular strength, chest circumference, thigh, forearm, upper arm (relaxed and flexed), girth measurements, haemoglobin, red blood cell count, total protein, albumin and blood lactate. The 60% of 1 RM group showed maximum percent increase in the post test scores of muscular endurance when compared to the other groups which were significant (P< 0.05) at 0.05 level.

The 80% of 1 RM group showed a significant (P<0.05) decrease in percent body fat and blood glucose when compared to all the other groups. There was no significant (P> 0.05) difference among the four groups in blood cholesterol and globulin.

CONCLUSIONS

The results obtained were classified, tabulated and presented through various diagrams for meaningful discussions and the following conclusions were drawn.

1. The greatest mean gain in muscular strength due to relative isotonic resistance training was obtained in 80% of 1 RM group due to a
greater increase in muscle bulk when compared to 60% and 40% of 1 RM and control groups.

2. The muscular endurance in 60% of 1 RM group of isotonic resistance training was more effective than 80%, 40% of 1 RM and control groups.

3. The relative isotonic resistance training with 40% 1 RM, 60% 1 RM and 80% 1 RM groups resulted in decrease of percent body fat when compared to the control group with the maximum decrease in 80% of 1 RM group.

4. The relative isotonic resistance training of 40%, 60% and 80% of 1 RM groups were associated with relative increase in chest circumference, thigh girth, forearm girth and upper arm girth (relaxed and flexed) when compared to the control group, with the maximum increase observed in 80% of 1 RM group.

5. The relative isotonic resistance training groups at 40% of 1 RM 60% of 1 RM and 80% of 1 RM showed higher increase in haemoglobin values when compared to the control group. Of the three groups the maximum gain was obtained in 80% of 1 RM group than the 60% of 1 RM, 40% of 1 RM and control groups.
6. The relative isotonic resistance training with 40% of 1 RM, 60% of 1 RM and 80% of 1 RM showed a decrease in blood glucose when compared to the control group. The 80% of 1 RM resulted in a greater decrease in blood glucose level than 60% and 40% of 1 RM groups suggesting that glucose utilisation was higher at 80% of 1 RM since it is predominantly a short term anaerobic activity.

7. The relative resistance training groups for total protein and albumin at 40% of 1 RM, 60% of 1 RM and 80% of 1 RM showed a higher increase when compared to the control group. Both 60% of 1 RM and 80% of 1 RM groups showed a higher mobilisation of total protein and albumin than 40% of 1 RM group and the control group.

8. The relative isotonic resistance training group of 40% of 1 RM, 60% of 1 RM and 80% of 1 RM demonstrated an increase in blood lactate level when compared to the control group with the 80% of 1 RM showing a higher turn over in blood lactate level due to increased anaerobic activity than the 60% of 1 RM and 40% of 1 RM groups.
RECOMMENDATIONS

The following recommendations are made based on the findings of this study.

1. The isotonic resistance training may be used by coaches and physical educators to design optimum relative resistance training programme for the improvement of muscular strength, muscular endurance and muscle girth of athletes.

2. The relative resistance training load based on 1 RM could be manipulated by varying the number of repetitions, sets, order of resistance and load to the requirements of specific individual or team sports for the development of muscular strength and endurance.

3. The knowledge of positive increase in haematological variables due to relative resistance training could be utilised by physical educators and coaches to enhance the aerobic capacity of the athletes.

4. The specific role of important biochemical variables, namely, total protein and albumin could be further investigated regarding their contribution in mobilisation and utilisation in muscle fiber damage, repair, growth and development.
5. The variation in the utilisation of glucose and net production of blood lactate at different relative resistance training intensities could be used to design suitable training programme at fatigue threshold levels of the athletes.

6. Research studies may also be conducted utilising the relative resistance training in combination with other training methods to improve the anthropometrical, motor and fitness components of athletes in different sports and games.

7. Similar studies may be conducted to compare the effect of relative isotonic resistance training between athletes and nonathletes and also for different age groups.

8. Similar studies may be conducted among state and national level athletes to further strengthen the findings of the present study.

9. Similar studies could be conducted on school children to assess the maturity related changes due to regular resistance training, and

10. Studies could also be conducted on women subjects to assess the specific sex related physiological changes in physical and anthropometrical variables due to relative resistance training.