**Fundamentals of Movement Screening**

Darcy Norman PT, ATC, CSCS
Performance Therapist
Performance Specialist
Athletes’ Performance
www.athletesperformance.com
www.coreperformance.com

**ABSOLUTE VS. RELATIVE**

- **Absolute**
  - We often speak in absolutes to get point across
  - Used as a foundation of teaching/information sharing

- **Relative**
  - There are always different perspectives/point of references
  - Rehab/Performance
  - Individual Needs/Differences
  - There are always exceptions
  - Nothing is absolute
  - Absolute and Relative
  - Both need to be considered when teaching/learning

**Athletes’ Performance Goals**

Everyone’s Working Hard let’s try and Work Smarter

**Training & Performance**

- Open Skilled
- Psychology
- Physiology
- Tactics
- Emotion
- Character
- Environment
- Altitude
- Heat
- Cold
- Health
- Nutrition
- Focus
- Confidence
- Commitment
- Closed
- Complex
- Offensive
- Defensive
- Special
- Passion
- Self
- Control
- Energized
- Integrity
- Respect
- Caring
- Fitness
- Oxygen
- Transport
- Physiology
- Power
- Strength
- Health
- Rest/Fatigue
- Recovery
- Sleep
- Fueled
- Hydration
- Nutrients
**Optimum Performance Pyramid**

- Sport / Work
- Athletic Movement

Adapted from Gray Cook 2001

**Functional Movement Screen**

How do you assess movement?
1. Squatting
2. Stepping
3. Lunging
4. Reaching
5. Leg raising
6. Push-up
7. Rotational stability

**FMS - BACKGROUND**

**ROLE**
- Bridges the gap between pre-performance physical and performance tests
- Assesses functional mobility and stability data

**GOALS**
- Prevention of Micro-traumatic injuries
- Performance Enhancement

**“A new idea is first condemned as ridiculous and then dismissed as trivial, until finally, it becomes what everybody knows.”**

William James (1842-1920)
Psychologist and Philosopher

**Manage Limiting Factors**

- Skill
- Performance
- Strength / Mobility

**Gray Cook, 2004**
So why do highly trained athletes sustain non-contact injuries?

Risk Factors
- Previous injury
- Gender
- Anthropometric characteristics
- Tape or brace use
- Flexibility
- Decreased vertical jump
- Valgus Collapse
- Shortened reflex response time
- Postural sway & balance
- Multifactorial

Movement Oriented Tests???

Can We Predict Injuries?
- Identify musculo-skeletal problems with basic movement patterns.
- Exercise prescription based on movement
- Get performance, fitness, rehab., and wellness working together.

Can we prevent injury?
- Verhagen 2004
  - Balance board training effective for prevention of ankle sprain recurrences
- Emery 2007
  - Balance training decreased acute onset injuries
Can we prevent injury?

- Hewett et al 1999
  - Strength/Flexibility/Plyometric/LE alignment training
  - Decreased knee injury 4 fold
- Mandelbaum 2005
  - Agility, strength, balance and flexibility
  - 88% decrease in ACL injury rate
- Junge et al 2002
  - Structured warm up, adequate injury rehab
  - 21% decrease in injury rate

- McGuine & Keen 2006
  - Balance exercises
  - Decreased ACL injury

- Olsen 2005
  - Power, strength, and agility exercises
  - Warm up & balance exercises

- Wedderkopp 1999
  - 88% decrease in acute ACL and ankle injury

- Myklebust 2003
  - Wobble board, foam, landing technique

- Wedderkopp 2003
  - Balance board training

- Caraffa 1996
  - Multilevel balance board training
  - Decreased ACL injury

- Gilchrist 2004
  - Strength, landing technique, balance
  - Decreased ACL injury incidence

Performance Continuum

<table>
<thead>
<tr>
<th>REHAB</th>
<th>REHAB (PREHAB)</th>
<th>PERFORMANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVALUATE</td>
<td>ISOLATE</td>
<td>INNERVATE</td>
</tr>
</tbody>
</table>

**Literature: Problems with Injury Predictability**

- Researchers suggest that there will always be a certain level of unpredictability
- Most injuries are multi-factorial, wide individual variations
- Current methods are inconsistent and not standardized
Let's look at some research of some of the factors related to non-contact injuries.

**Flexibility**
- Two prospective studies in soccer players implicate hamstring and quad flexibility as a risk factor (Sodermann 2001, Witvrouw 2003)

**Previous Injury**
- Orchard 2001 (Australian football)
  - Injury within 8 weeks, reinjury to same location
  - Hamstrings 8x
  - Quadriceps 15x
  - Calf 9x
- After 8 weeks
  - Hamstrings 2.5x
  - Quadriceps 3.5x
  - Calf 4x
- Injury within 8 weeks, reinjury to same location
- Hamstrings 6x
- Quadriceps 15x
- Calf 9x

**Inadequate Rehabilitation**
- Orchard 2001 (Australian football)
  - ACL reconstruction within 12 months
  - 11 times more likely to reinjury ACL
  - ACL reconstruction > 12 months
  - 4.5 times more likely to reinjury ACL
  - 41% to ipsilateral side, 59% to contralateral

- Faude 2006
  - Previous ACL rupture: 5x more likely to tear ACL

Asymmetries
• Nadler et al 2001
  • Prospective study
  • “for females… the percentage difference between right and left hip extensors was predictive of whether treatment for LBP was required over the ensuing year.”

Asymmetries
• Soderman 2001 (soccer)
  • Knee hyperextension >10 degrees
  • Right/left difference in ankle ROM
  • Low or high hamstring to quad ratio
• Knapik 1992
  • took seven lower body flexibility measurements and showed that athletes were 2.6 times more likely to suffer injuries if they had a hip extension flexibility imbalance of 15% or more.

Asymmetries
• Baumhauer 1995 (soccer, field hockey, lacrosse)
  • Increased ankle strength imbalance
• Rauh 2007 (cross country)
  • Increased injury risk with greater Q-angle asymmetry

Body Size/BMI
• McHugh et al 2006
• Tyler et al 2006
• Gomez et al 1998
• Lymann 2001 (baseball)
• Quarrie 2001 (rugby)

Dynamic Alignment and Knee Loading
• Hewett 2005
  • Knee ABduction angle was 8 degrees greater with landing in ACL injured
  • 2.5x greater knee ABduction moment with landing in ACL injured
  • ACL injured had increased ground reaction force and decreased stance time

Neuromuscular Control Deficits
• Zazulak 2007
  • 277 collegiate athletes (140 female and 137 male) test for trunk displacement after perturbation
  • Trunk displacements, proprioception, and history of low back pain, predicted knee ligament injury with 91% sensitivity and 68% specificity. ACL injured had increased ground reaction force and decreased stance time.
Poor Balance as a Risk Factor?

- Trojan & McKeag 2006
- Wang et al 2006
- Plisky et al 2006
- McGuine et al 2000
- Watson 1999
- Tropp et al 1984

Poor Balance – NOT a Risk Factor??

- Soderman 2001
- Hopper 1995
- Beynnon 2001

Is it “BALANCE” or Dynamic Neuromuscular Control?

Movement matters!

Injury Risk Factors (Prospective Studies)

- Previous Injury (20)
- Asymmetries (7)
- Dynamic Neuromuscular Control/Balance (7)
- BMI (5)

Previous injury...

Either we are not fully rehabilitating these athletes

OR

Previous injury...

Something fundamentally changes after injury

OR
Previous injury…

*BOTH*?!?

Changes in Proximal Joint Motion and Strength after Ankle Sprain

“Reduced knee and hip joint angles occurred simultaneously with reduced max distance reached indicating a relationship between altered neuromuscular control at the knee and hip due to ankle injury.”

Gribble 2004

Chronic Ankle Instability

- Significantly strong relationship was noted between hip abduction and extension strength and CAI.
- “This indicates that the dynamic balance deficits seen in the athletes with CAI may also be related to weakness in the hip abductors and extensors.”

Hubbard 2007

Proximal Muscle Timing after Ankle Sprain

“A significant difference between the two groups was the delay in onset of activation of the gluteus maximus in previously injured subjects. The existence of remote changes in muscle function following injury found in this study emphasize the importance of extending assessment beyond the side and site of injury.”

Bullock-Saxton JE, Janda V, Bullock MI 1994

Return to Sport Testing

- 80% isokinetic strength? 90% 100%
- Appropriate quad hamstring ratio?
- 90% Functional hop testing? 95% 100%

*Can we predict injuries??*

YES!

BUT…

What is the common denominator in these programs?
Movement!!!!!!

We needed something that looked at quality as well as could put a score to it (quantify it)!!!!!

The Problem With Movement Testing

- Difficult to quantify a dynamic qualitative phenomenon
- The biomechanics lab does this well.
- What do the rest of us do who have to test 175 athletes in 3 hours?

Let’s solve some problems...

Problem #1:

Pre-participation physical

If you make your pre-participation physical exam meaningful, you can prescribe exercises that may decrease a person’s risk.

PPE to Intervention

PPE to include the Y Balance Test, Deep Squat and ASLR

> 4cm asymmetry or 1’s on the DS or ALSR

To ATC for Full FMS

To ATC for SFMA

FMS score ≤15

FMS score >15 and no 1’s

MD/ATC

Clear to start Groups S & C Program

Let’s solve some problems...

Problem #2:

How do I know when someone can return safely to sport?
"Females who had undergone ACLR demonstrated increased VGRF and loading rate on the uninvolved limb during landing when compared with the involved limb and the control group. During takeoff, the involved limb showed significantly less ability to generate force than the uninvolved limb and the control limbs."

**CONCLUSION:**
Female athletes who have undergone ACLR and returned to sport may continue to demonstrate biomechanical limb asymmetries 2 years or more after reconstruction that can be identified during landing.

**Problem #2:** How do I know when someone can return safely to sport?
If you have a meaningful pre-participation physical, you will have the baseline information to compare in order to know when someone is fully rehabilitated.

**Problem #2 (continued):** How do I know when someone can return safely to sport?
Plus, you can have tests that determine when their movement has returned to normal.

**Problem #3:** How do you know someone is ready to participate in an injury prevention or PEP?
You can perform movement testing to be certain that a person has the requisite strength, ROM, flexibility, motor control to perform high level injury prevention programs.

**Highlight the Fundamental Need for Screening**
- Need a reliable method to measure movement characteristics in the field
- Demonstrate Limitations and Asymmetries
- What is the “Primary Problem”
- Create a Feedback System for Functional Exercise
- Help predict poor efficiency and breakdown
Here's what we're trying to do...

How do you assess movement?

1. Squatting
2. Stepping
3. Lunging
4. Reaching
5. Leg raising
6. Push-up
7. Rotational stability

Functional Movement Screen

Think of it as a filter.....

- Seven tests which are graded on an ordinal scale from 3 – 0
- Portable and easily administered (10 minutes)
- Reliable ICC = 0.98 (Composite score)

“The conventional view serves to protect us from the painful job of thinking.”

John Kenneth Galbraith

The Functional Movement Screen

- Designed as a screening tool performed on individuals without recognized pathology
- Not a diagnostic tool

3 Integral Components of Movement

- Joint Mobility and Stability
- Muscular Mobility and Function (strength)
- CNS Mobility and Function
Key Considerations...

- Neurological
- Software
- Musculoskeletal
- Hardware

Preventing Injury and Improving Performance

1. Attempt to identify who is at risk for injury
   - Evaluate Current Methods in Athletic Populations
   - Introduce Functional Movement Screenings?

2. Enhance Strength and Cardiovascular Endurance
   - Individualized Strength and Conditioning Program Based on Movement Deficiencies
   - Improve Movement and Performance Efficiency

The Functional Performance Pyramid

- Skill
- Performance
- Movement

Consider Squatting

What is required, mobility or stability?

"Qualitative" Complete Movement Pattern

Athlete #1  Athlete #2

“We look at structural symmetry......Why not consider functional symmetry.”
### Quality Vs Quantity

**Athlete # 1**
- 40 yd. dash: 4.6
- Squat: 315
- Vertical Jump: 24 in.
- Sit and Reach: +2 in.
- Leading Rusher: 20-25 carriers/game

**Athlete # 2**
- 40 yd. dash: 4.7
- Squat: 325
- Vertical Jump: 22 in.
- Sit and Reach: +2 in.
- Leading defensive back all categories

---

### Quality Vs Quantity

More Importantly can he function efficiently?

- Inefficient movements cause compensations which move a joint in an unnatural manner
- The body will always sacrifice quality for quantity. Movement Patterns will follow the path of least resistance
- Compensatory movements lead to micro-trauma

---

### Key Points

- What is the difference in movement quality and quantity?
- Is this movement acceptable for an active individual?

---

### How do you assess movement?

1. Squatting
2. Stepping
3. Lunging
4. Reaching
5. Leg raising
6. Push-up
7. Rotary Stability

---

### The Functional Movement Screen

- Think of it as a filter...what do you need to catch?
- Consists of seven tests which are graded from 3 - 0
  - 3 perform functional movement pattern
  - 2 perform functional movement pattern with a compensation
  - 1 inability to perform the movement pattern
  - 0 pain with movement
#1 DEEP SQUAT TEST

**Purpose** - The Deep Squat is used to assess bilateral, symmetrical, mobility of the hips, knees, and ankles. The dowel held overhead assesses bilateral, symmetrical mobility of the shoulders as well as the thoracic spine.

**Description** - The individual assumes the starting position by placing his/her feet shoulder width apart. The individual then adjusts their hands on the dowel to assume a 90-degree angle of the elbows with the dowel overhead. Next, the dowel is pressed overhead with the shoulders flexed and abducted, and the elbows extended. The athlete is then instructed to descend slowly into a squat position. As many as 3 repetitions should be performed. The squat position should be assumed with the heels on the floor, head and chest facing forward, and the dowel maximally pressed overhead. If the criteria for a score of III are not achieved, the athlete is then asked to perform the subsequent test with heels on the 2x6.

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

DEEP SQUAT CONT.

Poor performance of this test can be the result of several factors.

1. Heels off the ground - Ankle mobility
2. Hip Mobility - Tight Glutes, Hypomobile post hip capsule
3. Hip Stability - Genu Valgus, Femoral IR, Tibial ER - Glute med weakness, foot intrinsic weakness
4. T-Spine Mobility/Core Stability - Forward torso - Weak core muscles, fynomobile T-spine
5. Shoulder Mobility - Tight Lats, Pec Minor, low trap/serratus anterio
6. Motor Control - Decreased Balance/Proprioception/Timing

HURDLE STEP

1. Hip, knees and ankles aligned
2. Min to no lumbar spine movement
3. Dowel and hurdle remain level

IN-LINE LUNGE CONTINUED

1. Min to no movement in torso
2. Feet remain in-line in the Sagittal Plane
3. Knee touches behind the knee

SHOULDER MOBILITY CONT

1. 3 – within one hand length
2. 2 – within 1 and ½ hand length
3. 1 – more than 1 and ½

* A shoulder stability (active shoulder impingement) screen should be performed even if the athlete scores a III. The athlete places his/her hand on the opposite shoulder and then attempts to point the elbow upward. If there is pain associated with this movement, a score of zero is given. It is recommended that a thorough evaluation of the shoulder be done. This screen should be performed bilaterally. If the athlete does receive a score of zero both scores should be documented for future reference.
ASLR CONTINUED

1. Dowel between mid patella and ASIS
2. 3 – past dowel
3. 2 – b/w dowel and knee
4. 1 – below knee

TRUNK STABILITY PUSH-UP CONT

1. Females- Thumb in line with chin, then collar bone
2. Males- Thumb in line above forehead then chin
3. Elbows and knees off the ground

TRUNK STABILITY

1. Females- Thumb in line with chin, then collar bone
2. Males- Thumb in line above forehead then chin
3. Elbows and knees off the ground

* Lumbar extension should also be cleared after the last test even if a score of III is given. Spinal extension can be cleared by performing a press-up in the push-up position. If there is pain associated with this motion, a zero is given and a more thorough evaluation should be performed.

ROTATIONAL STABILITY

1. Performs 1 unilateral repetition while keeping torso parallel to board
2. Knee and elbow touch in line with the board

Spinal Flexion can be cleared by assuming a quadruped position, rocking back and touching the buttocks to the heels, chest to the thighs and reaching the hands forward. If pain is associated with this movement a score of Zero is given.

FMS SCORING SHEET

<table>
<thead>
<tr>
<th>SCREEN</th>
<th>RAW SCORE</th>
<th>FINAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Squat</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hurdle Step</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>In-Line Lunge</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Shoulder Mobility</td>
<td>3 / 0</td>
<td>0</td>
</tr>
<tr>
<td>Active Straight Leg Raise</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>Trunk Stability Push-Up</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rotatory Stability</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

ITS ALL ABOUT OPTIMIZING PERFORMANCE

ITS ALL ABOUT OPTIMIZING PERFORMANCE
Fundamental Movement Dysfunction as Measured by the FMS Shifts the Probability of Predicting a Time-loss Injury in Professional Football Players

Kiesel, Plisky and Voight
NAJSPT, Vol. 2, No. 3

Preliminary Findings with FMS
- FMS “cut-point” - players scoring 14 or below have greater chance of injury
- FMS ≤ 14 chance of membership on IR increases from 15% to 51%

Kiesel, Piskiy, Kersey 2008
(In Process)

Findings with FMS utilized in Fire Service
- 433 fire fighters were taken through the FMS
- An intervention to improve flexibility, strength and FMS scores through a training program was evaluated
- Intervention reduced time loss due to injuries by 62% and the number of injuries by 42% over a 12-month period compared to historical group

**FMS and Performance Tests**

- Vertical Jump and Squat have a positive relationship with total score.
- In-Line Lunge has a positive relationship with Power Clean and Vertical Jump.
- Deep Squat has a positive relationship with Power Clean.

**Core Training System**

*How do you assess movement?*

1. Squatting
2. Stepping
3. Lunging
4. Reaching
5. Leg raising
6. Push-up
7. Rotary Stability

**FMS SCORING SHEET**

<table>
<thead>
<tr>
<th>SCREEN</th>
<th>RAW SCORE</th>
<th>FINAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Squat</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hurdle Step</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>In-Line Lunge</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Shoulder Mobility</td>
<td>3 / 0</td>
<td>0</td>
</tr>
<tr>
<td>Active Straight Leg Raise</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>Trunk Stability Push-Up</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rotary Stability</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

**Core Training System**

Scoring Analysis:

- A zero must be evaluated and treated accordingly.
- Address asymmetrical 2’s first.
- Address symmetrical 1’s next.
- Re-test.
- For all scores of 3 individual can perform the warm-up activity.

**EXERCISE PRESCRIPTION**

*ISOLATION: Scores of 1*
- Restore Symmetry
- Break Abnormal Tone
- Clinical Hold/Relax Techniques
- Clinical Hands-On Stretching and Mobilization Techniques

*Integration: Scores of 2*
- Sequencing Activity
- Agonist/Antagonist relationships
- Motor Learning and Proprioception
Core Training System

**EXERCISE PRESCRIPTION**

- Warm-up: Higher Level Activities
- Complete Movement Pattern
- Motor Learning (whole) and maintenance
- Plyometrics

---

**FMS SCORING SHEET**

<table>
<thead>
<tr>
<th>SCREEN</th>
<th>RAW SCORE</th>
<th>FINAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Squat</td>
<td>R/L 1</td>
<td></td>
</tr>
<tr>
<td>Hurdle Step</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>In-Line Lunge</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Shoulder Mobility</td>
<td>3 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Active Straight Leg Raise</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>Trunk Stability Push-Up</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rotary Stability</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

---

**Deep Squat Ex. Pres.: Isolation**

- Side-lying Hip Stretch
- Closed Chain Dorsiflexion

---

**Deep Squat Ex. Pres.: Integration**

- Toe-Touch Progression: Toes Up

---

**Deep Squat Progression**
<table>
<thead>
<tr>
<th>SCREEN</th>
<th>RAW SCORE</th>
<th>FINAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Squat</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hurdle Step</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>In-Line Lunge</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Shoulder Mobility</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Active Straight Leg Raise</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Trunk Stability Push-Up</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rotary Stability</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>16</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Hurdle Step Ex. Pres.: Isolation**

- Prone Quadriceps/Hip Flexor Stretch

**Hurdle Step Ex. Pres.: Integration**

- Stride Self-Stretch
- Stride External Rotation Self Stretch
- Straight Leg Bridge
- Single Leg Stance w/ Core Engagement
## FMS SCORING SHEET

<table>
<thead>
<tr>
<th>SCREEN</th>
<th>RAW SCORE</th>
<th>FINAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Squat</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hurdle Step</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>In-Line Lunge</td>
<td>2 / 1</td>
<td>1</td>
</tr>
<tr>
<td>Shoulder Mobility</td>
<td>3 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Active Straight Leg Raise</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>Trunk Stability Push-Up</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rotary Stability</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

**FINAL SCORE**

- Deep Squat: 3
- Hurdle Step: 2
- In-Line Lunge: 1
- Shoulder Mobility: 2
- Active Straight Leg Raise: 2
- Trunk Stability Push-Up: 3
- Rotary Stability: 2

**TOTAL: 15**

---

**In-Line Lunge Ex. Pres.: Isolation**

### Partner Thomas Test Stretch

**In-Line Lunge Ex. Pres.: Integration**

### Leg Lock Bridge

**In-Line Lunge Ex. Pres.: Integration**

### Half-Kneeling Hip Flexor w/ Core Engagement

**In-Line Lunge Ex. Pres.: Integration**

### Lunge w/ Rotation

---

**FMS SCORING SHEET**

<table>
<thead>
<tr>
<th>SCREEN</th>
<th>RAW SCORE</th>
<th>FINAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Squat</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hurdle Step</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>In-Line Lunge</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Shoulder Mobility</td>
<td>3 / 0</td>
<td>0</td>
</tr>
<tr>
<td>Active Straight Leg Raise</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>Trunk Stability Push-Up</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rotary Stability</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>14</strong></td>
</tr>
</tbody>
</table>
Shoulder Mob. Ex. Pres.: Isolation
Shoulder Traction Partner Stretch

Shoulder Mob. Ex. Pres.: Integration
Wall Sit w/ Shoulder Flexion

Shoulder Mob. Ex. Pres.: Integration
Side-lying Rotation

Shoulder Mob. Ex. Pres.: Integration
Trunk Stability Rotation

FMS SCORING SHEET

<table>
<thead>
<tr>
<th>SCREEN</th>
<th>RAW SCORE</th>
<th>FINAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Squat</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hurdle Step</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>In-Line Lunge</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Shoulder Mobility</td>
<td>3 / 3</td>
<td>3</td>
</tr>
<tr>
<td>Active Straight Leg Raise</td>
<td>2 / 3</td>
<td>2</td>
</tr>
<tr>
<td>Trunk Stability Push-Up</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rotary Stability</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>

ASLR Ex. Pres.: Isolation
Straight Leg Partner Stretch
ASLR Ex. Pres.: Integration

Leg Lowering Progression

Leg Lowering w/ Core Engagement

ASLR Ex. Pres.: Integration

Single-Leg Toe Touch w/ Stick

FMS SCORING SHEET

<table>
<thead>
<tr>
<th>SCREEN</th>
<th>RAW SCORE</th>
<th>FINAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Squat</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hurdle Step</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>In-Line Lunge</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Shoulder Mobility</td>
<td>3 / 3</td>
<td>3</td>
</tr>
<tr>
<td>Active Straight Leg Raise</td>
<td>3 / 3</td>
<td>3</td>
</tr>
<tr>
<td>Trunk Stability Push-Up</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rotary Stability</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

TSPU Ex. Progression

Core Engagement Push-up

Incline Push-up
### TSPU Ex. Progression: Integration

**Push-up Walkout**

### FMS SCORING SHEET

<table>
<thead>
<tr>
<th>SCREEN</th>
<th>RAW SCORE</th>
<th>FINAL SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Squat</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Hurdle Step</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>In-Line Lunge</td>
<td>2 / 2</td>
<td>2</td>
</tr>
<tr>
<td>Shoulder Mobility</td>
<td>3 / 3</td>
<td>3</td>
</tr>
<tr>
<td>Active Straight Leg Raise</td>
<td>3 / 3</td>
<td>3</td>
</tr>
<tr>
<td>Trunk Stability Push-Up</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Rotary Stability</td>
<td>3 / 1</td>
<td>1</td>
</tr>
</tbody>
</table>

**TOTAL**

16

### Rotary Stability Ex. Pres.: Isolation

**Rolling Pattern**

### Movement Testing

- Y Balance Test
- FMS (Functional Movement Screen)
- SFMA (Selective Functional Movement Assessment)

### Pre-Participation Physical

- Y Balance Test
- FMS
- If poor score or asymmetry on YBT or FMS and previous injury → SFMA

### After Injury

- SFMA until all movement patterns normalized
- FMS & YBT normalized prior to return to sport
- FMS & YBT compared to pre-injury
PSATS/MLS Soccer Proposal

• With the permission of PSATS, AP do a study with the MLS
• We do not want it to be a make work program for any of the MLS staff
• Done in conjunction with PSATS, Adidas, MLS
• Would be at no expense to the team or league.

Goal of the Program

• To continue to look for ways to improve systems for the teams, players, and staff to improve safety and welfare of the players.
• Trying to be proactive with our endeavors
• Have an opportunity to set a standard in soccer both in the US and internationally