Sheri Walters, DPT, MS, ATC, LAT, SCS, CSCS
Manager, Performance Physical Therapy
Athletes’ Performance - Texas
Objective

1. To discuss functional evaluation and its application to strength and conditioning for decreasing injury risk and improving performance.
My Background

Athletes Performance

Sycamores

Shark

Pistons

Dallas Stars

Texas Rangers

Gators
Functional Movement?
Can You Do This?
What happens?
Pain and Motor Control

• Pain will alter muscle activity depending on a given muscle’s role as an agonist or antagonist to control movement for protection
  – Lund et al 1991
  – Richardson and Hodges 2004
Pain and Motor Control

- Pain, regardless of its origin, alters motor control

- Creates short term strategy (cheat) → becomes habit → alters functional movement → dysfunctional/inefficient movement → poor performance/injury

- Leads to decreased ROM, muscle length changes, and decreased strength
Repetitive Postures/Movements

• Often daily things
  – Sleeping posture
  – Repetitive work/sport movements
  – Sitting in class ALL day
• Causes microtrauma → macrotrauma
• Causes muscle length/strength changes
• Causes ligament laxity
• Cause changes in neural activation patterns
• All can alter PICR (path of instantaneous center of rotation)
Functional Evaluation

• “The observation of whole movements may redirect and broaden the clinical focus by revealing limitations unrelated to the medical diagnosis but pertinent to the restoration of normal function.”
  – Cook, 1995

• Patellar tendinitis/biceps tendinitis
“There are numerous ways in which slight *subtleties in movement patterns contribute to specific muscle weaknesses*. The relationship between altered movement patterns and specific muscle weaknesses requires that rehabilitation addresses the changes to the movement pattern”

“The performance of *strengthening exercises alone will not likely affect the timing and manner of recruitment* during functional performance.”
Basis - Janda

• Postural – short and tight
• Phasic – long and weak, poor endurance
• Upper & Lower Cross Muscle Imbalance
• Example:

  **Tight**  
  Lumbar Ext  
  Ilio-Psoas

  **Weak**  
  Abdominals  
  Gluteus
What is the Functional Movement Screen?

1. The FMS is a 7 movement screen that looks at the key fundamental movement patterns of our athletes.

- Deep Squat
- Hurdle Step
- In-line Lunge
- Shoulder Mobility
- Active Straight Leg Raise
- Trunk Stability Push up
- Rotational Stability
What is the Functional Movement Screen?

2. Identifies “Red Flags” or compensatory movement patterns that may put the athlete at a greater risk of injury.

3. Allows us to quickly rank the quality of the fundamental movement patterns of our athletes – isolating their ‘weakest links’.
What is the Functional Movement Screen?

4. Allows us to target their weak links with FMS Solutions – movements that work to efficiently correct compensatory movement.
   - Individualized training program
   - Increase movement efficiency
   - Help them reach their performance potential

5. Re-screen, re-prioritize, and adjust the targeted FMS solutions
   - FMS allows us to truly create a SYSTEM for functional training
FMS

• What’s the point?
  – Athletes find ways to compensate
    • compensation → inefficient movements → poor performance/injury
  – Quickly identify asymmetries, imbalances, and weaknesses (mobility and stability)
    • Find the weak link and address
  – Can individualize programs based on results
FMS: Injury Prediction

- If FMS score ≤ 14 then probability of suffering a time loss injury increased from 15% (pre-test probability) to just over 50%.

- *Trends Based on Results from one NFL football team over 1-year period

Low FMS scores (<14) have been shown to greatly increase injury potential.
FMS: Injury Prediction

• Players who were $\leq 14$ were 11x (p<0.05) more likely to be injured (CI$_{95}$ 1.2-99.2)

• Players with an asymmetry $\rightarrow$ 3x (p<0.05) more likely to be injured (CI$_{95}$ 1.1-10.6)

Kiesel, Plisky, Kersey 2008 ACSM
Stability

• Pillar Strength
  – Core stability leads to whole body stability
  – TA/Multifidus
  – Not “Core Strength” (Beach muscles)
  – Neutral Spine not flat back

• Ankle sprain
  – Weak Glutes (max and med)
Mobility

- Soft Tissue
  - Muscle
  - Tendon
- Joints
  - Spine
  - Hip
  - Knee
  - Ankle
  - Shoulder
Asymmetry

• Side to side imbalances
• Plisky et al 2006, Star Excursion Balance Test
  – Asymmetry of 4 cm = 3x more likely to get hurt playing basketball
Football Defensive Back

• Dysfunctional Painful Deep Squat
  – Pain in right hip
  – Regressional Patterns
    • Rotation: limited hip active and passive IR (R>L)
    • Squat: Closed chain dorsiflexion

• History of R ankle fracture
  – Was unable to get in stance
  – Tight soleus vs jt capsule
FMS™:
Deep Squat

3
- knees aligned over feet
- upper torso/tibia parallel or towards vertical
- femur below horizontal
- dowel aligned over feet

2
*2x6 under heels
- knees aligned over feet
- upper torso/tibia parallel or towards vertical
- femur below horizontal
- dowel aligned over feet

1
*2x6 under heels
- knees not aligned over feet
- upper torso/tibia are not parallel or towards vertical
- femur not below horizontal
- dowel not aligned over feet
Rehab/Training Philosophy

- Look at the body as a whole, not individual parts
- One part of the kinetic chain will effect the others
- Normalize function within their movement pattern
Functional Rehabilitation

- Refer if outside your scope of practice
- Treat/train what you find!!!
  - Start where you find it
  - Must integrate it back into function