

# Using the Functional Movement Screen™ to Reduce Injury Risk

Mike Osler, PT, DPT, SCS, CSCS

Proaxis Therapy

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- <http://www.youtube.com/watch?v=92ifz2qqtm8>



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# What we know...

- 500,000 injuries per year in HS and college football
- Between 18-51 injuries per 100 players
  - Not all injuries are preventable, however...
- Biggest risk factor for getting injured is a history of a previous injury

[www.cdc.gov](http://www.cdc.gov), Hootman 2006



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# What we can do...

- Athletes may demonstrate movement patterns that increase their risk of getting injured
- Screen athletes to determine who is “at-risk” using the Functional Movement Screen
- Implement corrective exercises to reduce risky movement patterns in athletes



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# Functional Movement Screen

- Series of 7 movements that evaluate an athlete's mobility and stability
- Places an athlete's body in extreme positions to discover limitations
- Scored 0-3 for total of 21 points
- Implemented at NFL combine ~ 2008

Cook 2006



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# FMS and Firefighters

- Tucson, Arizona 2007
  - 433 firefighters were tested
  - Implemented core strengthening program over 8-weeks
  - **44% decrease in injuries**
  - 62% decrease in time lost due to injuries



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Peate 2007



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# FMS and Div II female athletes

- Findlay Univ (Ohio) – 2010
  - 38 college athletes
  - Soccer, volleyball, basketball
  - **4 times greater risk of injury** if FMS score was  $\leq 14$

Chorba 2010



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# FMS and NFL football players

- One NFL team – 2005 season
  - 46 athletes screened
  - **6 times greater risk of injury** if FMS  $\leq$  14



Keisel 2007



# FMS components

Mobility



Stability



# FMS components

- Deep Squat
- Hurdle Step
- In-line Lunge
- Active SLR
- Shoulder Mobility
- Trunk Stability Push Up
- Rotary Stability



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# FMS components

- Score infers mobility or stability deficit
- Ordinal Scoring
  - 3 = able to complete movement without compensation
  - 2 = able to complete movement with compensation
  - 1 = unable to complete without compensation
  - 0 = pain



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# #1 - Squat

## III

- Upper torso is parallel with tibia or toward vertical
- Femur below horizontal
- Knees are aligned over feet
- Dowel aligned over feet



Figure 1. *Deep squat anterior view.*



Figure 2. *Deep squat lateral view.*



Figure 3. *Deep squat anterior view.*

## II



Figure 4. *Deep squat anterior view.*

## I

Cook 2006

# #1 - Squat



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# #2 – Hurdle Step

III

- Hips, knees and ankles remain aligned in the sagittal plane
- Minimal to no movement is noted in lumbar spine
- Dowel and string remain parallel



Figure 5. Hurdle step anterior view.



Figure 6. Hurdle step anterior view.



Figure 7. Hurdle step anterior view.

II



Figure 8. Hurdle step anterior view.

I

# #2 – Hurdle Step



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# #3 – In-Line Lunge

## III

- Dowel contacts remain with lumbar spine extension
- No torso movement is noted
- Dowel and feet remain in sagittal plane
- Knee touches board behind heel of front foot



Figure 9. *In-Line Lunge anterior view.*



Figure 10. *In-Line Lunge lateral view.*



Figure 11. *In-Line Lunge lateral view.*



Figure 12. *In-Line Lunge anterior view.*

## II

## I



# #3 – In-Line Lunge



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# #4 – Shoulder Mobility



Figure 1. *Shoulder Mobility III*

## III

- Fists are within one hand length (Assume one hand length is 8 inches)



Figure 2 *Shoulder Mobility II*

## II

- Fists are within one and a half hand lengths (Assume one and one half hand lengths is 12 inches)



Figure 3. *Shoulder Mobility I*

## I

- Fists are not within one and half hand lengths (Beyond 12 inches)

Cook 2006



Figure 4. *Shoulder Clearing Test*

# #4 – Shoulder Mobility



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# #5 – Active Straight Leg Raise



Figure 5. *Active SLR III*

**III**

- Ankle/Dowel resides between mid-thigh and ASIS



Figure 6. *Active SLR II*

**II**

- Ankle/Dowel resides between mid-thigh and mid-patella/joint line



Figure 7. *Active SLR I*

**I**

- Ankle/Dowel resides below mid-patella/joint line

# #5 – Active Straight Leg Raise



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# #6 – Trunk Stability Push Up



Figure 8. *Trunk Stab Push Up III (male)*

### III

- Males perform one repetition with thumbs aligned with the top of the forehead
- Females perform one repetition with thumbs aligned with chin



Figure 9. *Trunk Stab Push Up II (male)*

### II

- Males perform one repetition with thumbs aligned with chin
- Females perform one repetition with thumbs aligned with clavicle



Figure 10. *Trunk Stab Push Up I (male)*

### I



Figure 11. *Spinal Extension Clearing Test*

# #6 – Trunk Stability Push Up



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# #7 – Rotary Stability



Figure 12. *Rotary Stab Start III*



Figure 13. *Rotary Stab Finish III*

## III

- Performs one correct unilateral repetition while keeping spine parallel to surface
- Knee and elbow touch



Figure 14. *Rotary Stab Start II*



Figure 15. *Rotary Stab Finish II*

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## II



Figure 17. *Spinal Flexion Clearing Test*



# #7 – Rotary Stability



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# For athletes who struggle with FMS...

- NFL players who scored < 14 on FMS
- 7-week training program
- Focused on individual deficits and core strength
- FMS score improved by 2 points

Keisel 2009



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# Greenville County Injury Prevention Program

- Developed by Steadman Hawkins, Proaxis Therapy and Acceleration Sports
- Designed to address common deficits found during Functional Movement Screens of high school athletes



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# Greenville County Injury Prevention Program

- Goals of the Program:
  - Reduce injuries
  - Reduce costs associated with those injuries
    - Financial burden to families and school district
    - Physical and emotion burden
  - Improve performance



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# Injury Prevention Program

- 8-10 minutes in length
- Consists of 11 exercises divided into four components
- Completed before practice and games
- May replace jog/static stretching program
- Prepares the body through movements
- Designed to require minimal space/equipment



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# Injury Prevention Program

Available at: <http://www.steadmanhawkinscc.com/>

<b>Dynamic Warm Up</b>	<b>5 exercises</b>
<b>Functional Intervention</b>	<b>3 exercises</b>
<b>Balance/Stability</b>	<b>1 exercise</b>
<b>Agility/Control</b>	<b>2 exercises</b>



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# Greenville County High Schools Injury Prevention Program

Designed to be completed before practice and games in an effort to reduce injuries and improve performance.

Developed by Steadman Hawkins Sports Medicine, Proaxis Therapy, and Acceleration Sports Institute.

Full program available at [www.steadmanhawkinscc.com/orthopaedic-services](http://www.steadmanhawkinscc.com/orthopaedic-services). Reps can be increased as long as good form is maintained.

## Dynamic Warm Up



Knee Hug  
2 x 10 yds



Heel to Glute  
2 x 10 yds



Open the Gate  
2 x 10 yds



Close the Gate  
2 x 10 yds



Inch worm  
2 x 10 yds

## Functional



Trunk Rotation  
15 reps each side



Deep Squat  
2 x 15 second hold



Side Plank  
30 second hold each side

## Balance and Agility



Single Leg Target Reach  
15 reps each side



Line Hops with Control  
2 x 10 yds



High Skip  
2 x 10 yds

# What about after an injury?

- Often disconnect between the demands of “rehab” and the demands of on-field performance
- An athlete must be able to meet all demands of his position prior to returning to play



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# What about after an injury?

- Importance of 100% recovery
- Comprehensive return to sport therapy
  - Must address underlying deficits
  - Meet stringent criteria to return
- Requires team approach



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# “Early” Rehab



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# A successful outcome

- Requires coordination of the entire team
  - Athlete, parent, coach
  - Physician, athletic trainer, physical therapist, strength coach



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Our goal is to give each athlete the opportunity  
to be successful



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# Thank you!



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- Chorba et al - IJSPT 2010
- Cook et al - IJSPT 2006
- Cook et al - IJSPT 2006
- Kiesel et al - IJSPT 2007
- Kiesel et al - Scan J MSS 2009
- Hootman et al - JAT 2006
- Peate et al - J Occ Hlth 2007
- [www.cdc.gov](http://www.cdc.gov)