Pilates and riding
II. Postural Support

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Drawn figures by Sandy Johnson

In the first article of this series, I described pilates and how it can be used to enhance mental focus by using a specific breathing technique. This article will consider posture and postural support of the rider. In essence, this is the torso of the rider. The bones and muscles of the torso will be described as well as pilates-based exercises that enhance support of the rider's torso. Effective postural support is vital to developing a stable position on horseback with independent and harmonious aids.

Posture and alignment

Good posture is the proper alignment of the vertebrae of the spine. Figure 1 shows that the spine is a series of stacked bones or vertebrae. These bones are not stacked in a straight line, but form curves at the neck, or cervical spine, the mid-back or thoracic spine, and at the low back, or lumbar spine. The presence of these curves promotes shock absorption and mobility. The end of the spine is the sacrum; 5 fused vertebrae. The sacrum forms the back of the pelvis. For purposes of our discussion, the pelvis will be considered a solid ring of bone. It is designed to disperse the weight of our upper body onto our legs and similarly help with shock absorption from our legs pounding the pavement. The lowest part of the pelvis, the ischial tuberosities, or seat bones, is the part of the pelvis we feel when seated in the saddle or on a firm surface. The ribcage is formed by curved bones attached at the thoracic vertebrae and the sternum. The ribcage serves to protect vital organs (heart and lungs) from trauma. Since the spine is connected to both the pelvis and the ribcage, position of the spine affects the position of these other bones and vice versa. When the spine is in correct posture, this position is called "neutral spine" or "neutral pelvis" (Fig 2). When the spine is arched or extended, either the top of the pelvis tips forward and/or the sternum lifts up; the distance between the pelvis and ribcage in front increases (Fig 3). When the spine is rounded or flexed, the top of the pelvis tips back and/or the sternum dips down; the distance between the ribs and pelvis in front decreases (Fig 4).

Figure 1. The spine

Figure 2. Neutral spine in the saddle.

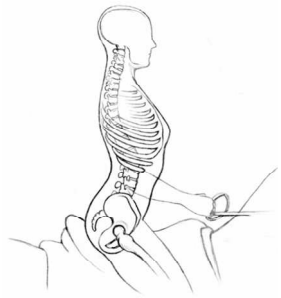


Figure 3. Too much arch (extension) in the spine..

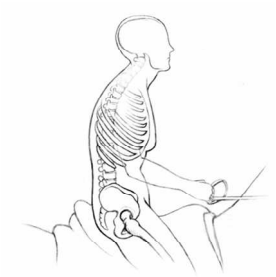


Figure 4. Spine is rounded or flexed.

A large focus of pilates is teaching awareness of the proper alignment of the spine and pelvis within each individual. This is first taught in exercises lying on the back, where one is able to feel how the bones of the spine and pelvis are aligned. Then, exercises challenge this awareness in the upright position.

Awareness of optimal spine and pelvic alignment is important as it is the most efficient position for the body to find balance. In fact, in the absence of spinal or muscular abnormalities, while at rest, the position of proper posture can be achieved with minimal muscle work. However, while on a moving horse, preservation of posture requires muscle activity. The deep muscles of the abdomen and the back are vital to supporting good posture. These muscles work cooperatively to keep the trunk upright and balanced by creating a deep, elastic wrap for the spine. Riders able to use these deep postural muscles to preserve balance are less likely to have excessive tightness and gripping of the muscles of the thigh and shoulder.

Muscles of the torso

The two deepest layers of abdominal muscles are the most important for postural support. They include the transversus abdominis and the internal oblique. The transversus abdominis is depicted in Figure 5. Note that its fibers run across the body. As muscle

fibers only shorten when they contract, using this abdominal muscle results in a pulled in abdominal wall or belly, as if you are trying to fit into jeans a size to small….. Because this muscle wraps almost all the way around the body, activating this muscle by pulling your belly in creates a corset-like support of your spine and torso. It is the primary muscle activated in last month's exercises describing how to perform the pilates focusing breath. Pulling in the abdominal muscles on the exhale breath activates this transversus abdominis muscle and stabilizes the spine, posture, and balance, preparing you for the next moment of your ride.

The internal oblique muscle is one of three muscles shown in Figure 6. Its fibers run from the rim of the pelvis to the ribcage. As such, its action is to either shorten one side of the torso (side bend) or pull the ribs closer to the pelvis and round or flex the spine (Fig 4). The other more superficial abdominal muscles, the external oblique and the rectus abdominis, are less important for postural support and balance. The rectus abdominis is the most superficial muscle, and when developed creates the "washboard abs" appearance. While this may be an attractive look for some, development of this muscle does nothing for body support and balance!

The deep muscles of the back are as important for postural support and balance as the deep abdominals. Note in Figure 7 that there are many layers of back muscle. The deepest layers span only one or two vertebrae. Activation of the muscles of the back pulls the spine into an arch, or extension (Fig 3) and increases the distance between the ribs and pelvis in front.

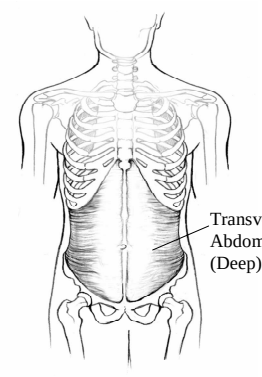


Figure 5. Transversus abdominis muscles

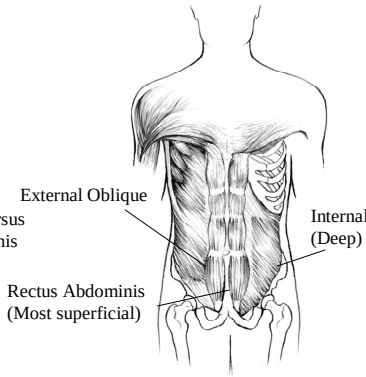


Figure 6. Other abdominal muscles

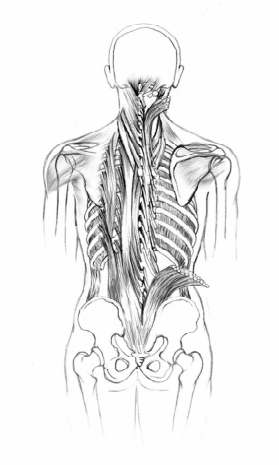


Figure 7. The muscles of the back

From these muscle descriptions you can imagine how balanced use of the transversus abdominis, internal oblique, and the deep back muscles work together to move the spine in all directions as well as stabilize the spine in good posture.

Essentially all of the pilates exercises teach access and function of the deep muscles of the abdomen and back to promote efficient balance. Some directly strengthen these muscles through movement, while others challenge the ability of these muscles to maintain alignment and spine stability during movement of the legs or arms. These approaches are both valuable. The rider develops sufficient muscle connection and strength to stay in good posture and balance on the moving horse, and, use of an arm or leg aid does not disrupt this balance. Truly independent aids are then possible.

Maintaining supported posture on horseback makes your horse's job easier. If you are balanced and centered despite the movement of your horse, the horse can more clearly feel and understand your aids. In contrast, if every step your horse takes puts you in a different position, shifts your weight, causes you to grip with one leg or pull on one rein, the horse will be lost and unable to understand which cues to ignore and which to answer. Our weight on the back of the horse is analogous to a back pack. It is uncomfortable and unsettling to carry a back pack with poor weight distribution. Likewise, a horse that has a

rider sitting always off to one side or always behind the vertical must make adaptations for that rider's imperfect position and balance. These adjustments detract from free, balanced and supple movement of the horse. Very small changes in posture and stability can have dramatic influences on the movement of the horse, both in a positive and negative direction. In times of evasions and conflict while riding, we owe it to our horses to first ask ourselves if our position and balance is the source or contributing to the problem before assuming it is entirely the horse's issue.

A rider with stable and balanced posture while riding looks graceful and supple. I would suggest, however, that like a ballerina, the pleasing look of balance and effortlessness is not easy and takes muscle activity and control. With focus on balance and posture, the rider becomes more attuned to the movement of the horse and can influence the horse's way of going in subtle ways. In the end, good riding becomes energy management of the horse. The horse puts energy into the rider and the rider must not be put off balance by this energy but channel it in the desired way (forward, upward, transitions, etc). Considering that the bulk of this energy management occurs in the rider's trunk or torso, awareness and support of posture and alignment is necessary for efficient and graceful riding.

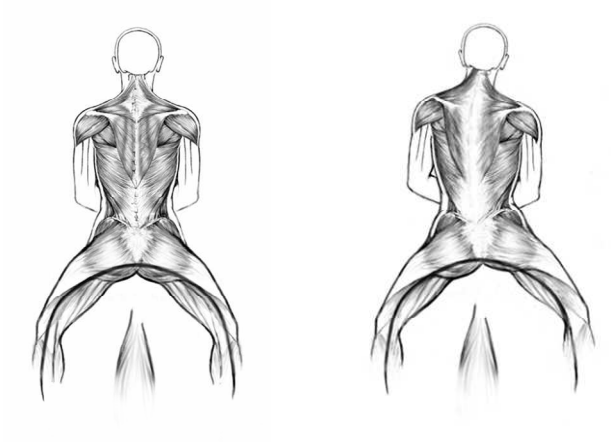
Common postural problems in riders

Many riders use their postural muscles asymmetrically. Some riders may adopt a rounded shoulder position in the saddle (Fig 4). This often stems from spending much of the day at a desk working at a computer in a similar slouched position. It may also be a protective posture. This rider needs activation of the muscles of the back to pull the body in a more upright position. As well, the muscles of the shoulder girdle need to be stretched and balanced – more on this in the next article in this series.

It is not uncommon that a rider, in an effort to "sit up straight with shoulders back", develops too much tone in the muscles of the mid- and upper back and pulls the spine into extension (Fig 3). This tension can spread to the arms and limit suppleness of the shoulder compromising contact with the horse through the bridle. Connecting to and using the abdominal muscles, in an inward fashion to pull the ribcage slightly closer to the pelvis, helps balance this muscle use. While riders initially feel like they are leaning forward, they soon appreciate the comparative ease with which balance can be maintained by improved trunk muscle balance and function.

Imbalance in these postural muscles can also interfere with side-to-side, or lateral symmetry. When the muscles on one side of the trunk are strong compared to the other, the strong side is shorter, the pelvis and thigh bone pulled up on the strong side, and the rider's weight shifted to the weaker, longer side (Fig 8 – Incorrect alignment). This asymmetry, to a greater or lesser extent, is very common. It is very rare that a rider doesn't have some degree of lateral asymmetry. Sometimes, but not always, it is related to handedness. For example, a right handed person is often stronger on the right side of the body, the right side is shorter, the weight is shifted onto the left seat bone, the right knee tends to be pulled up, and the rider may lose the right stirrup more often than the left. This lateral asymmetry interferes with the balance of the horse. The horse often

falls in the direction of the rider's weight. In our example of a rider with a strong right side, the horse may tend to fall to the outside of the circle while tracking right, and may have difficulty bending and tend to fall to the inside of the circle when tracking left. The rider may have difficulty changing from the right to left rein. The rider may try to "hold up" the horse's left side and keep them from falling to the left with the left rein.



Balanced alignment	Unbalanced alignment
• Right and left sides equal	• Right side shortened
• Weight is even	• Weight to left
• Shoulders are level	• Left shoulder high
• Seat bones level	• Right seat bone lifted

Figure 8

This right-to-left asymmetry is sometimes described as collapsing; that is, the rider is collapsing to the short side. I think that is not a good term to use, as "collapsing" implies passivity. This imbalance is anything but that on the short "collapsed" side. The short side is the overactive and strong side; the long, weighted side is the side that is "on vacation" and not doing its part to help the rider balance. Also, sometimes the rider is encouraged to "put weight in the lifted side of the pelvis or seat bone." But, since muscles only shorten and pull to move bones, there is no way to push the seat bone down onto the saddle. This asymmetry is best corrected by thinking of shortening the trunk muscles of the longer, weaker side and taking weight off of the heavily weighted side of the pelvis. This helps balance the muscle tone of the sides of the trunk and equalize the weight distribution over the pelvis in the saddle.

Exercises:

1. Postural awareness - Finding neutral alignment

Lay on the floor or a mat, knees bent, feet flat on the floor seat bone distance apart. Release the muscles of your back and let the weight of your body sink onto the floor (don't press any part of your back onto the floor). Now note where you feel the weight of your body contact the floor. When the spine is in neutral alignment with its normal curves, weight contacts the floor at:

The back of the pelvis
Around the shoulder and shoulder blades
The back of the head

There is little or no weight contacting the floor:

Behind the waist
Behind the neck

This describes the normal curves of your spine. Everyone is slightly different, but the back is not completely flat.

This exercise is valuable to introduce good posture and what it feels like in each individual.

2. On the mat – pelvic rocking

Lay on the floor or a mat, knees bent, feet flat on the floor seat bone distance apart, in neutral alignment. Take an easy inhale breath, breathing into the lateral ribcage. On the exhale breath, scoop in the abdominal muscles to rock the top of the pelvis toward the floor (pelvic tuck) flattening the low back. On the next inhale breath rock the top of the pelvis forward, arching the back slightly so that the low back comes off the floor. Slowly alternately flatten and arch the low back 6 to 8 times, inhaling as you arch the spine, exhaling as you flatten the spine onto the floor. Gradually decrease the range of motion until, like a pendulum, the low back comes to rest. Is this position different from how you started?

3. Sitting on an exercise ball – pelvic rocking front to back

Start by sitting upright on an exercise ball with your feet flat on the floor, hip width apart (Ex 3A). You may need a colleague or a mirror to check that you are in neutral spine alignment with your shoulders aligned over your pelvis and your seat bones pointing straight down. Take an easy inhale breath and as you exhale, scoop in the abdominal muscles to rock the pelvis into a tuck pointing your seat bones toward your heels, and flattening the low back (Ex 3B). Allow the shoulders to follow the movement, do not lean back. Inhale and use the deep back muscles to rock the pelvis back so that there is a slight arch in your spine and your seat bones point toward the back of the ball (Ex 3C). Exhale and tuck the pelvis underneath you again, and inhale to point the seat bones behind you. Rock back and forth between these positions 6 to 8 times, gradually settling to the middle of the movement, in neutral spine alignment. Concentrate on using the muscles of the torso to move the pelvis front and back. Try not to use your leg muscles to move the pelvis. This exercise you should help you feel grounded with your weight centered over the pelvis, efficiently balanced on the exercise ball.

#3 On an exercise ball, pelvic rocking front to back

A. Neutral

B. Tuck

C. Arch

4. Sitting on an exercise ball – pelvic rocking side to side

Sit on the exercise ball in neutral alignment (Ex 4A). Place your hands on your waist – this helps you feel the muscles of the trunk engage during the exercise. Lift up one side of the pelvis, or seat bone (engaging the trunk muscles on that side) while sinking weight onto the other seat bone. Imagine that you are shortening the distance between the arm pit and the pelvis on that side. Come back to start position, and repeat on the other side (Ex 4B&C). Do 8 to 10 swings side to side.

Most have one side for which this exercise is straightforward (the strong side), and one side for which it is not (the weaker side). (You can probably see it is easier for me to the right!) Feel what happens on the side that is easy. Try to duplicate this on the other side.

Be careful to not shift the shoulders to the side, or twist the body. The motion is a small side to side movement of the pelvis by the trunk muscles. Try not to use the gluteal muscles to move the pelvis.

#4 On an exercise ball, pelvic rocking side to side

A. Neutral B. Rock to Right C. Rock to Left

The purpose of exercises #2 - #4 is to learn what the different positions of the pelvis feel like, and to learn to use the muscles of the torso (back and abdominal muscles) to adjust the position of the pelvis. It is not uncommon that a rider needs to alter the position of the pelvis in the saddle. It is much more effective to adjust the pelvis by using the muscles of the torso, but most try to do so by using the muscles of the legs (particularly the gluteal, or butt muscles). But if the leg muscles move the pelvis, they have become involved in posture and postural support and are not available for leg aids. It is very important for riders to make adjustments in their posture or position of the pelvis using muscles of the trunk.

5. Sitting on an exercise ball – side twist

Sit upright on an exercise ball, feet on the floor, hip width apart. Lift your arms up and hold them in a big circle, as if you were holding a huge ball. Take an easy inhale breath, and on the exhale breath rotate your upper body to the right, then inhale back to center and exhale while you rotate your upper body to the left and inhale back to center. Repeat this twist or rotation of the spine 6-8 times each direction.

Be sure that you keep your seat bones equally weighted during this exercise. It is tempting to sink onto the seat bone on the side opposite the direction of the twist. Try to

feel if you do that, and if so, keep that seat bone lifted so that your weight stays in the middle of the ball throughout the movement.

This exercise helps you learn that you can move your upper body independently from the lower body. This allows you, while riding your horse on a circle, to keep your shoulders in line with the horse's shoulders and at the same time keep your weight balanced over the horse's back.

6. Abdominal strengthening – abdominal curls on the mat
Lay on the floor in neutral spine alignment, knees bent, feet flat on the floor seat bone width apart. Place your hands behind your head or neck. Take a normal breath in and as you exhale, scoop in your lower abdomen, and peel your upper body off the floor in a curl. Inhale as you roll back down. Repeat 10 to 15 times.

Keep the abdominal muscles scooped in as you curl up. Keep your fingers soft behind your head; don't pull yourself up with your arms. Don't push your low back into the mat and tuck the pelvis. Allow the back to lengthen. Don't lead with the chin; keep the back of the neck long. Curl up until just the bottom of the shoulder blades touches the floor, or less. Keep the movement smooth, not jerky. Keep the breaths flowing throughout the movement.

#6 Abdominal curls

Abdominal Curls – variations

Table top legs

With rotation

Done this way, this exercise strengthens the deep abdominal muscles. If the abdominal muscles bulge out, you are using the more superficial muscles of the abdominal wall, and the exercise is less useful.

To make the exercise more challenging, you can lift your feet off the floor so your legs are in a "table top" position with the hip and knee joints at right angles. Or, you can extend your legs out straight at about a 45 degree angle with the floor. Use caution with this leg position, however. If you don't have adequate support from the deep abdominal muscles pulling in, the weight of the legs can cause a strain on the low back.

Another variation, in any of the above leg positions, is to add a slight rotation at the top of each curl, alternating the direction of the rotation with each curl. Think of bringing the lower ribcage to the opposite side of the pelvis. Do 5 to 10 each direction

7. Abdominal strengthening – abdominal curls on an exercise ball

Sit upright on the ball in neutral alignment; fold your arms across your chest. Take an easy inhale breath and on the exhale breath scoop in and engage the lower abdominal muscles to tuck the pelvis and move the ball towards your feet, while your upper body rounds back. Take a quick inhale, and on the next exhale breath curl back up to sitting using the abdominal muscles to pull the ribs down towards the pelvis to pull you upright.

Repeat 8 – 10 times. At the start of the exercise feel your lower abdomen push through to the spine and the surface of the ball to control your curling back. Do not start the curls by throwing your shoulders and upper body back. Let the shoulders fall forward slightly with the movement. The further back you roll, the harder the exercise.

#7 Abdominal strengthening
abdominal curls on the Exercise Ball

8. Back muscle strengthening – spine extension on the mat

Lay on the floor on your stomach, your forehead on a towel. Place your arms by your side with palms up. Take an easy inhale and on the exhale breath pull your abdominal wall up off the floor (this should not be a visible movement – just a pulling in of your abdomen). On the next inhale breath, reach your shoulder blades back and down and slowly raise your upper body off the floor. The muscles to raise your upper body should be the deep muscles of the mid and upper back. Exhale as you rest the upper body back down, repeat 6 to 8 times.

Initiate the movement with the shoulder blades coming back and down towards the center of your body, not from the neck. Feel that you keep your head and neck in alignment with the rest of the spine. Feel as if the back is getting longer, reaching away from the pelvis.

#8 Back muscle strengthening
Spine extension on the mat

If this exercise causes low back pain, reduce the range of motion and seek support from the scooped in deep abdominal muscles, or avoid the exercise until you can get feedback.

9. Back muscle strengthening – spine extension on the ball
Lay on your stomach over the exercise ball, legs extended behind you with toes on the floor. The ball should rest mostly in front of your lower abdomen and pelvis. Bring your hands off the floor and place them on the ball just under your chest. Take an easy inhale breath, and on the exhale breath scoop in your abdominal muscles. On the next inhale breath press your shoulders back and down and lift your upper body up and away from the exercise ball (not completely off of the ball). Rest your upper body back down on the ball on the exhale breath. Repeat 6-8 times.

Keep your abdominal muscles pulled in throughout the exercise to keep your spine supported. Feel like you reach your upper body away from the ball, cantilevering out. Keep your shoulders back and down and your shoulder blades pinching together. Keep your neck long.

The exercise is made more challenging by reaching more of your body away from the ball. A challenging variation is to reach one arm at a time out to the side while you are extended up on the ball. Repeat 2 times.

10. Back muscle strengthening – plank on the ball
Lay on your stomach over the exercise ball. Shift your weight towards your hands, and walk your hands out onto the floor. Lift your legs up behind you so that your body is in a plank-like position, your spine in neutral alignment.

Begin by walking out until your pelvis rests on the ball. Hold this position for several breaths, then release back to laying on the ball. Do this 3 to 5 times.

Keep the abdominal muscles engaged to support the back. Keep the front of the shoulders open; keep the shoulder blades coming back and down, without letting the back arch.

#10 Back muscle strengthening
Plank on an exercise ball

The exercise is made more difficult by walking further out so that the front of the thigh, knee, or lower leg rests on the ball. The further away from the ball you move, the more support from the trunk muscles is needed to support neutral alignment and balance

11. Child's pose back stretch
This back stretch should be done after each spine extension or strengthening exercise (#8-10).

Start on your hands and knees. Sit back toward your heels while stretching your arms overhead. Keep the abdominal muscles scooped in to support the stretch of the back muscles. Hold for several breaths. Walk your hands over to one side, breathe into the stretched ribcage 2-3 times, repeat on the other side.

#11 Child's pose back stretch

The back and abdominal muscle strengthening exercises are just that, and I can't say that there is anything unique about these exercises for riders. Suffice to say that it takes awareness and strength of the abdominal and back muscles to keep balanced on a moving horse.