International Journal of Current Research and Modern Education (IJCRME)
Impact Factor: 6.725, ISSN (Online): 2455 - 5428
(www.rdmodernresearch.com) Volume 2, Issue 1, 2017

COMPARATIVE ANALYSIS OF TARGETED CIRCUIT AND RESISTANCE TRAINING PROTOCOLS ON REACTION TIME PERFORMANCE IN CRICKET PLAYERS

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Cite This Article: A. Praveen Kumar, "Comparative Analysis of Targeted Circuit and Resistance Training Protocols on Reaction Time Performance in Cricket Players", International Journal of Current Research and Modern Education, Volume 2, Issue 1, Page Number 279-282, 2017.

Abstract:

Objectives: The purpose of this study was to examine the effects of structured circuit training and resistance training programs on reaction time performance among collegiate male cricket players. The study also aimed to compare the relative effectiveness of these two training methods in improving reaction time.

Materials and Methods: Sixty male intercollegiate cricket players aged 18-25 years were selected and randomly divided into three groups: Circuit Training Group (CTG), Resistance Training Group (RTG) and Control Group (CG). The experimental groups participated in a 12-week structured training program, while the control group continued routine cricket practice without additional intervention. Reaction time was assessed using ruler drop tests and computerized visual reaction time tests. Statistical analysis was conducted using paired and independent sample t-tests, with the level of significance set at $p < .05$.

Results: Both CTG and RTG demonstrated statistically significant improvements in reaction time performance ($p < .05$), whereas the control group showed no significant improvement. The circuit training group exhibited greater enhancement in reaction time compared to the resistance training group.

Conclusion: Structured circuit and resistance training programs significantly improve reaction time among collegiate cricket players, with circuit training proving more effective. Incorporating circuit-based exercises into cricket conditioning programs is recommended to enhance performance and decision-making ability during play.

Key Words: Circuit Training, Resistance Training, Reaction Time, Physical Fitness, Cricket Players.

Introduction:

Reaction time is an essential component of athletic performance that refers to the ability to respond quickly and accurately to a stimulus. In competitive sports, faster reaction time enhances movement efficiency, coordination, anticipation and decision-making ability. According to sports performance research, reaction time plays a critical role in improving skill execution and reducing errors during high-intensity sporting situations. Cricket is a highly demanding sport that requires exceptional perceptual and motor abilities. Players must respond rapidly to visual and auditory stimuli during batting, bowling, fielding and wicket-keeping activities. Batters need quick reactions to judge ball speed, swing and bounce, while fielders require rapid responses to catches, throws and ground fielding situations. Similarly, bowlers and wicket-keepers rely heavily on neuromuscular coordination and reflexive movements for successful performance. Delayed reaction time may negatively affect match performance and increase the risk of mistakes during crucial game situations.

To improve sport-specific performance variables, coaches often implement structured conditioning programs. Circuit training involves performing a sequence of exercises with minimal rest intervals, targeting multiple physical fitness components simultaneously. This method improves cardiovascular endurance, muscular coordination, agility, neuromuscular efficiency and reaction ability through dynamic movement patterns and continuous activity. Resistance training, in contrast, focuses on developing muscular strength and power through progressive overload techniques using free weights, resistance bands or machines. Improved muscular strength and neural adaptation resulting from resistance exercises may positively influence reaction speed and movement execution.

Although previous studies have investigated the influence of circuit and resistance training on physical fitness variables such as strength, endurance, agility and speed, limited research has specifically examined their comparative effects on reaction time performance among cricket players. Considering the importance of rapid responses in cricket, identifying the most effective training method for enhancing reaction time is valuable for coaches and trainers. Therefore, the present study aims to investigate and compare the effects of targeted circuit training and resistance training protocols on reaction time performance among collegiate cricket players.

Materials and Methods:

Participants:

Sixty male intercollegiate cricket players aged between 18 and 25 years from Aditya College of Engineering, Surampalem, Andhra Pradesh, participated in the study. All participants were actively involved in regular cricket training and intercollegiate competitions. Participants were medically fit, healthy and free from

musculoskeletal injuries or neurological disorders that could affect training or testing procedures. Before participation, all subjects were informed about the purpose and procedures of the study. Written informed consent was obtained from all participants and the study followed standard ethical guidelines for research involving human subjects.

Experimental Design:

The study adopted a longitudinal experimental design involving 60 male collegiate cricket players who were randomly assigned into three equal groups consisting of 20 participants each: Circuit Training Group (CTG), Resistance Training Group (RTG) and Control Group (CG). The participants in the experimental groups underwent a structured 12-week training intervention specifically designed to improve reaction time performance. The Circuit Training Group participated in dynamic multi-station exercises emphasizing agility, coordination and rapid movement execution, while the Resistance Training Group engaged in progressive strength-training exercises using external resistance. In contrast, the Control Group continued their regular cricket practice and daily physical activities without any additional specialized training intervention. Reaction time performance of all participants was assessed before and after the training period using standardized testing procedures to determine the effectiveness of the respective training protocols.

Training Protocol:

The training program was conducted for a period of 12 weeks, six days per week, under the supervision of qualified trainers. Each training session consisted of a 10-minute warm-up involving light jogging, mobility exercises and dynamic stretching activities to prepare the participants physically and mentally for the workout. This was followed by a 60-minute main workout session and concluded with a 10-minute cool-down period that included relaxation exercises and static stretching to reduce muscular fatigue and improve recovery.

Circuit Training Group (CTG):

The Circuit Training Group (CTG) participated in a series of multiple exercise stations designed to improve reaction time, agility, coordination and neuromuscular efficiency. The training activities included agility drills, ladder exercises, shuttle runs, medicine ball throws, reaction ball drills and plyometric exercises performed with minimal rest intervals between stations. These exercises emphasized rapid movement execution, quick response to external stimuli and continuous body movement patterns.

Resistance Training Group (RTG):

The Resistance Training Group (RTG) engaged in a structured resistance training program using free weights, resistance bands and machine-based exercises. The exercises included squats, lunges, bench press, shoulder press, dead lifts and explosive resistance drills aimed at improving muscular strength, power and neuromuscular coordination. The principle of progressive overload was systematically applied throughout the training period to ensure gradual improvement in performance.

Control Group (CG):

The control group continued their routine cricket practice without participating in any specialized conditioning program.

Measurement of Reaction Time:

Reaction time performance was assessed using standardized testing procedures, including the Ruler Drop Test and the Computerized Visual Reaction Time Test. These tests were conducted under controlled conditions before and after the 12-week training intervention. The scores obtained during the pre-test and post-test sessions were recorded and analyzed to determine the effectiveness of the training protocols on reaction time performance among collegiate cricket players.

Statistical Analysis:

Data were analyzed using SPSS version 20. Paired sample t-tests were used to determine within-group differences between pre-test and post-test scores. Independent sample t-tests were applied to compare differences between groups. The level of significance was set at $p < 0.05$. Data are presented as mean ± standard deviation.

Table I: Comparison of Pre-Test and Post-Test Scores on Reaction Time

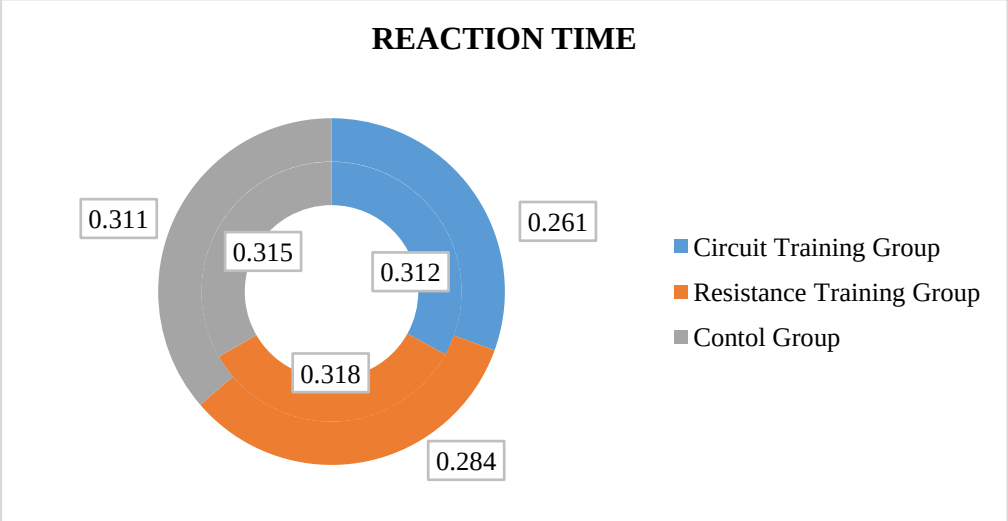
Group	Pre-test Mean	Post-test Mean	Mean Difference	SD	t-ratio	p
Circuit Training Group	0.312	0.261	0.051	0.02	8.14*	0.000
Resistance Training Group	0.318	0.284	0.034	0.03	5.02*	0.000
Control Group	0.315	0.311	0.004	0.04	1.12	0.276

* Significant at 0.05 level of confidence.

The findings of the present study revealed significant improvements in reaction time among both experimental groups following the 12-week training intervention. The Circuit Training Group (CTG) demonstrated the greatest improvement, with reaction time scores decreasing from 0.312 seconds during the pre-test to 0.261seconds during the post-test, indicating faster response ability. This improvement was statistically significant ($t = 8.14$, $p = 0.000$).Similarly, the Resistance Training Group (RTG) showed a significant improvement in reaction time performance, with scores improving from 0.318 seconds to

0.284seconds (t = 5.02, p = 0.000). In contrast, the Control Group (CG) displayed only minimal improvement from 0.315 seconds to 0.311seconds, which was not statistically significant (t = 1.12, p = 0.276).These results indicate that both circuit and resistance training methods positively influence reaction time performance among collegiate cricket players, with circuit training producing superior improvements.

Figure 1: Doughnut Chart Illustrating the Pretest and Post-Test Mean Values of the Circuit Training Group Resistance Training Group and Control Group on Reaction Time



Discussion:

The purpose of this study was to compare the effects of circuit training and resistance training on reaction time performance among collegiate cricket players. The findings demonstrated that both experimental groups significantly improved reaction time after the 12-week intervention period, while the circuit training group showed greater enhancement than the resistance training group. The superior improvement observed in the CTG may be attributed to the dynamic and sport-specific nature of circuit exercises, which involve rapid body movements, agility tasks, coordination drills and quick responses to external stimuli. These activities stimulate neuromuscular adaptation and improve sensory-motor coordination, thereby enhancing reaction ability.

Resistance training also produced significant improvements in reaction time, likely due to increased muscular strength, neural recruitment and movement efficiency. However, because resistance training primarily focuses on force production rather than rapid movement execution, its effect on reaction time may be comparatively lower than that of circuit training.

The absence of significant improvement in the control group emphasizes the importance of structured conditioning programs in enhancing performance-related fitness variables among cricket players. The findings of this study support previous research indicating that dynamic training methods and neuromuscular conditioning exercises effectively improve reaction speed, coordination and athletic performance in competitive sports.

Conclusion:

The present study concludes that both circuit training and resistance training significantly improve reaction time performance among collegiate cricket players. However, circuit training demonstrated greater effectiveness due to its dynamic, multi-movement exercise structure that enhances neuromuscular coordination and rapid response ability. The results suggest that incorporating structured circuit training into regular cricket conditioning programs can effectively improve reaction time, decision-making ability and overall sports performance while reducing performance errors during competition.

References:

1. Baechle, T. R., & Earle, R. W. (2008). Essentials of strength training and conditioning (3rd ed.). Human Kinetics.
2. Behm, D. G., & Sale, D. G. (1993). Velocity specificity of resistance training. Sports Medicine, 15(6), 374-388.
3. Bompa, T. O., & Haff, G. G. (2009). Periodization: Theory and methodology of training (5th ed.). Human Kinetics.
4. Fleck, S. J., & Kraemer, W. J. (2014). Designing resistance training programs (4th ed.). Human Kinetics.
5. Ghosh, A. K. (2017). Physical and physiological demands of cricket players. International Journal of Sports Science and Physical Education, 2(3), 45-50.

6. Kumar, R., & Sharma, P. (2021). Effect of circuit training on selected motor fitness variables among college cricket players. International Journal of Physical Education and Sports Sciences, 6(2), 22-28.
7. Mathew, J., & Joseph, S. (2022). Comparative effect of resistance and circuit training on performance variables among athletes. Journal of Sports Research, 9(1), 34-40.
8. Ratamess, N. A. (2012). ACSM's foundations of strength training and conditioning. Wolters Kluwer.
9. Singh., & Sharma. (2020). Neuromuscular coordination and reaction ability in sports performance. Indian Journal of Physical Education and Sports Sciences, 15(2), 55-61.
10. Thomas, K., & Reddy, M. (2023). Influence of circuit-based conditioning on reaction time and agility among collegiate athletes. International Journal of Exercise Science, 11(4), 78-84.
11. Verma., & Patel. (2024). Effects of resistance training on motor performance variables in cricket players. Journal of Sports Conditioning and Research, 8(1), 14-21.
12. Yadav, P., & Singh, H. (2021). Importance of reaction time in batting and fielding performance among cricket players. Asian Journal of Sports Medicine, 5(3), 66-72.
13. Bishop, D., Girard, O., & Mendez-Villanueva, A. (2011). Repeated-sprint ability - Part II: Recommendations for training. Sports Medicine, 41(9), 741-756.
14. Chaouachi, A., Chamari, K., Wong, P., Castagna, C., Chaouachi, M., Moussa-Chamari, I., & Behm, D. G. (2014). Stretch and sprint training reduces reaction time and improves athletic performance in trained athletes. Journal of Strength and Conditioning Research, 28(4), 1021-1029.
15. Sheppard, J. M., & Young, W. B. (2006). Agility literature review: Classifications, training and testing. Journal of Sports Sciences, 24(9), 919-932.
16. Young, W., James, R., & Montgomery, I. (2002). Is muscle power related to running speed with changes of direction? Journal of Sports Medicine and Physical Fitness, 42(3), 282-288.
17. Zorbas, Y. G., & Kakurin, L. I. (2018). Neuromuscular adaptations and reaction time improvements following circuit and resistance training programs in athletes. International Journal of Sports Physiology and Performance, 13(5), 611-618.