

# LOADED MOVEMENT TRAINING



**MICHOL DALCOURT**

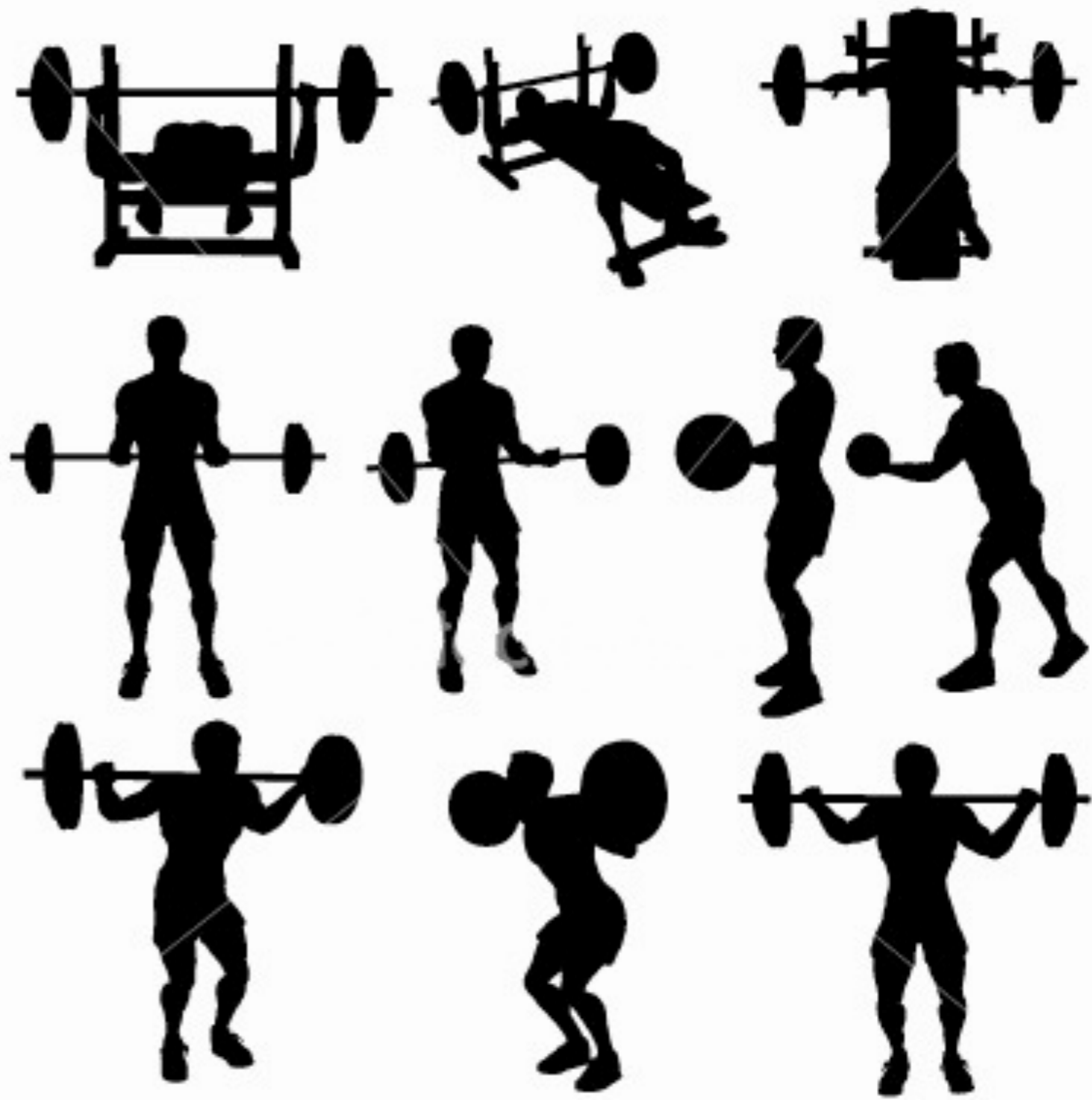
UNIVERSITY OF ALBERTA – EXERCISE SCIENCE

CREATOR - ViPR

ADJUNCT Faculty – University of San Francisco

DIRECTOR - Institute of Motion

CO-FOUNDER - PTA GLOBAL



**LIFTING**



# SHIFTING





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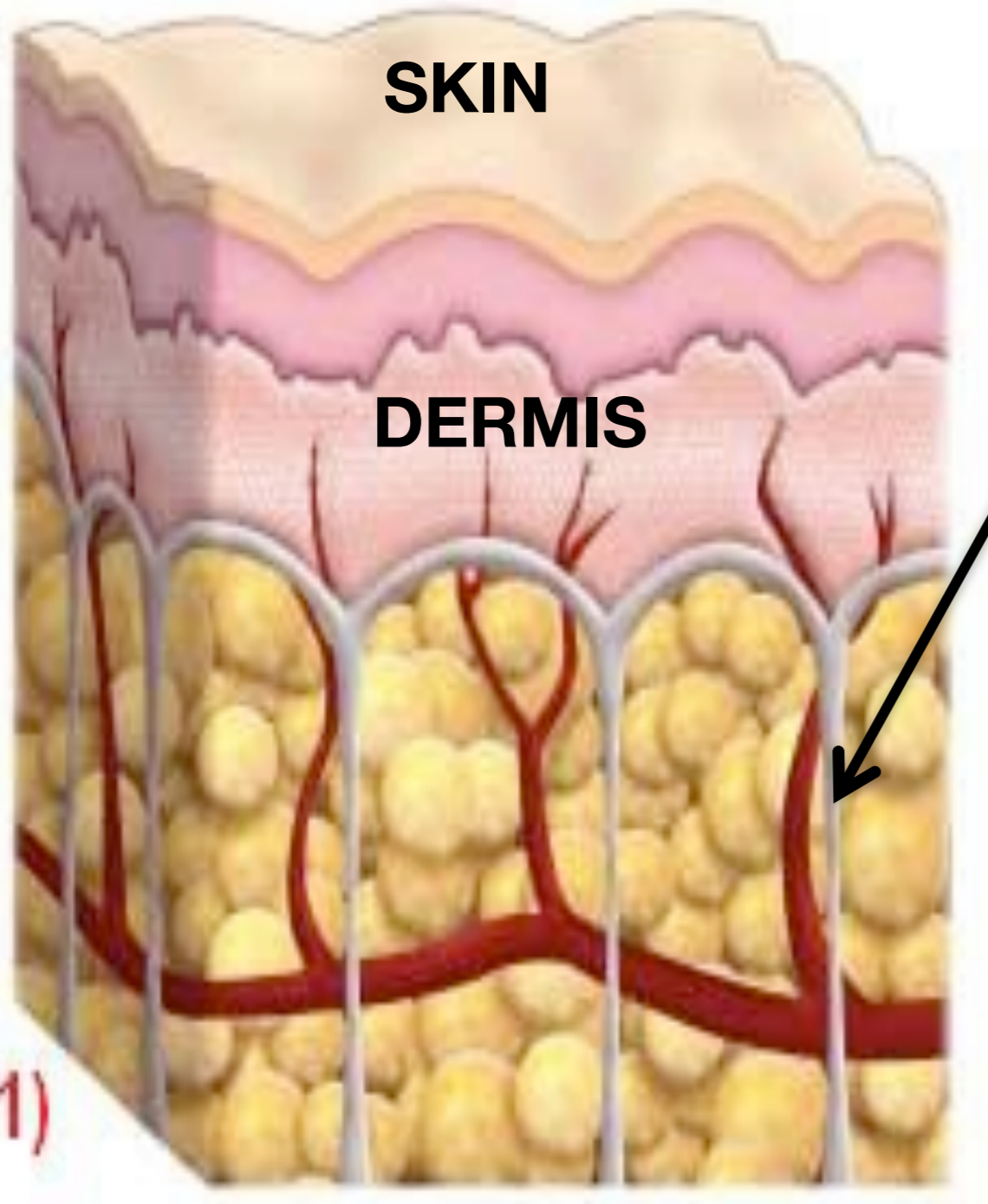


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Our skin is very much the skin "of" the superficial fascia,  
and they are thoroughly mechanically related

Gil Hedley – PhD Anatomist

# Retinacula Cutis



Bundles of collagen fibers, known as Cutaneous Ligaments extend from the dermis to the intermediate layer of the superficial fascia

Shearing of the skin will create a gliding effect on the superficial fascia.



## OBJECTIVES:

- DEFINE LOADED MOVEMENT TRAINING AND ITS RELEVANCE TO OVERALL CONDITIONING
- MAP LOADED MOVEMENT WITH OTHER FORMS OF EXERCISE
  - PROVIDE A SCIENTIFIC RATIONALE LOADED MOVEMENT TRAINING
  - SHOWCASE MYRIAD DRILLS FOR LOADED MOVEMENT TRAINING



# The Importance of a Concept:

<b><u>Concept</u></b>	<b><u>Product</u></b>
Core Training	Stability Ball
Speed / Agility / Quickness Training	Speed Ladder
Resistance / Strength Training	Barbell / Dumbbell / Kettlebell etc.
Functional Training	Adjustable Cables
Vibration Training	Vibration Plates
Suspension Training	TRX / Rings
MyoFascial Release	Foam Rollers
Functional Flexibility Training	Stretch Cages
Pilates	Reformer
Barefoot Training	Minimal Shoes



# 4 QUADRANT TRAINING



Loaded Movement Training combines task-oriented movement patterning with resistance training. Agility and strength come from moving the body through a multitude of purposeful actions, with load - just like back on the farm.



# 4 QUADRANT TRAINING

Loaded

Classic Resistance Training

Benefits include:

- Greater muscle Hypertrophy
  - Time under tension
  - Increase hormonal release
- Improvement in Stability / Strength / Power
  - Improved intra-muscular coordination

Linear  
Movement  
/ Recurrent

# 4 QUADRANT TRAINING

Linear  
Movement  
/ Recurrent

Skill Development Training  
Corrective Exercise  
Core Training  
MAT  
Therapeutic Rehab  
Muscle Testing  
Running / Cycling / Rowing / Swimming etc.  
Archetypal Poses

**Benefits include:**

- Re-education of neuro-muscular system
  - Stability / Mobility training
  - Weak Link Activation
- Targeted tissue improvement (i.e. muscle)
  - Improved intra-muscular coordination
  - Cardio and motor efficiency
  - Metabolic improvement

# 4 QUADRANT TRAINING

Transitional  
Movement - 3D /  
Variable

SAQ Training  
Skill Development Training  
Functional Rehab  
Animal Flow  
Tai Chi  
Yoga  
Archetypal Poses  
Ground to Standing Patterns

**Benefits include:**

- Rapid NS activation
- Mostability training
- Improved Motor learning
- Speed, agility, quickness improvements
- Increase functional reaction capabilities

UnLoaded

# 4 QUADRANT TRAINING

Loaded

## Loaded Movement Training



### Warding Patterns ViPR

Benefits include:

- Greater adaptations in muscle, nerve, skin, fascia
  - Less compressive forces
  - Increase hormonal release
- Improvement in multi-directional Stability / Strength / Power
  - Improved inter-muscular coordination
  - Whole body integration

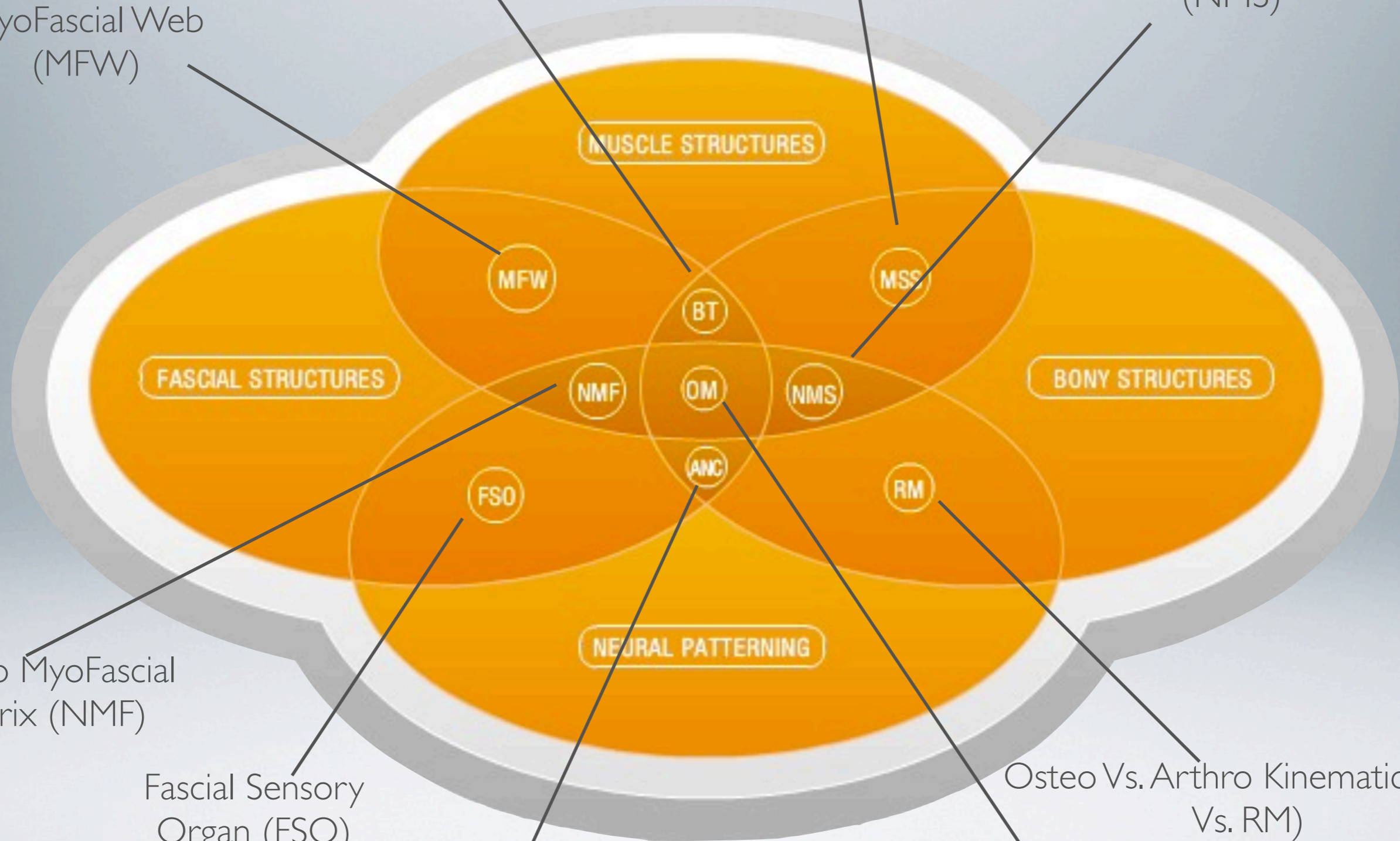
Transitional  
Movement - 3D /  
Variable

BioTensegrity (BT)

Musculo-Skeletal System (MSS)

Neuro -Musculo-Skeletal System (NMS)

MyoFascial Web (MFW)



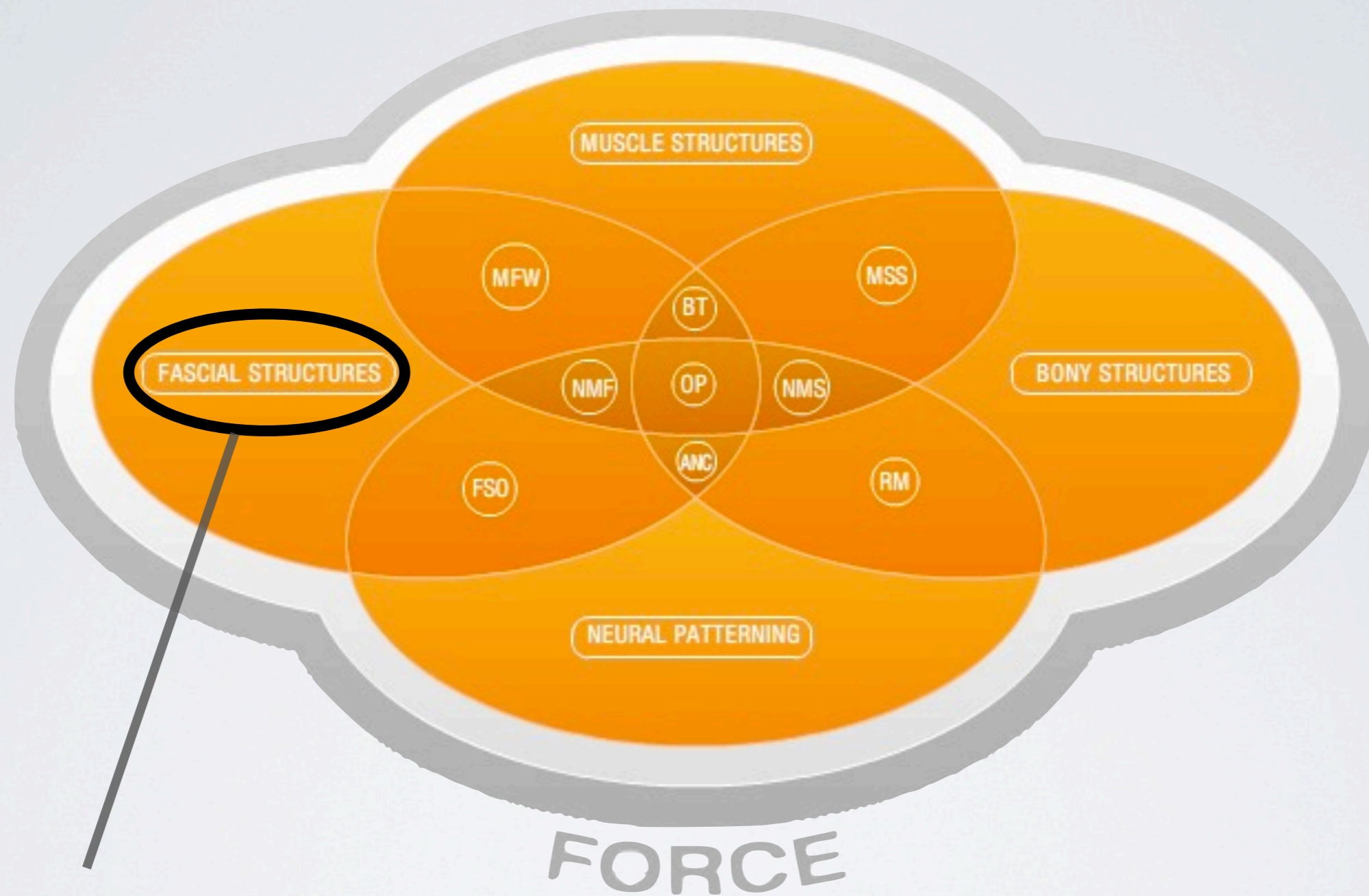
Neuro MyoFascial Matrix (NMF)

Fascial Sensory Organ (FSO)

Alpha Nerve Control Input (ANCI)

Osteo Vs. Arthro Kinematics (RM Vs. RM)

**'Optimal Movement Training Model' (OM)**



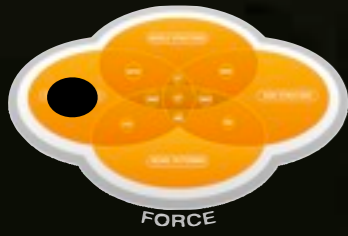
FASCIA



# Mechanical Load Variability



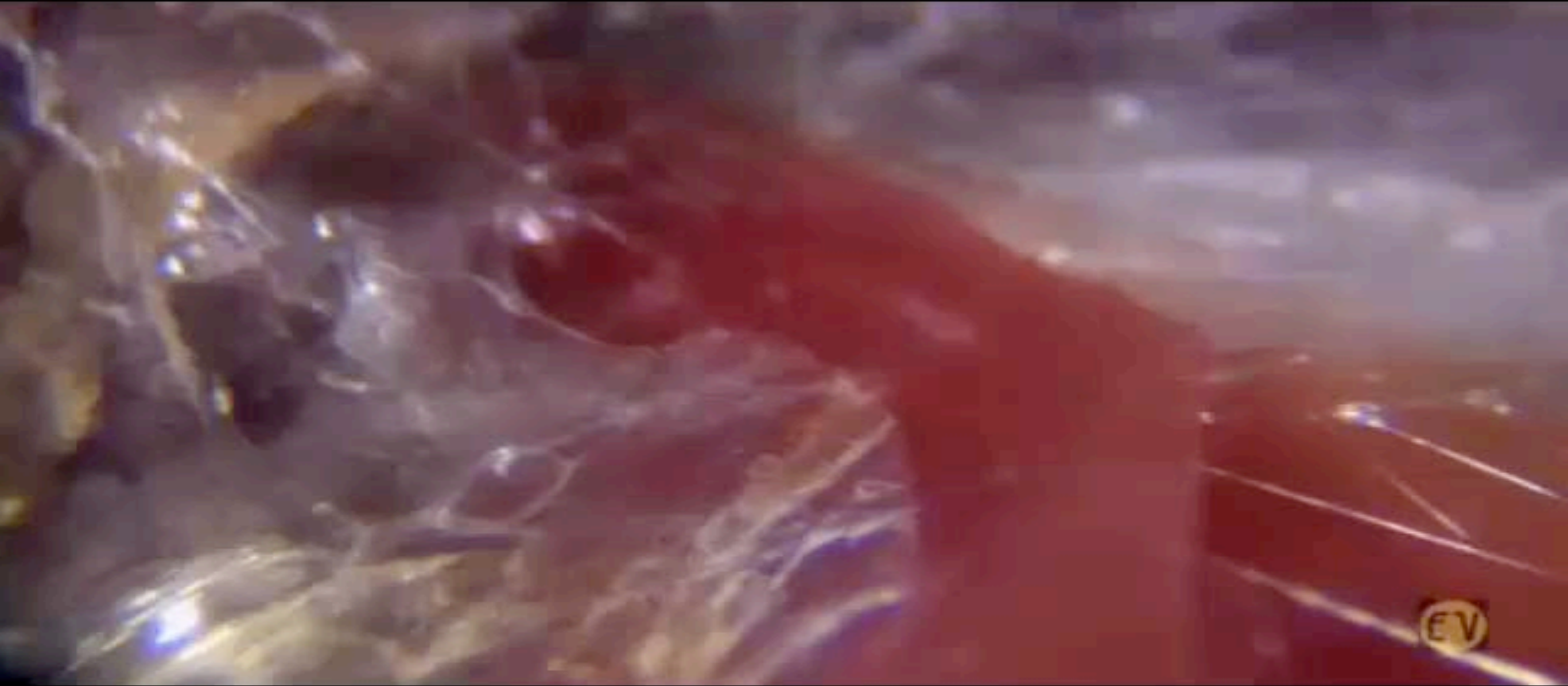
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# Vector Variability







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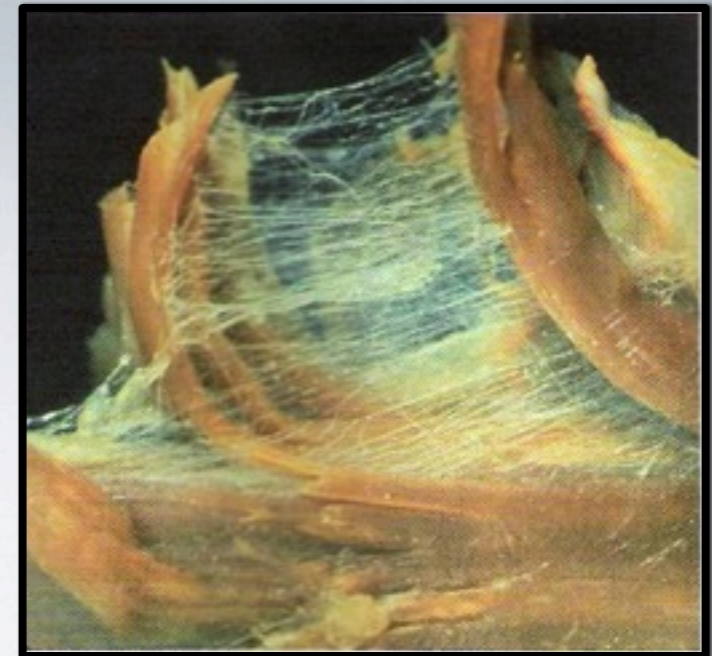
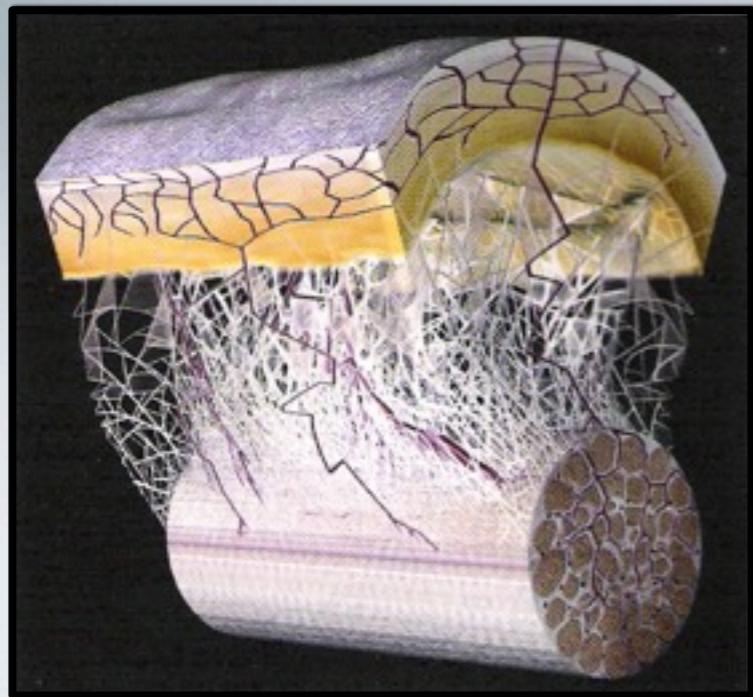
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# MechanoTransduction

How our Bodies Dissipate Force and Why?

“refers to the many mechanisms by which cells convert mechanical stimulus into chemical activity”



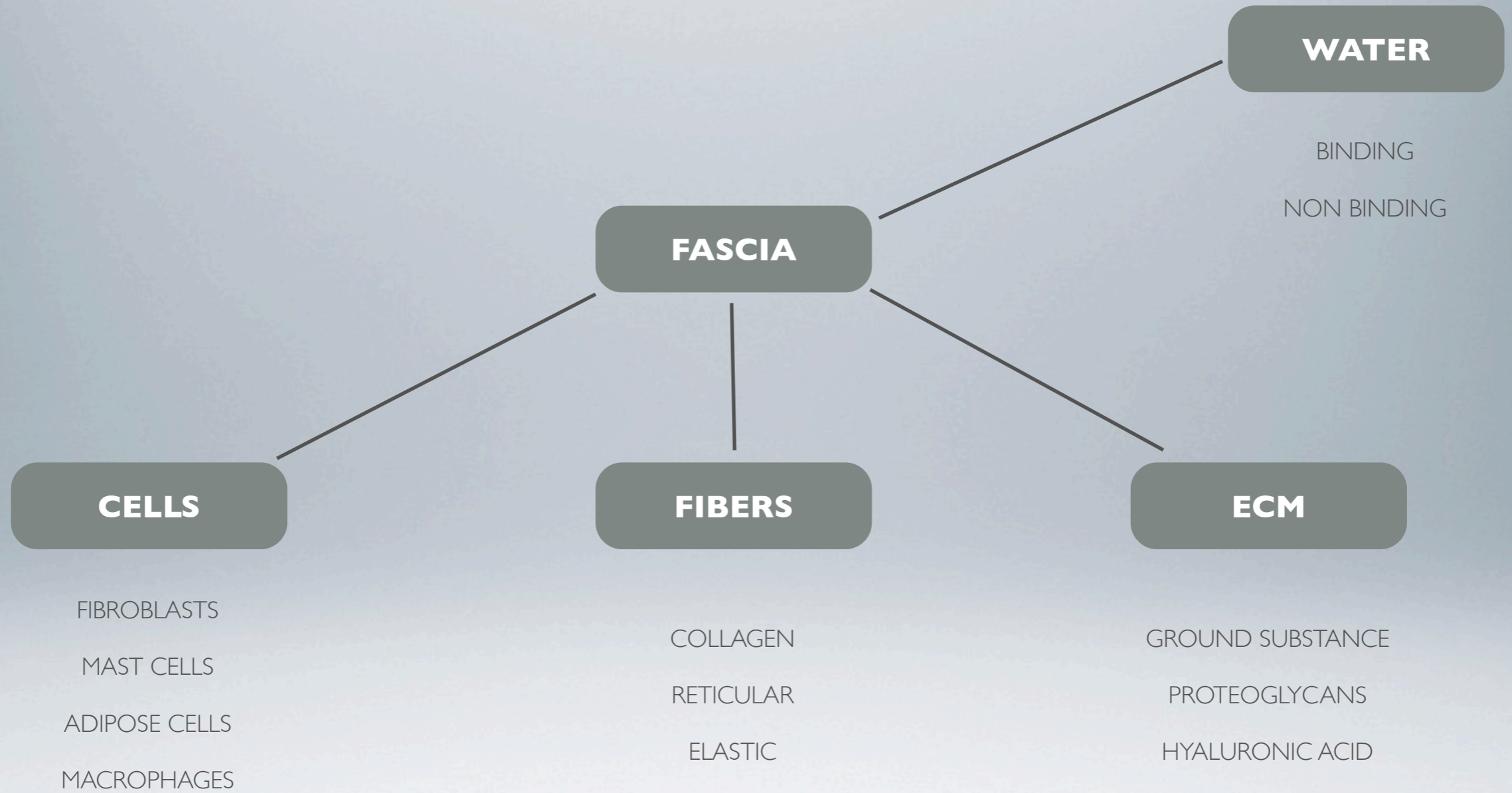


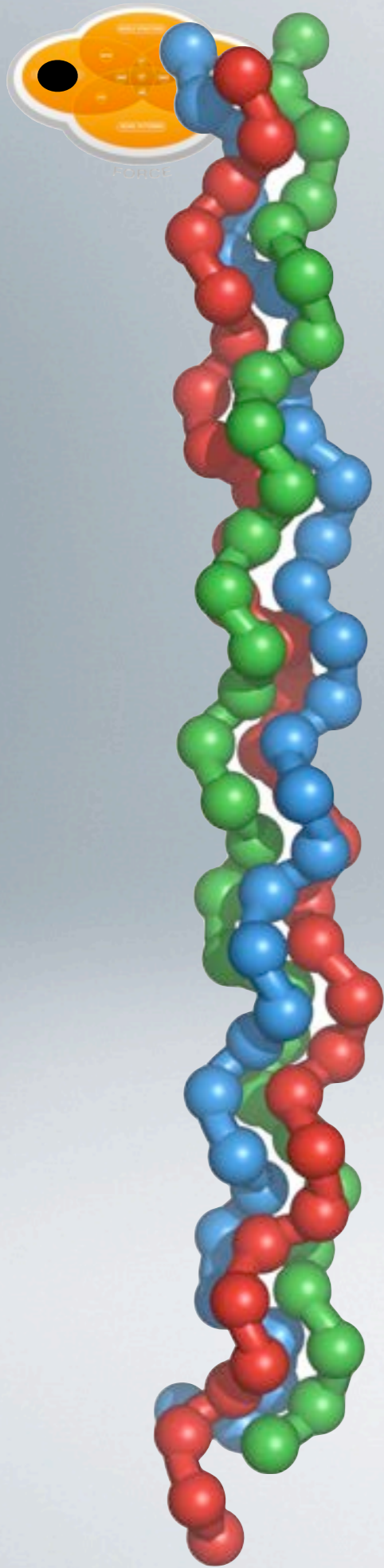
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# FASCIAL ARCHITECTURE





# Collagen

## Characteristics:

- Chains of amino acids coiled around each other in a triple helix format
  - The longer they are, the more strength they give
- The longest/strongest collagens are the hardest to make (require the right diet and the right movement)
  - All Collagen carry a special molecule called *Glycoaminoglycans*
- Once manufactured, collagen molecules get anchored to the exterior of the cell and unfurl throughout the extra-cellular matrix where molecules from adjacent cells can intertwine
- Wrinkles, arthritis, circulatory problems involve lesser quality collagen that cannot prevent the tissue from pulling apart and separating - this makes us look and function 'older' as stability begins to be affected





# Fascial Nutrition:

## Collagen Health for Life

- Foods that are rich in glycosaminoglycans help collagen production ... and attract A LOT of water with them (up to 1000 times their own weight)
- Glycosaminoglycans will naturally adhere to collagen everywhere in your body, moistening dry skin, helping your tendons and ligaments stay supple, and make you look and function younger
- Water in the connective system will coat joints and tissues in tiny, electrically charged clouds, which creates a protective layer of super-lubricating fluid



# Fascial Nutrition:

## Collagen Health for Life

- Collagen is the most prevalent kind of protein we have (about 15% of our dry weight)
- Research indicates that individuals with weak collagen experience more injuries throughout their lives
- When our body is making collagen, it's performing a physiological high-wire act, a feat of extraordinary timing and mechanical precision. This level of complexity makes collagen more dependent on good nutrition and more vulnerable to the effects of pro-inflammatory foods than other tissue types.





# Fascial Nutrition:

## Collagen Health for Life

- Inflammation is a culprit (under acute inflammation, the bodies response is to elevate white blood cell count, which attack free radicals and release collagen-chewing enzymes called *COLLAGENASES*)
- Under chronic inflammation / congestion (poor diet and environmental exposure) the exact same mechanism happens - but over a long period of time - and the fascial system suffers - leading to injuries, instability and poor motor control (due to the fact that nerves need fascial sensitivity)
  - The number of children with food allergies has risen 100% in the past 5 yrs
  - Sugar and Vegetable oil combined with nutrient-deficient foods make up the perfect pro-inflammatory diet
  - Poor diet will negatively affect collagen in the skin and fascia, negatively affecting aging, joint stability and function
- Collagen is made from raw materials we must eat. Unlike other tissues, collagen is uniquely sensitive to metabolic imbalances
  - One of the best ways to help collagen heal is to eat some (C. Shanahan, MD)



## 10M EXERCISE DESIGN AT A GLANCE



ORIENTATION



ACTION



DEVICE



FOOTPRINT



HANDPRINT



THRESHOLD

In which way will you orient your body to gravity / ground?

What gross movement is occurring in the body?

What external load are you choosing and why?

Foot position (stance) and / or foot movements while performing the exercise?

Hand position and / or hand movements while performing the exercise?

Acute variable manipulation (i.e. sets, reps, weight, ROM, speed etc.)

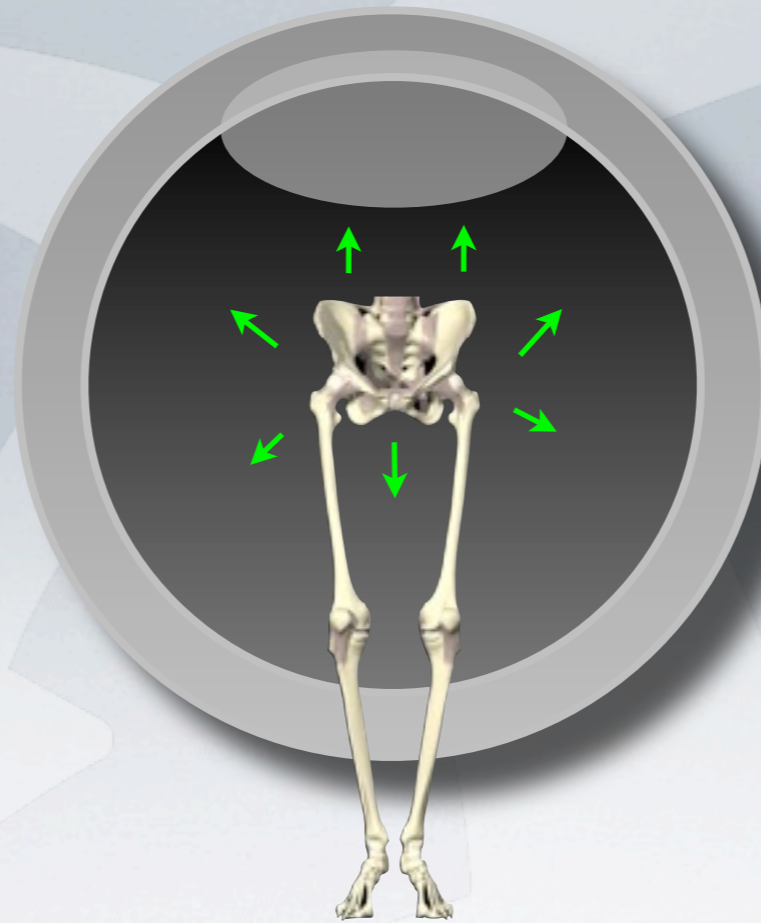


# Coaching Cues

(Adapted from Chuck Wolf, MS)



1. Maintain Length in the Spine



2. Initiate Movement with the Hips



3. Reach with the Scapula





## ViPR Squat Lunge Matrix

John Sinclair, Master Trainer

VARY FORCES AND  
DIRECTION OF LOAD

Evidence suggests that tissue (fascia) is better trained by a wide variety of vectors; in angle, tempo and load.

- Huijing 2007



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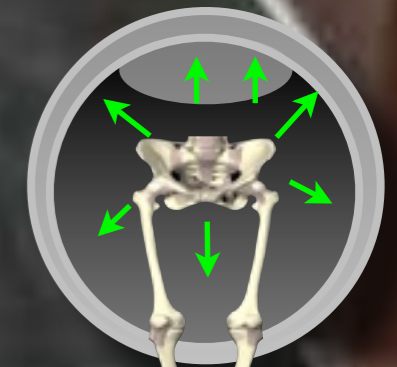
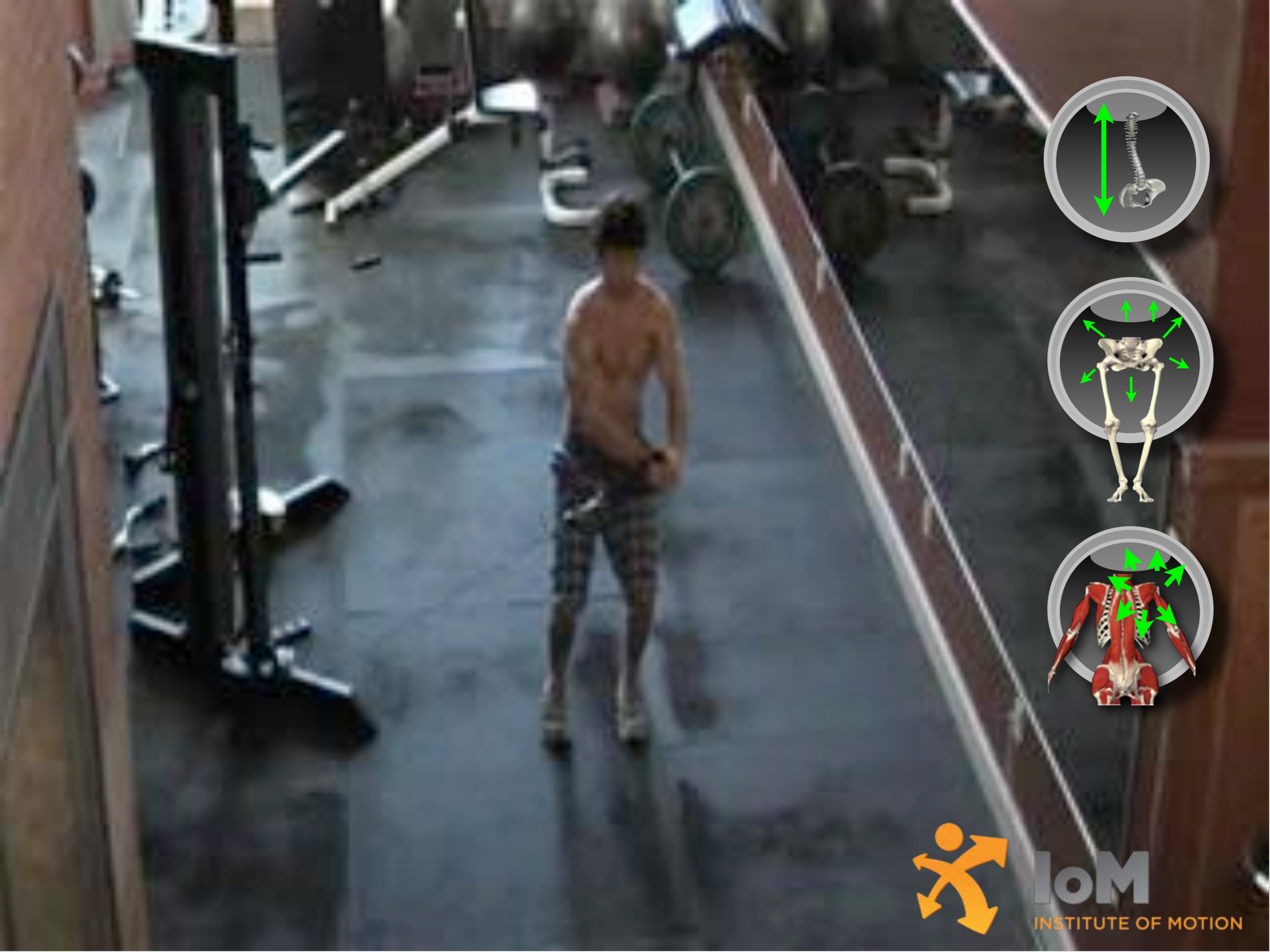
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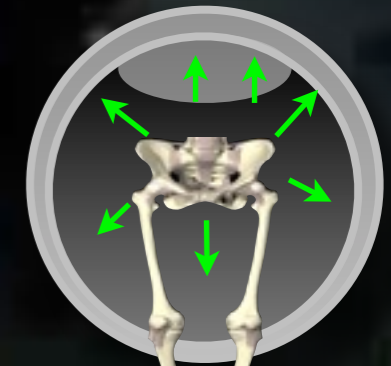
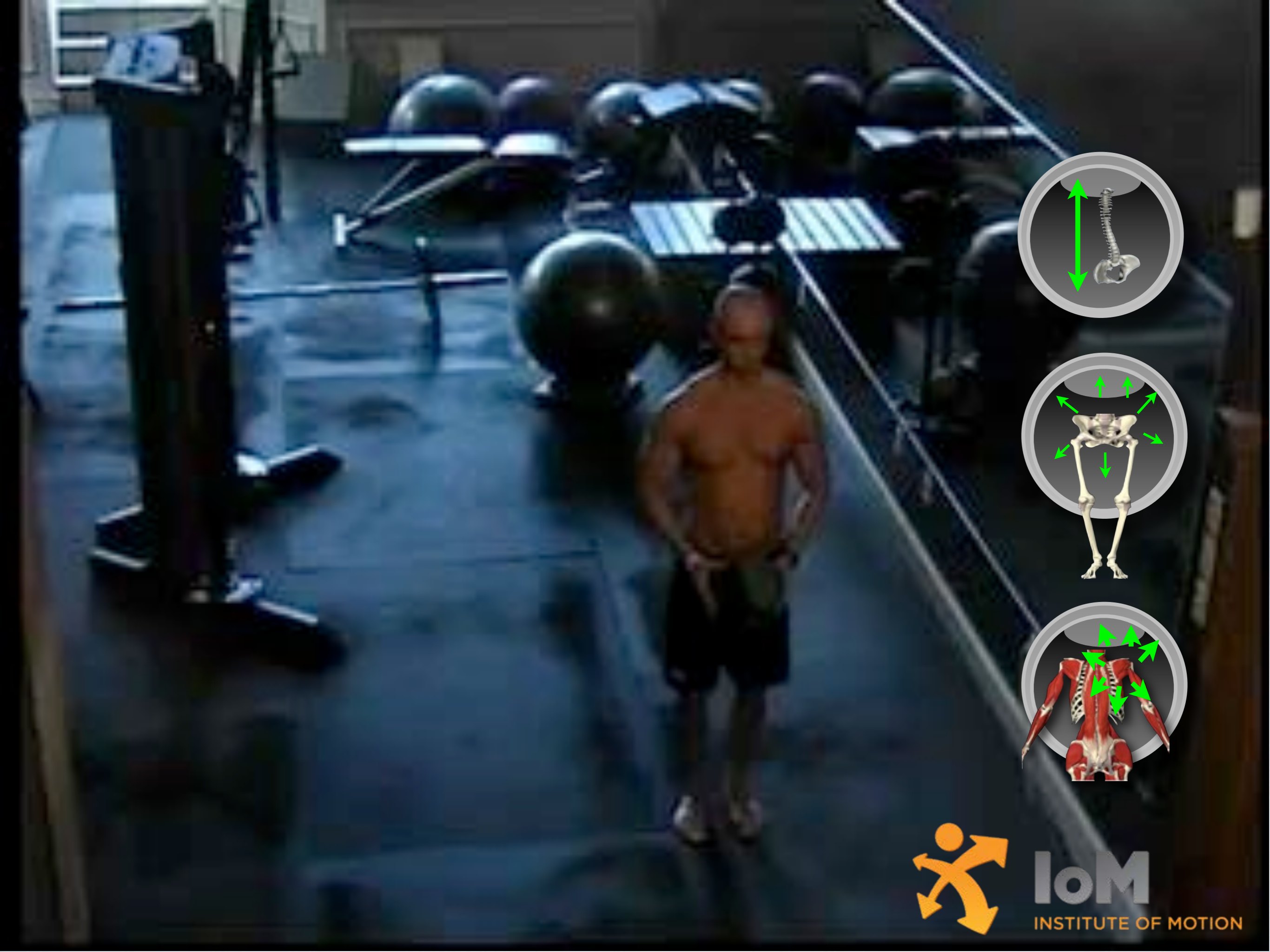
- Huijing 2007



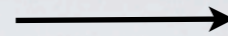
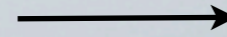
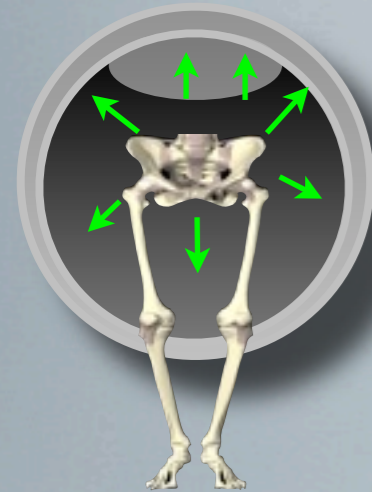
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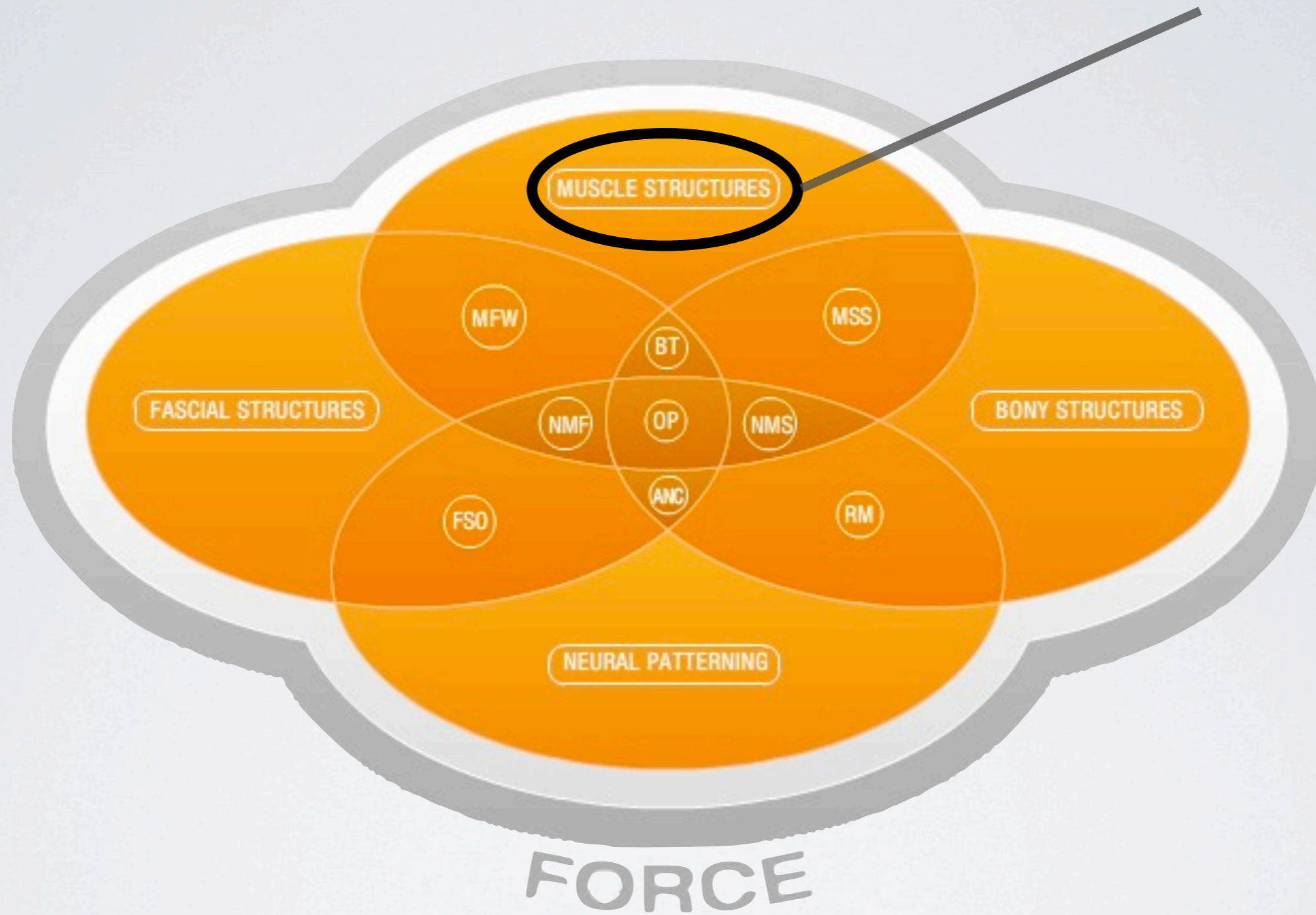
- Consider elite runners. They are elite because they run, to a large extent, on passive tissue and not muscle
- They are able to stiffen their passive tissues further with muscle activation given the many ligamentous and fascial connections
- This ability is enhanced with plyometric training, but is compromised with stretching
- A general guideline is to never stretch a runner beyond the joint angles utilized in running. Keep them tight to engage the springs with each stride.

OPTIMIZE THE PASSIVE CONNECTIVE TISSUE SYSTEM

'Superstiffness' - Stuart McGill



MUSCLE



# RAPID CONTRACTION / RELAXATION OF MUSCLE

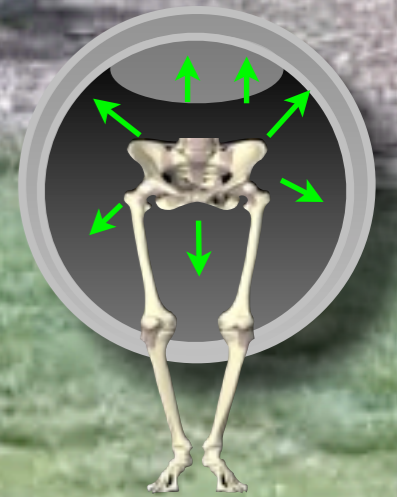
'Superstiffness' - Stuart McGill

- Muscle contraction occurs rhythmically
- It is just as important to 'turn on' the muscle as it is to 'turn off' the muscle
- Too many coaches train for speed with more strengthening approaches – actually slowing the athlete down. A muscle that cannot relax quickly will slow the athlete.

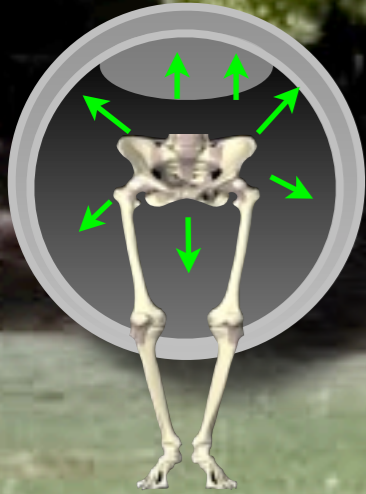
## TUNING OF THE MUSCLE

'Superstiffness' - Stuart McGill

- Muscles act as elastic springs (consider the abdominal wall)
- If the spring is too compliant, or too stiff, the elastic energy storage is hampered
- It appears that a pre-contraction level of about 25 percent of MVC creates the amount of muscle stiffness for optimal storage and recovery of elastic energy in the core muscles (at least in many situations).



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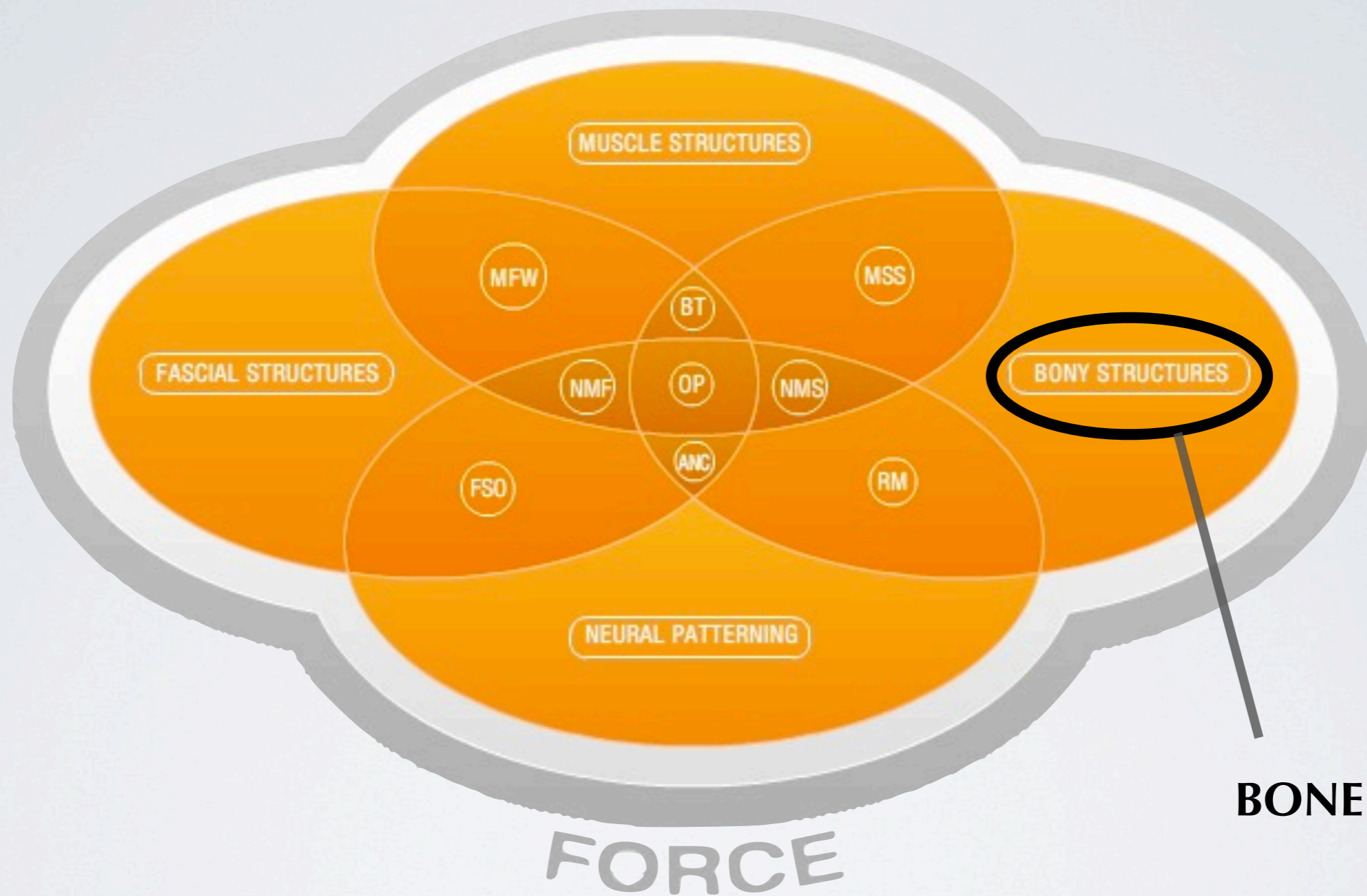
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USE 'COUNTER-MOVEMENT' TO  
CREATE PRE-STRETCH



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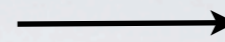
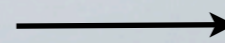
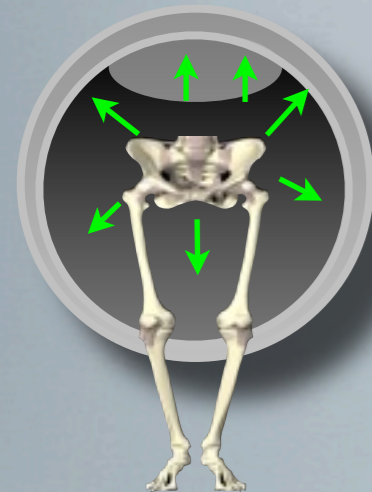
Less wear / tear on joint surfaces

Compression Vs. Tension loads

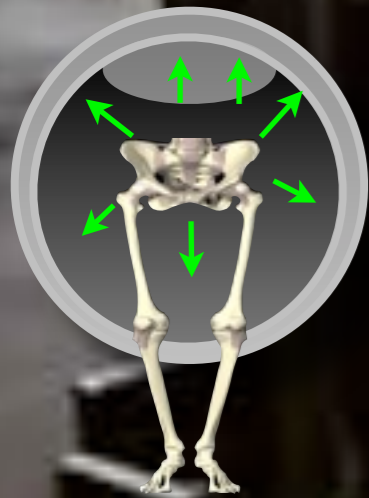
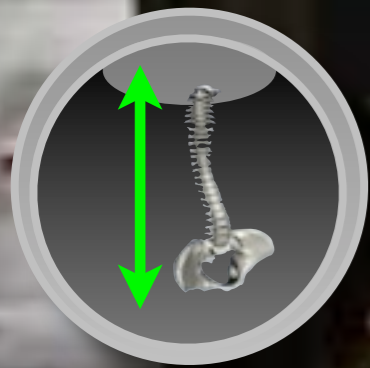


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# DUMBELL SHIFT & PRESS, VARIED HEIGHTS

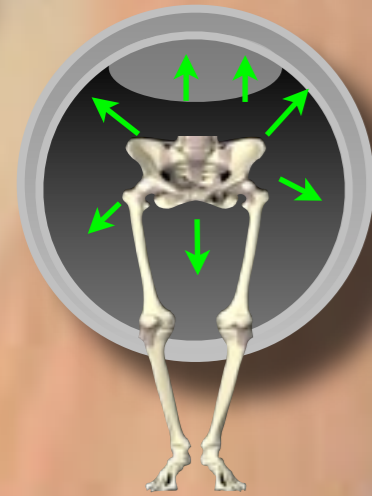
MATT TRUSCOTT, MASTER TRAINER

Evidence suggests that tissue (fascia) is better trained by a wide variety of vectors; in angle, tempo and load.

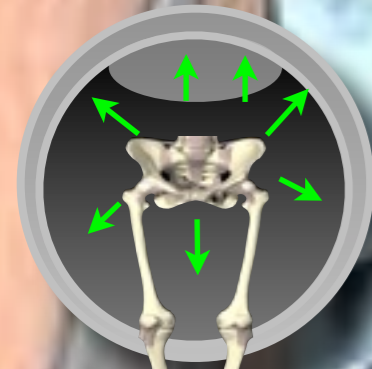
- Huijing 2007



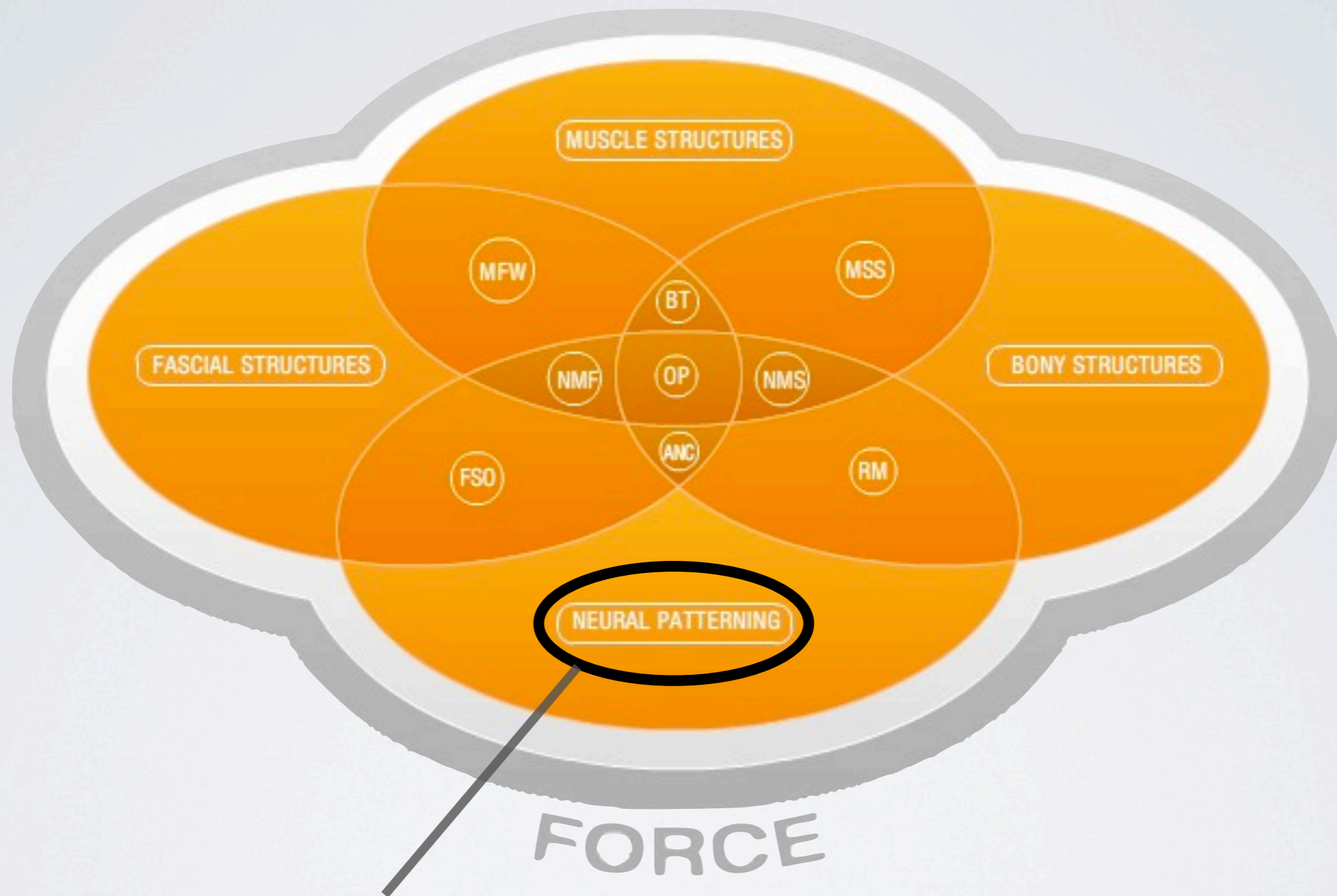
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# Motor Variability

--- Skill training:

synaptogenesis, synaptic potentiation, and reorganization of movement representations within motor cortex.  
(i.e. improves neural connections and potentials; improves wiring sequences)

--- Endurance training:

angiogenesis in motor cortex, but it does not alter motor map organization or synapse number.  
(i.e. increase capillarization of CNS blood and lymph vessels, but nothing of the neural connections)

--- Strength training:

alters spinal motoneuron excitability and induces synaptogenesis within spinal cord, but it does not alter motor map organization.  
(i.e. increases sensitivity of action potentials and improves neural connections, but does not alter wiring sequences)



Muscles rely on  
neural sensitivity



While Nerves  
rely on fascial  
sensitivity



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- It is well documented that exercising only one arm will also enhance strength in the 'untrained' arm
- By activating the nervous system, we enhance its ability to “squeeze” the neural drive back to the joint where enhanced performance is required

DIRECTING NEURONAL OVERFLOW

'Superstiffness' - Stuart McGill



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Nerves (timing/isometric)



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Nerves (timing/isometric)



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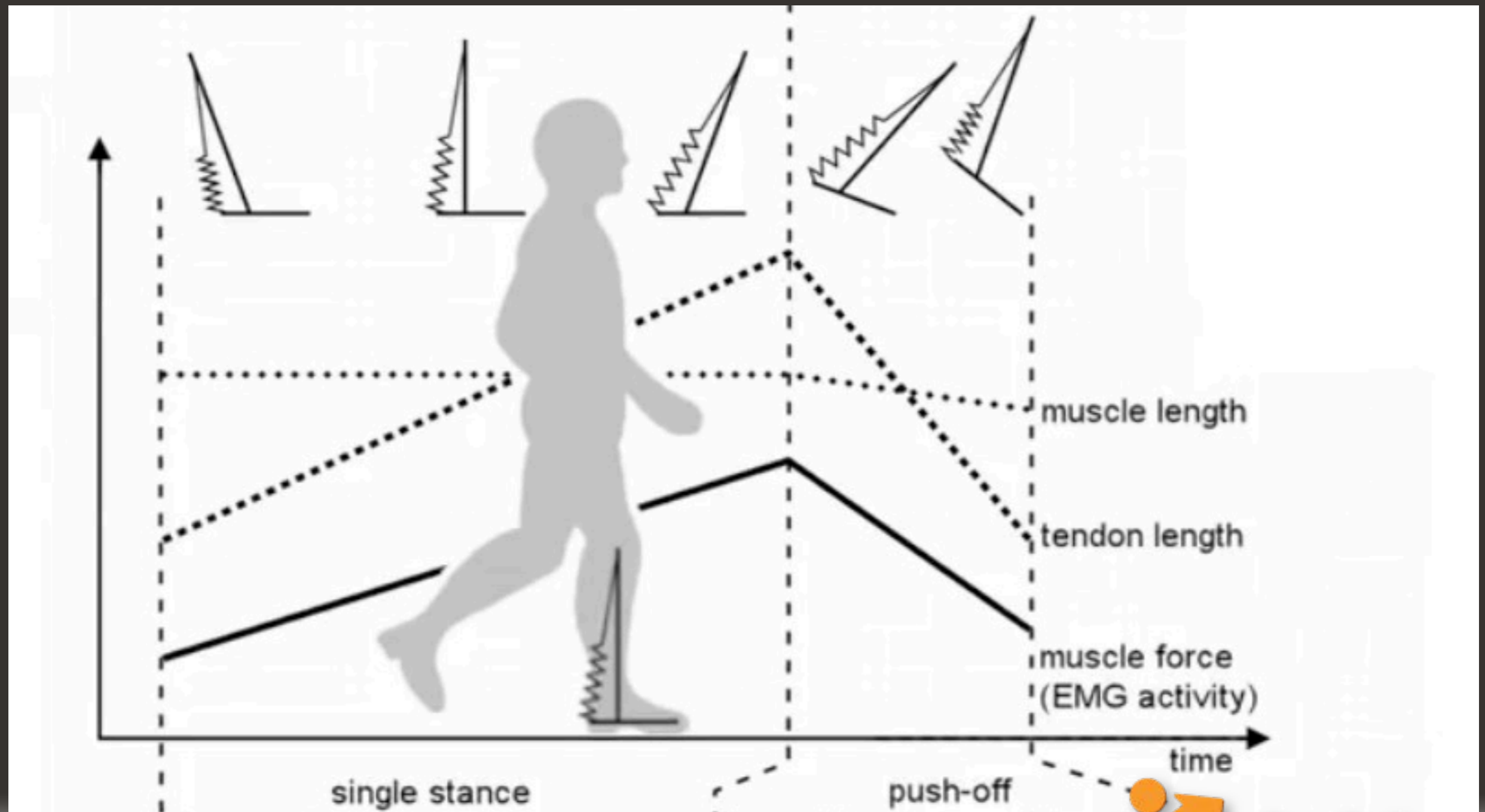
**LIFTING**



# SHIFTING

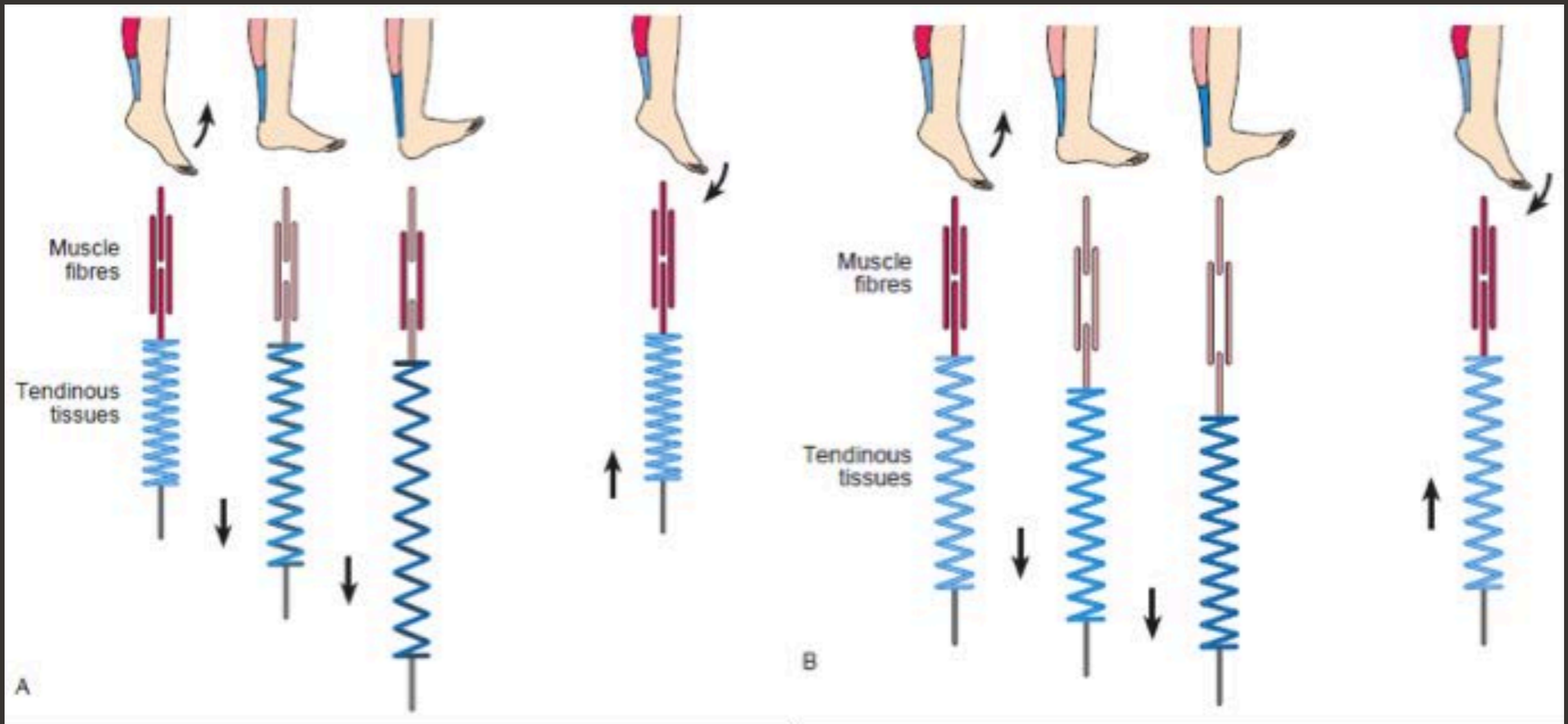


# Adjo Zorn – Fascial Elasticity



# Catapult Mechanism

Kawakami (2002)



## Elastic Recoil of Fascial Tissue

A - Less Length Change in Muscular Units (i.e. less eccentric muscle load)

VS.

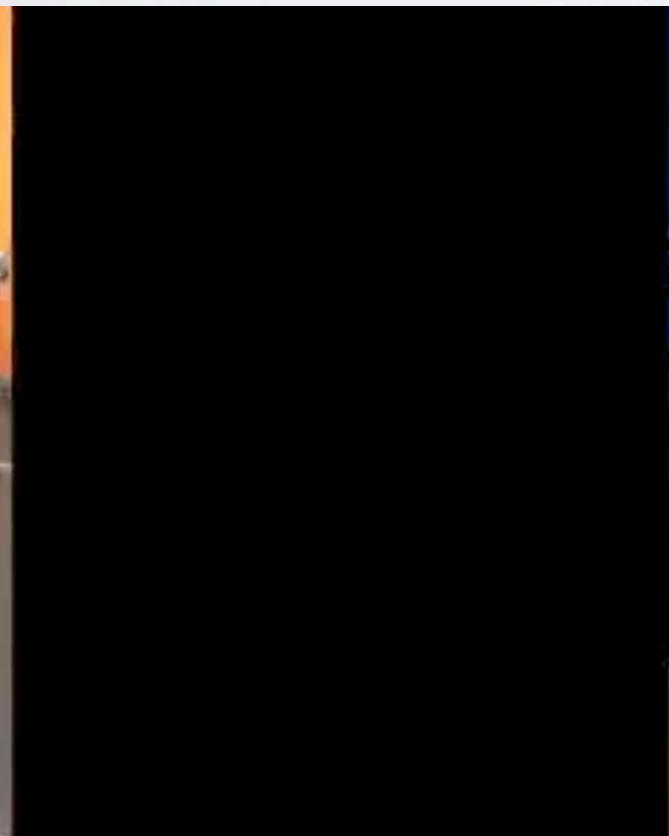
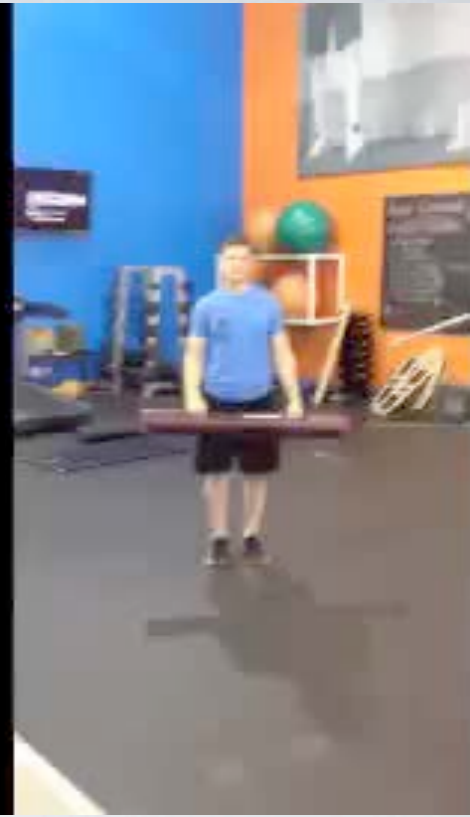
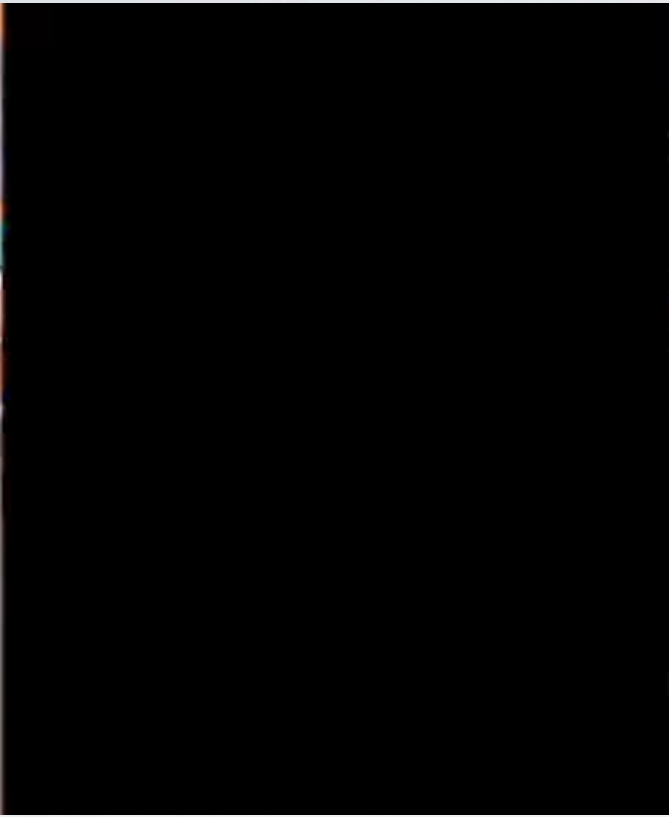
B - More Length Change in Muscular Units (i.e. more eccentric muscle load)



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# 10 MOVEMENT PREPARATION DRILLS

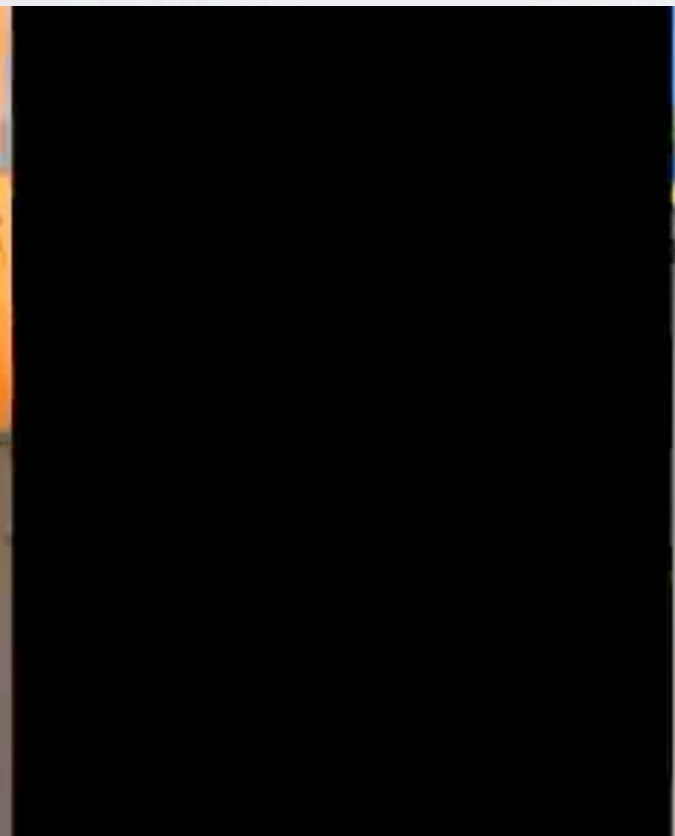
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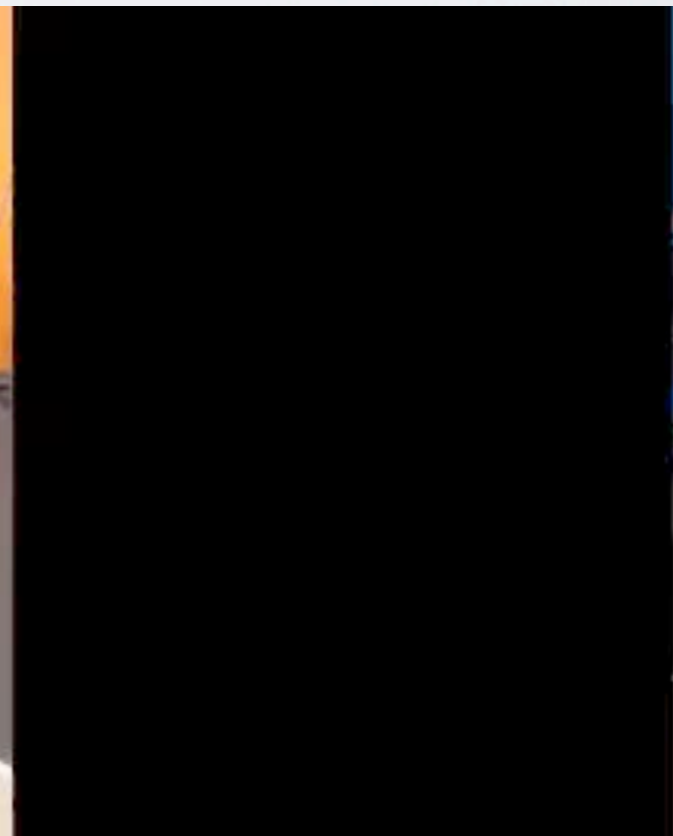
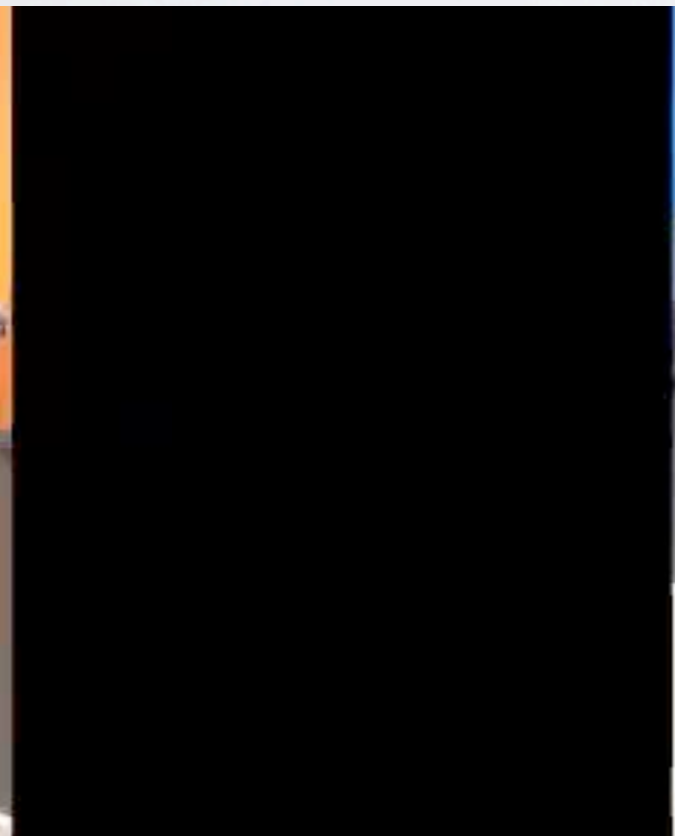
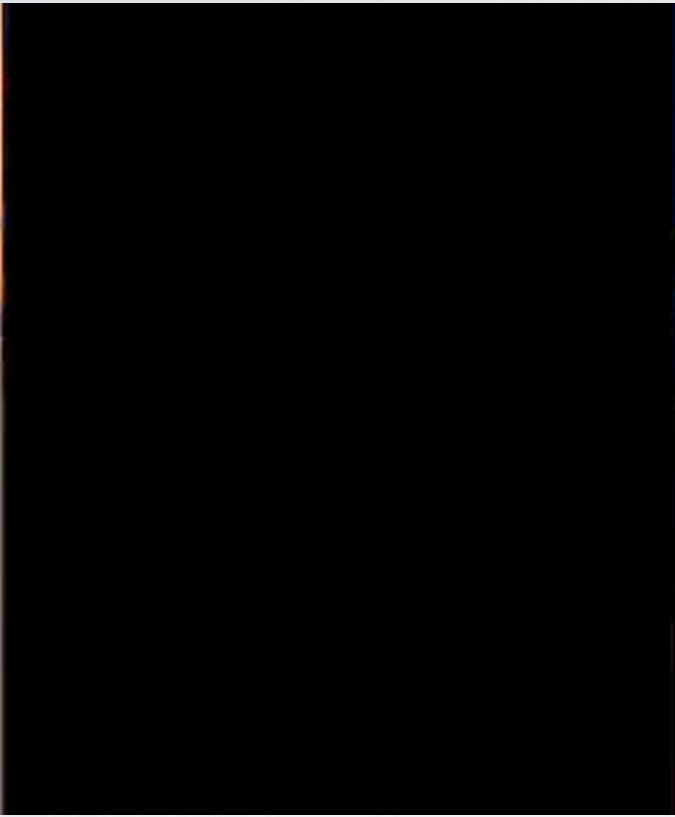
# 10 TISSUE ENHANCEMENT DRILLS

(pick 2 at a time)



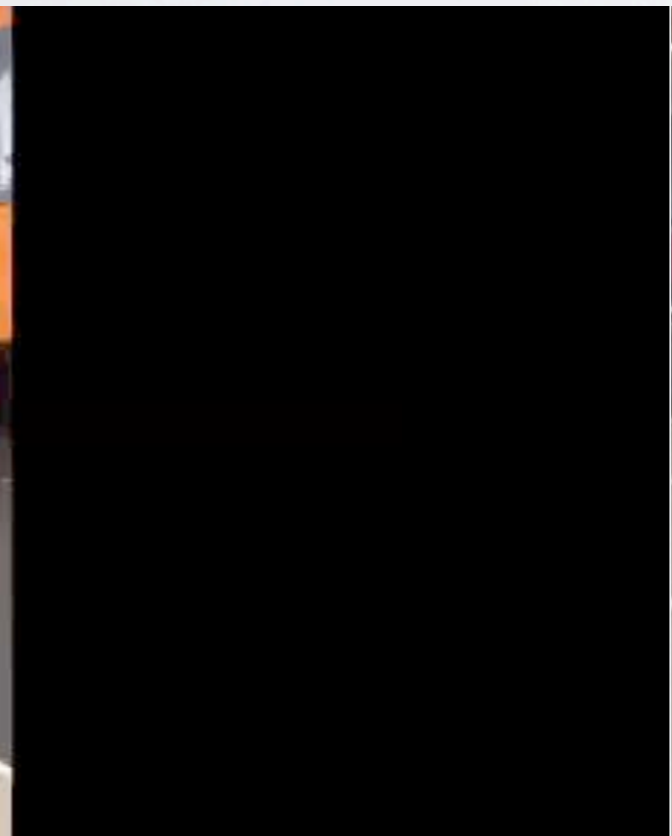
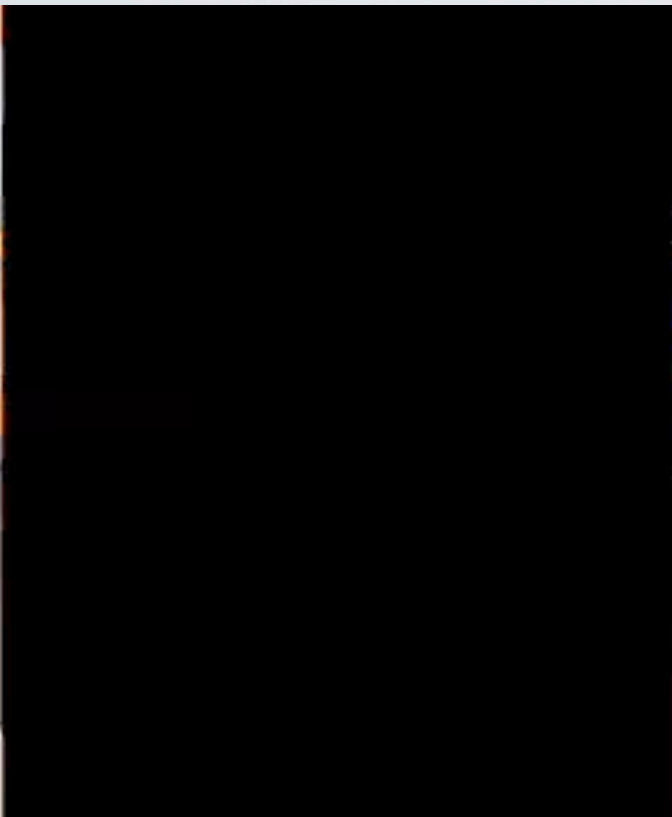
# 10 MOVEMENT BASED INTEGRATED STRENGTH DRILLS

(pick 2 at a time)



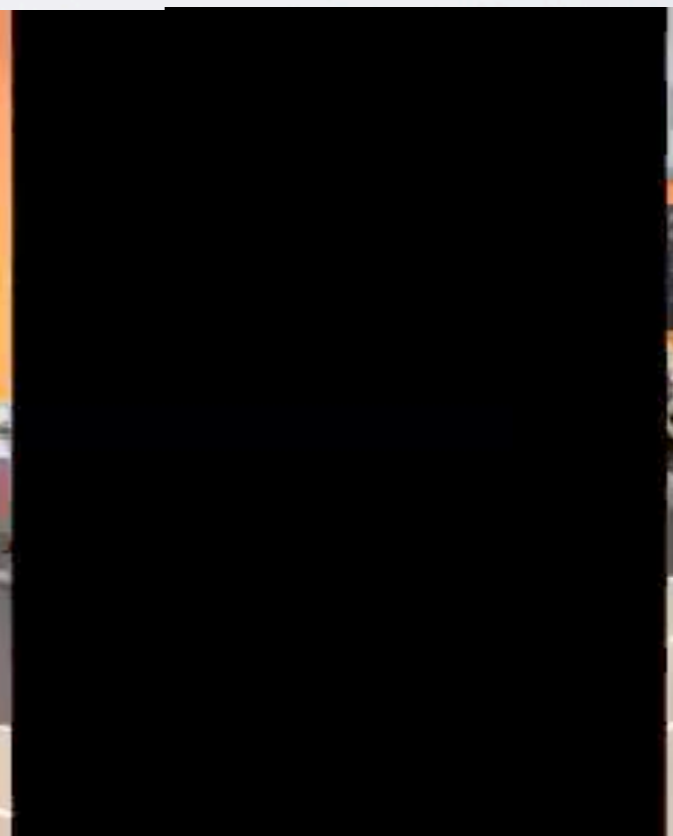
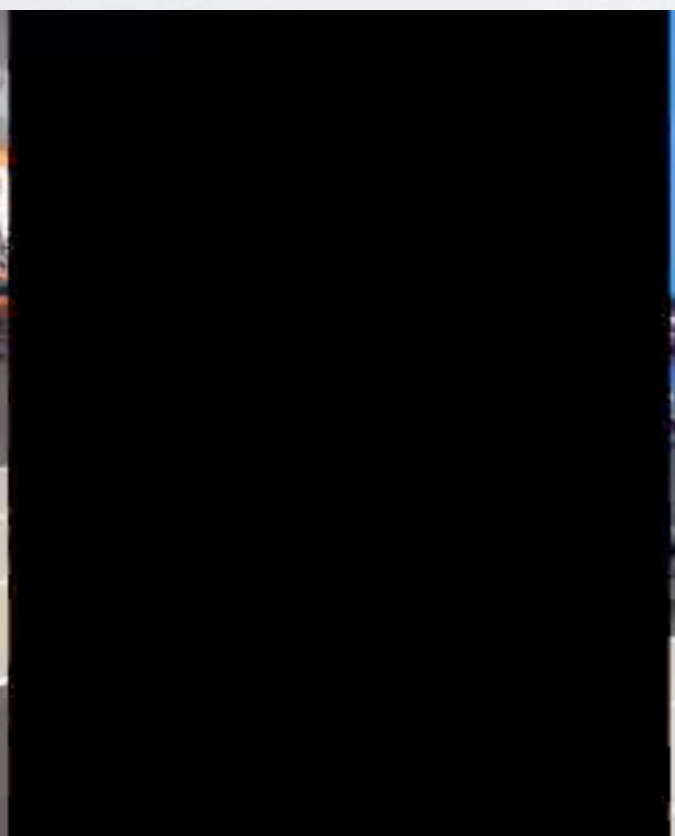
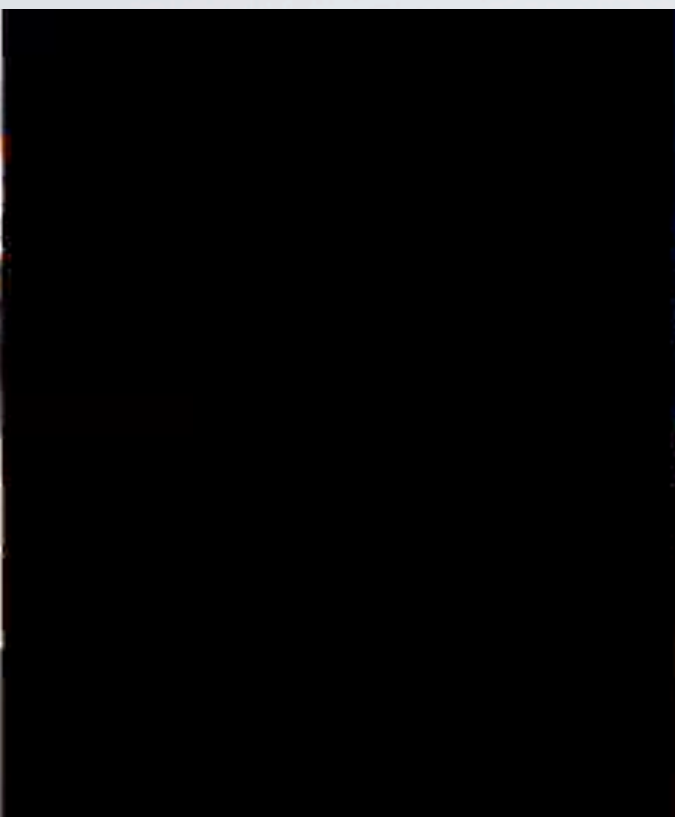
# 10 EXPLOSIVE MOVEMENT BASED POWER DRILLS

(pick 2 at a time)



# 10 SEQUENCING AND INTEGRATED MOVEMENT COORDINATION DRILLS

(pick 2 at a time)





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