A Comparison of Functional Movement Screens between Genders for NCAA D1 Swimmers

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This project does not attempt to produce generalizable knowledge. It is dedicated to the practice of developing skills and demonstrating understanding of the research process

INTRODUCTION

A Functional Movement Screen (FMS) is a way to analyze movement patterns and observe mobility and stability deficits. The FMS test consists of a deep squat, hurdle step, incline lunge, shoulder mobility, active straight-leg raise, trunk stability, and rotary stability movement patterns. The score of the FMS can range from 0-3, 0 being the lowest. In this study, researchers compared FMS scores between male and female, NCAA, D1, swimmers. According to Anderson et. al (2015), Healthy secondary school female athletes scored lower on the total composite than healthy secondary school male athletes. Females also scored lower on the following individual FMS tasks: inline lunge and trunk stability push-up. Healthy secondary school female athletes scored 14 or less on the FMS total composite score and significantly lower in general compared with healthy secondary school male athletes, which suggests these female athletes may be at higher risk for injury. Factors that may contribute to increased injury risk include deficits in mobility, core stabilization, and coordinated movement patterns. According to Johnson et. al (2021), there were significant differences between male and female athletes when analyzing the FMS scores. Females scored higher on the incline raise and active straight- leg raise, whereas males scored higher on the trunk stability pushup. However, there were no significant differences when comparing deep squat, shoulder mobility, hurdle step and rotary stability assessments.

Research has shown that males scored higher on the incline lunge and trunk stability push-up, and females scored higher on flexibility. Considering the findings of Taylor et al (2019); Anderson et al. (2015); and Johnson et al. (2021), it is hypothesized that females would score higher on the Functional Movement Screening test (FMS) due to more optimal mobility in the shoulders, hips, and knees.

The purpose of this study is to identify the physiological differences in flexibility, coordination, and stability among male and female swimmers.

METHODS

- 12 division one collegiate swimmers, 6 male and 6 female volunteered for this study
- In order to participate in this study subject could not have been diagnosed with a lower extremity injury within the last six months
- Prior to the subject arriving, researchers calibrated the weight scaled and set up FMS testing equipment in assessment room 2.
- Height and weight measures were gathered with shoes taken off utilizing Detecto scale as well as age and sex
- Following collection of pre-test data, the subject completed a body fat and muscle mass percent assessment using an Omron Bioelectrical Impedance Analysis (BIA)
- Age, sex, height, and weight were entered into the BIA assessment device while the subject was instructed to hold the device out in front of them with straight arms
- Once BIA testing was complete, resulting body fat and muscle mass percentages were recorded for statistical analysis
- Following data collection, the subject were asked to put their shoes back on and began functional movement screen (FMS) instruction
- The FMS test consists of a deep squat, hurdle step, incline lunge, shoulder mobility, active straight-leg raise, trunk stability, and rotary stability movement patterns, which will be demonstrated by the researcher prior to subject completion
- Scores on each of the movements range from zero to three with subject receiving an automatic zero if any pain is present whilst completing the movement
- If a subject received a zero they would have been recommended to a sports medicine professional in order to get properly evaluated
- For each movement, the subjects were given a score with tests consisting of both right and left upper or lower extremity recording only the lowest score of the two
- Once the FMS test was completed, final scores were calculated and recorded for statistical analysis

FMS TESTING

RESULTS

Table 1:

Female Subject Data

Statistics	Average	Standard Deviation	Range (low-high)
Age *(years)*:	20.33	0.82	20 – 22
Height *(in)*:	67.00	1.41	65 – 69
Weight *(lbs)*:	145.40	5.94	140.4 – 155.1
BMI:	22.80	1.68	20.7 – 25.8
BF *(%)*:	25.13	4.92	20.3 – 28.6

Note. BMI = body mass index, BF = body fat percentage, % = percentage, in = inches, lbs = pounds

Table 2:

Male Subject Data

Statistics	Average	Standard Deviation	Range (low-high)
Age *(years)*:	20.50	1.38	18 – 22
Height *(in)*:	72.00	2.45	68 – 74
Weight *(lbs)*:	174.30	9.15	165.4 – 185.7
BMI:	23.67	1.52	21.3 – 25.1
BF *(%)*:	12.70	2.96	8.4 – 16.4

Note. BMI = body mass index, BF = body fat percentage, % = percentage, in = inches, lbs = pounds

TEST	FEMALE SCORE	MALE SCORE
DEEP SQUAT	2.50	2.17
HURDLE STEP	2.42	2.50
INLINE LUNGE	2.67	2.67
SHOULDER MOBILITY	2.59	2.34
IMPINGEMENT CLEARING TEST	Pass	Pass
ACTIVE STRAIGHT-LEG RAISE	2.34	2.17
TRUNK STABILITY PUSHUP	2.33	2.83
PRESS-UP CLEARING TEST	Pass	Pass
ROTARY STABILITY	2.00	2.00
POSTERIOR RICKING CLEARING TEST	Pass	Pass
TOTAL:	15.83	15.83

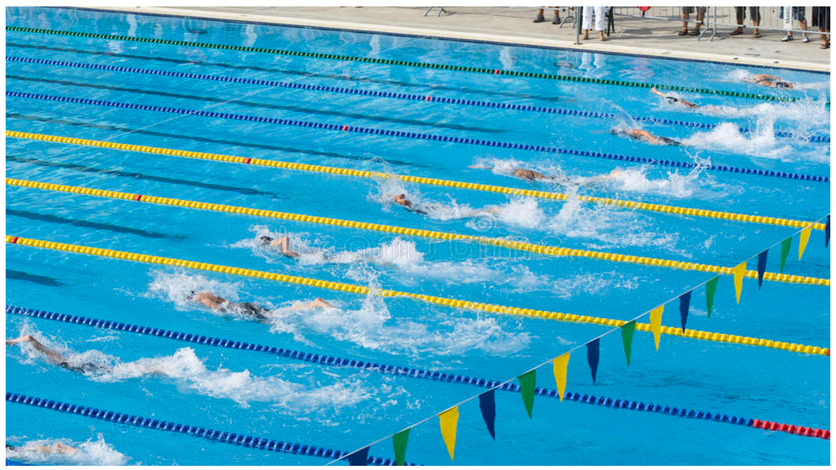
Figure 1. Average FMS Scores for the Female and Male Subjects. This figure presents the average scores for each movement.

DISCUSSION

The FMS scoring system is out of 21 total points. If an individual scores 13 points or less, they are at high risk of injury during physical activity. If they score 14 points or higher, then the risk of injury with physical activity decreases. The females scored higher on the deep squat, shoulder mobility, and active-straight leg raise. The males scored higher on the hurdle step and trunk stability push up. However, male and females had an equivalent score on the incline lunge and rotary stability. The results did not support the hypothesis of females scoring higher on the FMS test compared to males due to mobility in the shoulders, hips, and knees. Surprisingly, the females and males had the same total score of 15.83. This score reduces their risk of injuries during physical activity. The results from this study can be directly applicable to the life of a strength and conditioning specialist, physical therapist, or athletic trainer. These professionals can utilize the relevant information from this study in order to manipulate programs in order to boost performance and reduce the risk of injury for collegiate swimmers.

CONCLUSION

In conclusion, the total average scores for 6 male and 6 female NCAA division 1 swimmers were the exact same with a total score of 15.83. Overall, females did better on the deep squat, shoulder mobility, and active straight leg raise. Males did better on the hurdle step, and lastly, trunk stability and in line lunge were the same for males and females. It was hypothesized that females would score better, but this study did not prove that to be true. Our study was limited to NCAA division 1 swimmers. A larger, more diverse group of people may have changed the outcome of the study. This could have included more than 12 people, a variety of sports, or a study that was not limited to NCAA division 1 athletes.



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