Vol. XXVI, Issue 2/ 2025

G Y M N A S I U M

Scientific Journal of Education, Sports, and Health

Original Article

Improvement of Technical Skills of Football Players U13

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DOI: 10.29081/gsjesh.2025.26.2.15

Keywords: *technical skills, football, juniors U13*

Abstract

The aim of this research is to improve the level of technical skills of U13 football athletes. A number of 30 players were selected, divided in two groups: experimental group (n=15) and control group (n=15), both components of a football academy. The applied program consisted of six specific technical exercises: juggling, dribbling, long passes, hitting the goal, hitting the ball with the head, precision of passes. The evaluation test applied initially and finally consisted of the estimation of time or the awarding of points for the executions. The total research time was 42 weeks, 4/5 time a week (36h). The results showed improvement in experimental group in all samples ($p<0.05$- $p<0.0001$) compared to the control group, which did not progress in half of the samples. In conclusion, the program applied to the experimental group proved effective and improved the technical parameters followed in the research.

1. Introduction

Competitive soccer performance depends on many factors that include physical, physiological, mental, technical and tactical areas (Stolen, Chamari, Castagna & Wisloff, 2005).

Soccer is primarily aerobic in nature, where players have been observed to cover approximately 10 km during matches (Rampinini et al., 2007), but, success during soccer match-play is associated with increased high-intensity activity (Mohr, Krustrup & Bangsbo, 2003) and the quality of technical abilities actions. (Hughes & Franks, 2005). Football requires high basic technical skills, such as passing, control, and

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dribbling and is integral to team success and individual performance.

It was found that throughout a soccer match, each player completes between 50 and 110 technical involvements (Carling, 2010), and fullbacks have been reported to have a higher frequency of technical involvement than all other positions. Luhtanen (1990) cited in Russell & Kingsley (2011) states that in order to score a goal, a team must make between 16–30 attacks and take an average of ten shots whereas analysis of individual actions has revealed that dribbling and short passes are the most frequently performed skills during match-play. Carling, Bloomfield, Nelsen and Reilly (2008) affirmed that technical skills are crucial for successful match play. Bloomfield, Polman, & O'Donogue (2007) researched analysis of time-motion and they have reported that elite players perform an average of 16.7 short passes, 5.9 long passes, 2.5 headers, 23.8 receives, 17.6 dribbles, and 1.8 shots per match.

FIFA admit that technique is what creates the content of the game and facilitates all the tactical moves required for a team to work well together. Good technique is based primarily on developing a good relationship between the body and the ball, with the ball being at the service of the player and not the reverse. The difficulty involved in performing different technical movements increases according to the game conditions, and it is essential to adapt the level of training in order to improve technical skills (Bénézet & Hasler, n.d.).

The same specialists of FIFA divided technique in attacking technique (using the ball: feint – directional control – pass – dribble – shot (cross, volley, etc.) – header and defensive technique (recovering possession or breaking down the move: – pro-active defending, charge (body) – intercepting – tackling – clearance with the feet – defensive heading – defensive running).

Jukić et al. (2019) emphasize that technical abilities serve as significant differentiators among youth soccer players, particularly in the under-10 categories, highlighting the role of fundamental motor skills in identifying performance differences. This notion is supported by Smothers, Cropley, Lloyd, Oliver (2021) who argue that competencies in fundamental movement skills correlate with higher levels of technical performance in football, thereby accentuating the need for clubs to prioritize these skills in training regimens.

Furthermore, the examination of technical performance extends into team dynamics, where the interplay of technical skills among players influences overall team performance. For instance, Leontijević & Jankovic, (2019) examine team strategies and note that ball possession remains an essential aspect of attacking performance, although the utilization of technical skills can significantly vary across different leagues. This suggests that while fundamental technical abilities are key, their application within a tactical framework can also dictate success.

The tactical and technical competencies of players can evolve positively when players train and compete across age groups, enhancing their technical skills in game situations, as noted by Yıldırım & Göral (2023). This adaptability showcases the interplay between personal skill development and tactical understanding, complementing the findings by Ferrandis et al. (2024) which document changes in

technical and match performance as players transition between competitive levels.

The technique abilities are sustained by physical abilities: speed, power, suplese, coordination and therefore; the ability to sprint and dribble at high speed is essential for performance in soccer. Previous research has indicated that the better players distinguish themselves by their speed running while dribbling or pssing the ball (Barthelemy Ravé et al., 2024).

Basic technical skills become the main foundation for the development of soccer players, influencing the individual and collective performance of a team at various levels of competition (Leckie et al., 2023 as cited in Rambe Zul et al. 2024). The author Wang (2024) stated that for the manifestation of the best skills in soccer requires good physical condition. Sinurat, (2019) in the same idea confirm that physical condition is needed in mastering skills and to learn mastery of basic soccer techniques.

2. Material and methods

The purpose of reaserch is to analise the technique potencial of a soccer team U13 and validate the program of preparation adapted to the mach conditions.

In this direction we established the *hypothesis* of this research, so we presumed that technical performance can be improved by exercise a program on a small pitch with this components: speed dribbling, passing (short or long), shooting, juggling of a ball (footholds, or on the other part of body), heading.

Subjects The investigated sample included a number of 38 subjects, from which 30 players who were consistent in their training throughout the research and who completed the two evaluations, initial and final, were selected, who were divided into 2 groups, U13: the experimental group (n = 15; age: $m \pm s = 12.7 \pm 0.51$ years) and the control group (n = 15; age: $m \pm s = 13.01 \pm 2.33$ years).
All participants were recruited from the same Romanian professional football club. Approval was requested from the official staff of sportive club and parents to conduct the research and use the data obtained in the experiment.

Procedures The experiment was implemented over a span of 16 weeks, structured as follows: for 8 weeks, participants engaged in 5 training sessions per week (4 regular sessions and 1 match-play session), totaling 40 sessions. In the remaining 8 weeks, the training schedule included 4 sessions per week (3 regular sessions and 1 match-play), summing up to 32 sessions. Altogether, 72 training sessions were completed, with 30 minutes in each session specifically allocated to the experimental protocol, amounting to a total of 2,160 minutes (equivalent to 36 hours). The control group practiced the training program they had planned (15minutes/session, regular technical exercises, mach- play), and the experimental group added the independent variable of technical skills training (our program) and a double time.

Methods of research The proposed program consisted of exercises applied on a reduced-size field and in each school-game played at the end of the training session, the focus was placed on improving a specific technical skill. Across the training sessions, the main focus areas included: 15 training sessions targeting speed

dribbling, 15 on short passing, 15 on long passes, and 15 on shooting and 12 on heading technique. Additionally, each training session included exercises such as fast footwork with a ball, ball control, ball reception, and heading techniques.

Evaluation was conducted in two phases: the first before the start of the experiment and the second at the final. The assessment involved the successive performance of seven technical exercises, detailed below. Between stations, subjects engaged in active rest (walking and breathing exercises).

All statistical analyses were performed using IBM SPSS Version 20, with the significance level set at $p = 0.05$. The analysis included calculations of mean values, coefficient of variability, dependent t-test, and independent t-test.

Applied Tests

1. Shooting

Three points are marked along the sideline of the penalty area: the first on the goal line, the second 1 meter from the goal line, and the third 3 meters from the goal line, on both sides of the penalty box. The player must attempt to score by delivering an aerial pass directly into the goal. A total of 4 attempts are performed, with the player selecting the positions beforehand. The best 3 attempts are scored.

Rules: the player must choose all 4 shooting positions before starting the test; the ball must be passed toward the goal in the air (aerial trajectory).

Scoring criteria: a ball that enters the goal directly from the point on the goal line = 20 points; a ball that enters directly from the point 1 meter from the goal line = 15 points; a ball that enters directly from the point 3 meters from the goal line = 10 points; if the ball touches the ground before entering the goal, the attempt is not scored.

2. Ball Control – Dribbling

A 14-meter square is marked on the field. The player starts at the first cone, dribbles the ball through cones placed 3 meters apart, shoots the ball against a 30 cm-high bench, receives the rebound, then dribbles through two cones placed 2 meters apart. Next, the player continues dribbling toward a line marked 2 meters in front of a goal formed by two cones placed 1 meter apart. At this point, the player performs a self-pass through the cone goal, runs around the goal, regains control of the ball, and accelerates through two squares toward the finish line.

Rules: the timer starts when the player first touches the ball at the start and stops when the player crosses the finish line with the ball under control; if the ball crosses the finish line without the player, the ball must be retrieved, brought back to the cone goal, the self-pass repeated, and the exercise completed correctly; two timed attempts are allowed; the best result is recorded.

Scoring: under 18 seconds – 60 points; 18" to 20" – 50 points; 21" to 23" – 40 points; 24" to 26" – 30 points; 27" to 30" – 20 points; over 30 seconds – 0 points

3. Juggling

A 10-meter square is marked on the field. The player must keep the ball in the air using any part of the body except the hands.

Rules: the exercise begins with the player holding the ball in their hands; the attempt ends when one of the following occurs: the player completes 60 touches; the ball

touches the ground; or the player exits the square with the ball; each ball contact counts for 1 point; one warm-up attempt is allowed.

4. Frequency – Passing – Accuracy

A 5m x 10m rectangle is marked, with a gymnastics bench (placed upside-down) along one of the 10-meter sides. The player must pass the ball into the bench for 30 seconds, using the dominant foot (or both feet, at the player's choice), with the inside or instep of the foot.

Rules: a goal with a net is placed behind the bench; the ball may only be struck after it crosses the 5-meter line; if the ball goes beyond the bench and stops in the net, the player must retrieve it, return to behind the 5-meter line, and resume the drill; the ball does not have to be passed in one motion; it may be controlled or cushioned before the pass.

Scoring: each successful pass = 3 points; final result: number of passes in 30 seconds × 3 points; only one 30-second attempt is allowed.

5. Heading the Ball

A 5x5 meter grid is marked on the field. The goal measures 5 meters and is divided according to a predefined schematic. The player must perform 6 headers using balls tossed by an assistant.

Rules: the first three headers must target the lower rectangle of the goal; the next three should aim for the upper rectangle; the player must remain active (at least ankle mobility) behind the 5-meter line at the time of each attempt; the ball may bounce once before entering the designated scoring area; the ball must be tossed in an arched trajectory (lobbed); if the ball touches the marking tape and enters the correct zone, the attempt is considered valid.

Scoring criteria: one successful attempt = 10 points; each athlete is allowed two attempts, with the highest score being recorded; final score = number of successful headers × 10 points.

6. Long Pass

The boundaries of the 5x5 meter target area must be clearly visible (cones, markers, etc.). The player is required to execute 3 long passes into the target square.

Rules: the ball is in a static position before each pass; a pass that lands on the line of the square is considered successful.

Scoring criteria:

one successful long pass = 20 points;

the player is allowed one warm-up attempt and two evaluated attempts, with the best result being considered.

Final result = sum of points from the best trial.

7. Shooting at Goal

The player performs 6 shots on goal. Players aged up to 13 shoot from 20 meters. Players aged 14 and above shoot from 25 meters.

Rules: the ball must enter the goal through a direct aerial trajectory (without touching the ground first).

Scoring Criteria: 10 points: top right or top left corners;

5 points: bottom right or bottom left corners;

5 points: center top;
1 point: center bottom; total score is calculated by summing all points earned from the six shots.

3. Results and discussions

Results From Table 1, it is evident that all statistically processed data across the seven technical tests show a significant improvement for the experimental group. The control group also progressed, though to a lesser extent, and in three of the tests the progress was not statistically significant.

Table 1. *Significance of differences between averages of experimental and control groups in technical abilities of football- U13*

	Experimental Group		**Control Group**		
Test 1	**IT** pts.	**FT** pts.	**IT** pts.	**FT** pts.	**indep "t" test**
m±s	9.333±6.51	16± 3.873	7.667± 5.936	11±3.873	p<0.005
cv%	69.75	24.20	77.42	35.20	
dep "t"test		p<0.0005		p<0.01	
Test 2					
m±s	23.33±17.1	38± 12.071	19.33± 9.612	26.66±9.759	p<0.005
cv%	73.638	31.766	49.718	36.596	
dep "t"test		p<0.0005		p<0.001	
Test 3					
m±s	22.467±12.58	48.267±12.10	22.4±9.672	31.533± 9.342	p<0.01
cv%	55.993	25.088	43.179	29.626	
dep "t" test		p<0.0005		p<0.025	
Test 4					
m±s	5.4±1.352	12.933±1.58	5.333±1.799	5.733± 1.486	p<0.0001
cv%	25.037	12.217	33.733	25.92	
dep "t" test		p<0.0005		p>0.05	
Test 5					
m±s	12.667±12.799	32±14.243	13.333± 8.165	16.667±10.465	p<0.005
cv%	101.042	44.509	61.239	62.789	
dep "t"test		p<0.0005		p<0.05	
Test 6					
m±s	16±17.238	38±16.125	12±12.649	14.667±11.872	p<0.0005
cv%	107.738	42.434	105.408	80.944	
dep "t"test		p<0.05		p>0.05	
Test 7					
m±s	19±7.746	34.933± 4.992	19.8± 5.226	20.8±5.185	p<0.0005
cv%	40.768	14.29	26.394	21.786	
dep"t" test		p<0.0001		p>0.05	

Note: IT –initial test; FT- final test; Dep Test - dependent test; Ind test- independent test; m- average; s – standard deviation; cv%- variability coefficient

In the first test, volley shooting, the experimental group recorded a statistically significant improvement from the initial to the final test, with a gain of 6.67 points

($p<0.0005$). The control group also showed a statistically significant improvement ($p<0.01$). The independent samples t-test, which analyzed the differences between the two groups' means at the final assessment, revealed a statistically significant advantage for the experimental group ($p<0.005$).

In the second test - speed dribbling, targeted shooting after ball control, cone slalom dribbling, self-pass and shooting into a small gate formed by two cones placed 2 meters apart, and ball control at speed to the finish line — an improvement in score (i.e., a decrease in execution time) was observed: 14.67 points in the experimental group and 7.33 points in the control group. The difference in means between the two groups was statistically significant in favor of the experimental group ($p<0.005$).

In the third test - ball juggling - there was a statistically significant increase in the score obtained ($p<0.0005$) in the experimental group, from the initial to the final test, with an improvement of 25.8 points. The control group improved by 7.33 points ($p<0.025$).

In the fourth test - pass frequency and accuracy - we observe an improvement in the experimental group's performance compared to the control group ($p<0.0001$).

Statistically significant differences were observed in both groups from the initial to the final test in the fifth assessment - heading a ball- where scores improved by 19.33 points in the experimental group and 3.33 points in the control group (both $p<0.0005$). The difference in group means indicates a more effective technical training program in the experimental group ($p<0.005$).

The sixth test - long passing - showed consistent improvement in scores for the experimental group, while the control group displayed no statistically significant progress ($p>0.05$), with considerably lower scores. This confirms the effectiveness of the proposed training program.

The seventh test - 20-meter shooting, specific to the U13 age group — showed an improvement in technical indicators from the initial to the final test in the experimental group ($p<0.0001$), while the control group did not show statistically significant progress ($p>0.05$). The independent samples t-test between the two groups confirms the test's viability and the value of the results ($p<0.0005$).

Discussions

A lot of studies on football technique have determined the main components and the importance of approaching them from the beginning of the activity. So, Casal, Anguera, Maneiro, Losada (2019) identified in a study and differentiate the factors that determine the possession times of successful and unsuccessful elite football teams, with the purpose of identifying a more effective possession model. Ball possession, in recent years, has acquired transcendental importance in the offensive game model of many football teams. Results show how, in successful teams, possession time is influenced by: type of start-up, intention and field zone. On the other hand, in unsuccessful teams, possession time is determined fundamentally by intention and match status. In terms of the results of the predictive models, in the case of successful teams, they will have longer possessions in the offensive zone with the score in favor and, in the defensive zone with a draw score, in both situations, initiated with the intention of progressing by means of a transition.

A study by Hoppe, Slomka, Weber, Freiwald, (2015) showed that the distance covered with the ball was directly related to soccer performance, as it reflected actions involving ball possession. Although the task of juggling a ball occurs infrequently during actual match play, juggling tests are necessary as a measure of soccer coordination (Hoare & Warr, 2000).

Reilly and Holmes (1983), as cited in Ali (2011), conducted a study on 40 participants aged 12–13 using a test similar to the one employed in our study (players pass the ball as many times as possible from a passing zone 4.5 m away to an area measuring 3.6 x 2.4 m, within 30 seconds; points awarded for accuracy) and noted progress, although they mentioned that this type of repeated wall-volley passing lacks ecological validity.

Rösch et al. (2000) identified heading as a key component in evaluating technical performance, stating that "The act of heading a ball is an important ability within soccer, whether for defensive clearances or direct attempts at scoring a goal." A similar finding for different technical abilities is reported by Ali et al. (2007) in a study of 24 elite (1st/2nd level) and 24 non-elite (3rd/4th level) university football players, which aimed to evaluate the Loughborough Soccer Passing Test (LSPT) and the Loughborough Soccer Shooting Test (LSST) as tools for assessing soccer skill. In the LSPT, elite players had shorter mean and total execution times. In the LSST, although the average points per shot did not differ, elite players had higher shot speeds and completed sequences faster. Performance on both tests was also more consistent among elite players. Padro´n-Cabo, Rey, Pe´rez-Ferreiro´, Kale´n, (2019) found poor results for the non-dominant foot and a preference for the dominant foot for shooting a static ball and for shooting a launched ball. Thus, their finding of poor test-retest reliability for shooting a static ball with the left foot would seem to be due to the intrinsic characteristics of these motor tasks. In light of these reliability findings, they suggest that the F-MARC (FIFA Medical Assessment and Research Centre) (Rösch et al., 2000) shooting test should be performed with the player's preferred foot.

4. Conclusions

The research demonstrated that the program we proposed was effective and produced improvements in technical skills in U13 football players.

In summary, the 7th tests applied in our research have been shown to be valid and reliable methods of assessing soccer skill performance for research use. It has been shown that the tests can be repeated and applicable for many other athletes. They can themselves represent methods of training technical skills.

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