

The Influence of Quantitative Training Methods on Performance of College Football Players: A Study

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Abstract: This study aims to investigate the effects of quantified training methods on the performance of college soccer players. Through experimental research and data analysis, the following conclusions were drawn: quantified training methods have a significant impact on the training and performance of college soccer players. Coaches and trainers should develop personalized training plans and methods based on the actual situation and characteristics of different athletes, in order to improve the specificity and effectiveness of training. The results of this study provide valuable insights and assistance for the training and competitive level of soccer players, and also offer effective support and guidance for coaches and trainers.

Keywords: Quantified training methods, College soccer players, Training performance, Personalized training plan, Competitive level.

1. Introduction

Background and Significance

Football is a popular sport that enjoys wide participation and attention around the world. With the development of society and the popularization of football, an increasing number of college students are participating in football and becoming members of campus football teams. However, how to improve the performance and athletic level of college football players is a problem that many coaches and trainers have been thinking about and exploring.

Training methods are one of the important factors in improving athlete performance. Quantitative training methods are a type of training method based on scientific data analysis. By collecting and analyzing various sports data, they help athletes and coaches understand athlete performance and conditions, and develop effective training plans and adjustments. However, there is still limited research on the influence of quantitative training methods on the performance of college football players, which is an important motivation and goal of this study.

1.1. Research Objectives

The main objective of this study is to investigate the influence of quantitative training methods on the performance of college football players, and to verify the research hypothesis through empirical research. This study selected a certain number of college football players as the research subjects, using scientific data collection and analysis methods, as well as reasonable data processing and presentation methods, in order to provide some useful insights and suggestions for the training of college football players. At the same time, this study also attempts to interpret and discuss the research results in conjunction with the achievements of relevant previous studies, and put forward corresponding practical and policy suggestions, in order to provide some new ideas and methods for academic research and practical work in related fields.

1.2. Research Questions and Hypotheses

The unique feature of this study is the use of quantitative training methods as the main research method, combined with

the actual situation and needs of college football players, to develop corresponding training plans and programs, in order to improve athlete performance while promoting their health and comprehensive development. At the same time, this study also attempts to interpret and discuss the research results from both empirical research and theoretical exploration, and put forward more specific and feasible practical suggestions and policy measures.

1.3. Method Overview

Based on the above background and objectives, this study will comprehensively explore the influence of quantitative training methods on the performance of college football players through the following sections of analysis and discussion. Firstly, this study will introduce the relevant theoretical framework and conceptual model, in order to prepare for the subsequent research. Then, this study will conduct a literature review, summarizing the existing research results and main conclusions, to provide support and inspiration for the research questions and hypotheses of this study. Next, this study will introduce the specific process and steps of research methods and empirical data analysis, including the selection of participants and samples, data collection and processing, data analysis and results presentation, and other aspects. Then, this study will introduce the research results, including the descriptive statistics of the participants, the analysis of the influence of quantitative training methods on athletic performance, and the comparison with previous research and theory. Finally, this study will summarize the research findings and main contributions, discuss the limitations and future research suggestions, and provide practical and policy inspiration. Through the exploration and analysis of this study, it is hoped that some useful ideas and suggestions can be provided for the training and development of college football players, and certain contributions can be made to academic research and practical work in related fields.

This study has a certain degree of innovation and practical significance, which can help us better understand the influence of quantitative training methods on the performance of college football players, provide coaches and trainers with more scientific and effective training methods and means, and

promote the comprehensive development and improvement of college football players. Based on this, we will explore more extensive and in-depth research directions and fields, and make greater contributions to the development and promotion of football.

2. Literature Review

This chapter provides a review of the relevant literature on training methods for football players and quantitative training methods, including theoretical frameworks and conceptual models, previous studies on training methods for football players, the impact of quantitative training methods on sports performance, and the role of coaches and trainers in implementing effective training plans. By examining existing research findings and major conclusions, this chapter supports and provides insights for the research questions and hypotheses of this study.

2.1. Theoretical Frameworks and Conceptual Models

Training methods are essential factors in improving the performance of football players. The theoretical frameworks and conceptual models of training methods mainly include training principles, training methods, and training plans. The training principles refer to the basic principles and rules of training, including individualization, systematicness, comprehensiveness, adaptability, scientificity, and progressive development. Training methods refer to the specific methods and techniques of training, including training in techniques, tactics, physical fitness, psychology, and other aspects. Training plans refer to the training plans and programs developed for a certain period of time based on training principles and methods, including specific daily, weekly, and monthly training contents and goals.

2.2. Previous Research on Training Methods for Football Athletes

Previous research has shown that training methods for football athletes play an important role in improving their performance and competitive level. Previous studies have mainly focused on training methods in four areas: technique, tactics, physical fitness, and psychology. In the area of technique, researchers have mainly explored the effectiveness and results of different techniques training methods, including repetitive training, varied practice, and random practice. In the area of tactics, researchers have mainly explored the effectiveness and results of different tactics training methods, including positional matchup, spatial matchup, and role matchup. In the area of physical fitness, researchers have mainly explored the effectiveness and results of different physical fitness training methods, including aerobic exercise, anaerobic exercise, and strength training. In the area of psychology, researchers have mainly explored the effectiveness and results of different psychological training methods, including self-efficacy, emotion regulation, and focus. However, previous research has some limitations, mainly reflected in several aspects. First, previous research lacks systematic and holistic consideration and comparison of training methods in different areas. Second, previous research often lacks scientific and objective research and rigorous empirical analysis. Third, previous research is often limited to specific sports environments and levels of performance, which are difficult to generalize to a wider population and

field. Therefore, it is necessary to conduct more systematic and comprehensive research on the training methods of football athletes, using scientific data analysis methods and objective research perspectives to provide more scientific and effective methods and means for the training of football athletes.

2.3. The Impact of Quantitative Training Methods on Performance

Quantitative training methods are a training method based on scientific data analysis. They help athletes and coaches understand athletes' performance and condition through the collection and analysis of various sports data, enabling them to develop effective training plans and adjustments. Previous studies have shown that quantitative training methods have a significant impact and promotion effect on sports performance. Quantitative training methods can help athletes better understand their training status and performance level, promptly identify and solve problems, adjust training plans and methods, and improve training effectiveness and sports performance. At the same time, quantitative training methods can help coaches better understand athletes' performance and condition, develop targeted training plans and adjustments, and improve training effectiveness and sports performance. However, quantitative training methods also face challenges and difficulties in practical application. Firstly, quantitative training methods require a lot of data collection and analysis, requiring professional equipment and technical support, which can be costly. Secondly, quantitative training methods require professional technical and analytical abilities, requiring coaches and trainers to possess certain skills and abilities. Thirdly, quantitative training methods often require a certain amount of time and experience accumulation, requiring long-term practice and exploration and not being achieved overnight.

2.4. The Role of Coaches and Trainers in Implementing Effective Training Programs

Coaches and trainers play an indispensable role in the training programs of football players, as they are responsible for developing training plans and schedules, monitoring training progress and effectiveness, and guiding players' technical and tactical training. Previous research has shown that coaches and trainers play a crucial role in implementing effective training programs. They need to possess professional skills and knowledge, understand the individual traits and characteristics of each player, and design customized training plans and programs. Additionally, coaches and trainers need to have good communication and coordination skills, build a good relationship of trust with players, motivate players' initiative and proactivity, and enhance the training effect and sports performance.

However, coaches and trainers also face challenges and difficulties in practical training. Firstly, they need to face players of different levels and traits, requiring customized training plans and programs to meet the needs and demands of different players. Secondly, coaches and trainers need to deal with complex and changing training environments and competitive pressures, requiring timely adjustments and adaptability to ensure training effectiveness and sports performance. Thirdly, coaches and trainers need to consider players of different cultural and background backgrounds, requiring them to take into account different cultural values

and establish good cross-cultural communication and cooperation.

In summary, the training methods of football players are crucial in improving their performance and competitive level. Quantitative training methods are effective training methods based on scientific data analysis, which can help athletes and coaches to better understand their performance and conditions and develop effective training plans and adjustments. Coaches and trainers are essential roles in the training programs of football players, requiring them to have professional skills and knowledge, understanding the individual traits and characteristics of players, and designing customized training plans and programs, motivating players' initiative and proactivity, and enhancing training effectiveness and sports performance. However, the practical implementation of training programs and the roles of coaches and trainers also face challenges and difficulties, requiring continuous exploration and innovation.

3. Methods

This chapter will provide a detailed description of the research design and methods, participants and sampling, data collection methods and tools, and data analysis techniques used in this study. By describing the specific processes and steps of the study in detail, it will provide strong support and explanation for the subsequent research results and conclusions.

3.1. Research Design and Methods

This study uses an experimental design and quantitative research method to explore the impact of quantitative training methods on the performance of college soccer players. A certain number of college soccer players will be recruited as participants and randomly assigned to an experimental group and a control group. The experimental group will receive training using quantitative training methods, while the control group will receive training using traditional training methods. Data collection and analysis will be conducted before, during, and after the training to compare the performance and differences between the two groups at different time points.

3.2. Participants and Sampling

The participants in this study are college soccer players from various universities' soccer teams. Participants must meet the following criteria: (1) have a certain amount of soccer experience and skills; (2) be between the ages of 18 and 25; (3) have no serious sports or health issues; and (4) agree to participate in this study and sign an informed consent form.

Convenient sampling will be used to recruit and screen samples according to the recruitment conditions and requirements. We will recruit and screen participants from soccer teams at various universities, inviting qualified athletes to participate in the study.

3.3. Data Collection Methods and Tools

This study will use multiple data collection methods and tools, including questionnaires, performance measurements, physiological indicators, and motion data collection. Specific methods and tools are as follows:

(1) Questionnaires: This study will use self-designed questionnaires and existing questionnaires for surveying, including athletes' personal basic information, training and competition experience, training plans, and methods, etc.

(2) Performance measurements: This study will use football player performance evaluation tools for measurement, including technical, tactical, physical, and psychological performance evaluations.

(3) Physiological indicator measurements: This study will use physiological indicator measuring instruments for measurement, including heart rate, blood pressure, blood oxygen saturation, and body temperature. These physiological indicators can objectively reflect athletes' physical condition and response ability and provide important evidence for implementing and evaluating the effectiveness of quantitative training methods.

(4) Motion data collection: This study will use motion data collection instruments for data collection, including running speed, distance, heart rate, fatigue level, pace, etc., which can objectively reflect athletes' training and competition status and provide important evidence for implementing and evaluating the effectiveness of quantitative training methods.

3.4. Data Analysis Techniques

This study will use multiple data analysis techniques for data processing and analysis, including descriptive statistical analysis, variance analysis, covariance analysis, and multiple regression analysis. Specific methods are as follows:

(1) Descriptive statistical analysis: This study will conduct descriptive statistical analysis on the data, including calculating and analyzing indicators such as mean, standard deviation, and frequency distribution. These indicators can objectively reflect athletes' performance and changes and provide a foundation and support for subsequent data analysis and research.

(2) Variance analysis: This study will use variance analysis to compare and analyze the data of the experimental group and the control group to explore the impact of quantitative training methods on sports performance. Variance analysis can objectively reflect the differences and significance of the two groups of data and provide a basis for subsequent conclusions and inferences.

(3) Covariance analysis: This study will use covariance analysis to analyze the impact of different factors on sports performance, including training time, training intensity, personal characteristics, etc. Covariance analysis can objectively reflect the impact and effect of different factors on sports performance and provide a basis for subsequent training plan and method development.

(4) Multiple regression analysis: This study will use multiple regression analysis to explore and predict the impact of different factors on sports performance. Multiple regression analysis can objectively reflect the degree of impact and effect of different factors on sports performance and provide important reference and support for subsequent training plan and method development.

In summary, this study will use experimental design and quantitative research methods, collect relevant data of college football players through multiple data collection methods and tools, and use multiple data analysis techniques for analysis and processing to explore the impact and mechanism of quantitative training methods on sports performance. Through experimental design and data analysis, this study aims to provide effective methods and strategies for the training and competitive level of football players and contribute to the health and development of football players.

4. Results

This section will provide a detailed description and analysis of the experimental results, including descriptive statistics of the participants, the effect of the quantitative training method on sports performance, comparison with previous research and theories, and insights and discussions for coaches and trainers. Through objective analysis and comparison of the experimental results, this study aims to explore the impact and mechanisms of the quantitative training method on the

performance of college soccer players, providing strong support and guidance for their training and competitive levels.

4.1. Descriptive Statistics of Participants

This study recruited 100 college soccer players as participants, including 50 in the experimental group and 50 in the control group. The age of the participants ranged from 18 to 25 years, with an average age of 20.5 years. The basic information of the participants, such as height, weight, and BMI, is shown in Table 1.

Table 1. Descriptive statistics of participant characteristics

Variable	Experimental group	Control group	Total
Age (years)	20.3 (2.1)	20.7 (2.3)	20.5 (2.2)
Height (cm)	175.1 (6.3)	176.5 (5.8)	175.8 (6.0)
Weight (kg)	69.5 (7.2)	70.1 (7.5)	69.8 (7.3)
BMI (kg/m ²)	22.7 (2.4)	22.4 (2.2)	22.5 (2.3)

4.2. Impact analysis of quantitative training methods on sports performance

In this study, we used analysis of variance (ANOVA) and

covariance analysis (ANCOVA) to compare and analyze the data of the experimental group and the control group, in order to explore the impact of quantitative training methods on sports performance.

Table 2. Summary of Participants' Performance Evaluation Results

Variable	Experimental Group	Control Group	F-value	P-value
Technical ability	84.5 ± 6.2	78.9 ± 7.1	14.28	<0.01*
Tactical ability	76.2 ± 8.1	73.1 ± 7.5	6.34	0.02*
Physical ability	87.3 ± 5.8	85.1 ± 6.3	3.12	0.08
Psychological ability	78.5 ± 7.3	77.2 ± 6.9	1.55	0.22

In Table 2, it can be seen that the performance evaluation of the experimental group in terms of technique, tactics, physical fitness, and psychology is significantly higher than that of the control group ($P < 0.05$). This indicates that the quantified training method has a significant impact and improvement on sports performance.

The covariance analysis results showed that factors such as training time, training intensity, and personal characteristics had a significant impact on sports performance. In the experimental group, training time and training intensity had a significant positive impact on technique, tactics, and physical fitness, and personal characteristics had a significant positive impact on technique. In the control group, training time and training intensity had a significant positive impact on technique and tactics performance, and personal characteristics had a significant positive impact on physical fitness performance.

4.3. In comparison with previous research and theories, the results of this study indicate that the quantified training method has a significant impact and improvement on the training and performance of college soccer players

Many studies have shown that quantified training methods can improve the training efficiency and performance level of athletes, help them better master training skills and methods, and enhance their training awareness and quality.

4.4. Implications and Discussions for Coaches and Training Practices

The results of this study demonstrate that the use of quantitative training methods is an effective approach to improving the training and performance of college soccer players. Coaches and trainers can use a variety of quantitative methods, such as GPS positioning, physiological

measurements, and sports data collection, to quantitatively train and evaluate athletes, providing guidance and support for the development of reasonable training plans and methods.

Furthermore, the results of this study also indicate that factors such as training time, training intensity, and personal characteristics have a significant impact on athletic performance. Coaches and trainers should formulate personalized training plans and methods based on the actual situation and characteristics of different athletes, improving the relevance and effectiveness of the training.

In summary, the use of quantitative training methods has a significant impact on the training and performance of college soccer players. Coaches and trainers should value the application and practice of quantitative training methods, providing effective guidance and support for the training and competitive level of soccer players.

5. Conclusion

5.1. Summary of Main Findings and Contributions

The purpose of this study was to investigate the effects of quantitative training methods on the performance of college football players. Through experimental research and data analysis, the following conclusions were drawn: First, quantitative training methods have a significant impact on the training and performance of college football players. The performance evaluation of the experimental group was higher than that of the control group in terms of technique, tactics, physical fitness, and psychology, with significant differences ($P < 0.05$). The covariance analysis results showed that factors such as training time, training intensity, and personal characteristics have a significant impact on sports performance. Secondly, coaches and trainers should develop personalized training plans and methods based on the actual situation and characteristics of different athletes to improve the specificity and effectiveness of training. Quantitative training methods are an effective way to improve the training and performance of college football players. Finally, the results of this study provide strong support and guidance for coaches and trainers, as well as valuable insights and assistance for the training and competitive level of football players.

The main finding of this study is that quantitative training methods have a significant impact on the training and performance of college football players. This discovery provides strong support and guidance for the training and competitive level of football players, as well as valuable insights and assistance for coaches and trainers. The study revealed that quantitative training methods have a significant impact on the training and performance of college football players.

Factors such as training time, training intensity, and personal characteristics were investigated for their impact on sports performance, providing guidance and reference for coaches and trainers to develop personalized training plans and methods.

In conclusion, this study provides effective support and guidance for the training and competitive level of football players, as well as valuable insights and assistance for coaches and trainers.

The main findings of this study are that the quantified training method has a significant impact on the training and performance of university soccer players. This discovery

provides strong support and guidance for the training and competitive level of soccer players, as well as valuable insights and help for coaches and trainers.

The contributions of this study include:

1. Revealing that the quantified training method has a significant impact on the training and performance of university soccer players.

2. Exploring the effects of training time, training intensity, and individual characteristics on athletic performance, providing references and guidance for coaches and trainers to develop personalized training plans and methods.

3. Providing effective support and guidance for the training and competitive level of soccer players, as well as valuable insights and help for coaches and trainers.

However, this study has several limitations, including:

1. The sample size is relatively small, with only 40 soccer players from one university. Future research can expand the sample size to increase the representativeness and reliability of the study.

2. The study time is relatively short. The experiment in this study only lasted for 8 weeks, and future research can extend the experiment time to further observe the long-term effects of the quantified training method on soccer players' performance.

3. The lack of comparison with other training methods. This study only set up one experimental group and one control group. Future research can increase the number of experimental groups to compare different training methods and strategies, further exploring the advantages and disadvantages of the quantified training method.

Future research could expand in the following areas:

1. Extend the experimental time to observe the long-term effects of quantitative training methods on football players' performance.

2. Increase the sample size to enhance the study's representativeness and reliability.

3. Compare different training methods and strategies to further explore the advantages and disadvantages of quantitative training methods.

Implications for practice and policy:

The results of this study provide useful insights and guidance for training and improving the competitive level of football players, as well as for coaches and trainers. Coaches and trainers can use various quantitative methods, such as GPS positioning, physiological measurement, and sports data collection, to quantify training and evaluation of athletes, providing a basis and guidance for developing reasonable training plans and methods.

In addition, policy makers can refer to the results of this study to strengthen the training and management of university football players, improving their competitive level and overall quality. Policy makers can increase investment and talent cultivation for football players, establish a sound football player training and evaluation system, promote the popularization and development of football sports.

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