



The Art and Science of Contrology

Traditional Pilates

Simona Cipriani



Mat & Small Apparatus
Exercises for Pre-Pilates
& Beginner Levels



Workout Exercises

PRE-PILATES MAT (CHAPTER 4 – WEEKS 1-12):

1. Prep – Hundred / Lower Body
2. Prep – Hundred / Upper Body
3. Prep – Hundred
4. Prep – Roll Back Halfway
5. Prep – One Leg Circle
6. Balance Like a Ball
7. The One Leg Stretch
8. The Double Leg Stretch
9. The Pelvic Lift
10. Rocking
11. The Spine Stretch

PRE-PILATES SMALL APPARATUS (CHAPTER 5 – WEEKS 1-12):

MAGIC CIRCLE:

1. Inner Thigh
2. Arms on Back

THERABAND™:

3. Hamstring Stretch
4. Seated Dorsiflexion and Plantarflexion

TRANSITION TO STANDING:

5. Kneeling Front Stretch

WEIGHTS:

6. 90-Degree Halfway Curl Forward
7. 90-Degree Halfway Curl Sideways
8. Low Curl

WALL:

9. Small Arm Circles
10. Roll Down
11. Squat
12. Spider
13. Prep for The 2x4
14. Sciatica Stretch

ENDINGS:

15. Swedish Bars Stretch Forward with Armchair
16. Walking

BEGINNER MAT (CHAPTER 6 – WEEKS 13-24):

1. The Hundred
2. The Roll Up
3. The One Leg Circle
4. Rolling Back
5. The One Leg Stretch
6. The Double Leg Stretch
7. The Spine Stretch

BEGINNER SMALL APPARATUS (CHAPTER 7 WEEKS 13-24):

WEIGHTS:

1. 90-Degree Curl Forward
2. 90-Degree Curl Sideways
3. Low Curl

WALL:

4. Arm Circles
5. Roll Down
6. Squat

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ELONGATION AND ARTICULATION OF THE SPINE

Elongation is a concept that we use in Contrology to describe a healthy spine that is strong and flexible, so that it has the ability to lengthen as we exercise. *Articulation* describes the ability of the spine to move at each and every one of its joints; the ability to move *one vertebra at a time* (**Figure 1.11**).

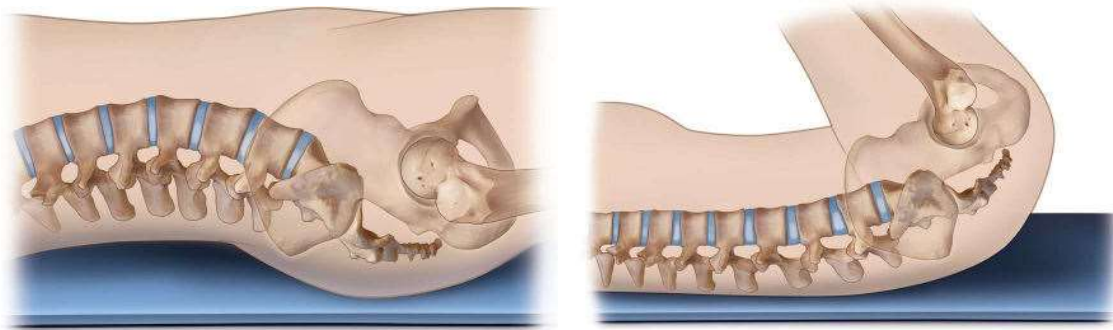


Figure 1.11. Elongation and Articulation of the spine.

Before we are born, our entire spine is in the primary C-curve of flexion, and only later do we develop our secondary spinal curves of extension in the low back and neck (**Figure 1.12**). These secondary curves allow us to be supported in an upright position so that we can balance the weight of our trunk over our hips and the weight of our head over our trunk. When at birth we are released from our confined prenatal environment into a spacious world, our spines begin to uncurl, straighten, and extend. As we live in this new environment, we instinctively and developmentally begin to stretch and strengthen our spine as we learn to roll, crawl, sit, stand, and walk. This natural process of straightening and moving from a C-curve to S-curves shows how intimately human development is connected with healthy movements of the spine. Also, our development coexists with forces of resistance. Even as a fetus, you grow with the resistance of water (amniotic fluid) and after we are born, we engage with the resistance of gravity as we learn to support ourselves and move.



Figure 1.12. We are born with one C-curve to our spine. As we grow, we develop S-curves.

However, during the course of our life, because of dysfunctional postures, weakness of spinal musculature, and the compression of gravity, it is common for the spine to begin to collapse; the normal healthy curves of the spine become excessive and the joint spaces decrease. Unfortunately, this process tends to increase as we get older.

In order to relieve this collapse of the spine, Joseph Pilates designed many Contrology exercises to be done with a straight back, to temporarily lessen or reverse the curvatures of the spine and add more space into the joints. He knew that in order for your spine to be malleable, you need to decompress it by lengthening and/or reversing whatever static postures you assume and dynamic motion patterns you perform. Working with a straight spine during many of the exercises during the Contrology session is a necessary first step toward increasing not only flexibility of the spine, but also its strength. There is a famous quote of Joseph Pilates that describes this idea: “A man is as young as his spinal column.”

Articulation involves the idea of the spine being flexible, but describes this idea more specifically, referring to the movement within the spine between each two vertebrae. It involves the idea of sequential motion from one end of the spine to the other, from the pelvis through the lumbar and thoracic regions, up to the neck and head; or perhaps in the opposite direction from the head to the pelvis (**Figure 1.13**). We can think of the spine as a series of separate elements, a chain of links, with the goal being to move this chain spatially and temporally, one link after the other.



Figure 1.13. Articulation of the spine during The Spine Stretch exercise.

In Contrology, we learn how to neurologically connect with each level of the spine; how to have more control within a specific region; and how to move each individual vertebra relative to the adjacent vertebrae. This allows us to have the freedom to move the spine in all directions, flexing and extending forward and backward, side-bending left and right, twisting to each side, as well as a translationally gliding. And this concept of articulation can be expanded to include not only the joints of the spine, but all joints of the body, including the upper and lower extremities.

It is important to thoroughly understand and master these concepts, because they are building blocks of the foundation of movement. By discovering elongation and articulation, we create a strong and flexible spine, allowing us freedom and grace of movement, and placing us in a balanced state of physical health.

RESISTANCE

All exercises are technically resistance exercises given the presence of gravity; so, of course, you are already working with resistance every day of your life. However, you may have lost sight of what the resistance of gravity does to your posture as well as how you might be able to use gravity to your advantage. When you start a new program like Contrology, your attention and awareness of the new movements will reawaken in you the natural way of learning correct movement patterns and a healthy relationship with gravity. This can be done with exercises that make use of the resistance of gravity, primarily Mat exercises. However, small Contrology Apparatus exercises can add in further resistance with the use of weights, bands, and Magic

Circle; and large Contrology Apparatus makes use of springs (**Figure 1.14**). With this added resistance, the mind must have a greater focus to learn to control the movement of the body against the additional resistance force.

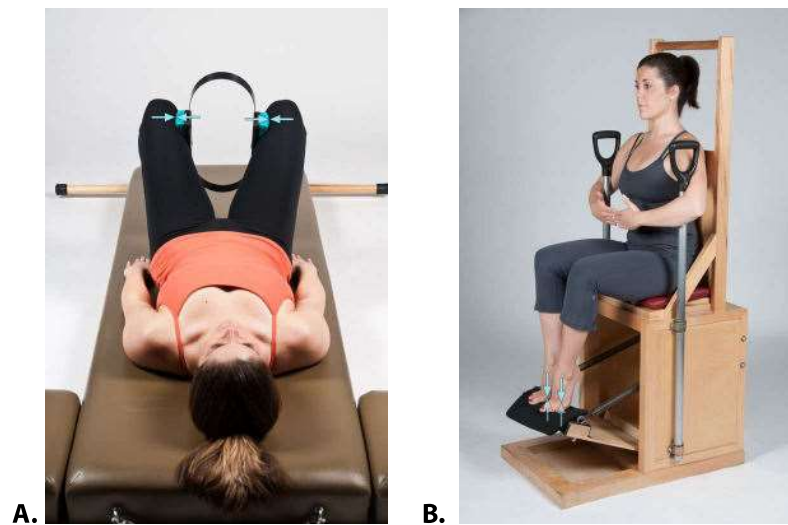


Figure 1.14. Exercises with added resistance. **A**, The Magic Circle. **B**, The Electric Chair.

Learning to adjust to changes with resistance actually begins at the moment of birth. Floating in the amniotic fluid, the human infant does not experience the force of gravity, but the infant does experience the resistance of the amniotic fluid with each movement that is made. Once the child is born, the infant must now adjust to the presence of gravity, as well as the decreased resistance that air presents. Further, the infant in the womb does not need to breathe, but upon entering the world, taking the first breath requires a coordinated control of the muscles of respiration.

What is it that is unique about Contrology that helps you understand this work deep in your body? For many people, it is working with resistance, whether it is the resistance of gravity on the Mat, or the added resistance of the small and large Apparatus. With this resistance, as well as imagery, verbal cues, and tactile guidance from the teacher, you are able to sense the work deeper in your physical body as well as your neurosomatic map, which can be very instructive and revealing.

OPPOSITION

A highlight of Contrology is that most exercises feature alternating patterns of movement; this concept is known as *opposition*. If there is a forward movement, there is a balancing movement backward (**Figure 1.15**). If there is a twisting to the right, there is a twisting to the left. If there is a compression, there is a lengthening and opening up. In this way, Contrology involves finding a symmetry by working with a balance between alternating patterns that involve opposite directions of motion through space.



Figure 1.15. Swedish Stretch exercise on the Ladder Barrel.

Contrology does not only work with opposite directions of motion through space, it also works with opposite motions within the body. This involves reaching two parts of the body away from each other. Opposition within the body is not very evident in Pre-Pilates and Beginner Pilates because at these levels, most exercises focus on stabilization of one body part, usually the proximal core, as another body part, usually a distal extremity or extremities, move. However, as your work deepens and you progress to Intermediate and Advanced exercises, the opposite motion patterns within the body will become more evident (**Figure 1.16**).



Figure 1.16. The Bicycle, an advanced Contrology exercise.

However, even at these Pre- and Beginner levels, there is an underlying engagement of musculature toward these oppositional directions. An excellent example of opposition within the body, as well as the increased challenge of opposition from early to more advanced levels of Contrology, is The Double Leg Stretch exercise. The **Starting Position** of The Double Leg Stretch is identical regardless of the level (**Figure 1.17A**). However, in Pre-Pilates and Beginner levels, during the movement of the legs, the arms are down against the body (**Figure 1.17B**), but in the Intermediate and Advanced levels, the arms move in the opposite direction of the legs (**Figure 1.17C**). The arm movement in the Intermediate/Advanced exercise is clearly away from the legs. However, even in the Pre- and Beginner levels, there is an engagement of the musculature of the core pulling away from the legs: the legs are reaching up and out toward the front wall as the spine is pressing back and down against the Mat.



Figure 1.17. Double Leg Stretch exercise. **A,** Starting Position. **B,** Pre-Pilates/Beginner level. **C,** Intermediate/Advanced level.

INTEGRATION

We have been discussing these fundamental concepts of Contrology as separate pieces, but in reality, they are all intertwined. Elongation and articulation of the spine are not possible without the concept of opposition. The spine elongates and decompresses by the creation of opposite forces downward and upward within the spine, lengthening the ends away from each other. And elongation, decompression, articulation, and opposition are not possible without

Flow

By practicing Contrology movements over time, we develop the proper *flow* with which we perform each exercise. However, our flow is more than just the proper performance of an individual exercise, it also involves how we as Contrology practitioners connect and transition one exercise to the next. The gracefulness with which we perform the exercises and their transitions involves the coordination of our muscle memory with the rhythm of our breath (**Figure 1.31**).



Figure 1.31. Flow of movement is another one of the Six Principles of Contrology. **Figure A** shows the transition flow from the Mat exercise, the Mermaid, to the next exercise, the Boomerang. **Figures B-I** show the graceful flow of the Boomerang. **Figure J** shows the transition flow from the Boomerang to the next exercise, the Seal.

The flow of performing an exercise and the transitions between exercises are an external view of the Contrology routine. However, there is also an internal flow within the body that we do not see, which Joseph Pilates referred to as the *internal shower*. Actually, the internal shower involves many internal flows... the movement of: arterial and venous blood, lymphatic fluid, fluid within the cells and the spaces between the cells, synovial joint fluid, and cerebrospinal fluid. There is even a movement and flow of the internal visceral organs. Each Contrology exercise has an effect on these flows, rejuvenating the health of the body.

THE MUSCULAR SYSTEM

MUSCLES

A muscle is an organ that is specialized to be able to contract, thereby creating a pulling force (muscles never push!). The concept of muscle contraction is often misunderstood because of the word *contraction*. The word *contraction* in everyday English means to shorten. However, a muscle contraction does not necessarily result in shortening of the muscle. The internal mechanism of a muscle is such that when it contracts, it does *attempt* to shorten toward its center; however, whether it actually succeeds in shortening is not definite. What is definite is that by attempting to shorten toward its center, the muscle does create a pulling force on its two attachments that tries to pull them toward each other (i.e., toward the center of the muscle). It is the presence of this pulling force that defines a muscle as contracting.

MUSCLE CONTRACTIONS

Whether a contracting muscle succeeds in shortening or not is determined by how strong the pulling force of the muscle is, compared to whatever the force is that resists the bone from moving. This resistance force is usually the weight of the body part that must be moved if the bone moves. For example, if a muscle that flexes the elbow joint contracts and pulls on a bone within the forearm, the muscle successfully shortens if the forearm moves toward the arm⁴. This would require the muscle to generate a force of contraction that is greater than the weight of the forearm, along with the weight of the hand because the hand would have to be moved along with the forearm. In this case, the weight of the forearm and hand would be the resistance force that the muscle would have to work against (**Figure 2.9A**).

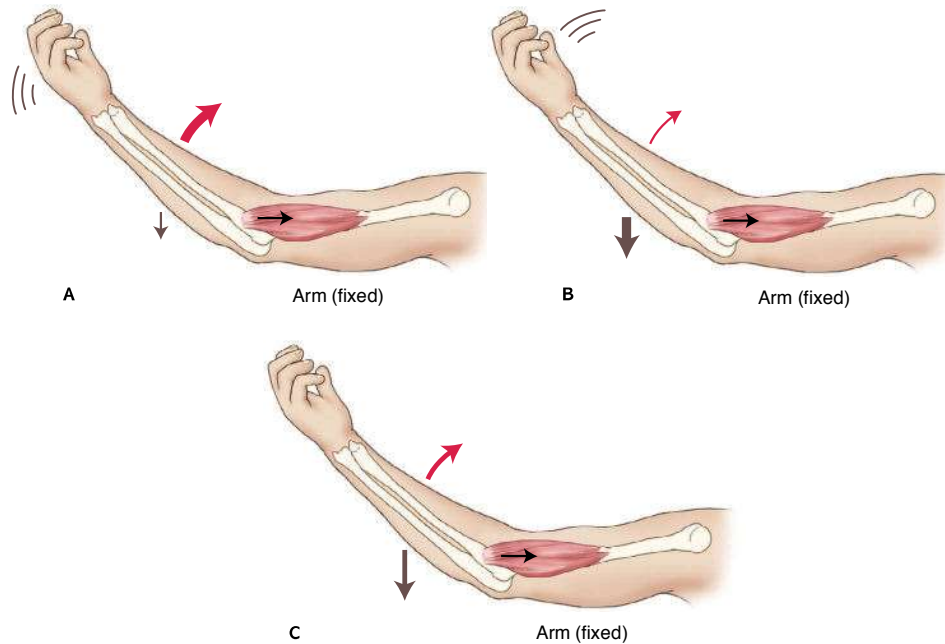


Figure 2.9. **A**, concentric contraction. **B**, eccentric contraction. **C**, isometric contraction.

Figure 2.9 demonstrates the three types of muscle contractions: concentric, eccentric, and isometric. **Figure 2.9A** illustrates that for the muscle to contract and successfully shorten, it must contract and generate a force that is more powerful than the resistance force (note that the red arrow representing the force of the muscle contraction is depicted larger than the black arrow representing the resistance force). In this scenario, the resistance force is the weight of the forearm and hand. **Figure 2.9B** illustrates an eccentric contraction in which the force of contraction of the muscle is less than the resistance force, therefore the forearm moves downward away from the arm (note that the red arrow representing the force of the muscle contraction is depicted smaller than the black arrow representing the resistance force). **Figure 2.9C** illustrates an isometric contraction in which the force of the muscle contraction is exactly equal to the resistance force; therefore, the forearm does not move at all (note that the red arrow representing the force of the muscle contraction is depicted the same size as the black arrow representing the resistance force).

If the biceps brachii generates a greater force than the weight of the forearm and hand, the muscle shortens and the forearm moves toward the arm. This is called a *concentric contraction*. By definition, a concentric contraction is a shortening contraction of a muscle. If, however, the resistance force of the weight of the forearm and hand is greater than the contraction force of

the muscle, the muscle will actually lengthen as it contracts, and the forearm will move farther away from the arm. This is called an *eccentric contraction*. An eccentric contraction is defined as a lengthening contraction of a muscle (**see Figure 2.9B**). If the force of the muscle contraction and the resistance force are exactly equal, then the forearm will neither move toward nor away from the arm. This is called an *isometric contraction*. An isometric contraction is defined as a contraction in which the muscle stays the same length (**see Figure 2.9C**). Let's look at the three types of muscle contractions more closely.

CONCENTRIC CONTRACTIONS AND MOVERS

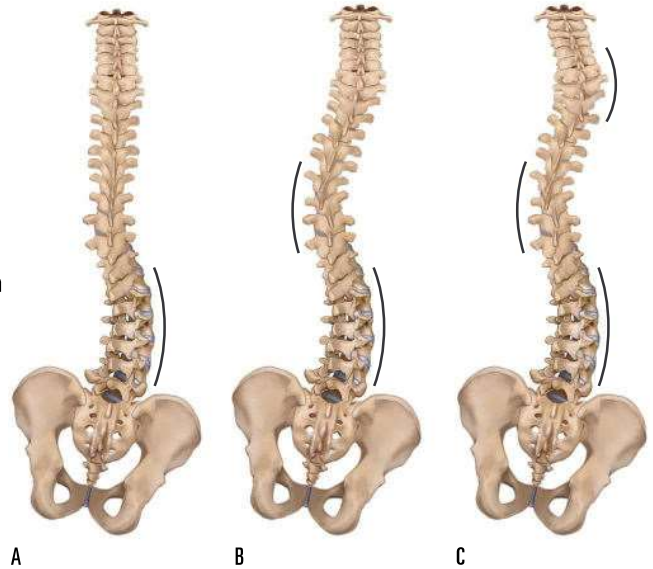
A concentric contraction occurs when a muscle contracts and shortens. If the muscle has shortened, then we know that the attachments must move closer to each other. If we name the two bony attachments as *A* and *B*, then one of three things must be true when a muscle concentrically contracts: (1) bone *A* moves toward bone *B*; (2) bone *B* moves toward bone *A*; or (3) both bone *A* and bone *B* move toward each other. If bone *A* moves toward bone *B*, then bone *A* is mobile and bone *B* stays fixed (stabilized) in place. If bone *B* moves toward bone *A*, then bone *B* is mobile and bone *A* is fixed. If both bones *A* and *B* move, they are both mobile.

Figure 2.10 demonstrates this idea with a muscle that crosses the elbow joint. When a muscle that crosses the elbow joint contracts, it pulls equally on both attachments. The usual result is that the forearm moves as in **Figure 2.10A** because for the forearm to move toward the arm, only the weight of the forearm and hand must be overcome. However, for the arm to move toward the forearm as in **Figure 2.10B**, the entire trunk must move along with the arm. Because this requires a greater contraction force on the part of the muscle, it is less likely to occur. In **Figure 2.10B**, the forearm is fixed and prevented from moving because the hand is holding an immovable bar, such as when doing a pull-up. In this scenario, the forearm is now more fixed so the arm would move if the muscle contracts with sufficient force. Of course, it is possible for both the forearm and arm to move toward each other as in **Figure 2.10C**.

Therefore, with a concentric contraction, there must always be a mobile body part; and whatever muscle concentrically contracts to move that body part is called a *mover* (hence the name). By definition, a mover muscle concentrically contracts and shortens when a joint action occurs, and the direction of its force is in the direction of the joint motion. More broadly, a mover does not have to be a muscle. Any force that creates the joint action in question (i.e., the joint action that is occurring), such as gravity or wind, is termed a mover.

SCOLIOSIS

Scoliosis is defined as a frontal-plane postural-distortion pattern of the spine. From a posterior view, the spine should be straight; any curve to the side (lateral flexion/side-bending curve) from this view is a scoliosis. Because lateral flexion usually couples with rotation, a scoliotic curve will also involve some vertebral rotation. As with any condition, scoliosis can be mild or severe in presentation. Measuring a scoliotic curve can be performed by viewing an X-Ray and measuring the angle formed by lines drawn along the bottom and top vertebrae of the curve. Scoliotic curves are usually described as “C”, “S”, and “double S” curves. A “C” curve contains one curve; an “S” curve contains two curves; and a “double S” curve contains three curves. A scoliotic curve is named for the convex side of the curve. A scoliotic curve in the thoracic region also affects the posture of the rib cage, usually resulting in what is described as a *rib hump*.



Diagnosis/assessment of scoliosis is done by X-Ray, although if severe enough, scoliosis may be visually apparent.

Contrology is extremely beneficial for clients with scoliosis. The stretching, strengthening, and focus on symmetry of posture and movement can help to either slow or stop the progression of the scoliotic curve, or even improve it. However, it is extremely important for the Contrology instructor to monitor the client’s spinal movements, so that the motions are occurring at the appropriate region of the spine.

SHIN SPLINTS

Shin splints is a lay term for pain in the (lower) leg, usually caused by an irritation/inflammation of the attachment of a muscle to the tibia. There are two major types of shin splints: *anterior shin splints* and *posterior shin splints*. Anterior shin splints involve the tibialis anterior muscle and are usually caused by excessive running sports. Running requires eccentric contraction of the tibialis

anterior (a dorsiflexor) to slow the descent of the foot (plantarflexion) as it hits the ground. Anterior shin splints are exacerbated by running on hard surfaces, because a shock wave enters the body just as the muscle is contracting. Posterior shin splints involve the tibialis posterior muscle and usually occur in dancers and other athletes who plantarflex their foot often and forcefully (the tibialis posterior is a plantarflexor).

Shin splints can be diagnosed/assessed by a physician or manual therapist. The assessment is based on the client's clinical history and palpation of the musculature.

In the acute phase, use of the foot/ankle joint is contraindicated in the Contrology workout. However, in the chronic stage, Contrology is beneficial for clients who experience shin splints, because strengthening the tibialis muscles can make them better able to meet the physical demands and stresses that are placed upon them.



SLUMPED SPINAL POSTURE

Whereas Lower Crossed Syndrome (see section on Lower Crossed Syndrome) is a postural distortion pattern in which the client's pelvis is excessively anteriorly tilted, *slumped spinal posture* involves excessive posterior tilt of the pelvis. This results in a hypolordotic lumbar spine or an actual reversal of the lumbar curve, in other words, a kyphotic lumbar spine. This condition often continues into the thoracic region with an excessive thoracic kyphotic curve. In effect, as the name implies, the entire spine falls into a slumped or rounded posture of flexion. Perhaps the major cause of this condition is rounding forward to work down in front of our bodies, especially with smart phones and other digital devices. Once the posture of rounding into flexion begins, gravity contributes to worsen the condition. Gradual weakening of the muscles



of anterior pelvic tilt (low back spinal extensors and hip flexors) and spinal extension, as well as shortening of the muscles of posterior pelvic tilt (hamstrings/gluteals and anterior abdominal wall muscles) and spinal flexion further entrench this condition; as does weakening of the posterior ligaments of the spine.

Assessment of this condition is made by postural evaluation and can be done by the Contrology instructor. Contrology is extremely beneficial for slumped posture because it can help to strengthen the weak (locked-long) tissues and stretch the tight/taut (locked-short) ones.

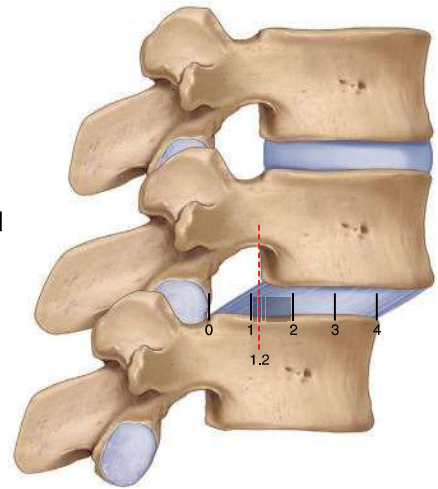
SPONDYLOLISTHESIS

A *spondylolisthesis* is a slippage of one vertebra on the vertebra below; most often this condition occurs in the lumbar region and the slippage is anterior (for this reason, it may also be called an *anterolisthesis*). For a vertebra to slip anteriorly on the vertebra below, a fracture in the upper vertebra is usually present, which allows the anterior body to slip forward while the posterior facets remain in place. This fracture can be acquired through

trauma or can be congenital. Because of the normal lordotic curve of the lumbar spine and the pull of gravity, it is usually L5 or L4 that slips forward. A spondylolisthesis may cause pain due to the anterior pulling tension that is exerted upon the soft tissues. However, the greatest danger is spinal nerve compression in the intervertebral foramina (IVF) if the vertebra slips sufficiently far enough to decrease the size of the IVF. Spondylolistheses are graded from 1-4 with 4 being the most severe (each grade can then be further subdivided into tenths).

A spondylolisthesis is usually diagnosed/assessed by a physician using X-Ray analysis. In addition to the spondylolisthesis itself, the physician looks for the fracture, typically found in the region of the lumbar vertebra known as the *par articularis*. A lateral view is used to assess the spondylolisthesis; and an oblique view is used to assess the fracture. MRIs may also be used.

Spondylolistheses can be very unstable and, when acute, contraindicate Contrology. However, Contrology can be extremely beneficial for this condition because strengthening the anterior abdominal wall musculature can help to maintain a posterior pressure on the vertebrae, thereby helping to prevent an anterior slippage.



1 — Prep - Hundred / Lower Body

REPS: 1-3; first rep, hold for 5 sec, second rep, hold for 10 sec, third rep, hold for 15 sec.

POINTS OF FOCUS:

- **Strengthening** the Powerhouse
- **Maintaining** the grounded stabilization of the pelvis and lower spine
- **Synchronizing** engagement of the Powerhouse musculature with movement of the lower extremities
- **Strengthening** the upper thigh, scapular retractors, and upper back extensors

4.1A



FIGURES

STARTING POSITION:

Lie on your back. Bend your knees into your chest by placing your hands just below the knee joints and firmly drawing each knee in the direction of the same-side shoulder; as you do this, allow the spine to elongate. Take in a slow deep breath through the nose and on the exhale sink into the abdomen (**Figure 4.1A**).

4.1B



4.1D



Without changing the posture of your spine, slowly lower your feet onto the Mat, placing them parallel and hip-width apart, and close to (**Figure 4.1B**) or directly under (**Figure 4.1C**) your knees, keeping your knees in alignment with the shoulders. Place your arms close to the sides of your body, palms facing down. Stabilize your upper body by pressing your hands, arms, shoulders, shoulder girdles, trunk, and the back of your head into the Mat (**see Figures 4.1BC**).

4.1C



MOVEMENT:

STEP 1: Keep your Powerhouse strong by holding your abdominals in and up as you bring your right foot up into the air by extending the lower leg at the knee joint. Keep both thighs and knees parallel with each other. Now turn the right thigh slightly outward so that you can see the inside of your heel. Maintain this position, holding the leg in place for a count of 5-15 (**Figures 4.1DE**).

4.1E





STEP 2: Now lower the right leg to the shin level of the left leg; be sure to maintain the alignment of your hip bones by feeling the left side of your pelvis stabilized and pressing down into the Mat. Deepen the work in the abdomen and hold for a count of 5-15 (**Figure 4.1F**).

STEP 3: Further lower the right leg to the height of the left ankle, maintaining a stable posture of the rest of the body. The lower you go with the leg, the more you should engage your gluteals. Continue to deepen the work in your Powerhouse while holding for another 5-15 counts (**Figure 4.1G**).



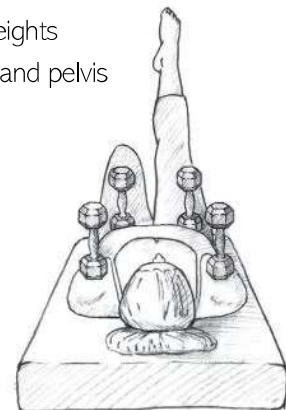
STEP 4: Return to *Starting Position* by lowering the right leg straight down to the Mat and bending the knee, drawing the right foot back until it is close to or under the knee and in line with the left foot (**Figure 4.1H**).

STEP 5: Repeat everything on the left side and perform a total of 1-3 reps.

NOTES:

- **The Prep - Hundred / Lower Body** is the first exercise of the Pre-Pilates workout because it is performed in a position that supports and stabilizes nearly the entire body. It is carried out with the back, neck, head, upper extremities, pelvis, and feet grounded on the Mat.

- One can picture four weights pinning their shoulders and pelvis down onto the Mat.



1 — Prep - Hundred / Lower Body

MODIFICATIONS

- **If you have a knee or hip issue,** instead of grasping the front of the lower leg, grasp instead the back of the distal thigh, near the knee joint.
- **The ideal position** is to have the feet as close as possible to being under the knees, as seen in **Figure 4.1C**. However, if your flexibility does not allow for this, the position shown in **Figure 4.1B** can be used.
- **To assist stabilization,** you can place your hands on the lower abdomen and pelvis: thumbs on the lower ribs, little fingers on the front of the pelvis (over the anterior superior iliac spine), and the other three fingers over the abdomen.
- **For people who are strongly deconditioned,** have a hip flexor or groin pull, or have an abdominal wall hernia, Step 3 can be omitted.
- **A pillow can be placed under the head** for heavy-chested people, and/or people with a neck issue or an increased thoracic kyphosis.



- ◆ **TRANSITION:** Remain lying on your back. Place your hands on the lower abdomen and pelvis; the thumbs on the lower ribs, little fingers on the front of the pelvis, and the other 3 fingers over the abdomen for the **Prep - Hundred / Upper Body**.

LOWER EXTREMITIES:

STANDING LEG:

The primary focus of **Prep-Hundred / Lower Body** is not the leg that is performing the movement, but rather the muscular engagement necessary to stabilize the pelvis from rotating to the movement-leg side and/or anteriorly tilting. Stabilization to prevent anterior tilt is accomplished primarily by the musculature of the anterior abdominal wall (*rectus abdominis* and abdominal obliques); stabilization to prevent pelvic rotation is accomplished by the standing-leg side hip extensors, shoulder girdle musculature, and bilateral abdominal obliques.

Planting the standing-leg foot on the Mat also helps to stabilize the pelvis from anterior tilt and rotation. For this reason, this exercise is an excellent Pre-Pilates exercise to prepare the client for the Hundred. Both the Prep-Hundred / Lower Body and the Hundred are concerned with forming a connection between engagement of the musculature of the Powerhouse and the musculature of the lower extremity.

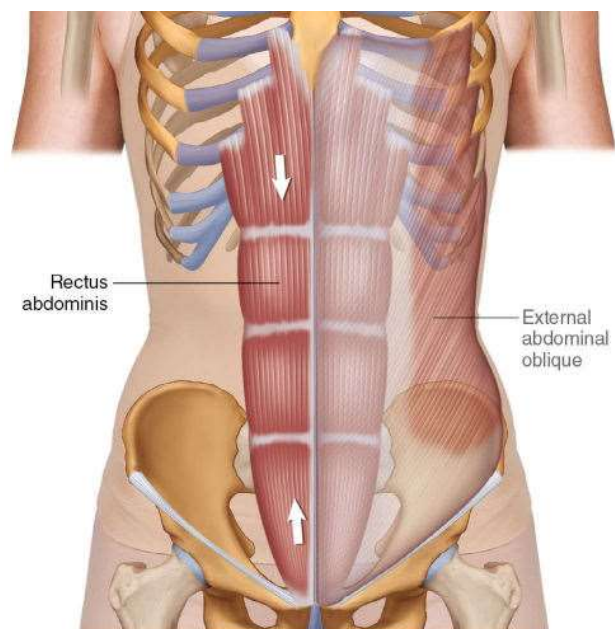
MOVEMENT LEG:

On the movement-leg side, this exercise primarily challenges the hip flexor musculature and knee extensor (quadriceps femoris) musculature. When lowering the leg to the Mat, the hip flexors engage eccentrically;

when holding the leg in position for a count of ten, they engage isometrically. The hip joint of the movement leg is turned out to engage the gluteus maximus, piriformis, and sartorius. Adductors are also called upon to engage in this position to neutralize the tendency toward abduction by the piriformis and sartorius. Balance between the adductors and outer gluteal musculature also assists with maintaining the legs parallel and hip-width apart.

UPPER EXTREMITIES AND TRUNK, NECK, AND HEAD:

Because the head, upper back, and shoulder girdles are pressed down against the Mat, this exercise also strengthens the upper spinal extensors and scapular retractors. The anterior abdominal wall musculature is also engaged for stabilization of the pelvis as mentioned above.



9 — Wall - Small Arm Circles

REPS: 5 reps each way (outward and inward)

POINTS OF FOCUS:

- **Strengthening** the shoulders and upper arms
- **Strengthening** the Powerhouse and elongating the spine
- **Working** with upper body symmetry
- **Coordinating** breathing with rhythm of arm movements

5.9A



FIGURES

STARTING POSITION: Holding a 1-lb or 2-lb free weight in each hand, stand in Pilates stance with your heels and body weight against the Wall. Move your feet forward to accommodate your lower back, lengthening until you can distinctly feel your lower and upper back completely pressed against the Wall (your heels will end up being between 6-24 inches from the Wall). With your shoulders open, bring your arms by the sides of your hips, rotating the forearms inward to bring your palms to face the Wall, reaching your fingers long to point toward the floor. Elongate your spine by lifting the abdominals in and up. What is most important is that your entire back is glued to the Wall's surface and that your chin is gently tucked back (**Figure 5.9A**).

5.9B



MOVEMENT:

STEP 1: Inhale while you lengthen your arms downward toward the floor (by depressing your scapulae) and begin the outward circles by raising your arms directly forward and up to shoulder level. Hold that position until the end of the full inhalation, maintaining your spine elongated and the scapulae in contact with the Wall (**Figure 5.9B**).

5.9C



STEP 2: Exhale as you continue the circles outward with the arms opening to the sides, to the limits of your peripheral vision (**Figure 5.9C**). Continue this fluid motion by bringing the arms down to the sides of your hips with the palms facing the wall, returning to **Starting Position** (see **Figure 5.9A**). This completes one outward circle.

5.9D



STEP 3: Repeat these outward circles for a total of 5 reps.

STEP 4: Inhale while you lengthen your arms downward toward the floor (by depressing your scapulae) and begin the inward circles by raising your arms to the side, oriented slightly diagonally, and up to shoulder level. Hold that position until the end of the full inhalation, maintaining your spine elongated and the scapulae against the Wall (**Figure 5.9D**).

5

NOTES:

- **Small Arm Circles** is the first exercise on the Wall; and involves utilization of weights as well.
- A principal focus of this exercise is shoulder range of motion.

STEP 5: Exhale as you continue the circles inward with the arms closing in front of your body to be shoulder-width apart (see **Figure 5.9B**), and then straight back down to the sides of your hips (see **Figure 5.9A**).

STEP 6: Repeat these inward circles for a total of 5 reps.

9 – Wall - Small Arm Circles

MODIFICATIONS

- If an injury of the shoulder makes it **difficult to perform circles**, straight-line motions can be substituted for the circles. Raise your arms directly forward and back down; and raise your arms out to the side and oriented slightly diagonally and back down. Depending on the comfort of your shoulder, the excursion of movement can be kept small.
- If **needed**, you can perform this exercise with 1-lb weights or with no weights at all.
- For a **frozen shoulder** or an injury of the arm, you can use your other hand to move the arm. With a firm and secure grasp on the wrist of the injured side

(Figure A), use your hand to move the arm through linear up-and-down motions and then small circular motions in front and across the body (Figure B). It is important that the injured-side arm remains passive throughout these movements.



◆ **TRANSITION:** Remain standing with your back against the Wall for the **Wall - Roll Down**.

Kinesiology:

UPPER EXTREMITIES:

With **Small Arm Circles**, the circles are performed by first flexing and then horizontally abducting the arms against gravity. Flexion requires concentric contraction of the anterior deltoid, as well as other flexors of the glenohumeral joint. During the phase of horizontal abduction, the anterior deltoid continues to contract isometrically to maintain the position of flexion as the horizontal abductor muscles, primarily middle and posterior deltoid, concentrically contract. During the return phase of movement of the arms, essentially the same muscles contract eccentrically to control the motion back toward the floor.

Via scapulohumeral rhythm, scapular upward rotator (**serratus anterior**, upper and lower trapezius) and protractor muscles (serratus anterior and pectoralis minor) must engage as coupled actions, accompanying the movement of the arms. When it is stated that the scapulae remain against the Wall during the arm movement, it is important that the scapulae are not overly protracted to entirely leave the Wall. They will slightly peel away from the Wall; but be sure to maintain the medial borders against the Wall.

TRUNK, NECK, AND HEAD:

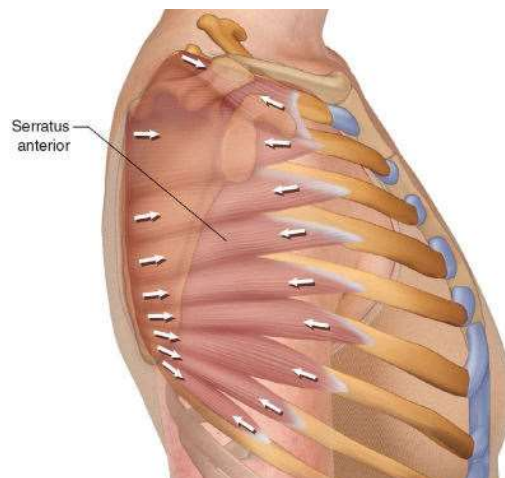
Gluing the back to the Wall equates to elongation of the entire spinal column, which involves posterior tilt of the pelvis, flexion of the lumbar spine, extension of the thoracic spine, and retraction of the shoulder girdles. This requires isometric contraction of the gluteals and anterior abdominal wall for posterior pelvic tilt and lumbar flexion, and paraspinal (erector spinae) musculature of the upper trunk for thoracic extension, and rhomboids and trapezius (especially middle and lower trapezius) for retraction of the scapulae (shoulder girdles).

Rib cage muscles must also engage for the coordinated respiration that accompanies the movement of the upper extremities.

Elongation of the spine also involves the posture of the cervical spine and head. What is most important here is the posture of the head upon the atlas (C1) at the atlanto-occipital joint. Tucking the chin involves flexion and posterior glide of the head/occiput on C1. This is especially important given the prevalence of the postural distortion pattern known as *forward head carriage* (part of *upper crossed syndrome*).

LOWER EXTREMITIES:

Muscular engagement in the lower extremities involves isometric contraction for stabilization of the body position. As part of Pilates stance, the adductor musculature engages to pull the inner thighs together. In addition to isometrically contracting to posteriorly tilt the pelvis, the gluteal muscles also engage to laterally rotate the hip joints to maintain Pilates stance; this can also involve the piriformis and other muscles of the deep lateral rotator group. And the quadriceps femoris musculature engages to hold the knee joints in full extension.



5 — The One Leg Stretch (1st of Abdominal Series)

REPS: 5-12 sets (5-12 reps for each leg)

POINTS OF FOCUS:

- **Strengthening** the Powerhouse
- **Stabilizing** the pelvis and scapulae; maintaining the Box alignment
- **Emphasizing** deep exhalation to increase lung capacity
- **Coordinating** opposition movements of the legs
- **Coordinating** arm movement with movement of the legs
- **Strengthening** the hip flexors; stretching the gluteal muscles

6.5A

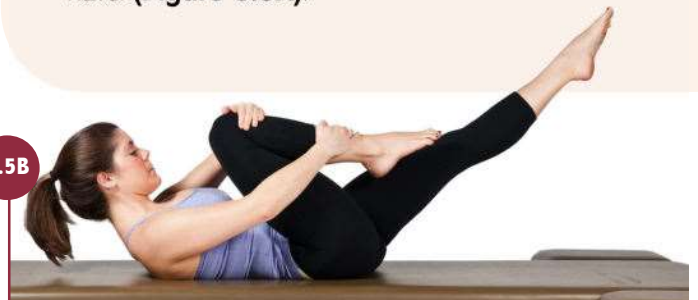


FIGURES

STARTING POSITION:

Lie on your back with your knees shoulder-width apart into Frog position (knees bent into the chest, heels together, and toes apart). Place your hands on the front of the lower legs as close to the ankles as possible. Engage the Powerhouse by scooping the abdominals in and up. Bring your chin toward your chest by lifting your head and upper shoulders off the Mat, focusing your eyes on your navel (**Figure 6.5A**).

6.5B



MOVEMENT:

STEP 1: Place your left hand just below the right knee joint. Straighten the left knee joint along the mid-line of the body, as you lower the left thigh (to be slightly less than 90 degrees of flexion) and slightly turn it outward.

STEP 2: Exhale firmly as you squeeze the right thigh against the right side of your chest. Keep your elbows down by the sides of your ribs (**Figure 6.5B**).

6.5C



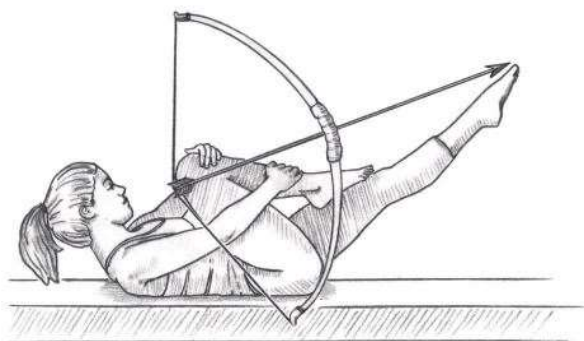
STEP 3: As you inhale, quickly change legs by straightening the right knee joint along the mid-line of the body, lower the right thigh (to be slightly less than 90 degrees of flexion) and slightly turn it outward; simultaneously drawing your left knee toward your chest in the direction of the same-side shoulder, placing your right hand just below the left knee joint and the left hand in front of the left ankle.

STEP 4: Now exhale firmly as you squeeze the left thigh against the left side of your chest. Keep your elbows down by the sides of your ribs (**Figure 6.5C**). This completes one set.

STEP 5: Repeat for a total of 5-12 sets.

NOTE:

- To help create opposition during **The One Leg Stretch**, imagine that the leg being pulled back toward the chest is the string of a bow brought into tension, and that the straight leg is the arrow being shot forward and away from the body.



5 – The One Leg Stretch (1st of Abdominal Series)

MODIFICATIONS

- **You can place a pillow** under your head.
- **For pregnant women**, people who are heavy-set, have a knee condition, or difficulty with coordination of the arms, both hands can be placed on the back of the thigh, just below the knee.
- **If it is difficult to grasp the knee** and ankle with the placement of the hands given in the exercise, their positions can be reversed

so that the same-side hand is placed on the knee and the opposite-side hand is placed on the ankle. This allows the thigh to turn out and be brought up toward the outside of the shoulder, relieving compression in the front of the hip. It also increases the stretch of the inner thighs.



- ◆ **TRANSITION:** Bring your right knee up toward the right side of your chest while you move each hand to the front of the same-side lower leg, as close to the ankle as possible. You are now in the Frog position for **The Double Leg Stretch**. Don't pause; move quickly through this transition. Do both The One Leg Stretch and The Double Leg Stretch as a series.

Kinesiology:

LOWER EXTREMITIES:

During **The One Leg Stretch**, the hip flexors (psoas major, **tensor fasciae latae**, and others) work concentrically as the thigh is brought up into flexion toward the chest. The hip extensors (gluteals and hamstrings) work concentrically to extend the thigh back toward the front wall (foot end of the mat); at the very end of this motion, hip flexors must eccentrically contract to brake the motion.

Ankle joint plantarflexors (gastrocnemius and soleus) contract isometrically to hold the foot in plantarflexion at the ankle joint. On the side where the thigh is hugged into the chest, the gluteals are stretched across the hip joint; and the vastus muscles of the quadriceps femoris group are stretched across the knee joint.

PELVIS:

This exercise also involves coordination between the two lower extremities: as one thigh flexes, the other extends. By the principle of femoropelvic rhythm, when the thigh/femur flexes, the pelvic bone on that side posteriorly tilts relative to the sacrum and opposite-side pelvic bone. For this reason, the repeated rhythmic alternation of thigh flexion movement on one side with thigh extension movement on the other side mobilizes the sacroiliac joints.

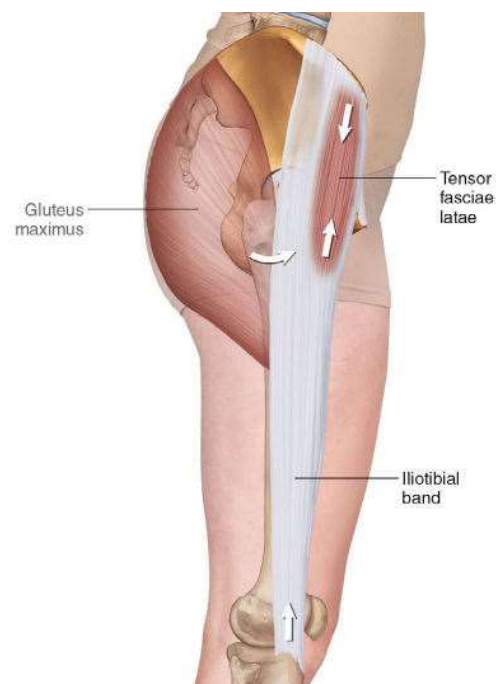
TRUNK, NECK, AND HEAD:

As with other exercises in which the thigh is flexed, the anterior abdominal wall muscles (rectus abdominis and abdominal obliques) engage isometrically to create a force of posterior tilt of the pelvis to prevent the

hip flexors from anteriorly tilting the pelvis. Because the head and neck are flexed, the neck flexors are engaged isometrically. Keeping the chin down inhibits the sternocleidomastoids, preferentially engaging the scalenes and deeper neck flexors (longus muscles).

UPPER EXTREMITIES:

Even though the shoulder girdles are protracted, shoulder girdle retractors (rhomboids and trapezius) contract to help pull the leg/knee into the chest. Because the shoulder girdles are held in a position of depression, the lower trapezius is preferentially engaged instead of the upper trapezius. Shoulder joint extensors (primarily posterior deltoid) and elbow joint flexors (especially brachioradialis given the halfway-pronated position of the forearm) are also engaged to help pull the leg/knee toward the chest.



3 — Weights - Low Curl

REPS: 10

POINTS OF FOCUS:

- **Strengthening** the arms with resistance
- **Working** the arms with control
- **Stabilizing** and strengthening the scapulae and upper back
- **Stabilizing** the entire body in standing posture
- **Aligning** the arms in the sagittal plane
- **Opening** and stretching the chest

7.3A



FIGURES

STARTING POSITION: If possible, use a mirror so that you can see your alignment during the exercise. With your gaze straight ahead, stand upright in Pilates stance, holding a 2-lb free weight in each hand. Bring your abdominals in and up, and as you engage the inner thighs, transfer your body weight forward to be balanced over the arches and balls of the feet. Open your chest by bringing your arms back as you bend your elbows as far back as possible, shoulder-width apart; simultaneously slightly bending your wrists and retracting your scapulae closer to the spine. Maintain this position of your scapulae and upper arms throughout the entire exercise (**Figures 7.3AB**).

7.3B



7.3C



MOVEMENT:

STEP 1: Inhale as you extend the elbows toward the back wall, while extending the wrists long. (**Figure 7.3C**).

7.3D



STEP 2: Continue inhaling as you lift your knuckles up toward the ceiling, curling the wrists backward, and extending the fingers of both hands long and parallel to each other (**Figure 7.3D**).

7.3E



STEP 3: Exhale as you curl (flex) the fingers to a form a fist, gripping the weights; and then flex the wrists forward to a straight position (**Figure 7.3E**).

STEP 4: Continuing exhaling as you flex the elbows back to *Starting Position*. (see **Figures 7.3AB**).

STEP 5: Repeat for a total of 10 reps. Remember to move smoothly and evenly as if you are moving through water.

NOTE:

- It is helpful to imagine that you are retracting your shoulder girdles against the resistance of springs during **Low Curl**.



3 – Weights - Low Curl

MODIFICATIONS

- If **needed**, you can perform this exercise with 1-lb weights or with no weights at all.
- If **you have a shoulder condition**, the elbows can be held lower at the sides of the body.
- If **you have a condition of the leg or foot**, this exercise can be performed seated.
- If **one side is weaker**, extra repetitions can be added for that side.
- **You can add more weight**—for example, if you worked with 1-lb weights in Pre-Pilates, you might progress to 2-lb weights now.



- ◆ **TRANSITION:** Lower your arms to your sides and walk to a wall that has open space to the sides. Stand with your back to the Wall in Pilates stance with your heels and body weight against the Wall. Move your feet forward to accommodate your lower back, lengthening until you can distinctly feel your lower and upper back completely pressed against the Wall (your heels will end up being between 6-24 inches from the Wall). With your shoulders open, bring your arms by the sides of your hips, rotating the forearms inward to bring your palms to face the Wall, reaching your fingers long to point toward the floor. Elongate your spine by lifting the abdominals in and up. What is most important is that your entire back is *glued* to the Wall's surface and that your chin is gently tucked back. You are now ready for **Wall - Arm Circles**.

UPPER EXTREMITIES:

Low Curl is extremely similar to the 90-Degree Curl Forward and 90-Degree Curl Sideways exercises, except for two differences. First, with Low Curl, the posture at the shoulder joint is extension beyond anatomic position, whereas Curl Forward was performed in flexion and Curl Sideways was performed in the plane of the scapula. Second, Low Curl adds in extension of the hands at the wrist joints, whereas Forward and Sideways Curls maintain the wrist joints in neutral posture.

One of the principal goals of this exercise is to strengthen the musculature of the upper extremity. The isometric contraction necessary to stabilize the shoulder joint would be performed primarily by the posterior deltoid (assisted by the latissimus dorsi and teres major).

The entire initial movement of elbow joint extension is aided by gravity, and the entire return movement of elbow joint flexion is against gravity. Therefore, these movements could be performed by eccentric contraction of the biceps brachii (as well as brachialis and other elbow flexors) during the initial movement of elbow joint extension; and concentric contraction of the biceps brachii during the return movement of elbow joint flexion. However, both of these movements are performed with co-contraction of the antagonist triceps brachii (hence, contraction of the mover and antagonist muscles) to increase resistance to the biceps contraction and therefore exercise and strengthen both biceps and triceps.

The addition of wrist joint extension adds in concentric contraction of the muscles of wrist extension. These are the three muscles of the wrist



extensor group: **extensor carpi radialis longus**, extensor carpi radialis brevis, and extensor carpi ulnaris. All other muscles that cross the wrist joint posteriorly can assist. Wrist extension also stretches the wrist flexor muscles in the anterior compartment of the forearm.

TRUNK, NECK, AND HEAD:

As with the other Curl exercises, even though this exercise strengthens the upper extremity, as with most every exercise in the Contrology system, it is important to perform it with a stable and elongated spine. This involves posterior tilt of the pelvis, flexion of the lumbar spine, extension of the thoracic spine, and retraction of the shoulder girdles. This requires isometric contraction of the gluteals and anterior abdominal wall for posterior pelvic tilt and lumbar flexion, and paraspinal (erector spinae) musculature of the upper trunk for thoracic extension, and rhomboids and trapezius (especially middle and lower trapezius) for retraction of the scapulae (shoulder girdles).

Elongation of the spine also involves the posture of the cervical spine and head. What is most important here is the posture of the head upon the atlas (C1) at the atlanto-occipital joint. Gently tucking the chin involves flexion and posterior glide of the head/occiput on C1.

LOWER EXTREMITIES:

Shifting the body weight forward involves slight dorsiflexion of the leg at the ankle joint (reverse closed-chain movement), requiring the plantarflexors to isometrically contract to hold this position by preventing collapse into further dorsiflexion. It also requires the quadriceps to contract isometrically to hold the knee joint in extension, thereby preventing collapse into flexion. Engaging the inner thighs is done by isometrically contracting the muscles of the adductor group (e.g., adductors longus, brevis, and magnus).