FMS: Focus on Functional Movement

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What Is Functional Movement?

- Difficult to pinpoint a single definition
  - Different definitions to fit all different lives.

One definition:
Functional movements are movements based on real-world situational biomechanics. They usually involve multi-planar, multi-joint movements which place demand on the body’s core musculature and innervation.

Today we will focus on functional movement and the Tactical Athlete

- Squat
- Lunge
- Push
- Pull
- Bend
- Twist
- Gait
THIS is Not Functional
Functional Movement Screen
History of Functional Movement Systems

- Functional Movement Screening was introduced in 1995 as a method to identify basic movement deficiencies.
  - “Sometimes the most innovative ideas evolve from the simplest concepts. That’s the case with Functional Movement Systems (FMS). Our story is not remarkable. Our model was not developed in a state-of-the-art lab. To be honest, it all started with our co-founder, Gray Cook, sketching diagrams of movement patterns...on a napkin. Those sketches laid the foundation for our entire system.”
- Started as a way to screen high school athletes to see who was ready to progress in the weight room and on the field
  - NFL
  - Military- USMC
  - Fire Service

Movement deficiencies were found to lead to preventable injuries caused by improper movement patterns due to poor flexibility and/or compensation for previous injuries.
“Burton's Breakdown: the movement screen is designed to determine which movement patterns we do well and which ones are a struggle. We look at movement patterns established during the early years of development, such as squatting, stepping, crawling. Unfortunately, many of us lose integrity in those patterns over time. Our goal is to reclaim them.”

“WE’RE NOT LAYING DOWN NEW MOTOR PROGRAMS, WE’RE GETTING OLD ONES BACK.”
DR. LEE BURTON

“WE SHOULDN'T COMPROMISE MOVEMENT QUALITY TO GAIN MOVEMENT QUANTITY.”
GRAY COOK

“BUILD SYSTEMS TO PROTECT YOURSELF FROM YOUR OWN SUBJECTIVITY.”
GRAY COOK
What is FMS?

- The Functional Movement Screen is a series of 7 movement patterns that are assessed and scored to determine deficiencies in symmetry and deficiencies in movement.
- Looks at a balance of mobility and stability
- Movements are based on basic developmental patterns that may be neglected once all movement milestones are achieved as a child.
  - Deficiencies in these movement patterns may help determine risk of injury
  - Results of the screen may be utilized to guide individual exercise programs
FMS – 3 principles

1. First move well. Then move often
   - Learn to move well before you load or train the movement
   - Once you move well, then move enough to cause adaptation within environment

   - Trainer’s responsibility
     - Do no harm, correct the patterns, develop and condition the patterns

3. Create System to Protect the Principles
   - Screen patterns, not individual impairments
   - Address movement patterns well beyond years of developmental milestones
Why FMS?

- Set a movement baseline for fundamental movement competency
- Identify pain and/or dysfunction
  - This screen of movement patterns may help identify deficiencies in fundamental movement that could lead to increased risk of injury.
- Provide a guideline for proper progression through conditioning and post-injury recovery

FMS exposes dysfunction or pain—or both—within basic movement patterns
Benefits of FMS

- Injury Prevention
  - Most preventable injuries are caused by the body’s loss of flexibility.
  - FMS may also be able to identify an injury before it gets worse.
- Improved performance as the body returns to optimal movement.
- Identification of asymmetrical movement/limitations.
Why is Symmetry Important?
- Asymmetrical movement creates torque and imbalance through our body that increases the risk of injury

What affects Symmetry?
- Structure
- Mobility
- Strength
- Stability
- Deficiency in Movement
- Conditioning
How Injuries Happen

1. Acute Injury
   - Load vs. Time
   - Injury occurs at sudden increase in load

2. Chronic Injury
   - Load vs. Time
   - Multiple peaks in load with injury occurring at specific point

3. Benefits of a Progressive Training Program
   - Load vs. Time
   - Increase in applied load without exceeding capacity of soft tissue
   - Injury occurrence is avoided through proper training
FMS - Guideline of Proper Progression

- Mobility → Static Stability → Dynamic Stability
  - Quality Stability is driven by quality proprioception
  - Quality proprioception is not possible with limitations in mobility
  - Gain mobility then train stability

- When a pattern is correct, then you load and condition that pattern
What Does The Screening Involve?

- The FMS Consists of 7 basic movements and 3 screening movements.
- Every participant is set up in the same position relative to their own body for each movement test using anatomical landmarks and joint angles.
- Every participant is given instructions prior to beginning each movement.
- Participants get up to 3 trials for each movement to achieve their highest possible score.
  - Highest score of the 3 trials will be carried forward.
- Actual movement patterns are not corrected beyond initial positioning.
Equipment
# The Functional Movement Screen

## Scoring Sheet

<table>
<thead>
<tr>
<th>NAME</th>
<th>DATE</th>
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<th>AGE</th>
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<table>
<thead>
<tr>
<th>HAND/LEG DOMINANCE</th>
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## Test Table

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<th>Raw Score</th>
<th>Final Score</th>
<th>Comments</th>
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<td></td>
<td>R</td>
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<tr>
<td>TOTAL</td>
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</table>

- **Raw Score**: This score is used to denote right and left side scoring. The right and left sides are scored in five of the seven tests and both are documented in this space.

- **Final Score**: This score is used to denote the overall score for the test. The lowest score for the raw score (each side) is carried over to give a final score for the test. A person who scores a three on the right and a two on the left would receive a final score of two. The final score is then summarized and used as a total score.
Important Tips for Testing

- Distance
- Movement
- Wear the same gear they wear to train
- No prior warm up, stretching or practicing
- Consistency of verbal instructions
Let’s take a closer look at each movement tested
FMS - Mobility

- Mobility is vital and assessed in these tests
  - Active Straight Leg Raise

- Shoulder Mobility
Active Straight Leg Raise

- Identifies the active mobility of the flexed hip, but also includes the initial and continuous core stability within the pattern as well as the available hip extension of the alternate hip.
- Can the participant dissociate the lower extremities in an unloaded position.
Shoulder Mobility

- Demonstrates the natural complementary rhythm of the scapular-thoracic region, thoracic spine and rib cage during reciprocal upper extremity shoulder movements
Clearing Test

- Looking for reports of pain
FMS - Stability

- Stability Testing
  - Rotary Stability
- Trunk Stability Push-Up
Rotary Stability

- Observes multi-plane pelvis, core and shoulder girdle stability during a combined upper and lower extremity movement
- Demonstrates reflex stabilization and weight shifting in the transverse plane
- Represents the coordination efforts of mobility and stability observed in fundamental climbing patterns
Clearing Test

- Looking for pain
Trunk Stability Push Up

- Observation of the reflex core stabilization
- No movement of spine or hips
Clearing Test

- Looking for pain
FMS - Functional Patterns

- Inline Lunge
  - Asymmetric stance

- Hurdle Step
  - Unilateral stance
Inline Lunge

- Intended to place the body in a position to focus on the stresses as simulated during rotation, deceleration and lateral movements
Hurdle Step

- Will expose compensation or asymmetry in stepping function
- Tests stability and control in a single stance
- Requires coordination and stability between hips, the pelvis, core
FMS - Functional Pattern

- Deep Squat
  - Symmetrical Pattern
Deep Squat

- Demonstrates fully coordinated extremity mobility and core stability, with the hips and shoulders functioning in symmetrical positions.
Scoring the FMS

- Each movement is scored with 0-3
  - 3 is awarded for perfect execution of the movement without question.
  - 2 is awarded for compensating while performing the movement.
  - 1 is awarded if the movement cannot be performed.
  - 0 is awarded if the movement causes any ‘new’ pain.

- Symmetrical movements get one score while all others are scored for each side.
  - Deep Squat and Trunk Stability Push-up have one score.
  - Hurdle Step, Inline Lunge, Shoulder Mobility, ASLR and Rotary Stability have a score for each side.

- When a movement is tested for each side of the body the lower of the two scores is carried forward.

- The cumulative score is the sum of all exercises with a maximum score of 21.

- Totals of 14 or lower indicate possible increased risk of injury
  - In a study conducted by UCH it was discovered that individuals with cumulative scores less than 14 are more susceptible to preventable injuries, such as sprains/strains.
I’ve Got My Score...What’s Next?

- After the FMS is completed, each participant is given several corrective exercises that they can do to help improve any deficiencies found during the screening.
- Corrective exercises generally involve foam rolling, stretching or basic calisthenics.
- Individuals scoring less than 10 or recording a ‘0’ on an exercise will not receive their corrective exercises until they are evaluated by a department Physical Therapist.
A look at stats related to FMS for DFD

- In 2015, Denver Fire Department began using the FMS as a tool to evaluate the physical condition of recruits.

- In 2016, the FMS Screening has been expanded to members returning to duty from injuries and offered on a voluntary basis to all personnel.

- In 2017, the Functional Movement Screen will be partnered with the VO2 Max (treadmill test) to comprise the annual fitness evaluation.
64.1% of the personnel on duty participated in the 2017 Fitness Evaluations.

We administered 375 Functional Movement Screens.

Move2Perform results:
- 46 members are at optimal performance (12%)
- 156 members have slight deficits (42%)
- 163 members have moderate deficits (43%)
- 10 members have substantial deficits (3%)
The average cost to treat a Workers’ Comp injury for DFD members in the “Substantial Deficit” category is 2.9 to 4.5 times higher than the cost to treat injuries for members in the “Moderate” or “Slight” deficit categories.

However, having a FMS score that puts a DFD member in the “Optimal” category does not appear to be more beneficial than being in the “Moderate” or “Slight” deficit categories.

FMS score/risk level category does not appear to influence whether or not a worker will have a first aid/exposure incident (call to work comp that results in no medical treatment).
DFD FMS 2017

- DFD members with an FMS score/risk level category of “Substantial Deficit” account for a higher than expected number of Workers’ Comp injuries - 75% higher than expected

- DFD members in the FMS risk level category of “Substantial Deficit” account for a higher than expected cost to treat their Workers’ Comp claims - 186% higher than expected

- DFD members in the FMS risk level category of “Slight Deficit” account for a lower than expected cost to treat their Workers’ Comp claims - 37% lower than expected
Extrinsic Value?

The median incurred cost for all final/closed workers’ compensation claims was $585 in 2018. This represents a 64.7% decrease over the median incurred cost of $1,658 per claim seen at the inception of the PT program.
Extrinsic Value

The average number of days to reach MMI for a workers’ compensation overexertion claim in the DFD decreased 74.9% between program inception and the end of 2018.
FMS - The Research

- **Functional Movement Screening performance of Brazilian jiu-jitsu athletes from Brazil: differences considering practice time and combat style.**
  
  This article found that Poor FMS score was observed and lower scores in the FMS were associated with higher risk of injury in BJJ athletes.


- **Prediction of Injury by Limited and Asymmetrical Fundamental Movement Patterns in American Football Players**

  This article found that during professional football preseason the players who score <14 exhibited a higher risk for injury. Additionally, players who had, at least, 1 movement pattern asymmetry combined with a score <14 was leading cause of injury.

FMS - The Research

- **Modifiable Risk Factors Predict Injuries in Firefighters During Training Academies**
  
  This article found that during firefighter training academy, the Functional Movement Screen cut score of ≤ 14 was able to discriminate between those at a greater risk for injury.
  
  Deep squat and push up component of the FMS were statistically significant predictors of injury status along with the sit and reach test.


- **The Effect of an Intervention Program on Functional Movement Screen Test Scores in Mixed Martial Arts Athletes**
  
  This article found that that a 4-week intervention program was sufficient at improving FMS scores compared to a control group and intervention group.
  
  Additionally, a greater number of participants in the intervention group were free from asymmetry at week 4 and week 8 compared with the initial test period.

FMS: Let’s see this applied to Denver Fire
Administering the FMS requires certification.

- Go to the following website to learn about certification.
- https://www.functionalmovement.com/
Questions?
Let’s Practice...