



## ChiroCredit.com™ / OnlineCE.com presents

### Soft Tissue Injuries 113: Hour 3

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#### Section XI: Stretching and Strengthening of the Lumbar Spine

Prior to initiating any stretching and exercise rehabilitation, the patient must be instructed on proper stretching techniques and correct posture. Patients that are in pain and/or spasm may find it difficult to maintain correct posture during exercise techniques. It is advisable to review and observe all exercises so that the patient can be corrected if posture becomes incorrect during any time of the activity. This may be necessary for several visits to assure that the patient is performing the procedures properly.

Stretching and strengthening the spine are complex movements that usually involve using the extremities for leverage or to assist with holding a position. Proprioception is a vital component of exercise and posture correction. Most of the information for proprioception to our brain is received by our feet. Therefore, proprioception exercises are done standing.

It is important that the patient be made aware of the various segments and regions of the spine. This is best done by having the patient bend down to reach their toes, then gradually rise to standing by tilting their pelvis back to the upright and slowly coming up one segment at a time.

Another technique that is helpful to assist the patient in becoming aware of their spinal regions was discussed in Section 4, **abdominal training**. It is so very important that I will repeat it here as well. While standing against a wall, their feet 6" from the wall, the patient is shown that they can place their hand easily behind the curve of the lumbar spine. With their hands besides them, the patient is told to press their spine against the wall, bottom segment up. This not only assists in segmental awareness but recruits their core to contract allowing the lumbar spine to flatten. The patient is then told to raise their head to lengthen the thoracic and cervical spines. This posture is held for 30 seconds as the patient breaths normally. When repeated for 30 days in a row, the proprioception signal from the core to the brain will be established. The core will now automatically contract upon standing. This does not strengthen the core but does allow for its initiation.

Stretching the spine can be done regionally or in its entirety. Yoga has single postures that address the entire spine. These benefit wellness and can be used to rehabilitate the spine as a whole or benefit regions. Regional stretches are used for acute injury or chronic degeneration rehabilitation. Those can be passive, active, or postfacilitation. Some can be performed at home and some need to be done in office with the practitioner.

Stretching the extremities also assists with the effectiveness of spinal movements. Tight hamstrings will keep the pelvis from flexing properly. Tight shoulder and arm muscles will prevent the thoracic spine and neck from stretching properly and maintaining correct posture.

Stretching not only involves muscles but fascia. Tight fascia will limit a stretch. Fascia of the body is interconnected. Tight fascia in one region could have a significant impact on the freedom of spinal movement.

Upper back strength is important for posture and can take pressure off a shoulder or neck weakness. Too often, posture is overlooked as a cause for discomfort or dysfunction. Correct posture in a standing, seated or reclined position is important not only while doing exercise but at rest. Actually moving the regions of the spine to become aware of what is correct and incorrect in any given exercise helps to reeducate the patient and allow them to begin to strengthen and stretch their spine.

Core strength is imperative for rehabilitation of the spine. Contraction of the abdominal muscles will not only support the spine but brace it to prevent injury. Most people are familiar with abdominal exercises that strengthen the rectus abdominus. Strengthening the oblique abdominal muscles also contributes to the stabilization of the core.

Balance is also important in rehabilitation. A weak core will drastically alter balance. Spastic and inflexible hamstrings will alter balance. A sedentary lifestyle will alter balance. Balance exercises can assist with body awareness, core strengthening, breathing, and reaction time. Athletes who practice balance techniques have a faster reaction time than those who do not. Exercising in a mirror is a good way for patients to see their posture and form. They can correct any improper alignment and balance issues and they can see if they are favoring one side over another.

***Lumbar Spine:*** Strengthening the lumbar spine is important but must be balanced with core work covered previously. It is the core that supports the lumbar lordosis and prevents use of the iliopsoas in keeping the anterior of the lumbar spine in check. The lumbar spine should also be stretched after any strengthening regiment so that it can recover from any stress that may have been placed upon it during strengthening.

### **Stretching:**

***Knees to chest:*** This is the most common form of stretch of the lumbar spine. It can be performed supine or seated. Supine, the patient brings their knees to their chest and pulls them further in with their arms. This can be held for 20-30 seconds. While in this position, the patient can gently

rock their lower back slightly from side to side. This will allow the lumbar spine to relax further and settle into its comfortable posture. In this position, the patient can also straighten their legs, knees slightly bent. Seated, the patient can bring their ischial bones toward the edge of the chair and drop their torso and arms bringing their body forward into flexion. Hold 20 seconds.

*Standing low back stretch:* This was previously covered in section 7 but will be reviewed here as well. The patient stands with their feet at hip distance apart, slightly bending their knees. They bend over with their elbows grasping each other. The result is that the patient will have their chest and abdomen approximating their thighs. The patient should focus on allowing the back to flex, not round, and the hips to flex as to hinge forward. This will loosen the low back and hips to allow for a better hamstring stretch.

*Seated low back stretch:* The patient can sit crossed legged on the floor. They then round their back and drop their heads. The patient places their arms on the floor in front of their head.

*Posture stretch:* As previously mentioned in Section 3, a method to stretch the low back during standing is to bring the coccyx downward. This opens the low back.

### **Strengthening**

**Back extension:** Any extension exercises of the back should be balanced with core strengthening.

There are many methods of back extension to strengthen the lumbar spine. What is important to note is that when the patient is doing back extension they **MUST** press their pubic bone into the floor. This will prevent lower back injury upon any back extension exercise. The following exercises are performed with the patient prone on the floor, their hands under their forehead.

\*The patient can lift their legs one at a time or both at the same time. These are held for just a few seconds.

\*The patient can lift their legs and criss cross or scissor them up to 20 times.



11-1

\*Superman hold: The patient lifts their upper torso and legs at the same time and holds it.



11-2

\*Swim: The patient can lift their upper torso and legs at the same time and make a swimming motion.

**Ball exercises for the back:** Hold each briefly. Breathe out while extending or raising the legs and breathe in while returning to starting position.



11-3

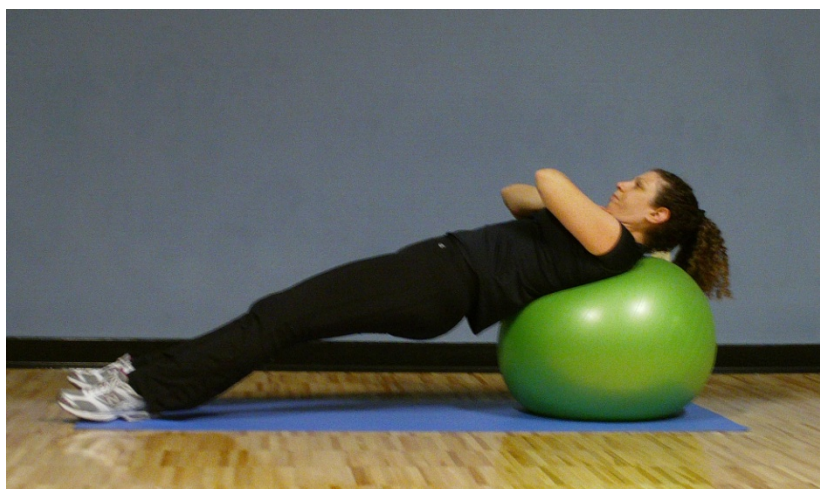
\**Ball hyperextension*: The patient kneels down in front of the exercise ball, their belly pressed on top of it. Place the hands on each side of the ball. Extend the back by extending the arms and legs.

\**Ball hyperextension – reverse*: The patient lies prone on top of the exercise ball which is itself on top of a bench. Their legs are down but extended. They grip the bench with both hands to maintain balance. The legs are raised up while extended. Slowly lower them down after a short pause.



11-4

*\*Ball row – upside down:* The patient is on their back with ankles on the exercise ball, legs extended. They grip the barbell with their hands, arms extended. The upper body is raised up by the arms. Slowly lower back down. Keep legs and back fully extended throughout.



11-5

\**Ball bridge*: The patient crouches down on their feet, the shoulder blades pressed against the exercise ball behind them. Place hands across the chest. Without moving the feet, extend the back until it is parallel to the floor, then lower it back down.



11-6

\**Ball arm-leg extension alternating*: The patient lies prone on top of the exercise ball, their belly pressed against it. Maintain balance with the feet and hands on the floor. Extend the left arm and right leg out and up, and lower them back. Alternate sides after each repetition.

## Section XII: Stretching and Strengthening of the Thoracic Spine, Ribs and Chest

The thoracic spine's natural kyphosis usually keeps the vertically oriented extensor group of the erector spinae and spinalis in a position which is more difficult to spasm and shorten. The muscles that usually spasm and shorten in this region are the ones with more horizontal fibers such as the rhomboids and trapezius as well as those associated with the scapula such as the levator scapulae, infraspinatus and supraspinatus. Spasms in the lordotic lumbar spine are more common due to the load and dynamics of the muscles. There are postures that will decrease the thoracic kyphosis and can affect a stretch in this region. It is important to understand that stretching the vertical erector spinae group will incorporate the lower back as well as the thoracic spine. Stretching the chest is a region that is mostly overlooked. This is not only important for balance anteriorly and posteriorly but helps to improve breathing and posture as well as shoulder function. Stretching the rib cage is also very important but must be done with care as to not over rotate the chest and thoracic spine.

### *Thoracic spine, ribs and chest:*

#### *Stretching:*

#### *Thoracic spine:*

*Quadratus lumborum*: The quadratus lumborum is a difficult muscle to actively stretch because its fibers run laterally. Passive stretch can be done with the patient prone. The practitioner can

contact the muscle just lateral to the spinal attachment and laterally by the rib cage and with opposing movement, stretch this muscle. Lateral bending will also stretch this muscle and will be covered in more detail under **Ribs**.

*Upper latissimus dorsi:* This is the upper section of the muscle with its attachment to the humerus and upper thoracic spine.

Standing, the patient brings both arms over head, fingers pointed toward one another, and laterally bends their torso away from the affected side. It is important to keep the body's weight distributed evenly on both feet as the patient laterally bends. Another good method for lateral bending was described in Section 3, **Postural Corrections**.

*Lower latissimus dorsi:* The division of the latissimus dorsi discussed in this section attaches to the humerus and the mid to lower thoracic spine as well as the lumbar spine.

Active stretching for this muscle is as described for its upper division, however, the arms can also be placed laterally while the torso rotates to achieve stretching the lower fibers of this muscle.

*Rhomboid minor:* With the patient standing, they clasp their hands in front of them, palms out and rounding their back, they push an imaginary desk beneath them.

*Rhomboid major:* Active stretching is as above but the patient pretends to push an imaginary wall in front of them while rounding their back.

The following stretches decrease the thoracic kyphosis to affect a stretch.



12-1a



12-1b

*Cat/cow stretch:* With the patient on the floor on their hands and knees, their spine is neutral. They then take a deep breath and drop their stomach and lift their head to bring their spine down toward the floor. They exhale and raise their spine up lifting their stomach toward the spine and rounding their back they drop their heads and look downward. Repeat 3 times.



12-2

*Child's Pose:* This Yoga posture is good stretch for the upper thoracic spine, ribs, shoulders and arms. The patient is on their hands and knees on the floor, their feet are together, their knees are shoulder width apart. They bring their arms in front of them, head down, spine down and bring their hips toward their feet. Hold this position for at least one minute.



12-3a



12-3b

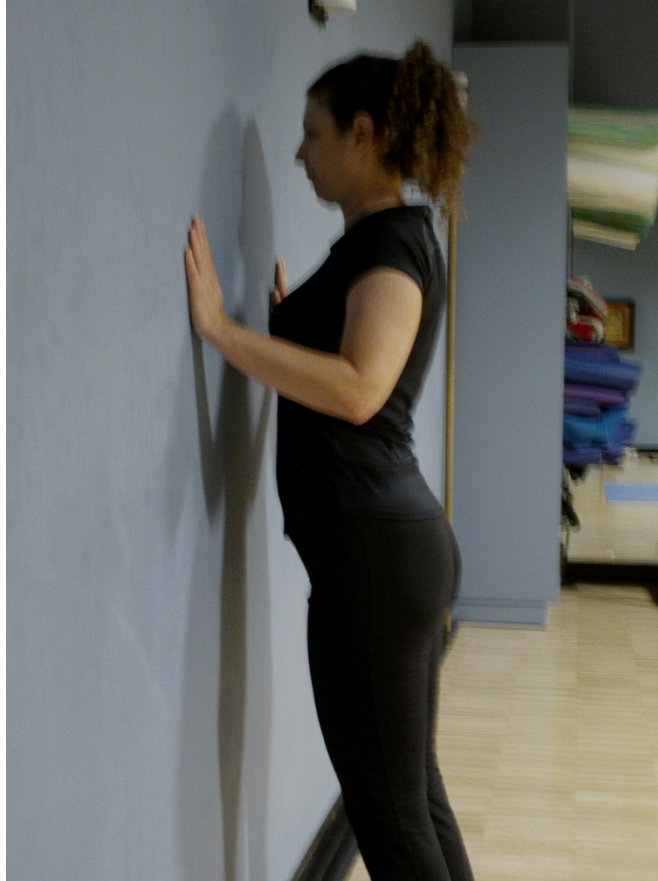


12-3c

*Sphinx:* This posture can be performed with a few modifications all stretching the thoracic spine. The patient is on the floor prone. Their hands and elbows are on the floor with the arms at 90 degrees from the shoulders to the elbows. The patient lifts their head and upper back off the floor and holds this posture. It is important that the patient's scapulae retract and relax. The posture can be modified by having the patient's hands and elbows remain on the floor and the hands making a support for the patient's head. This is done if there is a lower back issue. The arms can also be straight so that only the hands are on the ground when the patient lifts their head and upper torso. This is more advanced. The patient can alternate hand positions during the pose. Hold for at least one minute.

*Forward reach:* The patient can bend from the hips and reach a wall or counter top with their outstretched arms and hold. This was discussed as a postural correction as discussed in Section 3.





12-4

*Push against a wall:* The standing patient can lean against a wall with their hands and bending their elbows and retracting their shoulders, they can lean their thoracic spine further in toward the wall.

*Back round up:* The patient is on the floor and brings their knees to their chest. They then bring their head to their knees by pulling up on the back of their head with their interlocked hands.

***Ribs:***

**Side bending:** These should be held about 20-30 seconds.

\*Covered in detail in Section 3, the **posture exercise** incorporating lateral bending is an excellent lateral rib cage stretch and will affect the intercostal muscles.

\*Arm position can also alter side bending. With the arms overhead, elbows bent so that the hands are grasping the opposite elbow, laterally bend.



12-5

\**Seated side bending* can also be performed. With the patient seated on the floor, they should place their legs in front of them. Their arms go overhead and the torso bends laterally one side at a time.



12-6

*\*Side bending with a twist:* This can be performed standing or sitting. With the patient standing, they bring their feet about hip width apart and externally rotate them. The patient then, brings their arms out to their sides and rotates their body. Once rotated, the patient bends over to touch their foot with the opposite hand. The arm of that side should point toward the ceiling and the patient should look at the ceiling. Seated, the patient places their legs into a “V”, brings their arms out to the sides, twists their torso and bend over to touch their foot with their opposite hand. Repeat for other side for both.

### **Rib twists:**

Be very cautious when instructing your patient of any exercise that will twist their rib cage. It can be an excellent stretch and strengthening of that region but injury can occur if the chest and thoracic spine are not in the correct position. The patient should be warmed up prior to attempting these following Yoga postures:



12-7

*\*Seated Twist:* With the patient seated on the floor, their legs are crossed in front of them. They place their hand behind them and slowly twist so that they are facing the mirror. This is repeated for the opposite side.



12-8

*\*Seated Twist with Assist:* With the patient seated on the floor, their legs in front of them, they cross the right foot over the left leg and placing it by the opposite lateral knee. They take their left elbow and place it to the lateral of the right knee. The right arm is placed behind them so that they use their right hand for support on the ground. Once in this position, the patient needs to straighten their back and more importantly they need to raise their chest upward and keep it upward. This is crucial and will prevent injury. Once they accomplish that, the patient turns their head to the right to begin the rotation. They use their left elbow which is up against their right lateral leg to push their torso into rotation (chest up!). Move slowly. They may need to move their hand as they continue to rotate their head and torso. When they get as far as they can go, they hold for about 15 seconds. Remember, the power comes from the left hand against their right lateral knee. Do the opposite for the other side.

### Section XIII: Stretching and Strengthening of the Thoracic Spine, Ribs and Chest

***Thoracic spine, ribs and chest (continued):***

***Stretching (continued):***

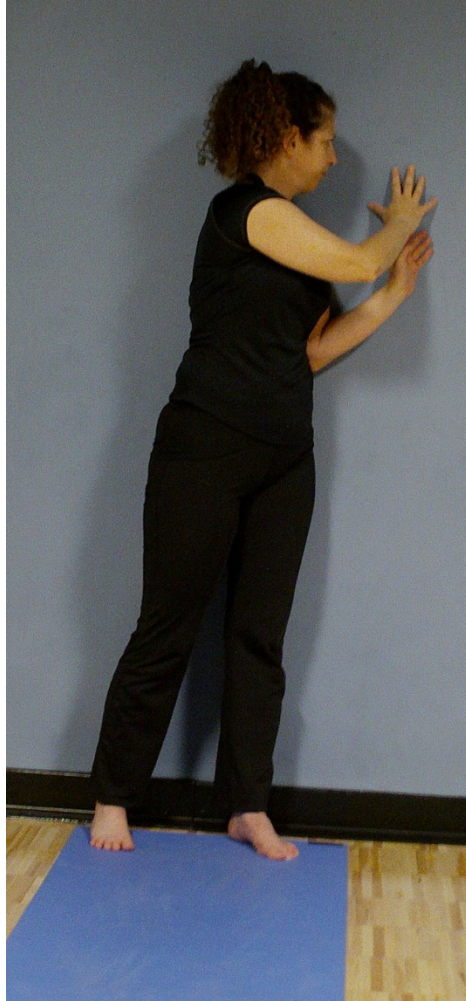
***Ribs (continued):***

***Rib twists (continued):***



13-1

*\*Knee Down Twist:* This Yoga posture will twist the thoracic spine and rib cage bilaterally and strengthen the abdominal obliques and posterior shoulder. The patient is supine. They bring their knees to their chest. The patient then rotates their hips so that both knees are to one side and as close to that axilla as possible. The patient brings their arms outreached to their sides and looks over the shoulder opposite the side their knees are on. The important thing the patient needs to accomplish is that the shoulder and rib cage of the side where they are looking remains on the floor. With each exhalation, the patient should press their rib cage and shoulder more into the ground. They can increase the challenge by taking the hand on the side of the flexed knees and further pull their superior leg toward the floor. If done properly, the focus of the rotation will be the mid-thoracic spine and rib cage. Hold for about one minute. Repeat for the other side.

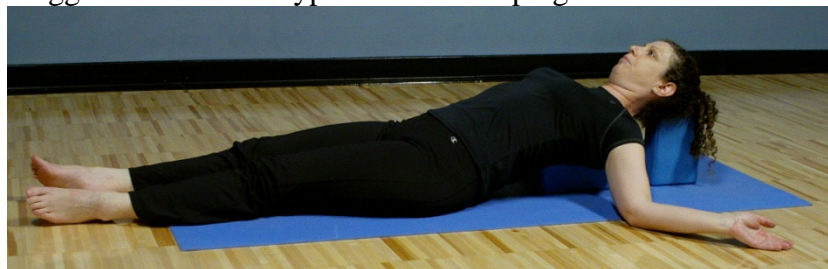


13-2

*Standing side twist:* Hold this stretch for 20 seconds. The patient is standing with their back toward a wall, feet shoulder width apart. They then rotate to bring their hands against that wall and turn their heads toward the wall. This can be modified so that the patient turns their head away from the wall. This will incorporate the opposite side in the stretch.

***Chest:***

*Anterior chest:* Stretching the anterior chest is very important and usually overlooked. It is the counterbalance to an exaggerated thoracic kyphosis and drooping shoulders.



13-3

To open up the chest and teach the patient to breathe into it, the patient needs two Yoga bricks. One brick is placed under their thoracic spine at the level of the scapulae. This brick is on its longer side. The other brick is on its shorter side so that it is higher off the ground than the one under the back. This is for the patient to rest their head. The patient sits on the floor with knees bent and lowers themselves on the thoracic brick. They lower until they can place their head on the other brick. Once in this position, the patient should bring their arms out to their sides. The patient's legs can be straightened or their feet can touch to allow for a hip stretch as well. For a greater stretch of the pectoralis group, they should bend their elbows and attempt to bring their arms up like a cactus. The bend of the elbow will increase the stretch to the pectoralis region. This will be difficult but they should get as close to this posture as possible. Once in this position the patient can breathe into their anterior chest wall to allow for rib expansion. Hold this posture for 4 minutes. A greater stretch can be accomplished with assistance as follows: When the patient is in the position above so that their arms are as a cactus, an assistant can place their hands over their anterior shoulder and push their anterior shoulders outward and upward while pushing their shoulders toward the ground. This opens up the anterior shoulder and chest.

This posture can be advanced for a greater stretch in the lateral and anterior upper rib cage and arms as follows:

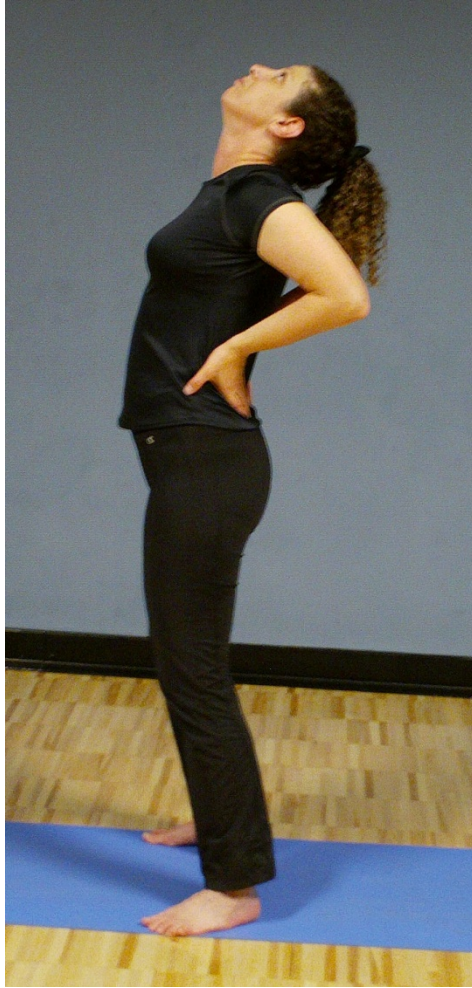
\*The patient can squeeze the thoracic brick with their shoulder blades for a few seconds, a few repetitions. When they relax, they can focus on keeping their scapulae relaxed to the sides of the bricks.

**You can access a video demonstrating this back on the course page. See video 5 of 6**

\*The patient can bring their arms up so that they are perpendicular with the floor. They then interlock their fingers and turn their palms toward the ceiling. Once in this position, the patient then drops the glenoid process downward into the glenohumeral joint. They will feel the scapulae move toward the floor if not already done so. The patient should keep their scapulae relaxed. Keeping their arms dropped into the glenohumeral joints, the patient should slowly bring their arms overhead. The goal is to get the hands as far toward the ground as possible.

\*The patient needs an assistant. In the position as above, prior to moving their arms over head, the assistant grasps the patient's arms and pushes them into the patient's shoulder sockets. They then take the triceps and rotate them toward the patient's body so that the triceps are turned inward toward the chest. With the shoulders pressed into their glenohumeral joints and triceps rotated, the assistant then pushes the patient's arms over head. Once the arms are at 180 degrees over head, the assistant should traction their arms at the triceps, continue to rotate the triceps inward and attempt to bring the patients hands backward with the goal of their hands touching the ground behind them. This is difficult to accomplish and their arms should be pushed only as far as the patient can comfortably go. Hold 5-10 seconds and slowly bring the patient's arms back up.

To get up from this brick posture, the patient should bend their knees, place their elbows on the floor and while tucking the chin to the chest rise up on their elbows.



13-5

*Standing anterior chest:* The patient stands with their feet shoulder width apart, knees slightly bent and places their hands on the lumbar spine. They bring their shoulders and elbow back, raise their chest.

*Standing anterior chest with arm assist:* The patient stands as above and brings their arms behind them interlocking their fingers. They bring their arms upward to increase the stretch.





13-6

*Towel stretch for anterior chest:* Roll up a towel and hold over head in both hands with arms abducted to about 120-150 degrees. Bring towel backward overhead rotating shoulders so that the position of their hands is near to their lumbar spine. Bring back over head and repeat. This can also be done with a bar.

*Serratus anterior and serratus posterior (superior, inferior):* With the patient standing, they abduct, externally rotate and extend their arm. They then laterally bend away from the affected side. In any lateral bend it is important to remember to press the ipsilateral foot into the ground. This accentuates the stretch.

*Pectoralis major:* There are three divisions of this muscle that can be stretched independently.

\*With patient supine, their arm is off the table in abduction and external rotation. The practitioner contacts their arm and stretches it to the floor (about 10 degrees extension). To stretch the clavicular division, the patient's arm is abducted 70 degrees. For the midsternal division, the arm is abducted 90 degrees. For the lower sternal division, the arm is abducted 110 degrees.

\*With patient standing, they place their forearm and palm against a door frame and step forward so that they can feel the pectoralis muscle stretch.



13-7

*Pectoralis minor:* With the patient standing, the interlock their fingers behind them, palms down and extend their chest. This then progresses into an internal rotation of the arms. It can also progress into extension of the arms. The arms can be extended to reach an object parallel with the scapula. Also, the patient can release their fingers and reach for opposite ends of a door frame behind them.

*General pectoralis stretch:* The standing patient brings their hand to a door frame. The position of the arm is straight with about 60 degrees of abduction. The patient then rotates their torso and head. To increase the stretch their opposite hand can be behind them grabbing onto their ipsilateral torso from behind.

#### Section XIV: Stretching and Strengthening of the Thoracic Spine, Ribs and Chest

##### **Strengthening:**

##### ***Thoracic spine:***

*Back extension:* Any extension exercises of the back should be balanced with core strengthening.

There are many methods of back extension to strengthen the thoracic spine. What is important to note is that when the prone patient is doing back extension they **MUST** press their pubic bone into the floor. This will prevent lower back injury during the back extension exercise. Those exercises specific for the thoracic spine will raise the upper back from the floor while allowing the lower limbs to remain on the floor.



14-1

With the patient prone, they place their both hands under their forehead as to make a cushion with them. Their elbows are lateral. While pressing the pubic bone into the floor, the patient rises up with their upper back, head and hands as a unit and then brings them back to the floor.

Another method is to bring their arms and legs up at the same time, then release back down. This will strengthen the entire back. In Pilates, there is a resistance ring apparatus.



14-2

If available, the patient can place the ring on its side with their hands interlocked on one section of the ring. They push the ring down and lift their upper torso up, belly button off the floor. Then release down. All of the above exercises should be repeated 5 times.

*Back row:* There are many methods to perform a back row exercise. The most common is with universal weight equipment. There are several different angles that this can be done. There is a row that is straight back. Make sure the patient's scapulae are approximated during the row. There is a universal row machine that brings the arms back and upward. This works some of the upper trapezius fibers as well and is preferred due to less injury. The patient can be prone and holding light weight, they bring their upper arms parallel with their body, elbows bent 90 degrees toward the floor. The action is to bring the weight ceilingward and to approximate the scapulae.



14-3

*Trapezius:* To strengthen this muscle the patient is prone on a workout bench or bed. They bring their arms out to the sides on the same plane as the body and 90 degrees from the torso, palms down. The patient brings their arms ceilingward to bring the scapulae closer together and brings them back down to the start position. This is done without weight. Bring this exercise up to 25 repetitions.

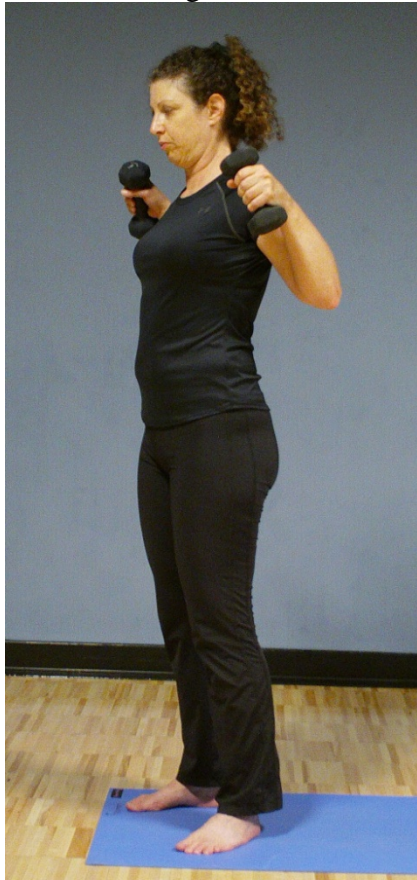
*Quadratus lumborum:* This muscle is difficult to isolate in exercise due to its lateral fibers. It can benefit from back extension as the entire region benefits.

*Latissimus dorsi:* Band work will allow for the pulling action that is required to exercise the latissimus dorsi. With the bands secured overhead, the patient grasps them and pulls downward. Also, a latissimus dorsi pull down universal weight machine at a gym will also work.



14-4

*Rhomboid minor:* With the patient prone, arms off the table, light weights can be brought up as in a prone back row with a gentle shoulder shrug.



14-5

With the patient standing, light weights in each hand, elbows bent, the patient can bring the weights up and back.

*Rhomboid major:* Prone with weights as above but patient brings their arms directly back, a pure prone back row.

***Ribs:*** Muscle strengthening is best for gross muscles. The intercostals and serratus muscles are not gross muscles and could be injured with any attempt at individual strengthening. Regional strengthening of the thoracic spine, chest and core will better suit this region. Stretching is best for the intercostals and serratus groups.

***Chest:*** The pectoralis muscles are most actively exercised for increasing chest strength.

***Bench press:*** This can be performed with several techniques each challenging the pectoralis group differently. If done with free weights, depending upon the angle of the bar or the angle of the seat, it will involve different sections of the pectoralis. Bench press can be done from different starting points to determine the challenge. Lifting heavy weight should be done with a spotter.

*Fly:* This can be done with free weights on the floor or on a universal weight machine. On the floor, the patient brings their arms out to their sides with light weight in their hands. They bring the weights up toward the ceiling and rounding the arms, touch the weights to each other, then bring them down. Up to 25 repetitions can be performed.

*Push ups:* These can be performed with the legs straight and feet on the ground or knees bent and on the ground. It is more challenging for the feet to be on the ground. To affect the pectoralis, the hands should be shoulder width apart. To affect the latissimus dorsi, the hands should be further apart. The patient's body should be in a plank posture during the push up. The chest should come as close to the ground as possible. Look for bad habits such as dropping the lumbar spine into lordosis or dropping the head and neck.

*Pectoralis major:* The patient is supine, light weight can be used. They begin with their arms in abduction and external rotation at 70, 90 and/or 110 degrees, and bring their arms into horizontal adduction.

*Pectoralis major - lower division:* Light weight can be used with the patient supine. The arms are placed into external rotation and 90 – 120 degrees abduction then horizontally adducted (in toward the chest).

*Pectoralis minor:*

\*Isometric: The patient can place their anterior shoulder against a door and press anterior shoulder against it.

\*Isotonic: With the patient supine, arms overhead, palms up with light weight, they can bring their arms forward toward their abdomen.

**Ball exercises for the chest:** Hold briefly. Breathe out while pushing and breathe in while returning to starting position.



14-6

\**Ball dumbbell press:* The patient lies on their back, shoulder blades against the exercise ball, back extended but hips and knees flexed. They hold light weights on each side of their chest. Push the dumbbells straight up and slowly lower them down.



14-7

*\*Ball push up:* The patient lies prone with their hands on top of the exercise ball, legs and back fully extended. They push up by extending the arms and slowly lower back down.



14-8

*\*Ball push up – on knees:* The patient kneels down in front of the ball with their hands on top of the ball, back extended. They push up by extending their arms and slowly lower back down.



14-9

*\*Ball push up – feet up:* The patient lies prone with their thighs on top of the exercise ball, legs and back fully extended and hands on the floor, elbows bent. They push up by extending their arms and slowly lower back down.



14-10

*\*Ball chest fly:* The patient lies on their back, shoulder blades on top of the exercise ball, back extended, knees flexed at 90 degree angles. They hold light weights out to each side of their body. Keeping elbows just slightly bent, they roll the light weights in and up and slowly lower them down.

*\*Ball chest fly – one at a time:* The patient lies on their back, shoulder blades on top of the exercise ball, back extended, knees flexed at 90 degree angles. They hold the handle out to one side of their body. Keeping the elbows slightly bent, they pull the handle in and up and slowly lower it down. Alternate sides.

## Section XV: Stretching and Strengthening of the Cervical Spine

### *Cervical Spine:*

Stretching and strengthening the cervical spine assists with Degenerative Joint Disease where flexion fixations of the joints are common. Stretching flexors and strengthening extensors will assist in maintaining the best posture for your patient as well as counteracting the affects of DJD. With DJD, several shorter exercise sessions during the day has been shown to be more effective than one longer session once per day. Caution should be taken with acute injury so that soft tissue is not overstretched. With acute injury, any stretch or strengthening should be followed by



icing the region. Active stretch and isometric strengthening are recommended. Isotonic and isokinetic strengthening are not recommended as the cervical spine could be injured. Weights are never used.

During exercise, it is important to protect the neck and head from strain. This includes sit ups, core exercises, shoulder strengthening and back extension. During sit ups, the patient should place their hands on their chest. This prevents them from placing their hands behind their head and forcing the cervical spine into flexion when doing a sit up. If they choose to place their hands behind their head they should be instructed to allow their head to rest on their hands. A helpful method is to have them look at something directly above them and focus on that during the sit up. For chronic conditions, a stretch and strengthening program should be introduced slowly over time for the best affect.

The TMJ can be adversely affected by spastic masseter, temporalis and/or pterygoid muscles. This is commonly found after acceleration/deceleration impact or with teeth grinders. Many cervical spine disorders that include dysfunction to cervical musculature can also contribute to an improperly functioning TMJ and its muscles. Most TMJ problems can be resolved by addressing these muscle groups. Stretches and strengthening the TMJ muscles can realign joint movement and relieve pain. More serious conditions involve the joint and disc itself.

### **Stretching:**

*Suboccipital region:* Since it is difficult to isolate this region, the best procedure is physician assisted postfacilitation stretch. This is performed with the patient supine and the practitioner standing behind them. The practitioner has one hand behind the occiput and the other hand on the forehead with the patient's neck slightly flexed. The patient is instructed to tilt their head back against the examiner and resist for 7 seconds. The patient is then told to release and the practitioner exerts traction on the occiput. The practitioner pushes down against the patient's forehead to bring C1,2 into flexion for 12 seconds, then releases.

*Long flexors:* These muscles are best stretched with the patient's neck in extension, lateral flexion and contralateral rotation. A gentle pull of the head will initiate an active stretch. The scalenes can also be stretched this way with the rotation of the head determining which scalene muscle will benefit from the stretch. Ipsilateral rotation will stretch the anterior scalenes, no rotation will stretch the medial scalenes and contralateral rotation will stretch the posterior scalenes.

*Long extensors:* These muscles are best stretched actively with the patient's neck in flexion. Lateral flexion and rotation can be added. A gentle head pull increases the stretch but instruct the patient to limit the flexion to prevent injury. It is common in exercise classes for the instructor to direct the class to roll their head. The cervical spine must never be rolled backward into extension. This shears the posterior facets. Instead, instruct your patient to laterally flex, roll into flexion and roll to laterally flex to the other side. Repeat in the opposite direction. This will prevent rolling into extension.

*Sternocleidomastoid:* With the patient seated or standing, they lift their chin to the ceiling to stretch the SCM and platysma at the same time. The patient can rotate their head from side to side for a more specific stretch of each SCM muscle.

*Levator scapulae:* Most patients contract this muscle unconsciously leading to poor posture, chronic spasm and possible headaches. It is important for the patient to understand what it feels like for this muscle to relax. A good method to do this is to have the patient bring their arms over their heads. Note that they contract their levator scapulae to do this as this is a very common recruitment. While their arms are above their head tell them to drop their shoulders down. They will feel the shoulders release and better understand that they are contracting the levator scapulae unnecessarily and unconsciously. They will also notice that it is easier to bring their arms near or behind their ears when the levator scapulae are not contracting. It is very important that this habit be broken. Creating awareness of contraction is the first step.

The patient grasps their head with their opposite hand and pulling their neck into lateral flexion. A greater stretch will occur with their arm behind them pulling it to the small of their back while they laterally flex their neck. Another technique is for the patient to be seated and place their palm on the seat behind their ipsilateral buttocks and push into the seat as they laterally flex their neck.

There is an excellent procedure to help the patient understand how to drop their shoulders. In truth, the shoulders do not drop by relaxing the shoulders. They drop by bringing the upper thoracic spine downward. This is difficult to understand without experiencing the difference. Try to drop your shoulders down by dropping your shoulders. They do not move very much. Now try to drop your shoulders by moving the upper thoracic spine downward. You will notice that the chest comes anterior, scapulas retract and glenohumeral joints drop down. There are two excellent exercises, standing and supine, to help your patient understand how to drop the thoracic spine.

*Standing:* The patient's back is against the wall, their heels together at the floor board. They bend their knees lowering their body. The patient then rises up by "scraping" their upper back against the wall. As this is done, their upper thoracic spine will drag against the wall as their body goes up. The patient will eventually be standing with their legs straight but their thoracic spine and shoulders will be lower due to the drag affect.

*Supine:* The patient is on the floor, their feet up against the floor board, their knees bent. They straighten their knees and drag their body cephalid. As they do this, the upper thoracic spine moves less than the rest of their body and is in effect, pulled downward. The lumbar lordosis is decreased as well. This exercise will drag their clothes so they should be instructed to give their clothes enough slack so that the drag will not cause them to be constricted by the moved clothing.

*Upper trapezius:* The seated patient compresses their hand into their seat while laterally bending and flexing their neck with the other hand. Hold for 15 seconds.

*Middle trapezius:* The standing patient clasps their hands in front of them, interlocks their fingers, palms out. The patient rounds their upper back and stretches their arms as though they are moving a brick wall in front of them. Hold for 10 seconds.

*Lower trapezius:* The standing patient clasps their hands in front of them. They turn their palms out with fingers interlocked and push an imaginary ledge above them rounding their back. Hold for 10 seconds.

### **Strengthening:**

*Translation:* The concept of translation can be a challenge to those that cannot connect to the backward movement of the head and cervical spine. It is unnatural to some and the tendency is to tip the chin usually up. It is very important to watch the patient do their translation exercises to assure they are doing this properly. Head retraction must be done in a horizontal plane. Once the patient understands the feeling of this movement, they do not need assistance. It is good to do this in front of a mirror. The patient can retract their posterior cervical spine against a ball that is behind their head on a wall. The patient can push their head against their hand that is behind them. The contraction is isometric once the head reaches the hand or ball.

*Isometric contraction:* These are done laterally for the lateral flexors, posteriorly for the extensor group and anteriorly for the flexor group. The patient pushes against their hand which is against their forehead either to their side, anteriorly or posteriorly. The movement posteriorly is different than for translation. Here the chin tips slightly for extension. This exercise can be adapted to contract the suboccipital muscles if the patient tips their chin higher to the ceiling as they isometrically contract against resistance.

*Long flexors:* For isometric contraction of the anterior spinal musculature, the patient places their hand anteriorly for resistance. The movement is forward pointing the chin slightly downward. The patient can also place their forehead on a ball against a wall and press against the ball.

*Long extensors:* Isometric retraction is performed with the patient standing. They retract their neck backwards slightly extend their cervical spine. Using a ball against the wall is recommended.

*Sternocleidomastoid:* Isometric contraction in flexion is recommended. Do not encourage the patient to strengthen these muscles by doing “head lifts”, this can lead to injury. Also, inform the patient that these muscles must remain relaxed during abdominal crunch exercises.