TOPICS IN EXERCISE SCIENCE AND KINESIOLOGY

Integrating the Functional Movement Screen ® into Strength and Conditioning Programs

Implementation Strategies

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Abstract

- The purpose of this article is to provide an overview of the Functional Movement Screen (FMS®) and how it can be integrated into strength and conditioning programs of all levels.
- We utilized current literature and previous FMS ® field experience to develop and recommend approaches for implementing FMS® protocols into strength and conditioning programs.
- **Description of FMS® Movements:** The FMS® is a comprehensive biomechanical efficiency screen which is comprised of seven movements that have been deemed fundamental to athletic performance (7). Those movements include the; deep squat, hurdle step, in-line lunge, shoulder mobility, active straight-leg raise, trunk stability push-up, and rotary stability.
- **Process of Integrating FMS® into a Strength and Conditioning Program:** FMS® should be integrated at the beginning of an athletic season, approximately 1/3 of the way through the season, and immediately after the season concludes. These assessment periods provide the strength staff with several opportunities to observe changes in functional capacity over the course of a season.
- **Next Steps following Integration of the FMS® into a Strength and Conditioning Program:** After the integration of the FMS®, interpreting and disseminating the results are integral for developing a specific exercise regimen of all ages, ability, and movement capacity.
- Key Words: periodization, speed, power, agility, flexibility, program design

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Introduction

As competitiveness in sports increases, greater emphasis has been placed on creating innovative approaches for improving athletic performance. Universities and secondary schools alike are exploring new protocols to assess their athlete's movement patterns to provide supplemental information for more effective program design (1, 2, 3, 4, 6, 9, 10). One such protocol is a Functional Movement Screen (FMS ®), which is a whole-body movement and mobility assessment used to identify deficiencies in movement patterns, asymmetries between limbs, and risk of injury (8, 11, 12, 17, 19, 20, 21, 22). Utilizing assessment protocols such as FMS ® allows health and sports professionals to capture movement profiles and plan more effective approaches to develop and improve overall athletic performance as well as reduce injuries during training and competition. Thus, the purpose of this article is to provide an overview of the FMS ® and how it can be integrated into a strength and conditioning program.

Methods and Results

In the past, strength and conditioning professionals were primarily responsible for preparing athletes for competition through cardiovascular and resistance training. However, due to higher performance demands and increased autonomy, the discipline has expanded to include assessment measures that might predict injury and improve athletic performance by observing movement capacity. FMS® is one such method, which consists of seven different movements that encompass the basis for athletic movement and sports performance (2, 8). This text provides a detailed three-step process for the familiarization, integration, and interpretation of FMS® within strength and conditioning programs. Point of Application 1, "Description of FMS® Movements", familiarizes the strength and conditioning professional with the FMS ® movements, what they are designed to assess, and how to score them. Point of Application 2, "Process of Integrating FMS® into a Strength and Conditioning Program", provides a 5-step process for the integration of FMS® into a strength and conditioning program. Point of Application 3, "Next Steps following Integration of the FMS® into a Strength and Conditioning Program", discusses the interpretation of FMS ® results.

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1. Description of FMS® Movements

The FMS ® is an evaluation tool that utilizes seven exercises to assess an individual's fundamental movement patterns, functional movement patterns, fundamental mobility patterns, fundamental core stability, and fundamental core strength (7). The seven exercises include the; deep squat, hurdle step, in-line lunge, shoulder mobility, active straight leg raise, trunk stability push-up, and rotary stability (2, 3, 4, 7, 8, 9) (See Figure 1.). Previous research suggests that each exercise encompasses the basis for athletic movement and sports performance (2, 3, 4, 7, 8, 9). The deep squat and hurdle step are functional movements that assess bilateral symmetrical and functional mobility of the hips, knees, and ankles, while the in-line lunge assesses torso, shoulder, hip, knee and ankle mobility and stability. Shoulder mobility and active straight leg raise assess fundamental mobility via bilateral shoulder range of motion and hamstring and gastroc-soleus flexibility. The trunk stability push-up and rotary stability both assess fundamental core stability in both, singular and multi-plane based tasks (7 and 11). Each of these movements are assessed and scored on a scale of 0-3 (0 - pain during a movement; 1- unable to perform or complete a movement; 2 - can perform a movement while compensating; 3 - meets all movement criteria). The sum of the seven movements range from 0-21, with scores of 14 or less being significantly associated with injury (4, 15, 17).

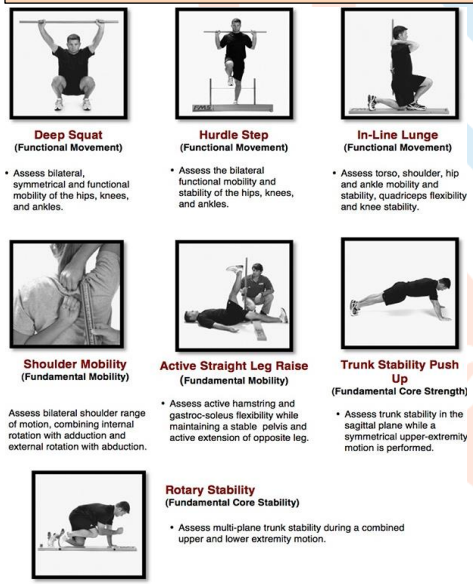

Figure 1. Displays the seven movements included within the FMS ® and what they assess. Those movements are the; deep squat, hurdle step, in-line lunge, shoulder mobility, active straight leg raise, trunk stability push-up, and rotary stability.

[Image of FMS ® exercises] (2019) Retrieved from https://pure.bond.edu.au/ws/portalfiles/portal/34659122/Poster_Functional_Movement_Profiles_Of_Police_Officers.pdf

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2. Process of Integrating FMS® into a Strength and Conditioning Program

First: Ensure that all personnel within the organization responsible for conducting testing have undergone the appropriate education and certification. **Second**: Identify time points throughout the season that provided the most information about particular athletes and teams. For instance, pre-, mid-, and post-season assessments may provide insight on initial, peak, and final fitness levels and movement capacities. **Third**: Schedule the FMS® during a time that doesn't conflict with the team's or athlete's regular schedule. **Fourth**: It may be beneficial to organize athletes into groups for their FMS ®. In the past, research groups have had success by conducting FMS ® with groups of 5-8 athletes every 15 minutes (13 and 14). **Fifth:** Conduct FMS ®.

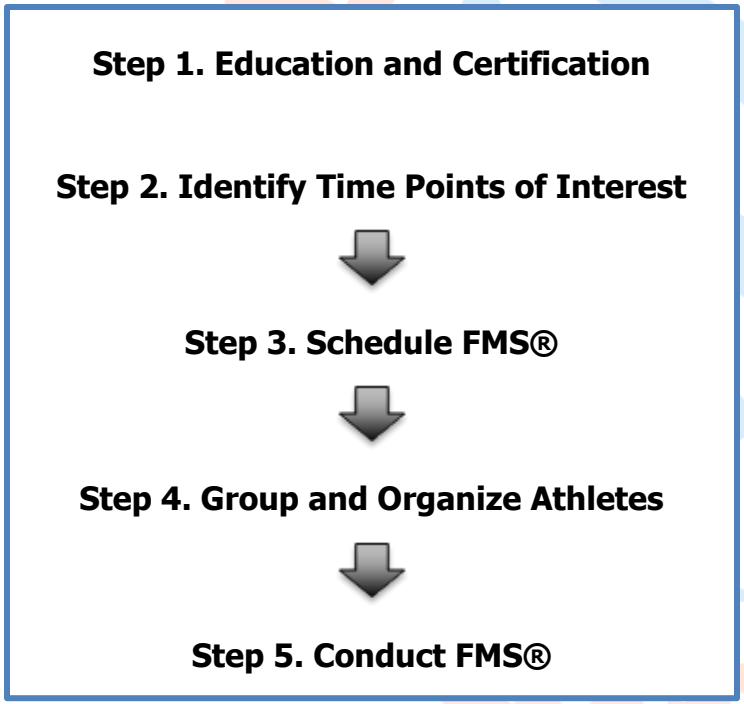

Figure 2. Illustrates the flow from steps 1.- 5. for successfully implementing the FMS into a strength and conditioning program.

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3. Next Steps following Integration of the FMS® into a Strength and Conditioning Program

After successful integration of the FMS®, the next step would be to analyze and interpret the results. This can be as simple as utilizing Microsoft® Office Excel to analyze the mean, median, and mode for each movement or providing a color coded output in order to identify athletes at an elevated risk of sustaining injury based on movement incompetency like the example provided in Figure 3. Additionally, software capable of conducting more powerful statistical analyses can also be utilized to identify significant differences between athletes, position groups, etc. or substantiate novel approaches for reducing injury, improving movement capacity, etc. Once data has been successfully analyzed and interpreted, it can be utilized to influence decision making for choosing appropriate programming and resistance training methods. Furthermore, these results can also assist in identifying corrective exercises which use a systematic process of identifying a neurological, muscular, or skeletal dysfunction, developing a plan of action, and implementing an integrated corrective strategy (5).

GREAT	OKAY	DANGER		ABOVE 14		14	BELOW 14	
Participants	DS	HS	ILL	SM	ASLR	PU	RS	Total
Participant 1	0	2	3	3	2	0	0	10
Participant 2	2	2	2	2	0	0	2	10

Figure 3. Displays an example of a color coded output of FMS® performance for reference. This formatting style was designed to assist with visually identifying athletes at an elevated risk of sustaining injury based on movement incompetency and includes the total scores for; Deep Squat (DS), Hurdle Step (HS), In-Line Lunge (ILL), Shoulder Mobility (SM), Active Straight Leg Raise (ASLR), and Rotary Stability (RS).

There are two different color schemes utilized within this figure that represent the scoring criteria mentioned earlier:

- "GREAT, OKAY, and DANGER" are in reference to the individual's scored performance on each exercise.
- "ABOVE 14, 14, and BELOW 14" are in reference to the individuals overall scored performance on the FMS ®.

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Equipment Utilized

- None