Functional Movement Screen

and Corrective Strategies

Weak Links

Most RT (and sport) injuries are the result of microtrauma

Mictrotrauma is caused by either:

- Overtraining
  - *Doing too much of a good thing, not allowing sufficient rest and recovery*
- Poor biomechanics
  - *Movement mistakes where the body compensates and uses suboptimal joint alignment, muscle coordination, and posture*

Weak links is a term used to identify any physical limitation to performance

- Commonly viewed as: strength | endurance | power | speed | limited athletic skill
- Could also be poor biomechanics due to: inadequate movement patterns | faulty coordination | lack of flexibility

Energy Leaks

An energy leak occurs when all of the energy generated to perform a certain task or movement does not go specifically into that task or movement

- Energy not used for movement may cause unnecessary work or movement in other parts of the body (limbs/spine), stressing muscles, tendons, ligaments and joints

Poor form almost always result from energy leaks (good ex. is swimming)

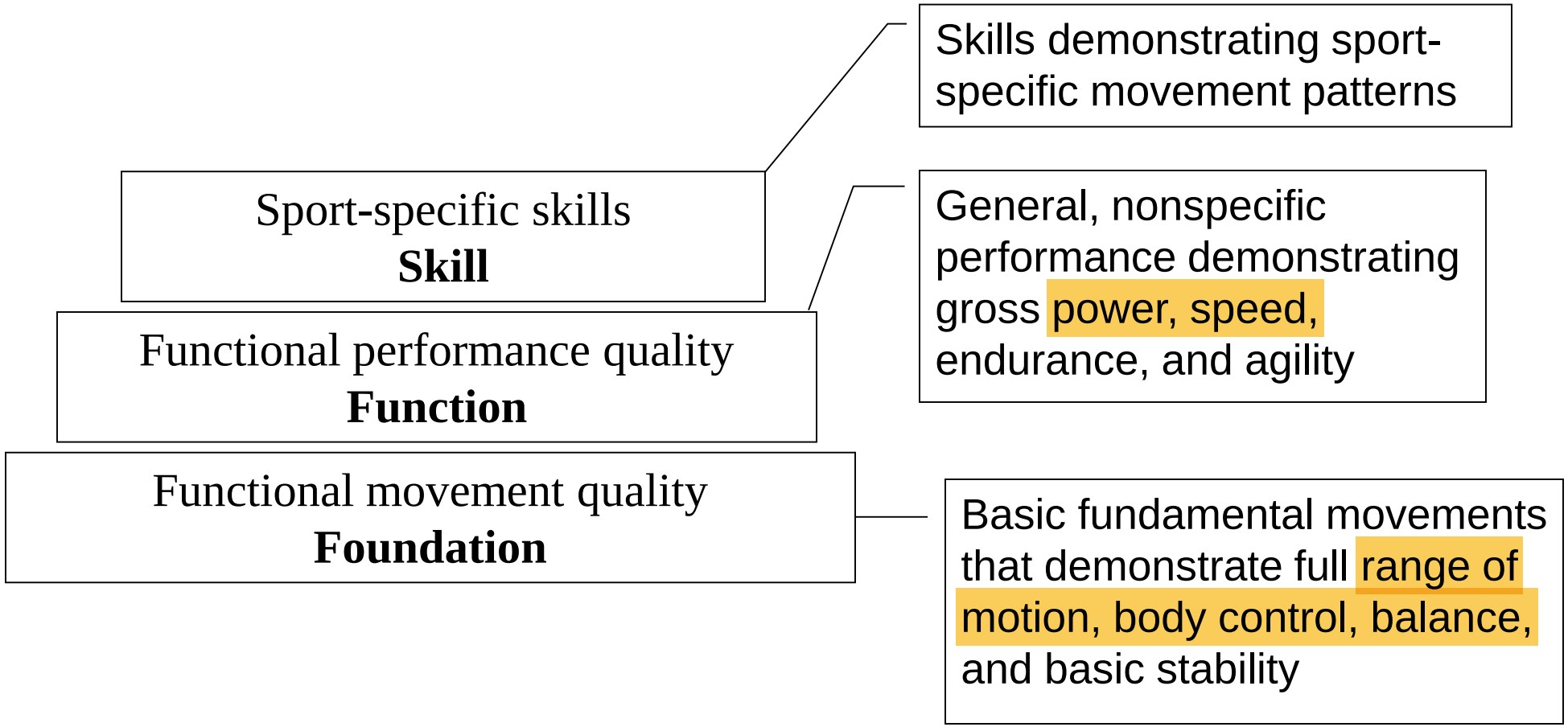
- Someone may perform well even when poor form is used, but eventually breakdown, inconsistency, fatigue, soreness, and injury results

Ultimately energy leaks indicates poor efficiency as well as stress

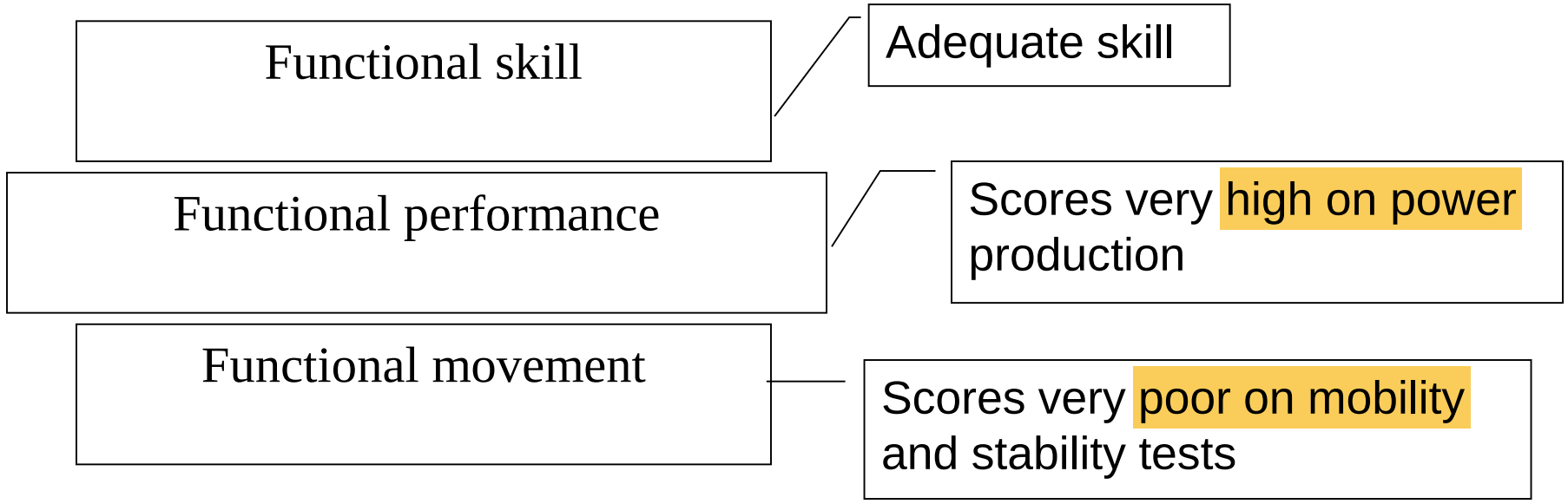
Training should encourage and reinforce efficient movement

- Allows for more training with less stress

Athletic Performance Pyramid



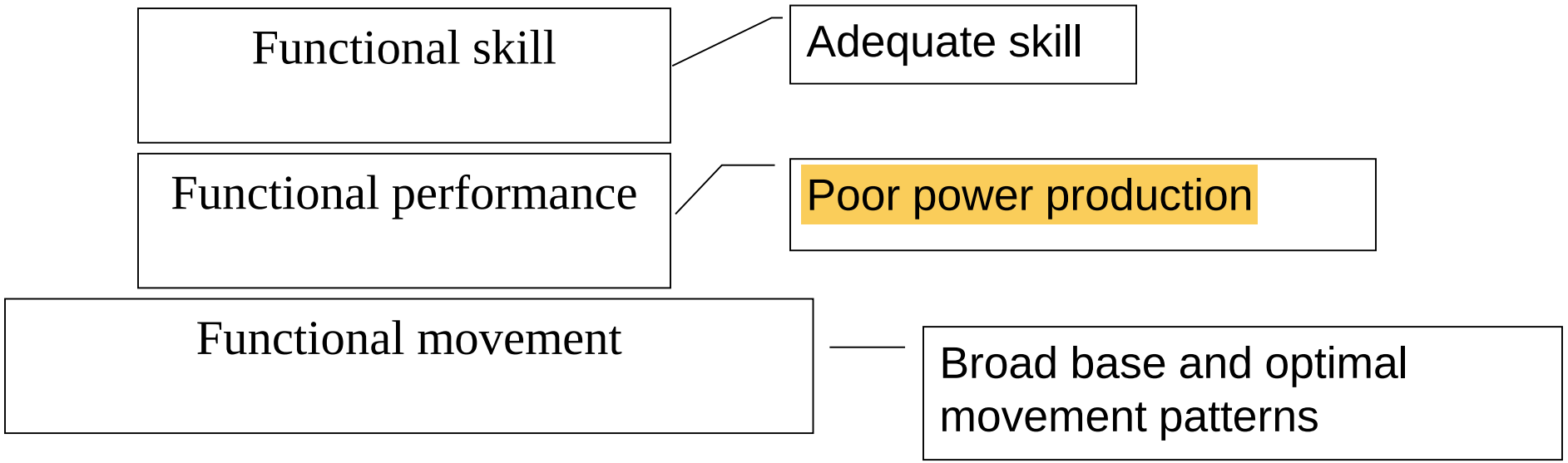
Overpowered Performance Pyramid



Many highly skilled and well-trained athletes follow this distribution

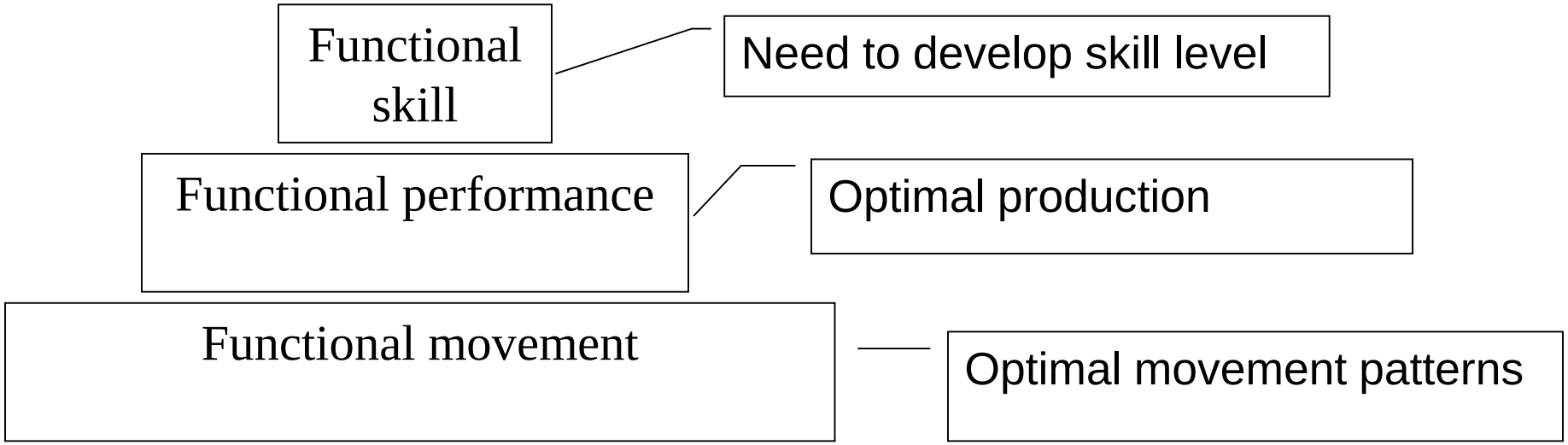
Untapped performance and resistance to injury limited by movement foundation

Underpowered Performance Pyramid



Training should focus on strength, endurance, power, and speed production without negatively affecting movement patterns

Underskilled Performance Pyramid



Athlete would benefit from technique training to refine or improve mechanics or to develop a greater awareness of the movement needed to perform skills at a higher level

Functional Movement Screen

Developed by Gray Cook (PT) & Lee Burton (AT)

A tool used to evaluate movement ability and quality

- Aim is to reveal limitations and/or asymmetries in healthy individuals with respect to basic movement patterns

Helps predict poor movement efficiency and breakdown

- Poor efficiency → fatigue early → poor form → increase potential for injury

Creates a feedback system

Functional Movement Screen

The screen involves extreme positions where weaknesses and imbalances become noticeable if appropriate stability and mobility is not utilized

- Mobility
  - *Represents muscle flexibility, joint range of motion, and multi-segmental interaction of body parts in functional positions and movement patterns*
- Stability (demonstration of body control)
  - *Static stability: maintenance of posture and balance*
  - *Dynamic stability: instantaneous integrity in the presence of full range of motion, components include:*
    - Mobility and flexibility | Strength | Coordination | Local muscle endurance | Cardiovascular fitness
- Must co-exist to create efficient movement

Functional Movement Screen

A baseline for movement

1. Deep Squat
2. Hurdle Step
3. In-line Lunge
4. Shoulder mobility
5. Straight leg Raise
6. Push-up
7. Rotatory Stability







Functional Movement Screen

Scoring

3 = ability to complete movement w/out compensation

2 = ability to complete movement with compensation(s)

1 = inability to complete movement

0 = presence of pain, regardless of movement performance

Interpretation

3 = appropriate/optimal mobility

2 = identifies priority of flexibility/mobility training

1 = poor functional base; ‘help’ is needed

0 = Sports medicine professional to identify source of pain

FMS – Deep Squat

While full deep squat is not often required in daily life, exercise or sport, its basic components are still required for efficient movement

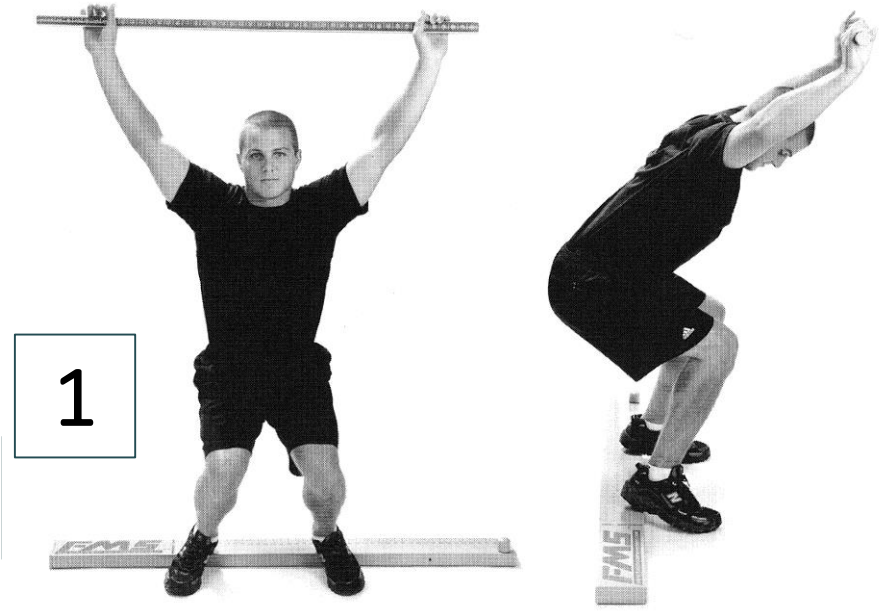
It is used to assess bilateral, symmetrical and functional mobility of the ankles, knees, hips and shoulder.

Starting position:

- Instep shoulder width apart
- Elbows flexed 90° when dowel placed on top of head

What to look for:

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



FMS – Hurdle Step

The movement requires proper coordination and stability between the hips and torso during the stepping motion as well as single leg stance stability

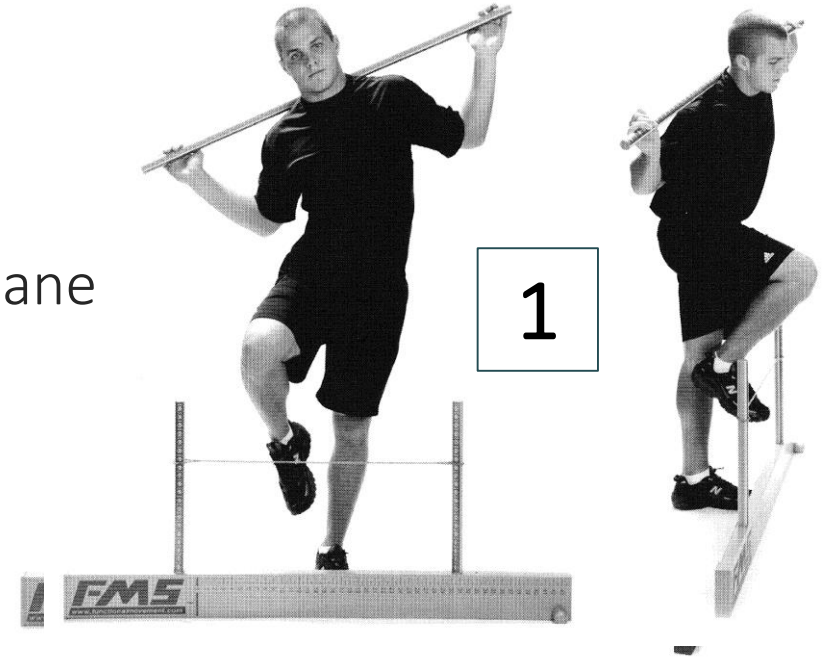
Assesses bilateral functional mobility and stability of the hips, knees and ankles while maintaining posture and balance

Starting position:

- Hurdle adjusted to the height of tibial tuberosity

What to look for:

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



FMS – In-line Lunge

This pattern places the body in a position that will focus on the stresses seen during rotational, decelerating and lateral-type movements

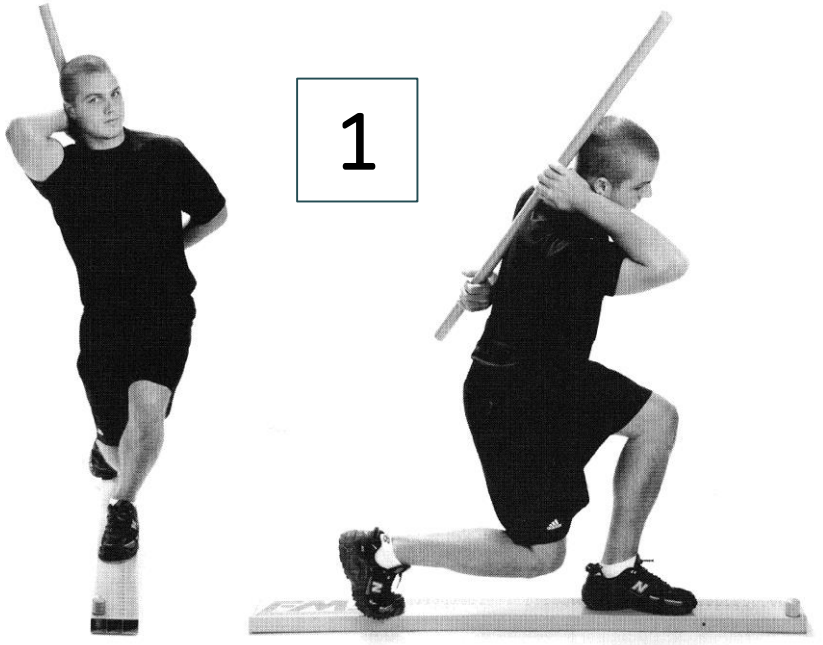
Challenges lower limb stability and mobility as well as latissimus dorsi and rectus femoris flexibility

Starting position:

- Note opposite arm and leg position
- Dowel touches head, thoracic spine and sacrum

What to look for:

- Minimal to no torso movement
- Feet remain in sagittal plane
- Knee touches behind heel of front foot



FMS – Shoulder Mobility

This pattern demonstrates the natural complementary rhythm of the scapular-thoracic region, thoracic spine and rib cage during reciprocal shoulder movements

Starting position:

- Determine hand length from wrist crease to tip of longest digit
- Make fist with thumbs inside the fingers

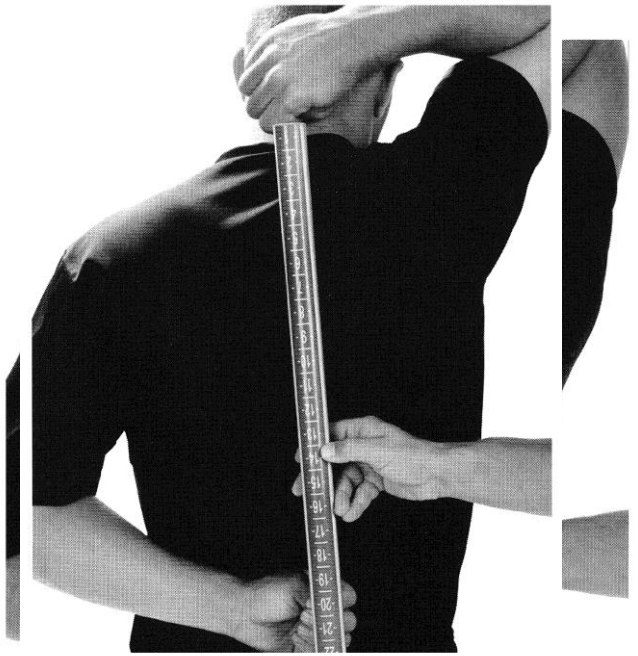
What to look for:

- Fists are within one hand length

3

2

1



FMS – Straight Leg Raise

Tests the ability to disassociate the lower extremity while maintaining core stability

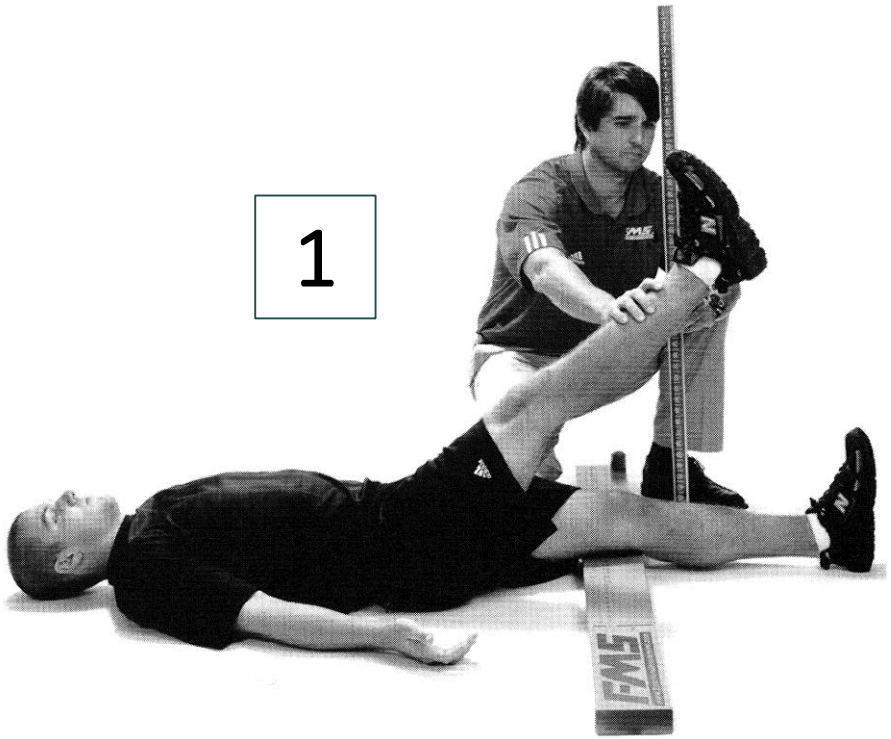
Assesses active hamstring and gastroc-soleus flexibility while maintaining a stable pelvis and active extension of the opposite leg

Starting position:

- Arms to the side with palms up
- Board under knee, toes vertical
- Lift leg from that position

What to look for:

- Dowel resides between mid-thigh and ASIS



FMS – Trunk Stability Push-up

The pushup is used to assess reflexive core stabilization and is not a test or measure of upper-body strength

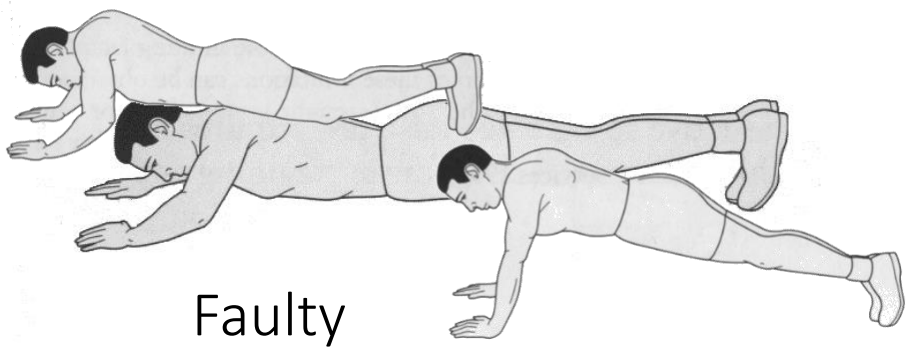
Trunk stability is required to transfer forces symmetrically from the upper extremities to the lower extremities and vice versa

Starting position:

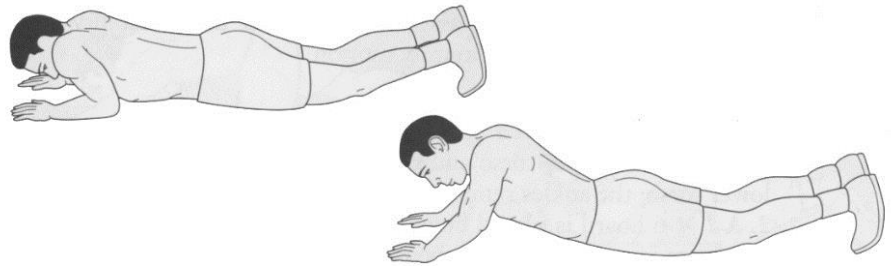
- Males: thumbs aligned with the top of the forehead
- Females: thumbs aligned with the chin

What to look for:

- The body should be lifted as a unit with no sway in the spine



Faulty



FMS – Rotational Stability

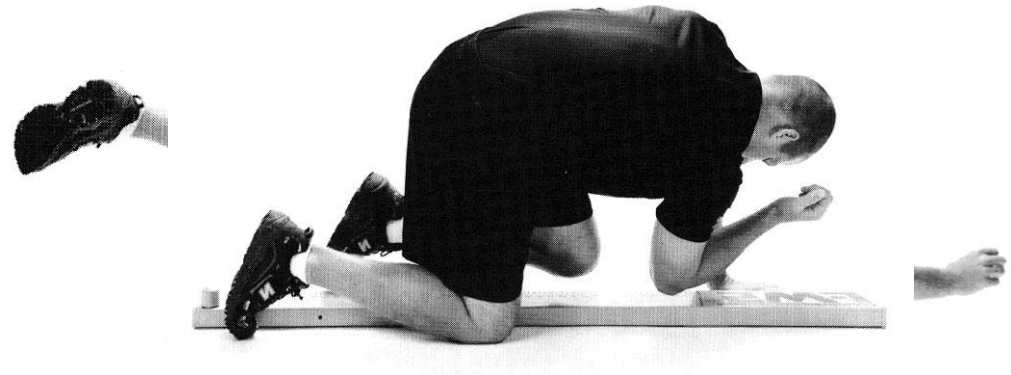
Assesses multi-plane asymmetric trunk stability in sagittal and transverse planes during a combined upper and lower extremity motion

Starting position:

- Shoulders, hips, knees, and ankles in a 90° position
- Hands in open position, thumb and toes touching the board

What to look for:

- Flex and extend elbow to knee while remaining in line with board
- The spine is allowed to flex during motion



Movement Corrective Strategies

Faulty movement patterns do not only require corrective exercises

Habits/exercise programs/activities/occupational duties that perpetuate faulty movement need to be addressed

Hierarchy in corrective approach

1. *Straight-leg raise*
2. *Shoulder mobility*
3. *Rotary stability*
4. *Push-up*
5. *Inline lunge*
6. *Hurdle step*
7. *Deep squat*

Movement Corrective Strategies

Corrective exercises fall into 3 categories

Mobility – targets freedom of movement

Stability – targets basic motor control

Movement Pattern Retraining – targets functional movement patterns utilizing both mobility and stability

The lower the score on a screen the greater the importance of flexibility training

Straight-leg Raise Corrective Exercises

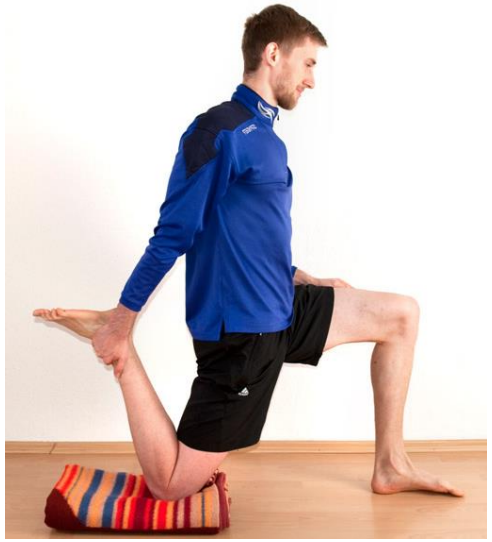
Any hamstring stretch

- Partner straight leg raise stretch
- Sit-and-reach

Any hip flexor stretch

- Can add knee flexion to stretch rectus femoris m.

Any glute stretch



Straight-leg Raise Corrective Exercises

Single leg lowering progression (maintain normal lumbar curve)

Lower one leg at a time to bolster (progress to remove bolster)

1. *Using table or doorway assistance*
2. *Unassisted*

Straight-leg Raise Corrective Exercises

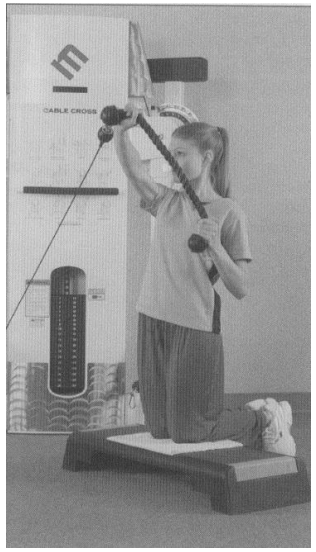
Toe touch progression

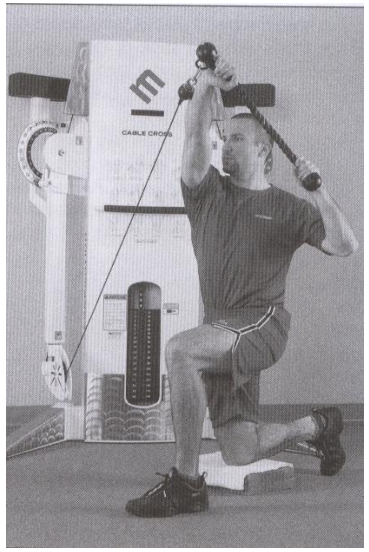
Rolled up towel between knees, squeeze when feeling tightness

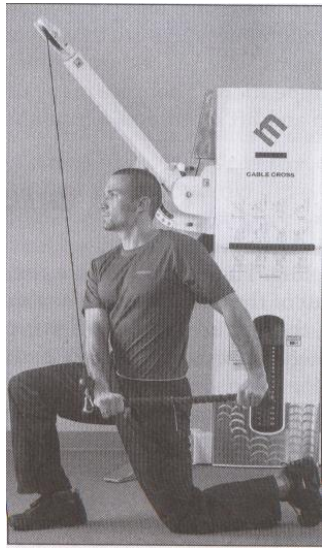
Forefoot elevated

Repeat w/ heels elevated

Chop & lift







Shoulder Mobility Corrective Exercises

Trunk rotation with shoulder internal/external traction

- Hips & knees flexed 90°, rotated one way while traction is applied on the opposite arm
- Note this stretch can be performed on the floor with cable assistance

Wall sit with shoulder press

Arm bar

<u>Wall sit w/ shoulder press</u>
Back of hand maintains contact with wall
Arms move up and down

Rotary Stability Corrective Exercises

Rolling

- Maintain close proximity with the knee and elbow while supporting the head on the opposite, flexed shoulder

Soft-Roll

- Movement is performed with upper body, lower body is completely passive
- Use head rotation to accomplish action (neck action reflexively stabilizes the core)
- An elastic may be used to encourage proper axis within body

Rotary Stability Corrective Exercises

Quadruped with elastics

- Extend one arm or leg at a time progress to opposite arm and leg

Chop & lift cable exercises

Bear walk exercise

- Resistance can be added with sleds

Asymmetrical loading

- Superman position

Push-up Corrective Exercises

Incline pushup progression

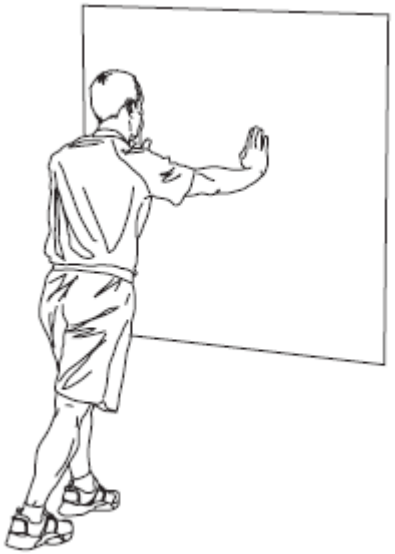
Chop & lift exercises

Pushup walk outs

- Walk hands out as far as possible without losing neutral lumbar spine. Walk hands back towards body

Coreboard (wobble board) static or dynamic pushup

Inline Lunge Corrective Exercises



Stretches as performed for the straight-leg raise corrective exercises

- Plus calf stretch (leg straight & knee bent)
- Spiderman stretch

Cook hip lift

Inline Lunge Corrective Exercises

- Medicine Ball Progressions
  - Half kneeling position first then standing lunge position
    - *Chop open (Lateral diagonal down)*
    - *Lift closed (Lateral diagonal up)*

Hurdle Step Corrective Exercises

Stretches as performed for the straight-leg raise corrective exercises

- Plus stride with spinal rotation

Mountain climber

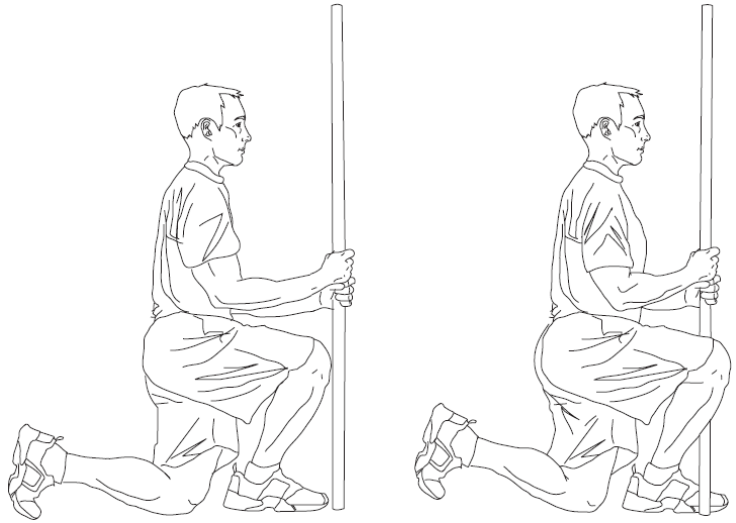
- Advanced variation: one-arm

Deep Squat Corrective Exercises

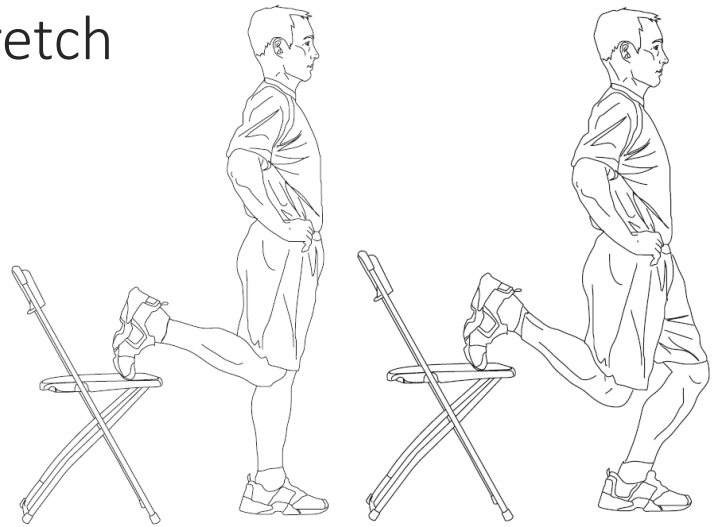
All other screens must be cleared (score at least 2) before addressing squat corrections

Ankle dorsiflexion flexibility

- Place dowel along lateral aspect of foot
- Shift forward, front knee tracking outside dowel
- The heel should remain down



Standing rectus stretch



Deep Squat Corrective Exercises

Pattern building

- Pulling the body down into squat
- Using tubing around knees
- Squat facing wall
  - *Toes & nose on the wall go as low as possible, important to kick knees out*