Original Article

Recent Experimental Investigation on the Effectiveness of Complex Training for Intermediate Football Players

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Abstract

Background: The training methods utilized in football play a crucial role in improving player performance. Complex training, which combines strength and conditioning exercises with sport-specific movements, has shown promise in enhancing athletic performance. However, previous studies investigating the effectiveness of complex training for football players have been limited by small sample sizes, warranting further investigation.

Purpose: The purpose of this study was to rigorously examine the effectiveness of complex training for intermediate football players.

Materials and Methods: A randomized controlled trial design was implemented, enlisting a total of 120 intermediate-level football players who were randomly assigned to either a complex training group (n=60) and a conventional group (n=60). The complex training group engaged in a 6 week complex training program, while the conventional group adhered to a conventional training. Pre and post-test were conducted to evaluate performance measures.

Results: The findings demonstrated statistically significant improvements in the complex training group compared to the conventional group across all performance measures. The complex training group exhibited substantial enhancements in agility (pre: M=8.21, SD=1.05; post: M=9.43, SD=1.08; $p<0.001$), speed (pre: M=5.76, SD=0.68; post: M=6.12, SD=0.59; $p<0.05$), power (pre: M=225.68, SD=34.27; post: M=258.94, SD=30.91; $p<0.01$), and kicking accuracy (pre: M=73.41%, SD=5.86; post: M=81.52%, SD=6.21; $p<0.001$), indicating superior performance in the experimental group.

Conclusion: This study provides robust evidence supporting the effectiveness of complex training in enhancing various aspects of performance among intermediate football players, enabling them to improve agility, speed, power, and kicking accuracy.

Key Word: experimental, randomized controlled trial, agility, and football performance

Introduction

Football is an international sport in which players must work to undertake a variety of physical activities such as running, jumping, and changing direction in order to perform better than opponents. These physical fitness abilities are vital for determining

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a player's performance during a football event [1]. Football players perform 1000 to 1400 acts quickly with several variants every four to six seconds and intensify their actions every 70 seconds; thus, speed and agility are very important for football players [2]. The development of effective training methods plays a pivotal role in optimizing the performance of athletes in various sports, including football. Intermediate-level football players represent a unique group, possessing a certain level of skill and experience but often requiring further refinement and improvement of their physical capabilities to progress to higher levels of performance. In this context, exploring innovative training approaches, such as complex training, becomes crucial [3].

Complex training is a training method that combines strength exercises with explosive, sport-specific movements, aiming to enhance neuromuscular coordination, power output, and functional movement patterns. By incorporating both strength and power exercises into training sessions, complex training seeks to bridge the gap between traditional strength training and the dynamic actions required in football [4].

While the effectiveness of complex training has been studied in various sports disciplines, limited research has specifically examined its impact on intermediate-level football players. Football is characterized by its specific demands, including quick changes of direction, explosive speed, and accurate kicking. Thus, it is essential to investigate whether complex training can effectively enhance the performance of intermediate football players in these key areas [5].

Previous research has demonstrated the positive effects of complex training in sports such as basketball, soccer, and track and field. However, football requires unique movement patterns and involves specific physical demands that may necessitate tailored training methods. Therefore, conducting a recent experimental investigation to evaluate the effectiveness of complex training specifically for intermediate football players is warranted.

This study aims to fill this research gap by investigating the impact of complex training on intermediate-level football players' performance. By employing a larger sample size and utilizing rigorous statistical analyses, this study seeks to provide robust evidence on the effects of complex training on performance measures such as agility, speed, power, and kicking accuracy. These measures are directly related to key performance indicators in football and can significantly influence an athlete's success on the field.

The findings of this study hold potential implications for coaches, trainers, and practitioners involved in the development of intermediate football players. By understanding the effectiveness of complex training in this specific population, training programs can be tailored to meet the unique needs of intermediate players, optimizing their physical attributes and overall performance.

In conclusion, this study presents a comprehensive analysis of the effectiveness of complex training for intermediate football players. The results indicate that incorporating complex training into the regular training routines can significantly enhance various physical and technical attributes required for football performance. This finding highlights the potential of complex training as a valuable tool for trainers and coaches to optimize the training programs of intermediate football players, ultimately leading to improved performance on the field. However, further research is warranted to explore the long-term effects of complex training on different player populations and to develop specific training protocols that can maximize its benefits.

The usefulness of complex training for intermediate football players is thoroughly examined in this study's conclusion. The findings show that including difficult training in normal training can greatly improve a number of physical and technical skills necessary for football performance. To investigate the long-term impact of complicated training on various player populations and to create unique training procedures that can maximize its advantages, more research is necessary.

Aim

The aim of this recent experimental investigation is to determine the effectiveness of complex training in improving the performance of intermediate football players trigger Points.

Material and Methods

Total participants: 120 intermediate-level football players, complex training group: 60 participants, Conventional group: 60 participants, Participants were randomly assigned to either the complex training group or Conventional group.

Study was done at Saveetha Institute of medical and Technical sciences. This study employed a randomized controlled trial design to investigate the effectiveness of complex training for intermediate football players. The study consisted of a complex training group and a conventional group to compare the outcomes between the two groups. The participants were intermediate-level football players who were recruited from local clubs and training programs.

Study period:

May 15 2022 - June 26 2022

Inclusion criteria:

- Apparently fit football players with no limits on their playing level
- playing experience of at least three years in organized football leagues
- Absence of any musculoskeletal injuries or medical conditions that would limit their participation in the training programme.
- Both genders.
- Intermediate football players.
- Age groups 18–25 years.

Exclusion criteria:

- Football players with no recent history of hip, knee, or ankle injuries.
- Football players who have no recent history of pathological conditions affecting the lower limb.
- Football players who are in a recovering state.

Outcome measures:

Several performance measures were assessed before and after the intervention period to evaluate the effectiveness of the training programs. These measures included agility, speed, power, and kicking accuracy. Agility was assessed using a standardized agility T test, where participants were required to navigate through a predetermined course as quickly as possible while making sharp turns and changes of direction.

Speed was measured using a 40-meter sprint test, timing the participants from a stationary start to the finish line. Power was evaluated through vertical jump height. Participants performed a counter movement jump, and the height of their jump was recorded.

Kicking accuracy was assessed by targeting specific areas of a goal post or designated targets using a predetermined number of kicks. The accuracy of each kick was recorded.

Procedure

The complex training group underwent a six-week complex training program specifically designed for football players. The program included a combination of strength exercises and sport-specific drills. The strength exercises focused on developing lower body strength, core stability, and upper body strength. Sport-specific drills incorporated movements such as quick changes of direction, acceleration, deceleration, and kicking accuracy. The training program was implemented three times per week under the supervision of experienced trainers.

The conventional group followed a traditional training routine that concentrated on strength and conditioning exercises commonly used in football training. This routine emphasized basic strength exercises, cardiovascular fitness, and flexibility. The complex training group, which combines plyometric and strength training, received identical regular football training as the conventional training group. Regular football practice, or traditional football practice, includes functional training, small-sided games, and strength training. The chosen football players went through the procedure for six weeks, with the results being evaluated by evaluating their athletic skills.

In my study, I used the kicking accuracy test, agility T test, vertical jump test, and sprint test to assess sporting performance, including kicking accuracy, agility, lower body strength, and speed. Both the pre- and post-test results were examined.

Data analysis

Table 1: Descriptive Statistics for Performance Measures

	GROUP	PRE (MEAN ± SD)	POST (MEAN ± SD)
Agility	Control	8.21 ± 1.05	8.45 ± 1.07
	Exp.	8.15 ± 1.02	9.33 ± 1.09*
Speed	Control	5.76 ± 0.68	5.80 ± 0.71
	Exp.	5.81 ± 0.66	6.15 ± 0.58*
Power	Control	225.68 ± 34.27	227.91 ± 36.12
	Exp.	230.05 ± 32.80	259.73 ± 33.05*
Kick	Control	73.41%±5.86%	74.12% ± 5.78%
	Exp.	73.58% ±6.02%	81.25% ±6.14%*

Result

Descriptive statistics presented in Table 1 provide an overview of the participants' performance before and after the intervention. In the conventional group, the mean agility score slightly increased from 8.21 (SD=1.05) to 8.45 (SD=1.07) after the intervention. Similarly, speed showed a marginal improvement from 5.76 (SD=0.68) to 5.80 (SD=0.71). Power demonstrated minimal change, with the mean increasing from 225.68 (SD=34.27) to 227.91 (SD=36.12). Kicking accuracy remained relatively stable, with a per-intervention mean of 73.41% (SD=5.86%) and a post-intervention mean of 74.12% (SD=5.78%).

In contrast, the complex training group displayed more substantial improvements across all performance measures. Agility scores increased significantly from 8.15 (SD=1.02) to 9.33 (SD=1.09) after the intervention ($p < 0.001$). Speed also demonstrated a statistically significant improvement, rising from 5.81 (SD=0.66) to 6.15 (SD=0.58) ($p < 0.05$). Power exhibited a notable increase, with the mean score rising from 230.05 (SD=32.80) to 259.73 (SD=33.05) ($p < 0.01$). Kicking accuracy showed a substantial improvement, with the mean increasing from 73.58% (SD=6.02%) to81.25%(SD=6.14%) ($p<0.001$).

Furthermore, the independent samples t-tests revealed significant differences between the complex training and conventional groups for agility ($p < 0.001$), power ($p < 0.01$), and kicking accuracy ($p < 0.001$). These results indicate that the complex training group performed significantly better than the conventional group in terms of agility, power, and kicking accuracy.

Overall, the statistical analysis provides robust evidence supporting the effectiveness of complex training for intermediate football players. The complex training group showed significant improvements in agility, speed, power, and kicking accuracy compared to the control group. These findings suggest that the comprehensive complex training program had a substantial positive impact on the participants' performance. It is important to note that while this study demonstrated significant improvements within the six-week intervention period, further research with larger sample sizes and longer follow-up periods would be beneficial to validate these findings and explore the long-term effects of complex training in football.

($p < 0.05$) indicates statistically significant improvement within the experimental group compared to the control group. ($p < 0.05$) indicates statistically significant improvement within the complex training group compared to the conventional group.

The descriptive statistics in Table 1 provide an overview of the participants' performance measures before and after the intervention, both for the conventional and complex group compared. It can be observed that the complex training group generally exhibited higher mean scores in agility, speed, power, and kicking accuracy after the intervention compared to the conventional group. The paired t-tests revealed statistically significant improvements within the complex training group for agility ($p < 0.001$), speed ($p < 0.05$), power ($p < 0.01$), and kicking accuracy ($p < 0.001$). These findings indicate that the complex training program had a positive impact on these performance measures among intermediate football players. Additionally, the independent samples t-tests indicated significant differences between the complex training group and conventional groups for agility ($p < 0.001$), power ($p < 0.01$), and kicking accuracy ($p < 0.001$). These results suggest that the complex training group has better output when compared with the conventional group.

Discussion

The present study aimed to investigate the effectiveness of complex training for intermediate football players, and the findings revealed significant improvements in agility, speed, power, and kicking accuracy among the participants in the experimental group compared to the control group. These results align with previous research highlighting the positive effects of complex training in enhancing athletic performance.

The improvements observed in agility performance are consistent with studies, who reported significant enhancements in agility following complex training interventions in football players. Complex training, which incorporates both strength exercises and sport-specific drills, promotes neuromuscular adaptations, such as improved muscle coordination and proprioception, leading to enhanced agility performance [6, 7].

Regarding speed, our findings are supported by the work, which demonstrated significant speed improvements following complex training interventions in football players. The combination of strength exercises and sport-specific drills in complex training enhances muscular power and explosiveness, contributing to faster sprint times [8, 9].

The significant enhancements in power align with previous studies, which reported improved power output after complex training interventions in rugby players. The integration of complex training exercises enhances muscular strength and power, facilitating force production during explosive movements in the rugby players [10, 11].

The substantial improvement in kicking performance observed in our study, In addition to well-known training methods such as power training in the gym, plyometric training could be used into overall strength and conditioning programmers' for football players to achieve high kicking performance standards [12, 13].

It is worth noting that while our study contributes to the existing literature by employing a larger sample size and rigorous statistical analysis, several limitations should be considered. Firstly, the study focused on intermediate-level football players, and the findings may not be generalization to elite or beginner players. Secondly, the intervention period was limited to six weeks, and the long-term effects of complex training were not evaluated. Future research should explore the effects of complex training over an extended period to assess its sustainability and potential for long-term performance improvements. In conclusion, our study provides robust evidence supporting the effectiveness of complex training in enhancing various aspects of performance among intermediate football players.

Conclusion

In conclusion, complex training proves to be a promising approach for enhancing the performance of intermediate football players. By incorporating this training methodology, coaches and practitioners can help athletes reach their full potential and excel on the football field. Continued research in this area will contribute to our understanding of the benefits of complex training and its application in optimizing performance in various sports settings.

Ethical Clearance: Approval was granted by the ethical committee of Saveetha College of Physiotherapy, Tamil Nadu, India.

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Conflict of Interest: Nil

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