



## Spinal Exercise Program/Core Stabilization Program

Adapted from *The Spine in Sports*: Robert G. Watkins

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Below is a description of a Core Stability Program, designed to improve the strength and coordination of the body's trunk movements.

### Abdominal Bracing and Hollowing

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Activation of the abdominal muscles is an integral part of rehabilitation of the lumbar spine. They provide stability through their attachments to the thoraco-lumbar fascia (a large, ligament like structure near the base of the spine). Abdominal hollowing and abdominal bracing are the foundations of all of the lower back strengthening exercises that you will perform therefore you must master them before proceeding with any other exercises in the sequence. It is important to remember that there are 4 layers of abdominal muscles. The outermost layer is called the rectus abdominis. This is the muscle that looks like a washboard in people who work out a lot. It attaches from just under the sternum to the top of the pubic bone. The next layer is the external obliques followed by the internal obliques. These are the flank muscles that work together to help to rotate and bend the torso. They attach to the ribs, iliac crests linea alba (a large tendon like structure in the middle of the abdomen) and the thoraco-lumbar fascia. The last layer is the transversus abdominis, which is the deepest layer that runs transversely across the abdomen, attaching to the linea alba in the front and the thoraco-lumbar fascia in the rear. It stands to reason that if you don't activate a muscle, it will not get stronger.

Activation of the 3 deeper layers is necessary if these muscles are going to be utilized to stabilize the lumbar spine. This is accomplished with abdominal bracing and hollowing.

1. **Abdominal Hollowing:** lie on your back and place your fingers on your abdomen about 3" lateral to your navel. Without taking a breath, suck your stomach in (make your abdomen "hollow" and hold it there, making sure you can feel the muscle contracting under your fingers.
2. **Abdominal Bracing:** perform abdominal hollowing as described above. Now move your fingers to your flank. Bear down (like your having a baby) without holding your breath. Make sure you can feel your oblique muscles contracting under your fingertips at your sides while maintaining your abdominal hollowing. Remember: practice makes perfect. When you have mastered abdominal hollowing and abdominal bracing, you are ready to proceed with the next set of exercises.

## "Dead Bug" Abdominal Exercises

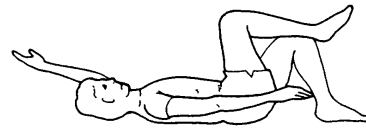
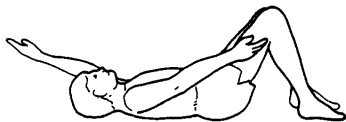
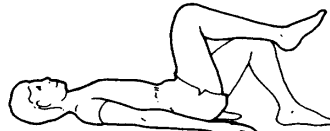
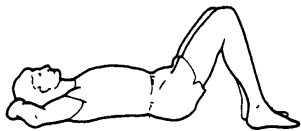
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Starting Position: Lay supine (on your back face up) with your feet on the ground and knees bent to 60 degrees. Contract your abdominal muscles by sucking your stomach in (think of pulling them into your back and flatten the arch of your back into the ground); and keep your abs. contracted through the entire sequence of exercises.

Do not use your glutei (bum) muscles, just your abdominals. Follow the sequence; if you can't do one of the steps, do not go on to the next one. Start at # 1 until you can perform it well. Each exercise should be done to 10 repetitions then continue on to the next step.

The Sequence is as follows:

1. Raise 1 arm at a time overhead (10 times right then 10. times left then alternating right and left 10 times).
2. Raise both arms overhead simultaneously (Same Sequence).
3. "March" (Simply marching feet in place alternate right then left, only lifting your feet slightly off the ground for 3 minutes).
4. Bring 1 knee up towards your chest at a time (knee only up to 90 degrees- just above your hips).
5. Bring 1 knee to chest (like #4) at a time while raising the opposite arm.
6. Bring 1 knee to chest (like #4) at a time while raising the same arm.
7. Lay supine like starting position, with thighs bent at 60 degrees keep the knees together, raise one leg out straight keeping thighs together; repeat for opposite leg.

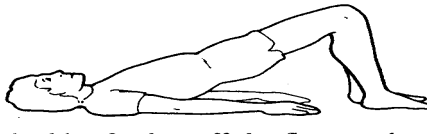


## Bridge Exercises

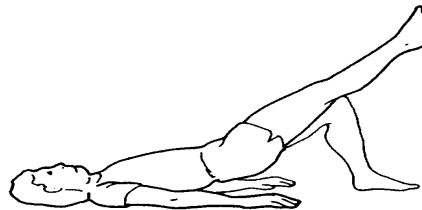
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**Starting Position:** Lay supine (on your back face up) with your feet on the ground and knees bent to 60 degrees. Contract your abdominal muscles by sucking your stomach in (think of pulling them into your back and flatten the arch of your back into the ground); and keep your abdominal muscles contracted through the entire sequence of exercises. Press your knees together, having them remain in contact at all times. Gently raise your buttocks off the ground until your torso and thighs are parallel, concentrating on keeping your knees together. This is the "bridge" position. Remember this is an exercise for your glutei muscles, so you must keep your buttocks contracted. Follow the sequence; if you can't do one of the steps, do not go on to the next one. Start at # 1 until you can perform it well. Each exercise should be done to 10 repetitions then continue on to the next step.

1. Go up into the bridge position, being careful to maintain your pelvic tilt and keep your knees together. Stop if you start to lose your pelvic tilt. Hold for 3 seconds, and then gently lower your torso and buttocks to the ground.



2. Go into the bridge position and raise one heel off the ground. Repeat for the opposite side (make sure those knees are together)
3. Go into bridge position and raise one foot 1-2" off ground, balancing on the opposite leg. Repeat for the opposite side.
4. Repeat #3 and then lower your buttocks toward the ground until they just touch it, then raise it back up again. Repeat this 10 times and then do the opposite leg.
5. Go into bridge position and extend one of your legs out straight (like you are kicking). Now bring it back to its original bent position. Repeat this 10 times, then do the other leg.

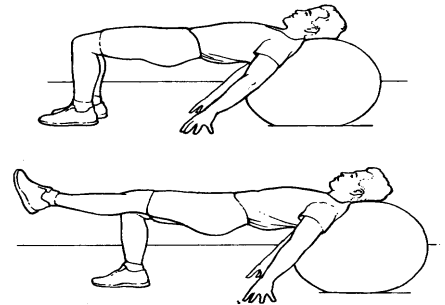


6. Go into bridge position and extend one of your legs, keeping it out. Now lower your buttocks down so they almost touch the floor while balancing on the opposite leg. Do this 10 times then repeat with your other leg.

## Ball Bridging: Supine

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**Supine Bridging:** Position the ball at the upper back position, with the chin tucked, the head up, the knees at 90 degrees, and the feet on the ground. Bridge by bringing the pelvis up, locked in the neutral position. Maintain, and then relax. Add alternate extension of the lower extremity in the bridged position. Hold for a count of 10 and relax.

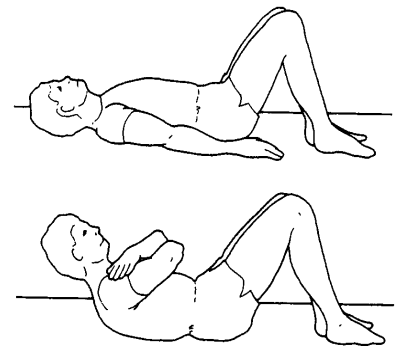


## Partial Sit-Up

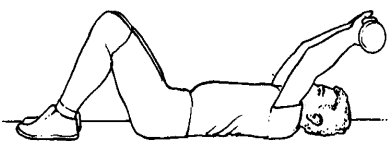
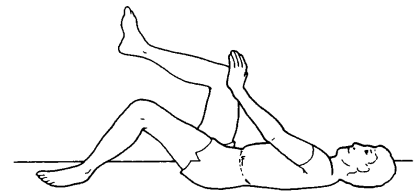
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**Starting Position:** Lay supine (on your back face up) with your feet on the ground and knees bent to 60 degrees. Start abdominal bridging. Contract your abdominal muscles by sucking your stomach in (think of pulling them into your back and flatten the arch of your back into the ground).

***Forward Exercise:*** Place the arms across the chest and raise the shoulders and back off the floor while maintaining the neutral pain-free position of the spine. As long as the unsupported head does not strain the neck, hold the shoulders off the ground for a count of 5, and then return. The amount of time the shoulders are held off the ground may vary from 2 to 10 seconds. The speed with which the maneuver is done may vary from a resting count of 1 to 2 seconds. This exercise is the key to increasing abdominal strength and stability. It may be done with the arms behind the head or on alternating shoulders.



***Right & Left Resistance Exercise:*** Maintain the neutral spine position. Tighten the trunk muscles (abdominal bridging) and do alternate knee pushes: the left hand against the right knee, alternating with the right hand against the left knee. Hold the push for 10 seconds.



***Unsupported Exercise:*** Maintain the neutral spine position, and holding a weight, extend the arms up over the body. Slowly extend the arms over the head and hold for a count of 10. Then, slowly return to the starting position.

Partial Sit-Up Exercises should commence with forward exercises (1 set of 10 repetitions) with the hands on the chest then progress to the next step in subsequent sessions.

1. 3 sets of 10 Forward Exercises
2. 3 sets of 10 Forward Exercises, 3 sets of 10 Right and 3 sets of 10 Left Resistance Exercises.
3. 3 sets of 20 Forward Exercises, 3 sets of 20 Right and 3 sets of 20 Left Resistance Exercises.
4. 3 sets of 30 Forward Exercises, 3 sets of 30 Right and 3 sets of 30 Left Resistance Exercises, Unsupported Exercise with Weights over Head and Behind.

## Prone Exercises

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**Neutral Position:** Lay prone (on your stomach). Because the prone position may be painful in certain back conditions, it is suggested that the prone exercises begin with a pillow under the trunk to prevent too much lumbar extension.



Rigidly tighten the trunk musculature into the neutral, pain-free position while maintaining the arms and the legs in an extended position. Hold for a count of 10 seconds and relax.

**Prone with Single-Arm Lifts:** Maintain the original abdominal bridging position in the neutral pain-free position while extending one arm off the ground. Hold for a count of 10 and relax. Repeat with the other arm.



**Prone with Single Leg Lifts:** Maintain the original abdominal bridging position in the neutral pain-free position while extending one leg off the ground. Hold for a count of 10 and relax. Repeat with the other leg.



**Prone with Alternate Arm and Leg Lifts:** Maintain the original abdominal bridging position in the neutral pain-free position while lifting the opposite arm and leg off the ground. Hold for a count of 10 and relax. Repeat with the other arm and leg.

**Prone with Double-Arm Lifts:** Maintain the original abdominal bridging position in the neutral pain-free position while extending both arms off the ground. Hold for a count of 10 and relax.



**Prone with Double-Leg Lifts:** Maintain the original abdominal bridging position in the neutral pain-free position while extending both legs off the ground. Hold for a count of 10 and relax.



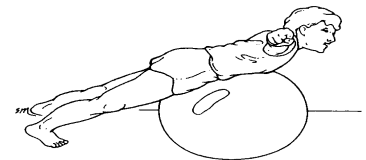
**Prone with Double-Arm and Double-Leg Lifts:** Maintain the original abdominal bridging position in the neutral pain-free position while lifting both arms and legs off the ground. Hold for a count of 10 and relax.



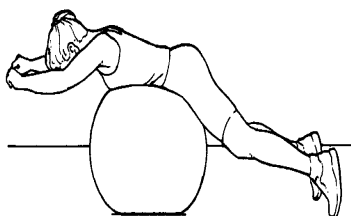
## Prone: Ball

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In the prone position, rollout with the abdomen resting on the ball, with the feet apart and the toes on the floor in the push-up position. Flex the arms at the shoulder and down to the floor. Roll forward slowly, extending the trunk out into midair while maintaining tight trunk control. Hold for 10 seconds; then roll back to the starting position.

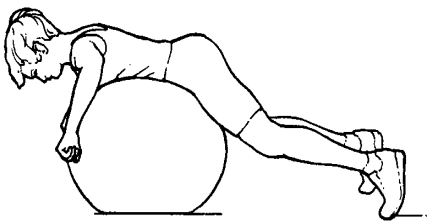
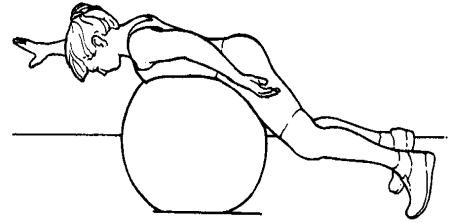


A variation of the exercise is to extend the arms parallel to the shoulders. Roll out slowly, hold for 10 seconds, and roll back. Weights can be held in the hands to increase the difficulty of the exercise.

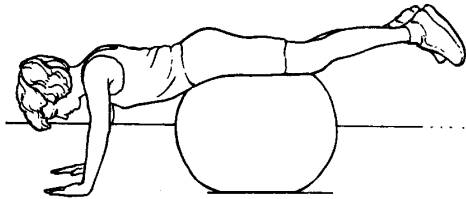


**Superman.** Start prone in the kneeling position with the ball approximately at chest level. Lock the spine in the neutral position, with the elbows at 90 degrees. Roll out on the ball and extend the elbows and knees at the same time. Hold; then roll back. Keep the neutral position tight and the trunk under tight control throughout this maneuver.

**Swimming:** In the prone position, place the ball approximately under the abdomen. Lock the spine in the neutral, pain-free position, with the feet and legs extended and the toes on the ground. Alternate arm extension at the shoulder with full arm reach - first the right arm and then the left arm.



**Green Ball Shoulder Abduction:** Position the ball prone on the stomach, with the legs apart and the toes on the ground. With the elbows at 90 degrees, extend the elbows back, hold, and return to the original position.

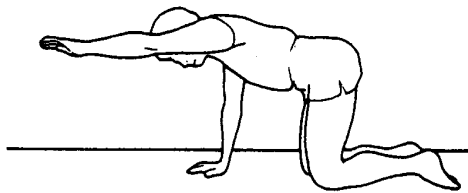
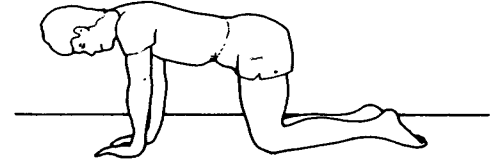


**Push-up prone on the ball:** In the prone position, place the ball approximately under the abdomen. Lock the spine in the neutral, pain-free position, with the arms extended to the floor, the palms down, the feet and legs extended, and the toes off the ground. Slowly lower the upper portion of the body to the floor, maintaining neutral - position trunk control. Then return to the starting position.

## Quadruped Exercises

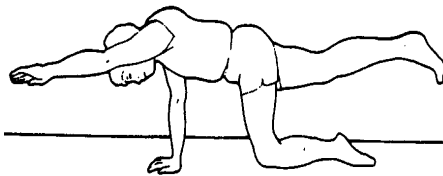
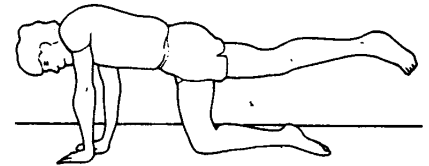
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In the all-fours position, with the knees and hands on the floor, tighten the trunk musculature and hold the spine in the neutral, pain-free position for a count of 10. Then relax.



In the all-fours position, with the knees and hands on the floor, tighten the trunk musculature and hold the spine in the neutral, pain-free position. Extend one arm, hold for a count of 10, and relax. Repeat with the other arm.

In the all-fours position, with the knees and hands on the floor, tighten the trunk musculature and hold the spine in the neutral, pain-free position. Extend one leg, hold for a count of 10, and relax. Repeat with the other leg.



In the all-fours position, with the knees and hands on the floor, tighten the trunk musculature and hold the spine in the neutral, pain-free position. Extend one arm and one leg, hold for a count of 10, and relax. Repeat with the opposite arm and leg.

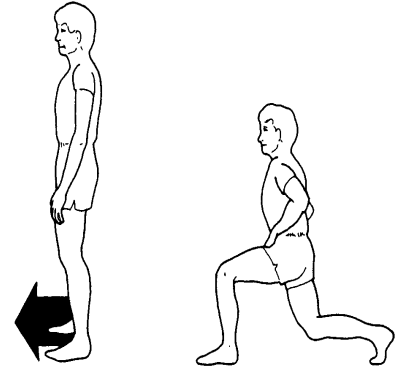
**Note:** The difficulty of the quadruped exercises can be increased with the use of light weights on the extremities or the balancing of the bar across the back.



## Lunges

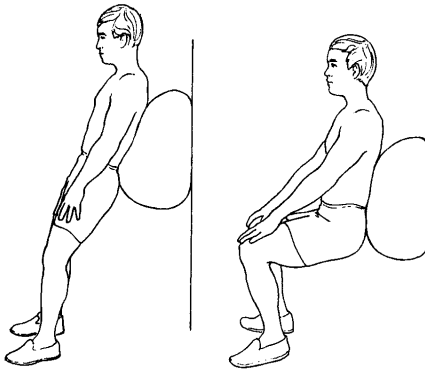
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Maintaining the neutral, pain-free position, stride forward with one foot, bending the knee, and partially kneel with the opposite knee. Hold for 3 seconds and return to the starting position. Repeat with the other leg. This can be done with the addition of weights on the arms or with a stick across the shoulders. This exercise is not appropriate for anyone with knee problems.



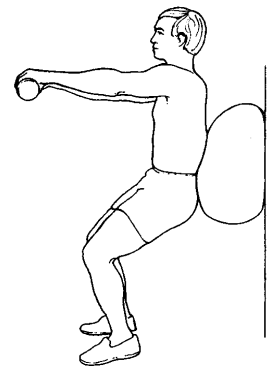
## Wall Slides

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Position an exercise ball behind the back against the wall, with the legs slightly apart and the arms at the sides. Roll your body down the ball into a sitting position and maintain this sitting position for a count of 10. Return to the beginning semi-standing position. Begin with only a slight knee flexion and a partial squat. Eventually you can proceed to a full 90/90 position – 90 degrees of hip and knee flexion.

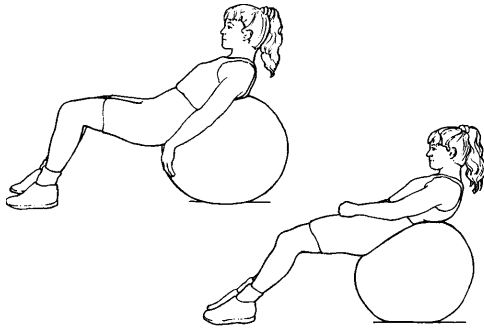
Throughout the exercise, maintain the trunk in the neutral, pain-free position with tight abdominal bridging. This exercise combines trunk strengthening with a functional quadriceps-strengthening maneuver. After you can maintain a full 90/90 position for three sets of 30 times each, holding the position for 10 seconds, you can do the maneuver while standing on the toes, with the option of holding a weight.



## Supine Ball Stabilization Exercises

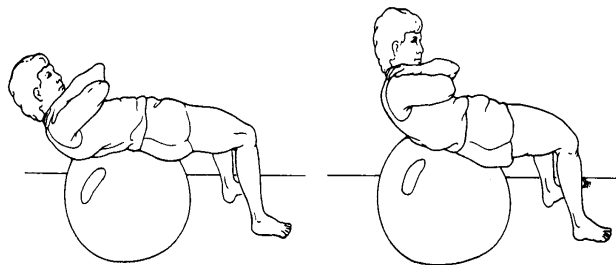
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### Supine Quadriceps Press:



Sit against the ball with the ball placed in the small of the back. Keep your chest and stomach tight. Keeping your feet in the same position, roll back on the ball by straightening your legs. Keep your chin tucked in so as not to strain your neck. Keep your back in neutral and your chest up off the ball. Return to the starting position by bending your knees and rolling back down on the ball.

**Supine Ball Sit-Ups:** Maintain a supine position with the lower back on the ball, the arms folded across the chest, the knees bent, and the feet flat on the floor. Tighten the trunk into the neutral, pain-free position. Keep the pelvis stabilized and level, using your abdominal and buttock muscles. Lift your shoulder blades and upper back off the ball, keeping your lower back in a neutral position. Walk backward on the ball so that more of the trunk is off the ball, projecting out into the air. Hold for a count of 4 to 8 while keeping the trunk rigid. Weights may be held to the chest to increase resistance. Repeat the manoeuvre of rolling the chest off the ball. With the arms positioned behind the head, rotate the left shoulder, pointing the elbow toward the right knee. Alternate with the right elbow pointing toward the left knee, again maintaining tight, rigid trunk control.



**Supine Ball Shoulder Flexion:** Alternating shoulders, flex the shoulders with the arms over the head: first do a right-arm hold, then a left-arm hold. Do this with or without weights.

