

Farklı Seviye Liglerde Mücadele Eden Futbolcuların Statik ve Dinamik Denge Testlerinin Karşılaştırılması¹

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ORIGINAL RESEARCH

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Öz

Bu çalışmanın amacı, farklı seviye liglerde mücadele eden futbolcuların statik ve dinamik denge test sonuçlarının mevkisel olarak karşılaştırılmasıdır. Çalışmanın araştırma grubunu T.F.F. Gelişim liginde mücadele eden Erzurumspor FK ve Erzurum Yerel liginde mücadele eden Ilıca İdmanyurdu kulübünün U-15 takımı oyuncuları oluşturmuştur. Çalışmaya Erzurumspor FK takımından 20, Ilıca İdmanyurdu takımından 20 sporcu olmak üzere toplam 40 futbolcu katılmıştır. Bütün sporcuların sağ ayak olması tercih edildi. Katılımcılara sağ ayak, sol ayak ve çift ayak olmak üzere hem statik hem de dinamik denge değerleri toplam 6 farklı ölçüm olacak şekilde ölçülmüştür. Tek bacak statik testi sırasında, diğer ayak dizini yaklaşık 20° fleksiyonda çift bacak statik denge testinde ise, futbolcuların her iki bacak üzerinde rahat bir pozisyonda platform üzerinde durması sağlanmıştır. Test süresi ise 30 sn olacak şekilde ayarlanmıştır. Elde edilen verilerin analizinde SPSS v25 paket programı kullanılmıştır. İkili karşılaştırmalarda Independent samples T Testi ve İlişkisel analizlerde Pearson Korelasyon testleri yapılmıştır. Tüm analizlerde anlamlılık düzeyi <0,05 olarak alınmıştır. Grupların statik ve dinamik denge değerleri karşılaştırıldığında, sağ ile sol ayak statik denge test sonuçlarında ve sol ayak dinamik denge test sonucunda Erzurumspor FK takımı lehine istatistiksel olarak anlamlı fark olduğu tespit edilmiştir (p<0,05). Diğer test sonuçlarında ise herhangi bir istatistiksel olarak anlamlı fark olmadığı tespit edilmiştir (p>0,05). Yapılan çalışmanın sonuçları gösteriyor ki, farklı seviye liglerde mücadele eden futbolcuların denge değerlerinde farklılıklar söz konusudur. Bu durumun sebebi; futbolcuların oynadıkları seviye arttıkça hem fiziksel hem de fizyolojik gereksinimleri artacak ve dolayısıyla gelişim gösterme oranları farklılaşacaktır.

Anahtar kelimeler: Lig Seviyesi, Futbol, Statik Denge, Dinamik Denge

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Comparing Static and Dynamic Balance Tests of Football Players Competing in Different Level Leagues

Abstract

The aim of this study is to compare the static and dynamic balance test results of football players competing at different levels by position. The research group of the study consisted of players from Erzurumspor FK competing in the Turkish Football Federation Development League and Ilıca İdmanyurdu club's U-15 team competing in the Erzurum Local League. A total of 40 football players participated in the study, with 20 from Erzurumspor FK and 20 from Ilıca İdmanyurdu. It was preferred that all players were right-footed. Participants' static and dynamic balance values were measured in six different measurements, including right foot, left foot, and both feet. During the single-leg static test, the other leg was flexed at approximately 20°, and in the double-leg static balance test, players were required to stand comfortably on the platform with both feet. The test duration was set at 30 seconds. The data obtained were analyzed using the SPSS v25 package program. Independent samples t-tests were performed for pairwise comparisons, and Pearson correlation tests were conducted for relational analyses. A significance level of <0.05 was adopted for all analyses. When the static and dynamic balance values of the groups were compared, statistically significant differences in favor of Erzurumspor FK were found in the right and left foot static balance test results and the left foot dynamic balance test result (p<0.05). However, no statistically significant differences were found in the other test results (p>0.05). The results of the study indicate that there are differences in the balance values of football players competing at different levels. This may be due to the fact that as players compete at higher levels, their physical and physiological requirements increase, and consequently, their rates of development vary.

Keywords: Different League Levels, Football, Static Balance, Dynamic Balance

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Introduction

Football, which garners significant interest worldwide and boasts one of the largest fan bases, is also among the most popular sports in our country. In Turkey, like in other countries around the world, football is the most popular sports discipline (Talimciler, 2008).

Balance forms the foundation of performance. It is known that the balance skill, which is at the core of conditioning abilities, plays crucial roles in the successful execution of many athletic skills, changing direction, stopping, starting, holding, moving objects, and maintaining specific body positions (Orth et al., 2010).

The coordinated movements of the entire body are directly linked to the ability to maintain balance. Physiologically, fatigue begins to set in after activity, followed by a loss of postural control. Fatigue occurring during and after exercise interferes with desired performance levels and increases the risk of injury due to balance loss (Makhlouf et al., 2018).

Balance control allows you to exhibit the most suitable posture through motor strategies that can develop instantly and adapt to changing focal points, involving the integration of sensory inputs and the planning and execution of complex motor skills with flexible motor models (Haliloglu et al., 2019). There are two types of balance: static balance and dynamic balance. Static balance is the ability to maintain the position of the center of gravity even in small movement situations. Dynamic balance can be seen as maintaining or regaining balance during certain movements or on unstable surfaces (Hrysomallis, 2011). Controlled balance enables the optimal posture against rapidly changing gravity centers (Can et al., 2005).

For balance to be established, systems need to work together. When the sensory system, musculoskeletal system, and central nervous system work together, good balance is achieved (Barber et al., 2011). Research has shown that different sports have specific skill requirements, and the environmental requirements of sports lead to sport-specific postural adaptations, significantly impacting an athlete's balance skills (Paillard et al., 2006).

Static and dynamic balance or postural stability are defined as the ability to control the center of gravity based on body support (Woollacott, 1986). The center of gravity is established based on the relationship between the gravitational line and the person's support surface. This center changes depending on a person's positional status and passes through the second sacral vertebra in an upright posture. The line passing through the center of gravity and directed towards the center of the Earth is called the gravity line. In a person standing upright, this line starts from the vertex, passes over the mastoid process, just in front of the shoulder joint, inside the hip joint, just in front of the knee joint center, and in front of the ankle joint (Tabrizi et al., 2013).

In the literature, there is limited comparison of the balance performance of youth football players at different levels of competition in the developmental league. Therefore, the aim of this study is to compare the balance performance of football players competing in the developmental league at different levels.

Method

Research Group

The study group of the research consisted of U-15 team players from Erzurumspor FK, competing in the Turkish Football Federation (TFF) Development League, and Ilıca İdmanyurdu, competing in the Erzurum Local League. A total of 40 football players participated in the study, with 20 from Erzurumspor FK and 20 from Ilıca İdmanyurdu. When selecting participants for the study, criteria included regular training and not having experienced any injuries in the past 6 months. All participants included in the research were informed about the measurement processes and tests. The research was conducted in accordance with the principles of the Helsinki Declaration.

Research Design

All participants included in the research were tested under the same conditions. Participants visited the laboratory on two separate days and took part in the tests. On the first day of laboratory measurements, height and weight measurements were conducted initially. Subsequently, a warming-up procedure determined by the researcher was carried out, followed by static balance tests. On the second day of laboratory measurements, after completing the warm-up procedure, dynamic balance tests were conducted.

Warm-Up Procedure

Participants included in the research were asked to perform both general and specific warm-up exercises before the balance tests. General warm-up consisted of a 5-minute low-intensity run followed by a 5-minute bicycle warm-up. The first part of the specific warm-up involved static stretching exercises, while the second part included dynamic stretching and flexibility exercises.

Data Collection Tools

Anthropometric Measurements

To determine the descriptive characteristics of the athletes, information such as age, sports age, history of surgical operations, and history of sports injuries was collected through a personal information form. Later, height and body weight measurements of the participants were taken.

Height measurements were recorded in centimeters using a wall-mounted stadiometer model 282 (Seca GmbH & Co Kg, Hamburg, Germany). Body weight and body fat measurements were obtained using the Tanita TBF 300 body composition device (TANITA, Middlesex, UK). Body mass index (BMI) of the athletes was calculated using the formula "body weight/height²."

Balance Tests

SPORTKAT 4000-TS kinesthetic balance assessment system was used for the balance tests of the athletes. The SportKAT device allows comprehensive evaluation of balance, and it is used for assessment and research purposes. It establishes a recreational research environment for athletes. The device consists of an electronic sensor-equipped balance platform to monitor platform movement and a computer system to record and store all data. The difficulty level of the connected balance platform can be adjusted as desired using an air pressure mechanism. A computer with software for interpreting data, a printer connected to the system for printing outputs, and support bars complete the system. Real-time biofeedback is provided through a monitor. The platform has a 360-degree range of motion around a central pivot point. The stability of the platform is controlled by changing the pressure of a round pneumatic cushion between the lower part of the unit and the platform. As pneumatic cushion pressure increases, the platform stabilizes, and as it decreases, the platform becomes less stable. An inclined sensor in front of the platform is connected to a computer to record platform deviation during the test. The distance between the center point and the reference position is measured in each record throughout the test. Balance Index (BI), which measures a person's ability to keep the platform near the reference position, is calculated by summing these distances. This means creating a common response to proprioceptive, vestibular, and visual stimuli.

Static Balance Test

The athletes' static balance tests were conducted sequentially on the right foot, left foot, and both feet. They were instructed to keep the test image on the computer screen in the center of the screen. During the single-leg static test, the other knee was flexed at approximately 20°, and during the double-leg static balance test, the football players were asked to stand comfortably on the platform with both feet. The test duration was set to 30 seconds.

Dynamic Balance Test

The athletes' dynamic balance tests were conducted sequentially on the right foot, left foot, and both feet. During the right foot test, they were instructed to follow the test image on the computer screen clockwise, counterclockwise during the left foot test, and clockwise during the both-feet test. During the single-leg static test, the other knee was flexed at approximately 20°, and

during the double-leg static balance test, the football players were asked to stand comfortably on the platform with both feet. The test duration was set to 30 seconds.

Statistical Analysis

After testing the normality distribution of the measured parameters using Skewness, Kurtosis, and the Shapiro-Wilk test, it was determined that the data exhibited a normal distribution (within the range of +2 to -2) (Groeneveld and Meeden, 1984). Since the data followed a normal distribution, an Independent Samples t-test was applied to determine differences between the leagues. In this study, a significance level of $p < 0.05$ was used.

Ethics of Research

The study obtained ethical approval with the decision number 2023/09 from the Ethics Committee of the Faculty of Sports Sciences at Atatürk University, under the reference E-70400699-000-2300316017.

Results

Table 1

The Subjects Characteristics

| | Development League | Local Leagues |
|--------------------|------------------------|------------------------|
| Variables | (n=20) $\bar{x} \pm s$ | (n=20) $\bar{x} \pm s$ |
| Age (years) | 14,79 \pm ,89 | 14,87 \pm ,74 |
| Height (cm) | 159,84 \pm 7,74 | 161,01 \pm 6,41 |
| Weight (kg) | 56,47 \pm 8,12 | 54,3 \pm 7,96 |
| Sports Age (years) | 8,24 \pm 1,54 | 8,10 \pm 1,79 |

Table 2

Comparison of Balance Values of Football Players

| Variables | League | n | X | Sd | t | p |
|---------------------------|--------------------|----|--------|--------|--------|---------------|
| Right foot static balance | Local Leagues | 20 | 664,50 | 363,89 | 2,721 | 0,010* |
| | Development League | 20 | 424,35 | 152,73 | | |
| Left foot static balance | Local Leagues | 20 | 645,70 | 314,91 | 3,100 | 0,004* |
| | Development League | 20 | 407,25 | 138,29 | | |
| Both foot static balance | Local Leagues | 20 | 435,10 | 214,08 | -1,534 | 0,133 |
| | Development League | 20 | 594,15 | 411,43 | | |

| | | | | | | |
|-----------------------------------|--------------------|----|---------|--------|--------|---------------|
| Right foot dynamic balance | Local Leagues | 20 | 1364,20 | 410,10 | 0,696 | 0,491 |
| | Development League | 20 | 1273,30 | 406,99 | | |
| Left foot dynamic balance | Local Leagues | 20 | 1323,65 | 488,68 | 3,108 | 0,004* |
| | Development League | 20 | 949,15 | 227,24 | | |
| Both foot dynamic balance | Local Leagues | 20 | 1194,55 | 411,85 | -0,571 | 0,572 |
| | Development League | 20 | 1270,50 | 429,90 | | |

*p<0,05 , Sd: standard deviation; X: Average

Discussion and Conclusion

The aim of this study is to examine the comparison of static and dynamic balance values of football players playing in different level leagues according to the leagues they compete in. The study included football players from Erzurumspor F.K playing in the T.F.F. U-15 Development League and football players from Ilica İdmanyurdu playing in the Erzurum Local League. Due to the limited research on the differences between players in developmental leagues, especially during the developmental period, this study was conducted.

When the findings of the studies are examined, it is observed that there is a difference in favor of the players in the developmental league in terms of static balance values of the right foot and left foot, as well as the dynamic balance values of the left foot. This is believed to be due to the training methods of the players in the developmental league or their athletic structures.

When reviewing the research in the literature, it supports our study that national-level football players have better balance values compared to regional-level players (Paillard et al., 2006). Additional balance exercises added to training programs, especially in offensive players expected to be more creative in football, can positively affect agility skills and contribute to the development of skills transfer, thereby increasing the players' sports abilities. Gürkan et al. (2012) reported balance values measured on a stabilometer for 36 elite futsal players with an average age of 22.47 ± 2.74 as $n=12.14 \pm 2.73$ seconds, while they found the balance retention time for sedentary individuals ($n=12$) as $n=15.97 \pm 5.86$ seconds. In their study, they reported that football training alone did not have a significant effect on balance ability, which is in line with our views, but there are publications in the literature that contradict these views, stating that football is the ideal sport for improving balance (Jakobsen et al., 2011).

In a study by Dunsky et al. (2017), they investigated the effects of static and dynamic balance training included in the FIFA 11+ program on injury prevention in young football players and reported that after 6 weeks, it had a positive effect on both static and dynamic balance values, reducing the injury prevention rate by 12-17%.

In a research comparing the static and dynamic balance values of Italian professional and developmental league football players, Pau et al. (2015) stated that there was no statistically significant difference in static and dynamic balance values. This could be due to two reasons: first, in Italy, where the long-term athlete development model is applied, there may be no difference among players, and second, developmental league players may add balance training to their regular training.

In a study by Amiri et al. (2015), they acutely examined the static and dynamic balance values of female football players after performing different stretching exercises and stated that dynamic stretching exercises improved the static and dynamic balance values of football players. In line with this information, it is considered essential, especially for players in the developmental stage, to perform dynamic stretching exercises to improve balance values, both to reduce the risk of injury and to enhance their abilities in turns, jumps, accelerations, and decelerations during matches.

In conclusion, balance is crucial, especially for athletes in the developmental stage. Balance training is recommended to promote their development and reduce the risk of injury. To reduce the physical differences among players in different leagues, balance training should be added to the programs implemented.

Declaration of interests

No potential conflict of interest was reported by the authors

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Ethics approval and informed consent

Tests were conducted according to the principles expressed in the Declaration of Helsinki and were approved the entire study design by the ethics committee of the Atatürk University Faculty of Sport Sciences (No:144 Date: 06.10.2023)

Authors Contributions Conclusion

Design of the Research: YÖ , GA

Data Collection: GA

Statistical Analysis: YÖ , GA

Preparation of the Article: YÖ

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