

# STOTT PILATES®

## FIVE BASIC PRINCIPLES

Using Contemporary Pilates Principles to Achieve Optimal Fitness

By Moira Merrithew, STOTT PILATES® Executive Director, Education

The aim of contemporary, anatomically-based Pilates training, such as STOTT PILATES®, is to develop optimal neuromuscular performance by focusing on core stability, while safely balancing muscular strength with flexibility. Whether performed on a mat or on specialized equipment, Pilates that incorporates modern theories of exercise science and spinal rehabilitation should involve the following biomechanical principles: breathing, pelvic placement, rib cage placement, scapular movement and stabilization, and head and cervical placement. ▶ By introducing these principles and reinforcing them over time, awareness of how the body moves is developed. This mind-body awareness ensures focus on precision and control to realize the full benefits of any exercise program. ▶ The Five Basic Principles that follow are accompanied by simple exercises to help illustrate them.

### Breathing

**BREATHING PROPERLY PROMOTES** effective oxygenation of the blood, focuses the mind on each task and helps to avoid unnecessary tension (particularly in the neck, shoulders and mid-back) during exercise.

Exhaling deeply helps activate the deep support muscles. When inhaling or exhaling, activation of the transversus abdominis helps enable the lumbo-pelvic region to remain stable throughout an exercise.

A three-dimensional breath pattern is encouraged, expanding the rib cage in all directions without neglecting lateral and posterior portions. During exhalation the rib cage closes in and down while the spine flexes slightly. For this reason, an exhale is suggested to accompany and facilitate spinal flexion. During inhalation, the rib cage opens out and up while the spine extends slightly. Therefore, an inhale is suggested to accompany and facilitate spinal extension. An exhale may be suggested during spinal extension in order to maintain abdominal recruitment to help stabilize and support the lumbar spine.

In all exercises, the breath and awareness of stabilization should precede the actual movement.

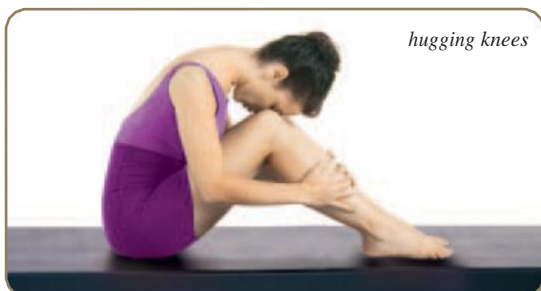
#### EXPERIMENTING WITH BREATHING

##### NOTICING NATURAL BREATH PATTERN

With body supine, breathe smoothly, noticing the natural breath pattern. Is one area affected more than others: the abdominal cavity, upper chest, sides or back of the rib cage?

##### BREATHING WHILE HUGGING KNEES

Sit on a mat, upper body and head rounded forward, hands resting on knees or shins, neck relaxed.



Focus on sending breath into the back and sides of the rib cage. Avoid a shallow breath solely into the upper chest and shoulders. Facilitate this breath pattern on another by palpating the lower posterior-lateral rib cage and encouraging expansion while engagement of the abdominal wall is maintained.

##### ABDOMINAL WALL ENGAGEMENT

The abdominal wall (transversus abdominis in particular), which is a support for the inner organs, also aids in forcing air out of the body as it compresses the abdominal cavity. Contraction of the deep pelvic floor muscles will aid in firing the transversus. Activation of these deep stabilizing muscles should be incorporated into the breath pattern. Feel the pelvic floor muscles gently contracting and lifting. Try seated or on all fours. To feel activation of the transversus, lie in a neutral position and place fingertips just medially to ASIS (anterior superior iliac spine). On an exhale, engage the transversus to draw the abdominal wall gently toward the spine, feeling it become taut beneath the fingers, as the pelvic floor contracts.

Breathing in through the nose and out through the mouth can help regulate the breath and encourage a fuller breath pattern. Exhaling through slightly pursed lips facilitates a deeper contraction of the abdominal muscles.

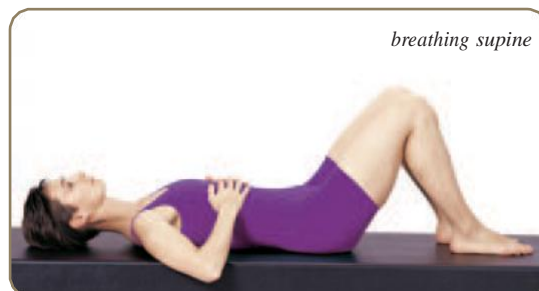
##### BREATHING SUPINE (lying on back)

**Inhale** Breathe in through the nose, expanding rib cage three-dimensionally.

**Exhale** Exhale through pursed lips, focusing first on gentle pelvic floor and transversus engagement. As you exhale more deeply, the obliques will be engaged to help press the air out.

**Inhale** Breathe in through the nose, maintaining engagement, feel lateral expansion of rib cage.

**Exhale** As before.



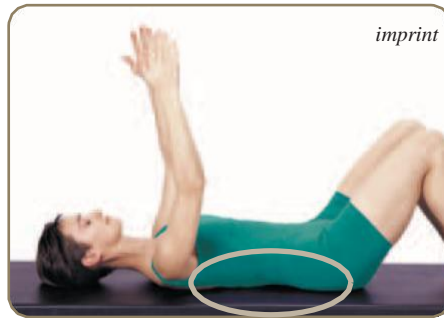
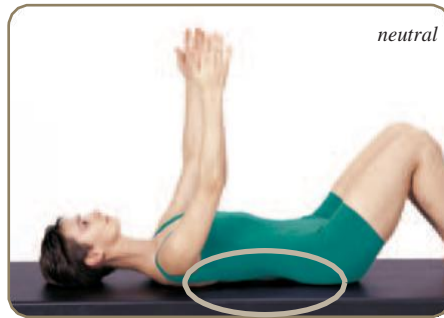
## 2 Pelvic Placement

IT IS KEY TO EMPHASIZE stabilization of the pelvis and lumbar spine both statically and dynamically in all positions and throughout all movements. Two positions often referred to are neutral and imprint. In a neutral position, the natural anteriorly convex curve of the lumbar spine is present. When lying supine, the triangle formed by the ASIS and the symphysis pubis should be parallel to the mat. This is the most stable and optimal shock-absorbing position and a good place from which to promote efficient movement patterns.

Neutral alignment should not be achieved by forcibly arching the back, but rather by allowing the weight of the sacrum to rest on the mat. While breathing, and with the transversus abdominis engaged, no strain should be felt through the spinal extensors in the lumbar area. If muscular tension occurs, shift the pelvis slightly toward a posterior placement. It is more important for the lumbar area not to strain than for the ASIS and symphysis pubis to lie in the same horizontal plane. For example, someone with large gluteals might actually create an exaggerated lordosis in the lumbar spine by trying to have the ASIS and symphysis pubis lie in the same plane.

An imprinted position combines a slight posterior pelvic tilt with slight lumbar flexion. The normal curve of the lumbar spine lengthens toward flexion by engaging the oblique abdominals to approximate the pelvis and the rib cage anteriorly. When supine, the pubic bone will be slightly higher than the ASIS. The pelvis is not so tilted that the sacrum curls off or loses contact with the mat.

It is not necessary to press the lower back all the way into the mat or to tuck under by overusing the rectus abdominis and gluteal muscles respectively.



The degree of contact between the lumbar spine and the mat will differ from person to person.

An imprinted position should be used to ensure stability of the pelvis and lumbar spine, if neutral alignment cannot be stabilized. When there is weakness in the obliques and other abdominals, placing them in this slightly shortened position can help maintain their engagement. This will often be useful when certain postural tendencies are present (for example, lordosis). When one or two feet are secure on the mat or other apparatus in a closed kinetic chain, the pelvis and lumbar spine are ideally neutral. When both feet are

off the floor in an open kinetic chain, the pelvis and lumbar spine should be in an imprinted position at first. Once enough strength has been developed through the abdominal muscles to achieve stability, a neutral position can be maintained in an open kinetic chain.

### EXPERIMENTING WITH PELVIC PLACEMENT

Start supine, with pelvis and spine neutral. Knees flexed, feet abducted hip-distance apart on the mat. Arms long by sides, palms down.

#### ROCKING PELVIS

Rock pelvis through anterior and posterior tilts to explore the range of movement. Neutral position will be somewhere between the two.

#### LEGLIDES

Test stability in a neutral position by sliding one foot along the mat, then drawing it back in. Limit the range of motion to where the lumbo-pelvic region can be stabilized.

**Inhale** To slide foot away.

**Exhale** To return.

#### NEUTRAL TO IMPRINT

**Inhale** Maintain a neutral alignment.

**Exhale** Contract abdominals and imprint.

**Inhale** Maintain an imprinted position.

**Exhale** Return to neutral.

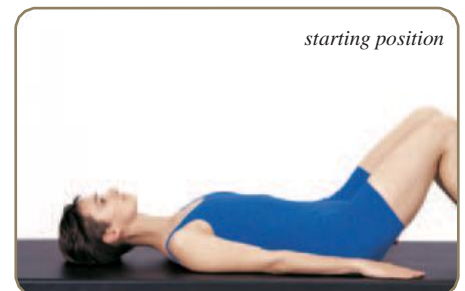
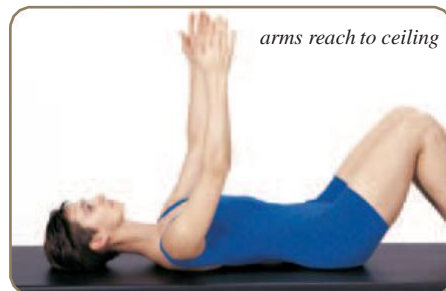
The transversus abdominis remains engaged throughout while the obliques shorten during imprint, and lengthen during return to neutral. Try lifting one or two feet off the floor to test the stability of the imprint.

## 3 Rib Cage Placement

THE ABDOMINAL WALL ATTACHES to the lower ribs. The abdominal muscles must often be recruited to maintain the rib cage, and indirectly, the thoracic spine, in proper alignment. Often the rib cage will tend to lift up in the supine position or deviate forward in a sitting position, extending the thoracic spine. Pay particular attention while inhaling or elevating the arms.

When supine in neutral, maintain a sense of the weight of the ribs resting gently on the mat, neither lifting away nor pushing into the mat. Emphasize breathing three-dimensionally into the rib cage during inhalation.

Allow the two sides of the rib cage to close toward each other during exhalation. Avoid overly depressing the rib cage, which will flex the thoracic spine, possibly extending the cervical spine and may deactivate the transversus abdominis.



# 4 Scapular Movement & Stabilization

**STABILIZING THE SCAPULAE** on the rib cage is as important as contracting the abdominal muscles during the initiation of every exercise. When stability is absent, there is a tendency to overwork muscles around the neck and shoulders.

Be aware of scapular stabilization at all times, whether there is movement of the arms and spine or not. Since they lack a direct bony attachment to the rib cage and spine, the scapulae have a great deal of mobility. In making a greater range of motion available to the arms, the scapulae can glide upward, downward, inward and outward, and can also rotate upward or downward.

Although the scapulae move with the arms, a sense of stability, not rigidity, should always be maintained. Keep the feeling of the ears reaching away from the shoulders, even though they may actually be elevating, as is the case when the arms lift overhead. A sense of width should be maintained across the front and back of the shoulder girdle. The shoulders should not be allowed to overly round forward or squeeze completely together. The scapulae should lie flat on the rib cage and glide across it without coming away from it.

Be aware that an individual's neutral placement of the scapulae may be slightly different from their natural resting position. An ideal working alignment must be established for each individual.

## EXPERIMENTING WITH SCAPULAR MOVEMENT AND STABILIZATION

Start supine, with pelvis and spine neutral. Knees flexed, feet abducted hip-distance apart on the mat. Arms long by sides, palms down.

### SCAPULA ISOLATIONS

(ELEVATION, supine)

**Inhale** Elevate scapulae, lifting shoulders toward ears.

**Exhale** Return scapulae to neutral, sliding shoulders down away from ears (avoid rounding shoulders forward as they slide down).

### SCAPULA ISOLATIONS

(DEPRESSION, supine)

**Inhale** Depress scapulae, drawing shoulders away from ears.

**Exhale** Return scapulae to neutral.

### SCAPULA ISOLATIONS

(PROTRACTION, seated or supine)

**Inhale** Protract scapulae, widening between shoulder blades.

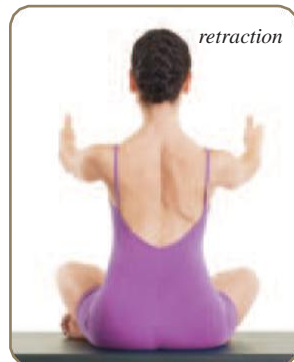
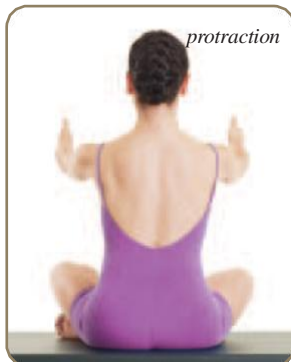
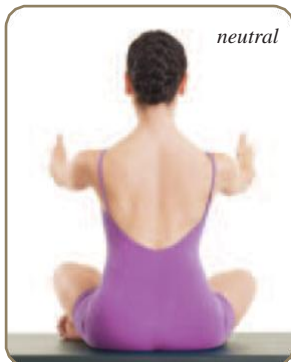
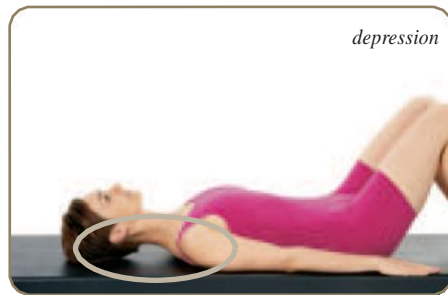
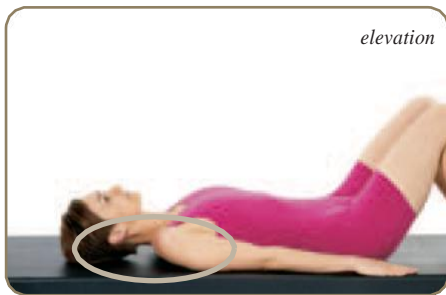
**Exhale** Bring scapulae back to neutral, with feeling of opening collarbone.

### SCAPULA ISOLATIONS

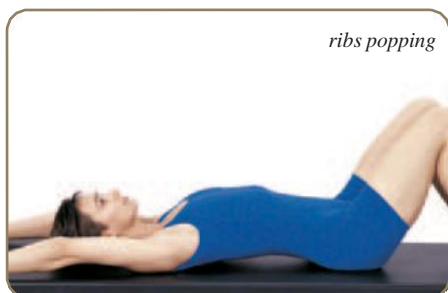
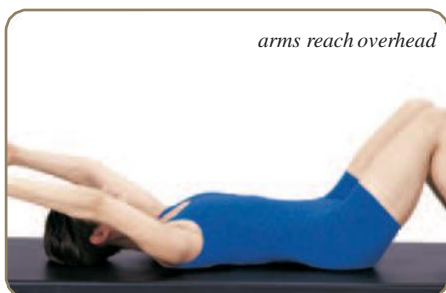
(RETRACTION, seated or supine)

**Inhale** Retract scapulae, bringing shoulder blades closer together.

**Exhale** Bring scapulae back to neutral.



When flexing, the rib cage will slide toward the pelvis anteriorly. When extending, allow the rib cage to open to facilitate thoracic extension. It is important to not completely relax the abdominals during extension, otherwise a loss of spinal stability will result.



## EXPERIMENTING WITH RIB CAGE PLACEMENT

Start supine, with pelvis and spine neutral. Knees flexed, feet abducted hip-distance apart on the mat. Arms long by sides, palms down.

### ARM RAISES

**Inhale** Reach arms to the ceiling, palms facing one another.

**Exhale** Reach arms overhead, only as far as abdominal connection and contact between the rib cage and mat can be maintained.

**Inhale** Reach arms to the ceiling.

**Exhale** Lower arms down by sides.

# 5 Head & Cervical Placement

THE CERVICAL SPINE SHOULD hold its natural curve and the skull should balance directly above the shoulders when sitting in neutral. This position should also be maintained when lying on the back. If there is a kyphosis or forward head posture, pads or pillows under the head may be necessary in a supine position to prevent the cervical spine from overextending.

In most instances, the cervical spine should continue the line created by the thoracic spine during flexion, extension, lateral flexion and rotation.

Cervical flexion should begin by lengthening the back of the neck. This is referred to as crano-vertebral flexion. Avoid jamming the chin into the chest. There should

be enough room between chin and chest to fit a small fist. Once crano-vertebral flexion and scapular stabilization are established, the upper torso can be flexed by contracting the abdominals to slide the rib cage toward the pelvis. When flexing the upper torso, focus on creating an even flexion through the thoracic and cervical spine.

When extending the upper torso, focus on creating an even extension through the thoracic and cervical spine. Avoid creating overextension and compression in the cervical area.

## EXPERIMENTING WITH HEAD AND CERVICAL PLACEMENT

Start supine, with pelvis and spine neutral. Knees flexed, feet abducted hip-distance apart on the mat. Arms long by sides, palms down.

### CRANIO-VERTEBRAL FLEXION

(also known as Head Nods)

**Inhale** Drop eye focus slightly, tipping head forward and lengthening back of neck. Leave head on the mat.

**Exhale** Return to neutral.

### MODIFIED ABDOMINAL PREPARATION

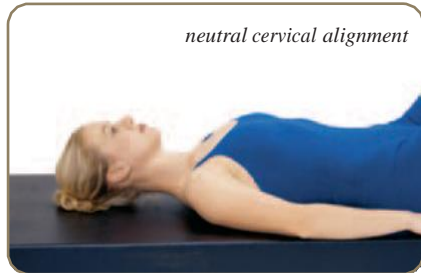
**Inhale** Lengthen back of neck.

**Exhale** While maintaining length through back of neck, stabilize scapulae, then flex thoracic spine.

Maintain neutral pelvis throughout the exercise, ensuring engagement of transversus abdominis.

**Inhale** Hold flexion by maintaining abdominal contraction while back and sides of rib cage expand. Maintain length in back of neck.

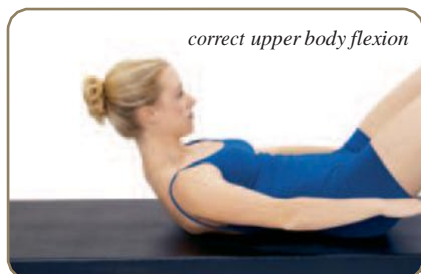
**Exhale** Return upper body to the mat, allowing cervical spine to return to neutral once head is on the mat.



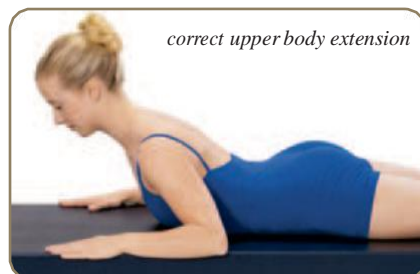
neutral cervical alignment



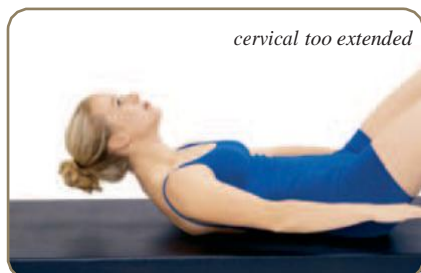
crano-vertebral flexion



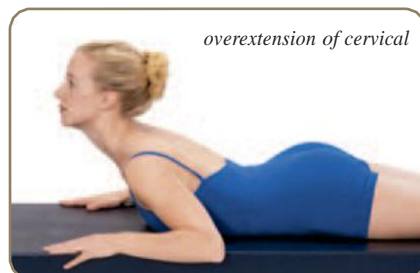
correct upper body flexion



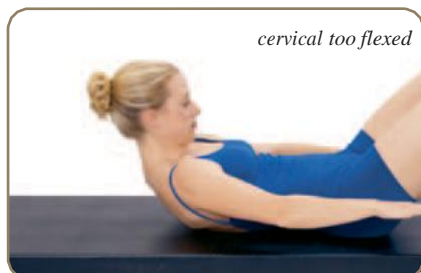
correct upper body extension



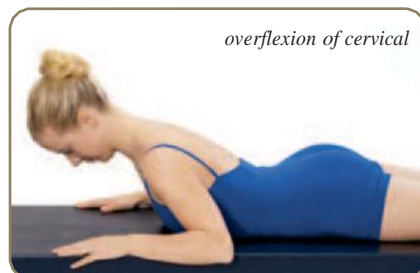
cervical too extended



overextension of cervical



cervical too flexed



overflexion of cervical

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