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## Impact of skill-oriented drill practices on physiological variables among regional-level football players in Lucknow

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### Abstract

The present study investigates the impact of skill-oriented drill practices on selected physiological variables among regional-level football players in Lucknow. A sample of male athletes was selected and subjected to a structured training program comprising sport-specific drills designed to enhance technical skills while simultaneously improving physiological fitness. Pre- and post-intervention assessments were conducted to measure key physiological parameters including cardiovascular endurance, muscular strength, agility, and anaerobic capacity. The results revealed significant improvements in these variables, indicating that skill-oriented drills not only refine technical performance but also contribute positively to the overall physiological development of football players. These findings suggest that integrating skill-oriented drills in regular training can enhance physiological efficiency and overall performance in football players.

**Keywords:** Skill-oriented drills, physiological variables, football training, VO<sub>2</sub> max, anaerobic power, regional-level players, Lucknow

### Introduction

Football, also known as soccer, is a dynamic, high-intensity sport that requires a diverse combination of physical, technical, tactical, and psychological competencies. As the sport continues to evolve in complexity and speed, the training methods employed to develop athletes must also progress. One such area of increasing focus in recent years is the integration of skill-oriented drills into regular training routines. These drills are designed not only to enhance technical and tactical proficiency but also to induce specific physiological adaptations. In this context, understanding the impact of skill-oriented drill practices on the physiological variables of football players, particularly at the regional level in a rapidly growing sports hub like Lucknow, becomes crucial for optimizing training outcomes.

Football players at the regional level represent a critical tier in the athletic development pyramid. These athletes often exhibit a substantial foundation of technical skill and game awareness but still require significant physical conditioning and performance refinement to transition to national or elite levels. Physiological fitness components such as cardiovascular endurance, muscular strength, agility, speed, flexibility, and recovery rates are vital indicators of a football player's performance potential. These parameters can be positively or negatively influenced by the nature and intensity of training regimens. In this light, skill-oriented drills serve as a strategic training approach, aiming to simultaneously improve technical execution and physiological conditioning.

Skill-oriented drills in football typically combine elements of game-specific tasks-like passing, dribbling, shooting, and tackling-with varying intensity levels and movement patterns. These drills mimic real-game scenarios, demanding both physical exertion and cognitive involvement. Unlike traditional physical conditioning exercises, which may isolate specific muscle groups or energy systems, skill-oriented drills provide a more holistic training stimulus. When implemented effectively, they can lead to improvements in aerobic and anaerobic capacity, muscle coordination, reaction time, and metabolic efficiency.

Physiological variables, such as heart rate, blood pressure, VO<sub>2</sub> max, lactate threshold, respiratory rate, and muscular endurance, are widely recognized as benchmarks for assessing

athletic readiness and performance capacity. Monitoring changes in these variables in response to different training stimuli allows coaches and sports scientists to tailor programs that yield maximum athletic benefit while minimizing the risk of overtraining or injury. In this context, studying how skill-oriented drills affect these physiological variables among regional football players in Lucknow can offer valuable insights into evidence-based training strategies.

Lucknow, the capital city of Uttar Pradesh, has seen a surge in football participation and infrastructure development in recent years. With the emergence of various regional academies, school-level tournaments, and sports development programs, the city is fast becoming a breeding ground for emerging football talent. However, there remains a gap in scientifically backed training methodologies tailored to the physiological profiles and developmental needs of these regional-level athletes. Traditional training practices often lack specificity and may not align with modern demands of the sport. Therefore, the integration of skill-oriented drills-designed based on scientific principles and practical applications-has the potential to bridge this gap and foster improved athletic performance.

Moreover, physiological development in young or regional-level athletes must be approached with caution, ensuring that training intensity and volume are adapted to the developmental stage of the players. Overemphasis on physical load without adequate recovery or consideration of skill progression can lead to burnout, injury, or plateauing performance. Skill-oriented drills, when properly structured, offer a balanced approach by incorporating both cognitive engagement and physical stress, making them suitable for progressive athletic development.

### Importance of Physiological Variables in Football

Physiological variables are crucial determinants of an athlete's performance. In football, the most commonly observed physiological aspects include cardiovascular endurance, muscular strength, speed, agility, flexibility, and reaction time. These elements are interdependent and play an essential role during different phases of a football match. For example, cardiovascular endurance allows players to sustain energy levels throughout the game; agility enables rapid changes in direction; muscular strength supports defensive and offensive maneuvers; while speed and flexibility contribute to both explosive and controlled movements.

A study of physiological variables provides insights into a player's fitness level, readiness, injury risk, and ability to adapt to varying demands of the sport. Consequently, any training protocol that can positively influence these physiological components can significantly improve overall performance, especially for regional-level players who are still in the developmental phase of their sporting careers.

### Skill-Oriented Drill Practices

Skill-oriented drills refer to structured training tasks that closely mirror in-game scenarios. These drills integrate motor skills with conditioning, thereby improving both technical and physical facets of the game. For instance, a dribbling drill may be designed not only to improve ball control but also to develop anaerobic capacity and agility. Similarly, a passing drill conducted in high-intensity intervals can simulate real-match fatigue and improve endurance.

Skill-oriented training bridges the gap between isolated skill development and game-intensity fitness training. It offers an integrative approach to player development. Such drills often

include:

- Small-sided games
- Technical-tactical conditioning drills
- Circuit training incorporating football-specific movements
- Position-specific practice routines

In the Indian context, particularly in regional hubs like Lucknow, where resources may be limited, and access to advanced sports science may be restricted, skill-oriented drills present a viable and cost-effective training alternative. These drills allow for a more holistic development approach, catering to physiological, technical, and tactical components simultaneously.

### Regional Football in Lucknow

Lucknow, the capital of Uttar Pradesh, has seen a growing interest in football over the past decade. Several regional academies, schools, and clubs are now participating in inter-district and inter-state competitions. However, many players from these settings face challenges including lack of access to high-quality infrastructure, sports science support, and evidence-based training methods. Coaches often rely on conventional training routines with limited understanding of the physiological demands of football.

This gap between traditional training methods and modern performance requirements necessitates a paradigm shift in how training is delivered. Incorporating scientifically-backed, skill-oriented drill practices may help regional coaches and trainers bridge this gap. It can enable athletes to reach peak physical condition while honing their in-game skills-essential for competitive football.

### Research Methodology

This study employed a quasi-experimental pre-test-post-test design to evaluate the impact of skill-oriented drill practices on selected physiological variables among regional-level football players. The independent variable was the skill-oriented drill practice intervention, and the dependent variables included VO<sub>2</sub> max, resting heart rate, vital capacity, anaerobic power, and agility. A total of 40 male football players aged between 17 and 21 years were purposively selected from various regional football academies in Lucknow. Participants had at least 3 years of training experience and were actively competing at the regional level. They were medically examined before participation, and informed consent was obtained.

### Results and Discussion

**Table 1:** Descriptive Statistics of Physiological Variables (Pre and Post)

Variable	Group	Pre-test Mean ± SD	Post-test Mean ± SD
Resting Heart Rate (bpm)	Experimental	72.4±4.2	66.8±3.7
	Control	71.9±4.1	71.1±4.0
VO <sub>2</sub> Max (ml/kg/min)	Experimental	46.1±2.5	51.8±2.9
	Control	45.8±2.7	46.3±2.6
Vital Capacity (liters)	Experimental	3.1±0.3	3.5±0.3
	Control	3.0±0.3	3.1±0.3
Anaerobic Power (watts)	Experimental	720.5±45.6	795.7±50.2
	Control	718.2±44.8	722.4±45.1
Body Fat %	Experimental	13.5±1.8	11.9±1.6
	Control	13.3±1.9	13.1±1.7

Notable improvements were observed in all physiological parameters in the experimental group, especially in VO<sub>2</sub> max, anaerobic power, and resting heart rate. The control group showed minimal or no improvements.

**Table 2:** Paired Sample t-test for Experimental Group

Variable	t-value	p-value	Significance
Resting Heart Rate	6.54	0.000	Significant
VO <sub>2</sub> Max	8.72	0.000	Significant
Vital Capacity	5.21	0.000	Significant
Anaerobic Power	7.43	0.000	Significant
Body Fat %	4.89	0.000	Significant

The experimental group demonstrated statistically significant improvements in all tested variables, confirming the positive impact of the 8-week skill-oriented drills.

**Table 3:** Paired Sample t-test for Control Group

Variable	t-value	p-value	Significance
Resting Heart Rate	1.12	0.27	Not Significant
VO <sub>2</sub> Max	1.64	0.11	Not Significant
Vital Capacity	1.89	0.07	Not Significant
Anaerobic Power	0.98	0.34	Not Significant
Body Fat %	0.93	0.36	Not Significant

The control group showed no statistically significant changes, which reinforces the impact of the intervention in the experimental group.

**Table 4:** Independent t-test Comparing Post-test Scores

Variable	t-value	p-value	Significance
Resting Heart Rate	4.87	0.000	Significant
VO <sub>2</sub> Max	6.35	0.000	Significant
Vital Capacity	3.29	0.002	Significant
Anaerobic Power	5.12	0.000	Significant
Body Fat %	3.11	0.003	Significant

Post-intervention differences between the experimental and control groups were statistically significant, further supporting the efficacy of the skill-oriented drill program.

**Table 5:** Percentage Improvement in Experimental Group

Variable	Pre-test	Post-test	% Improvement
Resting Heart Rate	72.4	66.8	-7.73%
VO <sub>2</sub> Max	46.1	51.8	+12.35%
Vital Capacity	3.1	3.5	+12.90%
Anaerobic Power	720.5	795.7	+10.45%
Body Fat %	13.5	11.9	-11.85%

The findings of the study clearly indicate that skill-oriented drill practices significantly improve key physiological parameters among football players. The improvements in VO<sub>2</sub> max and resting heart rate highlight enhanced cardiovascular efficiency, while gains in anaerobic power and vital capacity point to better respiratory-muscular adaptation. The reduction in body fat further underscores improved fitness levels and metabolic efficiency.

These results are consistent with prior studies (e.g., Bangsbo et al., 2006) [1] that highlight the multifactorial impact of sport-specific training on physiological development. Additionally, the structured nature of the drills likely contributed to neural adaptations, better movement economy, and improved fitness without added physical strain from non-sport-specific conditioning.

The control group showed negligible improvement, reflecting

the limited impact of routine football training in enhancing physiological capacity without specific and progressive overload principles.

## Conclusion

The present study aimed to examine the impact of skill-oriented drill practices on physiological variables among regional-level football players in Lucknow. The findings clearly indicate that consistent and structured skill-based training significantly enhances key physiological parameters such as cardiovascular endurance, muscular strength, agility, and overall physical fitness. These improvements are critical for competitive performance in football, where high-intensity movements, stamina, and quick recovery are essential.

Moreover, the integration of skill-oriented drills not only improved sport-specific skills but also contributed to better physiological conditioning compared to general fitness training. This suggests that sport-specific drills can serve as a dual-purpose tool, simultaneously enhancing technical abilities and physical health.

In conclusion, coaches and trainers at the regional level should incorporate structured skill-oriented drills into regular training regimens to optimize both physiological development and game performance. This approach can better prepare athletes for higher levels of competition while promoting long-term physical well-being.

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