



WORKING WITH THE **abdominals**

It is a common myth in fitness, and even in yoga circles, that to have a healthy core we should have six-pack (i.e. rock hard) abdominal muscles. The abdominal muscles are important to core stability, but no one set of muscles works miracles all by itself. Strong abdominal muscles are just one component of all round core stability, which requires that all contributing muscle groups are balanced in terms of their strength and flexibility. Images given to us in the media about what we should look like are about selling products, and have nothing to do with our health and wellbeing. Women's abdomens in particular can be strong and supportive of the structures within, without looking hard and flat. In fact, having a totally flat abdomen could be an indication of tension in that area, which may limit breathing and digestion, as well as indicate a loss of the natural curves of the spine.

Benefits of strong abdominal muscles in yoga practice

We need balanced strength in all of the muscles of the abdomen and the muscles that work synergistically to support them for a safe, sustainable yoga practice. Good core strength facilitates tilting at the hips in forward bends and keeping the lower spine held firm, thus avoiding strain. We are also able to limit hyper-extension of the lumbar spine in backbends, producing a more sustainable and even curve throughout the spine. Twists and side bends rely on the abdominal muscles to create these actions, and to prevent collapsing into the lower back while performing them. Arm balances such as Lolasana (Pendant Pose) rely on very strong abdominal muscles to create the lift. Inversions like Sarvangasana (Shoulder Stand) are similarly dependent on a strong core to hold the trunk firm in the upside down position and to lift and lower the weight of the legs in a safe and controlled manner. Finally, our pranayama (breath control) practice, especially when we introduce breath retentions that require the work of the bandhas, would not be possible without toned abdominal muscles to create strong, controlled and sustained muscular contraction.

Anatomy and the role of the abdominal muscles

Starting at the surface and moving in, the major muscles of the abdomen are as follows:

1. Rectus abdominis

This outermost vertical column of muscle runs along the midline of the abdomen, connecting at the top to the breastbone, and at the bottom to the pubic bone. It is divided down the centre by a band of connective tissue, and horizontally by three further bands. When very well defined, it is this muscle that gives that washboard look. A major stabiliser of the trunk, it helps hold the abdominal contents firm.

How it works in yoga practice

- When the rectus abdominis contracts from a sitting or standing position, it becomes a prime mover in the forward bends, such as Paschimottasana (Seated Forward Bend).
- It is one of the main muscles that contract to control the descent of the legs from a lying position as in Uttanpadasana (Raised Leg Pose); or from an inverted position such as from Sarvangasana (Shoulder Stand) into Halasana (Plough Pose).
- From a sitting position, when the insertion at the breast bone is held still, contraction of this muscle along with the transversus abdominis helps the pelvis to be lifted off the floor as in Lolasana.
- Strong, controlled exhalation, as is common in most pranayama practices, and especially forced exhalation practices such as Swana (Panting Breath) and Kapalhati (Shining Skull Breath) pranayamas, depends on the work of the rectus abdominis along with the TVA (transversus abdominis).
- Isolation of the rectus of abdominis is part of the practice of Nauli Kriya, a cleansing practice.



Diagram 1. Key Muscles

How to strengthen the rectus abdominis

Yoga sit-ups

Lie on the back with the knees bent and the feet hip width apart (refer figure 1). Place the hands onto the thighs. Inhale. As you exhale, slide the hands up the thighs towards the knees. Try to keep the chest open, shoulders back, and the feet on the floor. With each exhalation, pull the abdomen smoothly in. Keep all of the movements slow and controlled, without using momentum. Repeat 10 times or until tired.

See also Lolasana variation with blocks (section 4, figure 5).



Figure 1. Yoga sit ups

2. External obliques

The next layer in is the external obliques. There is one on each side of the body and they run from the lower back ribs, down and across the waist, to connect to the front of the pelvis.

If only one side of this muscle pair contracts, a side bend to that same side will result. In twisting, contraction of one side of the external obliques will rotate the spine in the opposite direction, when assisted by the internal obliques on the other side of the body. Contraction of right external oblique brings about a side bend to the right and twist to the left. If both sides contract at once, these muscles contribute to the combined abdominal contraction that brings about a forward bend.

3. Internal obliques

Lying beneath the external obliques, the internal obliques are also a pair of muscles, one on either side of the trunk. Their fibres run diagonally forward and upward, at right angles to the external obliques, connecting

the top of the pelvis to the lowest front ribs. If only one side contracts, the result will be a side bend to the same side. In twisting, contraction of one side of the internal obliques will rotate the spine in the same direction, when assisted by the external obliques on the other side of the body. Contraction of the right internal obliques brings about a side bend to the right and a twist to the right. Both sides contracting at once add to the combined abdominal contraction that brings about a forward bend.

How they work in yoga

- In a side bend to the right, such as Trikonasana (Triangle Pose) to the right side, the right side external obliques and the left side internal obliques contract. This combined action creates the side bend to the right as well as a twist to the left.
- In a twist to the right, for example Marichyasana C (Pose Dedicated to the Sage Marichi C) the left external obliques and the right internal obliques contract to

rotate the trunk to the right. Strong obliques are important to deepen more difficult twists, such as Parivrtta Trikonasana (Revolved Triangle Pose).

- If both sides of the internal and external obliques contract together, they are part of the combined muscular action that creates a forward bend, such as Paschimottanasana.
- Strong obliques provide stability in, and prevent collapsing into, the side waist in postures such as Trikonasana, and also side balances, such as Vasisthasana (Side Plank Pose).

How to strengthen the internal and external obliques

Jathara Parivartanasana (Revolved Abdomen Pose) variation

Bring the feet and knees together, arms out at shoulder height, with the palms turned upwards. Keep the knees squeezed together throughout the pose. Inhale, and as you exhale, lift the feet from the floor. Inhale. As you exhale, lower the knees to just above the right elbow; let them hover there in space, above the elbow. Inhale and come back to centre. Exhale and lower the knees to just above the left elbow. Make sure that both shoulder blades stay on the floor throughout the pose. Modify the difficulty of the posture by the degree of bend in the knees. Knees fully bent for those who are least strong, through to straight legs and the ankles above the wrists in the final position, for those who are very strong (refer figure 2).

This is one round. Practice four rounds.

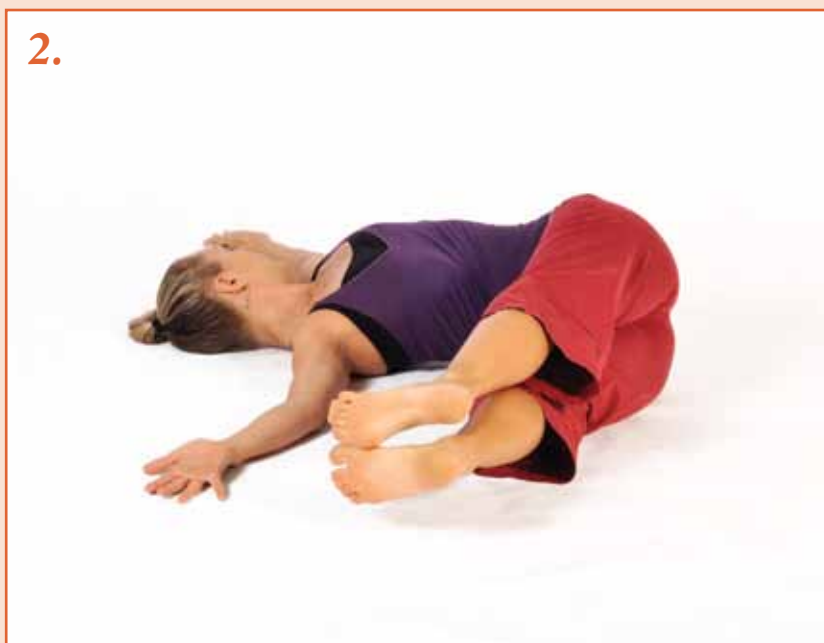


Figure 2. Jathara Parivartanasana variation - Modified abdominal twist

4. Transversus abdominis (TVA)

Deepest of all is the transversus abdominis. The fibres of these muscles run across the abdomen. It covers the whole front surface of the abdominal area, from the top of the hip girdle to the inside edges of the lowest front ribs.

Transversus abdominis is most like the body's natural weight lifting belt or corset. It helps to stabilise the pelvis and the lower spine, especially in lifting movements, as well as containing and supporting the internal organs (http://en.wikipedia.org/wiki/Transversus_abdominis - cite_note-Hodges-0). Training the rectus abdominis muscles alone will not give one a flat belly; this effect is more closely approached through strengthening the TVA.

How it works in yoga

- In a backbend, such as Urdhva Dhanurasana (Upward Bow Pose), contracting the TVA lightly (drawing the abdomen smoothly inward) compresses the abdominal contents around the lower spine, and helps to prevent over extending the lower spine. This action is far preferable to its alternative of tucking the tail, which in fact destabilises the sacroiliac joint in backbends and prevents the other abdominal muscles from fully stretching, as they should in this pose. This action is in fact an example of applying Uddiyana Bandha, upward abdominal lock, during asana practice.
- It could also be said that the TVA is a major muscle in creating the physical action of both Uddiyana Bandha and Mula Bandha or root lock.

How to strengthen the TVA

Abdominal compressions

Start with the knees bent, and the feet hip width apart. Place the right hand onto the abdomen below the navel. Stabilise the pelvis; press downward through the top of the sacrum into the floor (refer figure 3). Take a smooth inhalation, allowing the belly to relax. As you exhale, firm the abdomen and pull it smoothly in towards the spine. Repeat 10 times (refer figure 4).

Lolasana variation with blocks

Sit on the floor in Dandasana (Staff Pose), with the blocks a little forward of the hips. Place the hands on the blocks, with the fingers curled over the front edges. Bend the knees and cross the ankles, with the feet pointed down to the mat and the toes off the floor. Lean forwards enough that you have your weight resting on your palms. Inhale. As you exhale, try to lift the buttocks from the floor. Lift up out of the shoulders. Keep the chin in (refer figure 5).

Stay in the pose for three to five seconds, then rest. Repeat three times.

3.



Figure 3. Abdominal compressions - inhale position

4.



Figure 4. Abdominal compressions - exhale position

5.



Figure 5. Lolasana variation with blocks

Some important muscles that work in synergy with the abdominal muscles

Synergists are muscles that help prime movers perform their movement, either by adding extra force, or by reducing unnecessary movement as the prime mover contracts.

Iliopsoas

The iliopsoas muscles consist of the iliacus muscles, which run from each inner thigh bone to the inside, top rear of the pelvis, and the psoas muscles, which run from the inner thigh bone, through the pelvic girdle and attach to the sides of the lumbar spine. They are called the iliopsoas muscles because they share the same tendon at their origin at the inner thigh bone, close to the hip joint.

The psoas group of muscles assist the abdominals in forward bending movements of the trunk, especially when attempted from lying down on the back. Sit-up style movements often result in a sensation of tightness or pain in the groin area; this is an indication of how much work the psoas have been doing to assist in lifting the torso from the floor. They also contract eccentrically (in a lengthened position) to put the breaks on, as we lower the trunk back down again from a sit-up, or lower the legs

back down during leg raises. If the abdominal muscles are not strong, the psoas often takes over their work. Generally, the problem with the psoas is one of being too tight.

Balancing the work of the psoas and abdominal muscles

In order not to rely on the work of the psoas in leg raises and sit-up style movements, make sure that the top of the sacrum remains on the floor throughout the movement. Do this by drawing the abdomen smoothly in on the exhalation, and keep pressing strongly down through the top back of the pelvis. Don't allow the lower back to move into a deeper arch during any part of the movement. These actions will not only balance the work of the abdominal muscles and the psoas group, but also protect the lower back.

Quadratus lumborum

The quadratus lumborum are a pair of muscles, one on each side of the trunk and are important trunk stabilisers. They run from the inside edge of the top back of the pelvis to the lumbar vertebrae and the lowest back rib. It would be pointless having a corset

that only ran in a semicircle around the front of the waist; so it is with the muscles of the body in terms of stabilising the lower spine and pelvis. We need as much strength around the back of the waist as through the front. Both quadratus lumborum and the abdominal muscles lightly contract to help lift and support the lower spine in standing, and more strongly contract to protect the lower spine in backbends. Even in forward bends, keeping the quadratus lumborum lightly contracted as we move into the pose helps to lift out of the lower back and prevent the lumbar spine collapsing.

Strengthening the quadratus lumborum

Modified Salabhasana (Locust Pose)

Lie face down on the mat, with the forehead on the floor and the arms down by the sides. Have the backs of the hands pressing down into the floor. Inhale, and as you exhale press down through the tops of the feet and the backs of the hands, and try to lift the chest just off the floor (refer figure 6). Hold for five breaths if comfortable, and then relax. Repeat three times.



Figure 6. Modified Salabhasana

Adductors

The work of the inner thigh muscles (adductors) also helps to stabilise the hips, thus helping the abdominal muscles and lower back muscles to provide central stability. If the adductors are not strong, the thighs will roll outward in both forward bends and backbends, changing the tilt of the pelvis and the dynamic of the pose.

The adductors' main job is to work the inner thighs inwards in these postures. If the legs roll apart in Paschimottanasana, the pelvis will roll backwards, leading to the front of the spine collapsing. This is also clearly seen in inversions. In a posture such as Sarvangasana, for example, the

work of the adductors to keep the legs together is an important part of the lift out of the waist that achieves the final upright pose and stabilises the hips.

Strengthening the adductors

Work to keep the inner line of the legs together in seated forward bends and inversions. In a backbend such as Setu Bandha Sarvangasana (Bridge Pose), use a block between the inner thighs and squeeze it as you lift up into, roll down out of, and stay in the pose.

See AYL issue 32 Bio Mechanics of Backbends article.

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Flo's focus is on finding natural ease within the postures, and on cultivating an ever deepening awareness of the relationship between the body, the breath, and our state of mind. She specialises in 'paring back' each pose and starting always from a point of full awareness of the essential foundation of each posture. Flo runs classes, workshops, retreats and teacher trainings. www.intouchyogabyronbay.com




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