CHAPTER-V
SUMMARY, CONCLUSIONS & RECOMMENDATION

Summary

This research was undertaken to study the effectiveness of biofeedback and autogenic training on performance of Indian sport persons. Sport persons of three disciplines were considered as population of the present study. These three disciplines were Archery, Boxing, and Judo respectively. The experimental design of the present study is a type of true experimental design. Randomized two groups pre-test, post-test experimental design was used for the present study.

Subjects were consisted of 60 sport persons of national level which includes 20 Archers, 20 Boxers, and 20 Judo players for experimental group and 60 sport persons of national level which includes 20 Archers, 20 Boxers, and 20 Judo players for control group. The sport persons were selected and found to be similar on the basis of age, sports discipline and sex for Archery, Boxing, and Judo respectively.

The main purpose of this study was to test the effectiveness of biofeedback and autogenic training on the dependent variables such as: Reactionability (Simple visual reaction time, Choice visual reaction time, Simple audio reaction time, Choice audio reaction time), Coordination (Eye-hand co-ordination time, Eye-hand co-ordination error), Concentration (Hand steadiness), Anxiety/Stress (Galvanic skin resistance basal value, Galvanic skin Resistance relax value), Heart rate respectively for Archery, Boxing and Judo sport discipline.

All the subjects of experimental group and control group from Archery, Boxing, and Judo sports disciplines were clearly instructed along with demonstration about pre-testing of dependent variables. After pre-testing both the groups for all the 3 sports discipline. Results of pre-testing were noted on the framed result sheet.

Biofeedback and autogenic training which includes heaviness and warmness exercises along with general relaxation technique and self hypnosis therapy was given to each subjects of the experimental group of Archery, Boxing, and Judo sports discipline as per the schedule given in Chapter 3 respectively for fifteen days. There was no treatment / therapy given to any subjects of the control group of Archery, Boxing, and Judo sports disciplines.

On sixteenth day, post-testing of dependent variables was conducted on experimental group and control group from Archery, Boxing, and Judo sports disciplines. Results of post-testing of all dependent variables were noted on the framed result sheet.
The results of pre-test and post-test of the experimental group and control group of each experiment were computed separately for Archery, Boxing, and Judo sports disciplines respectively. The necessary statistical analysis, t-test, F-test, and adjusted t-test (which reflects the adjusted t-value after removing the effect of pre-test score on post-test score). These tests were done to find out the significant difference and to test the effectiveness of biofeedback and autogenic training on various dependent variables. Results are given separately for each dependent variable from table 4.1 to table 4.10 for Archery sports discipline, table 4.11 to table 4.20 for Boxing sports discipline, and table 4.21 to table 4.30 for Judo sports disciplines given in chapter 4.

**Conclusions**

Some general conclusions which are derived from the various types of analysis are reported below:

1. The independent variable, Biofeedback combined with autogenic training had effect on dependent variables, i.e., simple visual reaction time, choice visual reaction time, simple audio reaction time, and choice audio reaction time. Biofeedback combined with autogenic training has helped Hockey experimental group to improve their Reactionability, whereas there was no change in Hockey control group which were not given treatment. Biofeedback combined with autogenic training has been effective to improve the **Reactionability** of Hockey.

2. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variables, i.e., eye hand coordination time, and eye hand coordination error. The combination of Biofeedback and autogenic training has helped Hockey experimental group to improve Coordination, whereas there was no change in Hockey control group which were not given treatment. Biofeedback combined with autogenic training has been effective to improve the **Coordination** of the Hockey.

3. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variable, hand steadiness. The combination of Biofeedback and autogenic training has helped Hockey experimental group to improve Concentration and attention, whereas there was no change in Hockey control group which were not given treatment. Biofeedback combined with autogenic training has been effective to improve the **Concentration** of the Hockey.

4. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variables, i.e., Galvanic skin resistance basal value, and Galvanic skin resistance relax value. The combination of Biofeedback and autogenic training has helped Hockey experimental group to reduce their anxiety level and improve their relaxation, whereas there was no change in Hockey control group which were not given treatment. Biofeedback combined with autogenic
training has been effective to reduce / control anxiety / stress and improve their relaxation and voluntary control of the Hockey.

5. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variable, Heart rate. The combination of Biofeedback and autogenic training has helped Hockey experimental group to reduce heart rate, whereas there was no change in Hockey control group which were not given treatment. Biofeedback combined with autogenic training has been effective to reduce / control the heart rate of the Hockey.

6. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variables, ie., simple visual reaction time, choice visual reaction time, simple audio reaction time, and choice audio reaction time. Biofeedback combined with autogenic training has helped Handball players experimental group to improve their Reaction ability, whereas there was no change in Handball players control group which were not given treatment. Biofeedback combined with autogenic training has been effective to improve the Reaction ability of Handball players.

7. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variables, ie., eye hand coordination time, and eye hand coordination error. The combination of Biofeedback and autogenic training has helped Handball players experimental group to improve Coordination, whereas there was no change in Handball players control group which were not given treatment. Biofeedback combined with autogenic training has been effective to improve the Coordination of the Handball players.

8. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variable, hand steadiness. The combination of Biofeedback and autogenic training has helped Handball players experimental group to improve Concentration and attention, whereas there was no change in Handball players control group which were not given treatment. Biofeedback combined with autogenic training has been effective to improve the Concentration of the Handball players.

9. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variables, ie., Galvanic skin resistance basal value, and Galvanic skin resistance relax value. The combination of Biofeedback and autogenic training has helped Handball players experimental group to reduce their anxiety level and improve their relaxation, whereas there was no change in Handball players control group which were not given treatment. Biofeedback combined with autogenic training has been effective to reduce / control anxiety / stress and improve their relaxation and voluntary control of the Handball players.
10. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variable, Heart rate. The combination of Biofeedback and autogenic training has helped Handball players experimental group to reduce heart rate, whereas there was no change in Handball players control group which were not given treatment. Biofeedback combined with autogenic training has been effective to reduce / control the heart rate of the Handball players.

11. The independent variable, Biofeedback combined with autogenic training had effect on dependent variables, ie., simple visual reaction time, simple audio reaction time, and choice audio reaction time, whereas there was no change in choice visual reaction time. Biofeedback combined with autogenic training has helped Football players experimental group to improve their Reaction ability. Biofeedback combined with autogenic training has been partly effective to improve the Reaction ability of Football players.

12. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variables, ie., eye hand coordination time, and eye hand coordination error. The combination of Biofeedback and autogenic training has helped Football players experimental group to improve Coordination, whereas there was no change in Football players control group which were not given treatment. Biofeedback combined with autogenic training has been effective to improve the Coordination of the Football players.

13. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variable, hand steadiness. The combination of Biofeedback and autogenic training has helped Football players experimental group to improve Concentration and attention, whereas there was no change in Football players control group which were not given treatment. Biofeedback combined with autogenic training has been effective to improve the Concentration of the Football players.

14. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variables, ie., Galvanic skin resistance basal value, and Galvanic skin resistance relax value. The combination of Biofeedback and autogenic training has helped Football players experimental group to reduce their anxiety level and improve their relaxation, whereas there was no change in Football players control group which were not given treatment. Biofeedback combined with autogenic training has been effective to reduce / control anxiety / stress and improve their relaxation and voluntary control of the Football players.

15. The independent variable, Biofeedback combined with Autogenic training had effect on dependent variable, Heart rate. The combination of Biofeedback and autogenic training has helped Football players experimental group to reduce heart rate, whereas there was no change in Football players control group which were...
Biofeedback combined with autogenic training has been effective to reduce / control the **heart rate** of the Football players.

Overall results for all the three sports disciplines clearly shows that independent variable the biofeedback and autogenic training is effective on all the ten dependent variables i.e., simple visual reaction time, choice visual reaction time, simple audio reaction time, choice audio reaction time, eye hand coordination time, eye hand coordination error, hand steadiness, galvanic skin resistance basal value, galvanic skin resistance relax value, and heart rate under study with reference to Archery, Boxing, and Judo sports disciplines. After testing thirty hypothesis and results it has been clearly indicated that the combination of Biofeedback and autogenic training is helpful in performance enhancement of Hockey, Handball players, & Football players. This program is successful in Archery, Boxing, and Judo sports disciplines.

**Recommendations**

1. This types of study may be conduct in indoor sports discipline like, gymnastics, badminton, table tennis on same parameters.
2. This types of study may be conduct in outdoor sports discipline like, Athletics, Lawn Tennis, Archery, Shooting, etc….. sports disciplines can be considered on same parameters
3. Reaction time, coordination, concentration, anxiety, neuro-muscular coordination, etc….dependent variables can be considered in experimentation for various types of scientific studies on national, international level in different sports.
4. A similar study can conduct on same sports disciplines with various dependent variables of motor fitness, physiology, bio mechanics, sports sociology and hematology.
5. Cricket, Hockey, Volleyball, Basketball, Baseball, Handball, Kho-Kho, Kabbadi, etc….. sports disciplines can be consider as outdoor team sports. Further researches on such outdoor team sports disciplines can be done with autogenic, Electro dermal response changes and relaxation technique
6. Effectiveness of various exercises can be tested on various systems of the body and comparative study also can be done
7. Various programs and drills can be develop and implemented to the concerned sports persons for correction of their skills. Effectiveness of such program also can be tested for various types of research
8. Various diet programs can be prepared with the help of dietitian and nutritionist and implemented on the players to test the effectiveness of the diet program. Anthropometric measurements can be done and recorded as data.

9. Sports physiotherapists are integral part of the many national, international teams. Different programs can be prepared with experts regarding various exercises and can be given to sports persons to test the effectiveness of the program and also for the performance enhancement.

10. Therapeutic massage gives physiological relaxation whereas autogenic training gives mental relaxation to sports person. This analysis can be done for further research in this area.

11. Various Biofeedback Electromyogram, (EMG), Alfa Encephalography (Alfa EEG ), Electrocardiogram (ECG), can be used along with autogenic training to prepare scientific program involving various variables like reaction time, coordination, concentration, attention, heart rate, hand steadiness, anthropometric measurement etc… and different –different types of study can be done on any sports discipline by involving various other variables. This type of study can test the effectiveness of the program and also helpful in performance enhancement.