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EFFECTS OF SIX WEEKS OF CIRCUIT TRAINING ON SELECTED MOTOR FITNESS VARIABLES AMONG MALE KABADDI PLAYERS

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ABSTRACT

The purpose of the study was to examine the effects of six weeks of circuit training on selected motor fitness variables among male kabaddi players. Thirty male kabaddi players aged between 18 and 25 years were randomly selected from affiliated colleges in Tamil Nadu and divided into two equal groups, namely an experimental group (n = 15) and a control group (n = 15). The experimental group underwent circuit training for six weeks, five days per week, whereas the control group continued their regular routine activities without additional training. The selected motor fitness variables were speed, agility, explosive power, and muscular endurance. The variables were assessed using the 50-meter dash, shuttle run, standing broad jump, and sit-up test respectively. The collected data were analyzed using mean, standard deviation, paired sample t-test, independent sample t-test, and Analysis of Covariance (ANCOVA). The results revealed significant improvement in speed, agility, explosive power, and muscular endurance among the experimental group when compared to the control group at the 0.05 level of significance. The findings indicate that circuit training is an effective conditioning method for improving motor fitness performance among kabaddi players.

KEYWORDS*: Circuit training, motor fitness, kabaddi, agility, explosive power, muscular endurance*

1. INTRODUCTION

Kabaddi is one of the most popular indigenous sports in India and has evolved into an internationally recognized competitive sport because of its dynamic and physically demanding nature (Ghosh, 2022). The game requires players to perform repeated bouts of acceleration, deceleration, tackling, lunging, and rapid directional changes within a short duration (Sharma & Singh, 2021). Successful performance in kabaddi depends largely on physical fitness components such as speed, agility, muscular endurance, balance, and explosive power (Prasad, 2020).

Modern kabaddi is categorized as a high-intensity intermittent sport that predominantly relies on anaerobic energy systems and neuromuscular coordination (Wilmore et al., 2021). Players are required to execute offensive and defensive skills efficiently while resisting fatigue throughout the match. Therefore, development of motor fitness variables is essential for improving sports performance (Kansal, 2021).

Motor fitness refers to the ability to perform skilled movements effectively and efficiently and includes speed, agility, strength, endurance, coordination, and flexibility (Kansal, 2021). Improved motor fitness enables kabaddi players to react quickly, maintain balance, execute raids effectively, and perform defensive techniques efficiently during competition (Sharma & Singh, 2021).

Scientific conditioning methods are increasingly being adopted in sports training programmes to improve athletic performance. Among these methods, circuit training is considered one of the most effective approaches because it develops multiple fitness components simultaneously (Hoffmann, 2020). Circuit training consists of a sequence of exercises performed continuously with minimal rest intervals between stations and combines both aerobic and anaerobic conditioning exercises (Morgan & Anderson, 1953).

Previous studies have reported that circuit training significantly improves agility, muscular endurance, speed, and explosive power among athletes (Makaruk et al., 2021). Research conducted on kabaddi players also demonstrated significant improvements in selected physical fitness variables following systematic circuit training programmes (Suresh Kumar, 2022; Deepak Kumar et al., 2023). Furthermore, elastic-band-based circuit training has been shown to improve directional agility among kabaddi athletes (Utama et al., 2022).

2. OBJECTIVES OF THE STUDY

1. To determine the effect of circuit training on speed among kabaddi players.
2. To analyze the effect of circuit training on agility among kabaddi players.
3. To examine the effect of circuit training on explosive power among kabaddi players.

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4. To study the effect of circuit training on muscular endurance among kabaddi players.

3. HYPOTHESIS

It was hypothesized that circuit training would produce significant improvement in selected motor fitness variables among kabaddi players.

4. METHODOLOGY

4.1 Selection of Subjects

Thirty male kabaddi players aged between 18 and 25 years were randomly selected from affiliated colleges in Tamil Nadu. The subjects had experience in intercollegiate-level kabaddi competitions and were medically fit to participate in the training programme.

4.2 Inclusion Criteria

- Male kabaddi players aged 18–25 years
- Participation in regular kabaddi training
- No history of major injury during the study period

4.3 Exclusion Criteria

- Players with musculoskeletal injuries
- Players undergoing other specialized training programmes
- Players absent for more than three training sessions

4.4 Ethical Considerations

The study protocol was approved by the Institutional Research Committee. Informed consent was obtained from all participants prior to data collection.

4.5 Grouping of Subjects

The selected subjects were randomly divided into two equal groups:

- Experimental Group (n = 15)
- Control Group (n = 15)

4.6 Variables Selected

Independent Variable

- Circuit Training

Dependent Variables

- Speed
- Agility
- Explosive Power
- Muscular Endurance

5. CRITERION MEASURES

Variables	Tests
Speed	50 Meter Dash
Agility	Shuttle Run
Explosive Power	Standing Broad Jump
Muscular Endurance	Sit-Up Test

6. TRAINING PROGRAMME

The experimental group underwent circuit training for six weeks, five sessions per week, with each training session lasting 45–60 minutes. Minimal rest intervals were maintained between exercise stations.

Circuit Training Schedule

Exercise	Duration/Repetitions	Sets	Rest Interval
Burpees	30 seconds	3	20 sec
Push-Ups	15 repetitions	3	20 sec
Squat Jumps	20 repetitions	3	20 sec
Shuttle Runs	30 seconds	3	30 sec
Sit-Ups	25 repetitions	3	20 sec
High Knees	30 seconds	3	20 sec
Jump Rope	60 seconds	3	30 sec
Plank Hold	45 seconds	3	30 sec

The intensity and workload were progressively increased during the training period. The control group did not participate in any additional training programme apart from their routine activities.

7. STATISTICAL TECHNIQUE

The collected data were statistically analyzed using the following techniques:

- Mean
- Standard Deviation
- Paired Sample t-test
- Independent Sample t-test
- Analysis of Covariance (ANCOVA)

The level of significance was fixed at 0.05.

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8. RESULTS AND DISCUSSION

Table 1
Descriptive Statistics of Pre-Test and Post-Test Scores

Variable	Group	Pre-Test Mean ± SD	Post-Test Mean ± SD
Speed (sec)	Experimental	7.52 ± 0.31	7.11 ± 0.28
	Control	7.48 ± 0.29	7.46 ± 0.30
Agility (sec)	Experimental	11.42 ± 0.45	10.78 ± 0.39
	Control	11.39 ± 0.41	11.35 ± 0.43
Explosive Power (cm)	Experimental	201.35 ± 8.42	216.64 ± 7.85
	Control	202.11 ± 8.25	203.02 ± 8.11
Muscular Endurance (reps)	Experimental	28.13 ± 2.84	34.42 ± 3.11
	Control	28.45 ± 2.91	28.88 ± 2.95

The descriptive statistics indicated noticeable improvement in all selected motor fitness variables among the experimental group following six weeks of circuit training.

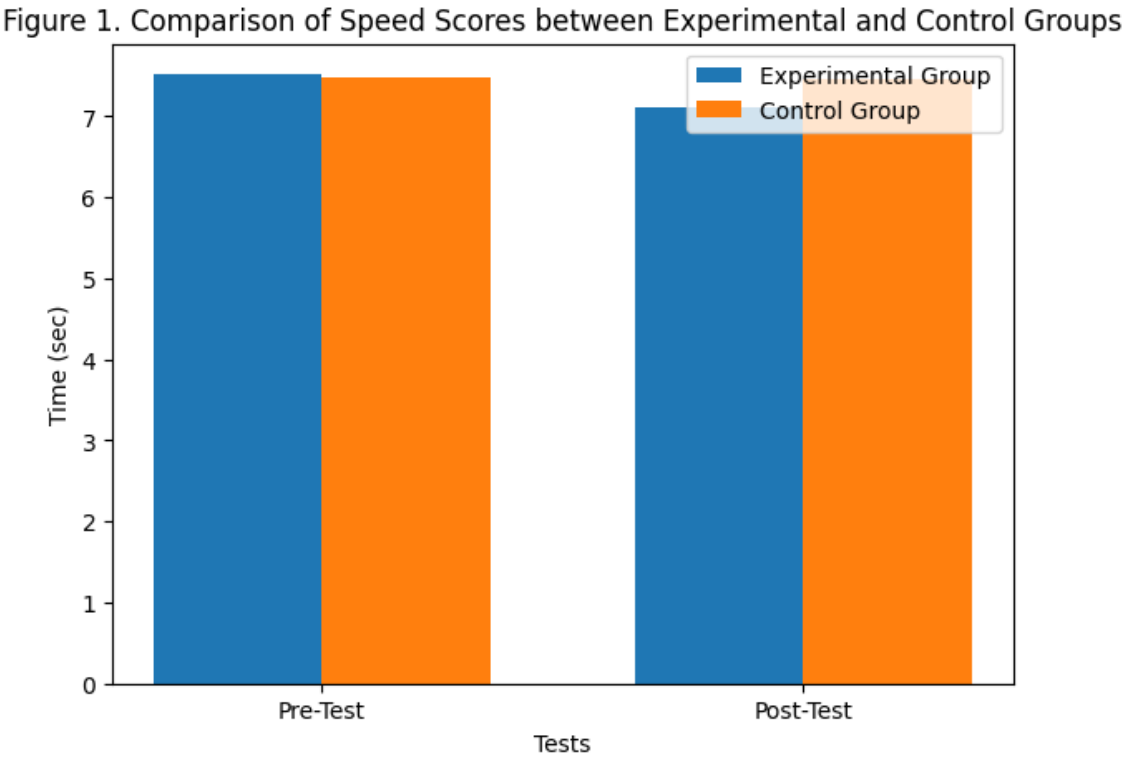
Table 2
Paired Sample t-Test for Experimental Group

Variable	Pre-Test Mean	Post-Test Mean	Mean Difference	t-value
Speed (sec)	7.52	7.11	0.41	4.87*
Agility (sec)	11.42	10.78	0.64	5.13*
Explosive Power (cm)	201.35	216.64	15.29	6.24*
Muscular Endurance (reps)	28.13	34.42	6.29	5.76*

*Significant at 0.05 level (Table value = 2.14)

The obtained t-values were greater than the required table value, indicating significant improvement in selected motor fitness variables among the experimental group.

Figure 1
Comparison of Speed Scores between Experimental and Control Groups



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The graphical representation indicates that the experimental group demonstrated greater improvement in speed performance compared to the control group after six weeks of circuit training.

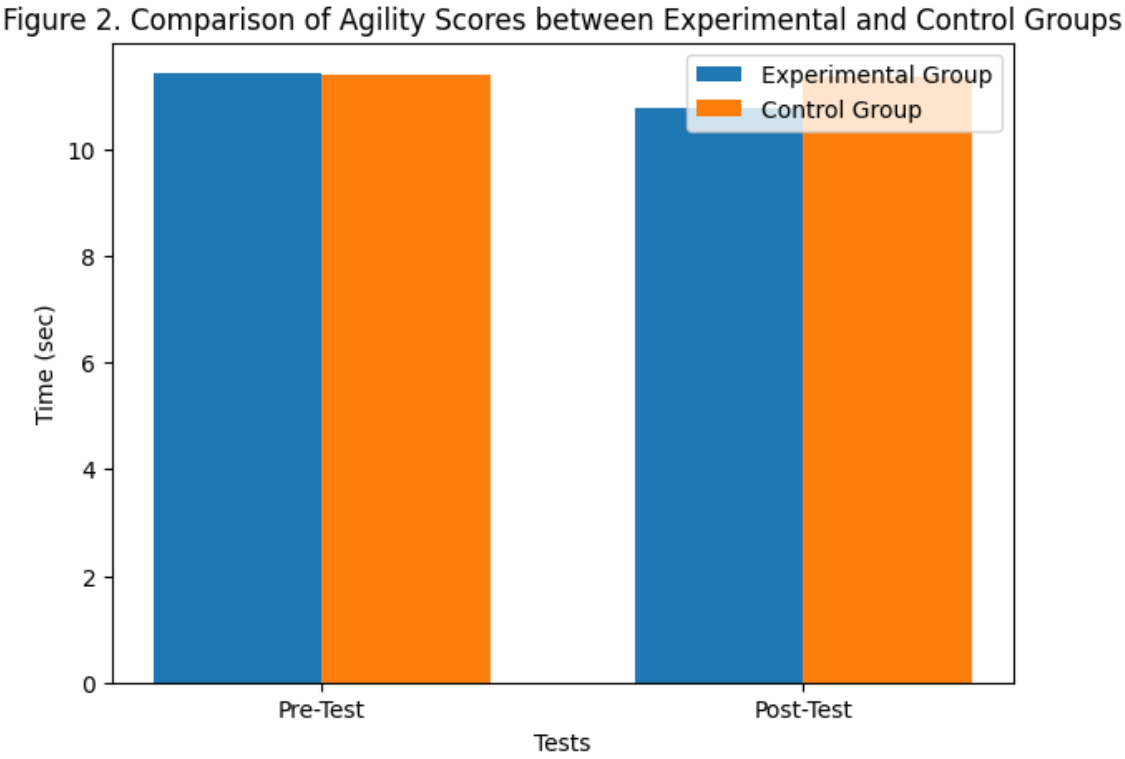
Table 3
Independent Sample t-Test on Post-Test Scores

Variable	Experimental Mean	Control Mean	Mean Difference	t-value
Speed (sec)	7.11	7.46	0.35	3.28*
Agility (sec)	10.78	11.35	0.57	3.91*
Explosive Power (cm)	216.64	203.02	13.62	4.76*
Muscular Endurance (reps)	34.42	28.88	5.54	4.25*

*Significant at 0.05 level (Table value = 2.05)

The post-test comparison revealed significant differences between the experimental and control groups in all selected motor fitness variables.

Figure 2
Comparison of Agility Scores between Experimental and Control Groups



The graphical representation clearly shows improvement in agility among the experimental group compared to the control group.

8.4 Analysis of Explosive Power

The obtained results revealed considerable improvement in explosive power among the experimental group following circuit training intervention.

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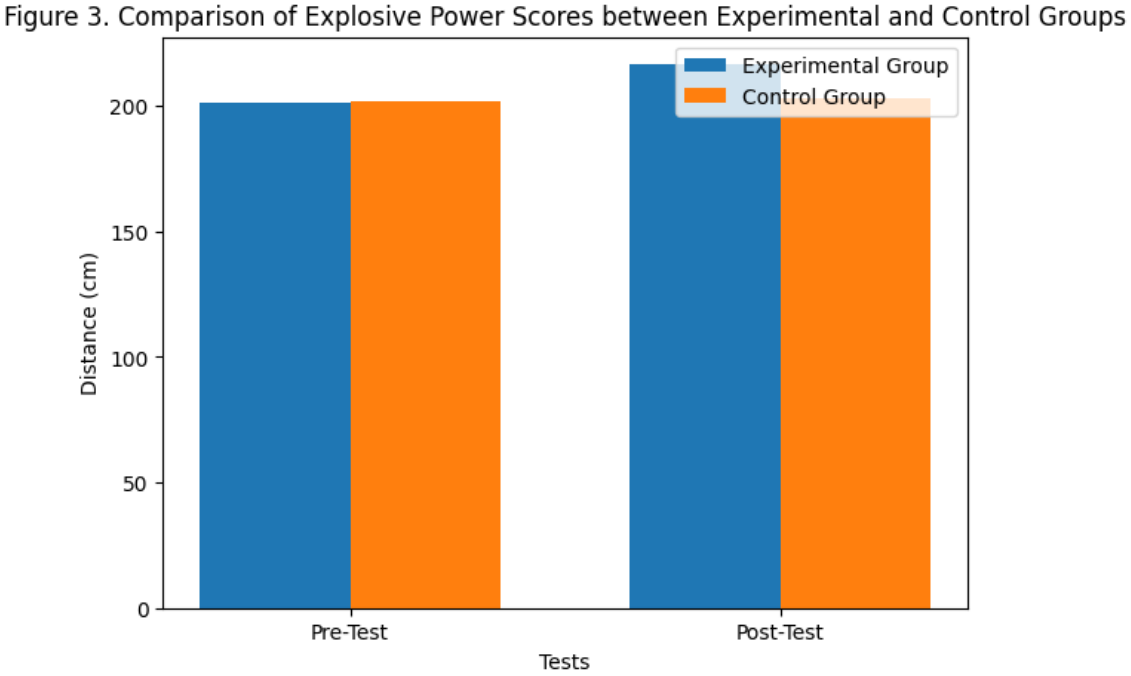
Figure 3
Comparison of Explosive Power Scores between Experimental and Control Groups



The graphical representation clearly shows improvement in explosive power among the experimental group after six weeks of circuit training.

8.5 Analysis of Muscular Endurance

The muscular endurance scores significantly improved among the experimental group after the training period.

Figure 4
Comparison of Muscular Endurance Scores between Experimental and Control Groups

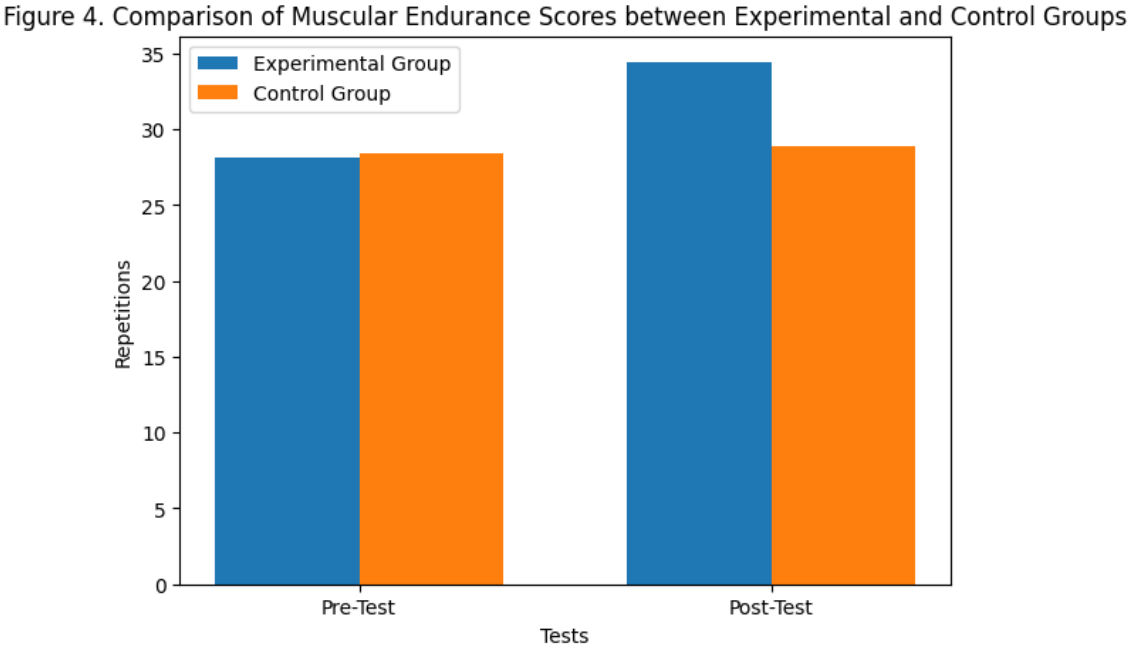


Figure 4 shows a marked increase in muscular endurance performance among the experimental group compared to the control group.

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Table 4
Analysis of Covariance (ANCOVA)

Variable	Source of Variance	SS	df	MS	F-ratio
Speed	Between Groups	1.42	1	1.42	8.52*
	Within Groups	4.50	27	0.17	
Agility	Between Groups	2.31	1	2.31	9.74*
	Within Groups	6.40	27	0.24	
Explosive Power	Between Groups	865.42	1	865.42	11.28*
	Within Groups	2071.63	27	76.73	
Muscular Endurance	Between Groups	132.14	1	132.14	10.36*
	Within Groups	344.28	27	12.75	

*Significant at 0.05 level

The obtained F-ratios were greater than the required table value at the 0.05 level of significance. Hence, it was concluded that circuit training significantly improved selected motor fitness variables among kabaddi players.

DISCUSSION

The findings of the present study revealed significant improvement in speed, agility, explosive power, and muscular endurance among kabaddi players following six weeks of circuit training. The improvement may be attributed to enhanced neuromuscular coordination, anaerobic efficiency, and muscular strength developed through systematic circuit exercises (Hoffmann, 2020).

Circuit training combines aerobic and anaerobic conditioning exercises, which improve cardiovascular efficiency, muscular endurance, and explosive performance (Faigenbaum & Myer, 2021). The improvement in explosive power observed in the present study may be associated with enhanced recruitment of fast-twitch muscle fibers and improved neuromuscular synchronization developed through repeated high-intensity exercises (Zatsiorsky & Kraemer, 2020).

The present findings are in agreement with earlier studies conducted by Makaruk et al. (2021), Deepak Kumar et al. (2023), and Karuppaiah and Kumar (2022), who reported significant enhancement in physical fitness and athletic performance following structured circuit training programmes.

9. CONCLUSION

Based on the findings of the present study, it was concluded that six weeks of structured circuit training produced significant improvement in selected motor fitness variables such as speed, agility, explosive power, and muscular endurance among male kabaddi players. The experimental group demonstrated better performance in all selected variables when compared to the control group, indicating the effectiveness of circuit training as a scientific conditioning method for kabaddi athletes.

The improvement observed in the motor fitness variables may be attributed to the combined aerobic and anaerobic nature of circuit training, which enhances neuromuscular coordination, cardiovascular efficiency, muscular strength, and overall physical conditioning. The training programme enabled the players to perform repeated high-intensity movements more efficiently, which is essential for successful performance in kabaddi.

The findings of the study clearly indicate that circuit training is highly beneficial for improving physical fitness characteristics required for raiding, defending, rapid directional changes, acceleration, and sustained performance during competitive matches. Since kabaddi is a physically demanding sport involving continuous movement and body contact, the enhancement of motor fitness variables plays a crucial role in improving overall playing ability and reducing fatigue during competition.

Therefore, coaches, trainers, and physical education professionals may incorporate structured circuit training programmes into regular practice schedules to improve motor fitness and sports performance among kabaddi players. The present study also suggests that circuit training can be effectively used as an economical, practical, and time-efficient training method for developing multiple fitness components simultaneously.

Further research may be conducted by including larger sample sizes, different age groups, female kabaddi players, and longer training durations to obtain more comprehensive findings related to circuit training and sports performance.

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