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THE EFFECTS OF 8 WEEKS OF BALANCE TRAINING ON SOCCER SKILL LEVEL APPLIED TO 10-12 AGE GROUP MALE SOCCER PLAYERS

Harun JİRA
Gazi University, Institute of Health Sciences, Training and Movement Sciences, Ph.D. Program, Ankara
ORCID: https://orcid.org/0000-0003-2880-1515
hrnkdry06@gmail.com

Seyfi SAVAŞ
Assist. Prof. Dr., Gazi University, Faculty of Sports Sciences, Physical Education and Sports Education, Ankara
ORCID: https://orcid.org/0000-0002-0780-7697
seyfi@gazi.edu.tr

Kadriye JİRA
Kilis 7 Aralık University, Graduate Education Institute, Department of Coaching Education, Kilis
ORCID: https://orcid.org/0009-0006-8947-3104
hrnkdry@hotmail.com

Yeliz AY YILDIZ
Gazi University, Faculty of Sport Sciences, Department of Physical Education and Sport, Ph.D. Program Ankara
ORCID: https://orcid.org/0000-0002-2002-0389
yelizayyildiz1977@gmail.com

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Abstract

The purpose of this study is to investigate the effects of 8 weeks of balance training applied to 10-12 age group male soccer players on soccer skill levels. This study involved 41 licensed Soccer players from two U-12 football teams competing in the same championship who trained regularly for at least one year. Footballers were randomly divided into two groups as experimental group (EG; N=20) and control group (CG; N=21). In addition to the usual soccer training, EG practiced balance training 3 times a week for 8 weeks and for 20 minutes, while the CG continued their routine soccer training. Before and after the study, EG and CG were given the football-specific technical skills test Loughborough Pass (LSPT), Loughborough Shooting (LSST) and Y Balance Test (YBT). At the end of the 8-week study, there was a decrease in trial periods in both groups. At the end of LSPT, there was a significant decrease in the EG penalty period compared to CG (-2.10 s), and as a result of (LSST), there was no significant difference between the groups while improvement was observed in both groups at the end of 8 weeks. As consequence the football player's (YBT) who were in the EG (p=.011) improved, while the CG did not change. As a result of the measurements, it can be said that the balance training added to the traditional training of young age group football players can improve some technical football skills more than the usual football training alone. For the development to be sustainable, it is thought that it would be appropriate to include the balance training program in the training routines and should regularly upgrade the program.

Keywords: Football, balance, technical skills.

INTRODUCTION

Football is the most played sports game in the world. The nature of the football game are sprints, sudden accelerations, and decelerations, turns, jumps, shots and grabbing balls (Andersson, Ekblom, & Krustrup, 2008). It is stated that technical skills, tactical and physical capacity are gaining more importance day by day within the requirements of modern football (Carling, Bloomfield, Nelsen, & Reilly, 2008). Balance is the process of holding the center of body gravity vertically over the support base and is based on rapid, continuous feedback and the integration of afferent information from the three sensory components, which are somatosensory, visual, and vestibular systems (Hrysomallis,

2011). Balance is a decisive factor in performing movements such as agility (sudden change of direction), holding, throwing, pushing, stopping, starting, which are the basic movements of sports. In cases such as failure to keeping balance or to maintain body position, it indicates that the athlete cannot demonstrate the expected performance and more likely to danger of injury (Paillard, Noe, Riviere, Marion, Montoya, & Dupui, 2006). In many sports branches, the quality of technical skills is one of the main criteria that determine the performance of an athlete. When we examine the relationship between performance and balance skills in football, it is seen that Soccer players have a better balance skill than sedentary ones, however, it has been noted that Soccer players competing at a higher league level also have better postural control than those competing at lower league levels (Paillard, Noe, Riviere, Marion, Montoya, & Dupui, 2006). In addition, studies show that among players in all sports branches, Soccer players have better balance skill (Matsuda, Demura, & Uchiyama, 2008). Although it is not usually specifically mentioned as one of the primary characteristics of top-level Soccer players, balance represents a very important aspect that contributes to greatly improving their performance (Pau, Arippa, Leban, Corona, Ibba, & Todde, 2015). Actually, during the match most situations, the lower extremities play different roles in which one must provide the necessary bodily support and balance when kicking, dribbling, passing, etc. (Oliveira, Silva, Farina, & Kersting, 2013; Chaouachi, Manzi, Chaalali, Wong, Chamari, & Castagna, 2012). It is stated that postural balance skill might be a very important indicator in determining performance in football so that one-leg balance skill can exhibit different technical movements such as passing, shooting, and dribbling in football (Paillard, Noe, Riviere, Marion, Montoya, & Dupui, 2006). Balance has been recognized as one of the most important key elements for the prevention of non-contact injuries in sports and the evaluation of rehabilitative training effects (McCall, Carling, Davison, Nedelec, Le Gall, Berthoin, & Dupont, 2015). Though the relationship has been established between balance and injury risk, the relationship between balance and sports performance remains still unclear (Rössler, Donath, Verhagen, Junge, Schweizer, & Faude, 2014; Rössler, Donath, Bizzini, Faude, 2016). For children and adolescents, somatosensory, visual and vestibular systems develop at different rates. The exact ripening period of each factor is still being debated (Faude, Rössler, Petushek, Roth, Zahner, & Donath, 2017). Complete somatosensory system maturation has been reported to occur on a very wide range of time, when children are between 3 and 12 years of age (15, 16). Inconsistencies have been reported between 7-10 years and 13-14 to 15 years for the age at which full visual system development occurs and similarly between 7-15 years and 15-16 years for the full development of the vestibular system (16-19). In addition to the maturation of the three sensory systems, balance development is also effected by the level of activity and experience (Peterson, Christou, & Rosengren, 2006). Although there are relatively numerous studies focusing on balance training, the relationship between balance ability and technical skills has not been extensively investigated up to now (Granacher, Prieske, Majewski, Büsch, & Muehlbauer, 2015; Cameron & Adams, 2003). Such a population, characterized by the possible incomplete development of the three systems related to the ability of balance, can also benefit from special balance training in addition to traditional football training to improve technical skills.

METHOD

Research Group

In the study, 41 licensed Soccer players from the same football team between the ages of 10-12 who competed in the U 11 and U 12 championships in Kahramanmaraş for at least one year took part in the trainings. Soccer players were divided into two groups as experimental group (EG; N=20) and control group (CG; N=21).

The necessary permissions were obtained from the parents and from institutions of the participants, the participants were informed about the research and a voluntary participation form was filled.
Inclusion Criteria:

- No obvious orthopedic and/or neurological disorders,

- Absence of vision, hearing or vestibular disorders,

- no lower extremity injury in the previous six months,

Training Protocol

In addition to the routine soccer training, EG practiced balance training for 3 sessions in a week and 20 minutes per training for 8 weeks long, while the control group continued routine soccer training. Each balance training session consists of 5 different drills. Balance exercises were done in the form for 3 sets and 30-60 seconds exercise, 60 seconds' rest. Participants have not been given any balance training protocol before. Training sessions were planned for football players, starting from simple balance exercises to cover more difficult and complex balance work. During the balance training period, both groups have done the same football training. The training protocol was implemented in April-May during the competition period, when players regularly participated in official matches. Before and after the study, Loughborough Pass Test (LSPT) for football-specific technical skills measurement, Mor & Christian shooting test and Y Balance Test (YBT) were applied to the EG and CG groups for balance measurement.

Descriptive statistic

Tablo 1. Descriptive statistic of groups

Variables		Min.	Max.	Mean	Std.Dev.
Control Group (N=22)	Age	9.00	12.00	11.318	.893
	Height	124.00	167.00	149.590	10.653
	Weight	24.00	68.00	43.045	10.458
Experimental Group (N=18)	Age	9.00	12.00	11.055	1.055
	Height	127.00	166.00	144.444	9.375
	Weight	23.00	60.00	38.500	8.683

When the Table 1 was examined, (EG) experimental group's age was 11.32 ± 0.89 years, height was 149.59 ± 10.65 cm, body weight was 43.05 ± 10.46 kg. The control group 11.06 years ± 1.06 years, height was 144.44 ± 9.38 cm, body weight was 38.50 ± 8.68 kg.

Collection of Data

Football passing test, football shooting test and y balance test (dynamic balance) were applied to the Soccer players.

Statistical Analysis

SPSS.22 statistical package program was used in the analysis of the research data. The normality test was performed by the Kolmogorov-Smirnov test. Comparison of normal distributed values in dependent groups was made using Paired Samples t test and independent t test in independent groups. Normal non-dispersive values were performed using Wilcoxon signed rank test in dependent groups and Mann-Whitney U test in independent groups. The significance value was .05.

RESULTS

Table 2. Pre-test and post-test comparison of the experimental group

N=18		Mean	Std.Dev.	Mean1-Mean2	Std.Er.	t value	p value
Balance	Pre-test	72.233	4.811	-3.08	1.56	8.402	.000*
	Post-test	75.316	4.902				
Pass	Pre-test	70.905	1.899	3.39	.69	20.858	.000*
	Post-test	67.516	2.009				
Pass penalty	Pre-test	22.927	.736	1.96	.39	21.362	.000*
	Post-test	20.972	.724				

*p<.05

According to Table 4, the t-test performed to determine the difference between the balance pre- and post-test scores of the experimental groups participating in the study was in favor of the posttest (Mean1-Mean2=-3.08; t=8.402; p<.05); the pass time was in favor of the post-test between the pretest and post-test scores (Mean1-Mean2= 3.39; t=20.858; p<.05); A significant difference was found

between the pre-test and final test scores in favor of the last test (Mean1-Mean2= 3.39; t=20.858; p<.05).

Table 3. Pretest posttest comparison of the experimental group

N=18	Mean	Std.Dev.	Min.	Max.	Z value	p value
Shoot pre-test	17.055	4.478	10.00	28.00	2.013	.044*
Shoot post-test	18.111	5.016	12.00	3.00		

*p<.05

When Table 3 is examined, a significant difference was found between the pre- and post-test values of the test group participating in the study in favor of the post-test (Z=-2.013; p<.05).

Tablo 4. Pretest post-test comparison of the control group

N=22		Mean	Std.Dev.	Mean1-Mean2	Std.Er.	t value	p value
Balance	Pre-test	76.71	5.59	-.45	.65	-3.229	.004*
	Post-test	77.16	5.58				
Pass	Pre-test	71.40	1.98	.74	.79	4.404*	.000*
	Post-test	70.66	1.83				
Pass penalty	Pre-test	22.59	1.41	.55	.62	4.152*	.000*
	Post-test	22.05	1.42				

*p<.05

When Table 4 is examined, the t-test performed to determine the difference between the balance pre- and post-test scores of the control group participating in the study was performed in favor of the post-test (Mean1-Mean2= -.45; t=-3.229; p<.05); the pass time was in favor of the post-test between the pre-test and post-test scores (Mean1-Mean2= .74; t=4.404; p<.05); There was a significant difference between the pre-test and post-test scores of the passing penalty period in favor of the post-test (Mean1-Mean2= .55; t=4.152; p<.05).

Table 5. Pretest post-test comparison of the control group

N=22	Mean	Std.Dev.	Min.	Max.	Z value	p value
Shoot pre-test	18.272	7.740	10.00	34.00	-2.058	.040*
Shoot post-test	20.090	6.574	12.00	34.00		

*p<.05

When Table 5 is examined, a significant difference was found between the pre- and post-test values of the experimental group participating in the study in favor of the post-test (Z=-2.058; p<0.05).

Table 6. Comparison of pre- and post-tests values the experimental and control groups participating in the study

Variables	Grup	N	Mean	Std.Dev.	Mean1-Mean2	Std.Er.	t value	p value
Balance pre-test	Control	22	77.16	5.58	1.84	1.68	1.096	.280
	Experimental	18	75.32	4.90				
Balance post-test	Control	22	76.71	5.59	4.48	1.67	2.680	.011*
	Experimental	18	72.23	4.81				
Pass pre-test	Control	22	71.40	1.98	.49	.62	.794	.432
	Experimental	18	70.91	1.90				
Pass post-test	Control	22	70.66	1.83	3.14	.61	5.170	.000*
	Experimental	18	67.52	2.01				
Pass penalty pre-test	Control	22	22.60	1.41	-.34	.37	.917	.365
	Experimental	18	22.93	.74				
Pass penalty post-test	Control	22	22.05	1.42	1.07	.37	2.917	.006*
	Experimental	18	20.98	.72				

*p<.05

When we examine Table 6, it is seen that while there is no difference in the total balance pretest of the control and experimental groups, there is a significant difference in the post test. It is seen in the statistical analysis results that the training program applied to the experimental group has a significant effect on the balance parameter (p<.05). There is no difference between the control of the total pass and pass penalty time values and the pre-tests of the experimental group. There is a difference of .05 significance between the latest tests. It can be said that the training program applied to the

experimental group positively improves the balance, passing, and passing penalty time performance in football.

Table 7. Comparison of pre- and post-tests performance values of the experimental and control groups participating in the study

Variables	Grup	N	Mean Rank	Sum of Ranks	Z value	p value
Shoot post test	Control	22	20.57	452.50	-.41	.967
	Experimental	18	20.42	367.50		
Shoot post test	Kontrol	22	21.93	482.50	-.869	.385
	Experimental	18	18.75	337.50		

*p<.05

When Table 7 was examined, there was no significant difference in the shot test when the pretest and posttest of the control and experimental group were compared (Z_{pre}= -.41; p ≥.05; Z_{post}= -.869; p≥.05).

DISCUSSION, CONCLUSION, and SUGGESTIONS

When the literature was examined, although there is not enough study on the effect of balance exercises on football-specific technical skills. It is stated that technical skills and balance skills are related to many balance exercise researches and that the technical skills of athletes who has good balance skills may also be good (Paillard & Noe, 2006). In this study, it can be said that as a result of balance training, the performance of two football specific technical skills, such as passing, shooting and dribbling, has improved.

The Effects of Balance Training on Balance Skills

When the literature was examined, there were many studies about Balance training improves postural control ability (Sayenko, Masani, Vette, Alekhina, Popovic, & Nakazawa, 2012). Football is characterized by several short-term, multi-directional movements that constantly push the balance in Soccer players compared to sedentary people (Bieć & Kuczyński, 2010). Similar to this study results, Biec and Kuczynski reported that balance training effectively improved balance ability in pre-adolescent football players compared to sedentary children of the same age. Holm et al. (2004) had participants do 10 weeks of balance training and found a significant improvement in single-leg dynamic balance skill performance as a result. He emphasized that despite the increased balance ability of both groups, adding special balance training to traditional football training could improve balance to a greater extent in the Experimental Group than in the Control Group (Hrysomallis, 2011; Paillard, Noe, Riviere, Marion, Montoya, & Dupui, 2006; Bieć & Kuczyński, 2010). These results are smilar with our study. Alyson et al. (2010) reported a statistical improvement in the Star balance test as a result of 8 weeks of balance exercises in a study on female football players (Filipa, Byrnes, Paterno, Myer, & Hewett, 2010). In the study involving 39 male football players, it was reported that as a result of 12 weeks of balance training, the balance skills of the Soccer players increased and their postural oscillations decreased (Gioftsidou, Malliou, Pafis, Beneka, & Godolias, 2006). In contrast to this study, in a study that examined the effects of 6 weeks of balance training on medio-lateral and anterior-posterior release, no difference occurred at the end of balance training (Tracey, Anderson, Hamel, Gorelick, Wallace, & Sidaway, 2012). The development of balance skills varies according to the balance training materials, training time and frequency used in balance exercises.

Effects of Balance Training on Passing Skills

At the end of the current study, a statistically significant difference was found between the pre-test and post-test values of pass performance in the training group (p=.000). In the control group, there was no statistical difference (p>.05). Football players should manage different lower extremity tasks at the same time. For example, one limb provides body stability while the other dribbles, kicks or passes the ball, so to have a better body stabilization may provide in greater accuracy while demonstrating technical skills (Pau, Arippa, Leban, Corona, Ibba, & Todde, 2015). In past studies, it has been reported that the support leg positively affects the kicking performance during the kick and that there is a relationship between the support leg balance skill and the kick accuracy (Tracey, Anderson, Hamel, Gorelick, Wallace, & Sidaway, 2012). Although there are not enough studies on balance and technical skill in the literature, Tracey et al. In a study on amateur football players, it was

reported that proprioceptive studies on bosu ball improved long passing skills in football along with balance skills (Tracey, Anderson, Hamel, Gorelick, Wallace, & Sidaway, 2012). It is also known that the balance skills of Soccer players playing in higher leagues are more advanced than those of players in lower leagues (Coughlan, Fullam, Delahunt, Gissane, & Caulfield, 2012). These results are similar to the current study results.

The Effects of Balance Training on Shooting Skills

In this study, as a result of balance training, a statistically significant difference was found between the pretest and posttests on accurate shooting skill in the experimental group (p=.044). In the literature, there have not been many studies investigating the effects of balance training on shooting skills. We have known from previous studies that balance trainings in which dominant and non-dominant legs are combined increase shooting speed (Bieć & Kuczyński, 2010). In a study, which made by Tracy (2012) examined the differences in balance skills between the right and left legs of football players and the relationship between balance skill and shooting accuracy at the end of this study, a significant relationship was found between balance skill and shooting accuracy. He also reported a relationship between the dominant leg and non-dominant leg balance ability during a shot (Coughlan, Fullam, Delahunt, Gissane, & Caulfield, 2012). The current study results are similar to those of this study. In another study, when the relationship between the displacement of pressure center on the force platform and the shooting speed and the swing speeds of the shot leg was examined, no relationship was found between balance skill and shot speed (Katis & Kellis, 2010).

Nowadays football coaches use many different training methods to improve technical skills and increasing performance. Balance training is also gaining importance on every passing day. However, many coaches and researchers usually focus more on the dominant leg where technical skills are performed during the development of technical skills. The fact remains that, the support leg plays a key role in demonstrating these technical skills. During the display of technical skills, the support leg provides balance and contributes to the movement to be performed with the desired sharpness. In this context, balance training might be a new and effective method of developing technical skills specific to football. It is seen that the balance training that the coaches will apply to the players on the dominant and nondominant legs, with the priority of the new athletes, can have a positive effect on the development of motoric and technical skills as well as the prevention of injuries. As a result, it can be suggested that the balance exercises, which have many beneficial effects, should be given a special place in weekly routine of football training plans. In addition, the posture development of young Soccer players is of particular importance for the development of their motoric and technical skills. For this reason, it is also recommended to practice balance training frequently.

Ethics and Conflict of Interest

We declare that we act in accordance with ethical principles in all processes of this study. There is no conflict of interest between the authors.

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