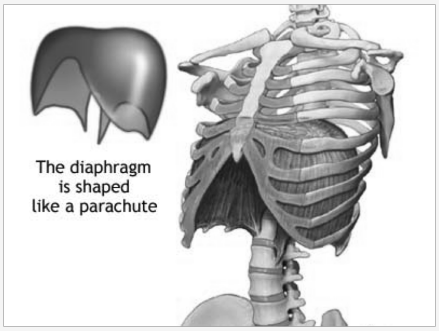
## Anatomy




- Important for core stability
- Intraabdominal pressure is important for spinal stability (increased = improved spinal stability)
- Serves a roof of canister

## Functional Anatomy

- IAP determined by strength of muscles around it
- Front and sides: transverse abdominous and intercostal muscles
- Back: paraspinal muscles - ES to multifidi
- Bottom: pelvic floor
- Roof: diaphragm
- Requires synergy of all the muscles mentioned
- Diaphragm contracts and compresses abdominal cavity, pelvic floor co-activates
- Then eccentric contraction of abdominal wall, lx extensors
- CNS needs to automatically "brace" the trunk (hard for some people during repetitive and sustained movements)
- instability of diaphragm can cause LBP, spinal disorders; strain, disc lesion and spondylolisthesis, over active spinal erectors

## Presentation

- Observation of breathing patterns
- Elevation of upper rib cage
- Inadequate or asymmetrical lateral rib cage expansion
- Nasal flaring
- Laboured breathing
- Frequent yawning
- Hyperventilation
- Mouth breathing
- Excessive paraspinal muscle contraction/initiation of breathing from chest than abdomen

## Techniques

- Get patient to lie supine with knees bent with one hand over sternum and other over umbilicus then deep breath
- Deep breath should start in the abdomen, minimal chest elevation
- On a prone patient, breathing should cause a wave like pattern of spinal flexion from diaphragm upwards
- Stand behind patient and place thumbs on paraspinal muscles with second and third fingers over patient's lower ribs, fourth and fifth fingers over abdominal wall

**Assess for:** Thoracolumbar paraspinal muscle contraction, rib movement, abdominal wall resistance

- Breathing and IAP should be assessed during squatting/other functional movements

## Management

- Breathing patterns should be fixed before core stability exercises are given
- Myofascial release of accessory muscles of breathing (upper traps, scalenes, ls, SCM and pecs)
- SMT of Tx/costovertebral joints
- Educate patient on how breathing patterns contribute to their symptoms
- Get the patient to palpate the area of dysfunction whilst they are breathing, get them to breath infront of a mirror
- Educate on idea breathing ratio (1:2 - inhalation and exhalation) - 3s of inhalation, 6s of exhalation
- Instruct patient to lightly compress their abdomen when they breathe in, then relax when breathing out
- Start supine, standing, then dynamic movements
- Then move onto rehab programs/core stability - abdominal bracing, planks, bird dogs, dead busg

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Not published yet.
Last updated 6th January, 2021.