Ovidius University Annals, Series Physical Education and Sport / SCIENCE, MOVEMENT AND HEALTH
Vol. XXI, ISSUE 2, 2021, Romania
The journal is indexed in: Ebsco, SPORTDiscus, INDEX COPERNICUS JOURNAL MASTER LIST,
DOAJ DIRECTORY OF OPEN ACCES JOURNALS, Caby, Gale Cengage Learning, Cabell's Directories

Science, Movement and Health, Vol. XXI, ISSUE 2, 2021
June 2021, 21 (2): 162 - 166
Original article

COMPARISON OF BALANCE PERFORMANCE IN EXPERIENCED AND AMATEUR FOOTBALL PLAYERS

OĞUZ YILMAZ [1], KEREM ERSİN [1], GENÇAL HATİCE NUR[1], AYAZ GÜLHANIM[1], ŞERBETÇİOĞLU MUSTAFA BÜLENT[1]

Abstract

Objective. Football is a game in which body balance is substantial. The fact that it is a sport based on physical struggle and played with an uneven surface area suggests that football can improve balance. Better balance performance is expected in people who play football for many years. One leg stance is required for hitting the ball and performing different technical movements in football. Therefore, football players might have better posture control on the support leg than normal individuals.

Methods. In our study, the balance scores of experienced and amateur football players were evaluated by Computed Dynamic Posturography test. 12 experienced and 12 amateur football players, aged 18-26, participated in the tests. Sensory Organization Test, Adaptation Test and Unilateral Stance Tests were applied to the subjects.

Results. Composite scores in the Sensory Organization Test showed a significant difference in favor of experienced football players ($p < 0.05$). In the Adaptation Test, no significant difference was found in the responses to sudden movements of the platform. In the Unilateral Stance Test, a significant difference was observed between the two groups when the left foot was closed ($p < 0.05$).

Conclusions. As a result, better composite score showed that long-term playing football has a positive effect on balance. Although a positive effect on visual and vestibular systems were observed but there is no significant difference was found. Unilateral Stance Test results is compatible with the support leg being the left foot in experienced football players. In addition, it has been observed that playing football has a positive effect on posture.

Key Words: Sport, Football, Balance, Computed Dynamic Posturography.

Introduction

Balance is a vital component of healthy and physical performance. Sensory information from the visual, vestibular, and proprioceptive systems is used as input for maintaining balance (Yılmaz et al., 2018). The vestibular nucleus is the primary processor of vestibular input and implements direct, fast connections between incoming afferent information and motor output neurons. The cerebellum is the main adaptive processor; it monitors vestibular performance and readjusts central vestibular processing if necessary. At both locations, vestibular sensory input is processed in association with visual and somatosensory sensory input (Hain 2014).

Many sports include technical skills specific to the sport. It is possible to talk about the existence of balance in almost every branch of sports especially in sports activities based on movement, balance is one of the basic conditions. It was stated that experienced athletes exhibit balance control developed according to the requirements of each discipline (Perrin et al., 2002). In other words, it is observed that various balance components are more developed depending on the needs of the sport of experienced athletes. It is necessary to demonstrate the skill required to reach the goal, sometimes on one leg, sometimes completely by defying gravity. At this point, the performance of balance and its sub-dimensions is an important factor that determines success (Sucan et al., 2005).

Football is a game played with different movements where body balance is important (Son, 2017). In some studies in the literature, the effect of football on balance has been studied. In these studies, it has been shown that football positively affects the balance (Sucan et al., 2005). However, there are few studies evaluating this balance improvement over sensor inputs.

In this study; experienced and amateur active football players were evaluated by the Computerized Dynamic Posturography. The effect of long football on balance parameters (visual, proprioceptive and vestibular system), reaction to sudden events and one-leg stance skills were investigated.

Methods

In our study, the Computerized Dynamic Posturography test battery was applied to 12

[1] Audiology Department, Faculty of Health Sciences, Istanbul Medipol University, Istanbul, Turkey
Email: haticenur.gencal@gmail.com
Received 04.13.2021 / Accepted 28.05. 2021

inexperienced active football players aged 18-26, male who played football for a maximum of 5 years and 12 active football players who played football for at least 10 years.

The Sensory Organization Test, one of the primary Smart Balance Master and NeuroCom Computed Dynamic Posturography test batteries, were applied to the structures. In the test, balance performance is evaluated in 6 different conditions that gradually become difficult. The 6 different conditions of the test obtain information on which of the visual, vestibular and proprioceptive inputs he effectively uses to maintain his balance, and when this provides the appropriate orientation information.

- Condition 1: Eyes open; ground and environment still
- Condition 2: Eyes closed; ground and environment still
- Condition 3: Eyes open; the ground is still, the environment is moving
- Condition 4: Eyes open; the ground is moving, the environment is still
- Condition 5: Eyes closed; the ground is moving, the environment is still
- Condition 6: Eyes open; ground and environment moving

In the Adaptation Test, the support surface on which the participant is on an antero-posterior rotation causes the patient to move suddenly 5 degrees toes up and 5 degrees forward ("tose down"). The test was completed in 5 repetitions. The magnitude of the force response required to deal with postural instability triggered by each movement of the support surface was calculated by scoring. The numerical values obtained as a result of the test show the reaction and oscillation energy. In the Unilateral Stance Test, the participants made 3 trials with eyes open and 3 trials with eyes closed, standing on one leg on the platform and keep maintaining their balance.

Results

Comparison of Sensory Organization Test Results

In the Sensory Organization Test results in Table 1 and Table 2, it was not found significant in 6 cases (p> 0.05).

Table 1. Comparison of the Sensory Organization Test Condition 1,2 and 3 Equilibrium Data

	Condition 1 M±SD	p	Condition 2 M±SD	p	Condition 3 M±SD	p
Experienced footballers	94.23±2.13	0,706	92.62±1.88	0,139	92.58±3.01	0,212
Amateur footballers	93.88±1.19		92.29±2.24		91.00±2.76	

M, Mean; SD, Standard Deviation

Table 2. Comparison of the Sensory Organization Test Condition 4,5 and 6 Equilibrium Data

	Condition 4 M±SD	p	Condition 5 M±SD	p	Condition 6 M±SD	p
Experienced footballers	85.37±5.81	0.312	73.08±8.88	0.214	71.34±12.63	0.078
Amateur footballers	80.73±10,72		67.00±11.56		59.82±16.85	

M, Mean; SD, Standard Deviation

In Table 3 and Table 4, there was no significant difference in Strategy values for 6 condition (p> 0.05).

Table 3. Comparison of the Sensory Organization Test Condition 1,2 and 3 Strategy Data

	Strategy1 M±SD	p	Strategy2 M±SD	p	Strategy3 M±SD	p
Experienced footballers	94,12±2,0	0,378	93,63±1,79	0.930	92,12±4,22	0.432
Amateur footballers	93,58±2,23		93,62±1,69		91,87±2,62	

M, Mean; SD, Standard Deviation

Table 4. Comparison of the Sensory Organization Test Condition 4,5 and 6 Strategy Data

	Strategy4 M±SD	p	Strategy5 M±SD	p	Strategy6 M±SD	p
Experienced footballers	87,62±4,26	0,602	81,25±4,57	0,686	79,56±6,15	0,386
Amateur footballers	85,63±6,31		78,15±8,86		78,22±4,97	

M, Mean; SD, Standard Deviation

There was no significant difference in somatosensory, visual and vestibular system data compared in Table 5 ($p > 0.05$).

Table 5. Comparison of the Sensory Organization Test Sensory Analysis Data

	Somatosensory M±SD	p	Visual M±SD	p	Vestibular M±SD	p
Experienced footballers	0,98±0,02	0,160	0,77±0,08	0,236	0,90±0,05	0,355
Amateur footballers	0,97±0,02		0,70±0,12		0,86±0,10	

M: Mean, SD: Standard Deviation

There was no significant difference in the preference data between the groups ($p > 0.05$) (Table 6.). In the comparison of balance scores, a statistically significant difference was observed between the two groups ($p \leq 0.05$) (Table 6.).

Table 6. Comparison of the Sensory Organization Test Composite and Preference Data

	Composite M±SD	**p**	**Preference M±SD**	**p**
Experienced footballers	83,00±4,70	0,030*	1,02±0,13	0,059
Amateur footballers	76,16±7,55		0,94±0,07	

* differences between sexes, p<0.05.

M, Mean; SD, Standard Deviation

Comparison of Adaptation Test Result

As a result of the Adaptation Test given in Table 7, no significant difference was found in "toes up" and "toes down" (p> 0.05).

Table 7. Comparison of Data in Toes Up and Toes Down Cases

	Toes Up M±SD		Toes Down M±SD	
Experienced footballers	70,15±23,40	0,356	40,46±6,53	0,525
Amateur footballers	61,93±13,23		42,16±6,30	

M, Mean; SD, Standard Deviation

Comparison of Unilateral Stance Test Result

There was no significant difference between the two groups when the left foot-eye was open, right foot-eye was open and closed (p> 0.05) (Table 8.). A statistically significant difference was found between the two groups in the left foot-closed condition (p≤0.05) (Table 8).

Table 8. Comparison Unilateral Stance Data

	Left- Eyes Open M±SD	**p**	**Left- Eyes Close M±SD**	**p**	**Right- Eyes Open M±SD**	**p**	**Right- Eyes Close M±SD**	**P**
Experienced footballers	0,64±0,11	0,505	1,35±0,29	0,032*	0,54±0,13	0,353	1,38±0,54	0,183
Amateur footballers	1,00±0,83		2,10±1,01		0,60±0,15		1,87±0,89	

* differences between sexes, p<0.05.

M, Mean; SD, Standard Deviation

Discussion

Balance is essential in the sports. In addition, balance is a complex system, the acquisition of effective strategies to maintain balance is a necessary element for sportive performance. (Kaya, 2019).

Paillard and Noe (2006) assessed balance performance and strategies of national and international football players on one leg stand. A posturographic evaluation was made on the players with eyes open and closed, and the strength of the athletes with their feet on the center of the force platform was measured. As a result of the research, it was observed that national football players have better postural performance than regional football players. This means it can be stated that the level of experience affects the measurement and strategies of postural control. (Paillard & Noé, 2006). Sucan (2005), investigated balance parameters in football players and sedentary individuals. Postural sway of the subjects was measured on one and two legs on the platform, with eyes open and closed. It was observed that the football group had lower maximum speed and lower maximum acceleration compared to the control group. This situation shows that the physiological system that provides balance in football players has better control (Sucan et al., 2005). In our study, Unilateral Stance Test results supports these two studies. The fact that the support leg of most of the experienced football players participating in our study is the left foot is compatible with the significant difference in the left-eyes close state in the Unilateral stance test. In other words, the good support leg score in favor of the experienced shows that the experience in football is effective.

Olchowik and Czwalik (2020) investigated the effect of regular football training on the balance system for young women. Female football players and the control group were evaluated with the Sensory Organization Test, Motor Control Test and Adaptation Test in Computed Dynamic Posturgraphy. Statistically significant differences were found in Compound Balance Score between the groups and it was observed that the players had better postural stability. It has been observed that football players use the vestibular system more while maintaining balance at the same time (Olchowik & Czwalik, 2020). Similar results were obtained when our study was evaluated. A significant difference was observed in favor of experienced football players in the composite value. Although there was no significant difference in Strategy 5, an increase in favor of experienced footballers was observed between the two groups. This means, experienced football players use the ankle strategy more than hip strategy. They are more comfortable in maintaining balance, and their vestibular systems are partially more developed than amateur football players. In addition, no significant difference was found in the 6 condition results. However, the scores of experienced football players were observed better in condition 5 and condition 6 results. This is because football is thought to have a positive effect on the vestibular system. Although there is no significant difference in preference value, it can be said that experienced football players are more successful in maintaining their balance in the presence of confusing visual stimuli.

As a result, it has been observed that the general balance values of experienced football players are better than inexperienced players, that is, experienced players are more successful in maintaining balance. Other studies support this result.

References

Hain TC, 2014, Anatomy and Physiology of the Normal Vestibular System. Vestibular Rehabilitation 4th Edition. F. A. Davis Company.

Kaya S, 2019, Futbolculara Uygulanan Core Antrenmanlarin Statik Denge ve Siçrama Performansina Etkisi. Ağri İbrahim Çeçen Üniversitesi.

Olchowik G & Czwalik A, 2020, Effects of Soccer Training on Body Balance in Young Female Athletes Assessed Using Computerized Dynamic Posturography. Applied Sciences, 10(3), 1003. https://doi.org/10.3390/app10031003

Paillard T & Noé F, 2006, Effect of expertise and visual contribution on postural control in soccer. Scandinavian Journal of Medicine and Science in Sports, 16(5), 345–348. https://doi.org/10.1111/j.1600-0838.2005.00502.x

Perrin P, Deviterne D, Hugel F & Perrot C, 2002. Judo, Better Than Dance, Develops Sensorimotor Adaptabilities Involved in Balance Control. Gait and Posture, 187–194.

Son M, 2017, Futbolcuların Antropometrik, İzokinetik Kas Kuvvetleri ve Denge Parametreleri Arasındaki İlişkinin Araştırılması. Kocaeli Üniversitesi.

Sucan S, Yilmaz A, Can Y & Süer C, 2005. Aktif Futbol Oyuncularının Çeşitli Denge Parametrelerinin Değerlendirilmesi. Sağlık Bilimleri Dergisi, 14(1), 36–42.

Yılmaz O, Ersin K, Öztürk ŞT, Yasak İ, Yavuz A, & Şerbetçioğlu MB, 2018. The Effect Of Sport On Balance Functions. Science, Movement and Health, 18(2), 197–202.