

CHAPTER – V

**SUMMARY, CONCLUSIONS
AND RECOMMENDATIONS**

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5.1. SUMMARY

Volleyball is a sport that involves a number of distinct methods of strength training and conditioning considerations. It shares similarities with softball on one level and cricket on another level. To succeed as a volleyball player in elite competition, the athlete must develop a wide range of physical skills. The ideal volleyball player is often tall and physically very limber. All players, irrespective of their height, will be agile, possessive of explosive leaping ability, a superior vertical jump, and balance.

The techniques involved in successful volleyball play are built on repetitive drills and the simulation of various game situations along with honing a combination of physical and mental skills. Effective volleyball strength training is premised on building the best musculoskeletal structure possible to perfect these game skills. Volleyball training, as with any sport, is designed through the application of the complex training principle. Complex training is the use of heavy resistance training immediately followed by a plyometric activity with a biomechanically similar movement pattern (Ebben, 2000). Having this concept in view, when striving for the means and methods to achieve this object, it is observed that varied modalities of complex training with varied nature of intensity, load, frequency and duration may be a viable source. For this the study has been designed entitle “Effect of varied training modalities of complex training and combined resistance training and plyometric training programme on muscle fitness parameters, physiological variables and skill performance of male volleyball players”.

The methodology used in the present study is described below:

To achieve the purpose of the study, ninety six players were selected as samples from the qualified teams of the quarter finals in the Acharya Nagarjuna University Inter-Collegiate Tournaments. To ensure the quality in selection of samples, as a criterion overall playing ability was considered. The overall playing ability of selected samples was assessed by a team of three experts including the investigator, by using ten point rating scale of the ninety six volleyball players, eighty players were selected excluding the players who scored lower and upper quarter. Finally 80 male volleyball players were selected as subjects for the present study. The selected subjects were equally divided into four groups. Group I underwent Combination of Resistance Training followed by Plyometric Training in the Same Session (CRTPT), Group II underwent Complex Training of Resistance Training followed by Matched Plyometric Training in the same session (CTR TMPT), Group III underwent Resistance Training for six weeks followed by Complex Training of Resistance Training with Matched Plyometric Training for another six weeks (RTCTR TMPT) and Group IV was Control Group (CG). All the three experimental groups were treated with respective training for one and a half hours per day for three days a week for a period of twelve weeks. The subjects were tested on muscle fitness parameters (upper body muscular strength, lower body muscular strength, abdominal muscular strength and endurance, upper body muscular power, lower body muscular power), physiological (aerobic capacity, anaerobic capacity) and skill performance variables (serving ability, passing ability and overall playing ability) before the training was administered (pre-test), and after the completion of the training (twelve weeks post-test). The readings on variables were recorded carefully in their respective units. The collected data were treated with both univariate and multivariate statistical analysis to test objective of the present study.

5.2 Results

Upper body muscular strength

The experimental groups RTCTRTMPT, CTRTMPT and CRTPT showed significant increase in the upper body muscular strength: 5.45 kg, 3.50 kg and 2.35 kg respectively from pre to post training.

The RTCTRTMPT group was found significantly better than ($p < .05$) the CTRTMPT group and CRTPT group and the CTRTMPT group was better than the CRTPT group in increasing the upper body muscular strength as measured by bench press.

Lower body muscular strength

The experimental groups RTCTRTMPT, CTRTMPT and CRTPT showed significant increase in the lower body muscular strength: 5.30 kg, 4.35 kg and 3.40 kg respectively from pre to post training.

The RTCTRTMPT group was found significantly better than ($p < .05$) the CTRTMPT group and CRTPT group and the CTRTMPT group was better than the CRTPT group in increasing the lower body muscular strength as measured by half squat.

Abdominal muscular strength and endurance

The experimental groups RTCTRTMPT, CTRTMPT and CRTPT showed significant increase in the abdominal muscular strength and endurance: 3.85 nos, 2.45 nos and 1.75 nos respectively from pre to post training.

The RTCTRTMPT group was found significantly better than ($p < .05$) the CTRTMPT group and CRTPT group and the CTRTMPT group was better than the CRTPT group in increasing the abdominal muscular strength and endurance as measured by modified sit-ups.

Upper body muscular power

The experimental groups RTCTRTMPT, CTRTMPT and CRTPT showed significant increase in the upper body muscular power: 0.54 meters, 0.41 meters and 0.29 meters respectively from pre to post training.

The RTCTRTMPT group was found significantly better than ($p < .05$) the CTRTMPT group and CRTPT group and the CTRTMPT group was better than the CRTPT group in increasing the upper body muscular power as measured by seated medicine ball throw .

Lower body muscular power

The experimental groups RTCTRTMPT, CTRTMPT and CRTPT showed significant increase in the lower body muscular power: 10.00 cms, 7.95cms and 6.25cms respectively from pre to post training.

The RTCTRTMPT group was found significantly better than ($p < .05$) the CTRTMPT group and CRTPT group and the CTRTMPT group was better than the CRTPT group in increasing the lower body muscular power as measured by vertical jump.

Aerobic capacity

The experimental groups RTCTRTMPT, CTRTMPT and CRTPT showed significant increase in the aerobic capacity: 4.96 ml/kg/min, 4.45 ml/kg/min and 5.71 ml/kg/min respectively from pre to post training.

The RTCTRTMPT group was found significantly better than ($p < .05$) the CTRTMPT group and CRTPT group and the CTRTMPT group was better than the CRTPT group in increasing the aerobic capacity as measured by Queen College 3 minute step test.

Anaerobic capacity

The experimental groups RTCTRTMPT, CTRTMPT and CRTPT showed significant increase in the anaerobic capacity: 129.60 kg/mts/sec, 90.35 kg/mts/sec and 47.75 kg/mts/sec respectively from pre to post training.

The RTCTRTMPT group was found significantly better than ($p < .05$) the CTRTMPT group and CRTPT group and the CTRTMPT group was better than the CRTPT group in increasing the anaerobic capacity as measured by modified margarita kalamen power test.

Serving ability

The experimental groups RTCTRTMPT, CTRTMPT and CRTPT showed significant increase in the serving ability: 4.95 points, 3.55 points and 2.30 points respectively from pre to post training.

The RTCTRTMPT group was found significantly better than ($p < .05$) the CTRTMPT group and CRTPT group and the CTRTMPT group was better than the CRTPT group in increasing the serving ability as measured by Russell-launge volleyball test.

Passing ability

The experimental groups RTCTRTMPT, CTRTMPT and CRTPT showed significant increase in the serving ability: 4.30 points, 3.10 points and 2.20 points respectively from pre to post training.

The RTCTRTMPT group was found significantly better than ($p < .05$) the CTRTMPT group and CRTPT group and the CTRTMPT group was better than the CRTPT group in increasing the serving ability as measured by Russell-launge repeated volleyball test.

Overall playing ability

The experimental groups RTCTRTMPT, CTRTMPT and CRTPT showed significant increase in the overall playing ability: 0.95 points, 0.58 points and 0.41 points respectively from pre to post training.

The RTCTRTMPT group was found significantly better than ($p < .05$) the CTRTMPT group and CRTPT group and the CTRTMPT group was better than the CRTPT group in increasing the overall playing ability as measured by judges ratings.

5.3. CONCLUSIONS

On the basis of the findings, the followings conclusions are drawn.

1. The combination of resistance training followed by plyometric training, complex training of resistance training followed by matched plyometric training and complex training preceded with resistance training improved or increased the upper body muscular strength, lower body muscular strength, abdominal muscular strength and endurance, upper body muscular power, lower body muscular power, aerobic capacity, anaerobic capacity and serving, passing, overall playing ability from pre to post training.
2. Complex Training of Resistance Training followed by Matched Plyometric Training in the same session produced a significant improvement in upper body muscular strength, lower body muscular strength, abdominal muscular strength and endurance, upper body muscular power, lower body muscular power, aerobic capacity, anaerobic capacity and serving, passing, overall playing ability better than the Combination of Resistance Training followed by Plyometric Training in the same session.
3. Resistance Training for first six weeks followed by Complex Training of Resistance Training with Matched Plyometric Training for another six weeks in the same session is more effective than the Combination of Resistance Training followed by Plyometric Training in the same session and Complex Training of

Resistance Training followed by Matched Plyometric Training in the same session in increasing the upper body muscular strength, lower body muscular strength, abdominal muscular strength and endurance, upper body muscular power, lower body muscular power, aerobic capacity, anaerobic capacity and serving, passing, overall playing ability.

4. Combination of Resistance Training followed by Plyometric Training in the same session, Complex Training of Resistance Training followed by Matched Plyometric Training in the same session and Resistance Training for first six weeks followed by Complex Training of Resistance Training with Matched Plyometric Training for another six weeks in the same session produced a significant improvement on selected muscle fitness parameters, physiological and skill performance variables than the control group. .

5.4 RECOMMENDATIONS

Based on the results of the study, the following recommendations have been made.

1. In the present study, the effect of varied training modalities is explained positively on muscle fitness parameters and skill performance variables of volleyball players, the physical education teachers, trainers and coaches can prefer this type of training so as to achieve their aim in time.
2. The concept behind complex training (performing powerful muscle contractions in a fatigued state) is that it may produce stimulus more specific to what would be experienced on the playing field. This study also proved that complex training increases the muscle fitness parameters, physiological and skill performance variables of volleyball players. Hence the volleyball coaches must use this complex training in the conditioning and training programme to increase the performance of volleyball players.

3. In the present study it has been proved that the resistance training with plyometric training preceded with resistance training enhances the selected muscle fitness parameters, physiological and skill performance variables of volleyball players. This is due to integrating the plyometrics with resistance training which requires the players to perform the plyometrics exercises in a fatigue stage, resulting in potentially increasing power production. Hence the volleyball players can use this type of training as a module in order to achieve high level skill performance in the game of volleyball.
4. Complex training is essentially a facelift to another older training technique, combined training (resistance training and plyometrics), which has been reached quite extensively. The coaches and physical education personnels can use this training strategy for power and strength development of the volley ball players.
5. In a combined training routine, a player performs a heavy set of traditional resistance training exercise, which is followed almost immediately by a plyometric exercise. In this study this type of combination proves to be effective in developing the fitness variables and skill performance, the coaches can utilize this training strategy for better performance of the players.
6. Another training strategy is known as complex training in which a player alternates biomechanically similar high load resistance training exercises with plyometric exercises, set for set, in the same workout. Since this type of training also proves to be effective in developing the fitness parameters and skill performance of the volley ball players the coaches can utilize this technique in their conditioning programme to develop the fitness and skill performance.
7. It is another new training strategy which is better than all other strategies is the complex training preceded with resistance training. In this study this new training strategy proved to be better than combined resistance training and complex training in developing the fitness variables. This technique can be

used by all coaches to improve the performance of the volley ball players. It is recommended that coaches must be mindful of individual strength levels, and be prepared to varied training modalities on power combination workout training.

8. In selecting the physical exercises while designing the training program, it is recommended that the form of exercise should have the structure of the skills instead of a static one.
9. To have the better psychological adaptations and to overcome the monotonous modules during the course it is also suggested that the application of varied training modalities to players is significant one.
10. It is recommended that while imparting the combining strength oriented and power oriented training, coaches should avoid high volume, shortest period training before power training.
11. It is recommended that the complex training may be useful for other set of populations by modifying the load, repetition and volume.
12. It is recommended that the complex training may be given to the players for high level performance during the competition periods.