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Journal of Ecophysiology and Occupational Health, *Vol 23(1), DOI: 10.18311/jeoh/2023/32073, 38-42, March 2023*
ISSN (Online) : 0972-4397
ISSN (Online) : 0974-0805

The Relationship between Functional Movement Screen Scores and Athlete Performance in Recreational Football Players

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Abstract

Introduction: Athletics is always accompanied by an inherent risk of injuries. It is very essential to determine the ability of a person to participate in sporting events. Functional mobility skills are important talents that should be assessed up to 10 years of age, as these skills are the foundation for a variety of sports. After the age of 10 years, it is essential to improve some athletic talents, such as agility, mobility, and flexibility. Therefore Functional movement screen scoring (FMS) has already been used as a test to make evaluating movement patterns in ordinary sports practice easier. **Aim:** This study aims to detect if there is a relationship between FMS and hamstring flexibility and agility. **Materials Methods:** Sixty-six subjects were chosen based on a set of eligibility criteria and were allotted to two distinct groups (group A FMS>14, group B FMS<14) using a convenient sampling technique. Group A (FMS>14) is a correlation done between FMS that was assessed using the FMS kit along with hamstring flexibility using the AKE test and Agility using IAT. Group B (FMS<14) is a correlation done between FMS that was assessed using the FMS kit along with hamstring flexibility using AKE and agility using IAT. The results were calculated using a coefficient correlation test. **Outcome Measures:** FMS, AKE, IAT. **Results:** There was a positive correlation between FMS and agility that is when FMS were high, the agility time was less and vice versa. The relationship of FMS with knee extension was positive, suggesting that when FMS were high, knee extension was more and vice versa. **Conclusion:** This study states that there is a positive correlation between FMS with athlete performance among recreational football players.

Keywords: Active Knee Extension Test (AKE), Functional Movement Screen Scores (FMS), Illinois Agility Test (IAT)

1. Introduction

Athletics is always fraught with the possibility of injury. It is critical to determine a person's ability to participate in sporting events. Injuries occur as a result of improper movement patterns. An excessive amount of stress is placed on the joints and soft tissues. this movement evaluation can assist in identifying an athlete's risk of incurring injuries. Soccer is a high-intensity sport characterised by irregular movement patterns[1]. It's a 90-minute sport that combines sprinting, changing directions, dribbling, walking, and running. poor movement patterns contribute to unfavourable biomechanical consequences, which can lead to an increase in the risk of mild or serious injury[2].

Functional movement skills, which are a basis for a wide range of sports, are vital skills that should be improved up to the age of ten. It is critical to increasing a few athletic abilities after the age of ten, such as agility, mobility, and flexibility. As a result, FMS scoring has been employed as a test to make assessing movement patterns in ordinary sports practice easier[3]. The seven basic movements that make up the FMS are as follows: (deep squat, hurdle step, inline lunge, shoulder mobility, straight leg raise, trunk stability push up and rotary stability). following that, the composite score is calculated by adding the final scores of the seven movement patterns, which are scored on a four-point ordinal scale based on the participants' performance or the presence of pain (0-21). A composite score of 14

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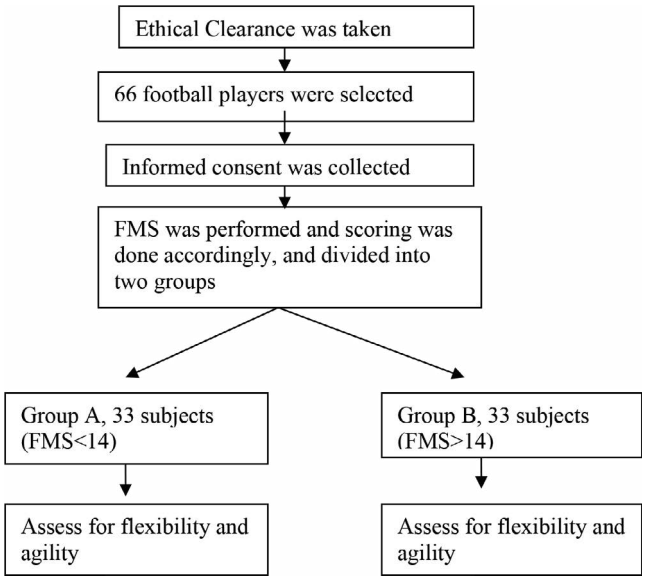
indicates a greater risk of musculoskeletal injury. Three trials of the sub-tests were completed, and the final results were entered on a score sheet[4]. An FMS tool may be able to identify athletes who are at risk of injury and would benefit from a professional assessment to pinpoint the source of any movement-related dysfunction[5]. Flexibility has been discovered to be a significant physical attribute linked to athletic performance, Muscle damage is a typical occurrence as well. It is vital to analyse the athlete's flexibility with precision and reliability to assess the effectiveness of training approaches or the success of a training programme in a certain rehabilitation environment. The active knee extension test is one of the most used tests for assessing flexibility. The active knee extension test involves moving the knee joint actively (where the hip is extended at ninety degrees), with the participant advised stopping when he or she feels a substantial resistance[6]. Participation in several team sports, like soccer[7], necessitates the ability to shift directions swiftly and at high rates. In soccer, handball, and basketball, agility is one of the most important predictors of performance. The majority of agility tests are designed to assess the ability to quickly change the direction and position of one's body in a horizontal plane. In a variety of sports, When evaluating agility and speed, the Illinois agility test is frequently used[8]. The purpose of this study is to see if there is a link between athlete performance and FMS in young football players aged 18 to 24 years[9].

2. Materials and Methods

The study design was made as two groups correlational study design and a convenient sampling technique were used. After obtaining ethical approval from the ethical committee (Ref: EC-MPT/20/PHY/007). The study was conducted at the Krupanidhi group of institutions and the duration of the study was from (1/1/2021 to 15/6/2021). All 66 participants were explained and informed consent was obtained for the study. 66 subjects, both male and female aged between 18-24 years were recruited for the study[9,10]. College-level football players, playing in midfield and forward positions were included in this study. Bilateral hamstring tightness was assessed for individuals with a range of motion <20 degrees using the Active Knee Extension test[11] and then were included in the study. Footballers playing football for more than one year were included in this study[2]. Subjects with a recent history of any musculoskeletal injury, those who had sustained injury that prevented them from fully participating in regular training and competition, or who had recently undergone surgery that hampered their ability to participate in sports and those with previous lower extremity surgery were excluded from the study[12].

3. Procedure



3.1 Outcome Measures

3.1.1 FMS

The FMS score is a test that makes evaluating movement patterns in routine sports practice more straightforward. The FMS includes deep squats, hurdle steps, inline lunges, shoulder mobility, straight leg raises, pushups, and rotary stability. On a four-point scale, each of the seven movement patterns is scored (0 = discomfort, 1 = immobility, 2 = compensatory movement, 3 = mobility). (Max = 21) The entire sum of FMS. Musculoskeletal injury is more likely in people with FMS<14[5]. Each movement was practised first, then executed in the same standardized order for scoring, and the results were entered on a score sheet. The movement was repeated if the examiner has doubts regarding the score. A warm-up period was not included[4,13,14].

3.1.2 Active Knee Extension Test

This test was carried out using a rectangular wooden frame as an experimental instrument. The subject was told to lie down on the table supine and flex the thigh till

it reaches the wooden frame to form a 90-degree angle with the table. The examiner will fully extend and stabilise the relevant limb. The measurement of mobility around a certain joint or body component is known as the range of motion. A standard universal goniometer was placed on the lateral femoral condyle, with one arm directed over the thigh toward the greater trochanter and the other arm aligned across the leg toward the lateral malleolus. The patients were encouraged to extend their knee and keep it there for 2-3 seconds while goniometer readings are obtained. The testing leg was allowed to rest for one minute before the identical procedures and readings are carried out[6, 15].

3.1.3 Illinois Agility Test

The Illinois change of direction test is the of setting four markers to designate a 10-meter by 5-meter space, with four markers 3.3 meters apart in the centre of the area. The participant begins in a prone posture, with his or her chin resting on the starting line's surface. During the Illinois change of direction test, the participant accelerates for 10 metres, turns about, returns to the starting line, swerves in and out of four markers, and ultimately completes the second 10-metre sprint. Instead of crossing the markers, the trial participants were instructed to run around them. The experiment was stopped and restarted after a 3-minute recuperation interval. Participants were disqualified if they do not follow these instructions. The results of the performance were collected using an electronic timing system[10]. The Illinois change of direction test is widely regarded as the gold standard for evaluating the change of direction abilities[9].

4. Results and Interpretation

Table 1. Relationship between Functional Movement with Agility and Hamstrings Flexibility for Group A and B

Correlation	R	p
Functional movement with agility 'Group A'	0.06	0.358
Functional movement with agility 'Group B'	0.406	0.019
Functional movement with flexibility 'Group A'	0.143	0.042
Functional movement with flexibility 'Group B'	0.165	0.007

It is inferred from Table 1 that there was a positive correlation between FMS with agility, that is when FMS were high, the agility time was less and vice versa. This relationship was discovered to be statistically significant $p<0.05$. The relationship of FMS with knee extension was positive, suggesting that when FMS were high, knee extension was more and vice versa, this relationship was discovered to be statistically significant $p<0.05$.

5. Discussion

Soccer is a high-intensity activity that requires a combination of physical fitness such as sprinting, changing directions, dribbling, walking, and running for more than 90 minutes. The goal of this study is to see how FMS correlates with athlete performance in recreational football players. This research found a positive relationship between FMS and agility, indicating that when FMS were high, agility time was short, and vice versa. This relationship was discovered to be statistically significant ($p<0.05$). The relationship of FMS with knee extension was positive, suggesting that when FMS were high, knee extension was more and vice versa, this relationship was discovered to be statistically significant <0.05. FMS is a test for determining the risk of injury. It aids in the analysis of an individual's movement patterns, mobility, and stability. The FMS is made up of seven components that are arranged according to the kinetic chain's movement patterns. It also evaluates side asymmetries as well as compensatory movements[9]. Another important factor to consider while evaluating soccer players' performance is their flexibility. The capacity to move a joint over a particular range of motion without constraint is characterized as flexibility. A person with strong flexibility is less likely to suffer from musculoskeletal injuries[16]. High-speed actions describe the performance of numerous sports games. In sports like football and basketball, One of the most essential predictors of performance is agility. the capacity to shift directions quickly is known as agility[17]. According to Yildiz (2018), an FMS test can be used to identify limitations and asymmetries, as well as anticipate potential athletic performance[3]. According to Silva, *et al.,* 2017, In youth soccer players, there is little evidence of a connection between FMS scores and physical performance[18]. Lockie, *et al.*, 2014 found that It was limited in its ability to detect movement compensations in female athletes that can decrease athletic performance[12]. FMS's ability to predict

injury in veteran football players is limited, according to Hammes, *et al*., 2016[19]. FMS and athletic performance in recreational football players are linked, according to the findings of this study.

6. Limitations

In this research, the sample size is small. The duration of the study is short.

7. Further Recommendations

A larger sample size with more outcome measures is recommended to make the study more reliable.

In future, the duration of the study can be more than 6 months. Future study is recommended with an equal number of male and female participants.

8. Conclusion

This study can be concluded by stating that functional movement screen scores have a positive correlation with athlete performance in recreational football players.

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