MJSS

Akdeniz Spor Bilimleri Dergisi

Mediterranean Journal of Sport Science

ISSN 2667-5463

Düşük ve Yüksek Yoğunluklu TRX Eğitimlerinin Futbolcuların Denge ve Dikey Sıçrama Performansları Üzerine Etkisi

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DOI: https://doi.org/10.38021asbid.1238192

ORIJINAL ARTICLE

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Yayın Bilgisi

Gönderi Tarihi: 17.01.2023

Kabul Tarihi: 09.03.2023

Online Yayın Tarihi: 28.03.2023

Öz

Araştırmanın amacı, düşük ve yüksek yoğunluklu TRX eğitimlerinin futbolcuların denge ve dikey sıçrama performansları üzerine etkisinin araştırılmasıdır. Bu araştırmaya düşük yoğunluklu TRX eğitimi 16,13 ± 7,7 yıl, boy ortalamaları 186,93 ± 4,4 cm, vücut ağırlığı ortalamaları 79,6 ±3,4 kg, yüksek yoğunluklu TRX eğitimi yaş ortalamaları 16,41 ± 3,8 yıl, boy ortalamaları 189,11 ± 3,7 cm, vücut ağırlığı ortalamaları 82,4 ± 6,1 kg düzenli eğitim yapan 30 futbolcu gönüllü olarak katıldı. Futbolcular rasgele 2 gruba bölündü: (1) grup düşük yoğunluklu TRX eğitimi (HI TRX) (%40 – 55, (2) grup yüksek yoğunluk TRX eğitimi (HI TRX) (%70 – 85). Deney grupları 8 hafta, haftada 3 seans ve her seansta 60 dakika kendi eğitim programlarını gerçekleştirdiler. TRX Eğitim programı öncesi her grubun da ön test ölçümleri (dikey sıçrama ve denge) geçekleştirildi. Sekiz haftalık çalışmanın sonunda grupların son test ölçümleri alındı Grupların ön ve son değişkenlerini belirleyebilmek amacıyla Paried samples test analizi kullanıldı. Verilerin analizine göre; (HI TRX) denge performans testi ($p<0.05$) düzeyinde istatistiksel olarak anlamlı bulundu. (HI TRX) dikey sıçrama performans testi performans testi ($p>0.05$) düzeyinde istatistiksel olarak anlamlı bulunmadı. (LI TRX) dikey sıçrama ve denge performans testleri ($p>0.05$) düzeyinde daha anlamlı bulunmadı. Sonuç olarak, futbolculara uygulanan (HI TRX) denge performansı değerlerinde etkili olduğu gözlendi.

Anahtar Kelimeler: Futbol, TRX Eğitimi, Denge, Dikey Sıçrama ve Performans

The Effect of Low and High TRX Training on Balance and Vertical Jump Performance of Footballers

Abstract

The aim of the study is to investigate the effects of low and high intensity TRX trainings on the balance and vertical jump performances of football players. Low-intensity TRX training was 16.13 ± 7.7 years, mean height was 186.93 ± 4,4 cm, mean body weight was 79.6 ±3,4 kg, high-intensity TRX training mean age was 16.41 ± 3, 30 football players who had regular training for 8 years, with an average height of 189.11 ± 3.7 cm, and an average body weight of 82.4 ± 6.1 kg, participated voluntarily. The players were randomly divided into 2 groups: (1) group low-intensity TRX training (HI TRX) (40 – 55%, (2) group high-intensity TRX training (HI TRX) (70 – 85%) Experimental groups 8 weeks, 3 per week. session and 60 minutes in each session, they carried out their own training programs. Before the TRX Training program, pre-test measurements (vertical jump and balance) were performed for each group. At the end of the eight-week study, the post-test measurements of the groups were taken. Paried samples test analysis was used to determine the pre- and post-variables of the groups. According to the analysis of the data; (HI TRX) was found to be more significant at the balance performance test ($p<0.05$). (HI TRX) was found to be statistically significant at the balance performance test ($p<0.05$) level. (HI TRX) vertical jump performance test performance test ($p>0.05$) was not found statistically significant. As a result, it was observed that the balance performance values applied to football players (HI TRX) were effective.

Keywords: Football, TRX Training, Balance, Vertical Jump and Performance

Introduction

In today's world, football is a very important sport that attracts people. This interest is due to the fact that football is easily accessible and easy to play by everyone. Today, football is one of the most invested sports branches by countries (Gümüşdağ, 2021). Advanced athletic performance is required, including outstanding performance, physical and anthropometric characteristics in sport (Egesoy and Gümüşdag, 2022). In football, key features of conditioning hand traits include sprinting ability, anaerobically repeated sprinting ability, and explosiand strength of lower kicks. These features are; relates to runs, turns, kicks, bounce types and balance (Posta et all. 2011). In a football match; any 3-5 seconds, the athletes perform various actions related to sprinting 30-40 meters, jumping, accelerating, decelerating, changing direction, dribbling and hitting the bal. (Morh et all. 2005; Bosgsbo et all. 2006). Football's motoric features are gaining more and more importance; Therefore, the effect of power, force and its derivatiands (sprint, acceleration, deceleration, balance and jump) can affect the quality of the action in a football match. (Gümüşdağ et all. 2011). New training programs created with the athletes' own body weights have led to the creation and development of new approaches and different training programs (ACSM 2003). TRX training program positively affects and develops muscle spindle and muscle golgi tendon structure (Usgu, 2015).

TRX training is effectiand in agonist, assistor and synergistic skeletal muscles (Pastuucha et all., 2012). TRX training uses rope and cord, which consists of two handles and a body, between the central axis of the rope, where it creates muscle contraction. Compared to traditional weightlifting training, TRX trainnig programe is more effectiand because it is performed with wider angles and activities. It is also seen as a beautiful and effectiand option for children and teenagers as well as performance athletes due to the ease of use of the TRX curand. (Ratames, 2011). It was stated that TRX training increased physical activity (Pancar et all., 2021). TRX may be a good option for those who want more challenges for the anterior and lateral core muscles. (Topcu et all., 2022). Trainers and conditioners benefit from TRX training to create higher quality functional activities that will increase the performance of athletes. (Behn and Coloda, 2012). Due to the nature of football, TRX training can be effective for young football players, considering the positive effects of TRX training on some motor characteristics. For this reason, the aim of our study is; The aim was to examine the effect of low peak intensity TRX training on the balance and vertical jump performances of football players.

Material and Method

Participation Group

This research was carried out in Uludağ University, Faculty of Sports Sciences, Physical Education and Sports Department Hall and Mustafa Göndem Football School. (LI TRX) 16.13 ± 7.7

years, mean height 186.93 ± 4.4 cm, mean body weight 79.6 ±3.4 kg, (HI TRX) mean age 16.41 ± 3.8 years, mean height 189.11 ± 3.7 cm, mean body weight 82.4 ± 6.1 kg, 30 football players who regularly trained participated voluntarily Bursa Uludag University Faculty of Medicine ethics committee decision (date 22 June 2022 12/25). "During the current research, it was acted within the framework of the "Higher Education Institutions Scientific Research and Publication Ethics Directive".

Educational Program

In our study, it was done in two ways as familiarity study and experimental study. As presented in the TRX training program (Table 1), both groups applied their own trx training program for eight weeks, 3 sessions per week and 60 minutes per week of trx training program.

Table 1

Educational Program

EXERCISE	**1-2 Weeks - Re-Sec /Set / Rest 30 Sec.**	**3-4 Weeks- Re-Sec /Set / Rest 30 Sec**	**5-6 Week- Repeat-Sec / Rest 30 Sec**	**Set 7-8 Weeks- Repeat-Sec /Set / Rest 30 Sec**
TRX Side Bend	20 x 2	25 x 2	27 x 2	30 x 2
TRX Knee Pull	10 x 2	15 x 2	15 x 2	15 x 2
T- Jump	10 x 2	10 x 2	15 x 2	15 x 2
Squat Jumps	22 x1	22 x1	20 x2	22 x 2
Mountain Climbers	20 x 2	25 x 2	27 x 2	30 x 2
TRX Supermen	22 x 2	22 x 2	20 x 2	20 x 2
Sumo Squat Jump	15 x 2	17 x 2	17 x 2	17 x 2
TRX Single Leg Squat	10 x 2	15 x 2	15 x 2	15 x 2
TRX Side Squat	10 x 1	10 x1	10 x 1	12 x 1
Hamstring Curls	10 x 1	10 x1	10 x 1	12 x 1

Experimental Procees

The measurements of this research took place during the education period (competition). Volunteering statement was distributed to all athletes and read by us. The risks and negative aspects of the research were explained to the athletes. The players were randomly divided into two groups: (1) low-intensity TRX training (LI TRX) (40- 55 %, (2) high-intensity TRX training (HI TRX) (70-85%) Experimental groups 8 weeks, 3 sessions per week and they carried out their own training programs for 60 minutes in each session. Before the TRX Training program, the pre-test measurements of both groups were balance and vertical jump (Table 2). At the end of the 8-week study, the athletes were given their final tests. Athletes performed their general and special warm-ups before starting the tests. Subjects were not subjected to any intensive training during the 24 hours before the first and last tests.

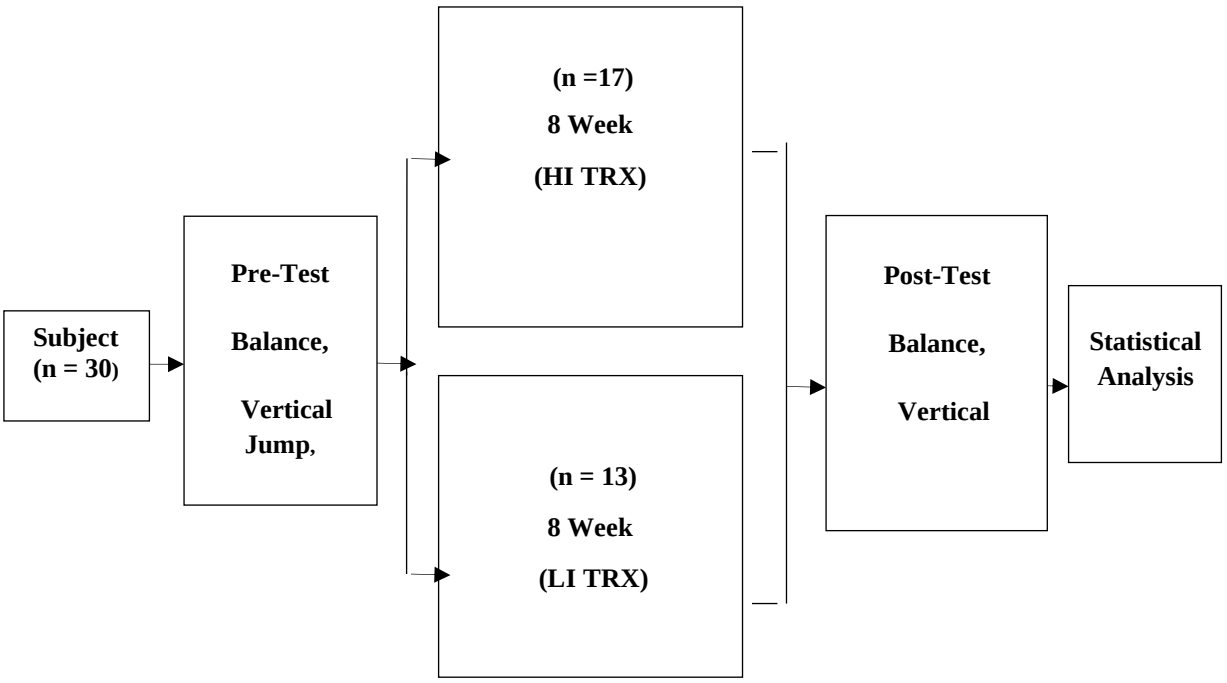

Figure. 1
Experimental l Procees

Body Composition of Athletes

The subjects' height measurements were made in the case of bare feet with the exact height measurements (Soehnle-Waagen Gmb, Hand Co. KG). The body nets of the athletes were made using the tool (Tanita, TBF-300, Tokyo, Japan).

Vertical Target Test of Athletes

An apparatus wall with a length of two meters and a diameter of 60 cm and a diameter of 155 cm was hung from the ground, in use to spread the vertical dimensions of the athletes and their performances. The athletes participating in the vertical target test performance first extended their arms from the extreme point and then performed their vertical target performance by jumping to the highest point. Vertical flight performances were measured in centimeters (Kamar, 2008).

Balance Test of Athletes

Prokim Tecnoboyd PK 200 measuring device was used for the balance test of the athletes. The values received with the apparatus and transferred to the computer via wireless connection**.**

Statistical Analysis

Paried Samples T test was used to make separate comparisons for the first and last measurements of the athletes in the 8-week training program for the experimental and control groups. The results obtained are the mean and standard deviation. (SD) was taken as the significance level (P> 0.05).

Results

In this study; The values and variables obtained according to the analysis of the balance performance and vertical jump performance data of the football players of the TRX low-intensity training program and the TRX high-intensity training program are presented in Table.1 and Table.2. (LI TRX) 16.13 ± 7.7 years, mean height 186.93 ± 4.4 cm, mean body weight 79.6 ±3.4 kg, (HI TRX) mean age 16.41 ± 3.8 years , mean height 189.11 ± 3.7 cm, mean body weight 82.4 ± 6.1 kg, 30 normal training players voluntarily participated.

Table 2
Comparation of Description Characteristics High-Intensity (HI TRX) and) Low-Intensity (LI TRX) Subjects

Variables	(HI TRX) Group (n = 17)			(LI TRX) Group (n=13)		
	Mean ± SD	Min	Max.	Mean ± SD	Min	Max.
Age (Years)	16,41 ± 3,8	15	17	15,76± ,72	15	17
Height (Cm)	189,11 ± 3,7	179	192	184,07± 4,4	179	192
Weight (Kg)	82,4 ± 6,1	69,5	96	79,6 ±3,4	75,8	87,9

Table 3
High-Intensity (HI TRX) and) Low-Intensity (LI TRX) Comparison of Pretest and Posttest Values

Variables	(HI TRX) (n = 17)				(LI TRX) (n =13)			
	Pre-test Mean ± SD	Post-Test Mean ± SD	T	Cohen's d	Pre-test Mean ± SD	Post-Test Mean ± SD	T	Cohen's d
Balance Text (sec)	339,30±56,9	304,87± 54,2	3,972*	0.96	687,55 ± 1222,9	358,14±60,4	0,996	0,28
Vertical Jump (cm)	41,52± 6,9	42,76 ± 7,5	-1,740	0.42	41,46± 7,05	42,84± 7,5	-,245	0,34

*p<0.005

According to the results of the data obtained in the research; According to the analysis of the data; (HI TRX) was found to be more significant at the balance performance test (p<0.05). (HI TRX) vertical jump performance test performance test was not found to be more significant at the level of (p>0.05). (LI TRX) vertical jump and balance performance tests (p>0.05) were not found to be more significant. (HI TRX) measurement value in balance test performance Cohen's effect size was

determined to be high. However, in the vertical jump test performance, the Cohen's effect size was determined as medium in the measurement value. (HI TRX) (LI TRX) vertical jump and balance test measurement value Cohen's effect size was determined to be low.

Discussion and Conclusion, Suggestions

The aim of this study was to examine the effects of low TRX training rograme and high intensity TRX training rograme on the balance and vertical jump performances of football players According to the results of the data obtained in the research; According to the analysis of the data; (HI TRX) was found to be more significant at the balance performance test ($p<0.05$). (HI TRX) vertical jump performance test performance test was not found to be more significant at the level of ($p>0.05$). (LI TRX) vertical jump and balance performance tests ($p>0.05$) were not found to be more significant. When the literature is searched; TRX training programs not only increase neuromuscular performance with special exercise skates in various sports, but also contribute to the functional characteristics of athletes. (Distefano vd., 2013) TRX training aims to develop motoric features such as flexibility, balance, strength and coordination required for actions. (Rosario, 2017). Football is a sport that includes high-intensity actions and contacts. By using the programs of TRX trainings, players can increase their action ability in the match.

In the study (Gümüşdağ et al., 2013), the relationship between VO2max, 10m sprint and 30m sprint running tests was also determined and a low correlation was found that there is a low correlation between VO2max and 10m sprint running test performance, while the correlation is moderate when 30m sprint performance run is considered.

Designed to increase endurance, strength, balance, flexibility, speed and agility of 8 weeks (HI TRX) and (LI TRX) Vales, Fatolahi, and Azarbayjain, (2020). They found that there was an increase in my vertical jump performance because TRX training programs positively affected the core muscles, back muscles and lower extremity muscles (Usgu, 2015). According to Shaik and Mondal (2012), they examined the effects of TRX training on motoric characteristics. It found that 8 weeks of TRX training resulted in a 5% increase in vertical jump performance (Jenkins ve Kieffer, 2011). It stated that there was an increase in vertical jump performance in her study named the effect of TRX training program and strength training using body weight on swimming performance (Şenol, 2015). In our study, no statistically significant difference was observed in vertical jump test measurement values (HI TRX) and (LI TRX). As the reason for this; This may be due to the fact that this study was carried out during the competition period. Had this study been done during the preparatory season, it could have yielded different results. TRX training programs have been shown to improve balance, explosive strength, and stability of the lumbopelvic hip assembly Anywhere LLC, (2013). In the

measurements made with the one-leg standing test, it was observed that the balance value improved after the 8-week training program (Smith vd.,2016). These studies show parallelism with our study. Technological possibilities developing in our world carry higher limits of people's abilities. In addition, many training programs have been developed to further the motoric characteristics of football players.

According to the analysis of the data obtained in our study; (HI TRX) was found to be statistically significant in the balance performance test ($p<0.05$). (HI TRX) vertical jump performance test performance test ($p>0.05$) was not statistically significant at the level. (LI TRX) vertical jump and balance performance tests ($p>0.05$) were not statistically significant. As a result, it has been seen that the balance performance values (HI TRX) applied to the football players are effective.

Ethics Committee Permission Information

Ethics evaluation committee: University Faculty of Medicine ethics committee

Date of ethics evaluation document: 22 June 2022

Issue number of the ethics evaluation document: 2022 12/25

Statement of Researchers' Contribution Rates

The entire study was conducted by the sole author of the study.

Conflict Statement

There is no conflict of interest.

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