THE THORACIC CAGE

The rib cage is composed of the sternum, thoracic spine, ribs and diaphragm. All of these elements are subject to somatic dysfunctions, which may alter their ability to comply with respiratory movement, adapt to postural and locomotion requirements of the body, as well as circulation of body fluids. Altered somato-visceral reflexes may affect innervations to pulmonary, cardiac, gastrointestinal and endocrine function. Evaluation and treatment of all components of rib cage dysfunction will add new dimensions to management of such clinical problems as chest wall pain, asthma, COPD, pneumonia, bronchitis, shoulder girdle pain, thoracic outlet syndrome, cardiac decompensation, edema of the pelvis, upper and lower extremities, hemorrhoids, leg or vulvar varicosities, herpes zoster, and post-operative mastectomies, thoracotomies - - the list is endless.

It has always been of utmost importance in my practice to evaluate and treat rib cage dysfunctions during my patients’ pre-admission physical exams, especially if surgery is anticipated. In this way their own diaphragms should be functioning well post-operatively, thus greatly reducing the risk of post-op pneumonias.

Disruption of anatomic relationships (fracture, dislocation, subluxation or strain) may occur if these structures are subjected to physical trauma. Standard medical treatment of rib fractures and dislocations may be augmented by careful and skillful management of associated respiratory motion restriction.

DIAGNOSIS OF RIB CAGE DYSFUNCTIONS

The first rib articulates with the manubrium via a long piece of flexible cartilage, and may be palpated near the manubrium for about two centimeters below the inferior margin of the clavicle, and at that point it passes postero-superiorly behind the clavicle. If one palpates at the lateral end of the clavicle where it approximates the head of the humerus, your finger will actually be on the second rib.

The second rib articulates at the junction of the manubrium and the body of the sternum, which is known as the sternal angle.

The heads of the second through ninth ribs each articulate between the bodies of its own vertebra and the vertebral body above (e.g. the second rib is between the bodies of T-1 and T-2). The tubercle of all ribs, except eleventh and twelfth, articulate with their own vertebral transverse processes. The first rib head articulates with the body and transverse process of the first thoracic vertebra, but does not touch the seventh cervical vertebra. Ribs ten, eleven and twelve have unifacet articulations with their own vertebral bodies.

Fred Mitchell, Sr., D. O. stressed that it was important to correct vertebral dysfunctions before treating the rib cage.

EXHALATION RESTRICTIONS may also be described as “locked up”, and don’t move down as the patient exhales. The operator must locate and treat the lower-most rib or ribs which prevent exhalation.
INHALATION RESTRICTIONS are described as “locked down”, and don’t move up with inhalation.

When one is evaluating the patient’s standing posture, it is common to find the right “shoulder” (A-C) lower than the left. This is often associated with a left thoracic convexity, and commonly the left rib cage will be “locked up” and won’t exhale. Along with that pattern, one often finds that the right first rib doesn’t inhale. It is wise to examine for abduction restriction of the sterno-clavicular joints before treating the rib dysfunctions, and again after treatment. Many times St-Cl dysfunctions are secondary to rib cage dysfunctions, and will not be found after the rib dysfunction is treated.

To establish a routine for rib cage evaluation, one should stand on the side of the operators dominant eye, and spread the fingers of both hands around the lateral side of the lower 1/3 of the rib cage, with fingers at about a 45 degree angle along the shafts of the ribs. The palpation should be light, and the operator feels watches inhalation and exhalation by focusing central vision mid-line, and using lateral vision to observe any restricted motion. The lower 1/3 of the rib cage motion is primarily “bucket handle” (BH) or side-bending.

The middle 1/3 of the rib cage evaluation is accomplished by placing left and right 2nd & 3rd fingers para-sternally, and the patient inhales deeply as the operator observes both inhalation and exhalation. The middle rib cage motion is approximately equal amounts of pump handle (PH) and BH motions.

The upper 1/3 of rib cage motion is evaluated by palpating with the tips of the middle fingers where the distal clavicle and humerus approximate each other. Again, the operator observes both inhalation and exhalation. The most common pattern is that the right side doesn’t inhale if there is dysfunction.

To evaluate the 11th and 12th ribs, the patient is prone with the operator standing on the dominant eye side. These ribs are not long enough to show PH or BH motions, therefore their movement is simply described as locked up (inhaled) or locked down (exhaled).

To evaluate caliper rib cage motion the patient is prone with the operator standing on the dominant eye side. I distinctly recall that Dr. Mitchell talked about the old ice tongs used to pick up big blocks of ice which were delivered to our homes in the days before refrigerators. His thumbs were adjacent to each other as he opened and closed the “tongs”. His hands were not on ribs 11 and 12 - - they were higher. His thumbs were placed “in the groove” next to the spinous processes of T7 to 10. He then separated his out-stretched fingers between the ribs the 7th to 10th ribs, and observed motion as the patient took a deep breath, then exhaled. He focused his central vision on the midline, and used his lateral vision to observe motion as the patient inhaled, then inhaled. Typically, the right caliper ribs are locked up - - won’t exhale. Of interest is that occasionally a lower thoracic dysfunction is stubborn to correct. At such times I have then corrected the caliper ribs, then rechecked the thoracic dysfunction - - only to find it corrected.

TREATMENT OF RIB CAGE DYSFUNCTIONS

I shall describe the dysfunctions which I commonly find them.
LEFT LOWER RIBS LOCKED UP: Patient is supine, and moves to the left so the left shoulder is about 6” lateral to the edge of the table. The operator stands to the left of the patient’s head, and the patient is asked to lift his head while flexing the thoracic spine, as the operator reaches under the patient and asks the patient to let his head rest on the operator’s right arm, next to the operator’s body. The operator palpates the lateral lower rib cage with out-stretched left hand, as the operator flexes the spine until that motion is felt in the ribs. The operator’s inner thigh (right) rests against the top of the patient’s shoulder. The patient takes in a little breath, and is asked to exhale while the operator simultaneously moves the left shoulder caudal and medially (almost a transitory motion) until a new motion barrier is palpated. Repeat one or two times. The patient is returned to mid-line and lies flat on the table. The lower rib cage motion is rechecked. I stress that the left hand’s only function is palpation - - never is any pressure placed upon the ribs.

LEFT MIDDLE RIBS LOCKED UP: The patient and operator’s positions are as in the previous task analysis, although less thoracic flexion and left lateral flexion are needed. Gentle gliding motion will take up the slack as the patient exhales. Repeat one or two times, and recheck.

UPPER RIBS LOCKED UP: The patient is supine, and the operator stands at the head of the table, and places his left hand under the upper 3 or 4 thoracic vertebrae. The operator palpates the lower-most restricted rib with his right index finger in the inter-space above the rib, and the middle finger in the next lower inter-space. He flexes the spine until he feels motion at the inter-space of the index finger, but not to the third finger. The patient takes up the side-bending slack by reaching slowly along the side of his leg until the patient reaches the side-bending barrier. Repeat one or two times. Recheck.

TREATMENT OF RIGHT CALIPER RIBS LOCKED UP: The patient is prone, and the operator stands on the left side of the patient. In order to produce a slight right T-L convexity the patient is asked to turn his head to the left, and as he is doing that the operator lifts the head and moves the head slightly to the left, then places it on the table. To create the convexity from below the operator places his left hand over the posterior right 7th to 10th ribs. He then moves one leg, then the other, toward him in order to localize the convexity to the area. The operator places heel of the left hand just lateral to T-7 to 10. The operator reaches under the area of the right ASIS (avoiding pressure directly on the ASIS), and rolls the pelvis toward him, thus engaging the rotation barrier. The patient is asked to take in a breath, then exhale completely. As the patient exhales, the operator rotates the pelvis toward him by leaning backward (not pulling with his hands), and the patient is asked to pull his right pelvis gently toward the table against a mild isometric counterforce to a count of three, then relaxes. The operator takes up the slack by engaging the new rotation barrier. He repeats the process a time or two, then rechecks findings.

The latissimus dorsi muscle is used in this isometric. It attaches to the spinous processes of the lower 5 or 6 thoracic vertebrae as well as the lumbar vertebrae and the median ridge of the sacrum and the outer tip of the iliac crest. I stress that it only takes an ounce or two of isometric counter-force. If the patient is extremely obese, it may be necessary to have an office assistant help rotate the pelvis, as well as help with the isometric contraction.
**TREATMENT OF RIGHT FIRST RIB LOCKED DOWN:** The patient is supine, and the operator is standing on the left side of the patient. The back of the patient’s right hand is placed on his forehead, and the operator rotates the neck @ 15 degrees to the right for the first rib dysfunction, and 20 degrees for a second rib dysfunction. Operator palpates the anterior surface of the right upper ribs, then asks the patient to inhale deeply, then try to lift the forehead (not his arm) toward the ceiling as the operator offers light isometric resistance. The patient relaxes. Repeat and recheck. Gentle isometrics are recommended.

The scalenes attach to ribs one and two, and the operator may observe their contraction with the isometrics.

Mitchell’s technique had the operator pull the patient’s right arm toward him with his right hand, and then with his left hand he reached behind the patient’s right shoulder girdle so that his flexed fingers wrapped around the right upper trapezius and supraspinatus which cover the first rib. Then he would take up the slack by pulling the first rib caudad before the isometric was performed. One day I couldn’t make myself do that on a very obese, odiferous male! So, I just monitored the anterior surface of the right upper ribs. And it worked!!