

CHASING PERFORMANCE
Movement, Mobility, and Maintenance
Kelly Starrett DPT

Why?

Coaches and athletes have consistently failed to address movement, mobility, and maintenance in their athletes and athletic practices including: (1) a lack of focus on improvement of joint, tissue, and muscle mobility; (2) a failure to address ideal positional and best-fit orthopedic movement set-up; and (2) and the failure to develop targeted, effective body-maintenance strategies. Unless and until an athlete incorporates mobility into their practice, they cannot realize and maximize their athletic performance.

Seminar Goals:

- Improve understanding of key anatomical elements as they relate to functional movement, and as how they act as performance limiters.
- Increase awareness of “Best-Fit” biomechanical set-up and movement strategies for optimal work outputs.
- Understand movement compromise strategies for specific movement outcomes.
- Develop an understanding of common movement dysfunctions and a systematic model for addressing common problems associated with elite training.
- Develop methods to address common myo-fascial pain/dysfunction.
- Understand how to treat soft tissue injuries.
- Develop better movement preparation strategies.

Why We Should Care About "Mobility"

- Performance
- Injury Prevention
- Injury Resolution/Attenuation of Injury Ghosting
- Leads to Best Expression of Ideal Technique
- CF is the Diagnostic Tool on the Planet (limitations will arise in your athletes)

Ready State

- The absolute peak fitness ideal state for an individual athlete.
- An individually optimized work capacity curve.
- The greatest capacity to project longevity Volume (health) under WCC

Best Fit

- There is an orthopedic/biomechanical ideal position from which maximal force can be produced and sustained. ex: Andy Bolton/Rip Connection
- Best Fit Positioning is dependent on athlete's capacity to achieve optimal set up and driven by task positioning and external environmental demands.
- Deviation from Best Fit is always ultimately a force production/work output compromise with potential "down-stream" implications.

One to Rule Them All

Of the Ten General Characteristics of Fitness, Mobility/Flexibility has the greatest capacity to limit the other nine.

- Strength
- Cardio-Respiratory Capacity
- Stamina
- Power
- Speed
- Co-ordination
- Accuracy
- Balance
- Agility
- **Flexibility/Mobility**

VO2 Min

- Kilgore's concept of well-developed movement strategies/motor solutions lead to decreased O2 task demand
- Expanded: Efficient, low drag athletes are capable of developing more power, at lower metabolic costs, and for longer periods of time.

Functional Tolerance

- An athlete's capacity to buffer deviation from Best Fit Ideal without physical consequence.

Ex: Diesel Weasel Rule

Good Position Cannot be Reclaimed

- Think of good positioning as Potential Potential
- Muted hips, rounded T-spines, Flexed Lumbar, and Adducted Knees are examples of lost positioning that cannot be reclaimed.
- Best Defense, No Be There.

Check List Concept

- Set Up-Best Fit
- Mid-Line Stabilization
- Up Stream/Down-Stream
- Mobilize at Position of Restriction (MAPR)

Mid-Line Stabilization

- Definition: The capacity to maintain a neutral spine under task, load, and duration demands.
- Neutral Spine is relative and task dependent. Best Fit deviation for O-lifting, not getting shot, or hit by a car...
- "Spine" includes your neck and hips
- C3 Penalty

Upstream & Downstream

- Functional segment movement strategies and compromises inform “downstream” movements and functional outcomes.
- Ex: Chicken Neck-Thoracic Flexion-Lumbar Flexion
- Pain and dysfunction must be solved within the context of the greater system

Mobilize at Position of Restriction

- Your brain is wired for movement, not muscle.
- We train with functional movement, not isolation. Segmental training yields segmental movement
- Don’t mobilize muscles, mobilize movements
- Catch Everything that needs to be caught. Don’t get caught in specifics.

I hate this: An email I received:

..As it relates to her knees we are working on general strengthening with particular focus on the Vastus Medialis and adductors which are both atrophied. She was a soccer player, and hopes to resume running. We do all the standard CrossFit work, and often in squats I have her focus on pushing up out of the ball of the big toe such that the medial quad fires. I also encourage her to walk, pushing out of the ball of the big toe instead of rolling to the outside of the foot.

In her shoulders she has what seems As to be pretty classic upper cross syndrome, with significant winging of the right shoulder blade. We do walkouts on the ball, push up plus, kb swings and snatches, and all the classic Xfit stuff like OH squats, cleans, push press, etc. She really likes back squats as the bar position helps to open her chronically tight pecs. The constant focus is on pulling the scapulas down to engage the serratus, and strengthening the lower traps and romboids.

Models Of Spinal Stabilization

- Butt and Gut
- Transversus Abdominus
- Local Segmental Stability
- Thoracodorsal Fascia- The Tent
- Valsava and Sphincter Lock
- More Sh*t Out

If You Don't Have a Plan

- The Squat/Dead Flinch
- Poor or weak MLS will default to "Second Order/Reactionary Stabilizers like Rectus and Psoas AFTER effective positioning is lost
- Practice Good Stabilization in a Routine Manner

Breathing and You

- Peak Tensions/Working Tensions
- High intra-abdominal pressures up-regulate downstream nervous system transmissions and is part of CNS sympathetic response
- Breathing out facilitates CNS para-sympathetic response
- Poor breath timing means missed lifts

Abdominal Bracing

- Develop Consistent Patterning
- Belly Tight -Stiff Trunk
- Bias Spinal Positioning
- Breath and Tongue Lock

Positional Inhibition

- Poor Body Mechanics and Poor Positioning Results in Poor Muscular Recruitment
- Ex: Ext/Abs, Squat/Quads, Thorax/Scap

Limit Spinal Movement Under Loading

- Loaded Pelvic Faulting-Model of Disc Derangement
- Loaded vs. Unloaded, Squat v. Pull-Up
- Extension Faults--Flexion Faults
- Minimizing Shear, Stance-Back and The Squat Cousins
- Active Hip and Leg Torque
- Set Up, Then Position of Emphasis
- Best-Fit Positional Hierarchy Trumps Brute Strength
- Many athletes cannot attain ideal positioning of spine/shoulder/hip/knee in loaded set up.

MLSC Violation

- Head as Keystone--Don't look where you don't want to go.
- Tail Wags the Dog
- Front Squat-Thoracic Reversal
- Wink vs. Over-Extension
- Ideal Movement vs. Task Demands
- Olympic Lifting: Pull, Clean and Jerk
- Getting Shot At

Understand the Implications of Your Conscious Compromise

- Turn Out, Knees Forward Squat

Passive/Active Insufficiency

- PI--The inability of a muscle that spans two or more joints to be stretched sufficiently to produce a full range of motion in all the joints simultaneously
- AI--The inability of a muscle, which spans two or more joints, to exert enough tension and shorten sufficiently to cause a full range of motion

Two Joint Muscles

A muscle that, from origin to insertion, crosses two joints, and thus can produce an action at both joints.

Two Jointers

- Rectus Femoris
- Psoas
- Two Hamstrings
- Gastrocnemius
- Sartorius
- Long Head Triceps
- Long Head of Biceps Brachii
- TFL

Hip Flex Assessment

- Thigh 90/ SLR
- R1/R2
- Stiffness
- Positions of Emphasis--Hip Flexion/Leg Extension +AD/AB Duction
- Scoring?

If you can't see change, there is no change.

What matters is if the technique works. Not, the technique.

What Needs Fixing

Problems are rarely a single issue, but rather multi-factorial

- *Muscle*
- *Joint*
- *Connective Tissue*
- *Motor Control*

Physiologic Movement vs. Intra-Articular Motion

Mobilizing with a physiologic movement will “catch” tissues affecting desired ranges but will not automatically change the characteristics of how a joint moves within the motion segment.

Stretching is Dead, PNF Basics

- MAPR
- End Range, High Tension 5 sec
- Release and Move Toward new Range 10 sec
- Repeat 5-6 cycles or Stop Making Gains
- Understanding Effects: MM v. ST\

PNF

- Contract/Relax
- Reciprocal Inhibition
- Isometric Shutdown
- Safe-Word

Leg Flexion

- Prone/Lumbar Ext
- R1/R2/Stiffness
- Ely's
- Score?
- Thomas

Trigger Points and Fascia Planing

- Models of Soft Tissue Dysfunction
- Active Tack and Stretch (ATS)
- Fascial Planing

Rough Joint Rule

For Extension: Mobilize to the Front
For Flexion: Mobilize to the Back

Movement Prep

- Raises heart and respiration rates.
- Raises body core temperatures.
- Prepares connective tissue and muscles for dynamic movement
- Increases nervous system arousal
- Greases key movement motor pathways
- Primes dominant metabolic pathways and shifts blood away from the stomach and gut and into muscles and lungs
- Increases cardiac pre-load and cardiac outputs by decreasing venous pooling.
- Attenuates Reflex Inhibition (sore and not working right)

Power Posture

- Rib Cage Down
- Pec's Flat
- Rhomboids/Trap Bulk
- Notch/Abs On
- Thumbs Forward

Translational Loading

Joint/segment translation across loaded tendons and support structures

- Ex: Biceps Tendon, Patella

Soft Tissue Injury

- Twenty Four Hour Rule
- The Real RICE
- Muscle Pulls
- NSAID's
- Stretch vs. STM