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Kampus Sultan Abdul Jalil Shah



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AN EMPIRICAL STUDY ON THE TRAINING METHOD OF SPECIFIC PHYSICAL FITNESS IN FOOTBALL IN XI'AN, CHINA

ZHANG WU



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UNIVERSITI PENDIDIKAN SULTAN IDRIS

2024



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AN EMPIRICAL STUDY ON THE TRAINING METHOD
OF SPECIFIC PHYSICAL FITNESS
IN FOOTBALL IN XI'AN, CHINA

ZHANG WU

THESIS PRESENTED TO QUALIFY FOR A
DOCTOR OF PHILOSOPHY

FACULTY OF SPORTS SCIENCE AND COACHING
SULTAN IDRIS EDUCATION UNIVERSITY

2024



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PROFESOR HADJAH ZULAKBAL BIN ABD KARIM
Signature of the Supervisor
Universiti Pendidikan Sultan Idris
31000 Pangkajene, Kelantan
Perkampungan Sultan Idris
IP: 016-8411 7210 M: 018-318 8441
Email: zulakbal@ups.edu.my



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DEDICATION

I dedicate my thesis work to my beloved parents, mentors and friends who shared their words of advice and encouragement to finish this study.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to God for granting me the knowledge, patience, strength, and good health throughout the preparation of this doctorate's thesis. I am deeply thankful to my supervisor, Assoc. Prof. Dr. Zulakbal bin Abd Karim, for his invaluable support, guidance, patience, and tolerance throughout my journey with this study. I extend my heartfelt appreciation to the lecturers of the Faculty of Sports Science and Coaching at Sultan Idris Education University and Xi'an Physical Education University, as well as the athletes from Xi'an Physical Education University team, for their cooperation and enthusiastic support, which contributed significantly to the success of this research. Special thanks to my parents, wife, children, and friends, especially Miss Tang Tsiao Yin, for their courage and unwavering support, which enabled me to complete this study. Finally, I offer my regards and blessings to everyone who supported me in any respect during the completion of this dissertation.

ABSTRACT

This study aimed to explore the specific physical characteristics of football players and develop training design ideas based on the performance characteristics of young athletes' physical ability. The study focused on the theoretical system of football specific physical fitness training and its constituent elements, using data collected from 12 male football players from Xi'an Physical Education University. The study adopted experiments, comparative analysis, mathematical statistics, semi-structured interviews with experts, literature search findings, and video analysis to develop a theoretical basis for football-specific physical training design. The theoretical system included cycle training theory, block periodization theory, functional training theory, and football-specific training theory. Specific aerobic capacity, specific anaerobic capacity, and specific muscle strength were considered when constructing the content design and specific physical training methods for football players. The results showed that four different forms of training elements under the control of 4v4 pass and grab exercise and small field competition exercise were suitable for aerobic high-intensity training requirements. For football-specific anaerobic training, the interval ratio of 1:2 and the load structure of 1.5 minutes were in line with the requirements of lactate generation training for speed endurance. The comprehensive strength training showed that there was no significant difference between the experimental group and the control group, except for the 5x30m sprint. As a conclusion, the design of football-specific aerobic training could improve athletes' long-term continuous exercise ability, high-intensity repetitive exercise ability, and recovery ability. Football-specific muscle strength training also serves to increase the athlete's muscle mass and explosive power, strengthening the strength performance of game-related activities and the strength output in high-intensity games. Overall, the football training program designed can be used as a tool to improve the performance of China young football athletes.



KAJIAN EMPIRIKAL MENGENAI KAEDAH LATIHAN KECERGASAN FIZIKAL KHUSUS DALAM BOLA SEPAK DI XI'AN, CHINA

ABSTRAK

Kajian ini bertujuan untuk meneroka ciri fizikal khusus pemain bola sepak dan membangunkan idea reka bentuk latihan berdasarkan ciri prestasi keupayaan fizikal atlet muda. Kajian itu memberi tumpuan kepada sistem teori latihan kecergasan fizikal khusus bola sepak dan unsur konstituennya, menggunakan data yang dikumpul daripada 12 pemain bola sepak lelaki dari Universiti Pendidikan Jasmani Xi'an. Kajian ini menggunakan eksperimen, analisis perbandingan, statistik matematik, temu bual separa berstruktur dengan pakar, penemuan carian literatur, dan analisis video untuk membangunkan asas teori untuk reka bentuk latihan fizikal khusus bola sepak. Sistem teori termasuk teori latihan kitaran, teori periodisasi blok, teori latihan berfungsi, dan teori latihan khusus bola sepak. Kapasiti aerobik khusus, kapasiti anaerobik khusus, dan kekuatan otot khusus telah dipertimbangkan semasa membina reka bentuk kandungan dan kaedah latihan fizikal khusus untuk pemain bola sepak. Keputusan menunjukkan bahawa empat bentuk elemen latihan yang berbeza di bawah kawalan 4v4 latihan hantaran dan rampas dan latihan pertandingan padang kecil adalah sesuai untuk keperluan latihan aerobik intensiti tinggi. Bagi latihan anaerobik khusus bola sepak, nisbah selang 1:2 dan struktur beban 1.5 minit adalah selaras dengan keperluan latihan penjaan laktat untuk ketahanan kelajuan. Latihan kekuatan komprehensif menunjukkan bahawa tidak terdapat perbezaan yang signifikan antara kumpulan eksperimen dan kumpulan kawalan, kecuali bagi larian pecut 5x30m. Sebagai kesimpulan, reka bentuk latihan aerobik khusus bola sepak boleh meningkatkan keupayaan senaman berterusan jangka panjang atlet, keupayaan senaman berulang intensiti tinggi, dan keupayaan pemulihan. Latihan kekuatan otot khusus bola sepak juga berfungsi untuk meningkatkan jisim otot dan kuasa letupan atlet, mengukuhkan prestasi kekuatan aktiviti berkaitan permainan dan output kekuatan dalam permainan intensiti tinggi. Secara keseluruhannya, program latihan bola sepak yang direka boleh digunakan sebagai alat untuk meningkatkan prestasi atlet bola sepak muda China.



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LIST OF ABBREVIATIONS

AAHPER	American Alliance for health, Physical Education, and Recreation
ACSM	American Society for Sports Medicine
ATP-CP	Adenosine Triphosphate Phosphocreatine
COVID-19	Coronavirus Disease
FIFA	International Federation of Football Association
MMR	Mixed Method Research
NSCA	National Physical Fitness, Strength training and Conditioning Association



APPENDIX LIST

- A** Expert Interview
- B** Specifications for the Assessment Test of Football Specific Sports Ability
- C** Football-Specific Muscle Strength: Examples of Training Design and Operation Specifications
- D** The Heart Rate Monitoring Chart of the Empirical Study of Football-Specific Physical Training
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CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter explains the background of the study, the statement of the problem, the significance of the study, the objectives of the research, the research questions, the research hypotheses and the operational definitions of the terms used.

1.1 Background of the Study

Football is one of the most popular sports in the world, with a long and rich history of development (Brewer & Rees, 2019). The sport has evolved over time, with changes to the rules, playing styles, and training methods, all of which have contributed to the development of specific physical fitness requirements for football players. In this section, the researcher explores the various factors that have led to the importance of

specific physical training in football games and the need for a comprehensive understanding of the specific characteristics of the sport.

1.1.1 The Development of Football Game

Football is one of the most popular sports around the globe. According to the International Federation of Football Association (FIFA) (2018), approximately 265 million players and 5 million referees and officials are actively involved in football games. This is equivalent to 4% of the world's population. However, due to differences in geographical, cultural, historical, and social aspects, football teams from different countries and continents are often characterized by different particularities of match-play (Gonçalves et al., 2019). Football games are intermittent in nature and involve multiple motor skills such as running, dribbling, kicking, jumping, and tackling (Romero-Franco et al., 2019). The performance of football athletes in matches depends on different individual skills and their interaction with their team members. Apart from excellent technical and tactical skills, physical capabilities are considered one of the most crucial factors in becoming a successful football player (Jukic et al., 2019).

1.1.2 The Critical Role of Specific Physical Training in Football Games

The increasing pace of modern football competitions and the rise in physical confrontation have placed higher demands on football athletes' physical abilities (Saez de Villarreal et al., 2018). Physical fitness is a multidimensional concept that encompasses various aspects of health, including cardiovascular fitness, muscular



strength and endurance, body composition, and flexibility. Football is a sport that requires a combination of these components, as well as specific skills such as agility, speed, and power (Brito et al., 2019). The physical demands of football vary depending on the position played, but generally involve a mix of aerobic and anaerobic energy systems, as well as upper and lower body strength and power (Loturco et al., 2018). In addition, football players require high levels of agility, balance, and coordination to perform quick movements and change direction while maintaining control of the ball (Faude et al., 2018). Past studies have shown that physical fitness and performance in football are influenced by a variety of factors, including training intensity, duration, and frequency, as well as nutrition and recovery strategies (Iaia et al., 2019).

The gap between skills and tactics among elite athletes has become smaller and smaller. Thus, understanding the specific physical fitness and performance characteristics has become the basic guarantee for athletes' athletic ability (Li et al., 2019). However, traditional sports training methods and habits still limit the understanding of specific physical fitness to some extent, neglecting the functions and dominance of specific physical fitness, and its connection with technology and tactics (Li et al., 2019). The introduction and application of new physical training methods and training concepts have brought new challenges to traditional sports training theories and methods, as well as extending athletes' sports life and improving training effects in high-density annual competitions.

Many sports coaches and practitioners have begun to rethink the importance of physical fitness (Ferreira-Junior et al., 2019; Scott et al., 2019; Yan et al., 2021). How can physical manifestations such as form, function, and quality be closely integrated with different characteristics? How can an effective, specific physical training design



be implemented based on the differences between different positions and individuals? These are the core issues that are worth pondering. Therefore, the combination of specific characteristics, physical characteristics, location characteristics, and other factors for research is undoubtedly a crucial breakthrough point for exploring the core basis of football-specific physical training (Liu et al., 2019).

In modern football training, the combination of speed and strength, the perfect synchronization of time and distance, and the specialty and efficiency of athletes' physical training are also emphasized (González-Ravé & Sánchez-Sánchez, 2019). Therefore, the construction of the theory and method system of physical training design for project characteristics will undoubtedly become the best way to explore the fundamental approach to football-specific physical training.

1.1.3 The Importance of a Comprehensive Understanding of the Specific Characteristics of Sports

All sports have their unique characteristics, which refer to the medical, biological, and kinematic indicators that differentiate them from other sports in competition and training, aimed at enhancing athletes' competitive ability and performance (Liu & Wang, 2020). As modern sports continue to evolve, the difference in technical and tactical abilities among high-level athletes has become increasingly smaller. Therefore, the key factors that determine winning or losing a game are reflected in the specific training details that enable athletes to understand and master the unique characteristics and intrinsic attributes of their sport (Feng & Zhang, 2021). This trend has prompted experts, scholars, and coaches, both domestically and internationally, to focus more on identifying the specific characteristics of their respective sports (McLean, 2019; Lago-

Peñas et al., 2020; Chen et al., 2021). Understanding the specific characteristics is the basic premise of a reasonable and effective movement training design process, which helps in setting up innovative training ideas based on the training goal. The targeted design of training methods and means can be matched with reasonable arrangement and effective training load control. This approach can enhance athletes' exceptional athletic performance, making it an essential component of high-level sports training (Tang & Zhang, 2021).

Additionally, the lack of understanding of specific characteristics in China traditional sports training practice has also resulted in a relatively backward approach to physical training. As a result, athletes may not be able to develop their full potential in terms of physical ability, which can negatively impact their competitive performance (Yuan et al., 2019). Therefore, it is crucial to construct a specific theoretical and microstructure system that accurately and effectively positions the specific characteristics of football to enhance the understanding and implementation of football-specific physical training among China practitioners. This can improve the scientific nature of specific physical training in China football and ultimately contribute to the development and success of China football on the international stage.

1.1.4 Lack of Research on the Design Theory and Practical Methods of Football Specific Physical Training

Theory refers to the logical inference and rational summary of phenomena existing in nature and society, based on people's knowledge through regularization, inference, deduction, and other methods (Liu et al. 2019). Macroscopic guidance and systematic perfection of theory are crucial for coaches to develop scientific and effective training



plans. According to Li and Zhang (2019), theory plays an essential role in regulating the process and direction of sports training, updating and improving the training concept and coach's training ability promptly. Scientific sports training theories and methods are the guarantee to improve the quality of training and prolong the athletes' life (Huang & Liu, 2019).

Additionally, Liu et al. (2020) explained that scientific sports training theories and methods can promote reasonable, adequate, and systematic training control to enhance athletes' competitive ability and promote the sustainable development of sports events. However, based on the current domestic and foreign literature review and analysis, it was found that the study of football sports specific physical training design theory still lacks relevant scholars to study the position of the football sport, physical characteristics, and period (Li & Wang, 2019; Wang et al., 2020). There is also a lack of specific research objects to explore the characteristics of physical stamina of external dimensions and propose corresponding training strategies (Liu et al., 2020). Therefore, this study is essential to fill these gaps and provide more comprehensive insights into football-specific physical training design theory.

1.1.5 Skills and Tactics as the Main Characteristic of Current Football Specific Physical Ability

In football, physical ability and tactics are closely intertwined, and a coach must have a sophisticated tactical philosophy and team management skills. Players of different styles can enhance and refine a team's tactical play (Wang & Zhang, 2019). Tactical execution reflects the physical needs of players, and the effectiveness of tactics is determined by varying levels of physical fitness (Zhang et al., 2019). Football players



require good physical fitness to continuously run during attacking and defending, complete various technical actions, and execute tactics during the game. The decline in physical fitness leads to a deterioration of an athlete's physical strength, judgment ability, emotions, and other aspects of function, resulting in an increase in wrong actions (Huang et al., 2020; Haugen et al., 2019; Issurin, 2010).

In football, tactical opportunities can arise at any moment, and players must have abundant stamina to respond promptly and execute tactical changes efficiently to win (Li et al., 2019). Refining specific rules and core technical and tactical indicators in football can accurately reflect the specific physical characteristics of the sport (Chen et al., 2019). However, there is a lack of research on this aspect from scholars (Zhang et al., 2019; Yang et al., 2020; Xu et al., 2021).

Physical fitness is the essential basis for tactical play to win the game, and tactical play cannot be separated from physical fitness factors (Bangsbo, 1994). Therefore, it is crucial to implement scientific and effective physical training in Chinese football research and training practice. This will help develop theoretical systems and training designs specifically for Chinese football, leading to progress and improvement in the overall perspective of the sport (Wei et al., 2020).

1.1.6 Competition Physical Demands as an Important Basis for the Design and Implementation of Specific Physical Training

Football is a team sport that places significant demands on physical fitness. Players need to possess technical and tactical skills and cooperate effectively with their teammates to achieve desired results. As football continues to evolve, players at

different positions are required to have more comprehensive abilities (Yang et al., 2019). Despite individual skills, players must adhere to overall tactical strategies and follow game rules. Moreover, each position requires specific movement patterns and physical demands during a football game (Chen et al., 2019).

Technical and tactical skills, such as passing, tackling, and shooting, require varying physical energy consumption and physical needs (Haugen et al., 2019). The athlete's actions during a match are dynamic, and different techniques used with or without the ball result in different scores and field situations (Jia et al., 2021). Therefore, designing specific physical training programs for football is crucial to improving athletes' performance and reducing injury risks. It is essential to understand the physical demands of football and develop training programs accordingly to achieve better results. The development of modern football-specific physical training is an urgent need to enhance the overall standard of the sport.

1.2 Problem Statement

Fast speed, intense competition, and tactical attack and defense have become the most prominent characteristics in the development of football games (Zhang et al., 2019). Athletes require good physical fitness to continuously run in attack and defense or complete various technical actions and tactics during football games. The decline of an athlete's physical fitness will lead to a deterioration of physical strength, judgment ability, emotions, and other aspects of function, resulting in an increase in wrong actions (Huang et al., 2020; Haugen et al., 2019; Issurin, 2010). As physical fitness is a comprehensive indicator of an individual's physical activity, football physical fitness

training should focus on the characteristics of the game itself. Scientifically formulated training forms and methods are necessary to better serve the game. In daily physical training, it is also important to pay attention to athletes' physiological conditions, understand the changes in physical performance indicators caused by training load, and use this as a basis to combine athletes' age and characteristics. This should be done by following the scientific arrangement of training methods and training load (Luo et al., 2020).

Due to the intense confrontation, high intensity, long duration, and high technical and tactical requirements of modern football, athletes must have a higher overall quality (Figueiredo et al., 2019). Specific physical fitness is essential for maintaining good condition and high-level performance of sports skills in the game (Gabbett et al., 2018). It is an indispensable and essential condition for excellent football player abilities, depending on intrinsic genetic factors and acquired training factors (Rebelo et al., 2018).

While current research on football-specific physical fitness mainly focuses on the external structure of physical fitness, such as running ability, aerobic capacity, anaerobic metabolism capacity, physical fitness, and energy supply methods in the game (Asadi et al., 2018), there is a lack of in-depth and detailed demonstration of the essential attributes of specific physical fitness (Wu et al., 2020). The controversy persists over which energy supply method better highlights the essential characteristics of football and plays a more significant role in football-specific physical fitness (Rampinini et al., 2019).



The development of Chinese football has been at a disadvantage for many years, with unsatisfactory competitive level and development status (Zheng et al., 2021). The lack of knowledge and differences in training concepts are the main reasons (Guan & Gao, 2019). The lack of a deep understanding of specific physical training is an essential factor that directly affects the training effect and athletes' competitive performance (Yu et al., 2018). Traditional training still exists deeply in most Chinese football professionals and coaches, despite modern sports training's inclination towards specialization and individualization (Ma et al., 2019). The lack of in-depth understanding of football's essential characteristics and methods has led to the stagnation and even significant decline of Chinese football for many years (Wu, 2019). This research aims to provide more systematic training design and ideas for specific physical fitness training in Chinese football.

Despite the significant attention that football-specific physical fitness has received in recent years, there is still a lack of knowledge regarding the most effective and efficient ways to improve specific physical fitness in football players. Additionally, there is a gap in the literature regarding the effectiveness of different training methods and approaches to improve specific physical fitness in football players.

Moreover, while previous studies have focused on external factors related to football-specific physical fitness, such as running ability and aerobic capacity, there is a need for a more comprehensive understanding of the internal factors that contribute to football-specific physical fitness. This gap in the literature highlights the need for further research to identify and develop a more holistic approach to specific physical fitness training in football players.



1.3 Objectives of the Study

The objectives of the study are as follows:

1. To analyze the specific physical characteristics of football players and identify training design ideas that are tailored to their performance characteristics to improve their physical ability and performance on the field.
2. To evaluate the effectiveness of specific physical training programs designed for football players.

1.4 Research Questions

1. What are the specific physical characteristics of football players, and how can training design be tailored to these characteristics to improve their physical ability and on-field performance?
2. How effective are specific physical training programs designed for football players in enhancing their physical ability and on-field performance?

1.5 Theoretical Framework of the Study

The researcher aims to investigate the theoretical basis for designing football-specific physical fitness training. The study involves analyzing the theoretical basis of specific

physical fitness training design and conducting a two-dimensional comparison of the theoretical basis and training design mode for football-specific physical fitness training. The comprehensive theoretical analysis and research on football-specific physical fitness training are presented in Figure 1.1. The study focuses on three main theory bases, namely specific theoretical basis, game performance characteristics, and training design pattern. In the specific theoretical basis, the researcher examines the definition of related concepts, training design characteristics, and training design theories. Then, the overall running characteristics, running position characteristics, and dynamic change characteristics under game performance characteristics are reviewed. In the training design pattern, the study covers physical needs assessment, fitness training goals, and physical training strategies.

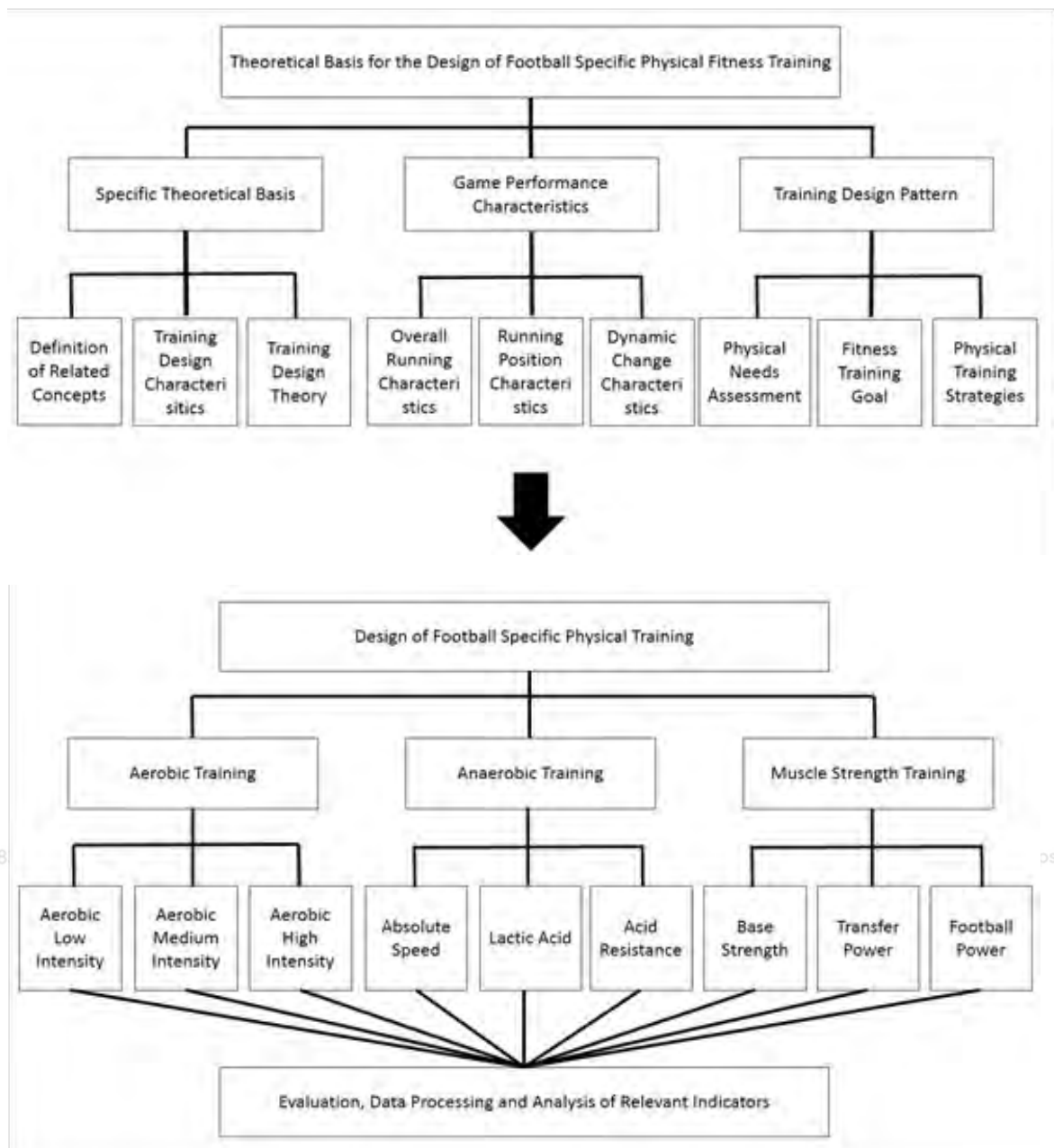


Figure 1.1. Theoretical Framework of the Study

Previously, the understanding of football-specific physical fitness was greatly restricted, and the function and meaning of specific physical fitness and its relationship with techniques and tactics were ignored (Zhang et al., 2021; Ayala & Moreno-Pérez, 2020; Rabbani et al., 2019). With different physical fitness requirements in each sport



activity, the comprehensive development of physical training theory and practice has been promoted, resulting in a systematic and comprehensive physical training method and concept (Köklü et al., 2020; Zhang et al., 2019). This has brought new impacts and challenges to traditional sports training theories and methods. Scientific and systematic specific physical training also provides strong support for athletes to prolong their sports life, improve training effect, and maintain a high level of athletic ability in high-density competition tasks. Therefore, many sports coaches and practitioners have begun to pay attention to the important position of physical training (Liu et al., 2021; Škof & Strel, 2019).

The core content of football-specific physical fitness training includes aerobic training, anaerobic training, and muscle strength training (Ayala et al., 2019; Beato et al., 2018). The researcher conducted detailed and comprehensive empirical research, combining ball training through different forms and load control elements, to verify the impact, effect, and intensity of athletes' specific physical training.

In the study of specific aerobic training methods, Lee and Joo (2020) and Bangsbo (2007) have pointed out that football players' aerobic capacity can be divided into three overlapping components according to different game tasks, preparation time, and training phases: low intensity, medium intensity, and high intensity. They also pointed out that the specific aerobic training of football should be carried out mainly in combination with the ball. The control of the load intensity between the three exercises is mainly based on the change of the heart rate. Therefore, a field test method for judging the athlete's maximum heart rate is proposed to effectively train the coach. Control training provides good guidance. At this stage, the convenient wearable device provides researcher with more convenient conditions to monitor various physiological





indicators of athletes. Through 24-hour heart rate monitoring, the researcher will obtain more comprehensive dynamic heart rate changes and provide high-standard physiological recommendations for scientific training.

Mashiko et al. (2019) and Bangsbo (2007) claimed that action rate is an important factor that affects specific strength and explosiveness. According to Lin et al. (2020), in football games, explosive action forms are inseparable from the support of action rate, such as sprinting, jumping, shooting, grabbing, intercepting, accelerating, decelerating, changing direction, and throwing the ball. Therefore, the concept of explosive force = power rate is also proposed, and the gain of football's specific strength and explosive power depends on the strength of specific muscles and the coordination ability of specific movements (Xu et al., 2021). In a game, these specific action forms can also make the training more specific and targeted through frequency quantitative analysis, such as sprinting 12-35 times, jumping 9-22 times, shooting 13-18 times, changing direction 51-82 times, maximizing acceleration 35-72 times, and so on. Training of specific muscle strength will improve the acceleration ability, turning direction change ability, sprint ability, and game rhythm control ability.

Based on the specific characteristics of football, the researcher designed aerobic, anaerobic, and muscle strength training methods under the influence of different exercise forms and training load control, and scientific training control basis such as intensity differences and load changes under different exercise forms. Through empirical research verification, physiological index analysis, and game changes, the researcher intends to prove the rationality and cutting-edge of the training design to enrich the theory and method of football specific physical training.



1.6 Conceptual Framework of the Study

Conceptual framework generally illustrates the overview of the study and highlights the essential elements of study such as constructs, factors or variables and the relationship between them (Kivunja, 2018). Figure 1.2 presents the conceptual framework for this study.

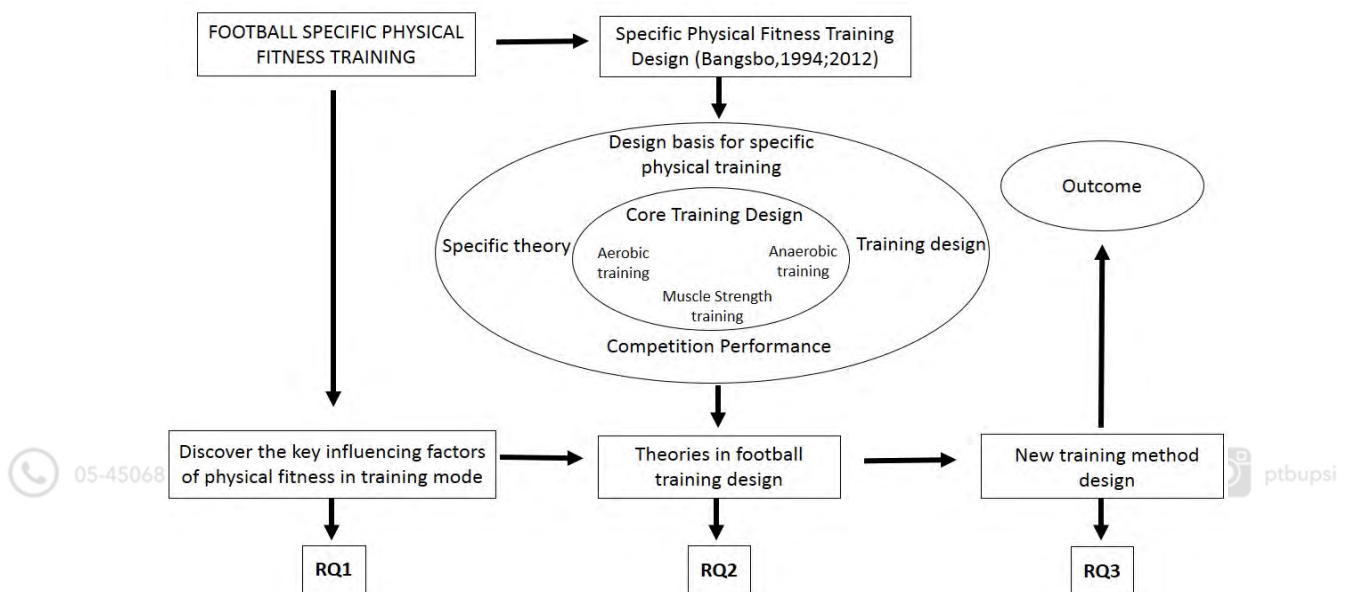


Figure 1.2. Conceptual Framework of the Study

1.7 Importance of the Study

With the rapid development of modern football and increasingly challenging competition, athletes need more scientific and reasonable training (Haugen, 2019; Wu et al., 2019). On the basis of not affecting their sports life, athletes need to explore their body's ability to bear the training load in order to comprehensively improve their

competitive level and adapt to the increasing pace and number of games (Chen et al., 2021). Therefore, the in-depth exploration of the essential rules and internal extension attributes of the specific sports characteristics of football has become a breakthrough point for relevant practitioners, experts, and scholars, both locally and abroad, to define and understand the specific physical abilities and performance characteristics of football players. Consequently, an in-depth, comprehensive, and detailed exploration of the modern football match performance of the athletes will help to update and improve the scientific concept of specific physical training.

This study can help Chinese football identify the root cause of weak restrictions on football players' physical ability level and guide the scientific analysis of football project characteristics and excellent performance characteristics of specific football players. This ensures a comprehensive understanding of the essential characteristics of football. It equips coaches and football practitioners with a fresh perspective on football athletes' specific physical training, providing a scientific theory basis for the establishment of a specific physical training theory and method system for football. This would enrich the design of physical training ideas and provide a reference for all football practitioners.

There are three major innovation points in this research.

Innovation point 1: Starting from the performance characteristics of football players, this paper analyses the theoretical basis of the design of football specific physical training from the perspective of combining theory and practice.

Innovation point 2: To build a universal physical training design theory and framework system for football sports, this study provides a reference for specific goal design, content design, method, and load design, cycle arrangement, etc.

Innovation point 3: According to the specific characteristics of football sports, the methods and means of aerobic energy, anaerobic capacity and muscle strength training under the influence of different exercise forms and training load control elements are designed, and the scientific training control basis such as intensity difference and load change under different exercise forms are verified through empirical research.

1.8 Operational Definition

The following are the operational definitions of terms used in this study.

1.8.1 Football

Football refers to a team sport that involves two opposing teams of eleven players each, with the objective of scoring goals by kicking a ball into the opposing team's goalpost. The game is played on a rectangular field with specific dimensions, and includes various physical activities such as running, jumping, and kicking. It is a popular sport worldwide, with millions of players and fans across different countries (FIFA, 2018). In the context of this study, football refers to a team sport that involves specific physical fitness requirements, including endurance, speed, agility, strength,

and coordination (American College of Sports Medicine, 2020). The training method of specific physical fitness in football is an important aspect of performance optimization for football players, particularly at the elite level (Zhang et al., 2019).

1.8.2 Training Method

The training method of specific physical fitness in football is a crucial aspect of performance optimization for football players, particularly at the elite level (Zhang et al., 2019). In this study, training method refers to a systematic and progressive approach aimed at enhancing specific physical fitness components, including endurance, speed, agility, strength, and coordination, as well as technical and tactical abilities relevant to football. The training program is designed based on the principles of exercise science, including the FITT principle (frequency, intensity, time, and type) and the overload principle, to ensure a gradual and effective improvement in performance (American College of Sports Medicine, 2020).

1.8.3 Specific Physical Fitness

Specific physical fitness refers to the physical attributes and abilities that are directly related to performance in a specific sport or activity (Ma et al., 2019). The training method of specific physical fitness in football is an essential component of performance optimization for football players, particularly at the elite level (Zhang et al., 2019). According to Rodríguez-Feijóo et al. (2021), specific physical fitness in football, includes endurance, speed, agility, strength, and coordination, as well as technical and

tactical abilities that are relevant to football. The development of specific physical fitness requires a targeted and progressive training program that is designed based on the individual player's needs and goals, as well as the requirements of the position they play (American College of Sports Medicine, 2020).

1.8.4 Football Specific Physical Fitness

According to Ma et al. (2019), football specific physical fitness is defined as the physical attributes and abilities that are directly related to performance in football, including endurance, speed, agility, strength, coordination, and technical and tactical abilities that are specific to football. Li & Zeng (2021) also pointed out that the core of football specific physical ability is the ability of athletes to directly or indirectly integrate into the football match and limit the performance of opponents in athletic competitions. In this study, football specific physical training specifically focuses on aerobic training, anaerobic training and muscle strength training.

1.8.5 Physical Ability

Physical ability refers to the measurable and trainable physical attributes that contribute to athletic performance and are essential for success in specific sports (Cronin & Hansen, 2019). These attributes may include, but are not limited to, aerobic capacity, anaerobic power, speed, agility, strength, power, and coordination (Bishop et al., 2019; Mujika et al., 2020; Sporis et al., 2018). Physical ability is an important component of an athlete's overall fitness and is developed through targeted physical

training programs that aim to optimize these specific attributes (Gamble et al., 2019; Petrakos et al., 2019).

1.9 Limitations of the Study

Like most studies, this study also has its limitations. There are three main limitations in this study. First and foremost, the study is influenced by uncontrollable factors such as weather, which may have led to a discontinuity of the established training plan in the empirical study, thus impacting the experimental data. However, the researcher attempted to mitigate this by looking for alternatives to carry out the training as scheduled, such as changing the venues to indoor stadiums or halls.

Next, the study's sample size is relatively small, which means that the results of the study may not represent the specific physical fitness training method for all of China. The study is also limited to football players only. Nevertheless, the researcher recruited the samples by following standard procedures in the midst of the COVID-19 pandemic.

Besides, the empirical study formulated in this paper is only six weeks long due to time constraints and limitations in conducting specific physical fitness training on the football players. The samples had to focus on preparing for their games and matches, and thus, the researcher could not take up much of their training time. If a longer follow-up record and training intervention can be conducted, more details and influencing factors can be reflected.

1.10 Overview of the Study

This first chapter of the research introduces the background of the study, statement of the problem, the purpose of the research, the objective of the study, research questions, the significance of the study and the operational definitions of the terms used.

The second chapter presents the literature review of the study. The first part explains the theoretical framework that forms the basis of the study whereas the second part follows with the distinctive viewpoints of proponents of the field with which critical evaluation has been attempted.

In chapter three, the research methodology and design are explained clearly. Mode of data collection, techniques of data analysis and validity of research techniques are highlighted in this chapter. The discussion encompasses the validity of data and sampling techniques used therein. Validity and reliability of various instruments of the study are discussed within this chapter.

Chapter four presents the findings of the research. The results answer the research questions. Results are shown both quantitatively and qualitatively.

In chapter five, the researcher discusses the findings of the study and makes conclusions based on the research questions of the study, followed by recommendations for further research.