Rib Stress Injury Prevention Program

Introduction
A rib stress injury can be described as a rib stress “reaction” or can lead to a rib stress “fracture” if not managed or treated correctly from the start of symptoms. The difference between a “reaction” and a “fracture” is a matter of degree. Both suggest a disruption of bone metabolism. Stress fractures can be described as an area in the bone that has become weakened and microscopic cracks have gradually formed because the bone is repeatedly loaded and stressed. A stress fracture to the rib is rare, but can be seen in athletes with significant demands of repetitive upper extremity activities, such as rowers. These fractures can occur at any rib level, but the most common being the middle ribs (T5-7). It is important for rowers to pay attention to the way they are feeling with the demands of training.

Symptoms of rib stress reaction or fracture may include increased pain symptoms with deep inhalation when breathing or coughing, sidelying, rolling in bed at night, reaching for something such as a “doorknob”, resisted shoulder adduction, or upper extremity weight bearing. Sometimes athletes can ignore these symptoms because they may think their muscles are just sore, stiff, or tight. If these symptoms are ignored, and training continues, over time, the bone remodeling process is unable to compensate for micro-damage caused by a combination of strain and muscle fatigue.

This program was designed to help the rower “prevent” possible rib stress injury. Proper rowing mechanics is very important. When athletes get tired, they may start to “round” or “hike” their shoulders which, puts a lot of stress on the shoulder retractors. When the scapular muscles get tired, there’s an increase in rib stress force. This program was developed to help the athlete work on proper posture by focusing on certain flexibility exercises, and scapular/posterior shoulder strengthening. It is recommended that the athlete do the flexibility exercises before each workout, and complete the strengthening exercises 3 x a week.

FLEXIBILITY

Upper Trapezius
Seated in a chair, reach with opposite hand of “trapezius” muscle being stretched and place on head. The hand of the side being stretched should be placed underneath the chair for leverage. Gently pull head to side. Stretch should be felt through your neck and trapezius muscle. Change position of head (forward or back) to feel different muscle fibers. Hold for 20 sec. Repeat 3-5 times. Switch side for balance.

Sleeper Stretch for Posterior RC
Sidelying, rest your chin on the shoulder that is being stretched. Make sure shoulder angle and arm are at 90 degrees. Opposite hand pushes arm being stretched, down towards the table. Stretch should be felt in the back of the shoulder. This is more of a dynamic stretch, therefore only needs to be held for 2-3 sec when end range is achieved. Switch side for balance. Complete 15 times.
**Posterior Deltoid**

Stand on one side of a wall and place the arm that is being stretched across your body. Grip onto the side of the wall, and look slightly away towards the side being stretched. Stretch should be felt behind the shoulder and scapula (shoulder blade). Hold for 20-30 sec. Repeat 3-5 times. Switch side for balance.

**Single Arm Anterior Chest using doorway**

Stand on one side of a wall with hand/forearm resting on the wall. Make sure to keep your shoulders down (keep shoulders away from ear). Step with the opposite foot forward, stretch should be felt on the one side of the pectoral group muscle. Hold for 30 seconds. Repeat 3-5 times. Switch side for balance.

**Anterior Chest using foam roller (Static and Dynamic)**

Lie on the foam roller (with the roller along your spine), and open up your chest by placing arms at your side making sure they are at 90 degrees. For the static stretch, hold position for up to 1-2 min. For the dynamic stretch, raise arms above your head trying to keep arms parallel with the ground and return to 90 degrees. Repeat 10-15 times.

**Wall Slides (Alternating arm lift)**

In a seated position, place your back and shoulder blades flat against the wall. Make sure not to arch your lower back in order for shoulder blades to come in contact with the wall. Tightening your core will help flatten your lower back as well. Alternate lifting right or left arm above your head, followed by the opposite arm, while keeping your shoulder blades against wall. Repeat 10-15 times each arm.

**Wall Slides (90/90)**

In a seated position, place your back and shoulder blades flat against the wall with your arms/shoulders at 90 degrees. Slide your arms up the wall until arms have straightened while keeping your shoulder blades in contact with the wall the entire time. Return to the 90/90 degree position, and repeat 10-15 times.
**Seated Trunk Sidebending on Physioball**

Seated on Physioball, make sure you are sitting upright and core is engaged for proper alignment. Place the hand of the side being stretched on your head and slightly lean away. Stretch should be felt along rib cage and latissimus muscle. Hold for 20-30 sec. Repeat 3-5 times. Switch side for balance.

**Latissimus/Trunk Sidebending on Physioball**

While standing, face the Physioball and place elbow with arm bent on the ball. Allow the ball to guide you into the stretch. Stretch should be felt in Latissimus muscle. Another option is placing elbow on the Physioball while standing and facing sideways. Lean into the ball to feel a deeper stretch. Hold for 20-30 sec. Repeat 3-5 times. Switch side for balance.

**Prayer Stretch on Physioball using Table**

In a standing position, place both hands on the Physioball. Lean into the Physioball with your arms, and allow it to guide you forward. Once you get to the end range, hold for 2-3 sec, and repeat 10-15 times. Stretch should be felt in your latissimus muscles.

**Prone Press Ups**

Start lying face down, with elbows bent and hands on table. Push your upper body into an extended position and hold for 2-3 sec. Be sure to keep the front of your hip bones in contact with the table during the entire movement. If your hip bones have come off the table, this means you are extending too far. Repeat 10 – 15 times.

**STRENGTHENING**

**Seated Scapular Retraction/Protraction Slides on Table**

Start by sitting in a chair in an upright position working on good posture. The side of the arm doing the exercise should be placed on the table. Slide your arm forward by using the muscles near your shoulder blade. The shoulder blade should open which is called “scapular protraction”. This should be followed by sliding your arm back, as if you would be squeezing your shoulder blades together, but isolating one side at a time. This is called “scapular retraction”. Repeat 2 -3 sets of 15-20 times on each side.

**Single Arm Prone Scapular Retraction, add weight as needed**

Start by lying down on the end of a table. Use a lighter dumbbell weight to start and progress as needed. The first part of the exercise is working on “scapular retraction”. While keeping your arm and elbow straight, contract the muscles surrounding the shoulder blade in order for the shoulder blade to slide towards the spine. Be sure not to “hike” your shoulders during exercise. Repeat 2 x 15-20 times. For the second part of the exercise, try holding the “scapular retraction” while doing a row. Repeat 2 x 15-20 times. Switch side for balance.
**Prone I’s, T’s, and Y’s, add weight as needed**

Start by lying face down on a table. Use a rolled up towel and place it under forehead to help relax the neck muscles. The first exercise is called “I’s”. Arms are placed at your side, and squeeze your shoulder blades together. The second exercise is called “T’s”. Place your arms out at your side to form a “T” with palms down then squeeze your shoulder blades together. This exercise can also be done with thumbs pointing upward. The third exercise is called “Y’s”. Place your arms above your head to form a “Y” with palms facing down and squeeze shoulder blades together. This exercise can also be done with thumbs pointing upward. Each exercise can be done 2 x 15-20 times.

**Supine Punch Ups with weight (front view)**

Lie on table facing up. Start with lighter dumbbell weights in each hand, and progress as needed. Arms should be straight, shoulder width apart, while holding the weights. Start with shoulder blades touching the table then simultaneously punch up towards the ceiling so the shoulder blades separate instead of squeezing together. At the end range of the exercise, there should be space between the back of your shoulder and the table. Exercise should end with shoulders touching the table again. Repeat 2 x 15-20 times.

**Tubing Scapular Exercises:**

No Money, @10, @90, @120 degrees. You will need a small piece of tubing for the following 4 exercises.

**No Money (Front View)**

Arms should be at your side with elbows bent at 90 degrees, and palms facing up. Use the tubing for resistance as you squeeze your shoulder blades together. Resistance should be felt within the scapular muscles. Repeat 2 x 15-20 times.
**At 10 degrees (Side View)**
Arms are straight, palms facing down and placed below the waist about 10 degrees away from the body. Use the tubing for resistance and squeeze your shoulder blades together. Resistance should be felt within scapular muscles. Repeat 2 x 15-20 times.

![Image at 10 degrees](image1)

**At 90 degrees (Side View)**
Arms are straight, palms facing down and placed out in front of body at shoulder level (90 degrees). Use the tubing for resistance and squeeze your shoulder blades together. Resistance should be felt within scapular muscles. Repeat 2 x 15-20 times.

![Image at 90 degrees](image2)

**At 120 degrees (Side View)**
Arms are straight, palms facing down and placed out in front of body at eye level (120 degrees). Use the tubing for resistance and squeeze your shoulder blades together. Resistance should be felt within scapular muscles. Repeat 2 x 15-20 times.

![Image at 120 degrees](image3)

**Standing Scapular Retraction using Tubing**
*Focus on retraction before pulling*
Arms are straight and in front of body at shoulder level. Simultaneously, squeeze shoulder blades together using the resistance of the tubing/cable unit. Try to keep arms straight during entire exercise in order to isolate the scapular muscles. Repeat 2 x 15-20 times.
**Quadruped Single Arm- posterior fly with thumbs up:**
In a quadruped position (on all fours), place a dumbbell in one hand. Start by making sure core is engaged and back is straight during entire exercise. Lift the arm with dumbbell, out to side, making sure thumb is pointing up towards ceiling. Lift to the level of your body and hold for 5 sec. Repeat 10-20 times. Switch side for balance.

**Quadruped Single Arm- shoulder flexion:**
In a quadruped position (on all fours), place a dumbbell in one hand. Start by making sure core in engaged and back is straight during entire exercise. Lift the arm with dumbbell, out in front, making sure thumb is pointing up towards ceiling. Lift to the level of your head and hold for 5 sec. Repeat 10-20 times. Switch side for balance.

**DB Bench Rows:**
Kneeling on the side of a lower table or bench with dumbbell weight in hand, lift the weight to body level making sure you are engaging the scapular muscles before completing the row. Repeat 2 x 15-20 times. Switch sides for balance.

**Prone Incline Bench Posterior Flys**
Lie facing down on an incline bench with two smaller dumbbell weights in both hands. Simultaneously raise the weights by squeezing shoulder blades together. Arms should end at body level. Repeat 2 x 10-15 times.

**Push Ups with a Plus**
Begin in a push up position (either on knees or toes). Keep elbows locked and head in line with spine. First pinch shoulder blades together and then push up through your shoulders while rounding out your back. Repeat 10-15 times.

**Plank Position, Upper Body Box Step Ups**
In a good plank position (this can be done on knees or toes depending on ability), alternate right and left arm stepping onto box while maintaining proper alignment during entire exercise. Repeat 2 x 5 - 10 repetitions each arm.

For more variety, start on one side of the box in a good plank position, and step right arm followed by left arm onto the box, and move towards the other side of the box. Work your way back to left, right and so on... Repeat 5 – 10 times.
Rhythmic Stabilization using DB- ABC’s, Circles

Hold a light dumbbell weight in right hand and place in front of your body keeping your elbow straight entire time. Start by writing the alphabet (A-Z) in capital letters. Rest. For the second part, draw circles to the right and left 10 times each. This is important for scapular stabilization (the muscles near the shoulder blade are working to stabilize with added movement). Repeat on left side for balance.