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High-intensity Functional Training (HIFT) and the Oxford System: Their Effect on the Physical and Skill Factors of Football Players During Weight Training

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Abstract

Background: Improving the functional fitness of elite football players requires specialized training techniques that align with structured sport-specific programs. High-Intensity Functional Training (HIFT) and the Oxford System are emerging methods incorporated into weightlifting programs to enhance physical and skill-related attributes in football athletes. This study explores their effectiveness compared to traditional weightlifting methods.
Aims: The study aims to assess the impact of HIFT and Oxford System exercises on football players' physical and skill development, focusing on explosive force, speed power, maximum speed, dribbling, passing, and scoring.
Methods: Twenty-four football players from the Darbandikhan Sports Club (2021–2022 seasons) were purposively allocated into an experimental group (HIFT and Oxford System) and a control group (conventional weightlifting). Physical and skill-related characteristics were measured through pre-tests and post-tests to evaluate improvements.
Results: The experimental group significantly improved physical and skill-related attributes between the pre-test and post-test. Post-test results revealed that explosive force, speed power, and maximum speed were significantly higher than in the control group ($t = -4.257$, $p = 0.002$). Skill-related dribbling, passing, and scoring improvements were also statistically significant ($t = 1.147$, $p = 0.001$; 1.264, $p = 0.002$; 4.287, $p = 0.004$). The experimental group outperformed the control group across all measured criteria.
Conclusion: The findings indicate that HIFT and Oxford System exercises effectively enhance football players' crucial physical and skill components. Incorporating these training methods into structured programs can significantly improve players' athletic performance.

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INTRODUCTION

In the ever-evolving field of sports training approaches, the quest to maximize athletic performance has led to exploring numerous training methodologies (Woods et al., 2020). The distinctive nature of football requires a specific combination of physical and cognitive capabilities, so the effectiveness of training regimens is paramount (Morgan et al., 2013; Chapman et al., 2024). Among the numerous tactics that are becoming increasingly popular are the Oxford System and High-Intensity Functional Training (HIFT) (Feito et al., 2018).

Because of its focus on functional movements, intensity, and variation, HIFT has become increasingly popular (Martin-Niedecken et al., 2020). These exercises combine strength and balance training to improve motor ability, central strength (the spine and mid-body), and neuromuscular efficiency. They are performed simultaneously and take the form of integrated and multi-level

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movements (front transverse, sagittal), which include acceleration, stabilization, and deceleration (Farhan, 2023). HIFT's proponents contend that in addition to improving an athlete's general physical fitness, it also promotes their capacity to perform well under pressure—a critical skill in football (Wang et al., 2023b).

The Oxford method or weight training system is an effective scientific means for training the muscles involved in technical performance to achieve a functional return for these muscles to acquire physical characteristics. However, the Oxford System provides a methodical approach to training phase planning and organization, guaranteeing a balanced development of strength and skill. It is distinguished by its planned approach to periodization (Pol et al., 2020). Football players have been incorporating weightlifting into their training regimens more and more as they aim for perfection (Haff et al., 2015). Comprehending the subtle differences between various training regimens, especially HIFT and the Oxford System, and their effects on performance is crucial for sports scientists, coaches, and players (Keshkar et al., 2021).

Some fascinating questions about how these two training approaches overlap regarding football players' weightlifting training (Suchomel et al., 2018). How does HIFT affect the power production and explosiveness required for football movements when lifting weights? Does periodization, as employed in the Oxford System, lead to more consistent skill development and injury prevention? These queries highlight the necessity of thoroughly examining how HIFT and the Oxford System affect physical and skill variables when it comes to weightlifting training tailored for football players. The unique qualities of Darbandikhan Sports Club make this study more critical. The club is known for developing young football talent in a region with limited access to advanced training methods. Players have challenges due to limited resources, inconsistent training, and the need for better injury prevention. In this situation, looking at High-Intensity Functional Training (HIFT) and the Oxford System might help clubs learn more about them. This study focuses on Darbandikhan Sports Club to make recommendations to improve player performance, training, and regional football development.

This article explores the finer points of how different training approaches affect a variety of skill—and physical-related variables in football players, particularly during weightlifting training. By investigating these approaches' effects on many parameters, we hope to add insightful information to the ongoing discussion about the best ways to coach football players.

METHOD

Research Design

This quasi-experimental study assessed the impact of the intervention using pre-tests and post-tests (Sabat et al., 2024; Tulus et al., 2024). This design contrasts experimental and control groups while regulating confounding variables.

Sample Selection

Purposive sampling was employed to select football players from Darbandikhan Sports Club for the 2021–2022 season. This technique guaranteed that participants fulfilled the study's inclusion criteria, including consistent training backgrounds, comparable skill levels, and health conditions. Through intentional sampling, the intervention's impact on a homogeneous cohort of athletes was regulated.

Homogeneity Testing

Homogeneity

tests were carried out to ensure there were no appreciable variations in age, height, weight, or training age between the experimental and control groups. Table 1 presents the findings, which include the arithmetic mean, standard deviation, and coefficient of variation for these variables.

Table 1. Anthropometric Characteristics of Athletes in Research

Variables	Measuring unit	Arithmetic mean	standard deviation	Variation coefficient value
Bloc	(Kg)	72.20	1.14	1.57
Length	(Centimeter)	175.40	2.50	1.42
Age	(Year)	24.00	0.64	2.66
Training age	(year)	8.80	1.34	15.22

Evaluating Protocols

Pilot testing, also known as pre-tests, assesses the feasibility and effectiveness of a new concept or idea before it is fully implemented. Before the main experiment, pilot tests were carried out on July 1st and 2nd, 2021, at 10:00 AM in the Darbandikhan Sports Club football stadium to identify and resolve any potential concerns. The purpose of each exam was to assess the efficacy and proficiency of the research assistants in carrying out the physical and skill assessments ,Validate the authenticity of the equipment and tools utilized in the experiment, Evaluate the suitability of the selected assessments for the participants' level of proficiency; Identify and resolve any potential hurdles or challenges that may occur during the testing process; Detect and correct any inaccuracies in measurements; Calculate the duration needed to finish each physical and skill assessment.

Pre-tests (Main Testing)

From July 4 to July 5, 2021, the research sample was subjected to physical and skill tests. Day 1 (July 4): Various physical examinations were conducted, such as a test of stability during the long jump (explosive leg power) (Benzidane et al., 2016). Ten seconds of the single-leg partridge test (two-leg speed) (Wu, 2021). 30-meter run with maximal speed transfer from a moving start (Ridha et al., 2019). Day 2 (July 5): Various skill assessments were conducted, such as: Examine your zigzag dribbling skills by rolling the ball between five bars (Cheng et al., 2022). A quick split-platform accuracy test that passes. Distance-based football scoring accuracy test

Data Collection Instruments

The researchers employed various instruments to gather the necessary data for their study*:* International sources and references, Survey instruments, Administering interviews, Evaluation recording cards, and Enrollment documents. Devices and Equipment Utilized in the Research: Stadiometer for the measurement of stature and body mass; Four handheld stopwatches (SONY, manufactured in Japan); Official footballs - 16 units; Metal measuring tape for the measurement of length; Fox-type whistle; Conical structures; Elastic resistance bands; Weighted vests; Kettlebells with varying weights; Leg curl apparatus; Leg press apparatus; Diverse weights.

Training Intervention

After the pre-tests, the researchers trained the experimental group to enhance particular physical and skill factors. The initiative ran from July 18, 2013, until August 26, 2013. The following are important training program details: The activities were created especially for this investigation. The repeated training approach and the Oxford resistance training system (Fish et al., 2003) were integrated into the program. A general and targeted warm-up targeting the muscle groups employed in the scheduled exercises preceded each training session. The activities were selected, and adjustments were made to meet the research goals, drawing from pertinent sources and studies.

Training Structure

Frequency: Four short sessions (weekly and one medium session .Intensity variation: Medium sessions employed a 3:1 load increase compared to the short sessions .Duration: Four "mini-cycles" consisting of three training units (12). Training sessions occurred on Sundays, Tuesdays, and Thursdays. Load progression: Intensity was increased while maintaining a set volume. Exercise time: Determined through pilot testing. Rest periods: Rest between sets and exercises were determined based on playing style, theoretical framework recommendations, and pilot testing results. Rest between sets was the same duration as the work period, with 4 minutes between exercises. Post-workout routine: Each player received a home exercise set consisting of back leg curls with Oxford-

style weights using a specific rep scheme (10 reps x 50% 1RM, 10 reps x 75% 1RM, 10 reps x 1RM) with positive rest between reps. The training session concluded with cool-down and stretching exercises. Post-testing: Following the training intervention, post-tests were conducted between August 28 and September 29, 2021, to evaluate the effectiveness of the training program in the experimental group. The physical and skill tests used during pre-testing were repeated under the same conditions, time constraints, and requirements for all participants. Control Group: The control group continued their usual training routine as determined by their coaching staff.

Statistical Analysis

A descriptive test was used to get the mean and standard deviation, and a t-test was used to find the difference between the means using SPSS statistical software version 26.0 (SPSS Inc., Chicago, Ill., USA). The minimal significance level was adopted $p<0.05$,and data was expressed as the mean ± SEM.

RESULTS AND DISCUSSION

Results

Initial analyses confirmed the sample's homogeneity in terms of age, height, weight, and training age, with coefficients of variance ranging from 1.42% to 15.22%, ensuring a balanced baseline for comparison (Table 1).

Group Equivalence

The two experimental and control groups were standardized regarding physical and skill factors (Table 2). The t-values for the physical and skill factors were determined to be 1.214, 1.164, 1.512, 1.265, 1.845, and 1.088, respectively. The probability values were 0.122, 0.953, 0.084, 0.079, 0.152, and 0.066, respectively, all of which exceeded the threshold of 0.05. The data suggest that there was parity between the two research groups.

Table 2. Statistical Parameters and the Calculated (T) Value

Equivalently Dependent Variables		Control Group		Experimental Group		Calculated value (T)	Probability Level	Significance
		Mean	Standard deviation	Mean	Standard deviation			
Physical variables	Explosive Force	2.32	0.19	2.36	0.22	1.214	0.122	Insignificant
	Speed Power	49.95	5.20	51.43	2.38	0.036	0.953	Insignificant
	Maximum Speed	3.41	0.39	3.39	0.31	1.512	0.084	Insignificant
Skill variables	Dribbling	11.09	0.98	11.14	0.88	1.265	0.079	Insignificant
	Passing	25.90	2.11	26.10	3.80	1.845	0.152	Insignificant
	Scoring	17.40	1.18	17.38	1.21	1.088	0.066	Insignificant

In addition, there were significant improvements in the physical variables of the experimental group between the pre-and post-tests. Explosive force increased significantly ($t=-4.257$, $p=0.002$), with a post-test mean of 2.54 vs. 2.34 in the control group. Speed power improved significantly ($t=-5.864$, $p=0.001$), with a post-test mean of 57.15 compared to 50.00 in the control group. Maximum speed also showed significant gains ($t=-5.682$, $p=0.003$), with a post-test

mean of 3.83 compared to 3.55 in the control group. These enhancements demonstrate the intervention's effectiveness in improving key physical features (Table 3).

Table 3. The Results of the Physical and Skill Variables of the Control and Experimental Groups in the Pre-Test and Post-Test Stages

Physical Variables							
Control Group	Pre –Test		Post-Test		**Calculated Value (T)**	**Probability Level**	**Significance**
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**			
Explosive Force	2.32	0.19	2.34	0.20	0.854	0.835	Insignificant
Speed Power	49.95	5.20	50.00	6.13	- 0.621	0.725	Insignificant
Maximum Speed	3.41	0.39	3.55	0.61	0.61	0.264	Insignificant
Experimental Group	**Probability Level**		**Experimental Group**		**Calculated Value (T)**	**Probability Level**	**Significance**
	Post-Test		Post-Test				
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**			
Explosive Force	2.36	0.22	2.54	0.17	3.234	0.012	Significant
Speed Power	51.43	2.38	57.15	3.27	- 4.373	0.003	Significant
Maximum Speed	3.39	0.31	3.83	1.27	4.657	0.018	Significant
Skill Variables							
Control Group	Pre –Test		Post-Test		**Calculated Value (T)**	**Probability Level**	**Significance**
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**			
Dribbling	11.09	0.98	11.12	1.09	0.425	0.654	Insignificant
Passing	25.90	2.11	26.10	2.47	1.294	0.264	Insignificant
Scoring	17.40	1.18	17.35	2.17	4.264	0.428	Insignificant
Experimental Group	**Control Group**		**Experimental Group**		**Calculated Value (T)**	**Probability Level**	**Significance**
	Pre –Test		Post-Test				
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**			
Dribbling	11.14	0.88	10.74	1.40	3.286	0.014	Significant
Passing	26.10	3.80	28.24	3.84	- 4.176	0.009	Significant
Scoring	17.38	1.21	20.46	1.12	1.197	0.001	Significant

Regarding skill factors, the experimental group showed considerable improvement between pre-and post-tests. Dribbling improved ($t = 1.147$, $p = 0.001$), with a post-test average of 10.74 versus 11.12 in the control group. Passing performance improved significantly ($t = 1.264$, $p = 0.002$), with a

post-test mean of 28.24 compared to 26.10 in the control group, as did scoring performance (t = 4.287, p = 0.004), with a post-test mean of 20.46 compared to 17.35 in the control group. A post-test comparison of groups found that the experimental group outperformed the control group in all assessed physical and skill measures, confirming the training programme's greater efficacy (Table 4).

Table 4. The Results of the Physical and Skill Variables of the Control and Experimental Groups in the Post-Test Stage

Physical variables	Control group		Experimental group		Calculated value (T)	Probability level	Significance
	Post-test		Post-test				
	Mean	Standard deviation	Mean	Standard deviation			
Explosive Force	2.34	0.20	2.54	0.17	- 4.257	0.002	Significant
Speed Power	50.00	6.13	57.15	3.27	- 5.864	0.001	Significant
Maximum Speed	3.55	0.61	3.83	1.27	- 5.682	0.003	Significant
Skill Variables	**Control group**		**Experimental group**		**Calculated value (T)**	**Probability level**	Significance
	Post-test		Post-test				
	Mean	**Standard deviation**	**Mean**	**standard deviation**			
Dribbling	11.12	1.09	10.74	1.40	1.147	0.000	Significant
Passing	26.10	2.47	28.24	3.84	1.264	0.002	Significant
Scoring	17.35	2.17	20.46	1.12	4.287	0.004	Significant

Discussion:

The findings of this study reveal the significant effects of High-Intensity Functional Training (HIFT) and the Oxford system on enhancing football players' physical and skill factors, as evidenced by the experimental group's substantial improvements in post-test results. The results of the present study are in line with the previous findings (Wang et al., 2023a; Gavanda et al., 2022; Molinaro et al., 2023) that confirmed that high-intensity and properly planned exercises could lead to significant improvements in the physical and skill abilities of football players. Maybe this was caused by the workouts utilized during training and resulted in the development of physical variables and the formation of favourable physiological adaptations in the athletes' bodies.

The cornerstone of the development of physical talents was the workouts, which were founded on scientific principles and the conditions of training physical characteristics with a focus on high training intensity in performance. Between the pre-and post-tests, there was a statistically significant variation in the football skill variables examined. This was caused by the growth of physical capabilities, significantly improving skill performance. In contrast, the control group exhibited no significant changes in physical variables (explosive force, speed, power, and maximum speed) or skill variables (dribbling, passing, and scoring), resulting from the lack of targeted and scientifically structured training in their regimen. This highlights the limitations of traditional training approaches, where insufficient attention to individualized physical development and skill enhancement can hinder progress.

On the other hand, physical fitness and skills play a crucial role in repeatedly executing various tasks with a high degree of accuracy and mastery (Farley et al., 2020). This ability, which depends on the player's physical capabilities, ensures optimal motor performance with minimal muscular effort in the shortest possible time, conserving energy and providing significant benefits to the team (Best, 2010).

In addition, we showed that the experimental group demonstrated significant improvements in the physical also; we showed that the experimental group demonstrated significant improvements

in physical variables such as explosive force, speed power, and maximum speed, as well as skill variables, including dribbling, passing, and scoring, compared with the control group. These results reflect the effectiveness of the intervention, which applied high-intensity, scientifically designed exercises aimed at promoting physiological adaptations such as increased muscle strength, enhanced speed, and improved motor coordination (Feito et al., 2019). The observed improvements in skill performance underscore the critical relationship between physical fitness and technical abilities in football (Gavanda et al., 2022). Enhanced physical attributes, such as strength and speed, directly contributed to greater accuracy, efficiency, and consistency in performing football-specific skills while reducing energy expenditure (Girma et al., 2021; Cavedon et al., 2020). High-intensity and properly planned exercises can significantly improve football players' physical and skill abilities (Ndlomo et al., 2022).

Potential processes suggest high-intensity training enhances muscle strength via muscle growth, improving explosive power and speed. These workouts enhance the functionality of the central nervous and anaerobic energy systems, augmenting power and speed. Moreover, high-intensity training enhances neuromuscular coordination and augments the precision and efficacy of technical skills such as dribbling and passing in soccer (Curovic et al., 2024). High-intensity training enhances aerobic capacity, accelerates recovery from exhaustion, and decreases energy expenditure throughout the game. Moreover, these activities enhance cardiovascular function, increasing endurance and expediting recovery during the game. Integrating these workouts with appropriate stretching enhances muscle and joint flexibility, mitigates injury risk, and expands the range of motion (Cao et al., 2025).

Finally, high-intensity, well-planned activities can significantly enhance football players' physical and skill qualities. Being physically fit is crucial for enhancing football skill performance. Additionally, the limited sample size is the primary weakness of this study. The absence of an appropriate control group may impact the study's findings and recommendations for further research, including larger and more varied samples and examining the effects of these kinds of exercises over the long run.

Research Contribution

This study provides valuable insights into football training methodologies by comparing High-Intensity Functional Training (HIFT) and the Oxford System, demonstrating their effectiveness in enhancing physical and skill-related attributes. The findings offer practical applications for coaches and trainers, emphasizing the importance of structured, high-intensity workouts in optimizing player development. Additionally, the study contributes to regional football development by addressing training limitations in resource-constrained environments and supporting evidence-based approaches to enhance player performance.

Limitations

Despite its contributions, this study has several limitations, including a small sample size, which may limit generalizability, and a relatively short training duration, making it difficult to assess long-term effects. Additionally, variations in training intensity for the control group and potential biases in performance evaluation could have influenced the results. The absence of longitudinal follow-up further restricts insights into injury prevention and sustained improvements in football performance.

Suggestions

Future studies should include larger and more diverse samples to enhance the applicability of findings and extend training durations to assess long-term adaptations. Investigating the role of these training methods in injury prevention, integrating biomechanical and neuromuscular assessments, and utilizing advanced technologies such as wearable sensors can provide deeper insights. Comparative studies across different sports disciplines could further explore the effectiveness of HIFT and the Oxford System beyond football.

CONCLUSION

This study's results indicated that high-intensity training and the Oxford system markedly enhanced soccer players' physical and technical skills. Notable enhancements were noted in explosive power, velocity, and skills such as dribbling and passing. This study underscores the necessity of implementing systematic and structured training programs and using systematic training protocols to improve soccer players' performance.

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AUTHOR CONTRIBUTION STATEMENT

HHA was the lead researcher responsible for study design, data collection, and statistical analysis. THMS, HAR, and DLS contributed to the literature review, manuscript drafting, and overall study development. All authors reviewed and approved the final version of the manuscript.

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