

Assessing The Role of Pre-Season Kabaddi Training on Visceral Fat and Performance Metrics

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Abstract

Background: Periodization is the process of organizing training programs and workout routines in a strategic way to reach peak athletic performance. Both off-season and in-season training are crucial for an athlete's development and performance. Off-season training is about growth and preparation, while in-season training focuses on maintaining gains and optimizing performance during competitions.

Aim: The purpose of the present study was to find out the effect of traditional pre-season Kabaddi training on selected performance variables namely speed, agility, foot-tapping, VO_{2max} and visceral fat.

Methods: A total of ten Kabaddi raiders were randomly selected from the Gandhigram Rural Institute (Deemed to be University), Gandhigram, Dindigul, Tamilnadu state, India. The selected subjects were underwent traditional pre-season Kabaddi training for six days per week up to eight weeks. Training volume and load was changed after five weeks. Selected Kabaddi players visceral fat and performance metrics speed, agility, foot-tapping and VO_{2max} were tested before and after the experimental period by following standardized test 50 yards, 10 X 4 meters shuttle run, foot tapping test and Yo-Yo intermittent recovery test respectively. The collected data were statistically examined by dependent 't' test.

Results: Due to the influence of the traditional pre-season training significantly reduce visceral fat level and improve the VO_{2max} level significantly ($P < 0.05$).

Conclusions: Eight weeks of traditional pre-season training enhance the Kabaddi players' straight line linear power are improved at the same time foot tapping control and change of direction ability are lagging.

Keywords: Kabaddi, Pre-season training, visceral fat, performance metrics, speed, agility, foot-tapping and VO_{2max} .

Introduction

In the contemporary sporting landscape, Kabaddi has garnered immense popular appeal, successfully capturing the attention of the entire global sports community. Played under the same name for centuries, Kabaddi is fundamentally a traditional training regimen historically practiced by Tamils to physically prepare themselves for *Jallikattu* (bulltaming) competitions. Following the inception of the 'Pro Kabaddi League,' the sport has experienced a significant resurgence and received widespread acclaim;

nevertheless, comprehensive research remains essential to effectively propel this sport forward and elevate its reach to a global scale.

To further enhance the quality and prestige of Kabaddi, the integration of modern technologies and innovative strategies is indispensable. Significant strides have been made in introducing technologies similar to those utilized in sports such as Cricket, Tennis and Football into the game of Kabaddi. These advancements include mandating the use of VAR (Video Assistant Referee) technology during matches, imparting the nuances of the game to young players through Kabaddi-centric video logs (Vlogs), and employing digital training tools to enhance players' physical fitness and strength. It was established that body weight plays a crucial role for 'Raiders' in the sport of Kabaddi; however, this weight should not be excessive—ideally, it should not exceed 85 kgs and must be maintained alongside a high level of physical fitness. Addressing the impact of these emerging trends, my ongoing research presented through a series of subsequent articles aims to drive the sport of Kabaddi forward. As a primary outcome of this impact, researchers' preliminary studies revealed the following:

Sivakumar et al. 2025a highlights how the body composition plays a key role in raiders' performance. Additionally, escalations in shedding of fat percentage leads to decline the building of the muscle mass. Based on the positive and negative body re-composition, the coaches, trainers, and athletes, understand the effectiveness of their training programme and to re-design or modify their training schedule according to the players' body composition.

Sivakumar et al. 2025b revealed the underlying key factors of the raiders' performance. Through the video analytical approach, researchers navigate the running bonus technique of south zone inter-university, Pro-Kabaddi Season 9 and 69th Men Senior National Kabaddi raiders in a bigger wisdom. Building upon these studies, **Sivakumar and Sugumar, 2026a** utilized the thermal image methodology to examine the accuracy of raiders' foot placement while they secured a bonus point. In continuation of the earlier studies, **Sivakumar and Sugumar, 2026b** designed to visualize the raiders' foot mechanics in a real-time manner by using smart insole's qualitative video and quantitative data while they executing bonus skill. The smart insole system provides real-time data on foot pressure, balance, and movement patterns, offering a scientific and objective method to evaluate players' bonus technique. Moreover, Salter Smart Insole is a user-friendly system with powerful insights which helps the players to learn and refine the basic movements, calibrate or recalibrate the execution of skills and sustain his/her performance. Additionally, the analysis of movement patterns provides valuable insights for coaches and players to enhance performance. Based on the above facts the researchers gained valuable insights into athlete development, performance enhancement, and the practical applications of technologies in sports. Inspired by the previous study outcomes, researchers focuses on analyzing the cause and effect of training on key fitness components such as body composition, endurance, speed, agility, and foot tapping control. The aim of this work is to create a structured pathway to comprehend the training plan and enabling the players to accomplish higher performance.

Objectives

1. To find-out the effect of traditional pre-season training on Kabaddi players' straight-line linear power.

2. To assess the impact of pre-season training on movement control and change of direction ability of the raiders.
3. To measure the traditional pre-season training on visceral fat level.

Methodology

Selection of Subjects

A total of ten Kabaddi raiders were randomly selected from the Gandhigram Rural Institute (Deemed to be University), Gandhigram, Dindigul, Tamilnadu state, India and they were regular participants of organized Kabaddi tournaments. Raiders’ height, weight, BMI, visceral fat, speed, agility, VO_{2max} , right and left Foot-tapping control were assessed two days prior to and after the traditional pre-season training programme. Raiders’ anthropometric, body composition and performance metrics were assessed by following testing procedure.

**TABLE:1
CRETERION MESURES**

Category	Parameters	Instrument/ test	Unit of Measurement
Anthropometrics	Height	Wall mounted manual height measuring scale (EASYCARE, China.)	Centimeter
	Weight	Weighing machine	Kg
Body Composition	BMI	Weight (kgs) / Height (m) ²	Numbers
	Visceral fat	Karada Scan (BIA Method)	Numbers
Performance metrics	Speed	50 yards dash	Seconds
	Agility	Shuttle run	Seconds
	Vo2max	Yo-Yo intermittent Recovery test: Level -1	MI/kg/min.
	Right and left Foot-tapping control	Foot tapping test - Video Analysis Method	Numbers

Height

Height was measured to the nearest 0.1 cm using a (EASYCARE, China.) wall mounted manual height measuring scale.

Body Mass

Body mass was measured prior to and after the treatment by using a calibrated digital weighing machine (SAMSO, India.). After emptying the bowl, the body Mass were obtained in minimal clothing.

Body Composition

Body composition profile of the bowlers was assessed by (OMRON Karada Scan HBF 362, India) Body Fat Analyzer.

Performance Metrics

Raiders’ speed, agility and Vo_{2max} was tested by conducting 50 yards dash, Shuttle run and Yo-Yo intermittent Recovery test: Level -1 respectively.

Right and left Foot-tapping test (FTT)

The FTT is a simple, non-invasive tool used to assess lower extremity motor function and upper motor neuron integrity. Following a practice trial, the subjects carried out the subsequent test trial. Participants are asked to stand with their feet on the mat surface and on the signal "go" they tap their forefoot as rapidly as possible for 30 seconds. The entire test procedure was video-graphed for assessment purposes. The researcher counted the number of taps (right and left foot) through recorded videos. <https://www.topendsports.com/videos/testing/speed/a-test-for-foot-speed/>

Training Programme

The selected subjects were underwent traditional pre-season Kabaddi training for six days per week up to eight weeks. Training volume and load was changed after five weeks. The traditional pre-season training schedule was presented in table 2. Every day the workout lasted for 30 to 40 minutes approximately. Raiders underwent their traditional pre-season training programme under strict supervision. Prior to every training session, participants underwent 10-15 minutes warm-up exercises, which included jogging, stretching, and assisting exercises such as push-ups, parallel squats and crunches. All the participants involved in the training programmes were questioned about their stature throughout the training period. None of them reported any injuries. However, muscle soreness was reported in the early weeks, but it subsided later.

TABLE: 2
PRE-SEASON TRADITIONAL KABADDI TRAINING PLAN

Day	Session	Exercise / Training / Drills	Numbers of drills in		Number of Sets in		Duration of Exercise	Density Between Sets
			1- 4 weeks	5-8 weeks	1- 4 weeks	5-8 weeks		
Monday	Morning	ABC drills	6	8	2	3	25 min.	6-8 minutes
	Evening	Offensive and defensive Drills	6	8	2	3	25 min.	6-8 minutes

Tuesday	Morning	Slow Continuous Run	60% intensity	70% intensity	1		40 Min.	--
	Evening	Baby hurdle workout	6	8	2	3	25 min.	6-8 minutes
Wednesday	Morning	Hurdle workout	6	8	2	3	25 min.	6-8 minutes
	Evening	Isometric exercises	6	8	2	3	25 min.	6-8 minutes
Thursday	Morning	Medicine ball exercise (5kg)	6	8	3	5	25 min.	6-8 minutes
	Evening	Circuit training	6 stations		2	3	25 min.	6-8 minutes
Friday	Morning	Fartlek training	60% intensity	70% intensity	1		30 Min.	--
	Evening	Core strengthening	6	8	3	5	25 min.	6-8 minutes
Saturday	Morning	ABC drills	6	8	3	5	25 min.	6-8 minutes
	Evening	Offensive and defensive Drills	6	8	3	5	25 min.	6-8 minutes

Analysis of Data

Table 3 exhibits the raiders’ variation in body weight, body composition and performance metrics of the raiders in pre and post treatment.

TABLE: 3
DESCRIPTIVE STATISTICS ON VARIABLES KABADDI RAIDERS

Category	Parameters	Mean ± S.D.		Minimum		Maximum	
		Pre	Post	Pre	Post	Pre	Post
Anthropometrics	Height	174.02 ± 5.61		168.20		187.00	
	Weight	68.8 ± 6.04	67.15 ± 4.77	55.40	57.80	78.60	76.00
Body Composition	BMI	22.75 ± 2.26	76.00	19.39	19.33	26.26	25.39
	Visceral fat	6.40 ± 2.170	4.20 ± 1.873	2.00	1.00	9.00	7.00
Performance metrics	Speed	7.43 ± 0.47	7.11 ± 0.35	6.45	6.69	8.19	7.85
	Agility	9.44 ± 0.46	9.68 ± 0.58	8.77	8.70	10.06	10.28
	Vo _{2max}	44.30 ± 2.55	46.96 ± 2.21	41.80	43.50	48.80	49.50
	Right Foot-tapping control	121.30 ± 8.43	120.30 ± 6.60	102	107	134	133
	left Foot-tapping control	121.30 ± 8.78	120.50 ± 6.72	101	108	135	134
N		10					

Table 3 clearly absorbed that the ten raiders' height ranges from 168.20 to 187.00 centimeters. Differences in body weight and visceral fat are evident among the ten raiders. In terms of raiders' body weight and visceral fat, the observed differences between pre and post are 1.65 and 2.2 respectively. In terms of raiders' speed, agility and Vo_{2max} the observed differences between pre and post are 0.32, 0.24 and 2.6 respectively. In terms of raiders' right and left foot tapping, the observed differences between pre and post are 1. and 0.8 respectively.

Before and after the traditional pre-season Kabaddi training, raiders’ visceral fat level and performance metrics such as speed, agility, Vo_{2max} level and Right and left Foot tapping control were measured. Measured data were statically analyzed by using dependent ‘t’ test and presented in table 4 & 5.

TABLE 4

THE SUMMARY OF MEAN AND DEPENDENT ‘t’-TEST FOR THE PRE AND POST TEST ON VISCERAL FAT, SPEED AND AGILITY OF THE RAIDERS

Tests	Visceral Fat	Speed	Agility
Pre-test (Mean ± S.D.)	6.40±2.170	7.43±0.466	9.44±0.457
Post-test (Mean ± S.D.)	4.20±1.873	7.11±0.348	9.68±0.575
S.E.M	0.4422	0.1534	0.1760
‘t’ test	4.975*	2.118	1.363

* $t_{0.05}(9) = 2.262$

From the table it was understood that the preseason traditional training had significantly decreased the visceral fat level. However, Speed and agility performance was not improved significantly.

TABLE 5

THE SUMMARY OF MEAN AND DEPENDENT ‘t’-TEST FOR THE PRE AND POST TEST ON ENDURANCE RIGHT AND LEFT FOOT TAPPING OF THE RAIDERS

Tests	Vo2max	Right	left
		Foot Tapping	
Pre-Test (Mean ± SD)	44.30±2.54	121.30 ± 8.43	121.30 ± 8.78
Post-Test (Mean ± SD)	46.96±2.20	120.30 ± 6.60	120.50 ± 6.72
‘t’ test	3.92*	0.785	0.629

* $t_{0.05}(9) = 2.262$

From the table it was understood that the preseason traditional training had significantly improved the Vo_{2max} level. However, right and left foot tap control was not improved significantly.

Discussion

The present study examined the effectiveness of an eight-week traditional pre-season kabaddi training program on visceral fat and selected performance variables, such as Vo_{2max}, speed, agility and foot-

tapping. The use of bioelectrical impedance analysis provided a practical and non-invasive method to monitor these changes over the training period (Kyle et al., 2004 and Ackland et al., 2012). In the present study also the researchers utilized bioelectrical impedance analysis procedure to observe the meaningful changes in visceral fat following the eight-week pre-season kabaddi training program.

In general observation, body composition plays a crucial role in Kabaddi performance. Excess body fat can hinder speed, agility, and endurance, while a higher proportion of lean muscle mass contributes to strength, power, and overall functional efficiency (<https://mmanovost.com/fattest-mma-fighter/>, Apr,2026.). Kabaddi is an intermittent sport that requires both aerobic and anaerobic energy systems; thus, improved cardiovascular efficiency allows players to sustain performance throughout the match duration. In Kabaddi, offensive players with higher skeletal muscle mass might have better explosive power, which is essential for initiating quick raids. Conversely, higher visceral fat levels can hinder agility and reduce endurance, making it difficult for raiders to execute the skills efficiently and sustain performance across multiple game intervals.

The present study confirmed a significant improvement in VO_{2max} level, as evidenced by enhanced performance in the Yo-Yo intermittent recovery test, which reflects an increase in maximal oxygen uptake (VO_{2max}). The observed increase in VO_{2max} may be attributed to the inclusion of continuous running, interval training, and game-specific drills during the training period (Midgley et al., 2006). Improved VO_{2max} not only supports prolonged performance but also contributes to faster recovery, thereby giving athletes a competitive advantage during match situations. The observed improvement in speed, as measured through the 50-yard can be attributed to repeated sprint drills and neuromuscular adaptations developed during the training period (Bompa & Buzzichelli, 2018).

The ability to change direction quickly and efficiently, which is essential for both offensive and defensive Kabaddi players. At the same time, Kabaddi players' agility and foot tapping control was not significantly enhanced due to the influence of preseason Kabaddi training. The integration of speed, agility, foot movement control, coordination and endurance training appears to be an effective in preparing athletes for competitive demands. As for as the present study is concerned, well-structured pre-season training programme enhance the basic fitness components (such as visceral fat and endurance performance), minimal improvement in speed performance and it ensure the players' readiness or preparedness for the next training season i.e. competitive-season training. During the competition phase, players' endurance stay at high level, reaction time will amplifies, speed performance will improves fast and agility will bounce back swiftly. The observed improvements may be attributed to the combined effects of regular physical training, increased energy expenditure, and the inclusion of strength and conditioning exercises within the training schedule (Bompa & Buzzichelli, 2018).

Conclusions

In the present investigation, as a result of eight week traditional Kabaddi training the following improvements occurred on selected variables.

- Eight weeks of traditional pre-season training enhance the Kabaddi players' straight-line linear speed and endurance performance.

- Present study training schedule are lagging to enhance the Kabaddi players' foot movement control and change of direction ability.
- Traditional pre-season Kabaddi training reduce the visceral fat level.

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