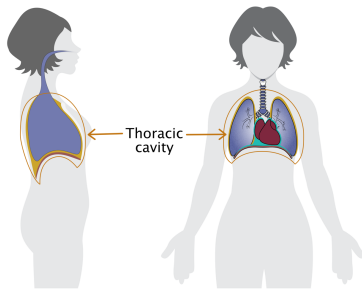


DUAL ROLES OF YOUR DIAPHRAGM

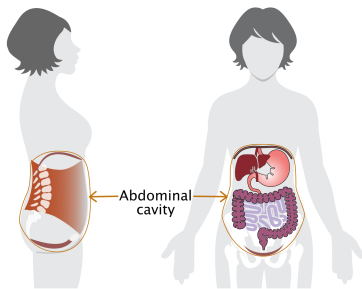
AND WHY THEY ARE ESSENTIAL IN YOUR YOGA PRACTICE



A diaphragm is the primary muscle of inhalation; it is responsible for about 75% of the air movement in normal breathing at rest (external intercostal muscles are responsible for the other 25%). Your diaphragm separates your thoracic and abdominal cavity, but at the same time it connects those two cavities during the process of respiration and the action of spinal stabilization. Understanding both of those functions is essential in our yoga practice.



Your *thoracic cavity* is contained within your ribcage (top and sides) and your diaphragm (bottom). It consists of your lungs, pulmonary tissue and heart. The outer surface of your lungs sticks to the inner surface of your ribcage and the top part of your diaphragm. On the inhale, your diaphragm contracts and moves down and your rib cage expands. Both of those actions pull on your lungs, causing them to expand and suck in air. On the exhale, your lungs recoil and pull your diaphragm upwards and rib cage inwards.



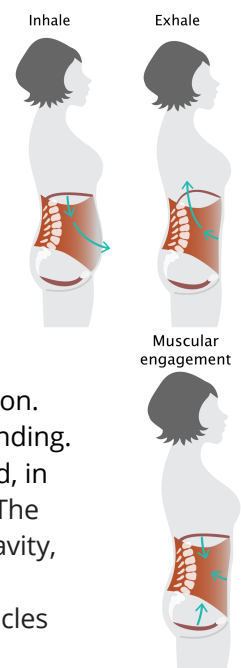
Your *abdominal cavity* is formed by your spine (back), abdominal muscles (front and sides), diaphragm (top), and pelvic floor (bottom). The abdominal cavity contains soft and squishy abdominal organs. You can think of them as water balloons – if you squeeze them, they change their shape, but they cannot be compressed. Your diaphragm drapes over your abdominal organs and connects to some of them. Every time your diaphragm moves down on inhale, it presses on one or several of those organs and changes their shape and position. The contents of your abdominal cavity shifts and needs to protrude somewhere. That is why your belly usually sticks out on inhale. As

this downward pushing action happens with every inhalation, your pelvic floor muscles need to be toned enough to withstand that pressure and support your abdominal organs. Your pelvic floor muscles help regulate intra-abdominal pressure that is created by the downward movement of the diaphragm.

Your diaphragm and your abdominal muscles (particularly transverse abdominis) can work together or oppose each other depending on what role they play.

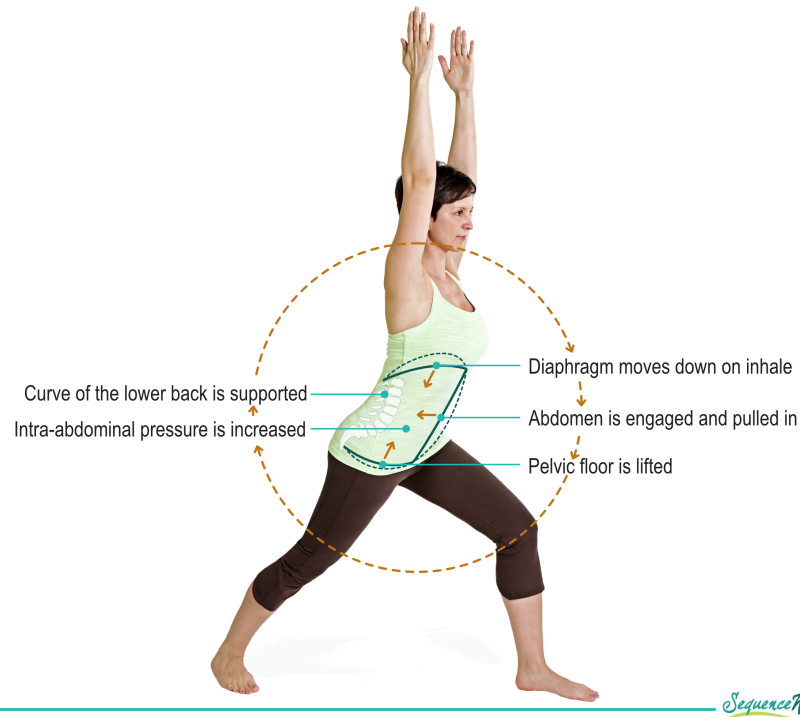
RESPIRATION – your diaphragm and your abdominal muscles work together. When you breathe, on the inhale your diaphragm moves down and your abdomen expands, on the exhale your diaphragm moves upward and your abdomen pulls in. It is important for your diaphragm to maintain tonicity, so that it can properly contract and move down and then return to its resting shape with ease. This ensures proper lung inflation and ongoing visceral massage.

SPINAL STABILIZATION – your diaphragm and your abdominal muscles work in opposition. If you keep your abdomen engaged when you inhale, it will prevent your belly from expanding. The downward movement of the diaphragm will work in opposition to your abdomen and, in conjunction with your pelvic floor muscles, they will increase intra-abdominal pressure. “The diaphragm and abdominal muscles together create a hydraulic effect in the abdominal cavity, which assists spinal stabilization by stiffening the lumbar spine through increased intra-abdominal pressure. Therefore, poor coordination of the diaphragm and abdominal muscles



may result in compromised stability and dysfunction of the lumbar spine. [...] Proper stabilization is critical for all dynamic activities ranging from simple functional tasks to skilled athletic maneuvers.” (1)

Proper spinal stabilization is essential for many yoga postures. Let’s examine how it works in Virabhadrasana 1.



This is why the action of progressive abdominal contraction (“zip-up”) combined with pelvic floor lift and diaphragmatic breathing is so important in most yoga postures. It helps regulate the position of the pelvis AND increase intra-abdominal pressure to aid with spinal stabilization while we move into the pose, hold the pose and particularly if we move our arms while holding the pose.

That is why we need to include the following elements in our yoga practice:

- Building awareness of diaphragmatic movement. Most of us cannot feel our diaphragms directly, but we can experience its movement indirectly by the outward flaring action of the bottom part of the ribcage when the diaphragm flattens on the inhaled. We can also visualize the diaphragm lifting and returning to its dome shape on the exhaled.
- Practicing progressive abdominal contraction (“zip up” action) with pelvic floor lift in most postures for spinal stabilization.
- Developing tonicity of the pelvic floor, so that it’s not too tight or too droopy, and is able to withstand the changes of pressure in the abdominal cavity and support our organs.
- Increasing the range of motion of the diaphragm by gradually lengthening all four parts of the breath (inhaled, hold after inhaled, exhaled and hold after exhaled);
- Encouraging good posture, as both slouching and military posture affect the range of movement of the diaphragm;
- Discouraging rigid holding of the abdomen in daily life, as it creates unnecessary intra-abdominal pressure. For most of us, our bodies will create that support when necessary on their own. It’s more important for us to increase that support consciously during exercise, yoga, heavy lifting and other more physically demanding activities.

1. **Stabilizing function of the diaphragm: dynamic MRI and synchronized spirometric assessment**
by P. Kolar et al.