The Ribcage and Diaphragm

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1. The ribcage is the weight segment of the body that protects the lungs/heart, supports the shoulder girdle, permits breathing
2. Parallel to head and pelvis – 3 main bony weight/function segments
3. Head – central nervous system, exteroception, eating/breathing inlet
4. Ribcage – breathing, heart protection, arm support
5. Pelvis – protect genitals, foundation of torso, connect 2 legs to one torso – mobility/stability
6. Ribcage includes the sternum to which the ribs attach anteriorly via cartilage (mobility)
7. Includes the spine, to which the ribs attach posteriorly
8. “True” and “false” ribs – creates solar plexus, greater mobility
10. Myofascial “girdle” connects ribs to pelvis -- surrounds this area of the body to provide flexibility, compression, containment and strength since there is only spine in center for bony support. Aids transfer of body weight from one leg to the other.
   Attaches to spine, ribcage, pelvis and all muscles.
11. Top of the girdle is the diaphragm (horizontal plane structure)
12. Bottom of the girdle is the pelvis and its floor is the pelvic floor – again a transverse (horizontal plane) myofascial structure
13. Girdle plus upper and lower transverse structures create a sort of “soup can” of muscle and fascia. In the back, a huge, thick sheath of diamond shaped fascia connects the pelvis with the spine, the trapezius and latissimus dorsi (shoulder muscles) and the front muscles (abdominals) (the girdle).
14. When this is tight, it’s hard to let the water volume of the viscera expand for the lungs to open downward – all lung opening must then come from ribs lifting and opening sideways.
15. Motion of ribs – pail handles, pump handles.
16. Iliopsoas plays a huge role in lumbar and sacral alignment which greatly affects core strength as well as facility of breathing. It goes from the hip to inside the thorax and goes right through an opening between the diaphragm and the ribcage/spine.
17. QL also has a huge effect on breathing because it holds the lowest ribs down.

There’s a huge amount of fascial girdling between the ribcage and the pelvis. All the muscles are embedded in it and implicate or pull on it in some way. In turn, it grounds them and makes their work a complicated concert rather than a series of individual pulls.
19. We think of the abdominals as being on the front of the body and going all the way up to down and side to side, but they really start in the back and come around partway to connect into fascial sheathes, with the exception of the six pack (rectus abdominis) which is in the center and a pure flexor. They’re like binder clips on the side of the body.

20. All abdominals have an effect on the ribcage because they connect to the fascial cylinder grounded on the ribs.

21. All the abdominals are involved in forceful exhalation.

22. Diaphragm. Attaches to lower ribs. Central tendon with muscle fibers coming down to the lowest ribs like stripes on the outer rim of an opened umbrella. Contraction lifts the lowest ribs, thus expanding the ribcage and distending the belly unless muscles are holding the involved structures in position. Involved in increasing abdominal pressure – expelling feces, vomit, urine etc. Also helps to prevent acid reflux by putting pressure on the aperture between esophagus and stomach.

23. Leslie Kaminoff’s words on the diaphragm: “Like many muscles, the diaphragm can move its insertion towards it origin (central tendon towards base of ribcage), or its origin towards its insertion (base of ribcage towards central tendon). It's all a question of which end of the muscle is mobile, and which is stable. From this perspective, a belly breath is the result of stabilizing the diaphragm's origin and mobilizing its insertion, while a chest breath is the result of stabilizing the diaphragm's insertion and mobilizing its origin.”

24. Insertion towards origin: Ribs are held in place; central tendon moves downward toward bottom of ribcage (internal intercostals contracted) = belly breathing.

25. Origin towards insertion: Abdominals including transversus (transverse fibers interdigitate with diaphragm fibers) hold abdomen in place. Transversus in particular acts as an anchor for bottom of fibers. Central tendon stays in place because it cannot move down… so fibers of diaphragm pull up to lift and separate lower ribs and transversus which also pulls abdomen in = ribcage lift and expansion breathing.

26. Relaxed breathing = less than full stabilizing contractions of muscles, so both origin and insertion move and movement of breathing occurs throughout torso.

27. Tight diaphragm. Muscular volume apparent at top of abdominals, just below ribs; widened ribcage (lower ribs “stuck in inhale”), difficult to take full relaxed breath; upper abdomen distended and firm (because ribs are held in inhale position and central tendon is also pulled downward). Can be linked with extension at dorsal hinge (perhaps because a slip goes down from the back of the diaphragm to L1 or L2).


29. Accessory breathing muscles: Pec minor, scalenes, SCM. Freeing them helps breathing but also brings ribs up and forward in the back upper thorax, thus permitting level shoulders and balanced head. Chest fascia in general needs release to
30. allow for full head and arm support from thorax. People with trouble drawing a
breath often have tight upper chest fascia.
31. Arm girdle hangs on top of ribcage-egg. Collarbones is a spacer, shoulder blade is a
raft on the round surface of the ribs.
32. Scapular dysfunction, sticking/holding cause most neck pain due to immobility of the
upper thorax. Release shoulders to ease the neck from having to compensate.
33. Erectors thought of as extensors of trunk. Under 50 percent autonomic control.
34. Massaged for hundreds of thousands of hours by massage therapists.
35. Erectors create the illusion that they are mostly up/down fibers. They are diagonal.
36. As individual actors, they more or less go diagonally upward from spinous to
transverse process or to ribs at varying angles.
37. Huge effect on ribs. Huge rotation, some lateral flexion.
38. When spine won’t go to or stay in neutral, ribs are the long lever that can keep them
off-center.
39. When erectors are super tight and won’t move or soften, chronically or acutely, ribs
in specific and rotation in general is the way to make the individual fibers, and thus
the mass, release.
40. This will work better than M-L and L-M motion.
41. To release the erectors, mobilize the ribs. Think diagonally.
42. To release the ribs, work the erectors.
43. To release the spinal segments, work the ribs.
44. To free the breathing, look to the abdominal muscles and fascia, the arm/shoulder
complex, the chest and front/side neck.
45. Neck is also helped most by upper thorax techniques and full body (hip especially)
alignment.
46. Long myofascial stretches for ribcage
47. Move diaphragm into exhale position to release diaphragm.
48. Release around sternum.
49. Serratus anterior and mid rib tightness.
50. Scalene techniques.
51. Evaluate breathing -- no “good” breathing. It’s contextual. Use breathing and ROM to
determine where you will work.