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ANALYSIS OF EFFECTS OF SPECIFIC FOOTBALL TRAINING ON THE DEVELOPMENT OF MOTOR SKILLS IN JUNIORS AGED 12-13 YEARS OLD

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Abstract: *This research, which was conducted over a competitive year, aims to evaluate the effects of football practice and the training methods on developing motor skills in juniors aged 12-13 years old. By using modern methods and tools for motor skill development, the study analyses the progress achieved through specific training tailored to modern football. The research involved an experimental group and a control group, each consisting of 22 juniors. Throughout the educational process, the experimental group had 20-30 minutes focused on motor skill development at the beginning or end of each training session, depending on the targeted motor skill. This program aimed to facilitate the specific development of each motor skill individually. Final tests demonstrated that the experimental implementation of a motor skill development methodology for 12-13-year-old juniors resulted in significant changes in the motor skill indicators of the experimental group across all tested exercises.*

Key words: *sports performance, motor skills, football, training.*

1. Introduction

The development of motor skills in young athletes is a crucial aspect of their training, especially given the complex demands of modern football. According to Bompa (2009), *"motor skills form the foundation for sports performance, and their development must be specific and adapted to the age and training level of the athletes."* Dragnea and Teodorescu-Mate (2002) further emphasize that *"training young athletes must integrate a variety of effective methods that promote progress both physically and psychomotorically."*

In football, speed, strength, and endurance are essential for performance, and these attributes can be effectively developed through specific methods integrated into structured programs (Reilly, 2003). Moreover, recent research has suggested that *"systematic structuring of training sessions based on precise objectives can lead to significant improvement in the sports performance of juniors"* (Stolen et al., 2005). Therefore, this study aims to analyse and evaluate

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the impact of modern football training on the motor skills of 12 to 13-year-old juniors, contributing to specialized literature and providing relevant methodological guidelines for coaches in the field.

Over time, numerous researchers have highlighted the importance of targeted training for the development of young athletes, particularly in complex sports such as football. As Matveev (1999) and Platonov (2013) state *"structuring training into stages, with clearly defined objectives, is essential to the harmonious development of athletes, permitting effective adaptations to the demands of performance activities."*

In football specifically, Bangsbo (1994) asserts that *"physical preparation and the development of motor skills cannot be separated from the tactical and technical requirements of the game."* Moreover, Meinel and Schnabel (2007) state that *"motor training for children and juniors, must encompass exercises that simultaneously stimulate coordination, speed, and endurance, thus providing a solid foundation for future performance."*

These perspectives are further confirmed by the research conducted by Malina and Bouchard (1991), who identify that *"the physiological and motor adaptations of young athletes are directly influenced by the quality and specificity of training."* Therefore, this study aims to analyse the effects of modern football training on the juniors' motor skills, contributing to the development of efficient methodologies for this age group.

Sun and Chen (2024) highlight systematically regular physical activities can substantially enhance coordination and agility in children. Furthermore, Shi and Feng (2022) underscore the relationship between motor skills and cognitive benefits among children and adolescents engaged in regular physical activities. These studies suggest that by implementing specialized football training programmes addressing both physical and cognitive aspects, juniors may achieve faster and more balanced development of their motor skills.

2. Material and Method

2.1. Purpose

This study aims to analyse and evaluate the impact of a structured and modern football-specific training program on the development of motor skills in 12 to13-year-old juniors. It compares the progress of juniors engaged in an intensive experimental programme, which includes a range of specific tools designed to enhance motor skills such as strength, endurance, speed, and coordination, against those who practise football within a standard sports framework. By incorporating modern methods and techniques within a clearly defined timeframe for motor skill development during training sessions, the research aims to demonstrate the effectiveness of this structured approach and its role in helping juniors adapt to sports performance standards. Furthermore, the study provides a comprehensive overview of the advantages of an organized intensive programme with specific exercises for motor skill development applied to 12 to 13-year-old juniors.

2.2. Hypotheses

H1. The introduction of a football-specific training program designed to develop speed, coordination, strength and

endurance will have a significantly greater impact on improving motor skills in the experimental group of 12 to 13-year-old juniors compared to the control group participating in a standard training program.

H2. 20 to 30 - minute targeted exercises focused on motor skill development, integrated into each training session leads to a notable improvement in motor performance indicators (speed, strength, endurance and coordination) in 12 to 13-year-old juniors, thereby facilitating optimal adaptation to age-specific sports performance standards.

2.3. Research objectives

The study aims to explore how modern training methods enhance the development of speed, strength, endurance and coordination in junior athletes. Its main objective is to assess the impact of specific time intervals focused on motor skill development on the physical progress of these juniors. Another objective is to identify the methodological aspects that most significantly affect sports performance, specifically tailored to the requirements of modern football. The research intends to design efficient training programmes that facilitate both harmonious and specific development of junior athletes. By analysing results obtained throughout a competitional cycle, the study intends to evaluate how targeted specific training sessions influence motor skill development and adaptation to the demands of sports performance.

2.4. Research organization

The experiment aimed to develop a set of tools designed to enhance various motor skills. This research incorporated structured activities and methodologies tailored to achieve specific objectives, focusing on the impact of football-specific training on the motor skills development of juniors aged 12 to 13. The study took place from June 2023 to August 2024 and involved two groups of juniors, each consisting of 22 athletes. The experimental group was composed of athletes from the Craiova “School Sports Club”, while the control group included juniors from the Craiova “PRO Junior Sports Association”. Motor performance evaluations were conducted in three testing phases: initial testing (conducted for both groups at the study’s outset), intermediate testing (conducted after six months) and final testing (conducted at the end of the experiment). This structure approach facilitated systematic data collection to evaluate the effects of the specific training interventions applied to the experimental group.

The content of the experiment involved creating a set of tools designed to enhance each motor skill for the experimental group, which were utilized in all training sessions throughout the study period. Specifically, exercises aimed at improving speed and coordination were conducted three times a week at the beginning of each training session, while tools for developing endurance and strength were implemented twice a week at the end of the session. The tools for the experimental group were uniquely designed and incorporated specific games such as 1vs1, 2vs1, 2vs2, 3vs2, 3vs3, 4vs3, 4vs4, 5vs4, and 5vs5, with objectives focused on developing the distinct forms of each motor skill suitable for 12 to13-year-olds. Meanwhile, the control group participated in a similar number of training sessions with comparable

duration and intensity; however, their focus was on standard training aimed at developing game-specific skills and routines typical for athletes aged 12 to 13. The subjects underwent various tests, including speed, endurance, strength and coordination.

The speed tests involved sprints over distances of 30 and 50 meters. For both distance tests, students started from a standing position. The electronic stopwatch with memory was activated as each student began running. Each test was conducted individually by each student completing it only once.

Endurance was tested through runs over distances of 600 meters and 800 meters. These runs were organized in two groups, each consisting of eleven students. Times were recorded using an electronic stopwatch with memory for both the 600-meter and 800-meter distances, conducted on flat terrain.

Strength tests consisted of standing long jump and vertical jump. Lower limb strength was measured using the standing long jump without a run-up. The jump started from a line marked on the athletics track, placing their toes at the line. They gained momentum through arm swings and knee bends. Each student was allowed two consecutive attempts, and the best jump was recorded, measured from the heel left on the ground.

Coordination skills were evaluated using two technical-tactical complexes. These complexes were executed on the field of the Craiova School Sports Club.

Technical-tactical exercises used

1. The executing player (no. 4) starts positioned two meters from the first cone, located at the centre field point, flanked by two cones placed three meters apart on the left and right. In front of the player, two balls are positioned laterally, one to the left and one to the right, placed halfway between the first cone and the centre field line. At the sound signal, the player begins to dribble the ball through a series of three cones spaced two meters apart. Upon passing the final cone, the player passes the ball to the player on the right (No. 2), who is positioned seven meters laterally to the right at a 45° angle. The pass must be delivered through a corridor marked by two cones that are one meter wide. After completing this pass, the player sprints back to the starting position and repeats the task with the second ball, this time passing to the left player (No. 3). The stopwatch stops when the ball is passed to the second player (No. 3). Players were penalized with one second for touching any cone or for an incorrect pass.

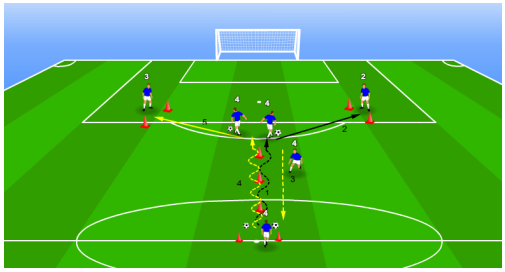

Fig. 1. *Technical-Tactical Complex 1*

2. The executing player (No. 5) begins at the centre field point and dribbles the ball towards five cones arranged in a straight line, spaced two meters apart. The first cone is positioned five meters to the left of the centre field point at a 45° angle. After passing the last cone, the player sends the ball toward the goal. At this moment, the player receives another ball from a teammate (No.2), who is positioned between two cones, also at a 45° angle from the last cone and five

meters away. After receiving the ball, the executing player (No. 5) resumes dribbling in reverse through the cones and repeats the task with another set of cones located similarly at the opposite goal. There, the player receives a pass from teammate 3.
The exercise is repeated four times, ensuring that the executing player makes two passes at each goal. A penalty of one second is applied if the player touches a cone or if the ball is not sent within the goal area. The goals measure 3x2 meters, and the exercise is performed on a football field measuring 50x70 meters.

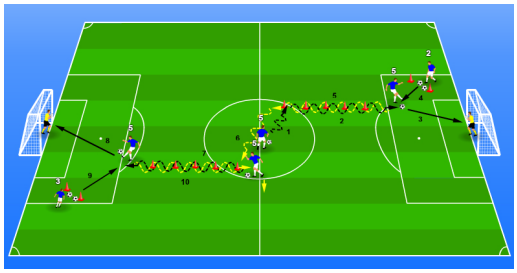

Fig. 2. *Technical-Tactical Complex 2*

3. Results

For statistical analysis and data processing, we used Microsoft Excel (Microsoft Corp., Redmond, WA, USA), the XLSTAT suite for MS Excel (Addinsoft SARL, Paris, France), and IBM SPSS Statistics 20.0 (IBM Corporation, Armonk, NY, USA). The collected data was stored in Microsoft Excel files and subsequently analysed to explore the relationships between the clinical and paraclinical data of the participants. Secondary data processing—descriptive analysis of the groups based on various parameters, calculation of fundamental statistical metrics such as mean and standard deviation, and their ratio (coefficient of variation)—was performed using Excel. For normality tests (Shapiro-Wilks and Anderson-Darling) and complex statistical tests (Student's t-tests), commands from the XLSTAT module and SPSS software were employed. The results of the initial testing (see Table 1) show that both groups had similar levels of motor skill development before the experiment. The average values and coefficients of variation demonstrated homogeneity between the experimental and control groups, which enhances validity of the research by enabling relevant comparisons between the two groups. This initial testing established a baseline for assessing the progress achieved through the specific training implemented in the experimental group. The similar results observed between the two groups support the hypothesis that any subsequent differences will reflect the effectiveness of the methodological intervention rather than external variables.

After conducting the final tests (see Table 2), we can confirm that these results validate the effectiveness of the methodological intervention and support the hypothesis that specific time for developing motor skills during training sessions directly contributes to improving the physical performance of junior athletes. In contrast, the control group showed only modest improvements, likely due to their general training. This further highlights the impact of targeted training on sports performance. The significant progress of the experimental group in all final tests demonstrates that implementing a structured training program focused on developing speed, strength, endurance and coordination is essential for optimizing motor skills and preparing juniors for the demands of modern football.

Comparative Indices of Psychomotor Development Data - Initial Testing Table 1

No.	Tests	Group	$\bar{x} \pm m$	σ	Cv (%)	t	P
1.	Speed run - 50m	E	8,38±0,09	0,44	5,25	0,99	p > 0,05
		C	8,55±0,15	0,74	8,65		
2.	Speed run - 30m	E	5,9±0,8	0,80	13,6	0,15	p > 0,05
		C	6,0±0,9	0,90	14,8		
3.	Standing long jump	E	161,4±3,04	15,2	9,42	0,56	p > 0,05
		C	159,15±2,65	13,26	8,33		
4.	Vertical jump	E	24,31±2,76	2,51	9,99	0,20	p > 0,05
		C	23,43±3,55	2,00	10,3		
5.	Endurance run - 800m	E	208,44±34,09	15,45	7,50	0,84	p > 0,05
		C	210,40±3,83	14,15	6,75		
6.	Endurance run - 600m	E	172,5±29,09	29,18	16,3	0,18	p > 0,05
		C	180,2±30,00	26,17	15,6		
7.	Technical-Tactical C 1	E	99,7±23	13,4	12,8	0,12	p > 0,05
		C	106±35	9,6	7,6		
8.	Technical-Tactical C 2	E	14,5±1,3	0,12	1,3	0,17	p > 0,05
		C	15,1±1,8	0,17	1,5		

Comparative Indices of Psychomotor Development Data - Final Testing Table 2

No.	**Tests**	**Group**	$\bar{x} \pm m$	**σ**	**C_v (%)**	**t**	**P**
1.	Speed run - 50m	E	7,9±0,64	0.64	0,26	3,53	p < 0,05
		C	8,4±-0,18	0.18	0,36		
2.	Speed run - 30m	E	5,5±0,45	0.45	0,25	4,16	p < 0,05
		C	5,9±0,07	0.07	0,37		
3.	Standing long jump	E	175.5±3,65	14.22	14,05	3,43	p < 0,05
		C	164,4±4,89	4.89	15,74		
4.	Vertical jump	E	31,6±3,22	2.56	12,30	8,31	p < 0,05
		C	25,7±2,13	2.13	8.29		
5.	Endurance run - 800m	E	186,7±2,43	15.12	9,24	4,52	p < 0,05
		C	201,6±3,15	3.15	11,86		
6.	Endurance run - 600m	E	143,4±2,45	11.62	12,55	9,28	p < 0,05
		C	167,3±3,34	3.34	11.40		
7.	Technical-Tactical C 1	E	72±25	12,3	10,20	4,12	p < 0,05
		C	98±29	6,6	8,40		
8.	Technical-Tactical C 2	E	11,13±1,50	0,15	1,20	4,18	p < 0,05
		C	14,3±1,40	0,13	1,10		

4. Discussions

The results of this study emphasize the positive effect of implementing targeted training programs on the development of motor skills in junior athletes. The experimental group, which underwent an innovative and structured methodology, demonstrated significant improvement in all final tests. This outcome underscores the importance of customizing training to meet the individual and age-specific needs

of the athletes.

An important aspect of this study is the significant difference in progress between the experimental group and the control group. The juniors in the experimental group benefited from a comprehensive training approach that focused on enhancing speed, strength, endurance, and coordination. In contrast, the control group, which followed a conventional training program, demonstrated only modest improvement. This confirms that a specialized training program is more effective than a general training one in optimizing physical performance.

This study provides valuable insights by validating these principles within the context of modern football for juniors aged 12 to 13. Additionally, recent research (López-Sánchez & Díaz-Suárez, 2020) have confirmed that specific physical preparation for young football players leads to substantial improvements in motor skills and technical-tactical abilities, which was also observed in this study.

The effectiveness of exercises aimed at developing speed and coordination at the beginning of training sessions, coupled with exercises focused on endurance and strength towards the end, indicates that the structure of training sessions plays a crucial role in maximizing physiological and motor adaptations. This methodology is supported by Markovic and Mikulic (2021), who highlight that well-developed neuromuscular and morphological predictors significantly contribute to enhancing reaction and movement speed which are essential components in football.

In addition, recent studies (Lehnert, Hůlka and Psotta, 2022) have demonstrated that interval resistance training characterized by high-intensity effort is highly effective for young athletes, leading to notable advancements in endurance development. These conclusions are perfectly aligned with the improvements observed in the experimental group in the endurance and speed tests.

Regarding the use of advanced technologies in training, Buchheit & Simpson (2017) have emphasized that performance monitoring technologies, such as player tracking devices, can provide valuable data for refining and optimizing the training process.

Moreover, research by Haugen, Seiler and Tønnessen (2019) has underlined the significance of merging theoretical and practical principles in the development of sports performance, advocating for a systematic and scientific approach can maximize progress. This finding confirms the methodology applied in this study, which integrated innovative components to optimize the performance of junior athletes. Therefore, our study contributes to enriching specialized literature and provides significant insights for enhancing motor preparation in contemporary performance football.

5. Conclusions

The implementation of a structured training program focused on the development of speed, strength, endurance, and coordination has proven to be significantly more effective in improving the motor skills of juniors than general physical training methods.

The performance outcomes achieved by the experimental group in the final assessments indicate substantial improvement, particularly in speed and explosive strength, thereby confirming the hypothesis that the structure and intensity of training play a decisive role in maximizing physical performance.

The significant differences in endurance and coordination test results between the experimental and control groups demonstrate that a systematic approach incorporating technical-tactical exercises contributes to developing a solid motor foundation essential for high-level performance in modern football.

The effectiveness of the methodologies applied to the experimental group validates the research hypotheses, emphasizing that the integration of a specialized programme focused on specific motor skill development into daily training has a direct and measurable impact on athletes' progress.

The results of this study suggest that the long-term implementation of specific motor training programmes enhances current performance and adequately prepares juniors for the transition to a higher competitive level.

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