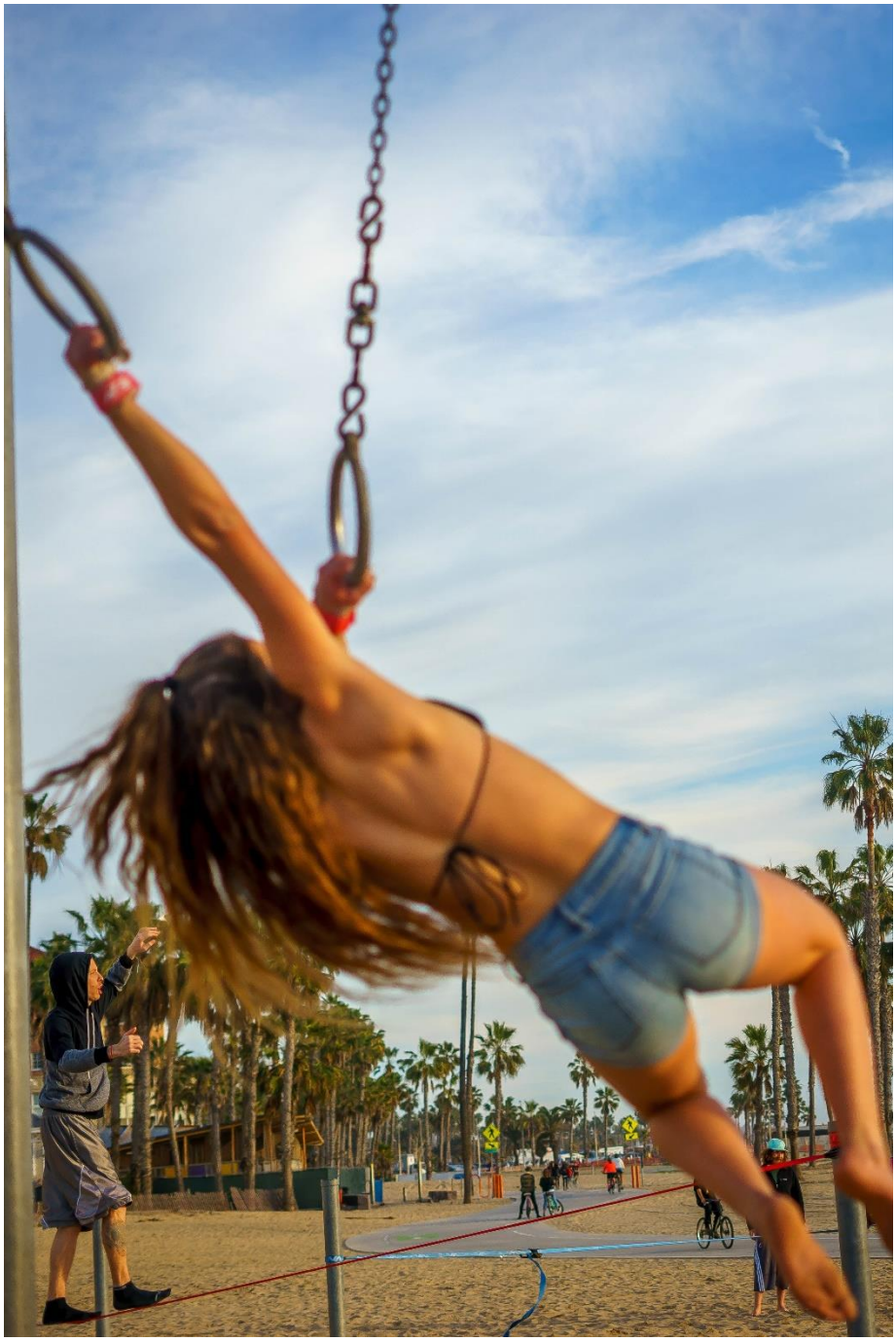
Unbound Health



Mechanical Kinesiology-Part One: Functional Mobility

Introduction

Welcome to this RootHealth guide on 'Mechanical Kinesiology': Part One-Functional Mobility.

The object of this guide is to inform on 'tactics' one may use to develop one's functional mobility *(you probably picked this up from the title)* . This is within on overall 'strategy' to create optimal mechanics for health, function, and performance. But what is 'functional mobility'? What is 'mechanical kinesiology'? To understand these concepts, let me explain.

Kinesiology

In academia, the word '*kinesiology'* is defined simply as: "*the study of human movement"*.

In practice, this really means: "*the study of the body's movements and the adaptations due to external stimuli or forces applied to human physiology"*.

In an objective practical description: *Kinesiology seeks to take a comprehensive analysis of an individual's current physiological condition (condition A) with respect to the condition they wish to achieve (condition B) and to implement a precise approach needed to get from condition A to condition B in a manner that no action wastes resources of time or effort while avoiding negative side-effects*.

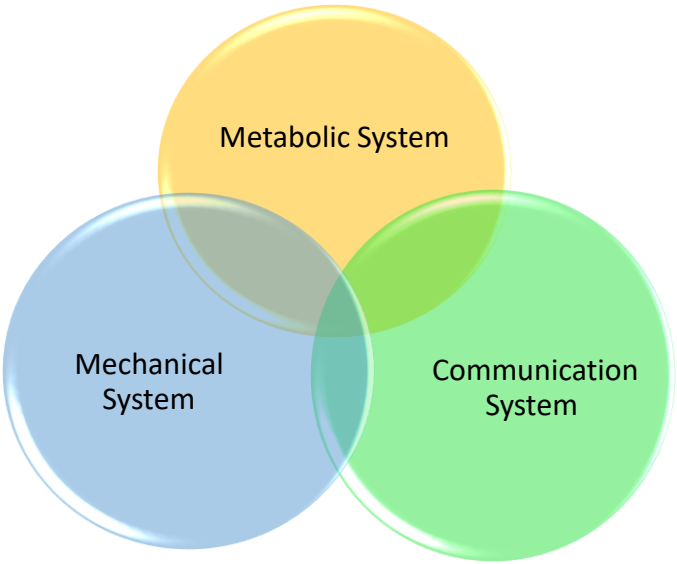
Wow! That was a mouthful! But, let's get a little deeper into these topics.

Holistic Kinesiology (HK)

The biomedical model breaks the body down into around 11 different systems (integumentary, cardiovascular, respiratory, digestive, etc). With HK, we simplify this by looking at the systems that adapt (or are

affected) most closely together from similar activity. Our simpler breakdown is as follows.

- Communication System: **Nervous system, endocrine system.** This system(s) is responsible for controlling all the other body processes.
- Mechanical System: **Muscular, fascial, skeletal systems**. Responsible for moving the body in space.
- Metabolic (Chemical) System: **Digestive, respiratory, integumentary, circulatory systems.** As you can see, this is the taking in of chemicals/nutrients into the body in the form of food, oxygen or other nutrients and then transporting them to body tissues.
- Energetic System: From eastern medicine. Important to mention but outside the scope of this guide or our expertise.



Mechanical Kinesiology

As noted above, the mechanical system is the system that uses leverage to create movement *(muscular system, skeletal system, fascial system)* along with its input from the nervous system. When developing this system, we would refer to this as 'strength' training.

As we will go into later, ‘strength’ happens from the combination of 3 main qualities of function (physiology) within the mechanical system: Range of motion (local mobility), stabilization, and gross strength.

In the first part of this book, we’ll go a little more in depth with these concepts. The rest (the bulk of the book) will be exercises (tactics) for accomplishing health, function, and performance in the area of ‘Functional Mobility’.

Mobility

Most of us throughout life have acquired muscular and fascial restrictions that hamper our ability to move optimally and perform physically without pain. As the basis for all strength and movement, we need: MOBILITY. Without adequate mobility, cardiovascular activity, strength, and athleticism will never be able to be fully developed. As a matter of fact, training these without respect to mobility could lead to either acute injury during training or creation of dysfunctional mechanical patterns that will elicit a chronic injury over time. When considering mobility first, we create a relaxed, strong, pain free body.

What is mobility? It sounds simple enough. 'It's the ability to move', right? That's correct! However, some explanation may help us better when it comes to actually TRAINING mobility.

Local vs. Functional Mobility

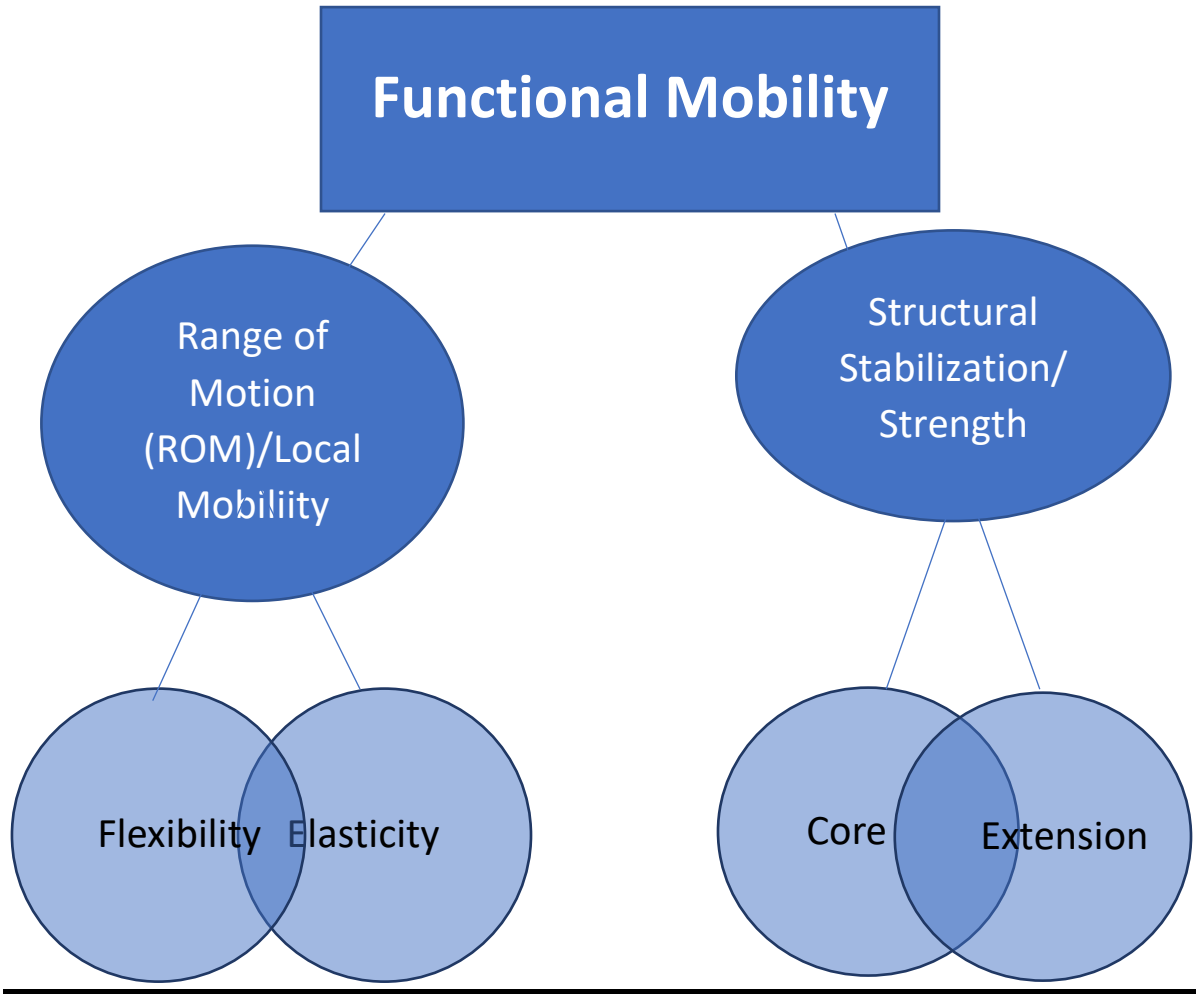
Functional Mobility is the ability to move in the way our bodies are genetically capable of into different positions, stabilize, and return to the original position efficiently and effectively.

Moving the whole body to a different position is different than the mobility in a single joint. ***Local mobility*** is the ability of a joint to access its full genetic range of motion without restrictions due to dysfunctions of fascia or muscle tissue (tissue restrictions). ***Functional mobility*** is the ability of the whole body to move to different positions in space. ***Functional mobility*** incorporates a variety of different components as well as individual joint **local** mobility.

All mobility is attained through the stretching and contraction of muscles along with the stabilization of joints in multiple directions of motion. In order to

visualize all the components of mobility, see the diagram below and read the definitions that follow.

Mobility Diagram



I had my own personal experience with severe and debilitating back pain over the course of 20 years (around ages 15-35….should be noted that the last 5 years were much better than the 1st 5). This was while building my both personal and coaching experience in athletics. During that time, I discovered more and more information on basic techniques to alleviate that pain while improving performance through range of motion and stabilization. This program is a straight forward technique toward developing mobility. It is, hopefully, simple and easy to follow and repeat. The techniques here and in Stage 4 will help you find your weaknesses in movement and address them either within your training routine or throughout the day.

Functional Mobility Components

Range of Motion

Range of motion refers to the ability of the muscles and fascia surrounding either one or a series of joints to elongate allowing the joint(s) enough movement to optimally perform its function. If the joint is not able to either move into the optimal angles or move out of those angles to perform a specific motion, the body will either compensate or simply not be able to perform. Dysfunctional ranges of motion can lead to pain and injury.

For example, take the squat movement. As we can see in the picture to the right, the subject has limited movement in the hips and ankles. If we can create ROM in these joints before he begins to perform squats, he will be able to move much more optimally and thus lessen his risk of injury both while performing the movement and, through repetition, developing long term dysfunction over time.

Flexibility: The ability of a muscle to reach its maximal length therefore allowing for a joint to reach its maximal angle (range of motion).

Elasticity: The ability of muscles to move through a full range of motion (flexibility) as well as contract out of those ranges (elastic response).

Structural Stabilization/Strength

Stabilization refers to the ability of the muscles and fascia surrounding any joint to contract and hold the joint in a static position as the joints

around it move to perform movement. If one or many joints are not able to hold a position, the joints around them will not be able to attain leverage to produce a movement.

Dysfunctional stabilization patterns can lead to pain and injury due partially to the nervous system restricting mobility. We address the patterns with these simple positional exercises. The positions described will use isometric (static, non-movement) components as their primary focus as well as slow moving mechanics.

Structural stabilization or strength is the ability to stabilize the joints of the spine, pelvis, head, and shoulder girdle (our definition of 'core').

Posture (Good): The position of the joints of the body in relationship to each other creating the least amount of metabolic or mechanical demand.

Core[1]: The ability of the muscles that are connected to the spine, sacrum, head, and ribcage along with the pelvis and shoulder blades to stabilize the involved joints.**

Extension: The ability of the muscles of the posterior chain (back of the body) to hold us upright and keep us from falling forward into passive flexion. (A primary component of posture)

Mechano-reception: An internal sense within proprioception involved with joint position and tension (both creating and sensing) coming from the inter-relationship of the fascial, muscular, and nervous system.

Proprioception. (prō'prē-ō-sĕp'shən) "The unconscious perception of movement and spatial orientation arising from stimuli within the body itself. In humans, these stimuli are detected by nerves within the body as well as by the semicircular canals of the inner ear. " More simply,

[1] '*Core'* can have many differing definitions in the health, performance, and fitness industries. This, as many of our subjects that do not have specific medical definition, is how we will define it within the scope of our study.

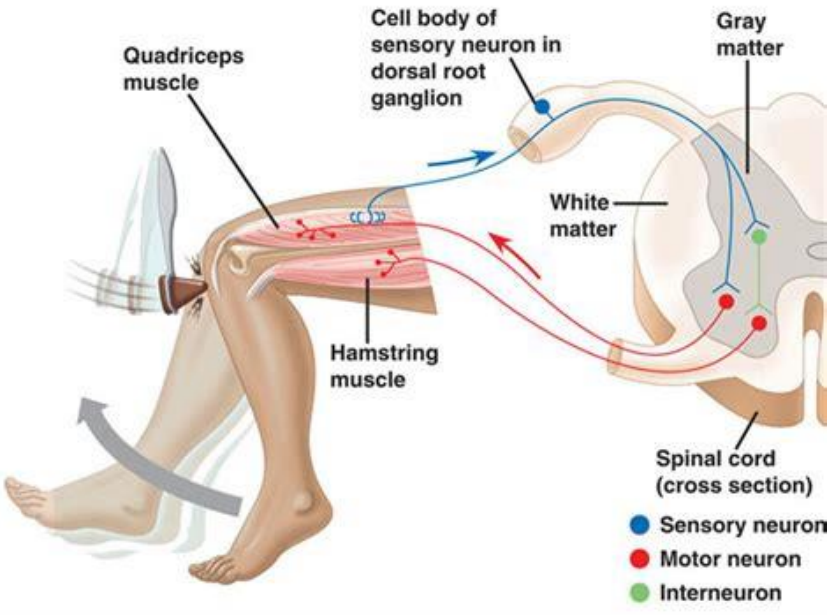
this is one of our 'sixth senses' that tells us the orientation of our body (both joint position and whether we are right side up or upside down, etc). As we refer to mobility with respect to our system, we are referring strictly to neuromuscular feedback on muscular tension and joint angles.

Gait: Posture magnified with movement. Movement during locomotion (especially walking).

These concepts working together allow us to run, throw, walk, jump, climb, crawl, lift, and swim.

How and why do these concepts work together?

Well, the body has another sense (actual a few) beyond our 5 senses. One is called mechano-reception. Mechanoreception uses special nerve endings in our muscles and joints to detect tension. Then, from the detection of tension, the body responds by telling the body how to hold itself and move. This is called the reflex arc. The reflex arc also works when we touch a hot stove or step on a lego. But, only mechanoreception is important here.



Picture from -The American Heritage® Science Dictionary

Building Mobility?

Have you ever seen a baby develop into a toddler? I watched my kid at 1 ½ years pick up a 5lb dumb-bell with perfect form and great range of motion. The fact is, you are born with 'mobility'. Therefore, mobility only has to be maintained throughout life by eliminating tissue restrictions that develop due to repetitive strains on the mechanical system.

Strength, both stabilization and gross, has to be built. This also means that, beyond a certain point, more mobility is actually disadvantageous. This is contrary to other physiological qualities like strength and cardiovascular capacity where greater levels lead, in the most part, to greater performance. I mean, despite great ROM and form, I don't see my 1 ½ year old reaching to catch any line drives.

Health Conditions Improved

Tissue restriction and associated losses in mobility is a factor in many conditions. Tissue restrictions and referral pain lead to chronic myofascial pain. Tension from restriction and negative mechanics lead to imbalances that are a factor in both chronic and acute injuries. Loss of mobility in the elderly is causal in injury due to falls. It is, therefore, logical to surmise (and we see in empirical practice) that re-developing mobility helps to solve and mitigate these issues.

How to use this guide

The instructional part of this guide presents tactics and techniques that are fairly basic and easy to employ. In no way are these the COMPLETE guide to all mobility techniques. Rather they form a template in which to form a foundational approach using stretching both for assessment of mobility and as a technique to restore a balanced mobility and stabilization for the entire body.

The strategy in which these techniques are embedded should be thought of as a comprehensive (addressing the full body) beginner's guide that can be employed forever. Stemming from some of the concepts in Unbound Health, the techniques are simple and repeatable. Other more complicated techniques can be taught by a professional (myself included, of course!)

In each section of the guide, simply choose an exercise, try it, feel it out, determine how it affects you, and then decide that it works for you or that you need to pick a different one. It's that easy.

Have fun and happy movement!

Static Stretching

The static stretches' purpose is to re-establish flexibility and local range of motion in a joint or series of joints to: A) *alleviate pain* (corrective) and B) *increase the functional capacity* of a joint or joints.

Whether to do static stretching before, after or during a training bout or competition depends on what types of tissue restrictions one may have as associated with the expectations of the event or training bout. In general, a person with no tissue restrictions would perform static stretching either after a training bout or athletic event or in between events as a tool to maintain mobility.

Also, in a person with no tissue restrictions, we may choose not to stretch statically during or before intense training or competition as studies have shown a possible diminished effect on elasticity, and reactivity in muscle directly after static stretching. This diminishing effect could impede performance or possibly even contribute to injury if the event or bout is at a high enough intensity.

Of course, other factors such as how soon before the bout stretches are done, how deep the stretches are performed, and how long they are held are also factors. This may lead us to the assumption that we should always limit ourselves to **dynamic** stretching before training bouts and athletic events.

However, in the case of someone who DOES have tissue restrictions (TR), we are better off using the static stretches to alleviate or mitigate these restrictions as this will lend to better performance and less chance of injury during extreme activity.

- <u>For those WITHOUT TR</u>: Goal to ***maintain*** **flexibility**: Perform one stretch from each category for 30 seconds (3-5 breaths) 1x per day **after or**

between training bouts. Goal to ***gain*** **flexibility**: Perform one stretch from each category for 30 to 60 seconds for 2 or more sets.

- For those WITH TR: Perform stretch on the area restricted along with any myofascial release techniques to relieve the restriction before an event or bout. Also follow the protocol for those without TR between events and bouts.

Breathing for Static Stretch:

Breathing is well-known as a necessary method used while releasing restriction. It is used as a primary element of yoga and strength training. I recommend, once a position of stretch is reached, a 5 second breath count is used in inhalation and an even exhalation along with release of muscle tension deeper into the stretched position. Breathe into the diaphragm (feels like tummy) for `3-5 seconds or more. Reverse your breath and breathe out for 2 seconds or so while feeling the muscle release and falling deeper into the position. Additionally breathing for reps in this manner eliminates the need to count for 30 seconds each set.

Body Scanning:

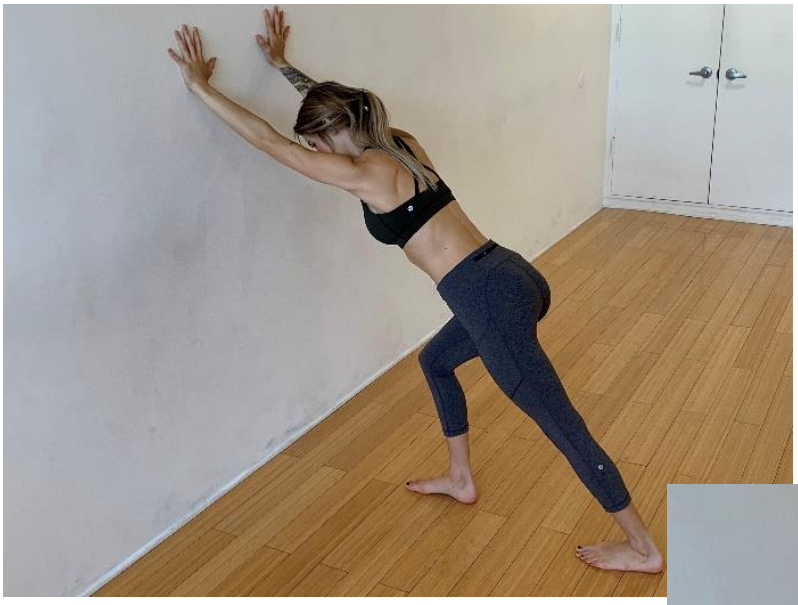
Another concept to focus on when performing our mobility routine is 'body scanning'. This is an assessment technique. Many times we may overlook imbalances in our joints and muscles as most of us that do not live a physically demanding lifestyle are not normally working in a full range of motion throughout a typical day….much less thinking about biomechanics at the times that we are.

Body scanning is simply identifying the state that our body is in. Body scanning while going through the movements presented in this manual can increase our awareness of every part of our body and thus give us vital information regarding areas that need to be addressed by techniques such as: additional

stretching, strengthening, fascial release, distraction, decompression, vibration, or other techniques we may apply. What we are looking for in body scanning in relation to mobility is 'tissue restriction'. Where is an area of tightness, pain, or stiffness restricting our range of motion or causing pain?

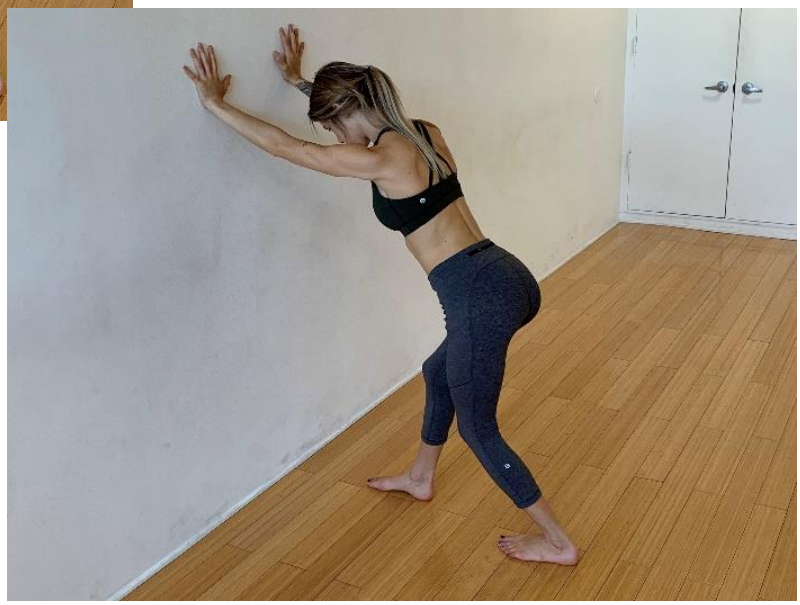
Static Stretch: The Exercises

Category 1: Calves



1.1 *(left)*: Lean against a wall with one foot forward supporting. The back leg should have the heel down stretching through the calf.

1.2 *(right)*: For the Achilles and lower calf, bend the knee while keeping the heel planted on the floor.



Category 2: Quads

2.1 *(left)*: Stand upright in the standing plank position (tall, pelvis slightly into posterior tilt). Bring one heel toward your buttocks. Catch with your hands. Squeeze the glutes and pull on the front of the ankle while opening the chest. Make sure not to allow a back arch.

2.2 (*Above-right*): For better hip extension allowing a better stretch from the upper part of the rectus femoris (part of the quads and hip flexors), lay down and let the ground assist.

2.3 (*right*): Try with both legs. Still don't let the back arch too much.

Category 3: Hamstrings

3.1.1 *(left)*: Start in a standing position with one foot up on a raised object and knee straight (can be locked or slightly bent). Slowly lean over pushing your chest toward your toes with your back flat.

3.1.2 *(right)*: Done with a rounded back and forward reach.

3.2 Toe touch series

3.2.1 *(left):* Keep the knee straight (can be locked or unlocked). Hinge forward with a flat back until the hamstrings are fully stretched. At this point, you may keep the back extended and flat or let it relax and round forward stretching the whole posterior chain.

3.2.2 *(right):* For more isolation and focus on each leg, cross one over the other and repeat on the other side.

3.2.3 *(left):* For focus on the external rotators and outside hamstring muscles, internally rotate the femurs pointing the toes toward each other.

3.2.4 *(right)*: For focus on the adductors and inside hamstring muscles, externally rotate the femurs at the hip pointing the toes out.

3.3 Lying Wall HS

3.3.1: Lie on your back with your heels against the wall and knees straight.

3.3.2: Scoot your butt toward the wall until you can touch it. The next progression (unshown) is against a door frame or corner with one foot up and one down.

Category 4: Hip Flexor

Split Kneeling HF

4.1.1: Start in a split kneeling position. Keep the chest high and push the hips forward until you feel a stretch in the front of the hips.

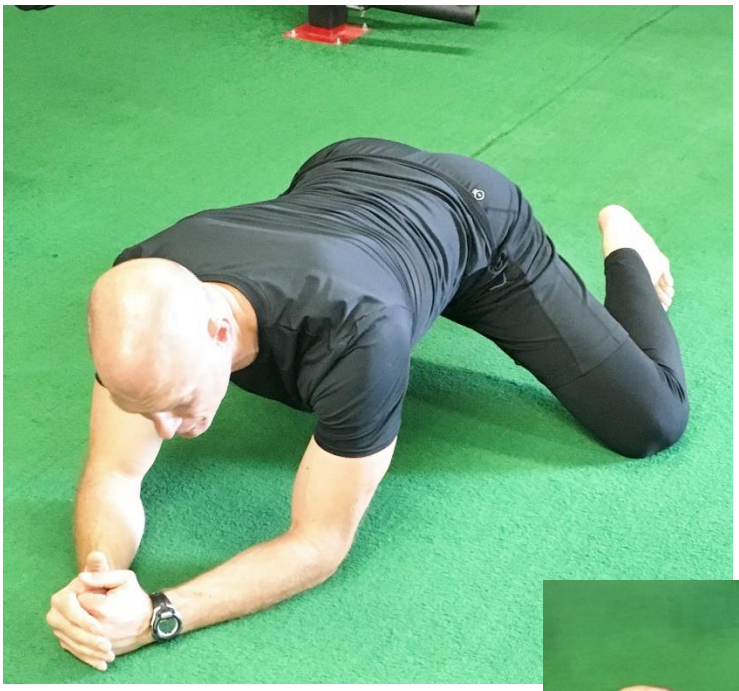
4.1.2: Then reach back and grab the ankle to integrate the quadriceps.

4.2 HF Lunge

4.2: Lunge forward. Keep the chest high and push the hip forward. Bring the arm on the side of the extended hip forward and across the body to create rotation.

Category 5: Adductors

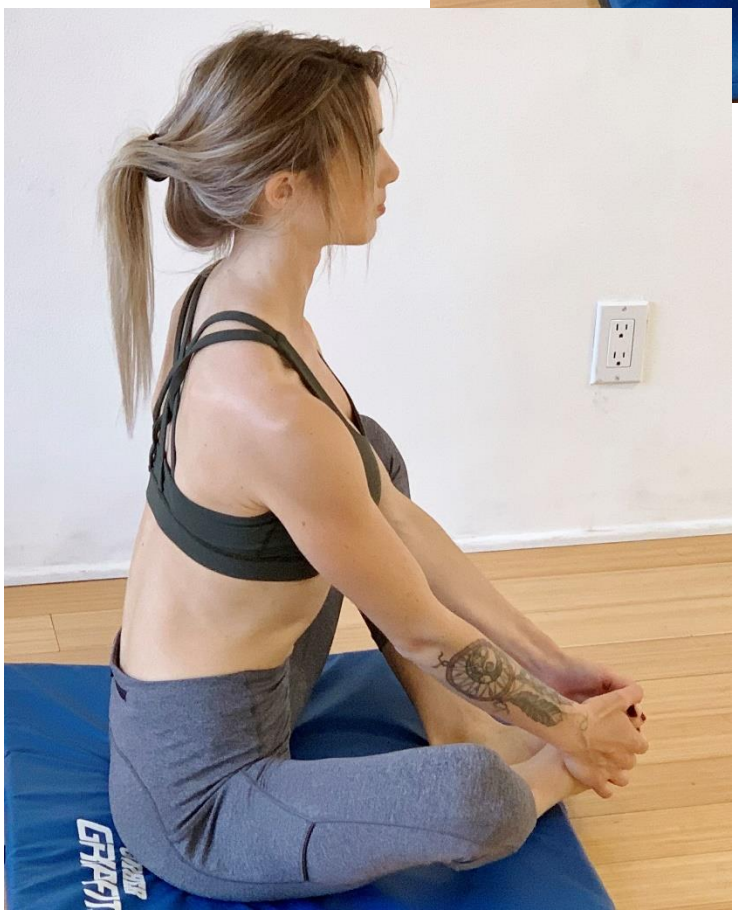
5.1 'Frog'/Wrestler's Stretch



5.1: Figures One, Two, and Three: Get into a kneeling position face down, elbows down.

Keeping the back flat, push the knees out as far as you can go comfortably.

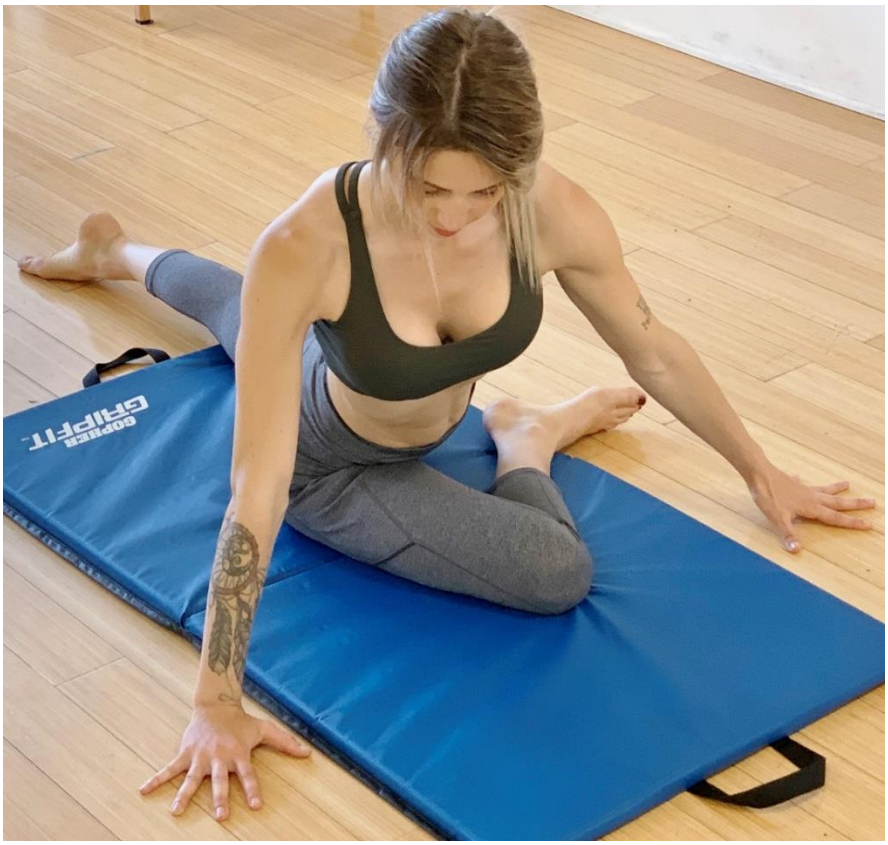
5.3 Butterfly



5.2: Sit up tall with the bottoms of the feet together and knees pushed down. Bring the heels as close to the groin and get the knees as close to the floor as possible.

Category 6: Hip External Rotation/Glutes

6.1 90/90



6.1.1: From the pushup position, bring the femur of one side underneath the chin with the knee at 90 degrees toward the sternum. Slowly bring the weight of the torso toward the floor.

6.1.2: As you advance, add more of a twist and push the torso toward the floor to get extra deep.

6.2 Figure 4

6.2: On your back, cross the lower part of one leg (outside of the ankle) over the upper part (upper leg just above the knee) of the other. With both knees at 90 degrees, bring the lower leg toward the chest. Repeat with other side.

Category 7: Hip and Spine Rotation

7.1.1: Lying on your back with arms out bring one knee up so that the knee and hip are bent at 90 degrees. Twist the pelvis so the knee goes toward the ground on the opposite side.

7.1.2: Same as above but with knee straight.

7.2 Lunge into Torso Twist

2.2.1: Find a fixed object such as a pole or a wall. Move into a lunge position with the object to your right or your left. Your foot closest to the wall should be forward. Rotate your upper body toward the wall and the fixed object to stretch the mid-section.

Category 8: Upper Back

8.1 Rhomboid/Lat Twist

8.1: To set up….start with a suspension or stable object such as a bar to your left side at hip height. Hinge forward. Rotate the shoulders toward the object. Grab the object with your right hand face up. Grab the object also with your left hand face down. Now, push with the right and let yourself be pulled with your left. This will stretch your back muscles between the shoulder blades and the sides (trapezius, rhomboids, and lats).

8.2 Standing Lateral Pull

8.2: Find a fixed object such as a pole. Stand with the object slightly in front of you. Reach the arm closest to the pole to the pole to stabilize with palm facing forward. Reach the other arm across and over the head to grab the object also with palm facing forward. Shift the hips away from the object and let the arm on top be pulled. The lower arm will stabilize and control for intensity. To get a greater stretch in the lats, on the side of the upper arm, let the leg drop across and backward across the body.

Category 9: Chest

9.1 Doorway Stretch

9.1: Stand tall and place the palm against a fixed object. With the elbow slightly bent, step forward with the leg on the side of the corresponding places palm. Let the arm come back at the shoulder and the scapula come toward the spine.

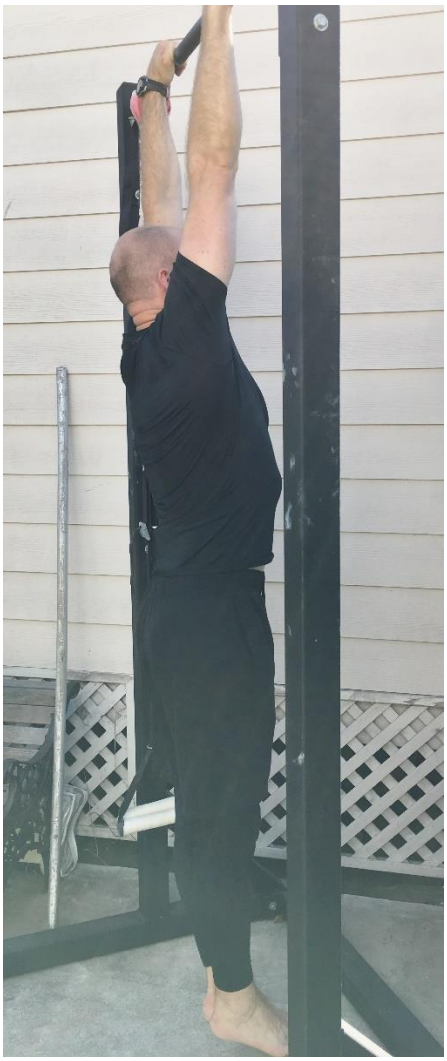
Category 10: Chest/Biceps

10.1 Standing Bicep

10.1: Stand up straight. Clasp hands behind the back with palms down on an object (can be fixed or suspension) that gives an upward resistance as you move forward. Let your arms be hyperextend at the shoulder as you move forward keeping your upright posture.

Category 12: Upper Body-Full

12.1: Hanging (decompression/complete shoulder and shoulder girdle stretch)

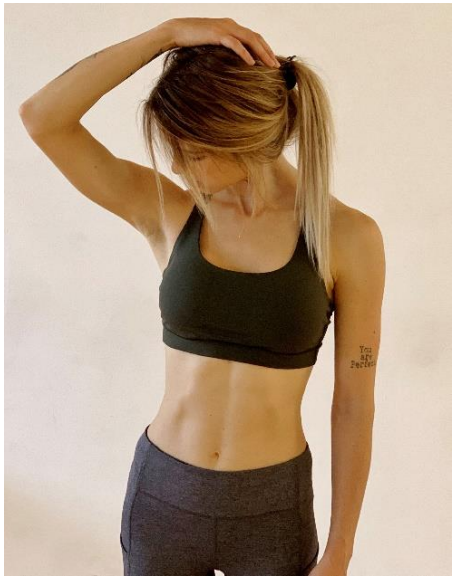


The hang is as simple and effective as it gets. Hold onto a bar and hang! Make sure you breath and open up the chest, then breath out and let your whole body elongate. This will effect EVERYTHING! The bulk of the stretch will go into the muscles of the shoulder, chest and back. Then the spine and pelvis will feel opening as well. The value of this decompressive exercise is immeasurable!!!!

Note: While the figure on the right is from the side, it is also a slightly different version as the head is still tucked between the arms keeping us more upright than the form in the one on the left with the head back.

Neck Series (for SHORT tight trapezius neck muscles)

11.1: Stand in anatomical position. Push the shoulder blades down and keep them there. Bring one ear toward one of the shoulders. Feel the stretch



11.2 and 11.3: Repeat at different angles. **on the backward stretch (looking up), do not impinge the cervical region on the back of the neck…..keep anatomical position and an open chest to avoid this.

Caveat: I don't automatically recommend a neck stretch if it feels tight or in a general mobility approach. Fascial release may be more appropriate for this area.

Bottom of feet (for plantar fasciitis)

- Bend the knee toward the chest and grab the foot
- stretch the toes back with the ankle bent

Sample Workout 1 (ADL + Static Stretch)

1. Walk to the park 10 mins away
2. Stretch for 1 min for an exercise in each joint category
3. Walk home

Sample Workout 2

Perform a set of stretch for each category with 50 jump rope steps between each stretch.
Exercises:

- **calves 30 sec each**
- jump rope x 50
- **quads 30 sec ea**
- jump rope x 50
- **hamstrings 30 sec ea**
- jump rope x 50
- **adductors 30 sec ea**
- jump rope x 50
- **glute stretch 30 sec ea**
- jump rope x 50
- **lower back 30 sec ea**
- jump rope x 50
- **chest 30 sec ea**
- jump rope x 50
- **lats 30 sec ea**
- jump rope x 50

Dynamic Stretch

Mobilities (or dynamic stretches) include all of our elements including **flexibility, elasticity, core stability, balance, and posterior chain extension**.

The element worked the most is ELASTICITY. We move a joint through a ROM in one direction and require the muscles to respond, moving it back to the opposite direction. Typically, the best time to perform 'mobilities' is as a warm up before a training bout or between sets or intervals within that training bout. But any time is a good time if you feel stiffness or restrictions coming on or as just a general approach to mobility. All are good.

You may even decide to perform these as a routine upon waking or during the day….or during a long car trip (when the car is stopped, of course!). These are a great low intensity active way to gain general mobility and counteract either the overstimulation to the muscles from intense activity or the effects of long periods of sitting or standing.

Repeat an exercise in each of these categories 5-10 reps each way in a full ROM with a medium controlled tempo until the joints addressed feel like they have the maximal range of motion that you feel comfortable with for the day.

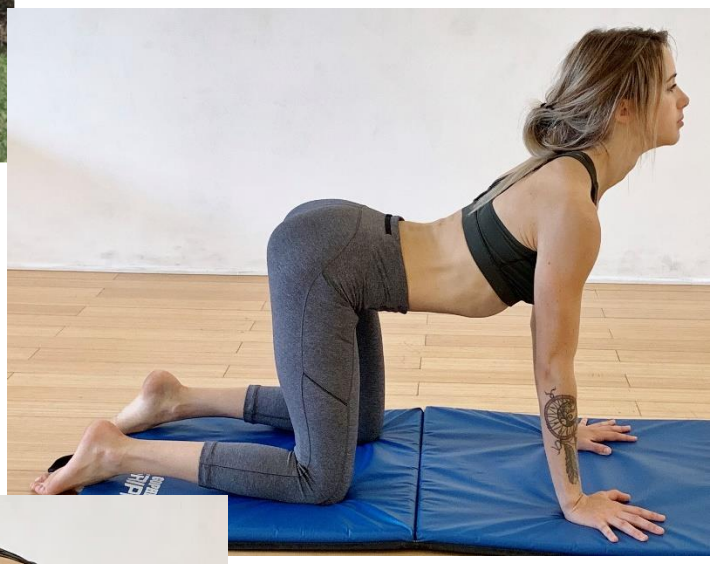
Category 1: Spine, pelvis, and shoulder girdle mobility.

1.1 Cats

Step One-*(left)*: Start in a table top position (hands under shoulders and knees under hips facing down)

Step Two-*(below)*: Arch the back completely by bringing the hips into an anterior tilt (tucking under) and bringing the head back as far as possible while the shoulder blades retract (come together). Breathe in completely into the belly button.

You should feel stretching in the abdomen, chest, and neck



Step Three-*(left)*: Reverse in the opposite direction. Bring the chin to the chest. Bring the hips to a posterior tilt. The shoulder blades should protract. Push every last bit of breath out. Squeeze the glutes and pull up on the pelvic floor (kegel). You should feel stretch in the upper and lower back with contracting glutes and abdominals.

1.2 Cobra Child

Step One *(right) 1*: Start in a table top position (hands under shoulders and knees under hips facing down)

Step Two-*left*: Push the hips forward. Bring the shoulders up and back toward the ears. Squeeze the glutes. Look up toward the sky.

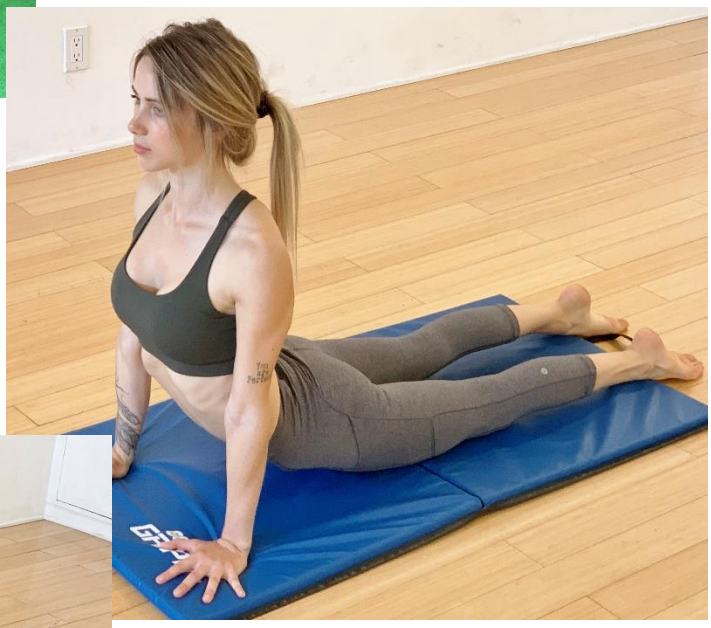
Feel a stretch in your abs, chest, front neck, and hip flexors.

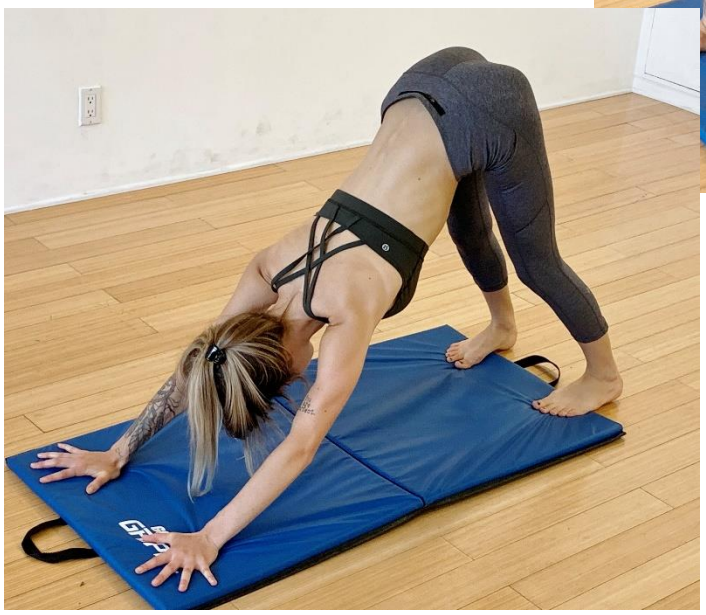
Step Three *(right)*: Reverse in the opposite direction. Push the hips back while your butt comes toward your ankles.
Feel a stretch in both your upper and lower back

1.3 Inchworms

Step One *(left)*: Start in pushup position

Step Two *(right):* With the elbows locked: 1) raise the head toward the sky stretching the neck. 2) Push the hips toward the ground without the thighs actually touching it, stretching the abdomen, hip flexors, and thighs. 3) Bring the shoulders into elevation toward the back of the head stretching the chest





Step Three-*(left)*: Reverse in the opposite direction. 1) Ankle the feet up (small steps with minimal knee bend), keeping the knees and elbows straight stretching the calves. The hips will raise toward the sky stretching the lower back and hamstrings. The head will come down between the shoulders. The shoulders protract and elevate pushing the hips toward the sky and stabilizing the shoulder and shoulder girdle.

Category 2: Hip Mobility.

2.1 Spidermans

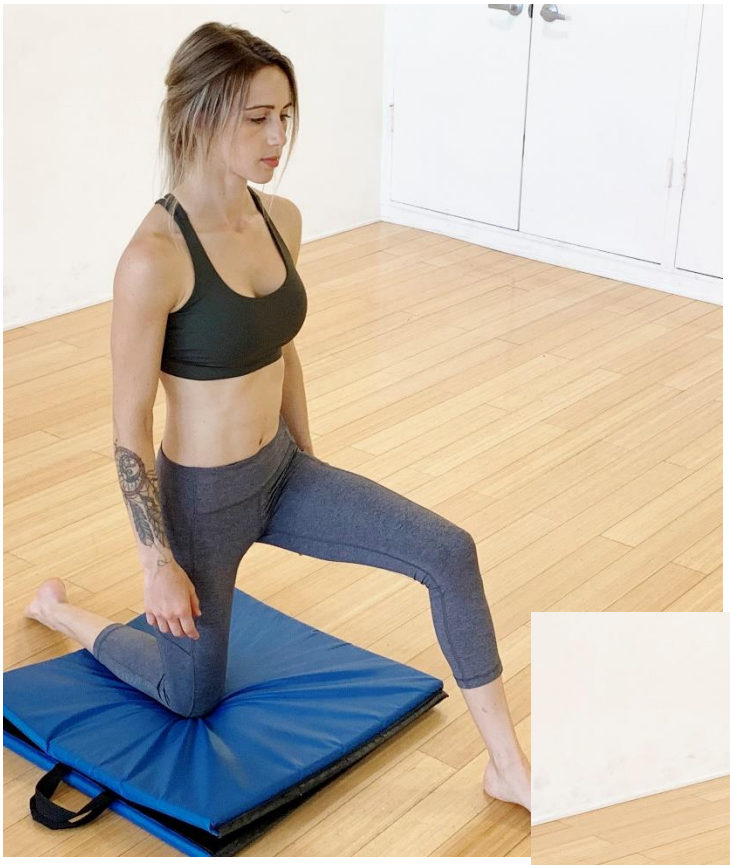
Step One *(left):* Start in pushup position

Step Two *(right)*: Bring one foot up to the outside of the same hand in a big lunge

stretching the hamstring and glute on that side. Push the other hip toward the ground bringing the chest high and the hip into extension stretching the hip flexors.

Return to starting position. Then, repeat on the other side.

2.2 Split kneeling Lunge (isolated hip flexor opening)



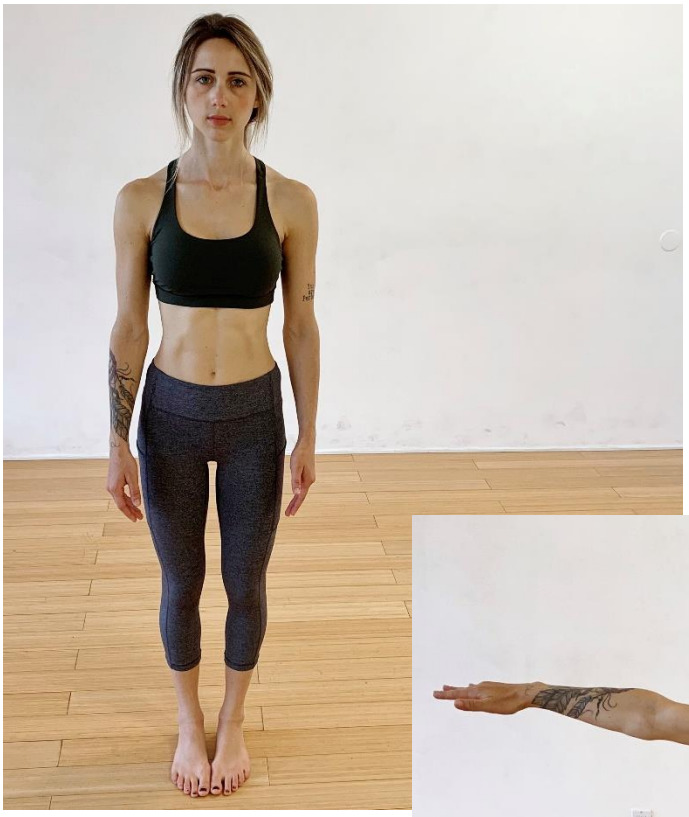
Step One *(left)*: Start in a split kneeling position with the front foot slightly leading the front knee.

Step Two-*Figure 2, 3, 4*: With the upper body and torso in extension (open chest), drive the hips forward pushing the hip and knee straight ahead. Should feel primarily in the hip flexors.

Repeat several times and switch sides.

Category 3: Hip mobility: adductors and abductors.

3.1 Lateral lunge



Step One *(left):* Stand with feet together in a tall posture

Step Two *(below)*: Take a step as big as possible to one side dropping into a deep lunge on that side. Keep the back flat and core tight. This will stretch the adductors (middle thigh).

Repeat toward the opposite side.

3.2 Side Leg Swings

Step One-*(right)*: Stand tall bracing on an object to help stabilize you while swinging one leg across your body to the opposite side.

Step Two-*(left):* Using momentum, swing the same leg out away from the body and let swing back in the opposite direction. Repeat for several repetitions.
The swing to the side will stretch the adductors/inner thigh.

Repeat on the other side

3.3 Split Kneeling-Side

Step One *(left)*: Start in the split kneeling position but with the front leg out to the side rather than straight ahead.

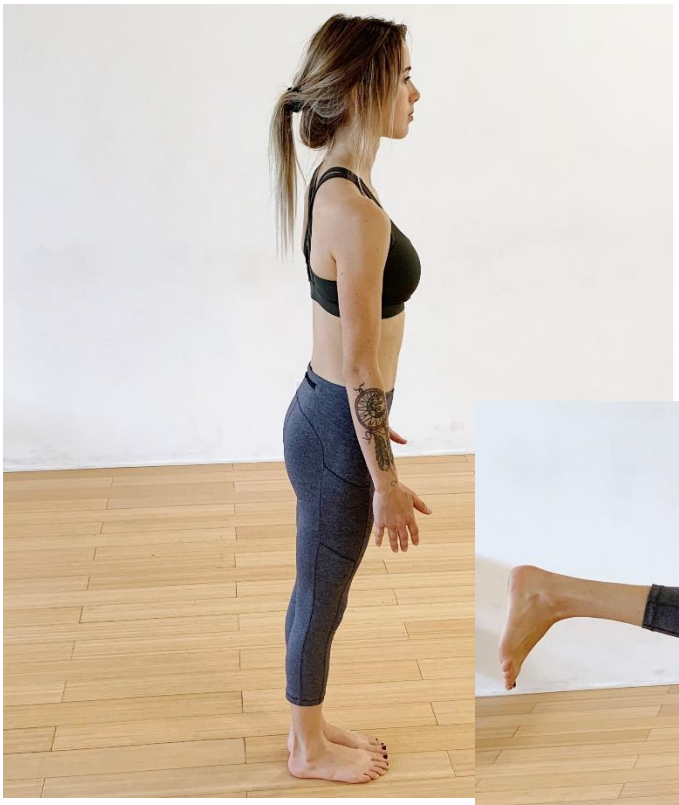
Step Two *(below):* Drive the body forward and toward the forward leg and return to starting position.

This will stretch the adductors/inner thigh.

Repeat repetitions on the other side

Category 4: Hip mobility: Hamstring

4.12 Single Leg Good Morning



Step One-*(left)*: Stand tall with core engaged and pelvis in a slight posterior tilt (standing plank).

Step Two-*(right)*: Hinging only through the hip on one side, lift the heel toward the sky. Reach toward the toe with both hands. The toe in the air should face the ground. There should be a straight line from the back heel to the back of the head. This stretches hamstrings.

Return to starting position and immediately repeat on the other side.

3.2 Backward Toe Touch

Step One *(left)*: Stand tall with core engaged and pelvis in a slight posterior tilt (standing plank).

Step Two-*(right)*: Hinging through the hip while taking a step backward with the toe flexed toward the shin. Lean forward pushing the chest toward the forward toe.

This stretches the hamstring of the front leg.

Return to starting position and repeat on the other side.

3.3 Frankensteins

Step One *(left)* : Stand tall and take a step forward with the arms raised above the eye level

Step Two (*right)*: With your hands up just above the eyes and kick one leg up towards them while keeping the knee straight but not locked.

Repeat the other side on the next step.

3.4 Walters

Step One: Lie on your back

Step Two *(left):* Lift both legs over head toward the ground to stretch the lower back.

Step Three *(right)*: Using momentum rock forward and reach toward the toes.

Repeat for 5-10 reps

Category 4: Knee and hip mobility: Quadriceps

4.1 Quad Walk

Step One *(left)*: Stand tall

Step Two *(right)*: Bring one heel off the ground toward the buttocks. Stretch the quadriceps by grabbing the front of the foot with either with both hands or one hand with a reach and extending the hip and flexing the knee.

Return to position, step, and repeat on other side

Category 5: Hip mobility: Deep Glutes.

5.1 Leg Cradle

Step One *(left)*: Stand tall.

Step Two *(above right)*: Flex the hip by bringing the right knee up toward the belly button and externally rotate at the hip bringing the heel of the right foot into the left hand. Hug the right knee with the right arm while raising the right heel with the left hand.
Stretching in the right glutes and external rotators.

Repeat on the other side *(right)***.**

5.2 Walters-Figure 4

Step One B *(left)*: Sit up tall with one ankle crossed over the opposite leg. Arms are straight with fingers reaching toward tows.

Step Two *(below)*: Using momentum rock backward stretching the glute on the bent leg and lower back.

Step Three: Using the opposite momentum rock back forward reaching toward the toe and stretching the hamstring on the straight leg.

Repeat either by switching every rep or repeating several times on one side and then switching sides.

Category 6: Shoulder and shoulder girdle (full motions).

6.1 Shoulder Circumduction

Step One-*left*: Start with the stick/band/towel at about chest height with hands as close together as to manage the ROM without bending the elbows

Step Two-*right*: All in one motion… Bring the arms overhead, elevating the shoulder blades. Push the scapulae into protraction stretching the back.

Step Three (left) Bring to position of the mid-back retracting the scapulae and stretching the chest. This should all be done in one motion.

Reverse in the other direction and repeat.

6.2 Around the Worlds

Step One-*Figure 1*: Start in the same position as the previous exercise. Begin by wrapping one arm around the head while rotating the torso in the same direction

Step Two-*Figure 2*: Reach fully to the other side of the body with the lead arm straight.

Step Three: Open up fully letting the torso and shoulder girdle open up at the same time.

Repeat in the other direction. The complete movement will stretch all the muscles of the shoulder/shoulder girdle.

Category 7: Spine Mobility

7.1 T-Spine Rotation (kneeling)

Step One *(Left and right):* Start in the tabletop position while reaching one arm across your body stretching the back.

Step Two *(Below):* Reach up toward the sky opening the chest and rotating the spine. Repeat this on one side for predetermined number of repetitions.

Repeat in the other direction. The complete movement will open up the thoracic spine with the shoulders.

7.2 Standing Torso Rotations

Step One *(left)*: Start with the stick at lower rib cage level with the shoulders packed.

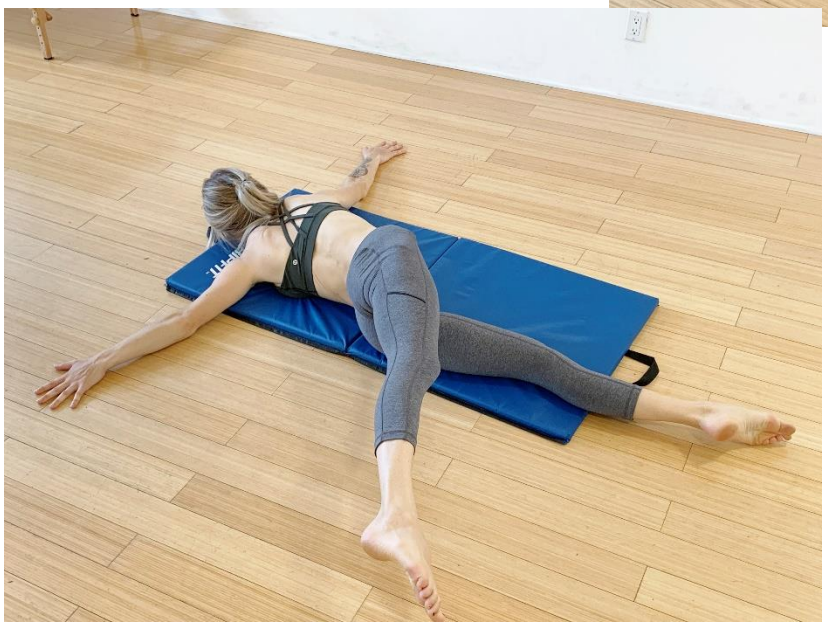
Step Two *(right):* Rotate the shoulders to the right while keeping the lower half of the body static as possible twisting the muscles of the front, sides, and back of the of mid-section and the lats.

Reverse to other side and repeat

7.3 Scorpions

Step One: Start on your belly with legs hip width apart.

Step Two-*Figure 2*: Rotate the right leg to the left side at between the level of knee and hip of the left side. This will stretch the hip flexor muscles, obliques (front) and those around the lumbar spine.



Reverse to other side.

Matrices

Lunge Matrix (tri planar triple extension-hips knees and ankles)

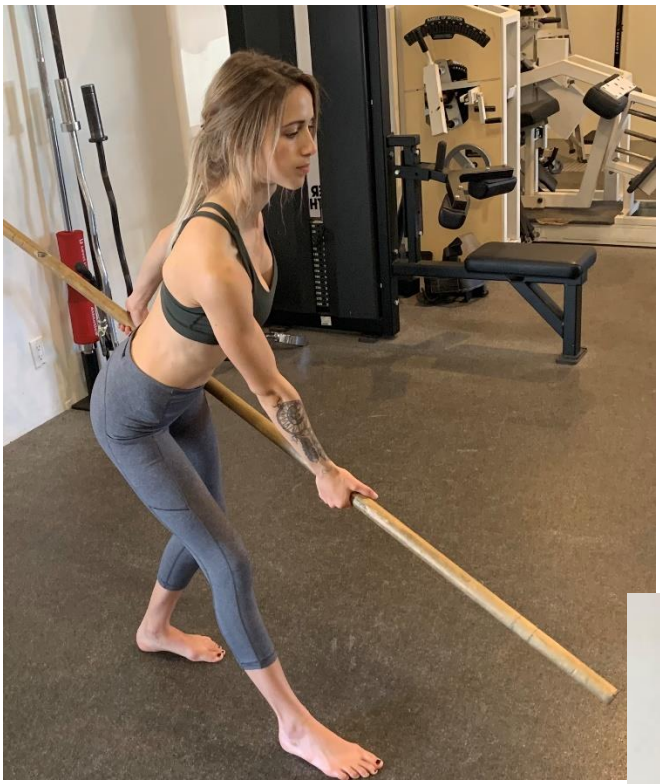
Movement One *(left):* Take an exaggerated step forward into a lunge opening the hip fully. Keep the torso high and in extension to keep the hip flexors opening.

Movement Two *(right)*: Take the same step to the side to open the adductors.

Movement Three: Curtsey into a twisting lunge to open the piriformis and glutes.

Scapular Opening

Movement One



Step One: Start with the stick at lower rib cage level pointing forward. You should have a staggered stance with significant distance between the front and back leg.

Step Two-*Figure 2 and 3*: Push with the back arm, push the hips forward, open the chest and spine, and let the back arm be pushed straight back overhead. The object is to tilt the scapulae backward.

Step Three: Repeat several times with momentum toward the right and then switch to the left.

Additional Notes: If wanting to open the entire front fascial line, the leg that is back should coincide with the arm that is forward on the stick. If focused purely on the shoulder girdle, the leg that is forward will have little bearing.

Movement Two

Step One: Start with the stick at lower rib cage level pointing sideways. You should have a square stance at a little further than shoulder width. The palm that is pushing will be down while the palm of the side being pushed is pointed up.

Step Two-*Right*: Take a small step to the side, push with the front arm, push the hips laterally, open the chest and spine, and let the back arm be pushed sideways and overhead. The object is to tilt the scapulae to the side (upward rotation) while also stretching the lats and obliques dynamically.

Step Three: Repeat several times with momentum toward the right and then switch to the left.

Movement Three

Step One: Start with the stick at lower rib cage level pointing sideways. You should have a square stance at a little further than shoulder width. The palm that is pushing will be down while the palm of the side being pushed is pointed up.

Step Two (*Right)*: Push with the force arm, twist the hips, open the chest and spine, and let the back arm be pushed straight back with a twist. The object is to tilt the scapulae inward (retraction) with torso rotation and the opposite (protraction) on the opposite direction.

Step Three: Repeat several times with momentum toward the right and switch to the left.

Wrist/Hands

Figure 1

Figure 2

Figure 3

Figure 4

Step One-*Figure 1*: Start with the fingers interlocked and elbows down to the side.

Step Two-*Figure 2*-4: Rotate the wrists around each other in a clockwise, then counter-clockwise motion. This will open up the wrist and finger joints with associated small muscles being stretched.

Fascial Release (Rolling)

For the fascial release section, I like this explanation from the site mentioned in the footnote: "Fascial Release is a safe and very effective technique that involves applying gentle sustained pressure into the Myofascial connective tissue restrictions to eliminate pain and restore motion. This essential "time element" has to do with the viscous flow and the piezoelectric phenomenon: **a low load (gentle pressure) applied slowly will allow** a viscoelastic medium **(fascia) to elongate**".

"Trauma, inflammatory responses, and/or surgical procedures create Myofascial restrictions that can produce tensile pressures of approximately 2,000 pounds per square inch on pain sensitive structures that do not show up in many of the standard tests."- [2]

In other words, direct pressure is another method for alleviation of myofascial restriction. Here are the techniques:

Note: *For all exercises, do 15 repetitions slowly for the length of the muscle for warmup, 25 repetitions for general mobility, and 50 repetitions for release of general fascial restriction.*

[2] https://www.myofascialrelease.com/about/definition.aspx

Quadriceps

Using a foam roller or pvc pipe about 4-6 inches in diameter:

Step One: Start with the pipe in the very middle of the muscle (group). In this case, it is the quadriceps.

Step Two: Slowly roll yourself over the object until you reach one end of the muscle. Feel for restrictions, sore points, along the way. Stop and roll over (kneed out) each one

Step Three: Repeat in the other direction until you reach the other end of the muscle.

Variation with only one leg.

Do this for 25-50 repetitions up and down the muscle. Repeat daily for progress, every other day for maintenance.

Additional Notes: The intensity should not be unbearable but strong. Once you are able to handle a soft object, move to a more rigid one.

Hamstring Variations

Calves

Both Legs-Easy

1 leg stacked-hard

Inside Calf

Outside Calf

IT Band

Glutes

Lats

For more accuracy and specific pin-point restrictions, one may use a lacrosse ball, baseball, or softball as we see here with use on the deep 6 external rotators of the hip.

Feet (for plantar fasciitis)

- Center the roller underneath the foot and use the weight of your body to roll up and down the bottom of the foot looking for restrictions.

Structural (Stabilization) Strength

Most of the time when we think of strength, we think of someone moving heavy loads or lifting a lot of weight. However, an underlying component of strength (including moving loads) is the ability to create a strong resistance against movement that is NOT desired. We'll refer to this as 'stabilization'. ***Local stabilization*** refers to the ability of the muscles and fascia surrounding a single joint to hold the joint in a static position in unison with the joints around it moving to perform their job. If one or many joints are not able to hold a position, the joints around them will not be able to attain leverage to produce a movement.

In this case, we are going to be developing the stabilization of the 'core'. In the context of this book, 'core' refers to the joints of the spine, pelvis, shoulder blades, head, and rib cage. Dysfunctional stabilization patterns can lead to pain and injury. We address them with these methods.

Educational concepts for stabilization:

1. Body Scanning: Utilizing Stabilization positions to develop body awareness.
2. Posture
3. Bracing/Pelvic Tilt: The center of hip and spinal stabilization
4. Breathing
5. Methods
    a. Bracing
    b. Breathing
    c. 5 Baseline Positions with Variations for Progression/Regression

Body Scanning:
As with basic range of motion, one of the first concepts that we should point our attention to in our stabilization routine is body scanning. Many times, we may overlook imbalances in our joints and muscles as we are not normally working heavily on stabilizing throughout a typical day. Our stabilization demands have mainly been outsourced to chairs, other furniture, and machinery. So, body scanning while going through these exercises can increase our awareness of every part of our body and therefore, give us vital information regarding areas that need to be addressed by either strengthened holds, myofascial release, decompression, vibration, or other techniques we may apply.

Posture:

The first and primary function of our stabilizers is to hold us in a mechanically efficient position. Optimal posture is necessary to hold the body in a position to one: not fall over crumpled into flexion and two: be able to function correctly in locomotion (moving across ground or in the water) or other tasks. Essentially, if one joint is instable or lacks ROM, another joint will have to compensate for it with extra stability or ROM to compensate in a given function.

We can think of this sort of like the game Jenga. When the pieces are: A) stacked properly, there is little likelihood of the structure falling. But if B) they are not, the likelihood of falling is greater and our body has to work in order to keep this from happening. In our body, the muscles are in either situation A or B. The nervous system is quick to let us know through pain if our skeletal system is in situation B. Pain and compensations come from the nervous system trying to correct for a situation B.

A simple scan for correct posture will focus on 4 points: the neck/head, the shoulders, the hips, and the knees. Look at yourself from the side for the first 3 points. For the head/neck, is the ear centered over the shoulder or pushed forward over the toes? It should be centered over

the shoulder. For the shoulders, are they pulled back, neutral, or rounded forward? They should be neutral so the shoulder is centered over the hip. If looking from the front (the view you see in the mirror), we should see the thumb side of the hands, not the back of the hands as when the shoulders are rounded. For the pelvis, is the tailbone pointing backward, tucked under, or centered in between? It should be centered in between. For the knees, look from the front. Are they centered underneath the hips, caving in toward the middle, or pointing outward? They should be centered when standing naturally.

For example, here is my progression while undergoing posture conditioning by applied myofascial release:

You'll notice how, in the first picture, my head is reaching far forward, leading my body. In the 2nd pic, both my shoulders and head are back, stacked over my hips and knees with my chest and belly leading. There are still some other small postural deviations but overall, there is significant improvement in alignment and was associated improvement in pain and stiffness.

Bracing/Pelvic Tilt:

Bracing is the action of the muscles that stabilize the pelvis and lumbar spine. Bracing is a function that our stabilization muscles perform all day long in any variety of tasks from standing, walking, running, and lifting. Dysfunctional bracing patterns can lead to pain, weakness, and even a feeling of lethargy or low energy (caused by the nervous system overload by trying to constantly correct).

Proper bracing in the mid-section depends on the pelvis' tilt. In most of our positional exercises, we'll enter the posterior tilt position to engage our stabilization muscles of the pelvic floor, diaphragm, transverse abdominis, gluteal group, and multifidus muscles to work in conjunction with each other. (Anatomy is not necessary but may help in understanding techniques later).

Breathing:
Breathing correctly during these exercises is imperative. Oxygen exchange in a situation of higher demand during exercise is of paramount importance. Another consideration is the role of the diaphragm. The diaphragm acting correctly will help us to extend the thoracic spine putting us into a correct postural position as well as create intra-abdominal pressure to stabilize the lumbar spine while supporting a load (weight). This is also a component of 'bracing'.

Recipe for Central Stabilization

Perform one exercise for each muscle action.

Muscle Actions:
Part 1: There are 4 fundamental physiological actions we work when we work stabilization/structural strength.** These are:

1. Counter Flexion
2. Counter Extension
3. Counter Lateral Flexion
4. Counter Rotation

**all of these are of the head, spine, shoulder girdle and pelvis.
Pick one and perform each in balance either within a training bout our full program.

Part 2: For each of these physiological actions, the exercise that you use or create must have a position to pair with it. 5 main positions to use:

1. Prone: Facing down
2. Supine: Face up
3. Upright: standing or kneeling
4. Hanging: Hands on a bar or feet hanging on a bar
5. Inverted: Handstand (or upside down hanging)

Add one of these and, PRESTO! You have an exercise. Also try to mix these up and use them all.

*Note on stabilization vs. balance work: We refer to, in this program, ***central*** stabilization as that which stabilizes the lumbo-pelvo joints, the spine and all its joints, the shoulder girdle (shoulder blades), and the head. ***Balance*** work (as will be taught in our mechanical kinesiology part ii) consists of movements that include a focus on the stabilization of the joints of the hips, shoulders, knees, elbows, wrists, and ankles.

In order to develop central stabilization for a proportional physiology, include each of these in isolation or as a component of a strength movement within a training program.

Before even applying the aforementioned recipe, it is good to start with the **vacuum** and the **brace**. These are preparation exercised for midsection stability. They together can teach us to create the proper inner tension in our midsection to secure and support our lumbar spine. First, we see here, the vacuum. The vacuum helps us to engage the deep stabilizers of our spine like the transverse abdominis and multifidus.

Exercise Instruction……

The bracing exercises…..

The Vacuum

To perform the vacuum, start by standing tall. Then, suck in your belly button as you breath in. Last, as you breath out, exhaling every last bit of air, try and bring the belly button even deeper toward your spine. Hold for 3-5 seconds. Repeat 3-5 reps.

Bracing

Lie on the floor with your elbows resting on the ground to the side

You'll notice a gap where the arch of the lower back allows me to put a hand underneath

Close this gap by contracting your abdominal muscles

As you get the spine as firmly into the floor as possible, breathe out all the way, hold the contraction for 3-5 seconds. Upon bracing

- Pull up on the pelvic floor (Kegels)
- Breathe out
- Tilt the pelvis so the tail bone tips slightly under
- Let the belly button come in toward the spine

<u>Breathing</u>:

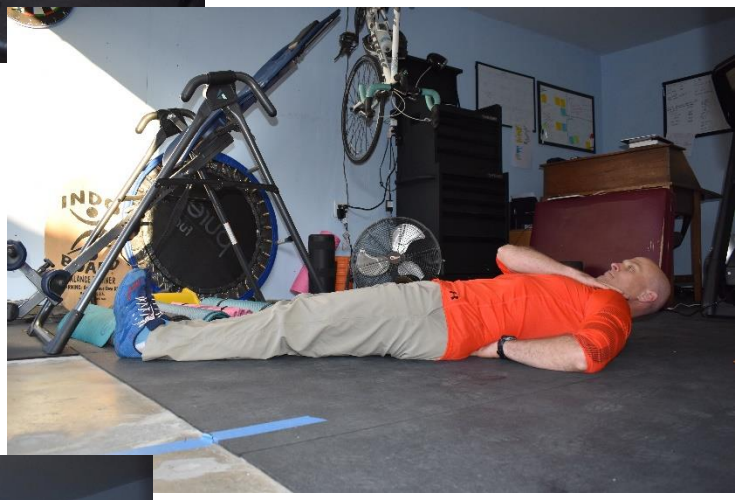
- Inhale into the belly button and fill the lungs from the bottom up.
- Purse the lips like a whistle to control air in and diaphragmatic contraction as you inhale
- Exhale out slowly while putting the tongue at the back of the teeth with a 'tsssst' sound.

Advanced Brace

If you feel like you are a little more advanced with your core training:

Step one from above

Feel the gap



Close the gap.

Our next central strength counter movements are……..

1. Supine Counter Flexion Baseline Exercise-***Bridge***

Starting Position

- Supine (on back facing up).
- Push the arms into the ground contracting the upper back against the ground.
- The feet should be flat on the ground with feet at 90 degrees.
- The head is neutral

Movement to 2nd position

- Brace: Tuck the tailbone under in a posterior tilt while slowly breathing out squeezing the glutes and pulling up on the pelvic floor (a Kegel)

- Continuing from the brace, lift the hips toward the sky keeping the hips tucked under.
- Make sure the upper back is engaged against the ground
- When the movement is at the most extended position squeeze the glutes, pelvic floor, and breath all the way out. Hold for 5 seconds per repetition.

Note: Athlete should feel this most strongly in the glutes and inner core muscles as well as hamstrings, lower, and upper back as supporting muscle groups. Head could be up (as shown) or down. If you feel strain in the neck, leave the head down.

Reps: 5-10 with squeeze/hold of 1-3 seconds at top of movement

2. **Prone Counter Extension** Baseline Exercise-***Plank***

<u>Position</u>

- Prone (face down)
- Shoulders neutral
- Hips neutral
- Elbows under the shoulders with palms up
- Head neutral

<u>Movement</u>

- Squeeze the lats into the side as if pulling the elbows toward the toes
- Squeeze the glutes, breath out and pull up on the pelvic floor while bracing and tucking the tailbone.

Reps: 5-10 isometric squeezes of 2-5 seconds each

3. Supine Counter Extension Baseline Exercise-***Hollow***

Starting Position

- Supine (face up)
- Feet flat on ground with knees bent at 90 deg.
- Arms slightly above the ground with palms up
- Head slightly lifted with chin tucked

Moving to position 2

- Brace while squeezing the glutes and pushing the lumbar spine against the ground
- Lift one leg straightening the knee to between 180 and 90 degrees of elevation above the ground.

- Lift the other leg. Find the position to where you can keep the lumbar spine tightly pressed into the floor and hold for 5 seconds.
- May perform with head up with chin tucked or down (shown).

Athlete will feel primarily in the inner core beneath the belly button as well as the glutes. Other groups engaged are chest, anterior neck, and quadriceps.

Reps: 5-10 reps of 5 second static core contractions in the extended position.

4. Prone Counter Flexion (thoracic) Baseline Exercise- ***Skydiver***:

Position

- Prone (face down) with eyed and head looking straight ahead
- Arms extended out reaching as far as possible above the head (as related to the body)
- Legs straight and slightly elevated above the ground
- Glutes tight and pelvis neutral

Movement to second position

- Breath in
- Squeeze the lats to bring the fingers toward the toes and bring the shoulder blades together raising the chest off the ground.
- The head should stay neutral with the shoulder rising off the ground with the shoulders and rib cage.
- Legs stay reaching the toes backward with glutes engaged

Athlete should feel in: primary: glutes, lats, upper back; secondary: lower back, rear cervical extensors, and hamstrings

Reps: 5-10 with 2-5 second holds at skydiver position

5. Standing Counter Rotation Baseline Exercise-***Anti-Wood Chopper***:

Starting Position

- Stand in an athletic position (pelvis neutral, belly button in toward the spine, head neutral with shoulders, knees slightly bent, hips slightly back)
- The outside hand will be holding the band/cable. The inside hand is supporting
- Arms flexed in toward the body
- Lats flexed to hold arms tight into rib cage
- Body weight is on the balls of the feet

Movement to 2nd position

- Brace by breathing out as arms extend
- All else stays the same. Keep postural position. Hold for 5 seconds with arms extended

Athlete should feel in: primary: glutes, lats, upper back; secondary: lower back, rear cervical extensors, and hamstrings.

Reps: 5-10 with 2-5 second holds at the extended position

6. Standing Rotation Baseline Exercise-***Weighted Torso Rotation:***

Starting Position

- Stand in an athletic position (pelvis neutral, belly button in toward the spine, head neutral with shoulders, knees slightly bent, hips slightly back)
- The hands will be squeezing the ball to engage the lats and pecs at the same time stabilizing the torso above the ribcage
- The ball should be approximately four to six inches from the sternum
- Body weight is on the balls of the feet

Movement:

- Rotate the ribcage as far to the right as possible with minimal movement in the knees and hips

Repeat to other side

- Movement should have momentum and is performed much faster than our other movement.

Athlete should feel in: midsection-obliques, under belly button toward the spine

Reps: 10-25 to each side

7.Hanging Counter Extension Baseline Exercise-***Hollow:***

Position

- *Figure 1*: Dead hang on a bar with arms shoulder width apart
- *Figure 2 (Hollow hang):* Pull the pelvis underneath with the legs straight and together bracing the pelvis and lumbar spine
- Engage the lats stabilizing the shoulders and thoracic spine

Movement (***Hanging Leg Raise)***

- Tilt the pelvis even more to raise the legs
- Keep lifting the legs to the level that you can control the form and stabilize in the flexed position for 3-5 seconds

Athlete should feel in: primary: glutes, lats, upper back; secondary: lower back, rear cervical extensors, and hamstrings

Reps: 5 reps with a 1 second hold at top and 5 second lowering of the legs

8.Hanging Counter Flexion Baseline Exercise-***Hanging Superman***:

Position

- Hang on a bar with arms shoulder width apart
- Pull the pelvis underneath with the legs straight and together bracing the pelvis and lumbar spine
- Engage the lats stabilizing the shoulders and thoracic spine

Movement:

- Tilt the pelvis backward while squeezing the glutes and upper back. Take note not to squeeze the lower back but the glutes and upper back
- The head should follow back with the shoulders
- Return in a controlled manner back to the starting position

Athlete should feel in: primary: glutes, lats, upper back; secondary: lower back, neck and head extensors, and hamstrings

Reps: 5 reps with a 1 second hold at contracted position and 5 second return to start

9.Standing Counter Flexion Baseline Exercise-***Standing Arm Extension***

<u>Position</u>

- The weighted object should be up next to the body. Elbows to the side. Pack the shoulders by squeezing down on with the lats and keeping the shoulders and head neutral.
- The position to start with is called standing plank. The feet should be hip to shoulder width apart.
- Pull the pelvis underneath with the legs straight bracing the pelvis and lumbar spine
- Breath out, squeeze the glutes, and pull up on the pelvic floor.

<u>Movement</u>

- Extend the arms.
- Breath out.
- Keep the rest of the body in the same position as the start. Hold for 5 seconds.

Athlete should feel in: glutes, lats, upper back; secondary: lower back, rear cervical extensors, and hamstrings

Reps: 5 reps with a 3-5 second hold at contracted position and 5 second return to start

11.Standing Counter Lateral Flexion Baseline Exercise-***Standing Single Arm Hold***

Position:

- Start in a standing plank position.

Movement:

- Pick up an object in one hand.
- The object of the exercise is to try and keep your posture exactly as you would if you were either holding something in both hands or in neither hand.
- Pack the shoulder on the side of the hand that is holding the object.
- Breathe evenly, hold the position
- Bonus: Combine with walking for a 'farmer's carry' or lunging

Athlete should feel in: glutes, inner core, lats, chest, obliques

Reps: Stand holding for 30 sec on each side with a weight that you can keep the posture or perform with another movement (loaded gait, squats, for example).

Bonus: **Prone Counter Flexion** (hips): Exercise-Reverse Back Extensions

Just nothing activates the glutes quite like these. Perform on a table or bench.

Start with the edge of the table underneath the crease in your hips.

Extend the legs. Hold at the top of the movement for 2-5 seconds. Repeat until you hit 15-25 seconds total.

Feel those glutes and lower back work! Try with ankle weights to get a little extra resistance. Don't hyperextend the lower back. Only extend the hips.

So, that's your strategy for beginning balanced functional mobility. For further development of body mechanics (mechanical kinesiology), we'll want to get more progressions and variations of these techniques along with building balance (stabilization of more joints), gross strength and more!

Hope this worked well for ya!

Jason Root, MS, CSCS, EIM