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Investigation of the Effects of Recreational Football on Some Functional Movement Skills in Older Men

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Abstract

This study aimed to examine the effects of recreational football on functional movement skill (FMST) levels of elderly men. 57 (65.05 ± 2.5) elderly men who participated in the study were randomly divided into the football group (FG, n= 28) and the control group (CG, n= 29). Data were collected with the FHTT scale and investigeted via mixed design ANOVA. The data were analyzed considering the significance level of p<.05. There was no statistically significant difference between the groups in the deep squatting movement (p>.096), and there was a statistical difference between the times (p<.002). Statistically significant differences were observed between groups, between times and group*time interaction at high stepping, respectively (p<.008, p<.001, p<.035). Statistically significant differences were observed between groups in a single-line move and in group*time interaction, respectively (p<.008, p<.006). There was a statistically significant difference between the groups in shoulder mobility (p<.001). There was no statistically significant difference between the times and in the group*time interaction, respectively (p>.98, p>.44). Statistically significant differences were observed between groups, between times and in group*time interaction in active straight leg raising, respectively (p<.004, p<.001, p<.035). There was no statistically significant difference between the groups in trunk stability movement (p>.089). There was a statistically significant difference between the times and in the group*time interaction (p<.024). Statistically significant difference was observed between groups and between times in rotational stability movement, respectively (p<.001, p<.001). There was no statistically significant difference in the groups*time interaction (p>.065). Statistically significant differences were observed in FHTT total scores between groups, between times and in the interaction of groups*time, respectively (p<.001, p<.001, p<.001, p<.001). The results show that recreational football is effective on FHTT and is a powerful exercise option in improving mobility, which is important for elderly individuals to maintain their quality of life.

Keywords: Elderly, Recreational Football, Functional Movement

Özet

Yaşlı Erkeklerde Rekreasyonel Futbolun Bazı Fonksiyonel Hareket Becerileri Üzerine Etkilerinin İncelenmesi

Bu çalışma rekreasyonel futbolun yaşlı erkeklerin fonksiyonel hareket beceri (FHTT) düzeyleri üzerinde etkilerini incelemeyi amaçlamıştır. Çalışmaya katılan 57(65.05 ± 2.5) yaşlı erkek rastgele futbol grubu (FG, n= 28) ve kontrol grubuna (KG, n= 29) ayrılmıştır. Ölçümler, Ön test-son test eşleştirilmiş kontrol gruplu desen araştırma

tekniğine göre yapıldı. Veriler FHTT ölçeğiyle toplandı ve karma desen ANOVA aracılığıyla incelendi. Veriler p<.05 anlamlılık düzeyi dikkate alınarak incelendi. Derin çömelme hareketinde gruplar arasında istatistiksel olarak anlamlı bir fark olmadığı (p>.096), zamanlar arasında istatistiksel fark olduğu görülmüştür (p<.002). Yüksek adımlamada gruplar arasında, zamanlar arasında ve grup*zaman etkileşiminde sırasıyla istatistiksel olarak anlamlı fark görülmüştür (p<.008, p<.001, p<.035). Tek çizgide hamle de gruplar arasında ve grup*zaman etkileşiminde sırasıyla istatistiksel olarak anlamlı fark görülmüştür (p<.008, p<.006). Omuz hareketliliğinde gruplar arasında istatistiksel olarak anlamlı fark görülmüştür (p<.001). Zamanlar arasında ve grup*zaman etkileşiminde sırasıyla istatistiksel olarak anlamlı fark görülmemiştir (p>.98, p>.44). Aktif düz bacak kaldırmada gruplar arasında, zamanlar arasında ve grup*zaman etkileşiminde sırasıyla istatistiksel olarak anlamlı fark görülmüştür (p<.004, p<.001, p<.035). Gövde stabilite hareketinde gruplar arsında istatistiksel olarak anlamlı fark olmadığı görülmüştür (p>.089). Zamanlar arasında ve gruplar*zaman etkileşiminde sırasıyla istatistiksel olarak anlamlı fark görülmüştür (p<.024, p<.024). Rotasyonel stabilite hareketinde gruplar arasında ve zamanlar arasında sırasıyla istatistiksel olarak anlamlı fark görülmüştür (p<.001, p<.001). Gruplar*zaman etkileşiminde istatistiksel olarak anlamlı bir fark görülmemiştir (p>.065). FHTT toplam puanlarında gruplar arasında, zamanlar arasında ve gruplar*zaman etkileşiminde sırasıyla istatistiksel olarak anlamlı fark görülmüştür (p<.001, p<.001, p<.001). Katılımcılar herhangi bir ağrı bildiriminde bulunmamışlardır. Sonuçlar rekreasyonel futbolun FHTT üzerinde etkili olduğunu ve yaşlı bireylerin yaşam kalitelerini sürdürmelerinde önemli olan mobiliteyi geliştirmede güçlü bir egzersiz seçeneği olduğunu göstermektedir.

Anahtar Kelimeler: Yaşlı, Rekreasyonel Futbol, Fonksiyonel Hareket

INTRODUCTION

The process of aging is developmental and involves detrimental mechanisms that affect our capacity to perform a range of functions within its cycle. According to Matteson (10), aging is a slow but dynamic process involving many internal and external influences, including genetic programming, physical and social environment. In this context, every period of life is important and aging should be viewed from a life course perspective.

The World Health Organization (WHO) ranks inadequate physical activity as the fourth leading cause of premature death and approximately 3.2 million people die each year due to sudden causes (18). WHO states that elderly individuals aged 64 years and older should engage in at least 180 minutes of multicomponent physical activity per week for quality aging. However, globally, one out of every 4 people cannot reach the recommended level of physical activity (19); in the Ministry of Health "Chronic Diseases Risk Factors Survey, it is stated that 87% of women and 77% of men in Turkey do not perform sufficient physical activity." (12). In this context, factors such as the perception of the elderly formed in the socio-cultural context, gender approach, urbanization, research and implementation problems limit participation in physical activity (13,16).

The World Health Organization (18) reported that healthy aging refers to the age- appropriate development and maintenance of functional functions. However, this process is closely related to both intrinsic and extrinsic variables and the interaction between them. Groessl et al. (8) state that mobility is a marker of an individual's health status and quality of life. In this context, Cook et al. (2) created a functional movement screening test (FHTT) to determine the functional movement capacities and limitations of all individuals in general and the elderly population in particular; to create exercise prescriptions and to monitor the development of movement patterns in case of injury or change in fitness levels.

Functional Movement Screening Test (FMST) has been used as an important data tool in the field of sports, mainly for the young population and in performance-oriented research in different sports disciplines. In this context, the global popularity of recreational soccer, the richness of the game's content (e.g., dual task involving motor and skill), the ease of adaptation to communities, and the characteristics of being a group activity are assumed to be a powerful functional mobility tool for older men. This study aimed to examine the effects of recreational soccer practice on functional movement components in older men. This study is limited to 65-74 years old male participants who have been inactive for the last two years, sedentary, without health risks and also referred to as young old age. This research hypothesizes that recreational soccer practice will be effective in the development of each movement pattern and inter-pattern coordination in older adults.

METHOD

Participants and workflow

The population of the study consisted of sedentary men between the ages of 65-75 (±2 years), and the sample consisted of 66 volunteer male participants living in Eskişehir who had not smoked and exercised regularly in the last two years. In addition, exclusion criteria include cardiovascular diseases, musculoskeletal problems, and conditions that cause movement restrictions such as hyper blood pressure. Participants were reached by snowball sampling technique and divided into two groups as FG (n=33) and CG (n=32) by drawing lots (Fig.1).

All participants were asked for a medical report stating that they were not medically unfit to participate in the study and were informed about the potential risks and discomforts related to the experimental process before giving their written informed consent for participation. Ethics Committee Report was obtained from Kütahya Dumlupınar University Ethics Committee before the study. The study was conducted in accordance with the "Helsinki Declaration of Ethical Principles for Medical Research on Humans".

Implementation procedure

Participants received recreational soccer for a total of 14 weeks, two sessions per week, each session lasting 60 minutes. The implementation group was divided into two groups, Tepebaşı (n=16) and Odunpazarı (n=16) Wise Feet groups, taking into account their physical activity, sports background and transportation to the facilities. The number of participants (4x4,5x5,6x6 and 7x7) for each team for each session was determined based on the number of participants. The field dimensions are 20x40 meters and are arranged depending on the number of participants.

Functional movement screening test (FHTT)

For this study, the Functional Movement Screening Test (FMST) developed by Cook and Burton (2) and consisting of deep squat, high step, single line lunge, shoulder mobility, active straight leg raises, trunk stability push-up and rotational stability movement pattern, respectively, was used (3,6,12). Fawcett (6) reported in his reliability study on older adults that the FMS total score was quite high (ICC=0.89, p<.00) but the individual score was in the poor to excellent range (ICC=0.2-0.89). Additionally, Onate et al. (14) by; It was similar to the result of the reliability study they conducted for the young, active sample group (ICC = 0.92). Participants were asked to comply with pre-test instructions such as not consuming alcohol 24 hours before the test, not exercising heavily, not eating or drinking excessive fluids 3 hours before the test, and on the day of the test, participants were asked to wear exercise clothes or comfortable clothes that would not limit movement.

Each participant was given two attempts for each movement before moving on to the next movement. For scoring, observation was done from both anterior and sagittal views. The scoring of each movement was expressed as a value between 0 and 3. A score of zero was given if the participant felt or expressed pain during the movement tested. A score of 1 was given for failure to complete the movement or loss of balance; a score of 2 was given for completion of the movement with compensatory movement strategies; and a score of 3 was given for full completion of the movement without any pain or compensatory movement strategies. When in doubt, the lowest score was given and interpretation was avoided.

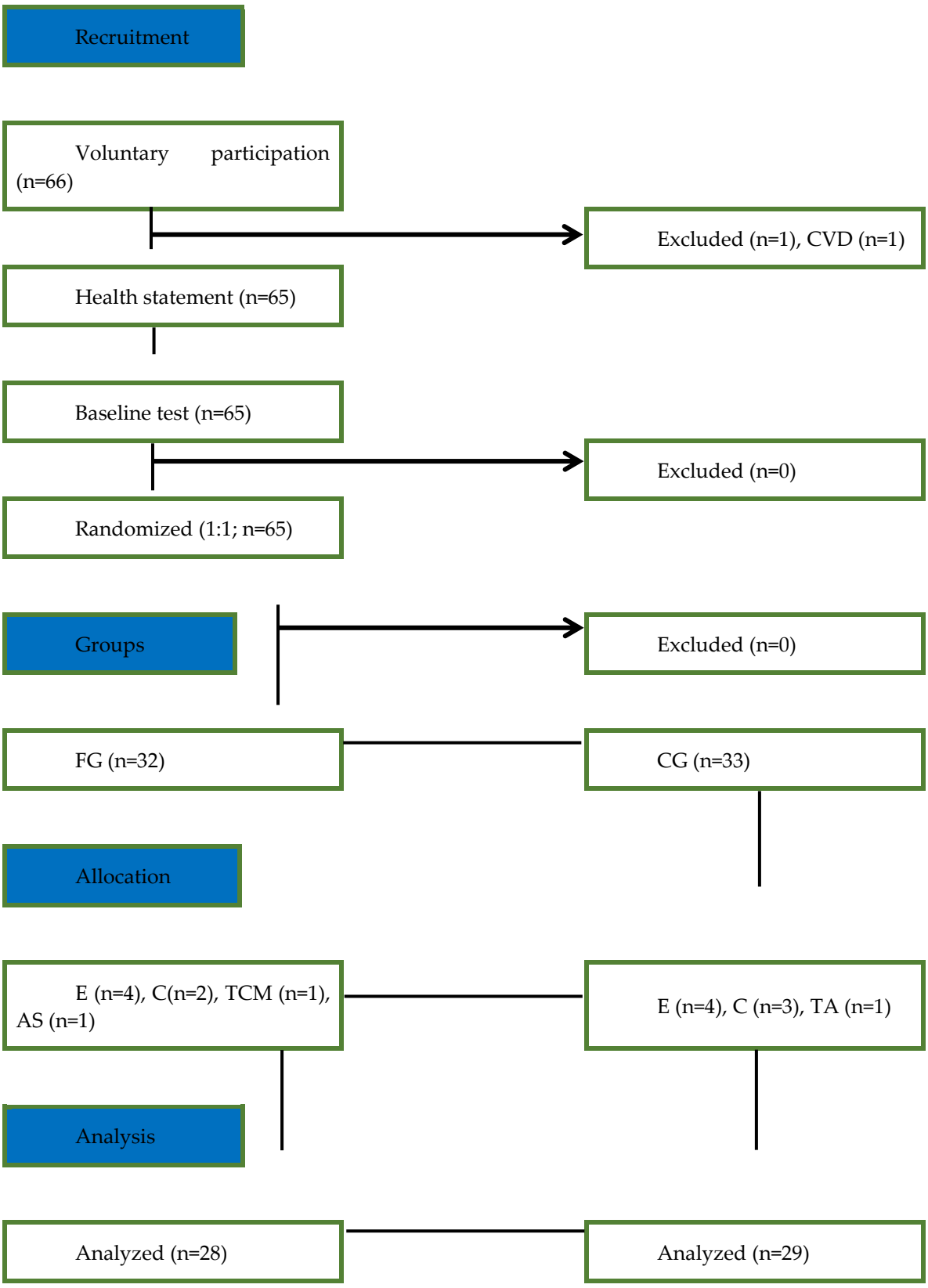

Figure 1. Sample and Work Flow Chart

Abbreviation: E, Excluded; TCM, Take care is mother; AS, Ankle sprain; C, Covid+; TA,Travel abroad

The highest score after two trials was recorded on the FHTT recording form, but for movements measured bilaterally, including high stepping, single line lunge, shoulder mobility, pain control test, active straight leg raises and rotational stability, the lowest raw score between the left and right side was recorded as the final score for that test. An FHTT certified exercise specialist performed scoring. Participants were given

the opportunity to familiarize themselves with the FHTT movements and scoring. For each score (0, 1, 2 or 3), a photograph of the movement was visually displayed. This test followed the FHTT test administration process applied by Cook et al. (2).

Data analysis

The normality of the data was tested by Kolmogorov-Smirnov, homogeneity was tested by "skewness", and "kurtosis" analyzes. After it was determined that the data showed normal distribution, it was decided to perform parametric analyzes. Intergroup, pre-post test time differences and group-time interactions of FHTT data were analyzed by two-way ANOVA. Group and time comparisons of the data were compared with Bonferroni post hoc test. Partial eta square (η^2p) was calculated to determine the effect size of two-way ANOVA. In these calculations, η^2p values in the range of 0-0.009 were accepted as insignificant effect size, 0.01-0.0588 as small effect size, 0.0589-0.1379 as medium effect size and values greater than 0.1379 as large effect size (1,17). Cohen's d effect sizes of the measurements were calculated to determine the magnitude of pairwise comparisons between time and between groups. The significance of effect sizes was determined as Cohen's d insignificant (<0.2), small (≥0.2), moderate (≥0.5) and large (≥0.8) (1,17). Statistical analyses were performed using R studio (version 4.2.1) and IBM SPSS program (version 2022).

FINDINGS

The findings, the seven sequential movement patterns that make up the FHTT battery and the FHTT total scores are given respectively.

Table 1. Two-way ANOVA Results for Deep Squat Values

Variables	Sum of Squares	df	Mean Square	F	p	η^2p
Groups	0.424	1	0.424	2.814	0.096	0.025
Time	1.511	1	1.511	10.039	0.002	0.084
Groups ∗ Time	0.458	1	0.458	3.046	0.084	0.027

When Table 1 is examined, there is no statistically significant difference between the groups in the two-way ANOVA for deep squat values. There is a statistically significant difference between times. There is no statistically significant difference between groups and time interaction.

Table 2. Two-way ANOVA Results for High Stepping Values

Variables	Sum of Squares	df	Mean Square	F	P	η^2p
Groups	1.825	1	1.825	7.345	0.008	0.063
Time	3.232	1	3.232	13.010	0.001	0.106
Groups ∗ Time	1.127	1	1.127	4.536	0.035	0.040

When Table 2 is examined, there is a statistically significant difference between the groups in the two-way ANOVA for high stepping values. There is a statistically significant difference between times. There is a statistically significant difference between groups and time interaction.

Table 3. Two-way ANOVA Results for Single Line Lunge Values

Variables	Sum of Squares	df	Mean Square	F	p	η^2p
Groups	1.816	1	1.816	7.208	0.008	0.062
Time	0.753	1	0.753	2.989	0.087	0.026
Groups ∗ Time	2.016	1	2.016	8.003	0.006	0.068

When Table 3 is examined, there is a statistically significant difference between the groups in the two-way ANOVA for the single line lunge values. There is no statistically significant difference between times. There is a statistically significant difference between groups and time interaction.

Table 4. Two-way ANOVA Results for Shoulder Mobility Values

Variables	Sum of Squares	df	Mean Square	F	p	η^2p
Groups	3.268	1	3.268	13.536	0.001	0.110
Time	4.321e-5	1	4.321e-5	1.790e-4	0.989	1.627e-6
Groups ✻ Time	0.140	1	0.140	0.582	0.447	0.005

When Table 4 is examined, there is a statistically significant difference between the groups in the two-way ANOVA for shoulder mobility values. There is no statistically significant difference between times and groups * time interaction.

Table 5. Two-way ANOVA Results for Active Straight Leg Raise Values

Variables	Sum of Squares	df	Mean Square	F	p	η^2p
Groups	1.503	1	1.503	8.870	0.004	0.075
Time	3.928	1	3.928	23.181	0.001	0.174
Groups ✻ Time	0.770	1	0.770	4.545	0.035	0.040

When Table 5 is examined, there is a statistically significant difference between the groups in the two-way ANOVA for active straight leg raising values. There is a statistically significant difference between times. There is a statistically significant difference between groups and time interaction.

Table 6. Two-way ANOVA Results for Trunk Stability Push-Up Values

Variables	Sum of Squares	df	Mean Square	F	p	η^2p
Groups	0.327	1	0.327	2.946	0.089	0.026
Time	0.581	1	0.581	5.236	0.024	0.045
Groups ✻ Time	0.581	1	0.581	5.236	0.024	0.045

When Table 6 is examined, there is no statistically significant difference between the groups in the two-way ANOVA for trunk stability push-up values. There is a statistically significant difference between times and groups* time interaction.

Table 7. Two-way ANOVA Results for Rotational Stability Values

Variables	Sum of Squares	df	Mean Square	F	p	η^2p
Groups	3.473	1	3.473	16.314	0.001	0.129
Time	2.583	1	2.583	12.134	0.001	0.099
Groups ✻ Time	0.759	1	0.759	3.564	0.062	0.031

When Table 7 is examined, there is a statistically significant difference between the groups in the two-way ANOVA for rotational stability values. There is a statistically significant difference between times. There is no statistically significant difference between groups and time interaction.

Table 8. Two-Way ANOVA Results of FHTT Total Scores

Variables	Sum of Squares	df	Mean Square	F	p	η^2p
Groups	86.031	1	86.031	49.993	0 .001	0.312
Time	69.586	1	69.586	40.437	0 .001	0.269
Groups ∗ Time	33.235	1	33.235	19.313	0 .001	0.149

When Table 8 is examined, there is a statistically significant difference between the groups in the two-way ANOVA conducted for the total score values. There is a statistically significant difference between times. There is a statistically significant difference between groups and time interaction.

DISCUSSION AND CONCLUSION

In this context, it is thought that the difference seen between the football group and the control group in the deep squat movement pattern may be the result of changes in glenohumeral and thoracic spine mobility, closed kinetic chain dorsiflexion of the ankles, mobility in the lower extremities and muscular-nervous system due to the effects of exercise practice. Soccer is a sport discipline in which the foot extremities are highly functional. While playing soccer, one leg often assumes the balance function of the body while the other leg is activated in different positions for the purposeful use of the ball. It is thought that these natural conditions may be due to the improvement in the stability of the stance leg or the mobility of the lunge leg of the football group participants.

The single line lunge movement pattern may be the result of possible cumulative improvements in the relative symmetry between stability and mobility around both hips, stance leg leg knee or ankle stability, hip adductor and abductor interaction and thoracic spine region due to the effects of exercise practice. Shoulder mobility pattern difference between groups are thought to be a result of the active renewal of the starting, inter-set and finishing sections in the recreational football practice and the activism experienced in the whole game. Active straight leg raising values, it can be said that due to the development of flexibility in the muscle and joint structures involved in the hip movement mechanism, which is frequently used in the application process.

Trunk stability push-up result of the improvements may be strength, flexibility, postural connections and learning practice in the muscle and joint structures involved in the lower and upper extremity mechanisms frequently used in the application process. The rotational stability movement is thought that this development may be a result of changes in learning, balance, coordination, skill experience and strength in the structures involved in the realization of movement.

The FHTT total score consists of the average of the sums of the scores of each of the seven sequential movements. In this context, the statistical results seen in the FHTT total scores of the intervention group are taken into consideration as a significant variable as an evaluation and norm value in research.

When the studies conducted within the scope of this study were examined, Fawcett (6) found that the reliability of the FHTT total score for adults aged 50 years and over was quite high (ICC=.89, $p<.05$, FHTT total score= 11.7 for male participants). It was also reported that there was a significant negative correlation between FHTT scores across age groups (12.3± 1.9 in the 50-54 age group, 12.6 ± 2.3 in the 55-59 age group, 10.2 ± 2.4 in the 60-64 age group and 10.6 ± 3.4 in the 65 and over age group)(6). Again, Perry and Kohle (15) reported that the average FHTT total score in healthy male individuals with an average age of 50.91 (sd=10.8) was 12.98 ± (sd=2.67) in the 60-64 age group and 12.56 (sd=3.27) in the 65 and over age group and that the exercise program was effective in increasing FHTT scores. Mitchell et al. (11) reported that the total FHTT score was 13.4 ± 2.3 in the 60-64 age group, 11.4 ± 2.4 in the 65-69 age group and 11.1 ± 2.6 in the 70-74 age group. Farrell et al. (5) reported that the total FMS scores of elderly male and female participants were 11.7 ± 2.8 and 11.9 ± 2.3, respectively, and that FMS performance was associated with key health markers. Hermosa et al. (9) suggest that exercise practitioners can use the modified FMS as a screening tool to improve physical fitness performance in older adults, as proficiency in the deep squat is associated with several commonly used measures of physical fitness, thus, practitioners may benefit from understanding the positive relationship between movement patterns and physical fitness.

Followay et.al. (7) reported that physically active older adults showed statistically significantly higher functional movement skill scores compared to inactive older adults in the deep squat [($t(27) = 5.328$, $p < 0.001$, $g = 6.801$); hurdle step ($t(27) = 5.534$, $p < 0.001$, $g = 4.709$) and in-line lunge ($t(27) = 5.337$, $p < 0.001$, $g = 6.846$). In this context, Çambel (4) stated that 8 weeks of plates and yoga exercise with 25 female participants (Plates, n=13; Yoga, n=12) aged between 35-46 years made a statistically significant difference on their functional mobility respectively ($p<.05$, $p<.05$). It is seen that there are similarities between the results of the literature and the results of this study.

The literature shows that age-related functional movement limitations (e.g., neuromuscular system changes in the elderly) increase the likelihood of falls and traumas as a result of falls in the elderly population. In this study, there was a significant difference between the FHTT pre-test and post-test of the football group, and between the football group and the control group post-test, indicating that there were significant increases in the FHTT total scores of the football group due to the exercise effect. In addition, no positive symptoms were detected in the pain control scans of the participants and two participants in the treatment group experienced temporary muscle strain.

The results of this study show that (1) recreational soccer positively affects motor control, mobility, stability limitations or asymmetries. (2) it contributes to the ability of the elderly population to perform their daily functions effectively by contributing to basic movement competence; (3) coordination and balance practices provide readiness in the face of events and phenomena due to the dual task structure of soccer; and (4) FHTT total score can be one of the preliminary markers in the creation of exercise protocol.

In this context;

The relationship between body composition variables of elderly individuals and exercise parameters such as weekly exercise frequency, duration of sessions and rest intervals can be investigated by creating different designs.

Using different measurement tools such as GPS, the effects of recreational soccer on physiological parameters as well as physical and motor parameters in elderly individuals can be investigated.

It may be useful to determine asymmetric differences in muscles by examining the effects of recreational soccer practice on ankle, hip and other extremities in elderly individuals.

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