



EFFECTIVENESS OF SMALL-SIDED GAMES IN DEVELOPING TECHNICAL SKILLS AMONG 12–13-YEAR-OLD FOOTBALL PLAYERS: A COMPARATIVE STUDY

D. Ivanov*

Department of “Football and Tennis,” National Sports Academy “Vasil Levski,” Sofia, Bulgaria

ABSTRACT

Purpose: This study aimed to examine the effectiveness of small-sided games (SSGs) in developing key technical skills—dribbling, ball control, and juggling in 12–13-year-old male football players. The goal was to determine whether a structured SSG-based training program could significantly improve technical performance compared to traditional training methods.

Methods: 32 youth players from two professional football academies were assigned to either an experimental group ($n = 16$), which followed a 10-week SSG-focused training program, or a control group ($n = 16$), which followed conventional training routines. Pre and post-intervention testing included football-specific assessments for dribbling (time), ball control (slalom timing), and juggling (number of repetitions). Data were analyzed using paired and independent sample t-tests to assess within-group and between-group differences.

Results: The experimental group demonstrated statistically significant improvements in all three technical domains ($p < 0.001$), with effect sizes ranging from moderate to large. Dribbling time decreased by 9.27%, ball control time improved by 15.68%, and juggling performance increased by 49.55%. In contrast, the control group showed no significant changes.

Conclusion: The findings support the use of small-sided games as an effective and practical method for enhancing technical skills in early adolescence. Coaches are encouraged to integrate SSGs into youth training curricula to accelerate technical development and promote game-specific learning.

Keywords: small-sided games, technical skills, youth football, dribbling, ball control, juggling

INTRODUCTION

The development of technical skills is a fundamental component of youth football training, especially during the critical developmental stage of 12 to 13 years of age. This period is widely considered a sensitive phase for motor learning and skill acquisition, in which players exhibit increased neuroplasticity and adaptability to complex stimuli (1-3). The efficiency of training methods during this stage can significantly influence a player's long-term performance trajectory.

In recent years, small-sided games (SSGs) have emerged as one of the most effective training modalities for developing technical and tactical abilities in youth football (3, 4). SSGs involve

modified game formats (e.g., 1v1 to 5v5) designed to increase player involvement, ball contacts, decision-making opportunities, and intensity within a controlled environment (5). These games replicate match-like conditions while maintaining pedagogical structure, thereby allowing players to practice technical skills under realistic constraints.

Several studies have demonstrated that SSGs enhance technical execution such as passing accuracy, dribbling control, and shooting under pressure (6, 7). Moreover, SSGs have been shown to improve players' engagement and motivation, which are essential for sustained learning and retention (8). Despite their increasing popularity, there is still a lack of structured methodologies that clearly demonstrate the longitudinal effect of SSGs on technical development in pre-adolescent players, especially in Eastern European contexts.

*Correspondence to: Danail Ivanov, Department of “Football and Tennis”, National Sports Academy “Vasil Levski”, Sofia, Bulgaria, phone: +359887130231, danail.ivanov@nsa.bg

The present study aims to evaluate the impact of a structured training program based on small-sided games on the development of selected technical skills in 12–13-year-old football players. It is hypothesized that regular use of SSGs will result in a statistically significant improvement in technical performance compared to traditional training methods.

METHODS

This study employed a pedagogical experimental design with pre- and post-testing, aiming to assess the effectiveness of small-sided games (SSGs) on the development of selected technical skills in youth football players. Two groups were monitored over a designated training period: an experimental group trained with a structured SSG program, and a control group trained using conventional methods.

Participants

The research involved a total of 32 male football players, aged 12 to 13 years (Mean age = 12.5 ± 0.4), recruited from two competitive youth academies. Participants were divided into two equal groups ($n = 16$):

- **Experimental group (EG)** – subjected to SSG-based training
- **Control group (CG)** – subjected to traditional training sessions

All participants had at least two years of structured football training experience and trained four times weekly. Players and their legal guardians provided informed consent.

Procedures

The intervention lasted 10 weeks, with training sessions held four times per week (a total of 40 sessions). The experimental group followed a training program based on small-sided games (ranging from 2v2 to 5v5), tailored to improve core technical skills: passing, dribbling, ball control, and shooting.

The experimental group participated in a 10-week training program consisting of four weekly sessions, with each session lasting 80–90 minutes. Each session included a warm-up, followed by 30–40 minutes of small-sided games (SSGs) designed to develop specific technical skills.

The small-sided formats varied from 2v2 to 5v5, and were conducted on reduced playing areas (15–30 m wide), depending on the number of players and the target skill. Specific constraints were applied to promote targeted skill development. For example:

- **2v2 and 3v3** games focused on close control, dribbling, and quick decision-making in tight spaces.
- **4v4 and 5v5** formats emphasized combination play, accurate passing, and transition phases.
- Constraints such as **limited touches, scoring zones, and target players** were used to stimulate technical execution under pressure.

All exercises were adapted weekly based on the progression principle and the coaching staff's feedback. The control group conducted sessions based on isolated technical drills without game-based components.

Both groups performed the same warm-up and physical conditioning routines, ensuring that the only variable was the technical-tactical component. The control group followed a traditional approach consisting of isolated drills and structured technical exercises.

Test Battery and Assessment

Technical skill development was evaluated using a standardized set of football-specific field tests:

Dribbling Test (**Figure 1**)

This test evaluates agility and ball control while dribbling through a designated course. The layout is identical to the Agility Test used previously, but this time the player dribbles a ball from start to finish. Timing is measured using electronic photocells placed at the start and end lines.

- The ball is placed motionless at the start line, and the player's starting foot is next to it.
- The test begins with a signal from the photocell system.
- The player must complete the course while maintaining close control of the ball.
- The run is valid only if the ball crosses the finish line within 1 meter of the player.
- Two attempts are allowed, with at least 120 seconds of rest in between. The best result is recorded.

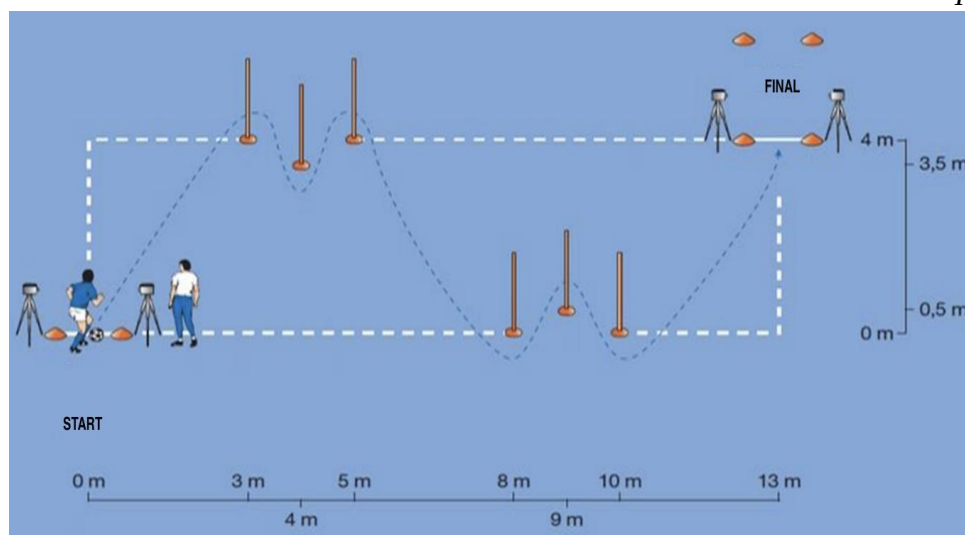


Figure 1. Dribbling test

Ball Control Test (**Figure 2**)

This test assesses the ability to receive and pass the ball accurately at speed.

- The player stands at a fixed distance from a wall or rebounder.
- The task consists of six successive passes and receptions against the surface.

- The timer starts with the first contact and stops after the sixth successful reception and pass.
- Each attempt must follow the same rhythm and technical standard.
- Two trials are given with at least 120 seconds of rest. The best time is recorded.

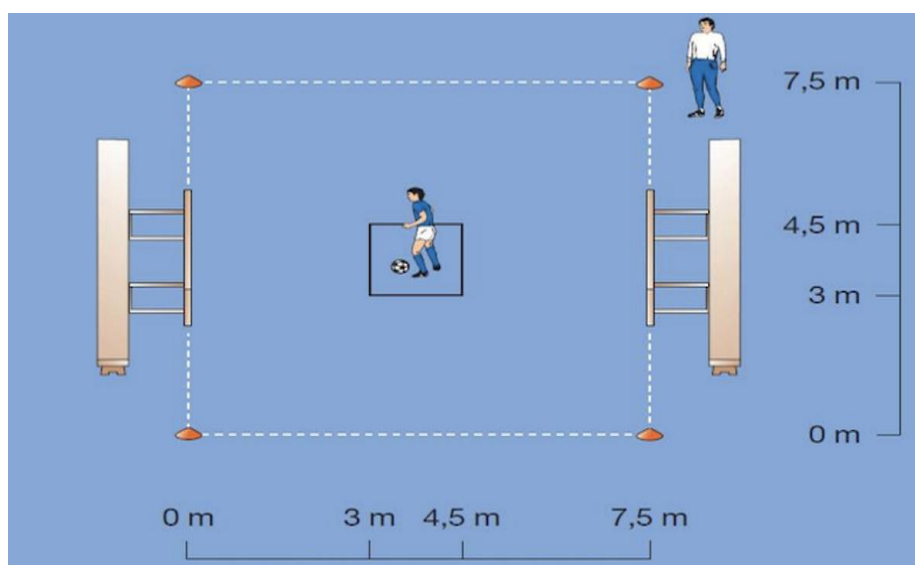


Figure 2. Ball Control Test

Juggling Test (**Figure 3**)

This test measures ball control and touch consistency over time while juggling.

- The player must juggle a ball while moving through a course composed of 8 straight segments.
- One point is awarded for every segment passed while maintaining at least one foot contact with the ball.
- The time limit is 45 seconds.
- The attempt starts from a static position with

the ball dropped by hand and struck with the foot.

- The ball must remain airborne and be played only with the foot. Ground contacts or touches with other body parts are not allowed.
- Only one attempt is permitted.

All tests were administered before and after the intervention under identical conditions. The reliability of the test battery was confirmed by test-retest procedures ($ICC > 0.85$).

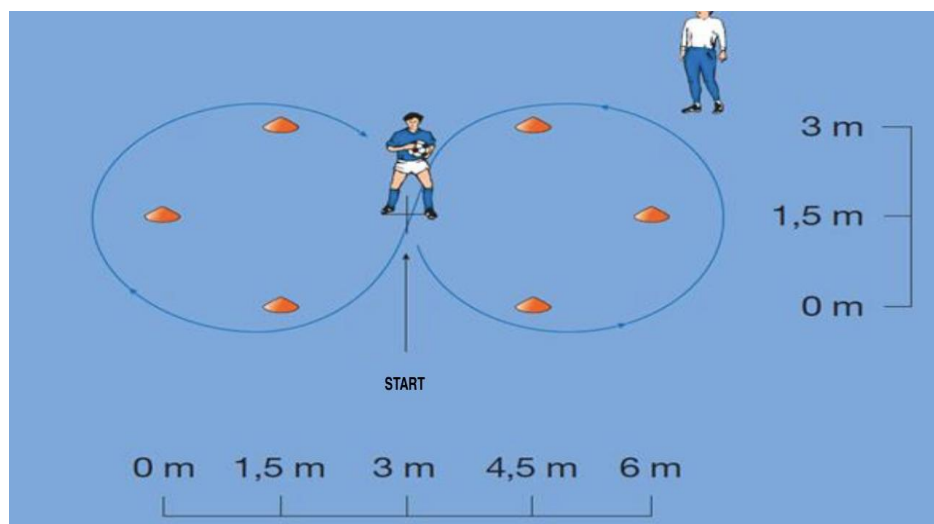


Figure 3. Juggling Test

Statistical Analysis

Descriptive statistics (mean and standard deviation) were calculated for each group. Paired samples t-tests were used to assess within-group differences (pre- vs post-test), and independent samples t-tests were applied for between-group comparisons. Statistical significance was set at $p < 0.05$. All analyses were conducted using SPSS v27 for macOS.

RESULTS

The analysis of the collected data reveals significant improvements in technical performance among players in the experimental group (EG) following the 10-week small-sided games (SSG)-based intervention (**Table 1**). In contrast, the control group (CG), which followed a traditional training program, showed minimal or no improvement in the same period.

Table 1. Pre/post results – CG/EG

Test	EG Pre (Mean $\pm$ SD)	EG Post (Mean $\pm$ SD)	EG t (Pre vs Post)	EG p	CG t (Pre vs Post)	CG p	Post-Test t (EG vs CG)	Post-Test p
Dribbling	11.41 $\pm$ 0.64	10.24 $\pm$ 0.61	7.71	< 0.0001	-0.08	0.9387	-7.37	< 0.0001
Ball Control	10.72 $\pm$ 1.02	9.13 $\pm$ 0.95	5.98	< 0.0001	-0.43	0.6746	-4.44	0.0001
Juggling	9.45 $\pm$ 3.73	13.58 $\pm$ 4.61	-5.39	< 0.0001	-0.20	0.8426	3.16	0.0037

Dribbling Test

The dribbling performance in the EG improved significantly, with the average time decreasing from 11.31 ± 0.70 seconds in the pre-test to 10.26 ± 0.48 seconds in the post-test ($t = 8.82, p < 0.001$), marking a 9.27% improvement. The CG showed no significant change, with a marginal increase from 11.40 ± 0.53 to 11.41 ± 0.55 seconds ($t = 0.76, p = 0.5419$).

Ball Control Test

EG players improved their ball control scores from 10.79 ± 1.01 seconds to 9.10 ± 1.03

seconds ($t = 7.80, p < 0.001$), reflecting a 15.68% gain in efficiency. The CG did not exhibit a statistically meaningful difference, moving from 10.57 ± 0.89 to 10.64 ± 1.19 seconds ($t = 0.66, p = 0.4819$).

Juggling Test

The most substantial improvement was observed in juggling, where the EG increased their average score from 9.17 ± 4.39 to 13.71 ± 5.55 points ($t = 7.04, p < 0.001$), a 49.55% enhancement. The CG's performance remained stable, changing insignificantly from 8.42 ± 3.94 to 8.55 ± 4.05 points ($t = 0.34, p = 0.7340$) (**Figure 4**).

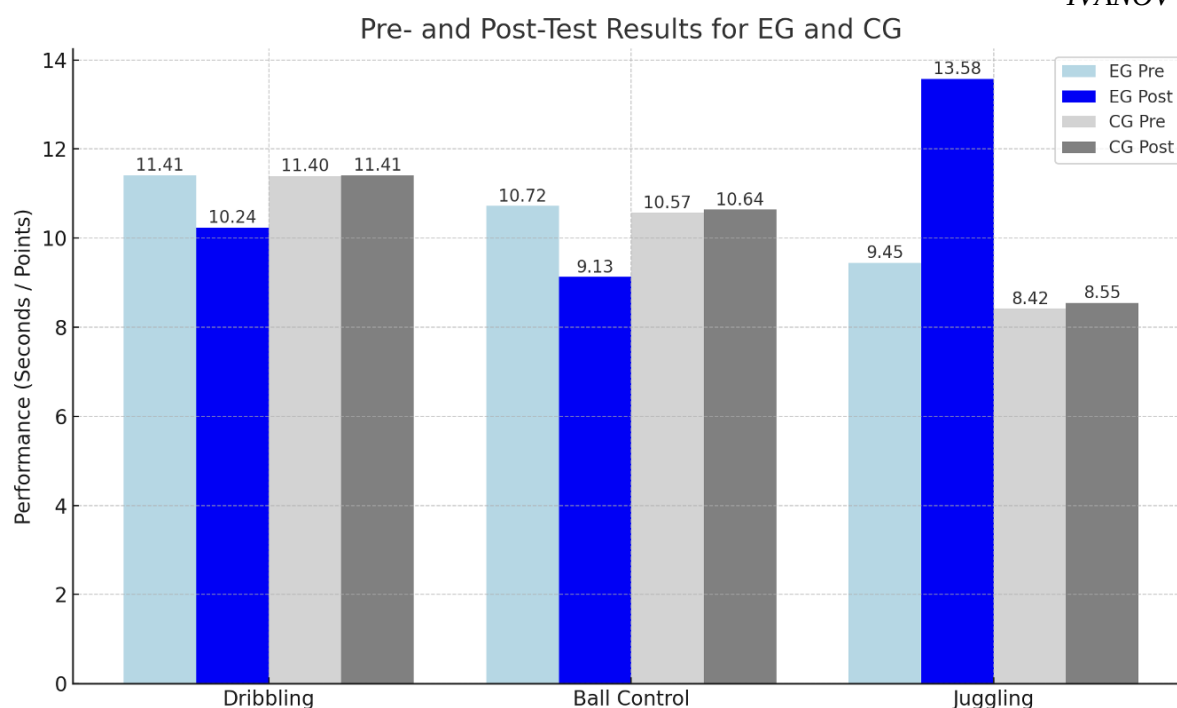


Figure 4. Results of EG and CG

These results (**Table 2**) support the hypothesis that structured training using small-sided games

significantly enhances technical performance in preadolescent football players.

Table 2. Summary of test results

Test	Group	Pre-Test ($\bar{X} \pm SD$)	Post-Test ($\bar{X} \pm SD$)	Improvement (%)	t-value	p-value
Dribbling (sec)	EG	11.31 ± 0.70	10.26 ± 0.48	-9.27%	8.82	0.001
	CG	11.40 ± 0.53	11.41 ± 0.55	+0.09%	0.76	0.5419
Ball Control (sec)	EG	10.79 ± 1.01	9.10 ± 1.03	-15.68%	7.80	0.001
	CG	10.57 ± 0.89	10.64 ± 1.19	+0.70%	0.66	0.4819
Juggling (points)	EG	9.17 ± 4.39	13.71 ± 5.55	+49.55%	7.04	0.001
	CG	8.42 ± 3.94	8.55 ± 4.05	+1.54%	0.34	0.7340

DISCUSSION

The findings of this study strongly support the hypothesis that small-sided games (SSGs) represent an effective training method for improving key technical skills in 12–13-year-old football players. The experimental group (EG), which trained exclusively using SSG-based methods, demonstrated statistically significant improvements in all three tested areas—dribbling, ball control, and juggling—whereas the control group (CG) showed minimal or no progress.

The improvement in dribbling among EG participants is consistent with previous studies that highlight the role of SSGs in enhancing spatial awareness, agility, and quick decision-making in tight playing spaces (3,5). The reduced dribbling times suggest improved

coordination, anticipation, and motor control, all of which are essential in high-pressure match situations.

Ball control significantly improved in the experimental group, further validating the hypothesis that repeated exposure to ball contacts and constrained environments within SSGs promotes fine-tuned control under variable conditions (1). The limited gains observed in the control group reinforce the idea that isolated drills may be insufficient to simulate realistic gameplay demands.

The most dramatic improvement occurred in juggling performance, which nearly doubled in the EG. This suggests not only enhanced technical consistency but also increased comfort with the ball, which often translates

into confidence and fluidity in open play. Such gains are supported by previous literature emphasizing the importance of ball mastery during early adolescence (2,8).

The current results are aligned with studies by Gabbett (4) and Aguiar (7), which show that SSGs elicit high engagement, repeated decision-making, and technical repetition—factors that are often missing in conventional training. Additionally, the improved technical efficiency in the experimental group echoes the developmental frameworks proposed by Côté and Balyi, which emphasize athlete-centered and game-based learning strategies. These findings are in line with research by Ivanov and Lovkov (9), who found that 63.4% of surveyed football coaches in Bulgaria believe that an integrated approach to training yields greater developmental impact, and 48.9% prefer it due to its closer resemblance to real-game conditions and football-specific scenarios. These results are also consistent with findings by Tsvetkov (10), who conducted a study among 147 Bulgarian football coaches regarding the impact of early sport specialization and diversified training approaches in youth development. Their findings highlight that most coaches recognize the value of diversified stimuli and caution against the risks of premature specialization. Furthermore, Tsvetkov and Gadzhev (11) conducted a four-month intervention with 12-year-old football players and reported similar improvements in dribbling efficiency (−2.98%), passing control (−7.9%), sprint performance (10 m and 20 m), and lower limb power (standing long jump). Their findings reinforce the effectiveness of well-structured, age-appropriate drills in improving both technical and physical performance in preadolescent players.

These findings carry significant implications for youth football coaches and development programs. Integrating SSGs into early training cycles not only improves technical skills but also enhances players' motivation and cognitive processing. Given their efficiency and engagement potential, SSGs should be considered a core component of long-term player development models in this age group.

CONCLUSION AND PRACTICAL RECOMMENDATIONS

The present study provides strong empirical evidence supporting the effectiveness of small-sided games (SSGs) as a training tool for developing technical skills in youth football players aged 12–13. Across a 10-week intervention, the experimental group, which followed a structured SSG-based program, demonstrated statistically significant improvements in dribbling, ball control, and juggling performance, while the control group showed minimal progress.

These results reinforce the view that SSGs not only replicate game-specific situations but also enhance player engagement, increase ball interactions, and accelerate skill acquisition. The improvements observed in the experimental group are consistent with existing literature emphasizing the developmental benefits of game-based learning strategies during early adolescence.

Practical Recommendations:

1. **Integration of SSGs in Youth Programs:** Coaches working with players in the 12–13 age range should systematically implement SSGs in weekly training cycles to enhance technical and tactical learning simultaneously.
2. **Individual Skill Focus Through Game Constraints:** Designing SSGs with tailored constraints (e.g., touch limitations, narrow zones) can help develop specific skills such as passing accuracy or ball control under pressure.
3. **Balanced Approach:** While SSGs are highly effective, a hybrid approach combining game-based and technical drills may offer the best results in long-term development.
4. **Monitoring and Assessment:** Regular testing and performance tracking should be embedded in training processes to evaluate individual progression and adapt training content accordingly.

In conclusion, small-sided games offer a developmentally appropriate and evidence-based approach to youth football training for youth coaches aiming to improve technical skill development in young footballers. Their adoption can contribute to more dynamic, engaging, and effective training environments aligned with modern football demands.

ACKNOWLEDGMENTS

The author would like to express sincere gratitude to PFC Levski Sofia and PFC Beroe Stara Zagora for their invaluable support and collaboration throughout the experimental phase of this research. The participation of their youth players and coaching staff significantly contributed to the Successful Implementation Of The Training Program And The Overall Validity Of The Study.

Conflict of interest

The author declares no conflict of interest related to the conduct of this study or the preparation of this manuscript.

Funding

This research received no external funding and was conducted independently without financial support from public or private institutions.

REFERENCES

1. Ford, P., De Ste Croix, M., Lloyd, R., Meyers, R., Moosavi, M., Oliver, J., Till, K. and Williams, C., The long-term athlete development model: Physiological evidence and application. *Journal of Sports Sciences*, 29(4): 389–402, 2010.
2. Balyi, I., Way, R. and Higgs, C., Long-Term Athlete Development. Human Kinetics, Champaign, IL, USA, 2013.
3. Hill-Haas, S.V., Dawson, B., Impellizzeri, F.M. and Coutts, A.J., Physiology of small-sided games training in football: A systematic review. *Sports Medicine*, 41(3): 199–220, 2011.
4. Gabbett, T.J., Skill-based conditioning games as an alternative to traditional conditioning for rugby league players. *Journal of Strength and Conditioning Research*, 20(2): 309–315, 2006.
5. Halouani, J., Chtourou, H., Dellal, A., Chaouachi, A. and Chamari, K., Physiological responses according to rules changes during 3 vs. 3 small-sided games in youth soccer players. *Journal of Sports Sciences*, 32(14): 1368–1376, 2014.
6. Owen, A., Twist, C. and Ford, P., Small-sided games: The physiological and technical effect of altering pitch size and player numbers. *Insight: The FA Coaches Association Journal*, 7(2): 50–53, 2004.
7. Aguiar, M., Botelho, G., Lago, C., Maças, V. and Sampaio, J., A review on the effects of soccer small-sided games. *Journal of Human Kinetics*, 33: 103–113, 2012.
8. Clemente, F., Wong del, P., Martins, F.M. and Mendes, R.S., Acute effects of the number of players and scoring method on physiological, physical, and technical performance in small-sided soccer games. *Research in Sports Medicine*, 22(4): 380–397, 2014.
9. Ivanov, D. and Lovkov, T., Study of perceptions of football specialists regarding the implementation of an integrated and isolated approach in football training process, 226-236, 2023.
10. Tsvetkov, V., Gadzhev, M., Stoilov, I. and Ivanov, D., Analysis of the opinion of Bulgarian football trainers regarding the influence of early sport specialization and diversification of training means among children–football players. *Trakia Journal of Sciences*, Vol. 19, Suppl. 1, pp 719-725, 65(2): 57–63, 2021.
11. Tsvetkov, V. and Gadzhev, M., Examination of the effect of various drills for improvement conditioning and technical elements with 12-year-old football players, *KNOWLEDGE-International Journal*, 64(1): 42–47, 2020.