

Functional Movement System (FMS)

A Proactive Approach to Identify Movement Dysfunction

The RWIP project Functional Movement System (FMS) A Proactive Approach to Identify Movement Dysfunction was implemented in June 2019. It will be referred to as FMS in this report. The following is the final report which provides the findings of the project and its participants, as well as describes what FMS is, more specifically the role of the FMS screen tests and what the test findings help identify to benefit the individual being tested.

What is Functional Movement System (FMS)?

Functional Movement System (FMS) is a system designed to help gauge movement quality before we gauge movement quantity. First it is important to **move well** before we **move often**.

The FMS is a predictive system. It is a well-used and reliable seven-step screening test, with three clearing tests, designed to rank movement patterns and its basic normal function. It is a screen designed for individuals who do not have a current complaint of pain or a known musculoskeletal injury. FMS screening is designed to identify functional movement deficits and asymmetries that may be predictive of general musculoskeletal injuries or increased risk factors for future injuries. Once identified, through the screening process, the goal of FMS is being able to modify the identified movement deficit, through individual corrective exercise to restore correct movement pattern.

As indicated by Gray Cook, one of the founders of FMS, the number one risk factor of a musculoskeletal injury (MSI) is a previous injury. The current medical and rehabilitation model can manage the pain and symptoms from an injury, with various forms of treatment. This approach, though successful and effective in managing and treating pain and symptoms, is less likely to have the ability to influence likelihood of recurrence. FMS is a system that can identify dysfunction and asymmetry in a movement pattern, which would increase risk to further problems or recurrence of injury. Where the former could be considered a **lagging indicator**, **FMS is a leading indicator**.

Methods

The project's objective was to provide a tool to reduce frequency and severity of musculoskeletal injury (MSI). Although Safe Work Procedures are regularly reviewed and provided in the workplace, MSIs still occur. Recurrence of an MSI is also quite common. This would suggest that under certain conditions a worker's physical movement is either *inefficient*

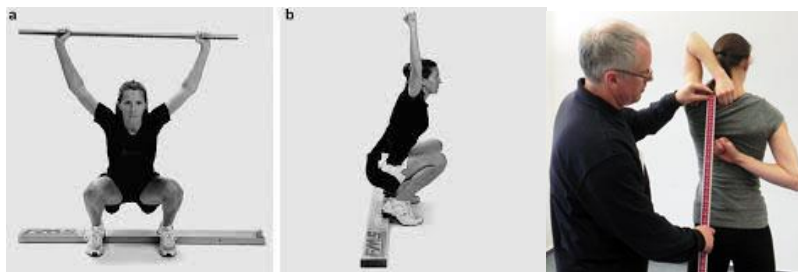
or *mechanically incorrect*. This would be either due to fatigue or the worker not being aware that he or she is executing a movement poorly. Ultimately, this could likely result in decreased productivity.

The project had 28 participants. Each participant was to receive 14 one-on-one visits, lasting up to 45 minutes each, throughout the project. Due to various unforeseen circumstances, participants had anywhere from 10-14 visits. Limiting achieving the full complement of one-on-one sessions was the fact that the Simkin Centre closed its doors to all outside visitors due to COVID-19. Also, the focus for all long-term care homes and its staff was to address the COVID situation. This situation lasted a very long time and still is ongoing at some level.

Full Screen Testing occurred every 4-6 weeks. As a result of the screen tests, asymmetries were identified. Once identified, corrective exercise was provided for the specific inefficiency.

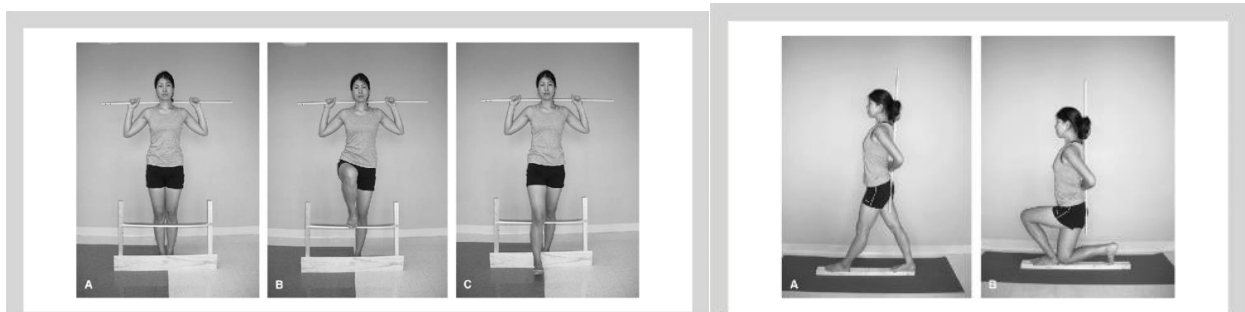
The initial score of the full screen tests ranged from 7-16. A perfect score for the screen test is 21. **PERFECTION WAS NEVER THE GOAL.** Preliminary research has shown that FMS scores of 14 or less are at an increased risk of developing injury and increased limitation of function. A score of 14 or less also indicates movement deficiency in the movement pattern.

The following diagrams are some of the screen tests and clearing tests which participants were asked to demonstrate.



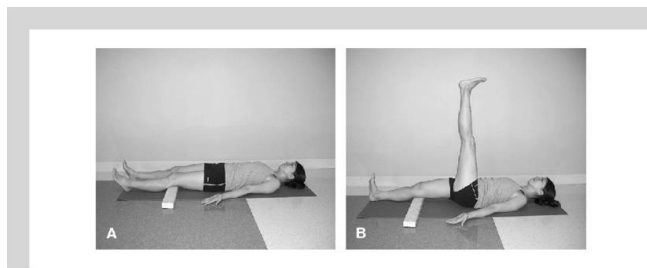
Deep Squat

Shoulder Mobility

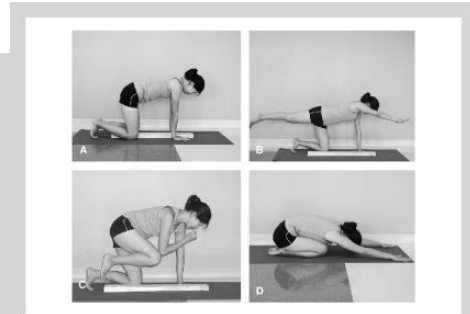


Hurdle Step

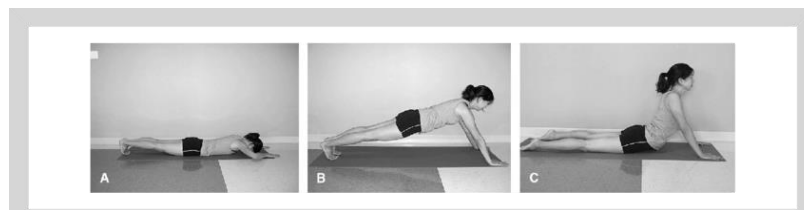
Inline Lunge



Active Straight Leg Raise



Rotary Stability, Flexion Clearing Test



Trunk stability

Extension Clearing Test

The screen testing was video recorded and reviewed with the participants. In that discussion, the deficiencies were shown and discussed. Proper movements were also emphasized. The discussion included explanation of the corrective exercise and what it was meant to accomplish. **By showing the participant what was correct and incorrect**, it was hoped that a more meaningful desire to improve the specific limitation would occur.

In the one-on-one sessions, the focus was to address the lower test scores and then provide corrective exercises for the specific deficiency identified.

Many participants demonstrated more than one movement pattern with deficiency. Deficient movement patterns were addressed *one at a time*. Once the deficiency showed improvement, another movement pattern was addressed when applicable. Throughout the project and the one-on-one sessions, the basic principles of FMS were constantly applied.

There are five basic principles of FMS:

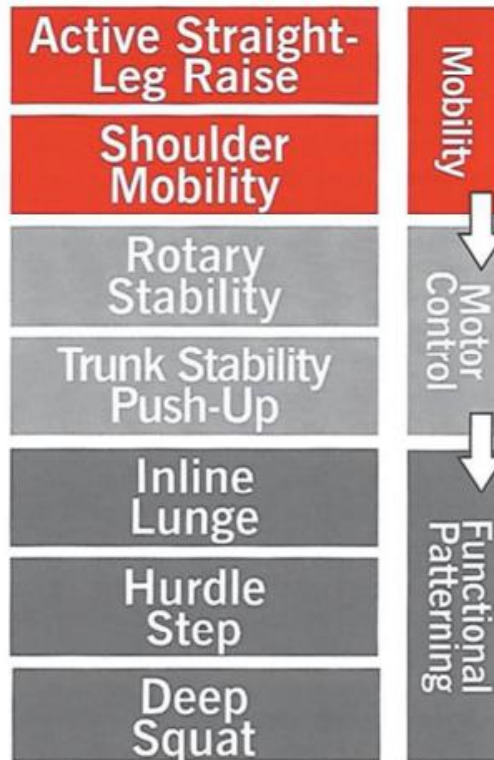
1. Body weight movement should not provoke pain.
2. Limitation of fundamental movement patterns, even if pain-free, leads to compensation and substitution, resulting in poor efficiency and increased risk of injury.
3. Fundamental movement patterns invoking the body's left and right sides should be symmetrical.
4. Fundamental movement capability needs to be addressed first. To assess performance, sound functional movement needs to be established.
5. Fundamental movement capability must precede complex movement activity.

When limitation, deficiency, or asymmetry are identified, the first step is to improve mobility to affected area. *Mobility is needed before motor control. Motor control is needed for function.* This is further demonstrated in the diagram below.

Corrective Strategy

GENERAL SCORING RULES

1. A score of Zero should be referred to the appropriate medical professional.
2. Mobility patterns are addressed first because Stability/Motor Control cannot be effective with reduced mobility. Mobility needs to be restored before addressing stability and motor control. Without quality levels of mobility, stability and motor control cannot be maximized.
3. A score of 21 is not the goal. The goal is to set a baseline and aim towards achieving at least 2's on each test.



FOUR STATEMENTS TO GIVE

1. Please let me know if there is any pain during the following movements.
2. If at any time you do not understand the instructions, stop me for clarification.
3. We are going to perform each movement one at a time and in a smooth and controlled motion.
4. Please wait for me to confirm that you have the proper setup position and then I will tell you to begin the movement

FMS is not expected to fix everything, but the test results point you to what is needed to address as the priority.

Final screening scores ranged from 7-18. One participant did not improve their screening score. All other participants improved their scores and those scores ranged from 10-18.

Knowledge Transfer Exchange

A presentation on the FMS scoring and testing was given to the WRHA Musculoskeletal Injury Prevention group. This was made up of approximately 15 individuals including management. The presentation included an introduction to FMS, followed by a demonstration of the 7 screening tests and 3 clearing tests. In addition, discussion of the testing also occurred.

The presentation was very well received. There was considerable discussion and questions throughout the demonstration. What was to be a 45-minute presentation became a 90-minute presentation/discussion. One of the key takeaways from the session was that there was no “*laying on of hands*” during the FMS process. FMS is not a treatment; it is a tool to provide information for treatment to be more effective.

Discussion

Challenges of the project include the following:

1. Compliance of the subjects with exercises given. Those who showed improvement in their scores were committed to the exercises and the fact that they were able to perform their home program effectively demonstrated to the testers their compliance. For those who showed no improvement in their scores, it was evident that compliance was not consistent.
2. Another significant challenge was the Pandemic. As the Pandemic continued, it shut down the project. Regular emails and texts were sent to the participants. Not all of them responded on a regular basis. As the Pandemic progressed, it was uncertain when the project could resume. As a result, it was felt, there were enough one-on-one sessions and enough test scores provided, for a final report to be submitted.

Conclusion

The functional movement screen sets a baseline for the *competency of fundamental movement*. It is of value to look at full movement patterns before looking at specific movements.

Imbalances and limitations within movement patterns are the markers tested. The imbalance and limitations identify greater risk of injury for the individual. It can also identify potential risk factors when symptoms are no longer displayed.

FMS was formed in 2001, to scope overall performance, fitness, rehabilitation, and management of risk injury in active individuals. Once fundamental movements were observed,

better discussions could be made on how to better the individual's workout or treatment plan. The intent of FMS was to create a more **proactive approach** when dealing with movement dysfunction and intervene as soon as possible.

The question which remains is **how can FMS be introduced to the workplace?** If FMS is to be introduced, consideration can be given to introducing it through safety meetings. This could occur in a staff or management person trained in level 1 FMS. Level 1 provides intro to the testing and level 2 provides introduction of exercises based on the test results. This can be completed online.

Using FMS should not compromise an offer of employment. It is a tool which can be introduced to assess possible increased risk factors. If an individual has a physically demanding job or a physically demanding component as part of their job duties, FMS is a tool to identify risk of injury, introduce corrective exercises, and ultimately reduce risk and recurrence of injury.

References

Movement

Functional Movement Systems: Screening, Assessment, and Corrective Strategies
By Gray Cook MSPT, OCS, CSCS