Functional Dissection of the Olympic Movements

University of Nebraska ~ November 8-9, 2014

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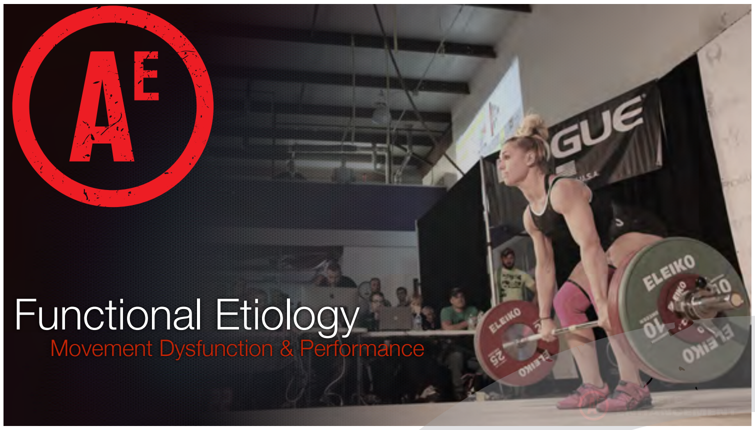
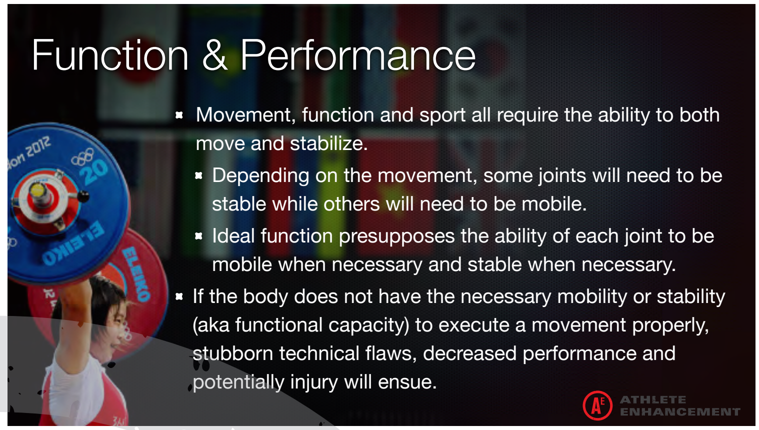
ATHLETE ENHANCEMENT


Functional Etiology
Movement Dysfunction & Performance


Function & Performance
Movement, function and sport all require the ability to both move and stabilize.
Depending on the movement, some joints will need to be stable while others will need to be mobile.
Ideal function presupposes the ability of each joint to be mobile when necessary and stable when necessary.
If the body does not have the necessary mobility or stability (aka functional capacity) to execute a movement properly, stubborn technical flaws, decreased performance and potentially injury will ensue.
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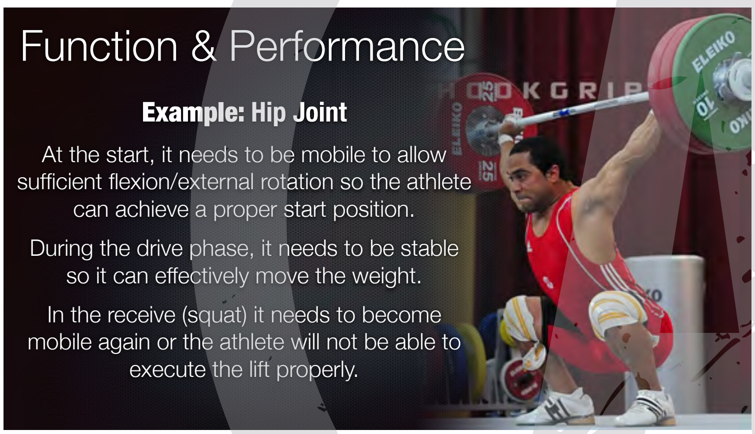
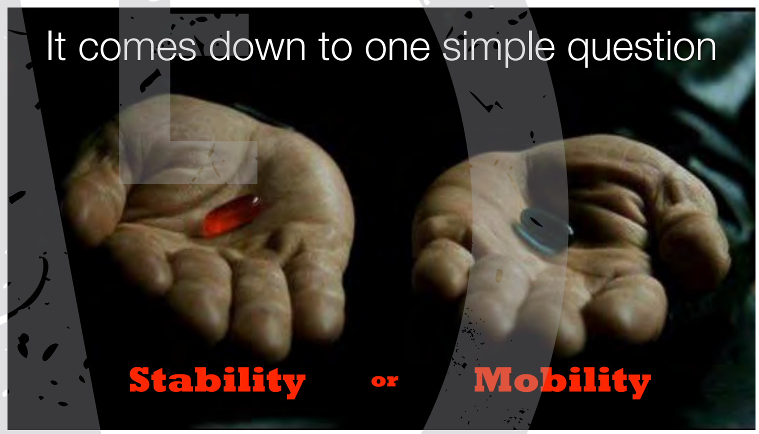

Function & Performance
Example: Hip Joint
At the start, it needs to be mobile to allow sufficient flexion/external rotation so the athlete can achieve a proper start position.
During the drive phase, it needs to be stable so it can effectively move the weight.
In the receive (squat) it needs to become mobile again or the athlete will not be able to execute the lift properly.


It comes down to one simple question
Stability
or
Mobility


Functional Competence
The ability (potential) to execute a movement correctly.
Functional competence for sport involves a lot more than muscles, bones and mechanics.
The body is a complex neruo-mechanical machine and must be treated as such if we are to optimize training and performance.
Lacking the ability to evaluate and assess an athlete's functional competence limits a coach's ability to maximize an athlete's potential.
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Sources of Movement Dysfunction

Sources of Movement Dysfunction

- Intense Training or over training (temporary tight muscles): athlete's muscular system has not retained its elasticity following a heavy training session and/or the athlete is getting overtrained.
- Pain/Pathology: Nociception experienced during the movement drives the brain into a protective movement patter, which does not allow for proper motion. (i.e. torn rotator cuff, back spasm from disc herniation)
- Lack of Movement / Lifestyle Choices: Soft tissue adapts to its longest functional length. If joints and muscles are not brought through a full ROM, these tissues will become functionally short and result in movement dysfunction.
- Structural/neurological abnormality: The skeletal, muscular or neurological system has developed pathologically, inhibiting ideal, "normal" movement. (i.e. femoral retroversion, Ehlers-Danlos syndrome, cerebral palsy).

Sources of Movement Dysfunction *Strain*

Athletes consistently push themselves beyond their limits. This is the process of improving and developing, but involves pushing beyond their ability to maintain good movement strategies and good positions.

- Load-strain: The force maximum required for the movement is greater than the athlete can tolerate. (i.e.1RM testing, or lifting to complete failure)
- Speed-strain: The angular joint velocity or muscle contraction speed is greater than the nervous system can handle. (i.e. box-jumps, Olympic lifts)
- Fatigue-strain: Athlete is in a state of either respiratory fatigue where they cannot stabilize and respirate properly or in a state of muscular fatigue where the lactate concentration inhibits muscular contraction. (i.e. final 100M of an Ironman, CrossFit workouts)
- Psychological-strain: High pressure situations which do not allow the athlete to relax, often resulting from over-thinking the movements. (i.e. Olympic games, post-season competitions)

Threshold Training

As strength coaches, you need to be aware of an athlete's threshold for each of the different types of strain and train them at that threshold.

This is the art of strength & conditioning, training an athlete right at their threshold for optimal development.

Movement Dysfunction: Underlying Cause

Poor Subcortical Stabilizing Strategy

(The brain does not stabilize the body correctly for locomotion)

Movement requires both mobility and stability; however, in locomotion, stabilization precedes movement.

Any breakdown in stability precludes proper motion from occurring.

Poor Subcortical Stabilizing Strategy

(The brain does not stabilize the body correctly for locomotion)

- Intentional movement involves both conscious and subconscious efforts.
- Enabling a conscious task to be accomplished is a myriad of neurological processes run by a combination of spinal reflexes and subcortical activity.
- The cerebral cortex focuses on the task, deciding what it wants to do.
- The subcortex has the monstrous task of making the movements smooth and precise, maintaining global posture, controlling muscle tone, and prioritizing incoming sensory information, so that the given task can be accomplished.

Functional Continuum

Decreased Performance or Pain

Movement Dysfunction

Tight Muscles
(Hypomobility)

Instability
(Hypermobility)

Subcortical Stabilizing Strategy Dysfunction
(SSSD)

Locomotion
(Ideal Movement Strategy)

- The body has evolved to move and stabilize a certain way.
- This “movement strategy” is efficient, joint-protective and ideal for both sports and life.
- It utilizes synergy and coactivation of all the muscles around a joint resulting in optimal joint loading for force production.

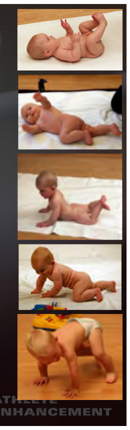
The question is...

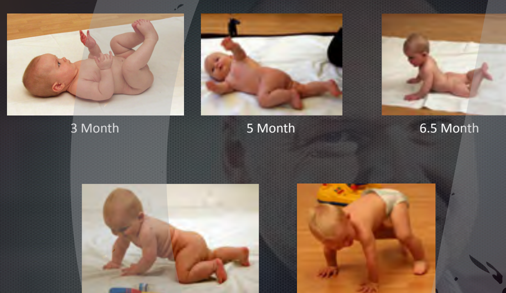
From where does this movement strategy come?

Ontogenesis

Defined: The development of an individual organism from its earliest stage to maturity.

- Unlike other mammals, humans are born with incomplete neuromuscular systems and must go through a maturation process where these systems must develop before optimal function can be achieved.
- During ontogenesis the child’s muscular, skeletal and nervous systems develop. Through this process, the child acquires fundament movements (i.e. turning, crawling, swallowing) that will become the functional building blocks of more complex movements such as throwing a baseball.
- It is during this process that the child “activates” or learns the ideal stabilizing strategy, which is initiated and driven by maturation of the central nervous system.
- Any breakdown in this process results in stubborn, sometimes fixed movement pathologies (i.e. winging scapulae or hyper-pronated feet).





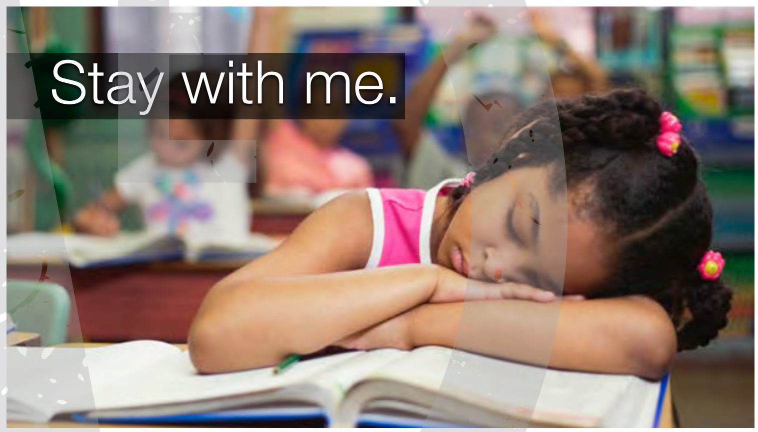
3 Month

5 Month

6.5 Month

9 Month

10 Month



Origin of the Ideal Movement Strategy

- As the CNS develops, under normal conditions, the child learns to stabilize and move with an ideal movement strategy.
- Early in the process (newborn stage), movement and posture are controlled exclusively by the spinal cord and brainstem.
  - During the newborn stage of development, only a small portion of muscles are active. These muscles are known as the *tonic system*.
- As this process continues, higher centers of the central nervous system activate and begin to control purposeful movement.
  - During this time, the rest of the muscles of the body (i.e. gluteus maximus, deep neck flexors, etc.) known as the *phasic system*, activate and begin participating in stabilization and locomotion.
- The ideal movement strategy involves higher centers of the brain, but is built upon proper function of the lower, more primordial levels of the nervous system.

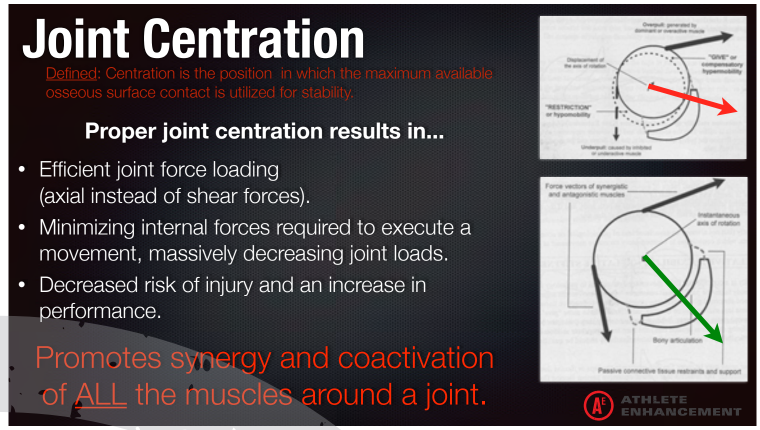
Tonic Muscles

Pronator Teres
Subscapularis
Pectoralis Major
Pectoralis Minor
Latissimus Dorsi
Upper Trapezius
Levator Scapulae
Wrist Flexors
Neck Extensors
Iliopsoas
Hip Adductors
Hamstrings

Phasic Muscles

Opponens Pollicis
Wrist Extensors
Teres Minor
Infraspinatus
Serratus Anterior
Lower Trapezius
Transverse Abdominis
Obliqueis Internus
Obliquis Externus
Hip Abductors
Gastrocnemius
Longus Colli


So what is the ideal movement strategy?


Joint Centration
Defined: Centration is the position in which the maximum available osseous surface contact is utilized for stability.
Proper joint centration results in...
• Efficient joint force loading (axial instead of shear forces).
• Minimizing internal forces required to execute a movement, massively decreasing joint loads.
• Decreased risk of injury and an increase in performance.
Promotes synergy and coactivation of ALL the muscles around a joint.
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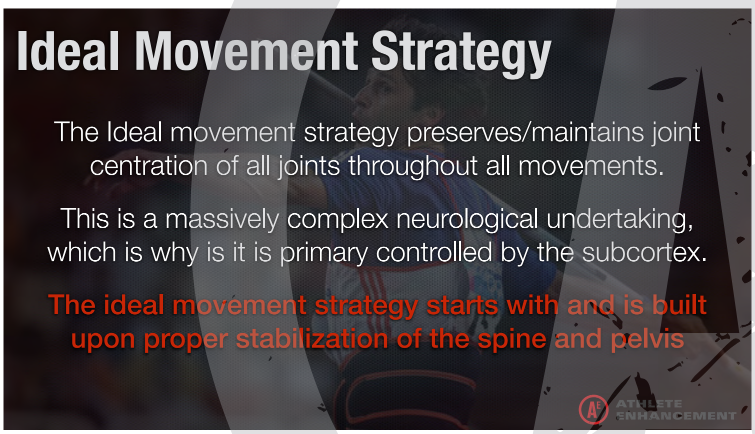
Ideal Movement Strategy
The Ideal movement strategy preserves/maintains joint centration of all joints throughout all movements.
This is a massively complex neurological undertaking, which is why is it is primary controlled by the subcortex.
The ideal movement strategy starts with and is built upon proper stabilization of the spine and pelvis
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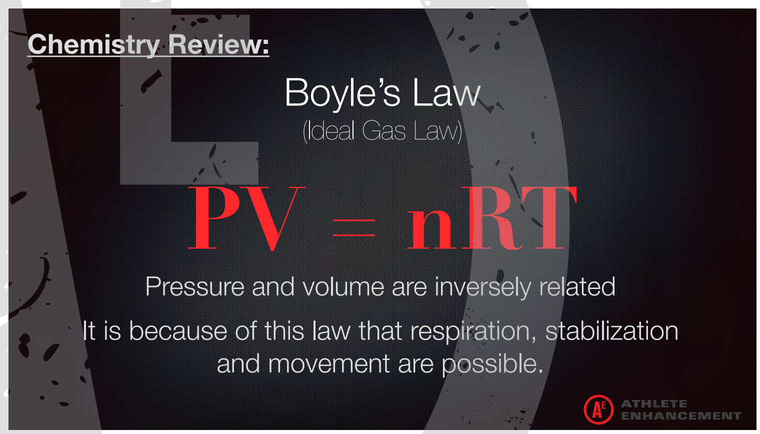
Chemistry Review:
Boyle's Law
(Ideal Gas Law)
PV = nRT
Pressure and volume are inversely related
It is because of this law that respiration, stabilization and movement are possible.
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The Forgotten Hero
The diaphragm is perhaps the single most important muscle for stabilization and locomotion.
It is attached to the lower ribs and the spine at the thoraco-lumbar junction, separating the chest cavity from the abdominal cavity.
Comprised of a central tendon (non-contractile) and three muscular divisions (two costal and one crural)
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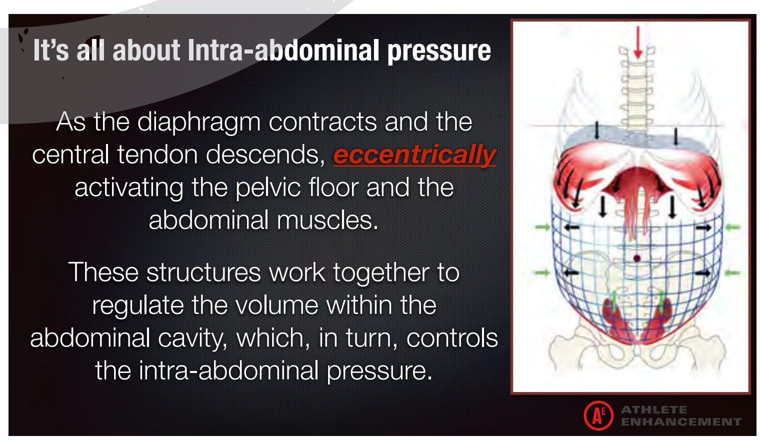
It's all about Intra-abdominal pressure
As the diaphragm contracts and the central tendon descends, eccentrically activating the pelvic floor and the abdominal muscles.
These structures work together to regulate the volume within the abdominal cavity, which, in turn, controls the intra-abdominal pressure.
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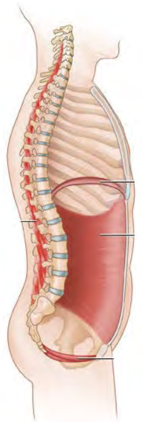


It's all about Intra-abdominal pressure

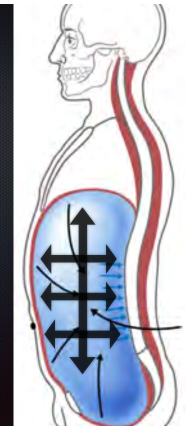
If no additional stability is needed, the abdominal wall will expand to maintain the volume and therefore the pressure within the abdominal cavity.

However, if additional stability is required, the abdominal wall will resist expansion against the force of the descending diaphragm, decreasing the volume of the abdominal cavity resulting in an increase in intra-abdominal pressure.

Intra-abdominal Pressure

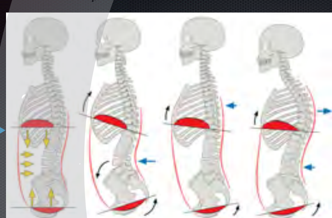
As the intra-abdominal pressure rises, so does the force of the pressure pushing outward in all directions.

This pressure simultaneously pushes posteriorly into the spine (resisting the extension force created by the erector spinae) and creates a traction (decompressive force) massively reducing the intradiscal pressure and the load placed on the spine.



Pressure, Posture & Position

AKA…
"Zone of Apposition"
For the PRI junkies



- Adequate (optimal) generation of intra-abdominal pressure requires the pelvic floor and diaphragm being positioned parallel to each other.
- This dictates "proper" positioning of the spine in all movements, especially loaded movements like such as the Olympic lifts.

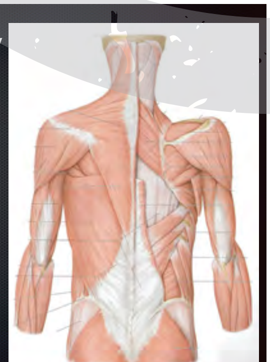
Pressure, Posture & Position

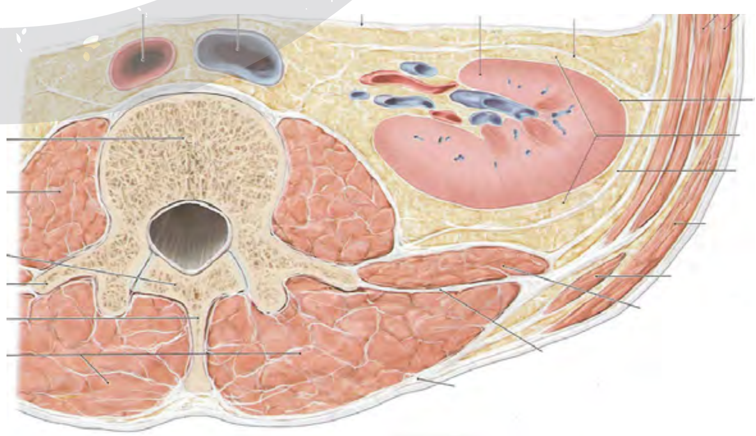
Thoraco-Lumbar Fascia & Spinal Stability

The abdominal wall attaches to the thoraco-lumbar fascia, which itself attaches to the posterior portion of the spine.

Rising pressure within the abdomen increases the tension in the abdominal wall and therefore increases the tension within the thoraco-lumbar fascia.

As IAP rises, the spine is squeezed between the pressure within the abdomen and the tension within the thoraco-lumbar fascia, further increasing the rigidity of the spinal column.






Questions?


The Fragility of Locomotion
Optimal function of the locomotor system is delicate and difficult to maintain. If proper development does not occur or the athlete is progressed too rapidly through their training progression, they will regress to more primitive stabilizing strategies.
Such regression also occurs when execution of a task (i.e. throw a baseball, snatch 90K, squat 500lbs. etc.) requires more force, speed, or endurance than can be generated with the IMS.
In these cases, the body must resort to less efficient, less ideal, more primitive (younger), compensatory movement strategies to complete the task.
Such strategies are pervasive in sports and are the source of stubborn technical flaws, movement dysfunction, recalcitrant injuries and decreases in performance.
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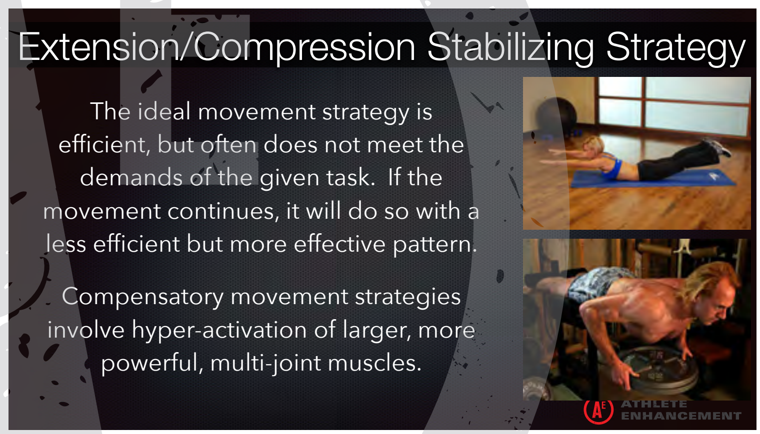
Extension/Compression Stabilizing Strategy
The ideal movement strategy is efficient, but often does not meet the demands of the given task. If the movement continues, it will do so with a less efficient but more effective pattern.
Compensatory movement strategies involve hyper-activation of larger, more powerful, multi-joint muscles.
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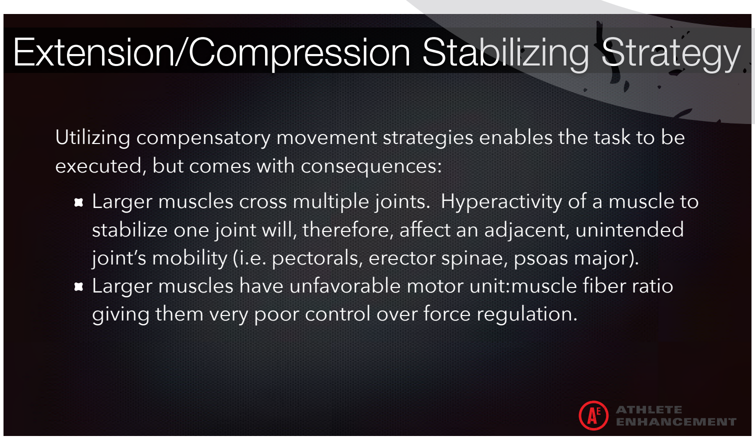
Extension/Compression Stabilizing Strategy
Utilizing compensatory movement strategies enables the task to be executed, but comes with consequences:
Larger muscles cross multiple joints. Hyperactivity of a muscle to stabilize one joint will, therefore, affect an adjacent, unintended joint's mobility (i.e. pectorals, erector spinae, psoas major).
Larger muscles have unfavorable motor unit:muscle fiber ratio giving them very poor control over force regulation.
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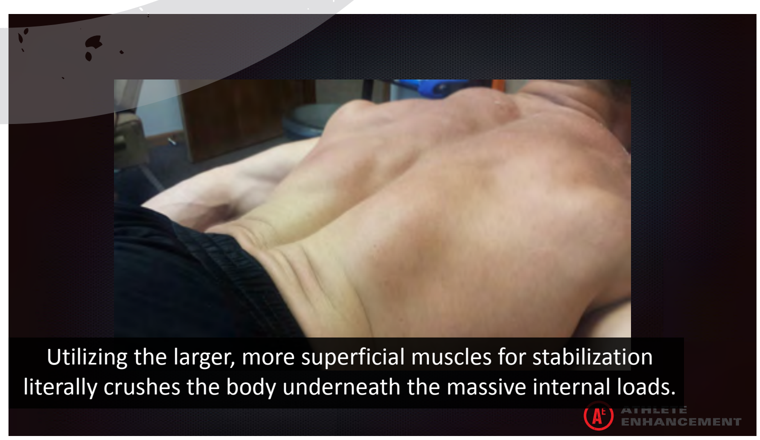
Utilizing the larger, more superficial muscles for stabilization literally crushes the body underneath the massive internal loads.
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Extension/Compression Stabilizing Strategy
Whenever the threshold for the ILS is exceeded (speed, force, etc.), the extensor/compression stabilizing strategy will dominate the movement.
We must train our athletes and clients to raise the threshold of the ILS so that efficient, optimal movement will predominate.
This is joint protective, prevents injury, allows the athlete to sustain higher training loads, decreases functional blocks and improves performance.
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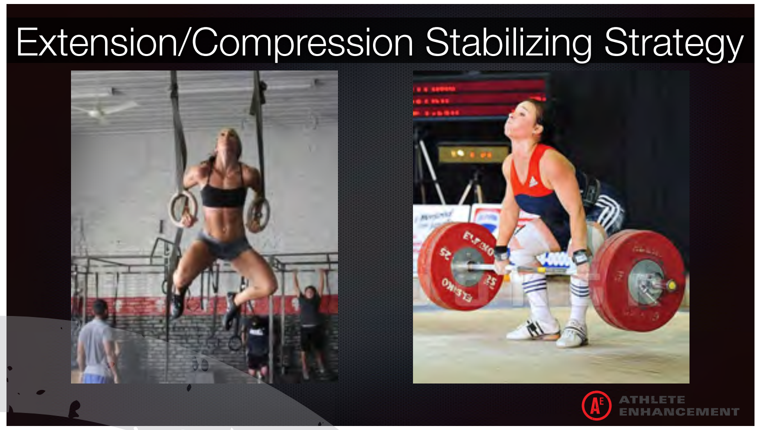
Extension/Compression Stabilizing Strategy
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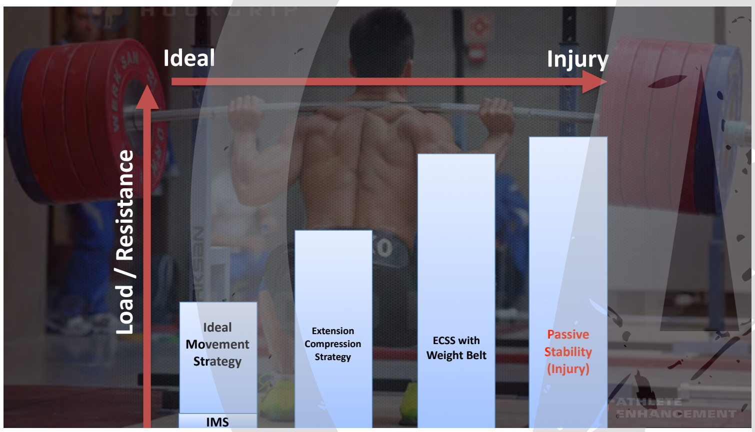
Ideal
Injury
Load / Resistance
Ideal Movement Strategy
IMS
Extension Compression Strategy
ECSS with Weight Belt
Passive Stability (Injury)
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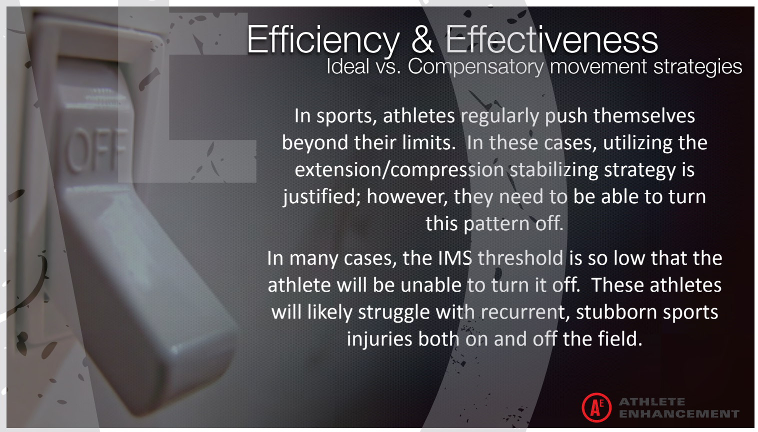
Efficiency & Effectiveness
Ideal vs. Compensatory movement strategies
In sports, athletes regularly push themselves beyond their limits. In these cases, utilizing the extension/compression stabilizing strategy is justified; however, they need to be able to turn this pattern off.
In many cases, the IMS threshold is so low that the athlete will be unable to turn it off. These athletes will likely struggle with recurrent, stubborn sports injuries both on and off the field.
OFF
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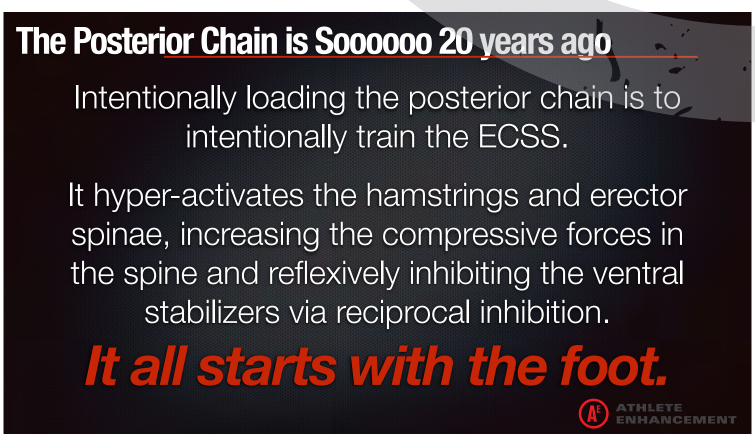
The Posterior Chain is Soooooo 20 years ago
Intentionally loading the posterior chain is to intentionally train the ECSS.
It hyper-activates the hamstrings and erector spinae, increasing the compressive forces in the spine and reflexively inhibiting the ventral stabilizers via reciprocal inhibition.
It all starts with the foot.
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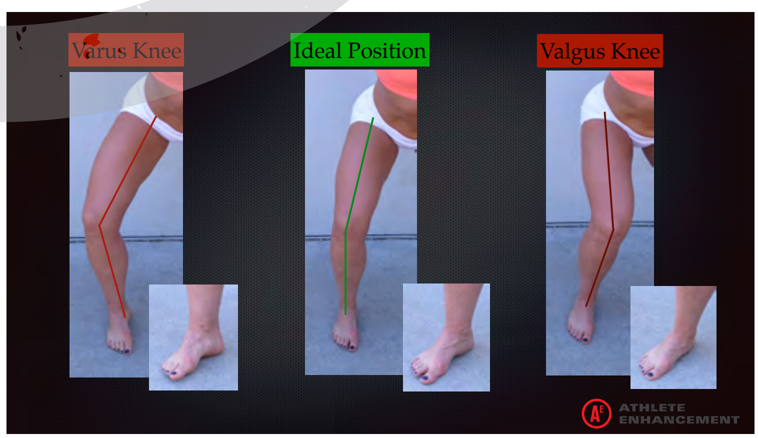
Varus Knee
Ideal Position
Valgus Knee
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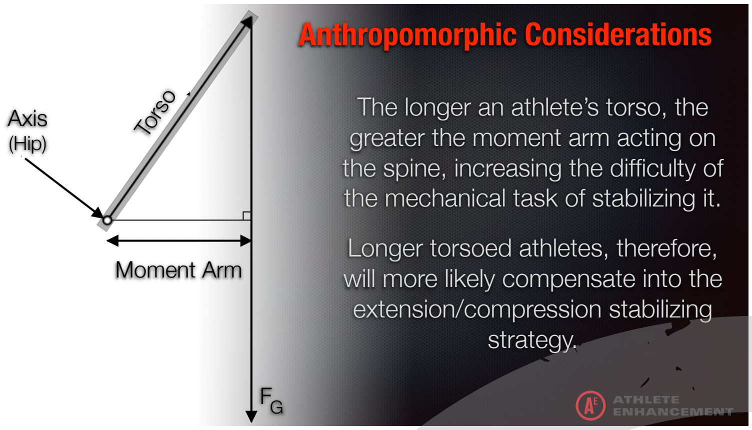
Anthropomorphic Considerations
Axis
(Hip)
Torso
Moment Arm
F_G
The longer an athlete's torso, the greater the moment arm acting on the spine, increasing the difficulty of the mechanical task of stabilizing it.
Longer torsoed athletes, therefore, will more likely compensate into the extension/compression stabilizing strategy.
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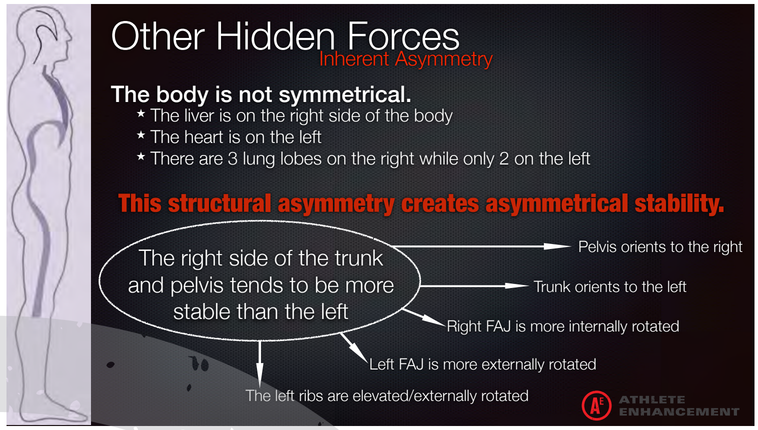
Other Hidden Forces
Inherent Asymmetry
The body is not symmetrical.
* The liver is on the right side of the body
* The heart is on the left
* There are 3 lung lobes on the right while only 2 on the left
This structural asymmetry creates asymmetrical stability.
The right side of the trunk and pelvis tends to be more stable than the left
Pelvis orients to the right
Trunk orients to the left
Right FAJ is more internally rotated
Left FAJ is more externally rotated
The left ribs are elevated/externally rotated
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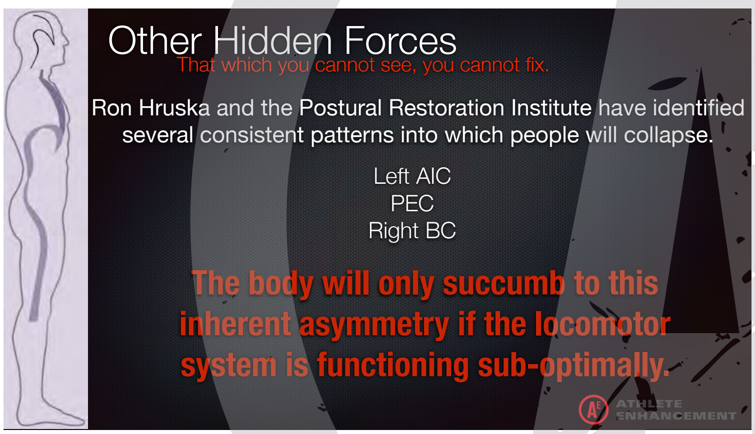
Other Hidden Forces
That which you cannot see, you cannot fix.
Ron Hruska and the Postural Restoration Institute have identified several consistent patterns into which people will collapse.
Left AIC
PEC
Right BC
The body will only succumb to this inherent asymmetry if the locomotor system is functioning sub-optimally.
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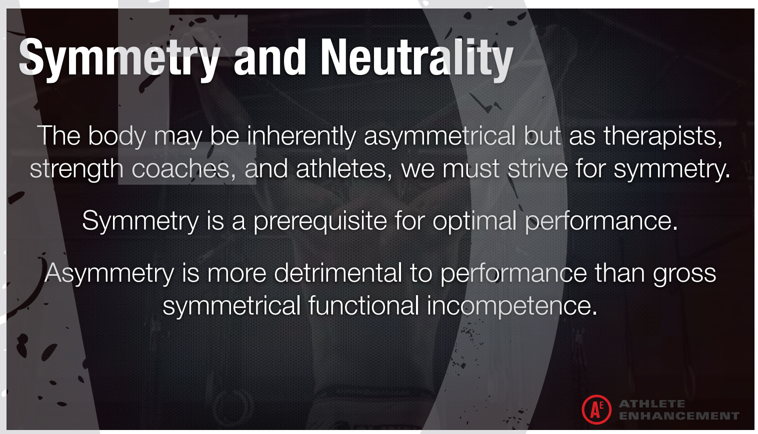
Symmetry and Neutrality
The body may be inherently asymmetrical but as therapists, strength coaches, and athletes, we must strive for symmetry.
Symmetry is a prerequisite for optimal performance.
Asymmetry is more detrimental to performance than gross symmetrical functional incompetence.
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Questions?
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Common Functional Blocks
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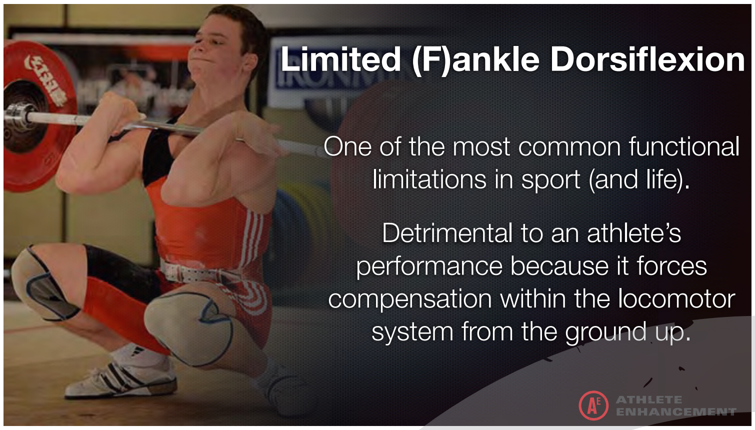
Limited (F)ankle Dorsiflexion
One of the most common functional limitations in sport (and life).
Detrimental to an athlete's performance because it forces compensation within the locomotor system from the ground up.
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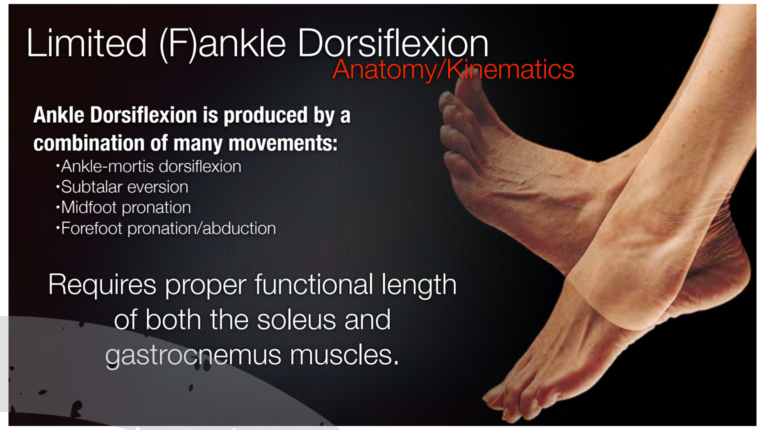
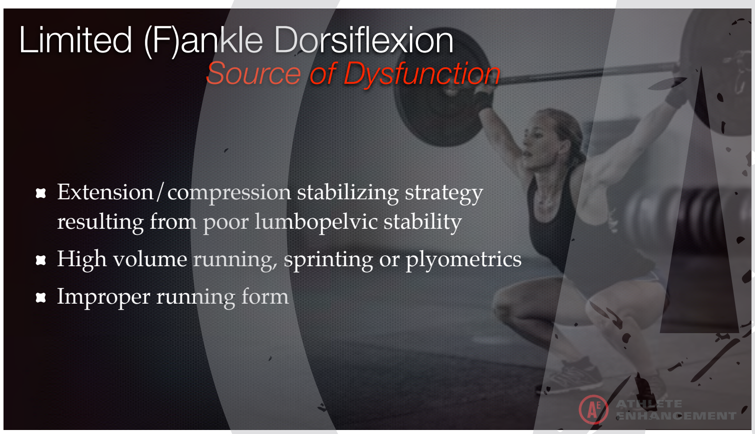

Limited (F)ankle Dorsiflexion
Anatomy/Kinematics
Ankle Dorsiflexion is produced by a combination of many movements:
•Ankle-mortis dorsiflexion
•Subtalar eversion
•Midfoot pronation
•Forefoot pronation/abduction
Requires proper functional length of both the soleus and gastrocnemus muscles.


Limited (F)ankle Dorsiflexion
Source of Dysfunction
Extension/compression stabilizing strategy resulting from poor lumbopelvic stability
High volume running, sprinting or plyometrics
Improper running form
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Limited (F)ankle Dorsiflexion
Injury Risk
Knee problems (patellar tracking, patellar tendonitis, meniscus-like symptoms)
Back pain (hyperactive erector spinae, lumbar disc pathology) - results from the flattened spine angle that puts the spine in a very mechanically disadvantageous position.
Shoulder pathology (rotator cuff sprain/strain, labral tear)
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Limited (F)ankle Dorsiflexion
Movement Pathology (Technical Flaws)
Inability to achieve a good starting position
Athlete will tend to externally rotate their feet (external foot flare) at the start and during the catch.
Athlete will prefer a wider stance in the squat.
Early/Excessive lumbar flexion in the starting position (worse in the snatch) and at the bottom of the catch.
Athlete will have a more pronounced flattened (horizontal) spine angle.
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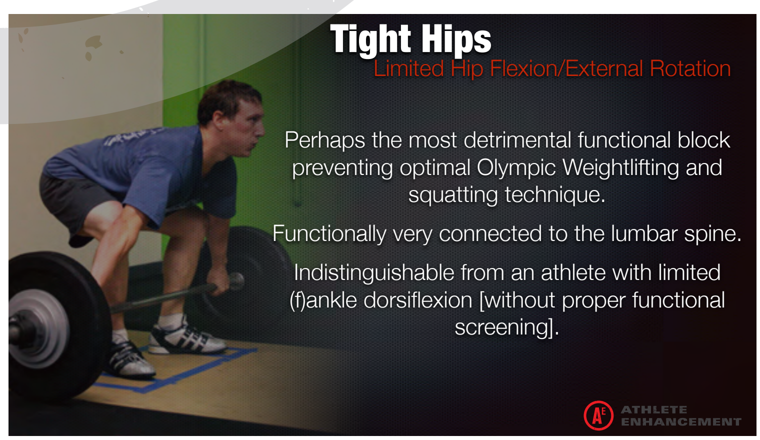
Tight Hips
Limited Hip Flexion/External Rotation
Perhaps the most detrimental functional block preventing optimal Olympic Weightlifting and squatting technique.
Functionally very connected to the lumbar spine.
Indistinguishable from an athlete with limited (f)ankle dorsiflexion [without proper functional screening].
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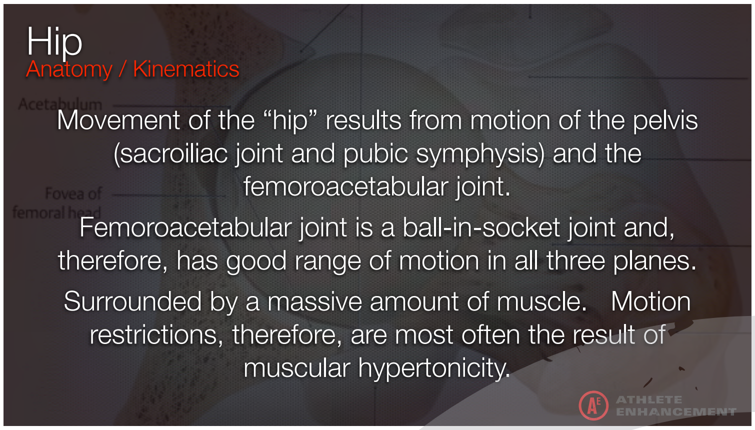
Hip
Anatomy / Kinematics
Acetabulum
Movement of the "hip" results from motion of the pelvis (sacroiliac joint and pubic symphysis) and the femoroacetabular joint.
Femoroacetabular joint is a ball-in-socket joint and, therefore, has good range of motion in all three planes.
Surrounded by a massive amount of muscle. Motion restrictions, therefore, are most often the result of muscular hypertonicity.
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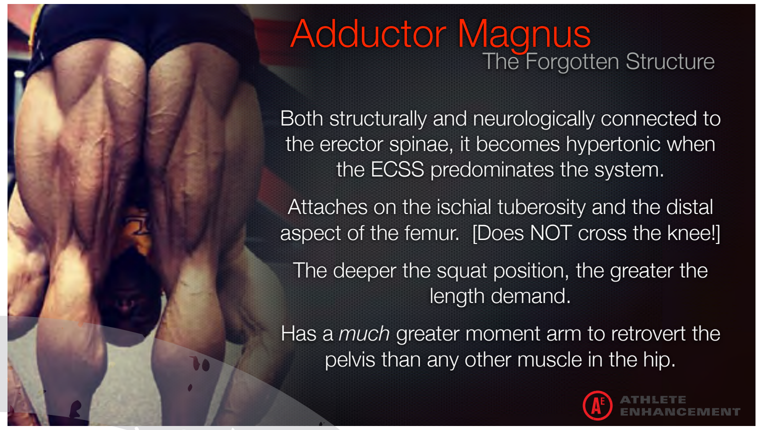
Adductor Magnus
The Forgotten Structure
Both structurally and neurologically connected to the erector spinae, it becomes hypertonic when the ECSS predominates the system.
Attaches on the ischial tuberosity and the distal aspect of the femur. [Does NOT cross the knee!]
The deeper the squat position, the greater the length demand.
Has a *much* greater moment arm to retrovert the pelvis than any other muscle in the hip.
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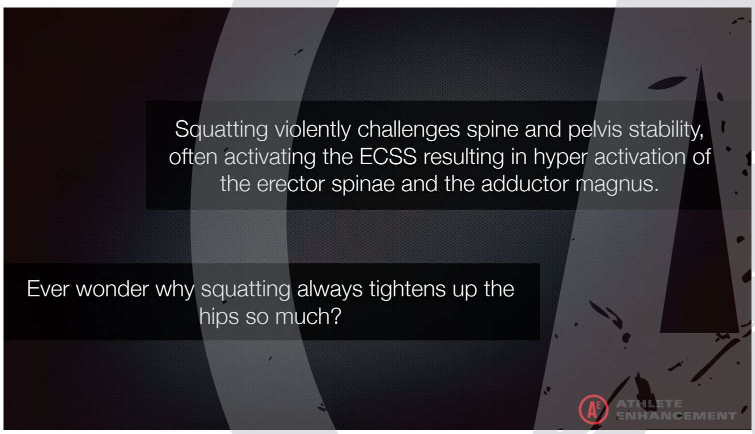
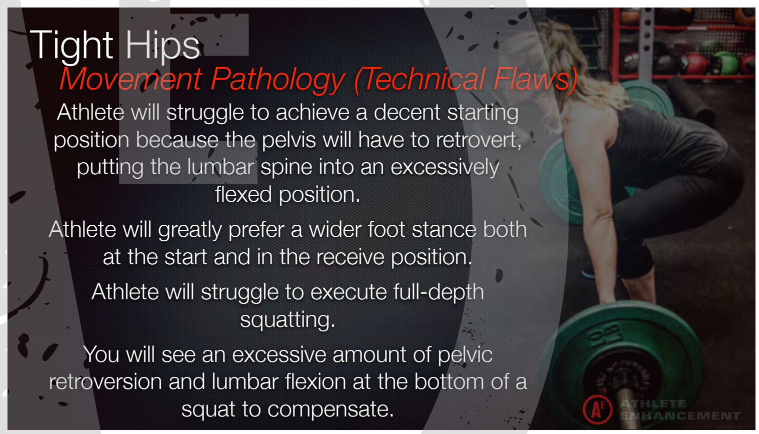
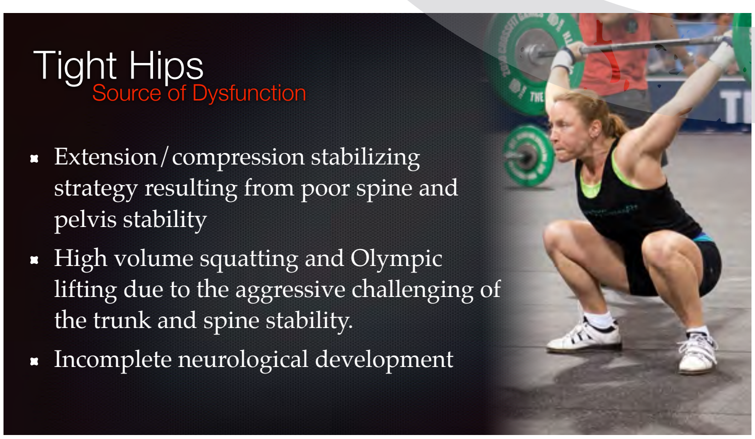
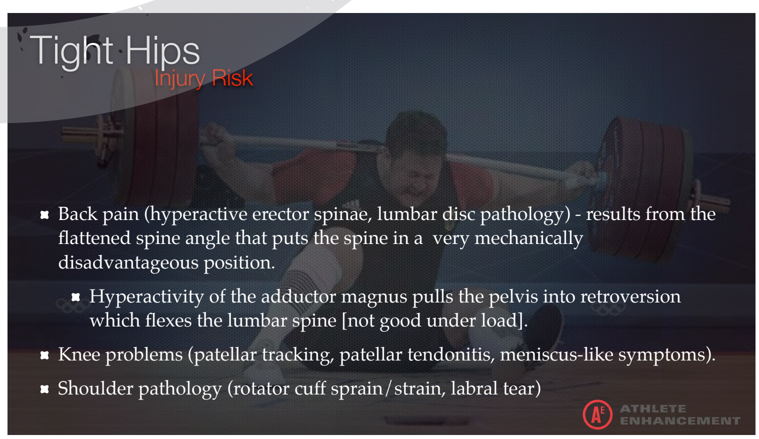
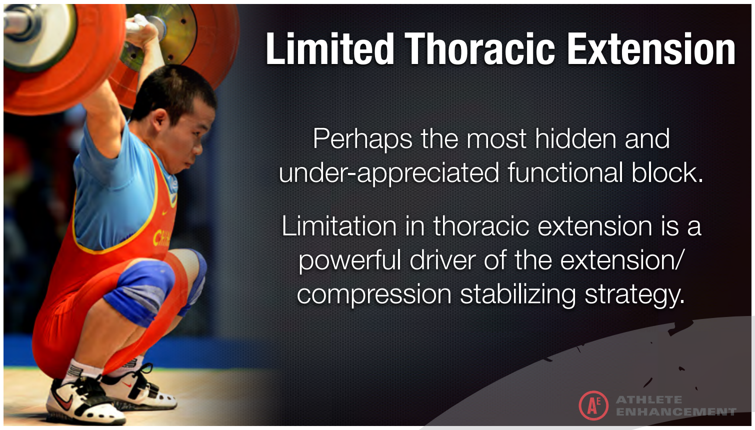
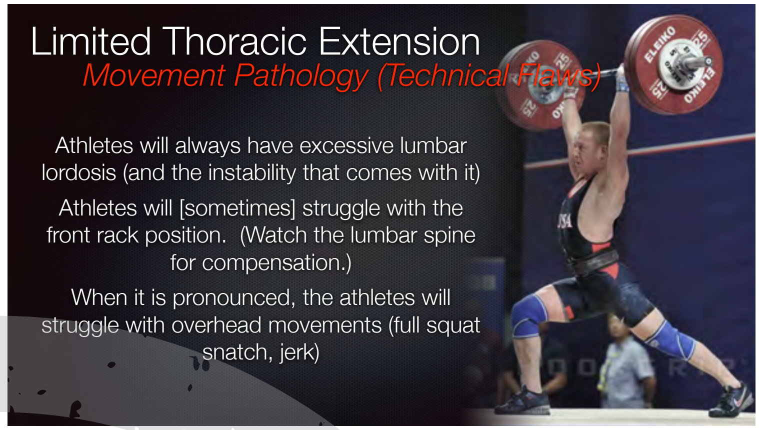

Squatting violently challenges spine and pelvis stability, often activating the ECSS resulting in hyper activation of the erector spinae and the adductor magnus.
Ever wonder why squatting always tightens up the hips so much?
ATHLETE ENHANCEMENT

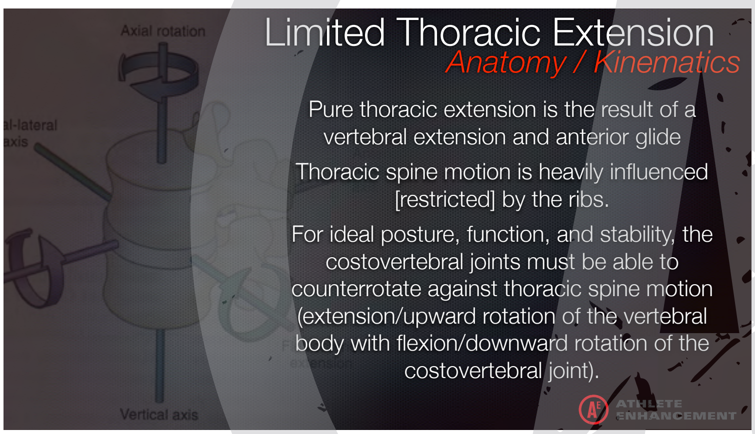

Tight Hips
Movement Pathology (Technical Flaws)
Athlete will struggle to achieve a decent starting position because the pelvis will have to retrovert, putting the lumbar spine into an excessively flexed position.
Athlete will greatly prefer a wider foot stance both at the start and in the receive position.
Athlete will struggle to execute full-depth squatting.
You will see an excessive amount of pelvic retroversion and lumbar flexion at the bottom of a squat to compensate.
ATHLETE ENHANCEMENT

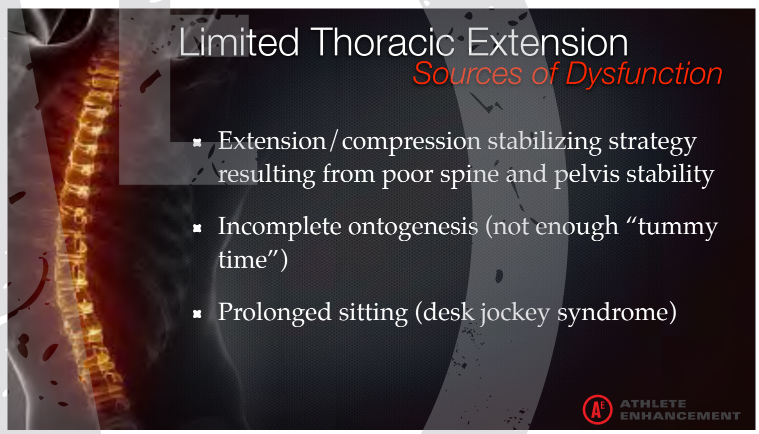

Tight Hips
Source of Dysfunction
Extension/compression stabilizing strategy resulting from poor spine and pelvis stability
High volume squatting and Olympic lifting due to the aggressive challenging of the trunk and spine stability.
Incomplete neurological development

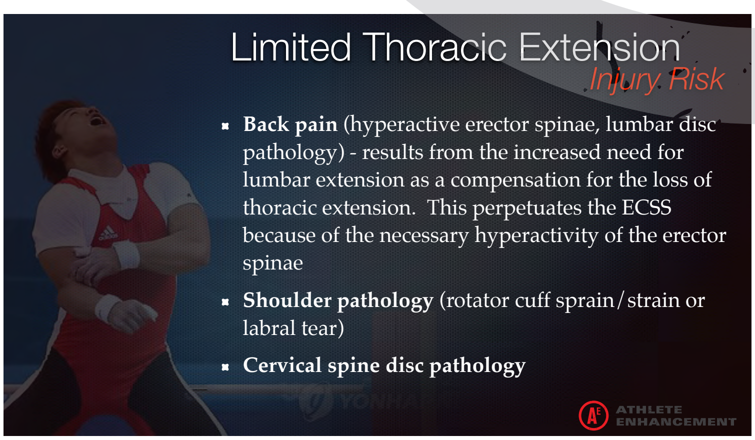

Tight Hips
Injury Risk
Back pain (hyperactive erector spinae, lumbar disc pathology) - results from the flattened spine angle that puts the spine in a very mechanically disadvantageous position.
Hyperactivity of the adductor magnus pulls the pelvis into retroversion which flexes the lumbar spine [not good under load].
Knee problems (patellar tracking, patellar tendonitis, meniscus-like symptoms).
Shoulder pathology (rotator cuff sprain/strain, labral tear)
ATHLETE ENHANCEMENT

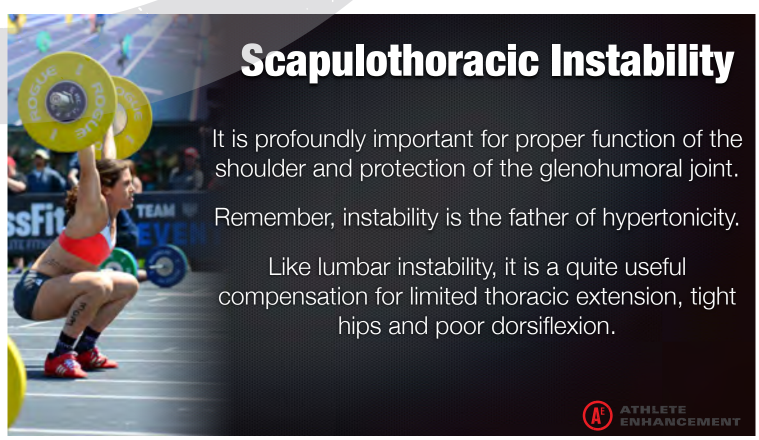

Limited Thoracic Extension
Perhaps the most hidden and under-appreciated functional block.
Limitation in thoracic extension is a powerful driver of the extension/ compression stabilizing strategy.
ATHLETE ENHANCEMENT

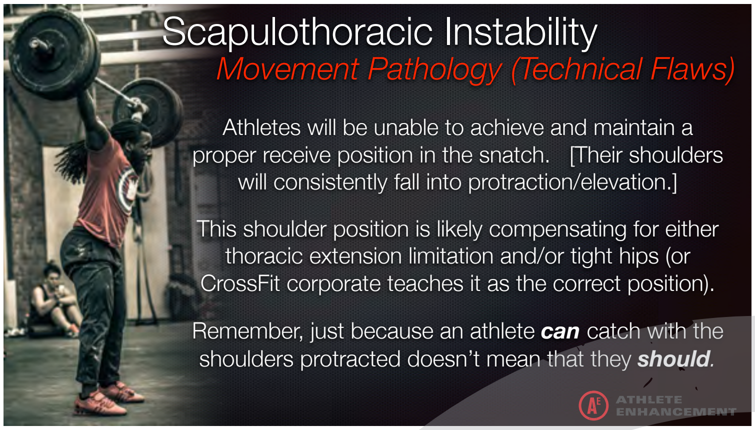

Limited Thoracic Extension
Movement Pathology (Technical Flaws)
Athletes will always have excessive lumbar lordosis (and the instability that comes with it)
Athletes will [sometimes] struggle with the front rack position. (Watch the lumbar spine for compensation.)
When it is pronounced, the athletes will struggle with overhead movements (full squat snatch, jerk)

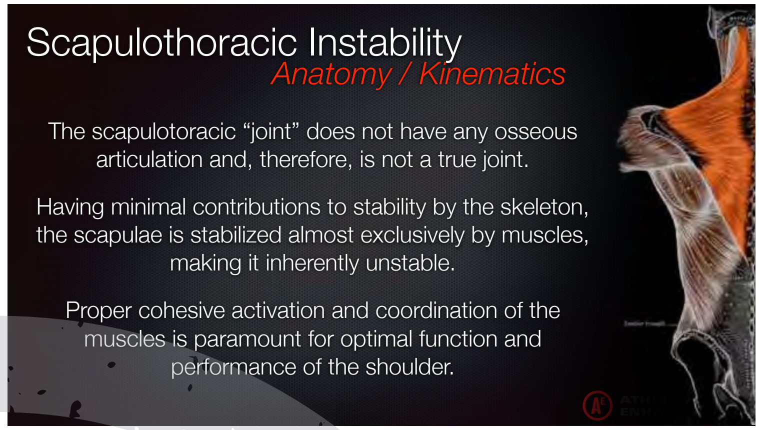

Limited Thoracic Extension
Anatomy / Kinematics
Axial rotation
Vertical axis
Pure thoracic extension is the result of a vertebral extension and anterior glide
Thoracic spine motion is heavily influenced [restricted] by the ribs.
For ideal posture, function, and stability, the costovertebral joints must be able to counterrotate against thoracic spine motion (extension/upward rotation of the vertebral body with flexion/downward rotation of the costovertebral joint).
ATHLETE ENHANCEMENT

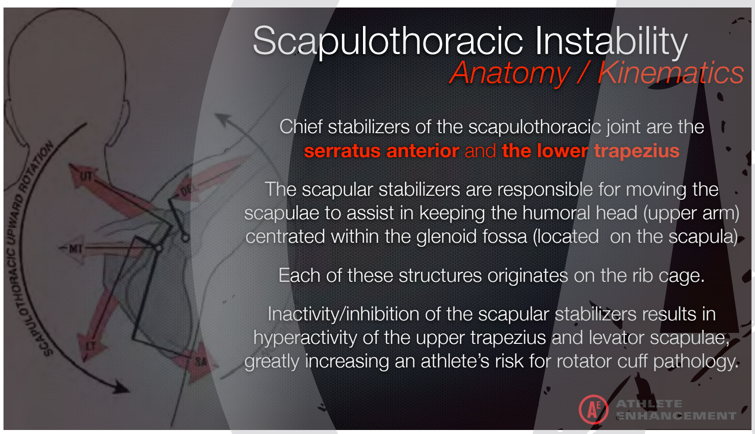

Limited Thoracic Extension
Sources of Dysfunction
Extension / compression stabilizing strategy resulting from poor spine and pelvis stability
Incomplete ontogenesis (not enough "tummy time")
Prolonged sitting (desk jockey syndrome)
ATHLETE ENHANCEMENT

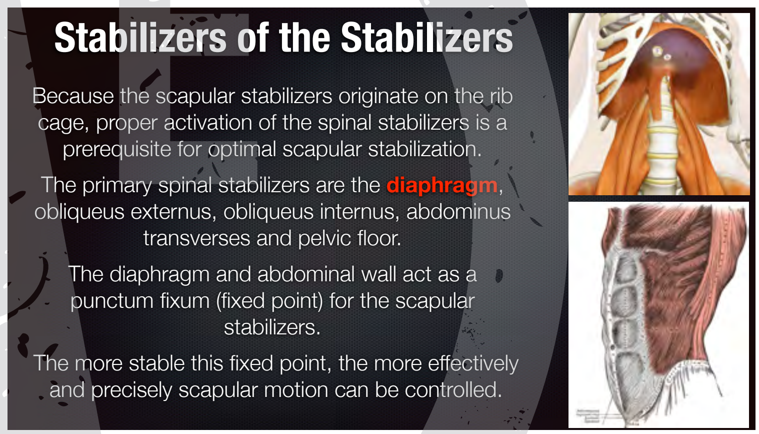

Limited Thoracic Extension
Injury Risk
Back pain (hyperactive erector spinae, lumbar disc pathology) - results from the increased need for lumbar extension as a compensation for the loss of thoracic extension. This perpetuates the ECSS because of the necessary hyperactivity of the erector spinae
Shoulder pathology (rotator cuff sprain / strain or labral tear)
Cervical spine disc pathology
ATHLETE ENHANCEMENT

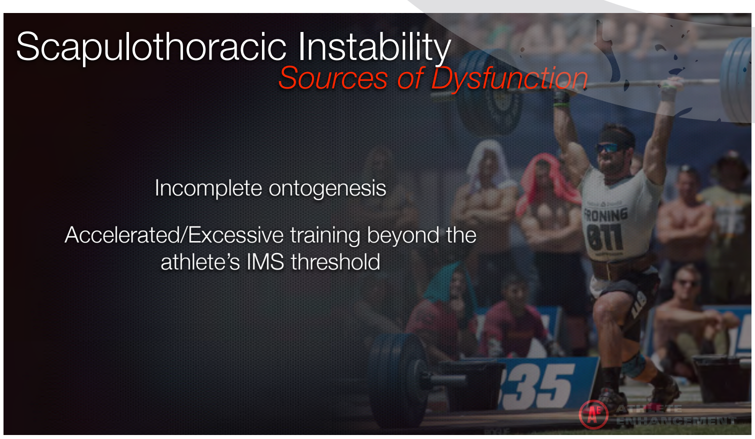

Scapulothoracic Instability
It is profoundly important for proper function of the shoulder and protection of the glenohumoral joint.
Remember, instability is the father of hypertonicity.
Like lumbar instability, it is a quite useful compensation for limited thoracic extension, tight hips and poor dorsiflexion.
ATHLETE ENHANCEMENT

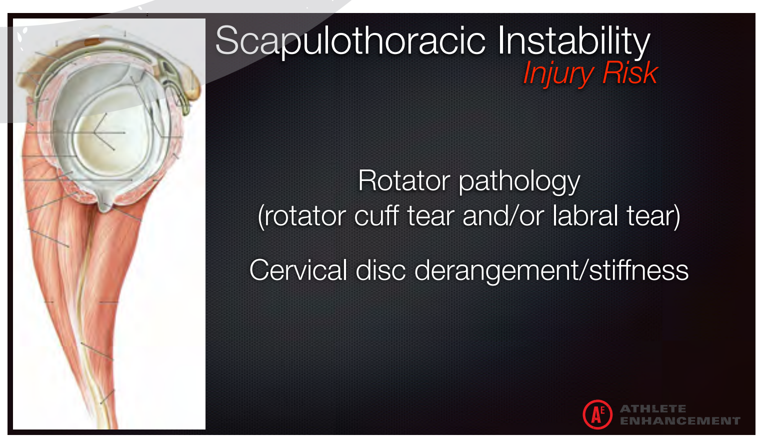

Scapulothoracic Instability
Movement Pathology (Technical Flaws)
Athletes will be unable to achieve and maintain a proper receive position in the snatch. [Their shoulders will consistently fall into protraction/elevation.]
This shoulder position is likely compensating for either thoracic extension limitation and/or tight hips (or CrossFit corporate teaches it as the correct position).
Remember, just because an athlete *can* catch with the shoulders protracted doesn't mean that they *should*.
ATHLETE ENHANCEMENT


Scapulothoracic Instability
Anatomy / Kinematics
The scapulotoracic "joint" does not have any osseous articulation and, therefore, is not a true joint.
Having minimal contributions to stability by the skeleton, the scapulae is stabilized almost exclusively by muscles, making it inherently unstable.
Proper cohesive activation and coordination of the muscles is paramount for optimal function and performance of the shoulder.


Scapulothoracic Instability
Anatomy / Kinematics
Chief stabilizers of the scapulothoracic joint are the **serratus anterior** and **the lower trapezius**
The scapular stabilizers are responsible for moving the scapulae to assist in keeping the humoral head (upper arm) centrated within the glenoid fossa (located on the scapula)
Each of these structures originates on the rib cage.
Inactivity/inhibition of the scapular stabilizers results in hyperactivity of the upper trapezius and levator scapulae, greatly increasing an athlete's risk for rotator cuff pathology.
SCAPULOTHORACIC UPWARD ROTATION
UT
MT
LT
SA
ATHLETE ENHANCEMENT


Stabilizers of the Stabilizers
Because the scapular stabilizers originate on the rib cage, proper activation of the spinal stabilizers is a prerequisite for optimal scapular stabilization.
The primary spinal stabilizers are the **diaphragm**, obliqueus externus, obliqueus internus, abdominus transverses and pelvic floor.
The diaphragm and abdominal wall act as a punctum fixum (fixed point) for the scapular stabilizers.
The more stable this fixed point, the more effectively and precisely scapular motion can be controlled.


Scapulothoracic Instability
Sources of Dysfunction
Incomplete ontogenesis
Accelerated/Excessive training beyond the athlete's IMS threshold
35


Scapulothoracic Instability
Injury Risk
Rotator pathology
(rotator cuff tear and/or labral tear)
Cervical disc derangement/stiffness
ATHLETE ENHANCEMENT

Limited Glenohumoral ROM

In the absence of acute injury, limited glenohumoral ROM is always coexistent with scapular instability.

Remember, instability is the father hypomobility.

Limited Glenohumoral ROM
Anatomy / Kinematics

The GHJ is a very mobile ball-in-socket joint that must be able to roll and glide to maintain proper position.

The rotator cuff is responsible for maintaining centration throughout all motions.

To accomplish this, the fibers of the rotator cuff blend with the capsule of the GHJ, allowing it to control the positioning of the humoral head.

Any dysfunction in the rotator cuff will result in improper kinematics increasing the propensity for pathology.

Limited Glenohumoral ROM
Movement Pathology (Technical Flaws)

Athlete will struggle to achieve a proper snatch receive position. You will see pronounced compensation to avoid this potentially painful position.

Athlete will often experience tightness/pain at the bottom of a full squat snatch.

Limited Glenohumoral ROM
Sources of Dysfunction

The #1 non-traumatic cause of GH hypomobility is scapular instability.

Repetitive overuse — especially if an incorrect receive position is trained in the athlete.

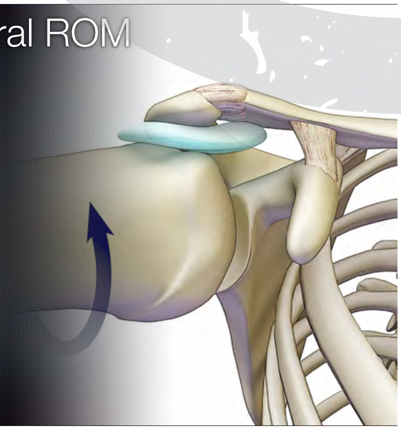
Poor posture.

Also, scapular instability accelerates the repetitive overuse process due to the increased load/demand placed on the rotator cuff.

Limited Glenohumoral ROM
Injury Risk

Rotator cuff sprain/strain/tear

Labral tear



Central Instability

Central instability is the king of all functional blocks because it is often the source which creates the rest.

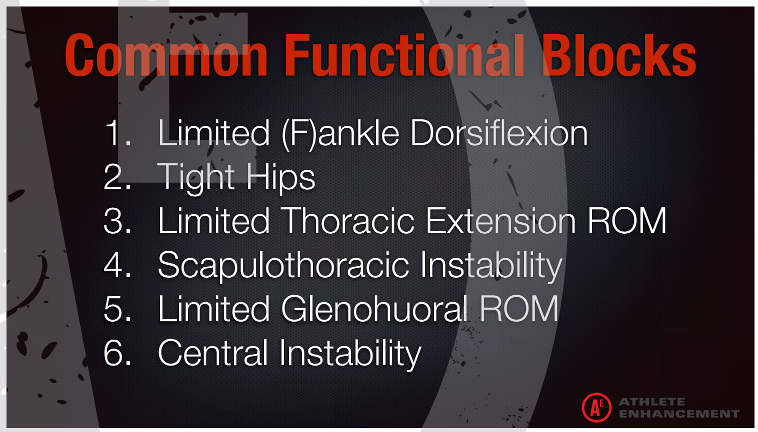
Addressing a functional block such as limited (f)ankle dorsiflexion without restoration of central stability is fruitless.

Remember, central instability manifests as a regression to a more primitive neurological/ontogenical stabilizing strategy.


Central Instability
Movement Pathology (Technical Flaws)
Athlete will struggle to keep the lumbar spine in a neutral position.
If the instability is compensated, they will exhibit the extensor/compression stabilizing strategy. If they have non-compensated instability they will collapse into flexion more often.
Athlete will often possess limited range of motion at both the FAJ and the GHJ, which will produced the expected technical flaws.
Overhead squatting or full squat snatches will often be virtually impossible for these athletes.
ATHLETE ENHANCEMENT


Central Instability
Sources of Dysfunction
Incomplete neurological development.
Early introduction of athletics.
Accelerated progression through sports.
Over-emphasis on performance (results/output) in training.
ATHLETE ENHANCEMENT


Central Instability
Injury Risk
Shoulder Labral tear
Meniscus Tear
Plantar Fasciitis
Rib subluxation
Cervical disc herniation
Frequent Back Spasms
Rotator cuff Sprain/Strain
Achilles Tendonitis
Hip Labral Tear
Patellar Tendonitis
Medial Epicondylitis
Lateral Epicondylitis
Lumbar disc herniation
Temporomandibular Dysfunction
Carpal Tunnel Syndrome
Exertion Headaches
Urinary Incontinence
Gastric Reflux
ATHLETE ENHANCEMENT


Common Functional Blocks
1. Limited (F)ankle Dorsiflexion
2. Tight Hips
3. Limited Thoracic Extension ROM
4. Scapulothoracic Instability
5. Limited Glenohuoral ROM
6. Central Instability
ATHLETE ENHANCEMENT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