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THE EXAMINATION OF BALL SKILL DEVELOPMENT IN YOUTH FOOTBALL PLAYERS

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Abstract

In modern football, in addition to advanced physical and mental abilities, players must have excellent technical skills. Coaches must emphasize the development of ball skills during youth training that will enable athletes to execute technical elements accurately and precisely, even at a fast game pace. The present research investigated the significance and effects of ball skill development among youth football players. The study focuses on the role and importance of technical elements in football, implementing the Coerver training method.
Material and methods: The U11, U13, and U14 youth teams of Loki Focisuli Debrecen KSE participated in the study. We examined the effect of a 14-week training program on ball skills. We implemented sport-specific tests to assess these technical skills. Fourteen weeks later, we conducted the second measurement under the same conditions.
Results and conclusion: The study confirmed that youth football players may improve ball skills with the help of a 14-week training program based on Coerver's training method. The most significant improvement was measured in the U11 age group.

Keywords: *football, ball skill development, youth training*

INTRODUCTION

In modern football, a skilled player can execute the technical elements that solve different game situations to the highest and quickly throughout the game, even in the opponent's presence (BICSKEI, 1997). It is vital to enhance technical skills at a younger age. These skills must be developed and maintained to the highest possible level with the help of various training methods (GÖLTL, 2002; TÓTH, TÓTH JR., 2011). More and more studies investigate body composition and conditioning skills in youth football (CZIMBALMOS et al., 2020).
Dribbling is one of football's main fundamental technical elements. Although it is an essential technical element of the game, it is often downgraded in modern football. Collective team play is increasingly taking over; thus, passing is declining as a technical element. There is a distinct difference between passing and shooting, depending on the way of execution. The initial goal of passing is cooperating with a teammate while shooting aimed at scoring. A crucial technical element in team play is takeover and dribbling. The spectacular execution of this technical element makes football extraordinary (MLSZ, 2014).
The sensitive period of technical skill development is between six and fourteen. The primary goal for children aged six and seven is to develop a love for football. All exercises

must be performed with a ball. It is necessary to incorporate various playful exercises during a short-duration training session. To develop ball sense, the size of the ball can also be changed (2-3 sizes, rubber ball, etc.), thus promoting the development of ball sense (FÓRIÁN, 2021). The goal is to improve technique. At the early ages (6-8 years) of training, great emphasis is placed on ball control, perception, and dribbling skills (CSANÁDI, 1978a). According to modern training methods, young players must have contact with the ball at least 5-600 times in a training session (BICSKEI, 1997; (BICSKEI, 2008a; BICSKEI, 2008b; BICSKEI, 2000). The Coerver training method is excellent for this. The first step of the process is to develop proper ball control. The players must have contact with the ball by all parts of their foot. Performing exercises with the weaker and dominant leg is essential to support the highest skill development.
A young player aged 8-9 should already have general, basic knowledge of attack and defense and the ability to work in a team. It is essential to focus on ball control, ball skill development, and playing skills (BICSKEI, 2008a). Various drills developing ball sense are increasingly emphasized in this age (FÓRIÁN, 2021).

The period of 10-13 years is significant for youth training. The goal is to improve technique and the ability to incorporate these skills in a game. By age 12, players should be able to apply and perform almost all technical elements in different game situations (BICSKEI, 2008c). With carefully planned, guided exercises, accurate execution can be effectively facilitated. Body composition, anatomy of the feet, and other physiological aspects may affect the execution of technical drills. Passing drills in different shapes (rhombus, square, triangle, etc.) are essential training elements (FÓRIÁN, 2021). In football, dribbling is the technique children love to practice and incorporate during a game.
The technical elements must be practiced first solo, later against passive opponents, and finally against active defenders. Football players can apply technical skills during the game when facing active resistance.

Coerver method

This training method aims to raise skilled, confident, creative players who communicate well with their teammates. The Coerver training method is based on the fact that the technical knowledge of a player is not solely determined by talent but can be developed gradually. It is highly recommended to incorporate the Coerver training method into the training of players from 5 to 16 years old (1). The Coerver method has been the basis of Dutch football schools in recent decades, successfully implemented in youth training in several Western countries. Coerver's core philosophy is to build an individual first, not a team player. If the appropriate "steps" are taken in personal development, specific skills can be incorporated into team play (*Figure 1*).

Most importantly, players learn to control the ball with both feet and develop ball sense, which helps develop technical skills. Implementing small games (1:1, 1:2, 2:1, 2:2) into the training sessions may help in the effective development of technical skills (2).

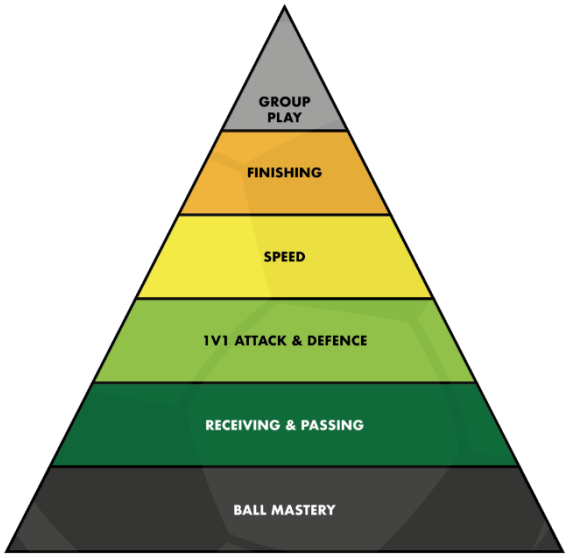

Figure 1: Coerver training method training pyramid
Source: https://www.coervercoaching.com, 2023.01.01

PURPOSE

The primary goal of our study was to assess the development of technical skills in youth football players. The participants completed a 14-week training program based on Coerver exercises. We examined the technical skills often occurring during the match - dribbling, shooting on goal, passing, and ball control. We specifically investigated the role of sensitive periods in motor skill development.

HYPOTHESES

H1: We assumed that the performance improvement in juggling would be the greatest by the end of the training program.
H2: The performance improvement of U11 football players would be the greatest by the end of the training program as they enter the sensitive period of skill development.
H3: A 14-week training program improves the accuracy of shots and the ability to pass.

MATERIAL AND METHODS

We examined the technical development of youth football players at Loki Focisuli Debrecen KSE's youth age teams. Participants of our study have regular practices three times a week. We investigated three age groups - U11 (9-10 years old), U13 (12 years old), and U14 (13 years old). We randomly selected twelve male players per team.
The vast majority of U11 participants have been playing football for almost four years on average. Some of them just recently started playing football. U12 players have been participating in football for an average of five years. The homogeneity of the team is demonstrated by the fact that only three participants joined later. Still, they have also

been regularly attending training sessions for at least 2.5 years. The U14 age group is the most homogeneous regarding the years spent in football. Similarly to the U12 age group, they have been practicing football for almost five years. At the beginning of the study, during the first measurement, the participants performed pre-planned exercises to assess technical skills. We monitored the following skills: dribbling, turns with the ball, changes of direction, pass accuracy, and ball control. The participants performed juggling, agility T-test, Christmas tree–dribbling, shooting – facing the goal, and shooting – facing backward. The participants executed the shooting from a 15-meter distance to a smaller-size (2X1-meter) goal. First, they trapped (stopped) the moving ball and then performed the kicking movement. Subsequently, for 14 weeks, the coaches incorporated a specific set of exercises three times a week. After the 14-week intervention, a second measurement was conducted under the same conditions.

RESULTS

Results of the U11 age group

The participants of this group performed the juggling exercise first. The group was homogeneous in terms of performance in juggling, i.e., individual players performed this task almost identically. After the completion of the 14-week training program, the lowest and highest executions were higher. We measured a more pronounced increase in the highest executions (*Table 1).*

Table 1: Evaluation of U11 age group results: juggling n=12

Juggling	First measurement				Second measurement			
U11 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	2	13	6	3,0	3	22	8	5,3

Source: Own source, 2023

The second test was the agility T-test with a ball. During the first measurement, the fastest-performing player completed the course in 14.6 seconds, while the slowest completed it in 21.9 seconds. The most agile player has been practicing this sport for five years, while his slowest-performing partner joined the club only one year ago. In terms of results, there was the lowest variation in the player's performance. During the second measurement, we experienced a decrease and an improvement in the lowest, highest, and average time results (*Table 2).*

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Table 2: Evaluation of U11 age group results: agility T-test (sec) n=12

T-test	First measurement				Second measurement			
U11 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	14,6	21,9	17,2	2,3	13,2	18,5	15,3	1,7

Source: Own source, 2023

The Christmas tree dribbling test involved fewer turns and direction changes than the agility T-test. The athletes had to perform the test on both sides, right and left. To the right, the participants completed the test in an average of 11.2 seconds. Low standard deviation values demonstrated a balanced performance in this age group. Fourteen weeks later, average values improved to 9.9 seconds, a 13 percent performance improvement (*Table 3).*

Table 3: Evaluation of U11 age group results: Christmas tree dribbling – right side (sec) n=12

Christmas tree dribbling	*First measurement*				*Second measurement*			
U11 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	9,8	13,3	11,2	1,3	8,9	11,1	9,9	0,7

Source: Own source, 2023

The players also performed the test on the opposite side. Surprisingly, the average values of the first and second measurements were identical. We measured an improvement in the lowest and highest values on the effect of the training program. The fastest player completed the test in 8.9 seconds; even the weakest time result changed to 11.2 seconds, a performance improvement of more than 3 seconds. The average performance of the group improved to 9.9 seconds. When comparing the averages, we recorded a 13 percent improvement, similar to the performance on the right side (*Table 4).*

Table 4: Evaluation of U11 age group results: Christmas tree dribbling – left side (sec) n=12

Christmas tree dribbling	First measurement				Second measurement			
U11 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	9,9	14,4	11,2	1,3	8,9	11,2	9,9	0,8

Source: Own source, 2023

We examined the efficiency of ball control and kicking when the athlete was facing the goal. The player who scored the most completed the test seven out of ten times. The player with the most inaccuracies completed the test successfully three out of ten times. During the second measurement, the best-performing player made only one mistake, completing the test nine out of ten times. Even the lowest values, four successful trials in ten attempts, demonstrated a performance improvement. The average performance of the group also improved by 17 percent. We recorded six successful trials in ten attempts (*Table 5*).

Table 5: Evaluation of U11 age group results: shoot facing the goal n=12

Shoot facing the goal.	First measurement				Second measurement			
U11 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	3	7	5	1,4	4	9	6	1,6

Source: Own source, 2023

The test was repeated with the player facing backward to the goal. The player who scored the most completed the task six out of ten times, while the most inaccurate was successful only once. The second measurement demonstrated a moderate improvement seven out of ten times for the best performer; even the least accurate performance improved (two out of ten times). The average value also showed slight improvement, with the successful executions increasing from three to four. The standard deviation values remained almost the same after the completion of the exercise program (*Table 6).*

Table 6: Evaluation of U11 age group results: shoot facing backward n=12

Shoot facing backward	First measurement				Second measurement			
U11 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	1	6	3	1,5	2	7	4	1,4

Source: Own source, 2023

Results of the U13 age group

At the first measurement, the best-performing player performed thirty-two jugglings; the lowest value was four. The best-performing player has been participating in training for seven years, while the lowest-performer joined the team only two years ago. The average number of jugglings was nineteen. We experienced the most remarkable difference in

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juggling after the 14-week training program. The highest number of executions improved by 64 percent, and the lowest values doubled on the effect of the exercise program. The average performance also increased by 34 percent. However, significant individual differences (SD=23,6) were present (*Table 7).*

Table 7: Evaluation of U13 age group results: juggling n=12

Juggling	First measurement				Second measurement			
U13 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	4	32	19	8,6	8	88	29	23,6

Source: Own source, 2023

We also evaluated the results of the agility T-test. During the first measurement, the most agile player completed the course in 13.4 seconds, while the slowest performer executed the test in 18.9 seconds. As we expected, ball handling and control skills were directly related to the number of years in football. The average result was 15.6 seconds, and the low standard deviation (SD=1,9) demonstrated a slight difference in the player's performance.

During the second measurement, the lowest and highest time results were minimally reduced, and agility improved compared to the first. The fastest player completed the test in 12.8 seconds, and the slowest time was 18.1 seconds. During the second measurement, the average performance also slightly improved. (*Table 8).*

Table 8: Evaluation of U13 age group results: T-test (sec) n=12

T-test	First measurement				Second measurement			
U13 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	13,4	18,9	15,6	1,9	12,8	18,1	15,2	1,9

Source: Own source, 2023

The players dribbled in the shape of a Christmas tree to the right and left sides. On the right side, the fastest time in the first measurement was 8.6 seconds, while the least agile player completed the track in 11.5 seconds. On average, the participants completed the test in 10.1 seconds. Fourteen weeks later, the lowest and highest values remained unchanged. The average result improved by 4 percent (*Table 9).*

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Table 9: Evaluation of U13 age group results: Christmas tree dribbling – right side (sec) n=12

Christmas tree dribbling	First measurement				Second measurement			
U13 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	8,6	11,5	10,1	1,0	8,5	11,7	9,7	1,1

Source: Own source, 2023

The results on the left side demonstrated a very similar pattern. During the first measurement, the fastest player performed the test in 8.8 seconds and the slowest in 12.1 seconds. On the effect of the exercise program, we registered a slight improvement in the lowest and highest values. The most agile player completed the course in 8.3 seconds; even the weakest time result was changed to 11.9 seconds. The group's average performance improved to 9.6 seconds (*Table 10*).

Table 10: Evaluation of U13 age group results: Christmas tree dribbling – left side (sec) n=12

Christmas tree dribbling	First measurement				Second measurement			
U13 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	8,8	12,1	10,4	1,0	8,3	11,9	9,6	1,3

Source: Own source, 2023

We examined the player's ball control and shooting skills facing the goal. The player who scored the most completed the test nine out of ten times. The player with the most mistakes completed the course successfully twice. After the 14-week training program, we registered no improvement in the highest number of executions.
We experienced a decline in the performance of the least accurate participants. There was no change in the average number of successful executions *(Table 11).*

Table 11: Evaluation of U13 age group results: shoot facing the goal n=12

Shoot facing the goal.	First measurement				Second measurement			
U13 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	2	9	6	1,8	1	9	6	2,3

(Source: Own source, 2023)

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The players also completed the test facing backward to the goal. Surprisingly, after the 14-week exercise program, we measured a decline in successful executions of the best performers. Participants who scored only once during the first measurement could significantly improve their performance. However, the average values also demonstrated a negative tendency, as we measured a performance decline at the second measurement *(Table 12).*

Table 12: Evaluation of U13 age group results: shoot facing backward n=12

Shoot facing backward	First measurement				Second measurement			
U13 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	1	8	5	1,9	3	6	4	1,2

Source: Own source, 2023

Results of the U14 age group

Among the three age groups investigated, the U14 players were involved in football training for the longest time. Participants of this group would be able to perform the technical skills more efficiently than their younger counterparts. We assumed that the proficiency of their motor skills was the highest among the examined groups. The highest-skilled participant performed an impressive 232 in juggling, while the lowest performer executed four. These values have remained unchanged after the completion of the exercise program. The average number of executions demonstrated a 25 percent increase in performance. The high standard deviation values (59,7 and 61,7) indicated a high variability in juggling performance. The group members had very heterogeneous results *(Table 13).*

Table 13: Evaluation of U14 age group results: juggling n=12

Juggling	First measurement				Second measurement			
U14 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	4	232	39	59,7	4	234	52	61,7

Source: Own source, 2023

The fastest player performed the agility T-test in 13.1 seconds. The highest result was 17.1 seconds. The group members completed this test in an average of 14.5 seconds. During the second measurement, the lowest, the highest, and the average results also decreased, and performance improved compared to the previous results. All values

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(lowest, highest, average) enhanced with a very low variability (SD=1; 1,1). The results were highly homogenous *(Table 14).*

Table 14: Evaluation of U14 age group results: T-test n=12

T-test	First measurement				Second measurement			
U14 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	13,1	17,1	14,5	1,0	12,1	15,3	13,9	1,1

Source: Own source, 2023

The fastest time measured during the completion of the Christmas tree dribbling test (right side) was 9.6 seconds, while the slowest time result was 11.8 seconds. The average result was 10.4 seconds. All values (lowest, highest, average) improved at the second measurement, with a negligible difference (SD=0,7 and 0,6) between the results. The average value improved by 11 percent on the effect of the exercise program *(Table 15).*

Table 15: Evaluation of U14 age group results: Christmas tree dribbling – right side (sec) n=12

Christmas tree dribbling	First measurement				Second measurement			
U14 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	9,6	11,8	10,4	0,7	8,3	10,3	9,4	0,6

Source: Own source, 2023

Participants also performed the test on the opposite side. The results of the first measurement demonstrated that the fastest-performing player completed the task in 9.3 seconds, while the slowest-performing player completed the test in 11.9 seconds. The average results also improved by 7 percent after the 14-week intervention. The Christmas tree dribbling test results were similar regardless of the side it was performed on. *(Table 16).*

Table 16: Evaluation of U14 age group results: Christmas tree dribbling – left side (sec) n=12

Christmas tree dribbling	First measurement				Second measurement			
U14 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	9,3	11,9	10,5	0,8	8,2	11,9	9,8	0,8

Source: Own source, 2023

The participants were facing the goal when examining the effectiveness of the ball control and kicking technique. The player who scored the most completed the test eight out of ten

times. The player with the most inaccuracies completed the test successfully two times in ten attempts. After the 14-week training program, the highest-skilled player had no mistakes in the test (ten out of ten), while the lowest performer scored four times out of ten attempts. The average performance also improved by 14 percent *(Table 17).*

Table 17: Evaluation of U14 age group results: shoot facing the goal n=12

Shoot facing the goal.	First measurement				Second measurement			
U14 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	2	8	6	1,7	4	10	7	1,8

Source: Own source, 2023

When facing backward to the goal, the players had to perform a turn, trapping the moving ball and shooting with proper control. The player who scored most successfully executed the test eight times in ten attempts. The most inaccurate participant performed the test two out of ten times. After completing the exercise program, all values remained the same, only the lowest values improved slightly. The standard deviation values suggested the group's performance was homogeneous *(Table 18).*

Table 18: Evaluation of U14 age group results: shoot facing backward n=12

Shoot facing backward	First measurement				Second measurement			
U14 age group	Lowest	Highest	Average	Standard deviation	Lowest	Highest	Average	Standard deviation
	2	8	5	1,9	3	8	5	1,8

Source: Own source, 2023

RESULTS AND CONCLUSIONS

According to Rigler-Müller (2002), the ability to accurately execute movements several times demonstrates the instant level of skill proficiency or the ability to reproduce a movement.
Researchers such as JUHÁSZ et al. (2019) and MÜLLER et al. (2018a, b) suggested that the development of ball skills plays an essential role in preparing youth ball sport players.
During the evaluation of the results, we confirmed that a 14-week training program aimed explicitly at mastering specific technical skills leads to significant performance improvements. The most significant improvement was measured in juggling with the ball. We measured a 33 percent performance improvement in the U11 age group, 34 percent in the U13 age group, and 25 percent in the U14 age group. Our first hypothesis was

supported since the most significant performance improvement occurred in juggling by the end of the exercise program.

We also experienced an improvement in the performance of the agility T-test. The results of the youngest group (U11 players) demonstrated the most considerable improvement, with a 12 percent improvement. We registered a 3 percent improvement among the participants of the U13 and a 4 percent improvement in the U14 participants.

During the Christmas tree dribbling test, speed of movements (turns), ball control, and ball handling skills were monitored. We registered a 13 percent improvement in performance in both directions in the U11 age group. In the U13 age group, we measured a 4 percent improvement in performance on the right side and an 8 percent improvement on the left. This resulted in an average 6 percent overall improvement. In the oldest age group, we experienced an 11 percent improvement to the right and a 7 percent to the left side. Overall, we measured an average 9 percent improvement in both directions by the end of the 14-week exercise program. The degree of performance improvement was the lowest in the agility T-test and the Christmas tree dribbling among the participants.

Finally, we monitored technical skills such as ball control and kicking technique. The participants performed shootings facing the goal and backward. When participants were facing the goal, we measured a 17 percent improvement in performance in the U11 age group and a 14 percent improvement in the U14 age group. The performance in the U13 age group remained the same after the exercise program. When participants were facing backward, we registered a 25 percent improvement in performance in both the U11 and U13 age groups. We measured no change among the U14 players. Performing shootings facing the goal resulted in an average 15 percent improvement and a 25 percent improvement when facing backward among all participants. Overall, the 14-week training program resulted in a 20 percent improvement for all participants. This supports our assumption that the accuracy of shots on goal and passing improves even after a 14-week training program, so our hypothesis 3 has been confirmed. Juhász et al. (2017) found similar results when investigating proficiency in throwing on target among young handball players. The researchers found a slight improvement in the quality of throwing skills. Müller et al., (1999) concluded that proficiency in shooting skills may be improved by non-specific (football) exercises, however the magnitude of improvement is rather limited.

We measured a 13 percent performance improvement by the members of the U14 age group. The U13 age group demonstrated a 15 percent improvement in performance. We recorded the most remarkable improvement -16 percent in the members of the U11 age group. Thus, our previous assumption (hypothesis two) was also supported by our results.

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INTERNET RESOURCES

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