Frontiers in Sports Injury Prevention: The Functional Movement Screen

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Our Functional Movement History

High School Athletics

– Bridge Gap between PPE And Performance Tests
– Functional biomarkers
– Movement vital signs
– Directed intervention
Screening creates perspective
Movement Patterns

We started this journey by simply categorizing human movement patterns not by measuring body parts.
Simple to complex motor control requirements within the FMS help you find that developmental level.

“What gets measured gets done”
What does the research say?

• Reliable tool that can be quickly and easily administered in any setting

• Can be used as a tool to identify who is at risk for injury within certain population groups

• The FMS can be improved with interventions
**FMS (Reliability)**

<table>
<thead>
<tr>
<th>Study</th>
<th>Journal</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onate et al, 2012</td>
<td><em>J Strength Cond Res</em></td>
<td>The FMS total scores displayed high intersession and interrater reliabilities</td>
</tr>
<tr>
<td>Bribble et al,</td>
<td><em>J Strength Cond Res</em></td>
<td>Intrarater reliability is strong and seems to strengthen when the individuals are exposed to the FMS in a clinical experience.</td>
</tr>
<tr>
<td>Teyhen et al, 2012</td>
<td><em>Journal of Orthopaedic &amp; Sports Physical Therapy</em></td>
<td>FMS composite score demonstrated moderate to good interrater and intrarater reliability</td>
</tr>
<tr>
<td>Smith et al, 2013</td>
<td><em>J Strength Cond Res</em></td>
<td>HS least Reliable test SM most reliable test</td>
</tr>
<tr>
<td>Gulan et al, 2014</td>
<td><em>Int J Sports Ther</em></td>
<td>Level of experience of the rater scoring the FMS™ should be considered, as it appears that the expert rater was more critical than novice raters in the interpretation of the scoring criteria</td>
</tr>
</tbody>
</table>


# FMS (Injury Validity)

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<td>Teyhen et al, 2015</td>
<td><em>Clin Orthop Rel Res</em></td>
<td>US Army Rangers</td>
<td>211</td>
<td>Asymmetrical ankle dorsiflexion &amp; Pain with Functional Movement Screen clearing tests were associated with increased injury risk</td>
</tr>
<tr>
<td>Garrison et al, 2014</td>
<td><em>Int J Sports Phys Ther</em></td>
<td>College Athletes</td>
<td>160</td>
<td>Athletes with an FMS™ composite score at 14 or below combined with a self-reported past history of injury were at 15 times increased risk of injury.</td>
</tr>
<tr>
<td>Mcal et al, 2014</td>
<td><em>Br J Sports Med</em></td>
<td>Pro Soccer Teams</td>
<td>44</td>
<td>The FMS was ranked the number 1 tool to identify injury risk in Professional International Premier league teams</td>
</tr>
<tr>
<td>Kiesel et al, 2014</td>
<td><em>JSR Journal of Sport Rehabilitation</em></td>
<td>Pro Football Players</td>
<td>238</td>
<td>Combination of scoring below the 14 and exhibiting a movement asymmetry was leading cause of injury</td>
</tr>
<tr>
<td>O’Connor et al, 2011</td>
<td><em>Medicine &amp; Science in Sports &amp; Exercise</em></td>
<td>USMC Officer Candidates</td>
<td>874</td>
<td>FMS composite of 14 or below were twice as likely to drop out of basic training due to injury. 14 or below twice as likely to drop out, whether injured or not.</td>
</tr>
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</table>


## FMS (Modifiability)

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<tr>
<th>Study</th>
<th>Journal</th>
<th>Population</th>
<th>n</th>
<th>Program Time</th>
<th>Control Group</th>
<th>FMS Composite Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goss et al., 2009</td>
<td><em>J Spec Oper Med</em></td>
<td>Special Ops Soldiers</td>
<td>90</td>
<td>6 weeks</td>
<td>N</td>
<td>2.5</td>
</tr>
<tr>
<td>Cowen et al., 2010</td>
<td><em>J Bodyw Mov Ther</em></td>
<td>Firefighters</td>
<td>77</td>
<td>6 weeks</td>
<td>N</td>
<td>3.3</td>
</tr>
<tr>
<td>Frost et al., 2011</td>
<td><em>J Strength Cond Res</em></td>
<td>Firefighters</td>
<td>60</td>
<td>12 weeks</td>
<td>Y</td>
<td>NC</td>
</tr>
</tbody>
</table>

### Movement training does not change FMS score
Not all training programs improve FMS results

Using basic information from the FMS screen and programming an exercise intervention from that data can lead to improvement

**An Individualized Training Program May Improve Functional Movement Patterns Among Adults.**
Why talk injury risk?

- Injury is inevitable, or
- Injury has already occurred

Bumps, Bruises and Breaks

Heading into Super Bowl week, NFL players have collectively sustained more than 1,300 injuries on the field this season.

Source: SimpleTherapy; Stock photo Illustration

The Wall Street Journal
Should we look at patterns or parts?

The FMS lunge pattern confronts the basic mobility and motor control that could complicate 777 out of 1,345 of these injuries. 58%
Perfect - In-line Lunge Pattern:

A competitive advantage for those who actively manage it…
Also the lunge pattern is beginning to show in and of itself as important

ARMY RANGERS: Ankle DF ROM
Asymmetry is predictive
8-10 minute movement screen
What is the “Real” Objective?

<table>
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<th>Score</th>
<th>Objective</th>
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<tr>
<td>3</td>
<td>Perform pattern as directed</td>
</tr>
<tr>
<td>2</td>
<td>Perform pattern with compensation/imperfection</td>
</tr>
<tr>
<td>1</td>
<td>Unable to perform pattern</td>
</tr>
<tr>
<td>0</td>
<td>Pain with pattern regardless of quality</td>
</tr>
</tbody>
</table>
What Does the Evidence Suggest?
Injury Risk/Prediction

If goal is injury prediction or injury risk assessment you must “stack” risk factors………………

1. Previous injury
2. Severity of previous injury
3. Pain with any test
4. DF ROM symmetry
5. Performance on FMS - Functional Movement Screen
   YBT – Y Balance Test
The FMS has been effectively implemented in a variety of settings and populations.
Once an injury occurs . . . the more 2’s and 3’s an individual has, the faster they return to activity.

33% missed training days
Costs for Sprain/Strain Injuries

Academy 33-36 (4 recruit classes)
Actual Claim Costs for S/S-related Injuries over $500

- 13 and Below (30% of recruits) have created 80% of costs to date
- 14 and Above (70% of recruits) have incurred 20% of costs to date

Orange County Fire Authority

- $826,900
- $208,482

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FMS: across age groups

Perry in press, Schneiders 2011

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**USATF Sports Performance Workshops**

"Don’t train movement-fitness in the presence of movement-dysfunction. This data was collected in extremely elite athletes. I believe that the results would apply to developing athletes even more."

*Todd Arnold, MD - USATF Sports Performance Scientist*
Assess Structural Integrity
Movement Health – potential to grow

Screen Functional Patterns
Movement Function – potential to learn

Test Movement Capacity
Movement Resources – energy expression

Evaluate Movement Complexity
Movement Resourcefulness – specific sport/activity skills
| Why?     | How It Happens | What to Look At? |
|----------|----------------|-----------------
| move well | SA (Organism)  | ID (Environment) |
| move often| SA (Organism)  | FCS (Fundamental Capacity Screen) |
Hey, can I get a golf lesson?

Get Healthy!
Hey, can I get a golf lesson?

Get Functional!
Hey, can I get a golf lesson?

Get Fit!
Hey, can I get a golf lesson?

Get a Club!
Functional Movement Systems

FMS™
FUNCTIONAL MOVEMENT SCREEN

SFMA™
SELECTIVE FUNCTIONAL MOVEMENT ASSESSMENT

YBT™
Y BALANCE TEST

FCS
FUNDAMENTAL CAPACITY SCREEN

FunctionalMovement.com
A simple battery of **seven movements** over the course of less than **10 minutes** demonstrates pain in over **20%** of people preparing to go into an athletic or strenuous endeavor, and who have been declared healthy themselves and/or by a physician.
TAKE THE NEXT STEP
JOIN US FOR A LIVE COURSE, OR TAKE A COURSE ONLINE!

Use your smartphone to scan the QR code to access exclusive content and learn more about FMS!

FMS move well. move often
FunctionalMovement.com

Use this code to register this weekend and save $75, or save $50 in the next 2 weeks!

Enter code at checkout.

bit.ly/fmsfall2015

FunctionalMovement.com