Теорія та методика фізичного виховання
Physical Education Theory and Methodology
Teorìâ ta Metodika Fizičnogo Vihovannâ

ISSN 1993-7989 (print)
ISSN 1993-7997 (online)
ISSN-L 1993-7989

Original scientific article

Optimizing the Speed and Explosive Power Performance of Football Players: The Effect of a Six-Week Neuromuscular Training

Laishram Santosh Singh[1ABCDE], Ningthoujam Rojesh Singh[1ABCDE], W. James Singh[2ABCDE], Okram Robinson Singh[1ABCDE] and Dessalegn Wase Mola[3ABCDE]

[1]Manipur University
[2]Rajiv Gandhi University
[3]Ambo University

Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

Corresponding Author: Laishram Santosh Singh, E-mail: santoshlaishram@manipuruniv.ac.in
Accepted for Publication: September 9, 2024
Published: October 30, 2024

DOI: 10.17309/tmfv.2024.5.03

Abstract

Background. Football players require high levels of speed and explosive power to perform effectively on the field, making these physical attributes critical for success. Neuromuscular training has been proposed as a method to enhance these performance metrics.

Objectives. The purpose of the present study was to examine the effect of neuromuscular training on the speed and explosive power performance of football players.

Materials and methods. A total of thirty male football players (aged 20 to 26 years) from Imphal West District, Imphal, Manipur, India, who had participated in national-level competitions, were selected for the study. The subjects were randomly assigned into two equal groups: an experimental group (n = 15) and a control group (n = 15). Both groups were assessed before the intervention for speed and explosive power performance using the 50 m dash speed test and the standing broad jump test to determine the baseline significance of the selected variables. Following the initial assessments, the experimental group underwent a supervised neuromuscular training program, while the control group received no special training. The neuromuscular training was conducted over a period of six weeks, with sessions held five days a week (Monday to Friday), each lasting 60 minutes.

Results. The experimental group confirmed significant improvements in both speed and explosive power compared to the control group ($p < 0.05$). The mean and standard deviation of speed for the experimental group were 7.15 ± 0.71 in the pre-test and 6.54 ± 0.61 in the post-test. For explosive power, the values were 2.36 ± 0.32 in the pre-test and 2.55 ± 0.39 in the post-test. The notable enhancements in speed and explosive power performance in the experimental group are likely attributed to the six-week neuromuscular training program, which facilitated rapid physical adaptation among the football players.

Conclusions. Implementing the six-week neuromuscular training program effectively enhanced the speed and explosive power performance of football players. This type of training has been demonstrated to be highly effective for optimizing these performance metrics in football players.

Keywords: neuromuscular training, speed performance, explosive power performance, physical adaptation.

Introduction

Football is the most popular ball game globally, enjoyed by players and spectators alike, with millions watching soccer matches and its popularity growing daily (Islam & Rahman, 2021). The game involves two teams of eleven players each trying to score by kicking the ball into the opposing team's goal, using any part of their bodies except their hands and arms, with only the goalkeeper allowed to handle the ball within the penalty area (Alegi et al., 2024). Known for its fast-paced play, football's global appeal is unmatched, making it thrilling for both players and fans. The modern game emphasizes "high sports performance," highlighting skill application, technical and tactical growth, enhancement of

© Singh, L. S., Singh, N. R., Singh, W. J., Singh, O. R., & Mola, D. W., 2024.

key motor components, and physiological traits impacting performance. Sports scientists focus on physical and technical development as well as cognitive abilities (Mola & Shaw, 2024). Research indicates that attributes such as muscular endurance, flexibility, coordination, upper body strength, leg power, maximum leg strength, speed, agility, and reaction time are essential for football players (Singh et al., 2018; Singh et al., 2016; Rahman & Sharma, 2023).

Neuromuscular training encompasses a range of activities aimed at enhancing motor sensory function during physical performance in various sports. It seeks to boost muscle motor efficiency, reduce neuromuscular fatigue, and improve overall fitness (Sanudo et al., 2019; Rogasch et al., 2009). Studies show that this training can improve the neurological system's response to the muscular system, enhancing muscle recruitment and activation, which in turn increases athlete compatibility and strength (Akbar et al., 2022). While match-play scenarios requiring maximum running speeds are rare, a player's top running speed during a game is a common measure of physical ability, with professional footballers typically reaching peak sprinting speeds of 31-32 km/h (Rampinini et al., 2007).

Explosive strength and power are essential for athletic performance and are the foundation combined with game-specific techniques, tactics, and daily activities (Heang et al., 2012; Reza et al., 2024). Developing maximum strength performance is critical as it supports most other aspects of physical ability. Lower body training typically includes exercises such as jumping, hopping, and bounding. Plyometric exercises, involving jumping, hopping, and skipping, are fundamental to many sports movements (De Villarreal et al., 2010). The systematic development and assessment of these skills can be challenging. Strength and speed training can improve teenagers' muscular and neurological reaction rates, strength, and explosiveness. These exercises can also be used to evaluate their impact on football performance (Barrera et al., 2023). Therefore, this study aims to examine the effect of neuromuscular training on the speed and explosive power performance of football players.

Materials and Methods

Selection of Subjects

In this study, the researcher randomly chose 30 male football players, aged between 20 and 26, from Imphal West District in Imphal, Manipur, all of whom had competed at the national level.

Selection of Variables

After assessing the feasibility of the equipment and reviewing the relevant literature, the researcher identified the following variables:

1. Independent Variable: Neuromuscular Training.
2. Dependent Variables: Speed and Explosive Power.

Criterion Measures

The study utilized the following standardized tests:

1. Speed: Assessed with the 50-meter dash test, with times recorded in seconds.
2. Explosive Power: Evaluated using the standing broad jump test, with distances measured in meters.

Design of the Study

In this experimental study, participants were randomly divided into two equal groups: an experimental group (n = 15) and a control group (n = 15). Both groups were evaluated before the intervention to establish baseline measurements for speed and explosive power using the 50-meter dash test and the standing broad jump test. After these initial assessments, the experimental group underwent a supervised neuromuscular training program, while the control group did not receive any specialized training. The neuromuscular training program spanned six weeks, with sessions conducted five days a week (Monday to Friday). Each session lasted 60 minutes, with weekends reserved as rest days.

Administration of Training

To fine-tune the volume and intensity of the exercise, a pilot study was carried out with 8 football players, split into

Table 1. Six-weeks neuromuscular training program

Days	Warm-Up	Particular Exercise	Sets	Reps	Intensity	Rest
Mon	Slow Jogging, Free hand Exercise, Whole Body rotation and Stretching	Squat Jump, Push Up Lateral Jump, High Knee forward Run, Shuttle Run, Burpee	2	8	30-40 %	30 sec
Tue	Slow Jogging, Free hand Exercise, Whole Body rotation and Stretching	Push up, Pull up, Jump squats Plank, Sit ups, Split squad	3	10	40-50 %	30 sec
Wed	Slow Jogging, Free hand Exercise, Whole Body rotation and Stretching	10 m running, 30 m running 50 m running, Single leg Hop Box Jump	4	12	50-60 %	30 sec
Thu	Slow Jogging, Free hand Exercise, Whole Body rotation and Stretching	Squat Jump, Push Up Lateral Jump, High Knee forward Run, Shuttle Run, Burpee	5	14	60-70 %	30 sec
Fri	Slow Jogging, Free hand Exercise, Whole Body rotation and Stretching	10m running, 30 m running 50 m running, Single leg Hop Box Jump	6	16	70-80 %	30 sec

Note: The neuromuscular training program was conducted over six weeks, with sessions held five days a week (Monday to Friday). Each session lasted 60 minutes, with rest days on Saturday and Sunday

4 in the experimental group and 4 in the control group. Notable differences were found between the pre-test and post-test measurements of the variables. Subsequently, the refined training sessions for the experimental group were conducted in the mornings at the Manipur University Football Ground. The neuromuscular training program lasted six weeks, with sessions held five days a week (Monday to Friday). Each session lasted 60 minutes, with Saturday and Sunday as rest days. Details of the specific neuromuscular training program for the experimental group are provided in Table 1.

Statistical Analysis

Data were entered into an Excel spreadsheet and analyzed using IBM SPSS software (version 22.0; SPSS Inc., Chicago, IL, USA). The normality of the statistical distribution was assessed through descriptive statistics. To evaluate differences between groups, paired t-tests and ANCOVA were utilized. A significance level of 0.05 was applied in the statistical analyses.

Ethical Approval

The study received approval from the Institutional Human Ethics Committee at Manipur University, Canchipur, Imphal (India), and informed consent was obtained from all participants.

Results

The results indicated a significant enhancement in speed performance among football players in the experimental group who underwent the neuromuscular training program. The descriptive analysis of the pre-test and post-test speed performance for this group is detailed in Table 2.

Table 2 displays the mean and standard deviation of speed for both the experimental and control groups in the pre-test and post-test assessments. For the experimental group, the pre-test mean and standard deviation were 7.15 ± 0.71, while the post-test mean and standard deviation were 6.79 ± 0.61. In the control group, the pre-test values were 7.05 ± 0.54, and the post-test values were 7.00 ± 0.53. A significant improvement was observed in the experimental group, with a calculated t-value of 6.06, exceeding the table t-value of 2.14 at 14 degrees of freedom and a 0.05 level of significance. Conversely, the control group showed no significant change, as its calculated t-value of 0.71 was lower than the table t-value of 2.14 at 14 degrees of freedom and a 0.05 level of significance. Figure 1 provides a graphical comparison of the pre-test and post-test mean speed performance for both groups.

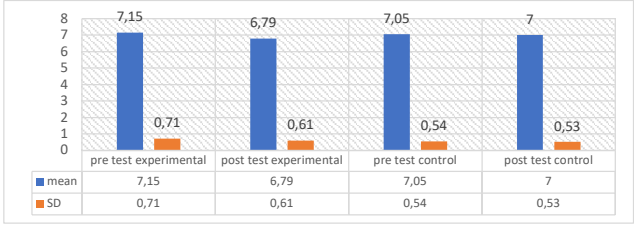

Fig. 1. Graphical comparison of pre-test and post-test speed performance for experimental and control groups

The study results revealed a significant enhancement in explosive power performance among football players in the experimental group following the neuromuscular training program. Table 3 provides a descriptive analysis of the pre-test and post-test explosive power performance for this group.

Table 4 shows the mean and standard deviation for explosive power in both the experimental and control groups during pre-test and post-test assessments. For the experimental group, the pre-test mean and standard deviation were 2.36 ± 0.32, and the post-test mean and standard deviation were 2.55 ± 0.29. In the control group, the pre-test values were 2.35 ± 0.25, while the post-test values were 2.32 ± 0.20. A significant improvement was observed in the experimental group, with a calculated t-value of 1.64 surpassing the table t-value of 2.14 at 14 degrees of freedom and a 0.05 significance level. Conversely, the control group

Table 2. Pre-test and post-test mean for experimental and control groups of speed performance of football players

Variable	Group	N	Test	M	SD	SEM	df	t-value	Sig.
Speed	Experimental	15	Pre-test	7.15	0.71	0.18	14	6.06*	0.00*
			Post-test	6.79	0.61	0.15			
	Control	15	Pre-test	7.05	0.54	0.13		0.71	0.48
			Post-test	7.00	0.53	0.13			

*Significant at 0.05 level

Table 3. Mean pre-test and post-test explosive power performance for experimental and control groups

Variable	Group	N	Test	M	SD	SEM	df	t-value	Sig.
Explosive Power	Experimental	15	Pre-test	2.36	0.32	0.08	14	9.11*	0.00*
			Post-test	2.55	0.29	0.07			
	Control	15	Pre-test	2.35	0.25	0.06		1.64	0.12
			Post-test	2.32	0.20	0.05			

*Significant at 0.05 level

did not show a significant change in explosive power, as its calculated t-value of 1.64 was lower than the table t-value of 2.14 at 14 degrees of freedom and a 0.05 level of confidence. Figure 2 illustrates the graphical comparison of pre-test and post-test mean explosive power for both groups.

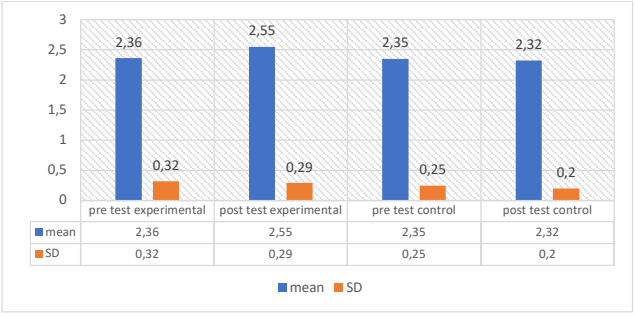

Fig. 2. Graphical representation of pre-test and post-test mean comparisons for speed performance in the experimental and control groups

Table 4. Pre and Post mean comparison (ANCOVA) between experimental and control group for speed of football players

Variable	Source	Type III sum of errors	df	Mean Square	F	Sig.
Speed	Group	0.63	1	0.63	12.46*	0.00
	Error	1.38	27	0.51		
	Total	1438.24	30			

* Significant difference at 0.05 level

Table 4 shows a significant difference between the pre-test and post-test mean scores for speed performance in both the experimental and control groups, as determined by analysis of covariance (ANCOVA). The obtained F-value of 12.46* was higher than the tabulated F-value of 4.21, confirming the effectiveness of the six-week neuromuscular training program in enhancing football players' speed performance. Table 5 presents the ANCOVA results for pre-test and post-test explosive power between the experimental and control groups.

Table 5. Pre and post mean comparison (ANCOVA) between experimental and control group for explosive power of football players

Variable	Source	Type III sum of errors	df	Mean Square	F	Sig.
Explosive Power	Group	0.37	1	0.37	10.35*	0.00
	Error	0.10	27	0.00		
	Total	181.13	30			

* Significant difference at 0.05 level

Table 5 indicates a significant difference between the pre-test and post-test mean scores for explosive power in both the experimental and control groups, as determined by analysis of covariance (ANCOVA). The obtained F-value of 10.35* exceeded the tabulated F-value of 4.21, confirming that the six-week neuromuscular training program effectively improved explosive power performance in football players.

Discussion

The study aimed to examine the impact of neuromuscular training on speed and explosive power in football players. Thirty national-level players from Manipur University, aged 20 to 26, were randomly assigned to either an Experimental Group or a Control Group, with 15 players in each group. The Experimental Group participated in a six-week neuromuscular training program at Manipur University Football Ground, with sessions held five days a week. Post-test data were collected and analyzed using IBM SPSS (version 22.0). Statistical analyses, including paired t-tests and ANCOVA, were performed with a significance level set at 0.05.

Based on the results, Table 2 displays the mean and standard deviation values for speed in both the experimental and control groups during pre-test and post-test assessments. Significant improvements were observed in the experimental group, while the control group showed no notable changes. Table 3 presents mean and standard deviation values for explosive power, with significant gains in the experimental group and no significant changes in the control group. Table 4 demonstrates a significant difference in speed performance between pre-test and post-test scores for both groups, confirmed by ANCOVA, indicating that the six-week neuromuscular training program effectively enhanced speed. Similarly, Table 5 shows a significant difference in explosive power performance between pre-test and post-test scores for both groups, also confirmed by ANCOVA, confirming the effectiveness of the training program in improving explosive power. Singh et al. (2023) investigated the impact of a six-week Speed, Agility, and Quickness (SAQ) training program on 30 male football players aged 18-25. The study found that the SAQ program significantly enhanced speed and agility in the experimental group compared to the control group.

Anbu et al. (2022) and Singh et al. (2022) found that neuromuscular and plyometric training enhanced agility, speed, and explosive power in young football players. Singh and Lamani (2016) discovered that varying training loads improved physical and physiological variables in male soccer players. Mola & Bayeta (2020) confirmed that circuit training increased muscular endurance, strength, and flexibility in sport science students. Fenta & Mola (2023) demonstrated that calisthenics exercises effectively improved passing accuracy, dribbling speed, agility, and muscular strength in female handball players. Menezes et al. (2020) showed that integrative neuromuscular training improved balance, flexibility, and vertical jump height in young soccer players. These studies collectively highlight the significance of implementing well-structured, scientifically-supported training programs to boost athletic performance across different sports and age groups.

Recent research underscores the effectiveness of plyometric and speed-strength training in enhancing various physical attributes in soccer players. Kokinda et al. (2023) showed that plyometric training improves running speed, acceleration, and directional changes. Similarly, Feng Gao (2023) found that speed and strength exercises

enhance running speed, muscular explosive force, and agility. Justin Antony (2023) assessed a 6-week plyometric program in football players aged 16-19 and noted significant improvements in speed, though agility did not show notable changes. These results suggest that while plyometric training is effective for boosting speed, its impact on agility is less clear, highlighting the need for further research in this area.

Sannicandro et al. (2023) demonstrated the effectiveness of integrative neuromuscular pitch training in improving lower limb strength and sprint performance in young soccer players. Buchheit et al. (2010) found that a 10-week program incorporating shuttle sprints and explosive strength training improved 30-meter sprint times, although results for shorter distances were mixed in adolescent male soccer players. Hughes et al. (2012) reported enhanced sprint performance in certain age groups through combined speed and plyometric training. Carlos Álvarez-Serrano et al. (2023) highlighted the role of neuromuscular training in reducing injury risk and potentially enhancing various physical performance factors such as strength, power, speed, agility, and balance in soccer players. These studies collectively emphasize different strategies for improving soccer performance and injury prevention through targeted training approaches.

Conclusion

Based on the study results, it can be concluded that neuromuscular training significantly improves the speed and explosive power of football players. The six-week neuromuscular training program resulted in substantial gains in these areas. Consequently, incorporating such a program is highly advantageous for boosting athletic performance in football players. This training regimen effectively develops essential physical attributes like speed and explosive power, making it a valuable addition to training protocols for players seeking to enhance their overall on-field performance.

Acknowledgment

The author extends heartfelt gratitude to the football players for their collaboration, assistance, and positive contributions. Special thanks are also due to the co-authors for their valuable help in finalizing the text. Best wishes are sent to everyone who supported this project, both directly and indirectly.

Conflict of Interest

The authors and participants in these studies declared no conflicts of interest.

Reference

Islam, M. S., & Rahman, M. H. (2021). An observation on the historical evolution of soccer from before Christ to the first World Cup. *Journal of Indonesian Physical Education and Sport, 7*(1), 28-34. https://doi.org/10.21009/JIPES.071.03

Alegi, P. C., Weil, E., Joy, B., Giulianotti, R. C., & Rollin, J. (2024, May 24). *Football. Encyclopedia Britannica.* Retrieved from https://www.britannica.com/sports/football-soccer

Mola, D. W., & Shaw, D. (2024). Significance of Managerial Skills for Talent Development in Ethiopian Athletes. *International Journal of Kinesiology and Sports Science, 12*(2), 21-29. http://doi.org/10.7575/aiac.ijkss.v.12n.2p.2

Singh, L. S., Lamani, G. C., Augustine, R. A., & Surendra, S. H. (2018). Study of training on physiological variables of football players. *Academic Sports Scholars, 7*(1), 1-7.

Singh, L. S., & Lamani, C. G. (2016). A study of training load on selected physical and physiological variables of soccer players of Manipur state. *Academic Sports Scholars, 5*(11), 1-10. https://doi.org/10.13140/RG.2.2.12826.47042

Rahman, M. H., & Sharma, J. P. (2023). An assessment of maximal isometric hand grip strength and upper body explosive strength and endurance in various ball sports. *Physical Education Theory and Methodology, 23*(6), 932-939. https://doi.org/10.17309/tmfv.2023.6.16

Sanudo, B., Sánchez-Hernández, J., Bernardo-Filho, M., Abdi, E., Taiar, R., & Núñez, J. (2019). Integrative neuromuscular training in young athletes, injury prevention, and performance optimization: A systematic review. *Applied Sciences, 9*(18), 3839. https://doi.org/10.3390/app9183839

Rogasch, N. C., Dartnall, T. J., Cirillo, J., Nordstrom, M. A., & Semmler, J. G. (2009). Corticomotor plasticity and learning of a ballistic thumb training task are diminished in older adults. *Journal of applied physiolog, 107*(6), 1874-1883. https://doi.org/10.1152/japplphysiol.00443.2009

Akbar, S., Soh, K. G., Jazzily Mohd Nasiruddin, N., Bashir, M., Cao, S., & Soh, K. L. (2022). Effects of neuromuscular training on athletes' physical fitness in sports: A systematic review. *Frontiers in Physiology,* 13, 939042. https://doi.org/10.3389/fphys.2022.939042

Rampinini, E., Coutts, A. J., Castagna, C., Sassi, R., & Impellizzeri, F. M. (2007). Variation in top level soccer match performance. *International Journal of Sports Medicine,* 28, 1018-1024. https://doi.org/10.1055/s-2007-965158

Heang, L. J., Hoe, W. E., Quin, C. K., & Yin, L. H. (2012). Effect of plyometric training on the agility of students enrolled in required college badminton programme. *International Journal of Applied Sports Sciences, 24*(1), 18-24. https://doi.org/10.24985/ijass.2012.24.1.18

Reza, M. N., Rahman, M. H., Islam, M. S., Mola, D. W., & Andrabi, S. M. H. (2024). Assessment of motor fitness metrics among athletes in different sports: An original research. *Physical Education Theory and Methodology, 24*(1), 47-55. https://doi.org/10.17309/tmfv.2024.1.06

Sáez-Sáez De Villarreal, E., Requena, B., & Newton, R. U. (2010). Does plyometric training improve strength performance? A meta-analysis. *Journal of Science and Medicine in Sport, 13*(5), 513-522. https://doi.org/10.1016/j.jsams.2009.08.005

Barrera, J., Figueiredo, A. J., Duarte, J., Field, A., & Sarmento, H. (2023). Predictors of linear sprint performance in professional football players. *Biology of sport, 40*(2), 359-364. https://doi.org/10.5114/biolsport.2023.114289

Singh, L. S., Puinachandra, K., Singh, T. B., & Singh, S. O. (2023). Effect of SAQ training program on speed and agility performance among football players. *International Journal of Food and Nutrition Science, 12*(1), 113-120. https://doi.org/10.13140/RG.2.2.35536.79369

Anbu, N., Malar, S., & Maniazhagu, D. (2022). Effect of Concurrent Neuromuscular Training and Football Game Practice on Agility. *J Adv Sport Phys Edu, 5*(10), 219-224. https://doi.org/10.36348/jaspe.2022.v05i10.002

Singh, L. S., Singh, S. O., Devi, O. P., & Singh, W. J. (2022). Effect of pranayama exercise on breath-holding capacity of soccer players. *International Journal of Disabilities Sports and Health Sciences, 5*(2), 97-105. https://doi.org/10.33438/ijdshs.1172462

Mola, D. W., & Bayisa, G. T. (2020). Effect of circuit training on selected health-related physical fitness components: The case of sport science students. *Turkish Journal of Kinesiology, 6*(4), 142-148. https://doi.org/10.31459/turkjkin.812512

Fenta, B. G., & Mola, D. W. (2023). Effect of eight-week callisthenics exercise on selected physical fitness quality and skill performance in handball. *Jurnal SPORTIF : Jurnal Penelitian Pembelajaran, 9*(3), 550-566. https://doi.org/10.29407/js_unpgri.v9i3.21335

Menezes, G. B., Alexandre, D. R. O., Pinto, J. C. B. L., Assis, T. V. L., Faigenbaum, A. D., & Mortatti, A. L. (2020). Effects of integrative neuromuscular training on motor performance in prepubertal soccer players. *Journal of Strength and Conditioning Research, 36*(6), 1667-1674. https://doi.org/10.1519/JSC.0000000000003666

Kokinda, M., Kozák, T., Fečík, M., & Vilner, O. (2023). The effects of plyometric training on the running speed in soccer. *Studia Sportiva, 17*(2), 7-15. https://doi.org/10.5817/StS2023-2-1

Gao, F. (2023). Improvement of speed and explosive strength in soccer players. *Revista Brasileira de Medicina do Esporte,* 29, 1-4. https://doi.org/10.1590/1517-8692202329012022_0582

Justin Antony. (2023). Effect of 6 weeks plyometric training on speed and agility of football players. *International Journal of Science and Research, 12*(6), 271-277. https://doi.org/10.21275/MR23531174058

Sannicandro, I., Cofano, G., D'Onofrio, R., & Piccinno, A. (2023). Jumps and Lower Limb Strength Asymmetry in Young Soccer Players: Differences Between Sand and Conventional Surfaces. *Physical Education Theory and Methodology, 23*(4), 636-642. https://doi.org/10.17309/tmfv.2023.4.20

Buchheit, M., Mendez-Villanueva, A., Delhomel, G., Brughelli, M., & Ahmaidi, S. (2010). Improving repeated sprint ability in young elite soccer players: repeated shuttle sprints vs. explosive strength training. *Journal of strength and conditioning research, 24*(10), 2715-2722. https://doi.org/10.1519/JSC.0b013e3181bf0223

Hughes, M. G., Lloyd, R., & Meyers, R. (2012). *Sprinting and plyometric ability in youths: The effect of natural development and training.* New York: Nova Science Publishers, Inc.

Serrano, C. A., Segovia, J. A., Muñoz, E. G., & Rivera, M. A. (2023). Neuromuscular training in football: A literature review. *Journal of Novel Physiotherapy and Rehabilitation,* 7, 39-47. https://doi.org/10.29328/journal.jnpr.1001055

Оптимізація показників швидкості та вибухової сили футболістів: Вплив шеститижневого курсу нервово-м'язового тренування

Лайшрам Сантош Сінгх[1ABCDE], Нінгтхоуджам Роджеш Сінгх[1ABCDE], В. Джеймс Сінгх[2ABCDE], Окрам Робінсон Сінгх[1ABCDE], Дессален Васе Мола[3ABCDE]

[1]Маніпурський університет
[2]Університет імені Раджива Ганді
[3]Університет Амбо

Авторський вклад: A – дизайн дослідження; B – збір даних; C – статаналіз; D – підготовка рукопису; E – збір коштів

Реферат. Стаття: 7 с., 5 табл., 2 рис., 27 джерел.

Історія питання. Для ефективної гри на полі футболісти потребують високого рівня швидкості та вибухової сили, зумовлюючи критичну важливість цих фізичних якостей у досягненні успіху. В якості методу покращення цих показників запропоновано проведення нервово-м'язових тренувань.

Мета дослідження. Метою цього дослідження було вивчити вплив нервово-м'язового тренування на показники швидкості та вибухової сили футболістів.

Матеріали та методи. Для проведення дослідження було відібрано тридцять футболістів-чоловіків (віком від 20 до 26 років) із Західного округу Імпхал (штат Маніпур, Індія), які брали участь у змаганнях національного рівня. Досліджувані були розподілені методом рандомізації на дві рівні групи: експериментальну (n = 15) та контрольну (n = 15). Перед початком інтервенції в обох групах оцінювали показники швидкості та вибухової сили, застосовуючи тест на швидкість бігу на дистанції 50 метрів, а також тест з виконання стрибків у довжину з місця з метою визначення вихідного рівня значущості відібраних змінних. Після проведення початкового аналізу експериментальна група виконувала контрольовану програму з нервово-м'язового тренування, тоді як контрольна група не займалася жодним спеціальним тренуванням. Нервово-м'язові тренування проводилися впродовж періоду шести тижнів, заняття проходили п'ять днів на тиждень (з понеділка по п'ятницю), з тривалістю 60 хвилин кожне.

Результати. В учасників експериментальної групи спостерігалося достовірне покращення показників як швидкості, так і вибухової сили порівняно з контрольною групою ($p < 0,05$). Середні значення та стандартне відхилення швидкості в експериментальній групі становили 7,15 ± 0,71 перед початком проведення тесту та 6,54 ± 0,61 після його завершення. Для вибухової сили ці показники становили 2,36 ± 0,32 на етапі передтестового дослідження та 2,55 ± 0,39 — на етапі післятестового періоду. Суттєве покращення показників швидкості та вибухової сили в експериментальній групі, ймовірно, пов'язане з проведенням шеститижневої програми нервово-м'язових тренувань, яка сприяла швидкій фізичній адаптації футболістів.

Висновки. Реалізація шеститижневої програми нервово-м'язових тренувань сприяла ефективному поліпшенню показників швидкості та вибухової сили футболістів. Доведено, що такий тип тренувань є високоефективним методом оптимізації зазначених показників у футболістів.

Ключові слова: нервово-м'язове тренування, показники швидкості, показники вибухової сили, фізична адаптація.

Information about the authors:

Singh, Laishram Santosh: santoshlaishram@manipuruniv.ac.in; https://orcid.org/0000-0002-7387-6797; Department of Physical Education and Sports Science, Manipur University, Indo Myanmar Road, Canchipur, Imphal, Manipur 795003, India.

Singh, Ningthoujam Rojesh: nrojesh1234@gmail.com; https://orcid.org/0009-0004-5178-5861; Department of Physical Education and Sports Science, Manipur University, Indo Myanmar Road, Canchipur, Imphal, Manipur 795003, India.

Singh, W. James: waribam_james@rediffmail.com; https://orcid.org/0000-0002-8778-8341; Department of Sports Science, Rajiv Gandhi University, University Road, Papum Pare, Arunachal Pradesh 791112, India.

Singh, Okram Robinson: robinleiokra@gmail.com; https://orcid.org/0009-0000-3081-9007; Department of Physical Education and Sports Science, Manipur University, Indo Myanmar Road, Canchipur, Imphal, Manipur 795003, India.

Mola, Dessalegn Wase: dessalegn.wasie@gmail.com; https://orcid.org/0000-0001-9688-0775; Department of Sports Science, Ambo University, Ambo, Ethiopia.

Cite this article as: Singh, L. S., Singh, N. R., Singh, W. J., Singh, O. R., & Mola, D. W. (2024). Optimizing the Speed and Explosive Power Performance of Football Players: The Effect of a Six-Week Neuromuscular Training. *Physical Education Theory and Methodology, 24*(5), 697-703. https://doi.org/10.17309/tmfv.2024.5.03

Received: 24.07.2024. Accepted: 09.09.2024. Published: 30.10.2024

This work is licensed under a Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0)