# WHY THORACIC MOBILITY SHOULD BE AN ESSENTIAL PART OF ANY ATHLETE'S TRAINING ROUTINE

**KLynergy Massage and Wellness**
Tampa, FL

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# INTRODUCTION

When was the last time you paid attention to your thoracic mobility? For most athletes, it's not an active part of their training routine. But it should be.

While 50 of the spine's 70 joints are found in the thoracic region, this area of the spine is at a disadvantage when compared to the cervical and lumbar regions. The neck, upper back, and lower back are the areas we devote much of our time and energy to. However, it's the thoracic spine that plays the biggest role. This is because many athletes experience hypomobility in their thoracic spine, which is often diagnosed as rotator cuff, shoulder, neck, or lower back injuries. The source is often misdiagnosed. Thoracic mobility, therefore, should be one of the most important aspects of any athlete's conditioning program.

# WHAT IS THORACIC MOBILITY?

To understand thoracic mobility, you first have to understand the thoracic spine. Made up of 12 vertebrae, the thoracic spine is positioned between the cervical and lumbar regions of the vertebral column. As a whole unit, the motor function of the thorax provides breathing and postural stabilization.

These vertebrae are responsible for the majority of rotation on the horizontal plane. **Each thoracic vertebrae should be able to rotate, roughly 3 degrees, which means our thoracic spine should be able to rotate up to 35 - 40 degrees from left to right.**

In addition, a healthy T-spine moves 60 degrees in flexion and extension and 50 degrees when bending to the side. The thoracic spine has a natural kyphotic curvature, outward, of 20-40 degrees. When all is aligned within the thoracic spine, the ribcage should move freely and align with the pelvis, the diaphragm should descend fully during breathing and postural stances, the sternum (breast bone) should easily move forward and back, and the pelvic floor should be stabilizing.

By now, you may already begin to see that when the thoracic spine is restricted from optimal movement, the cervical and lumbar spine become hypermobile in order to compensate. It is these compensatory patterns that reduce performance and strength and make the cervical and lumbar vulnerable to injury and degeneration.

Thoracic mobility can affect different athletes in different ways. For example:

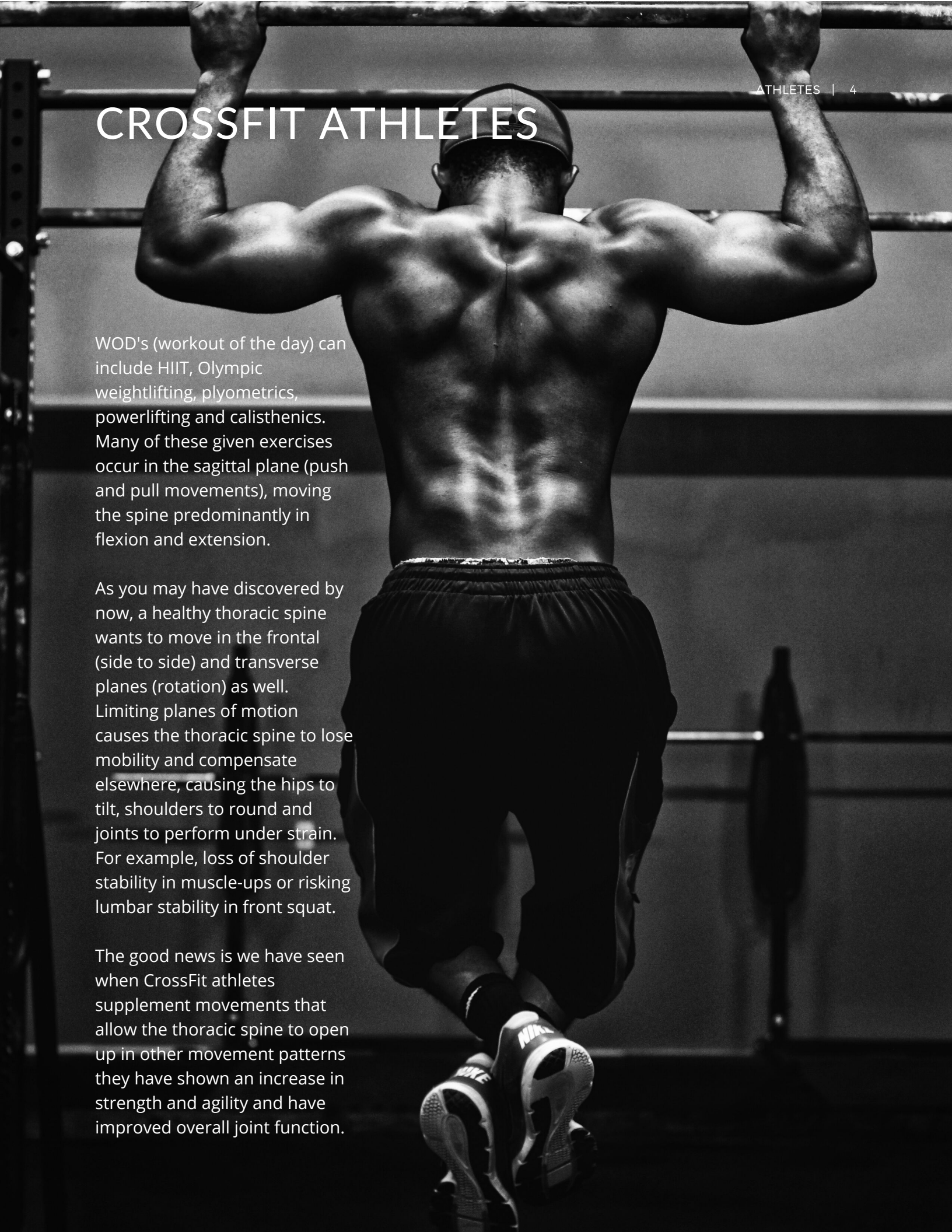
# SOCCER PLAYERS

The spine does a fair amount of lateral movements in the sagittal and transverse planes to ensure a soccer player can effectively strike, save the ball, or head a ball while running and cutting in different directions for 90 minutes on the pitch. This puts a lot of pressure and torsion on the spine. When the athlete's thoracic mobility and power is then limited and it means the lower back has been recruited to do the majority of that rotation. This will eventually result in pain - or worse, injuries.

# TENNIS PLAYERS

Looking for power behind that serve? Lack of thoracic mobility can not only affect a tennis player's serving power, but also their accuracy. Thoracic movement will influence the match and speed of reaction time if the ability to accelerate or decelerate is compromised. Tennis players must be able to move laterally along the sagittal and transverse planes of their body in order to swing their racket and hit the ball. If an athlete cannot fully extend his or her back to serve the ball, there will be a loss of power behind the serve. During a volley this also invites injury to the shoulders, low back, elbow and knees if stability and full ROM (range of motion) isn't present in the thoracic spine.

# CROSSFIT ATHLETES



WOD's (workout of the day) can include HIIT, Olympic weightlifting, plyometrics, powerlifting and calisthenics. Many of these given exercises occur in the sagittal plane (push and pull movements), moving the spine predominantly in flexion and extension.

As you may have discovered by now, a healthy thoracic spine wants to move in the frontal (side to side) and transverse planes (rotation) as well. Limiting planes of motion causes the thoracic spine to lose mobility and compensate elsewhere, causing the hips to tilt, shoulders to round and joints to perform under strain. For example, loss of shoulder stability in muscle-ups or risking lumbar stability in front squat.

The good news is we have seen when CrossFit athletes supplement movements that allow the thoracic spine to open up in other movement patterns they have shown an increase in strength and agility and have improved overall joint function.



# BASEBALL PLAYERS

Whether you are pitching, fielding, or batting, thoracic mobility affects your ability to catch and release with speed and precision. For instance, on the mound, if a pitcher has a stiff thoracic spine, the speed and control of the ball will be restricted. What's more, the shoulder of the pitching arm becomes vulnerable to instability as it has to put in extra work to release the pitch to make up for lack of thoracic movement. Batters also have to be aware of thoracic mobility, since generating power behind a swing will be much more difficult if the thoracic spine is limited in its rotational capacity.

# GOLFERS

Golfers need to be able to rotate, flex, and extend their spine for a forceful and impactful golf swing. A stiff thoracic spine can affect the extension of a golfer's spine as well as how far they will be able to hit the ball.

**"Exploring how to integrate these movements into a golf swing in a slow and controlled environment is extremely important when working towards change,"** says Jeff Foxenberger.

Take the time to learn how to use your entire spine to perform a golf swing slowly and with control to avoid injury and to improve your performance and speed.

# WHAT CAUSES THORACIC SPINE PAIN?

So far, we've discussed the function of the thoracic spine, why it's so important for mobility, and how it can affect certain athletes. But what, exactly, causes a thoracic spine to have reduced mobility? Thoracic spine pain can be caused by a number of factors, including but not limited to:

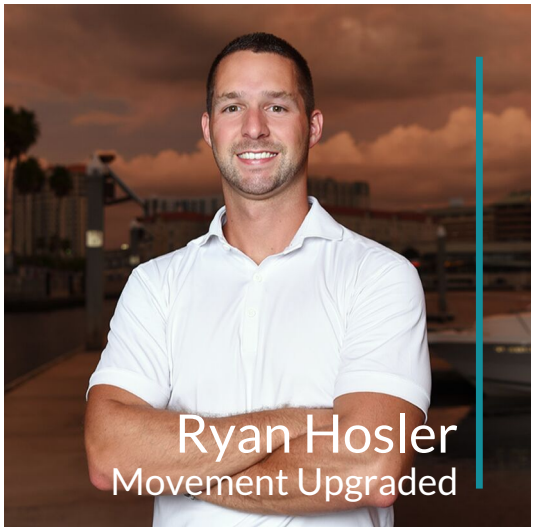
- Sitting for an extended period
- Standing in a slouched position
- Standing disproportionately to one side (hip hiking)
- Repetitive motion (a common concern for sport-specific athletes)
- Wearing a heavy backpack or shoulder bag
- Spraining or straining the spine

There are also more serious conditions to be aware of, such as thoracic stenosis (narrowing of the spine due to wear and tear), slipped discs, or ankylosing spondylitis (inflammation of the joints between the thoracic vertebrae). In his book "Pain Free: A Revolutionary Method for Stopping Chronic Pain," author Pete Egoscue references and supports these pathologies are a result of musculoskeletal dysfunction.

# HOW DO I KNOW IF I HAVE A STIFF THORACIC SPINE?

Dr. Ryan Hosler explains, "Having a stiff thoracic spine must first be identified as a joint mobility restriction limitation or a motor control limitation. If there is a true joint mobility restriction limiting thoracic spine extension, manipulation/ mobilization techniques should be performed to the area to restore normal joint movement.

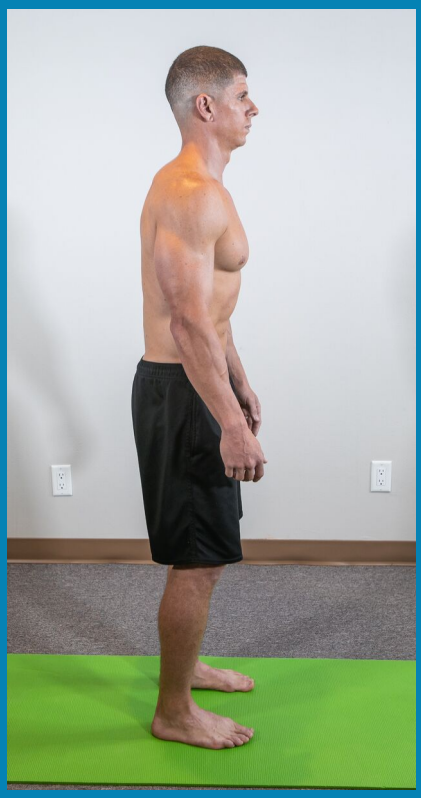
However, if there is a motor control limitation, then specific exercises should be utilized to target the thoracic spine extensor muscles. These exercises should build strength of the upper back as well as improve the mobility and stability of the upper back."



# WHY THORACIC MOBILITY IS IMPORTANT

Without thoracic mobility, an athlete's body begins to rely on the lower back, upper back, shoulder joints, elbows, and other joints and muscles for rotation and extension. Overusing these muscles and joints - and using them improperly, as is often the case in these instances - results in pain, inflammation, and injury.

## 1. THORACIC MOBILITY AFFECTS YOUR POSTURE



Posture is one of the most significant aspects of any athlete's performance. Incorrect posture leads to poor biomechanics and technique, not to mention injury susceptibility. This 'weakening' is commonly associated with forward head posture, elevated and rounded shoulders, hyperextension of the upper cervical vertebrae, change in lumbar curvature, pelvic tilt, and weakened core and pelvic floor.

NeuroKinetic Therapy® is a treatment modality that can help athletes who are having posture issues due to thoracic stiffness. Using a specific set of precise tests to assess the way other muscles and joints are overcompensating for your lack of thoracic mobility, NKT reprograms your brain to change old patterns and the way it reacts to movement.


"NKT allows us to assess how your brain is cheating, or compensating, around an area of your body and, in turn, teach your brain how to return balance to the system," says Zach Moreno, LMT.

"Then, appropriate exercises will instill better movement patterns to help enforce support long term."

# 2. THORACIC MOBILITY AFFECTS UPPER BODY MOVEMENT

It's essential for the thoracic spine to be able to flex and extend to its fullest ability, enabling the neck, shoulders, and lower back to move easily. When the thoracic spine is stiff, it limits how far it can efficiently extend the muscles that rely on the thoracic region for movement.

A good example of this is athletes who may have limited thoracic spine extension, which directly impacts the shoulder joint. The shoulder blades rest in the thoracic spine, between T2 and T7 on a 5 degree forward angle, which means thoracic mobility forms the entire foundation for how well - or not well - the shoulder joint works.

A weak thoracic spine places abnormal stress on the shoulder joint, throwing the entire shoulder region out of alignment and making it more complicated to perform the simplest athletic tasks, such as throwing, thrusting, pushing, pulling or swinging.

# 3. THORACIC MOBILITY AFFECTS LOWER BODY MOVEMENT

Earlier on, we talked about how the lumbar spine has to put in extra work when the thoracic spine isn't able to rotate and extend to its fullest abilities. This, in turn, means the lower back is often extending far beyond what it should typically do. For example, while each thoracic vertebrae can rotate 3 degrees, each lumbar vertebrae should only be rotating 2 degrees. **When the thoracic vertebrae cannot fulfill that 3-degree rotation, it requires the lumbar vertebrae to pick up the slack.** While the lumbar spine can handle an extra degree of rotation, anything beyond that can tear collagen fibers and damage the articular surface. That's when lower back pain occurs.

Movement of the lower body is important for all types of athletes, from soccer players who need to twist their torso easily while kicking a ball to baseball players who need to be able to rotate quickly when hitting a ball. Without thoracic mobility, these activities place stress on the lumbar region and, ultimately, result in pain and injury for athletes.

# 4. THORACIC MOBILITY AFFECTS YOUR BREATHING

When the thoracic spine is stiff, the diaphragm and lungs are restricted and not able to function to their fullest capacity. And breath is incredibly important to athletic performance. Imagine a runner who is not able to fully fill and empty his lungs or a CrossFit athlete who cannot breathe deeply in the midst of a tough WOD. Breath affects performance, posture, and energy.

**Labored breathing affects your posture because you will need to draw in air from somewhere, so your body reverts to its secondary respiratory muscle, the shoulders.**

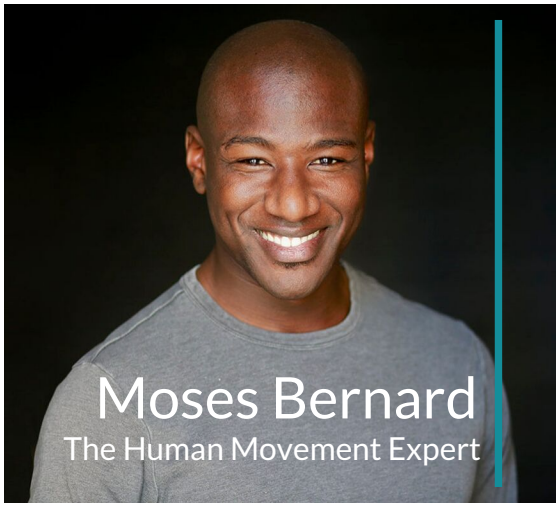
The shoulder girdle has to compensate for lack of intercostal movement, restricting and elevating the position of the first and second ribs. In turn, you shoulder begins to act as an accessory to respiration in order to allow for the lungs to have more room to expand and draw breath.

The diaphragm has two roles for breath - respiration and stability. If either role is providing more support when breathing, that means the other role has been compromised. For example, let's say you're breathing heavily during a workout. This means the diaphragm is using its respiratory role more than its stability role, and there is no leverage left for stability. In this case, putting your hands on your knees will lower the requirements for the stability role and help make it easier to breathe.

# IMPORTANCE OF THE DIAPHRAGM

Stability of the diaphragm is not so much a function of strength as it is one of regulating pressure, so even athletes with the strongest core can struggle with diaphragm instability.

Think about it this way: the tires on your car work seamlessly not because they have the thickest rubber but because they have the right amount of air pressure. The same is true for diaphragm stability. While a strong core helps you get through a tough workout, it's your breathing strategy that will determine how much air you're drawing into your lungs.


"The ideal breathing strategy not only creates a super stiff lumbar spine but also decompresses the thoracic vertebrae. When we use too much of our neck and shoulders to breathe, we end up doing the opposite: we destabilize the lower back and end up losing mobility through the thoracic spine."- Dr. Moses Bernard

# THORACIC MOBILITY EXERCISES

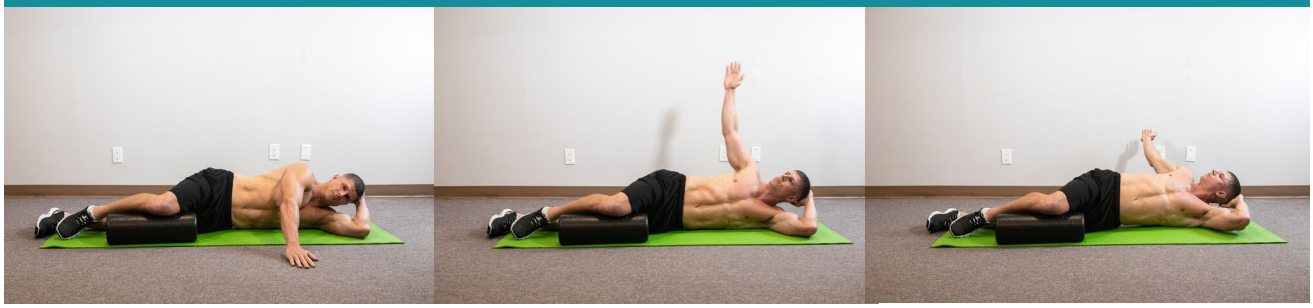
The obvious question to learning that thoracic mobility can help or hinder athletic performance is: how can I improve my thoracic mobility? The good news is, strengthening a stiff thoracic spine is possible.

Disclaimer: It is strongly recommended to consult with your physician before beginning any exercise program. You should be in good physical condition and able to perform these exercises. You should understand that when participating in any exercise program, there is the possibility of physical injury. If you engage in this exercise or exercise program, you agree that you do so at your own risk.

# Foam Rolling

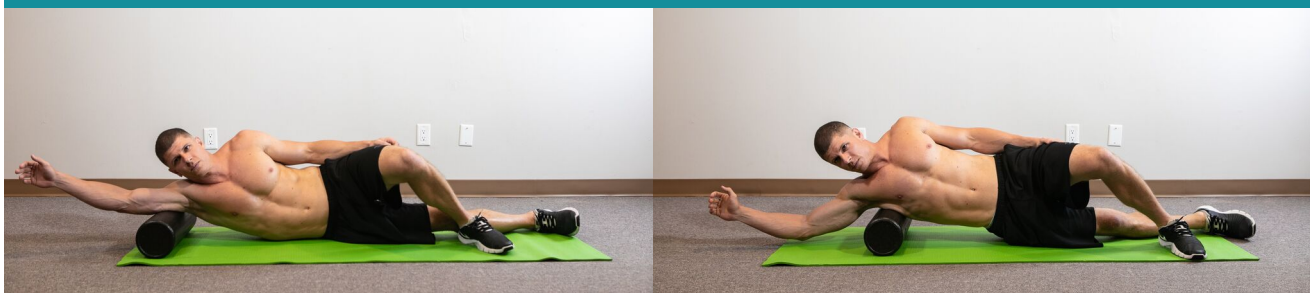
Foam rolling will loosen up tight muscles in the thoracic region, which is exactly what the spine needs to function to its fullest ability. Some exercises you can do include:

## T-SPINE FLOOR ROTATION (FOAM ROLLER SUPPORT)



Lay on your side with the foam roller parallel to your body. Place your top knee on the foam roller. Lay your bottom arm straight out in front of you or bent to support your head. Begin with top arm resting on floor. Stretch open chest by extending your top arm vertically toward the ceiling. Lean the top arm back and away from the foam roller to give yourself a great stretch. Return to your starting position and repeat, switching to the other side after a few repetitions.

## LAT ROLL



It is not advised to perform a lat roll if you are experiencing shoulder pain or injury. To perform, lie down on your side and place the foam roller underneath the axillary border of the scapula (your armpit), perpendicular to your body. Extend your bottom arm straight up so it's in line with your body. Lift up as if in a side plank, your body supported by the foam roller and your feet. Roll the foam roller slowly down your lats and then back up again. Stop and hold the roller firmly in any areas of tenderness. You could also roll the foam roller higher up your arm to target the proximal attachment of the tricep to improve shoulder extension. This stretch targets the latissimus dorsi, teres minor, and lateral attachments of the rotator cuff.

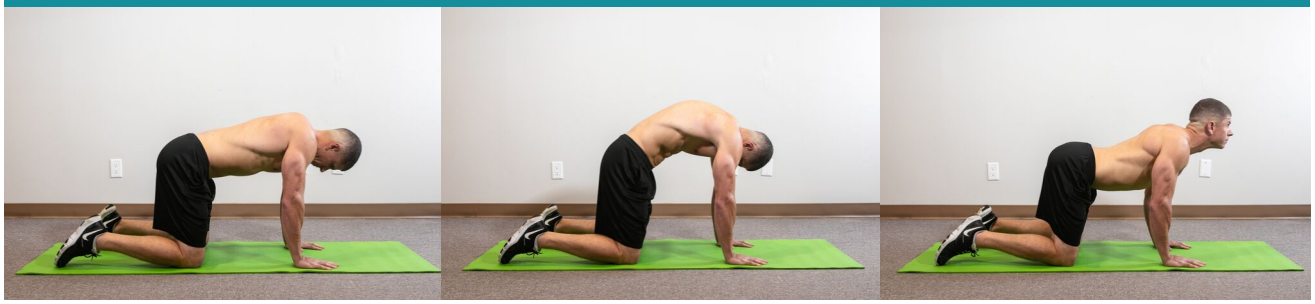
# Lengthening Techniques

After foam rolling, it's time for static stretches that will work to lengthen your spine to improve your overall extension. These stretches further loosen up your stiff thoracic spinal region so that you can begin strengthening this area.

## ARM HANG

Grab a stable grip bar with arms facing away from your body and hang. Similar to a pull up, slowly begin to roll your shoulders forward with controlled inhalation and exhalation. Then, rotate your shoulders in the opposite direction. Next, elevate and depress your shoulder blades. These lengthening techniques free the movement of the shoulders to allow them to act independent from the thoracic vertebrae.

## CAT/COW POSE

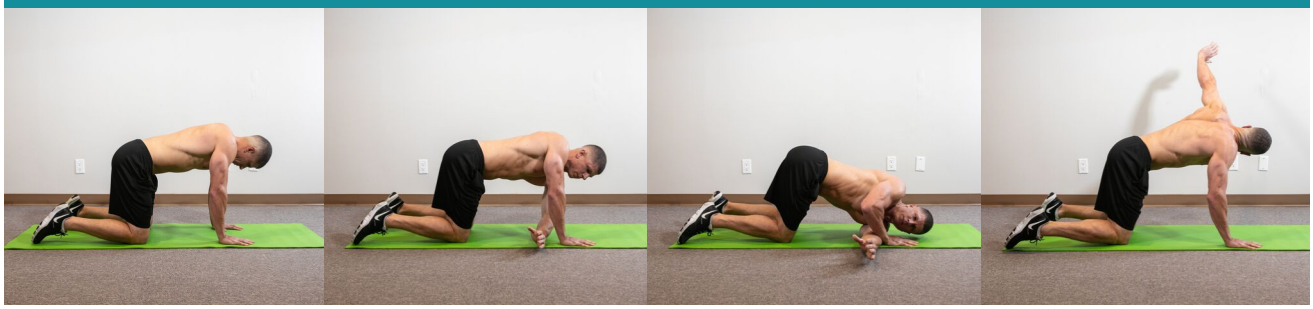


Cat pose - Begin on your hands and knees with your hands underneath your shoulders and your knees under your hips, head in a neutral position. Arch your back, pressing your rib cage toward the back of your spine. You should look like a cat that has woken up from a nap. Return to start and repeat as many times as needed.

Cow pose - Remain on your hands and knees after Cat Pose. Inhale as you drop your belly to the mat. Draw your shoulders back and lift your head to create a reverse curvature of the spine, chin to navel. Gently combine Cat and Cow pose for a full range of thoracic extension.

# Lengthening Techniques

## THREAD THE NEEDLE



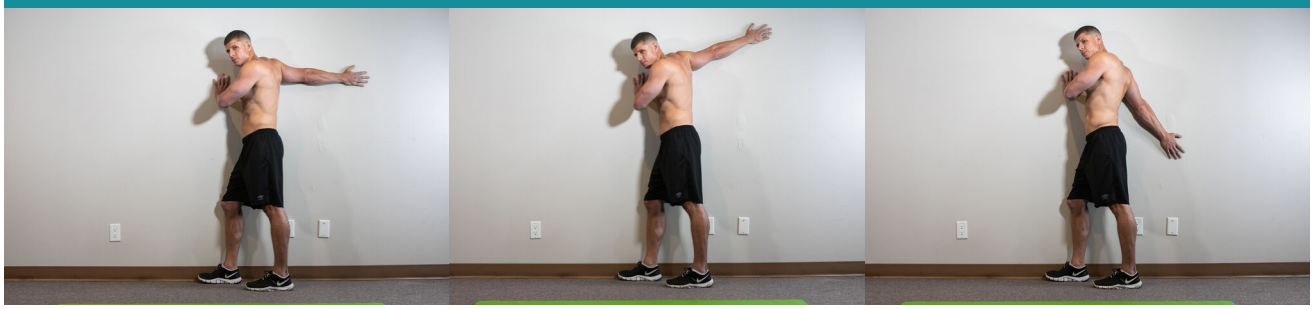
Begin on your hands and knees with your wrists under your shoulders and your knees directly under your hips. Your legs should be hip-width apart and your head should be in a neutral position. With the right palm facing up, slide your right arm underneath your left arm and let your right shoulder drop all the way to the mat. Look to your left and let your head press against the mat. Hold for a few moments. To safely return to neutral position, press your left hand on the mat and gently slide your right arm out. Extend the right arm up and away for a wider range. Repeat on the other side.

Megan Wade says,
"Thread-the-needle is another great pose for thoracic mobility because it stretches the space in between the shoulder blades as well as the muscles underneath the scapula."

**Megan Wade Yoga**

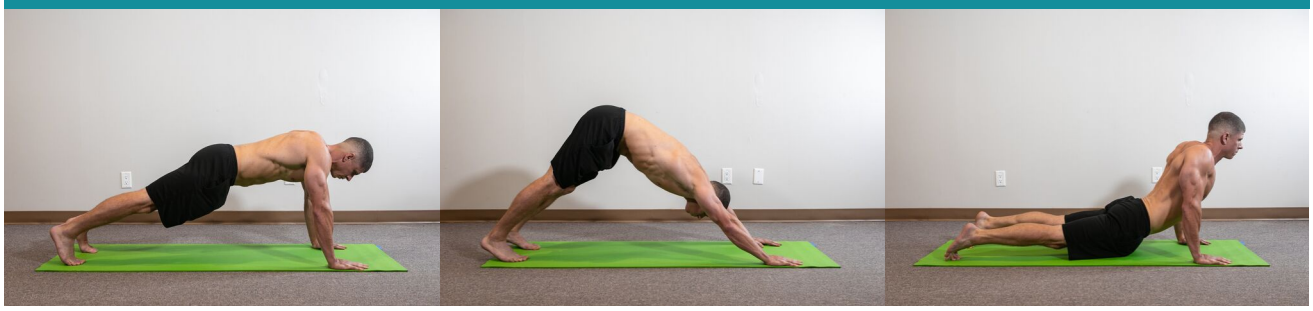
# Lengthening Techniques

## STANDING PECTORAL STRETCH



Stand with one hip next to a wall and place the outside leg behind in gentle lunge stance. Place the arm closest to the wall behind you with your palm facing the wall. To progress this stretch, place the hand that is on the wall in several different positions - 4 o'clock, 3 o'clock, and 2 o'clock. You can place your other hand on the wall to stabilize near your chest. Make sure it is perpendicular from the wall. Repeat on the other side.

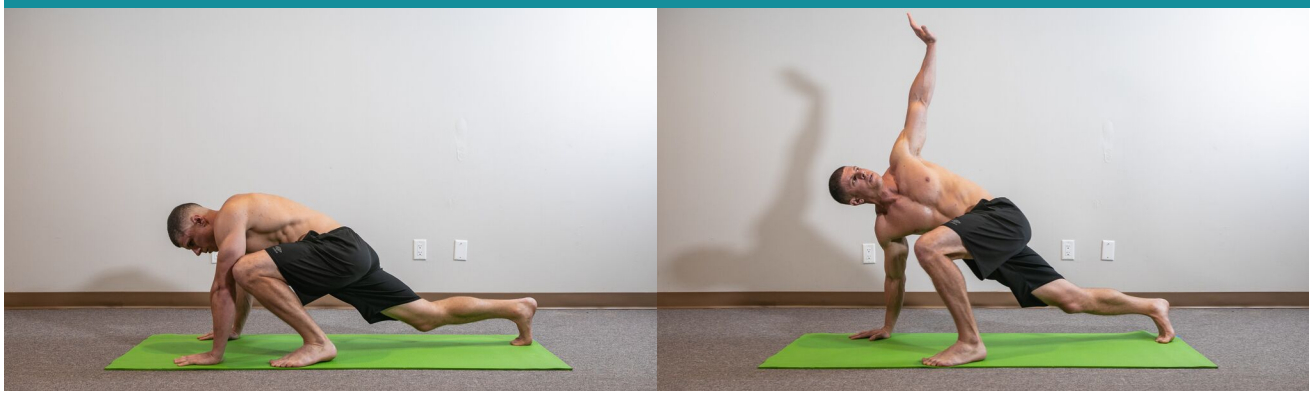
## DOWNWARD TO UPWARD FACING DOG



Start in a plank position and press your hips back toward the ceiling to get into downward-facing dog. Take a few seconds to feel a good stretch. It is ok if heels do not touch the ground. Then transition slowly into upward-facing dog by returning to plank, lowering hips, then pushing from your palms, rotating shoulders back and lifting the head to a forward gaze. Move back and forth between these two positions a few times.

# Lengthening Techniques

## SPIDERMAN (THORACIC ADAPTATION)



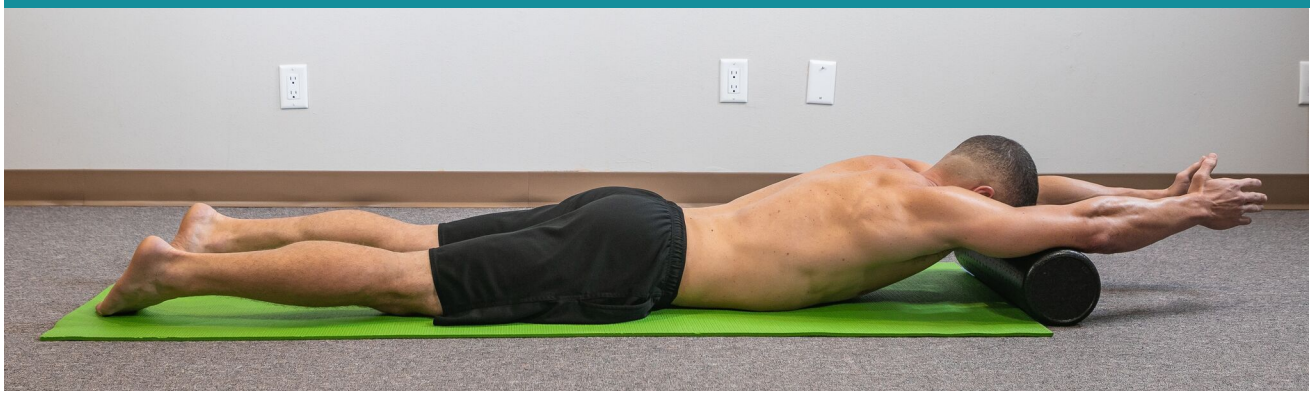
Start in a deep spiderman lunge stance and place both palms flat on the floor next to your front foot. Keep the back leg straight and do not let the knee touch the ground. Lift the hand opposite of the lunged leg up to the ceiling so that your spine is rotated. Hold for a few moments. Repeat on the other side.

## SERRATUS WALL HOLD

Facing the wall with your feet hip distance apart and knees slightly bent, hold your arms against the wall, bent at the elbows 90 degrees, and parallel to one another. Drive your elbows into the wall in order to round your mid-back. Breathe into the space between your shoulder blades. Be mindful of your elbows so they remain parallel to one another. Keep your head in a neutral position, facing the wall. Continue for 10 long slow deep breaths.

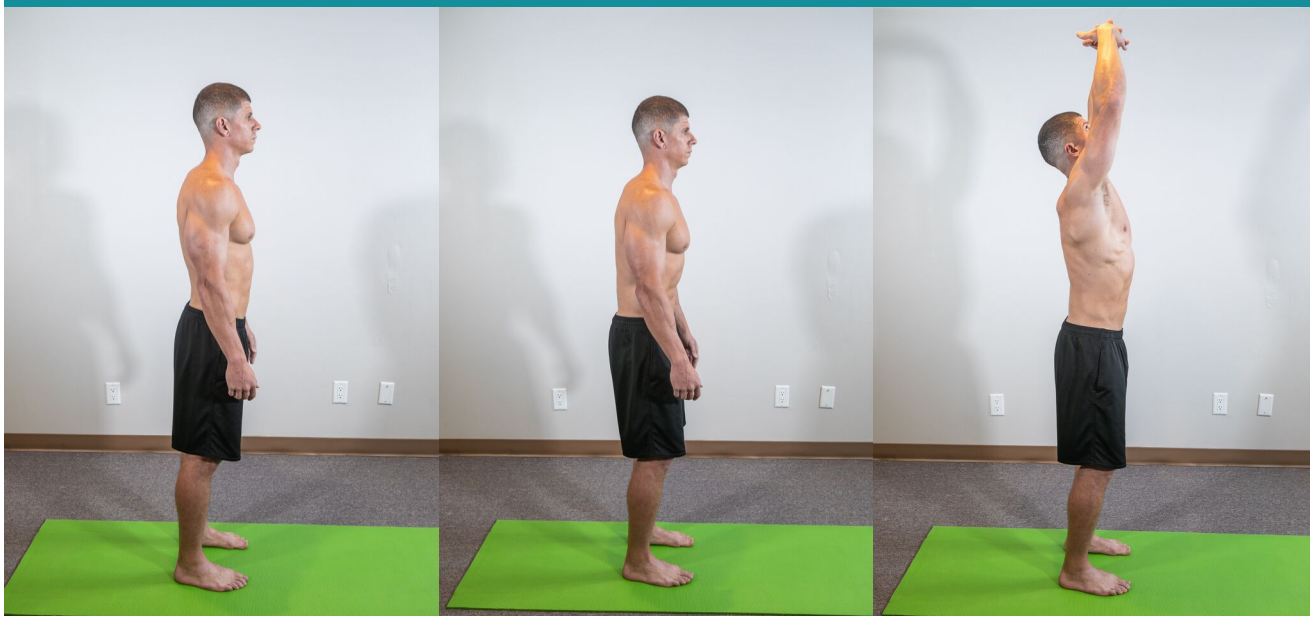
# Muscle Activation

## MODIFIED SUPERMAN



Lie facedown on your stomach with your arms extended above your head and legs extended, pointing your toes inward (pigeon toed). Place a 6-inch block under your forearms with thumbs pointing toward the ceiling.  Disengage the lumbar spine and focus on the thoracic region. Hold this position for one minute. Release arms from block and repeat a few times.

## OVERHEAD EXTENSION



Stand with your feet straight, hip distance apart. Clasp hands away and up, extending arms overhead with elbows straight, palms facing down. Tuck pelvis under to disengage low-back before looking up at your palms. (If neck is painful, cast eyes up as far as you are able with ease and no pain). This activates the lower trapezius to stabilize shoulder position. You should feel the mid-back muscles engage.

*Experts in order of mention:*
*Jeff Foxenberger - Tampa Movement Therapy*
*Dr. Ryan Hosler - Movement Upgraded*
*Zach Moreno - KLynergy Massage and Wellness*
*Dr. Moses Bernard - The Human Movement Expert*
*Megan Wade - Megan Wade Yoga*

*Resources:*
*- Won-gyu Yoo, Effects of thoracic posture correction exercises on scapular position, NCBI, 2018 Mar 2, ncbi.nlm.nih.gov/pmc/articles/PMC5857448/*
*- CrossFit, Foundational Movements, crossfit.com, crossfit.com/exercisedemos/*
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*- Pete Egoscue, Exercises and Theory, The Egoscue Method, egoscue.com/learning-center/*
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