SQUAT

You don't know squat. But you should. One of the seven primal patterns, squatting was essential for survival when we were cavemen and -women. And while evolution has developed our Texting pattern such that many of us have a thenar eminence the size of our bicep, our squatting skills have suffered in kind. Because of this, over 80% of people will endure an episode of back pain in his or her lifetime. And triathletes aren't immune. So squat! It's good for your back. It's good for your knees. And it's good for your triathlon performance. The only thing it's not good for is your orthopedic surgeon's bank account.

First Descent—1 dowel-rod support
Second Descent—2 dowel-rod supports
Third Descent—Swiss Ball on wall as support

EXAMPLE EXERCISES

Back Squat

1. Stand with a barbell on shoulders (not the neck) and with **chest out, shoulders back, and navel in** (this is **Good Posture** and gospel for **every** exercise as it emphasizes proper body positioning and activation of the TVA). Hands should be as close in on the bar as flexibility will allow. Feet should be positioned a little wider than hip width apart and either straight ahead or slightly externally rotated.
2. Inhale to charge the thoracic cavity and then descend into a squat position by leading with the glutes as if sitting in a chair. Go down as far as possible without pain or losing the lordotic curve in the lumbar spine.
3. Return to the start position by pushing through the heels and exhaling through pursed lips after passing the sticking point of the ascent. Ensure knees track over feet throughout the movement.

Front Squat

1. Stand with arms crossed, elbows facing forward, barbell on the shoulders and the thumbs of the hands, and with Good Posture. Feet should be positioned a little wider than hip width apart and either straight ahead or slightly externally rotated.
2. Inhale to charge the thoracic cavity and then descend into a squat position by leading with the glutes as if sitting in a chair. Go down as far as possible without pain or losing the lordotic curve in the lumbar spine.
3. Return to the start position by pushing through the heels and exhaling through pursed lips after passing the sticking point of the ascent. Ensure knees track over feet throughout the movement.

Step Up

1. Stand with Good Posture with non-dominant leg placed on a box/bench of appropriate height.
2. Step onto the box/bench by pushing through the heel (think about pushing the box/bench away). Knee should track over the foot and torso should remain upright

throughout the movement. Additionally, hips should not swing out to the side but should remain directly above the foot and knee.
3. Return to the start position by descending under control, maintaining pressure through the heel so that glutes and hamstrings remain activated.

Crossover Step Up

1. Stand with Good Posture behind and to the side of a box/bench of appropriate height.
2. Beginning with the non-dominant side, bring the outside leg across the body and onto the outer edge of the box/bench.
3. Step onto the box/bench by pushing through the heel (think about pushing the box/bench away). Knee should track over the foot and torso should remain upright throughout the movement. Additionally, hips should remain level throughout the movement.
4. Cross the non-dominant leg behind the body to descend back to the floor on the opposite side of the bench/box.
5. Repeat in the opposite direction.

Unilateral Squat

1. Stand with Good Posture on top of a box/bench.
2. Take the dominant leg off the box/bench and bend the opposite knee to descend the body toward the floor.
3. Maintain pressure through the heel of non-dominant leg, allowing knee to track over the foot and chest to remain elevated and hips to stay level throughout the movement. .
4. Go as far as strength will allow with proper form and then push through heel to return to the start position.

High Step Up

1. Stand with Good Posture with non-dominant leg placed on a box/bench taller than knee height.
2. Step onto the box/bench by pushing through the heel (think about pushing the box/bench away). Knee should track over the foot and torso should remain upright throughout the movement. Additionally, hips should not swing out to the side but should remain directly above the foot and knee.
3. Return to the start position by descending under control, maintaining pressure through the heel so that glutes and hamstrings remain activated.

LUNGE

85% of gait takes place on one leg. Whether you're pedaling perfect circles or in squares like most novices, you're deriving most of your power from alternating legs while on the bike. Even swimming works the legs unilaterally. So while the squat pattern is a foundation for many movements in triathlon, the literal next step is the lunge. Performed correctly, it strengthens the hamstrings and the glutes—muscles often underdeveloped and underutilized on triathletes—as well as the quads. Additional benefits, from improved balance to ramped-up core recruitment, make this movement a critical one to master for the competitive triathlete.

> **NOTE:** *All of the lunge movements described below can be made more neurologically challenging and sport specific by adding arm movements such as bicep curls or shoulder presses. When doing so, always follow a* ***cross-crawl pattern*** *where the arm and the opposite leg work together. This will stimulate biomotor integration as well as help establish more connections in the corpus callosum, the part of the brain which connects the right hemisphere to the left hemisphere. Additionally, the Twist pattern can (and should when proficiency allows) be integrated into any of the lunge patterns below so that the legs learn to work in a coordinated fashion with the spine—as they should in the sport of triathlon and the sport of life!*

First Descent—1 dowel-rod support
Second Descent—2 dowel-rod supports
Third Descent—Smith Machine

EXAMPLE EXERCISES

Lunge

1. Standing with Good Posture, take a step forward with the non-dominant leg so that the shin is perpendicular to the ground when the thigh is at parallel. Knee should track over foot throughout the movement. Torso should remain upright and the trailing leg should be bent with the knee almost touching the floor (as flexibility/strength allow) while ball of foot stays in contact with the ground.
2. Pushing through the heel, return to start position and repeat on the opposite side.

Backward Lunge

1. Standing with Good Posture, take a step backward with the dominant leg so that the shin of the forward/non-dominant leg is perpendicular to the ground when the thigh is at parallel. Knee should track over foot throughout the movement. Torso should remain upright and the trailing leg should be bent with the knee almost touching the floor (as flexibility/strength allow) while ball of foot stays in contact with the ground.
2. Pushing through the heel, return to start position and repeat on the opposite side.

Side Lunge

1. Standing with Good Posture, take a step to the side with the non-dominant leg.
2. Once in this straddle position, continue the lateral motion by bending the knee of the non-dominant leg. Feet should remain relatively square or externally rotated slightly. Torso will naturally incline forward, but chest should stay upright. Go as deep as possible without the dropping the chest, lifting the heel of the non-dominant foot off the ground, or bending the knee of the opposite leg which should be straight with the foot flat on the ground.
3. Pushing through the heel of the non-dominant leg, return to start position and repeat on the opposite side.

45° Lunge

1. Standing with Good Posture, take a step forward at a 45 degree angle with the non-dominant leg so that the shin of the forward/non-dominant leg is perpendicular to the ground when the thigh is at parallel. Knee should track over foot throughout the movement. Torso should remain upright and relatively square. Trailing leg should be supported by the ball of the foot with the knee angled at 45 degrees to maintain the integrity of this hinge joint.
2. Pushing through the heel, return to start position and repeat on the opposite side.

Clock Lunge

1. Standing with Good Posture, take a step forward with the non-dominant leg so that the shin is perpendicular to the ground when the thigh is at parallel. Knee should track over foot throughout the movement. Torso should remain upright and the trailing leg should be bent with the knee almost touching the floor (as flexibility/strength allow) while ball of foot stays in contact with the ground. Pushing through the heel, return to start position.
2. Take a step forward at a 45 degree angle with the non-dominant leg so that the shin of the forward/non-dominant leg is perpendicular to the ground when the thigh is at parallel. Knee should track over foot throughout the movement. Torso should remain upright and relatively square. Trailing leg should be supported by the ball of the foot with the knee angled at 45 degrees to maintain the integrity of this hinge joint. Pushing through the heel, return to start position.
3. Take a step to the side with the non-dominant leg. Once in this straddle position, continue the lateral motion by bending the knee of the non-dominant leg. Feet should remain relatively square or externally rotated slightly. Torso will naturally incline forward, but chest should stay upright. Go as deep as possible without the dropping the chest, lifting the heel of the non-dominant foot off the ground, or bending the knee of the opposite leg which should be straight with the foot flat on the ground. Pushing through the heel, return to the start position.
4. Take a step backward at a 45 degree angle with the non-dominant leg so that the shin of the forward/dominant leg is perpendicular to the ground when the thigh is at parallel. Knee should track over foot throughout the movement. Torso should remain upright and relatively square. Trailing leg should be supported by the ball of the foot with the knee angled at 45 degrees to maintain the integrity of this hinge joint. Pushing through the heel, return to start position.

5. Take a step backward with the non-dominant leg so that the shin of the forward/dominant leg is perpendicular to the ground when the thigh is at parallel. Knee should track over foot throughout the movement. Torso should remain upright and the trailing leg should be bent with the knee almost touching the floor (as flexibility/strength allow) while ball of foot stays in contact with the ground. Pushing through the heel, return to start position.
6. Repeat all movements with the dominant leg.

Lunge Walk

1. Standing with Good Posture, take a step forward with the non-dominant leg so that the shin is perpendicular to the ground when the thigh is at parallel. Knee should track over foot throughout the movement. Torso should remain upright and the trailing leg should be bent with the knee almost touching the floor (as flexibility/strength allow) while ball of foot stays in contact with the ground.
2. Pushing through the heel, move forward to a standing position and repeat on the opposite side

45° Lunge Walk

1. Standing with Good Posture, take a step forward at a 45 degree angle with the non-dominant leg so that the shin of the forward/non-dominant leg is perpendicular to the ground when the thigh is at parallel. Knee should track over foot throughout the movement. Torso should remain upright and relatively square. Trailing leg should be supported by the ball of the foot with the knee angled at 45 degrees to maintain the integrity of this hinge joint.
2. Pushing through the heel, more forward to a standing position and repeat on the opposite side.

Run Pose

1. Standing with Good Posture in lunge position with non-dominant leg forward, push through the heel as you move into a standing position supported by the ball of the foot of the non-dominant leg. Knee of the dominant leg should be driven toward chest. Support leg's knee should track over foot throughout the movement, and the torso should remain upright. Arms should work in a cross-crawl pattern so that the left arm moves forward when the right leg is forward and vise versa.
2. Perform all repetitions on one side before repeating on the opposite side.

Backward Lunge Walk

1. Standing with Good Posture, take a step backward with the dominant leg so that the shin of the forward/non-dominant leg is perpendicular to the ground when the thigh is at parallel. Knee should track over foot throughout the movement. Torso should remain upright and the trailing leg should be bent with the knee almost touching the floor (as flexibility/strength allow) while ball of foot stays in contact with the ground.

2. Pushing through the heel, return backward to a standing position and repeat on the opposite side.

Bosu Lunge

1. Standing with Good Posture, with the non-dominant leg in the center of Bosu, take a step backward with the dominant leg so that the shin of the forward/non-dominant leg is perpendicular to the ground when the thigh is at parallel. Knee should track over foot throughout the movement. Torso should remain upright and the trailing leg should be bent with the knee almost touching the floor (as flexibility/strength allow) while ball of foot stays in contact with the ground.
2. Pushing through the heel, return to start position and continue with the designated number of reps before repeating on the opposite side.

PULL

Another one of the seven primal patterns, pulling movements are often neglected or underdeveloped compared to their sister pattern, pushing movements. This is often because people don't have vision for what they can't see. When you "see" a tree, you don't really see the whole tree. You don't see its roots. You don't see the other side of the trunk or the top of the canopy. Yet the tree could never be fully developed without them. So just because you can't see the muscles of your posterior chain does not mean you should ignore them. You are more than just your mirror muscles. In fact, it is the predominance of anterior chain movements in triathlon which make pulling proficiency so important for triathletes to maintain postural balance along with orthopedic health.

> **NOTE**: *Anytime you do unilateral (i.e. single arm) Pull or Push Patterns, you are creating a rotational force and, thus, mobilizing the spine. This not only helps nourish the spine by pumping the spinal discs with the fluids essential for health, it's also specific to the movement patterns involved in triathlon.*

First Descent—Braced
Second Descent—Seated or lying
Third Descent—Seated or lying on fixed-axis machine

EXAMPLE EXERCISES

Low Row

1. Standing with Good Posture and holding a bar with a supinated grip, shoulder width apart, pull hands toward body so sides of wrists finish at rib cage as the bar touches the torso near the level of the sternum.
2. Return to start position and repeat.

Unilateral Row

1. Standing with Good Posture and holding a handle with a pronated grip, pull hand toward body, supinating the hand so the wrist finishes at the side of the rib cage at approximately the level of the sternum.
2. Return to start position and repeat.

High Row

1. Standing with Good Posture and holding two handles (or a bar if necessary) with a pronated grip, a bit wider than shoulder width apart, pull hands toward body while keeping the elbows high and the forearms in the same plane as the angle of pull. Wrists should remain neutral (i.e. not flexed) and finish movement at approximately shoulder level.
2. Return to start position and repeat.

High Row with Rotation

1. Stand with Good Posture, holding two handles with a supinated grip, shoulder width apart. Initiate movement by rotating torso to the non-dominant side. Simultaneously pull handle held by non-dominant hand toward body while keeping the elbow high and the forearm in the same plane as the angle of pull. Wrists should remain neutral and finish the movement at approximately shoulder level.
2. Return to start position and repeat on the opposite side.

Suspended Row

1. Maintain Good Posture while leaning back at the appropriate angle (difficulty increases as angle steepens) and holding the handles of a suspension system with a pronated grip, shoulder width apart.
2. Pull body toward handles while maintaining high elbows and forearms in the same plane as the angle of pull which should perpendicular to the body. Wrists should remain neutral and finish at approximately shoulder level.
3. Return to start position and repeat.

Pull Ups/Chin Ups

1. Stand with Good Posture while grasping a Pull Up Bar above the head. Grip should be swim width apart and pronated for a Pull UP or shoulder width apart and supinated for a Chin Up.
2. Pull body towards hands until chin passes over the bar. Legs should not swing forward at any time during the movement.
3. Return to start position and repeat.

Overhand Pull Down

1. Kneeling or seated with Good Posture holding two handles or a bar with a pronated grip, swim-width apart, pull hands toward body until handles go below chin level but not below the clavicle.
2. Return to start position and repeat.

Cable Pulls

1. Stand in a counter stance with Good Posture while holding a handle with the non-dominant hand and a pronated grip. The other arm should be pulled back so the wrist is at approximately shoulder level with the elbow high and the forearm parallel to the angle of the other arm.
2. Pull hand toward body while simultaneously rotating along the axis of the spine to the non-dominant side. Hands should switch places so that the non-dominant side is now at shoulder level with a high elbow and the other arm is outstretched in front of the body with the palm facing down.
3. Return to start position and continue for the designated number of reps before repeating on the opposite side.

PUSH

In reality, muscles do not push. Movements, even pushing ones, occur because a muscle (or muscles) contracts or shortens and *pulls* the origin and insertion closer together. Even during a push up, the triceps contract to *pull* the origin and insertion closer together, causing the arms to extend and the body to rise away from the ground. This, of course, is achieved with the help of additional actions of the pectorals and deltoids (not to mention countless core muscles essential to a proper push up. These are the same muscles often lacking in a guy who has a 250-pound bench, yet can't hold his pelvis level to perform a decent push up). In the sport of triathlon, forward propulsion is achieved mainly by the action of these muscles. This section will focus exclusively on the upper-body pushing movements.

First Descent—Braced
Second Descent—Seated or lying
Third Descent—Seated or lying on fixed-axis machine

EXAMPLE EXERCISES

Push Ups

1. In prone position with arms outstretched and hands placed shoulder width apart, lower the body down until the upper arm is approximately parallel with the floor.
2. Return to start position and repeat.

Decline Push Ups

1. In prone position with arms outstretched, hands placed shoulder width apart, and feet on an elevated surface, lower the body down until the upper arm is approximately parallel with the floor.
2. Return to start position and repeat.

Medicine-Ball Push Ups

1. In prone position with arms outstretched and hands placed on a medicine ball, lower the body down until the upper arm is approximately parallel with the floor.
2. Return to start position and repeat.

Bosu Push Ups

1. In prone position with arms outstretched and hands placed shoulder width apart on a Bosu, lower the body down until the upper arm is approximately parallel with the floor.
2. Return to start position and repeat.

Hands-on-Physio-Ball Push Ups

1. In prone position with arms outstretched and hands placed shoulder width apart on a physio ball, lower the body down until the chest just touches the ball.
2. Return to start position and repeat.

Feet-on-Physio-Ball Push Ups

1. In prone position with arms outstretched, hands placed shoulder width apart, and feet (or foot to increase neurological complexity) on a physio ball, lower the body down until the upper arm is approximately parallel with the floor.
2. Return to start position and repeat.

Shoulder Press

1. Standing with Good Posture, hands holding two dumbbells just above the shoulders with palms facing forward, extend arms overhead.
2. Return to start position and repeat.

Arnie Press

1. Standing with Good Posture, hands holding two dumbbells at shoulder height with palms facing body, extend arms overhead so that palms end the movement facing forward.
2. Return to start position and repeat.

Unilateral Arnie Press

1. Standing with Good Posture on the dominant leg, hands holding two dumbbells at shoulder height with palms facing body, extend non-dominant arm overhead so that the palm ends the movement facing forward.
2. Return to start position and repeat with the opposite arm, switching stance legs once half the reps in the set are completed.

Bosu Arnie Press

1. Standing with Good Posture on a Bosu, hands holding two dumbbells at shoulder height with palms facing body, extend arms overhead so that palms end the movement facing forward.
2. Return to start position and repeat.

Kneeling-on-Physio-Ball Arnie Press

1. Kneeling with Good Posture on a physio ball, hands holding two dumbbells at shoulder height with palms facing body, extend arms overhead so that palms end the movement facing forward.
2. Return to start position and repeat.

Straight-Arm Push Downs

1. Stand with Good Posture, hands holding a bar with a pronated grip, swim width apart.
2. Push down and bring hands toward the legs until bar touches thighs. Do not allow arms to bend at elbows as pivot point is at the shoulders.
3. Return to start position and repeat.

Unilateral Straight-Arm Push Downs

1. Stand with Good Posture, non-dominant hand holding a handle with a pronated grip.
2. Push down and bring hand toward the legs until it is beside or even behind the thigh. Do not allow arm to bend at elbow as pivot point is at the shoulder.
3. Return to start position and repeat.

Cable Push

1. Stand in a counter stance with Good Posture while holding a handle at shoulder level with the non-dominant hand and a pronated grip. The arm should be pulled back so the elbow is high and the forearm parallel to the angle of the dominant arm which should be outstretched in front of the body, palm down.
2. Push non-dominant hand away from the body while simultaneously rotating along the axis of the spine to the dominant side. Hands should switch places so that the dominant hand is now at shoulder level with a high elbow and the other arm is outstretched in front of the body with the palm facing down.
3. Return to start position and continue for the designated number of reps before repeating on the opposite side.

Swim

1. Stand facing a cable machine with non-dominant side holding a dumbbell at shoulder height with palm facing body and the dominant side holding a handle at shoulder height with palm facing forward and the elbow glued to the side of the body.
2. Simultaneously extend the non-dominant side overhead while pressing the handle down until the dominant arm is fully extended.
3. Return to start position and continue for the designated number of reps before repeating on the opposite side(s).

BEND

One of the most important of the primal patterns, this movement is one we perform multiple times a day without much thought. It's probably not on our mind when we're bent over the bars during the bike leg of a triathlon either. But we stand up and take notice when we realize that strength in this pattern helps us actually to be *straight* when we stand up! Bending strengthens both the ligamentous system and the muscular system, without which we'll be running out of T2 folded at the waist. Thus, this movement pattern is critical. If the triathlete can't bend, he'll break.

First Descent—Spotter support
Second Descent—From knees
Third Descent—From seated

EXAMPLE EXERCISES

Dead Lift

1. In a Squat position with feet positioned a little wider than hip width apart and externally rotated slightly, grasp a barbell with an alternate grip (supinated on one side and prontated on the other).
2. Inhale to charge the thoracic cavity, draw the navel in toward the spine, then ascend to the standing position by leading pushing through the heels and exhaling through pursed lips after passing the sticking point of the ascent. Ensure knees track over feet throughout the movement and lumbar spine never rounds into kyphosis (which may limit how deep the movement can be peformed).
3. Inhale and draw the navel in again before returning to the start position and repeating the movement with the exception of the inhalation which should now be performed in the standing position.

Bent-Over Row

1. Stand with feet pedal-width apart holding a pair of dumbbells or a bar with a supinated grip, chest out, shoulders back, navel in.
2. Soften the knees (approximately 20° bend), which makes the iliotibial band taut so that the gluteus maximus has a foundation off which to work. The glutes can then help share the load so that the back need not work in isolation.
3. Pivot forward at the hips so that the torso is positioned between 45 and 90° in relation to the legs. The angle should be dictated by the flexibility in the hamstrings—if the back starts to round or you lose your neutral lumbar and thoracic curves, you have bent over too much. Head should remain in neutral, too, (i.e., don't look forward), to avoid shortening the sub occipitals.
4. Pull weight to chest while maintaining high elbows, pausing at the top of the movement. The forearms and wrist should remain perpendicular to the floor. Return the weight to start position and repeat for the designated number of reps.

Alternating Unilateral Bent-Over Row

1. Stand with feet pedal-width apart holding a pair of dumbbells with a supinated grip, chest out, shoulders back, navel in.
2. Soften the knees (approximately 20° bend).
3. Pivot forward at the hips so that the torso is positioned between 45 and 90° in relation to the legs. The angle should be dictated by the flexibility in the hamstrings—if the back starts to round or you lose your neutral lumbar and thoracic curves, you have bent over too much. Head should remain in neutral, too, (i.e., don't look forward).
4. Pull non-dominant hand to chest while maintaining a high elbow and keeping the forearm and wrist should perpendicular to the floor. Return the weight to start position while simultaneously performing the exact same movement on the opposite side.
5. Repeat for the designated number of reps.

Alternating Unilateral Bent-Over Row on Bosu

1. Stand on a Bosu with feet pedal-width apart holding a pair of dumbbells with a supinated grip, chest out, shoulders back, navel in.
2. Soften the knees (approximately 20° bend).
3. Pivot forward at the hips so that the torso is positioned between 45 and 90° in relation to the legs. The angle should be dictated by the flexibility in the hamstrings—if the back starts to round or you lose your neutral lumbar and thoracic curves, you have bent over too much. Head should remain in neutral, too, (i.e., don't look forward).
4. Pull non-dominant hand to chest while maintaining a high elbow and keeping the forearm and wrist should perpendicular to the floor. Return the weight to start position while simultaneously performing the exact same movement on the opposite side.
5. Repeat for the designated number of reps.

NOTE: The following exercises are the ones which should be utilized when the training program calls for "back extension" movements.

Twisting Back-Extension (on Ball)

1. Lie in the prone position (navel down) with arms above the head, palms down.
2. Inhale and lift the chest off the ground, rotating to the non-dominant side so that one shoulder is higher than the other. Lower body should remain relaxed with feet on the floor. *Those whose lumbar curvature is excessive should concentrate on initiating the movement by squeezing the glutes first so that recruitment of the lumbar erectors is not excessive*. Make sure chin stays tucked so that head is aligned with the rest of the spine to avoid shortening of the sub occipitals.
3. Lower chest back to the floor and perform the exact same movement in the opposite direction before repeating for the designated number of reps.

OR

1. Lie in the prone position on a physio ball with hands on the floor below the shoulders.
2. Inhale and lift the chest off the ball while simultaneously rotating to the non-dominant side. The non-dominant arm should swing down toward the legs and the dominant side should swing up above the head. Keep the lower body relaxed with feet on the floor. *Those whose lumbar curvature is excessive should concentrate on initiating the movement by squeezing the glutes first so that recruitment of the lumbar erectors is not excessive*. Make sure chin stays tucked and the head is aligned with the rest of the spine.
3. Lower chest back toward the ball and perform the exact same movement in the opposite direction before repeating for the designated number of reps.

Prone Cobra on Ball

1. Lie in the prone position on a physio ball with arms by the sides of the body, palms up.
2. Inhale and lift the chest off the ball, aiming to reverse the thoracic curvature while supinating the arms and squeezing the shoulder blades together. Keep the lower body relaxed with feet on the floor. *Those whose lumbar curvature is excessive should concentrate on initiating the movement by squeezing the glutes first so that recruitment of the lumbar erectors is not excessive*. Make sure chin stays tucked so that head is aligned with the rest of the spine to avoid shortening of the sub occipitals.
3. Hold for the designated period of time.

Reverse Hyper-Extension on Ball

1. Lie in the prone position on a physio ball with hands on the floor below the shoulders.
2. Inhale and lift the legs off the ground, aiming to get them perpendicular to the floor. *Those whose lumbar curvature is excessive should concentrate on initiating the movement by squeezing the glutes first so that recruitment of the lumbar erectors is not excessive*.
3. Return to start position and repeat for the designated number of reps.

Alternating Superman on Ball

1. Lie in the prone position with the navel in the center of the ball and the hands on the floor below the shoulders.
2. Inhale and lift the chest off the ground, aiming to reverse the thoracic curvature while supinating the arms and squeezing the shoulder blades together. Keep the lower body relaxed with feet on the floor. *Those whose lumbar curvature is excessive should concentrate on initiating the movement by squeezing the glutes first so that recruitment of the lumbar erectors is not excessive*. Make sure chin stays tucked so that head is aligned with the rest of the spine to avoid shortening of the sub occipitals.

Horse Stances (Vertical)

1. Get on hands and knees with hands directly beneath shoulders and knees directly beneath hips. Bend arms slightly at the elbow so that back is parallel to the floor. I recommend use of a dowel to ensure maintenance of a neutral spine. The dowel rod should touch the sacrum, the thoracic spine between the shoulder blades, and the back of the head.
2. Draw the TVA in toward the spine and activate the pelvic floor musculature. (Women: Perform a kegel. Men: Pull your testicles up toward your head.)
3. Lift one hand and the contralateral knee off the floor just enough to slip a piece of paper under it. If I were looking at you from the side, I should hardly be able to tell you're moving at all.
4. Remain still, deviating neither side to side nor fore and aft, and hold this position for 5-10 seconds.
5. Repeat this procedure on the opposite sides, again holding for 5-10 seconds. Continue alternating sides for 8-10 reps each side.

TWIST

Usually coupled with other movements, twisting is an integral part of most sports, and triathlon is no exception. In fact, rotation is the core of all movement. Swimming is predicated on rotation. If a runner can't twist, the movements which propel him forward are not only shortened, they are less efficient and the restriction will likely cause a compensation which will result in injury. Even cycling has rotational forces which must be stabilized in the body to deliver optimal power to the pedals. Proficiency in the twist pattern, then, should be a goal of every triathlete who wants to make it, not only to the starting line, but to the finish line as well.

First Descent—Kneeling
Second Descent—Seated on Swiss Ball
Third Descent—Seated on machine

EXAMPLE EXERCISES

T Push Ups

1. In prone position with arms outstretched and hands placed shoulder width apart directly underneath the shoulders, lower the body down until the upper arm is approximately parallel with the floor.
2. Push back toward the start position by extending the arms while simultaneously rotating to the dominant side so that body is supported by the non-dominant arm. Feet should roll on top of each other if proficiency allows. Otherwise, feet can remain apart, giving more stability.
3. Return to start position by reversing the motion and then repeat on the opposite side.

Twister

1. In prone position with arms outstretched, hands placed shoulder width apart directly underneath the shoulders, and shins on top of a physio ball, rotate lower body to one side as far as possible without losing neutral spinal curvatures.
2. Rotate back toward the start position and continue the movement in the opposite direction.
3. Return to start position and repeat for the designated number of reps.

Upper-Body Russian Twists

1. Seated on a physio ball, roll body down until the ball supports the head and shoulders. Feet on the ground with shins perpendicular to the floor. Arms should be outstretched in front of body so that hands are in front of the chest with the fingers interlaced. Maintain TVA function (i.e., navel drawn in slightly) to avoid over-recruitment of the lumbar erectors.
2. Rotate torso to one side by rolling the ball and the shoulder together while keeping the hips elevated. Hands should move because the body moves—i.e. *roll, don't reach*).
3. Rotate back to the start position and then repeat the movement in the opposite direction.

4. Repeat for the designated number of reps. Reposition feet as necessary. If head comes off ball, make sure tongue is placed in the physiological rest position so that forward head posture is not exacerbated.

Lower-Body Russian Twists

1. In prone position with arms outstretched, hands placed shoulder width apart directly underneath the shoulders, and shins on top of a physio ball, flex the hips so that the body is in a pike position.
2. Rotate pelvis to one side by rolling the ball and the hips/lower legs together.
3. Rotate back to the start position and then repeat the movement in the opposite direction.
4. Repeat for the designated number of reps. Reposition hips as necessary.

Drop and Recover

1. Seated on a physio ball, roll body down until the ball supports the head and shoulders. Feet are on the ground with shins perpendicular to the floor. One arm should be outstretched in front of the body with the palm facing down. The other arm is retracted into the ball with the hand at the level of the shoulder, palm down.
2. Explosively rotate torso in the direction of the arm that is outstretched in front of the body while simultaneously switching the positions of the arms so that the opposite arm is outstretched in front of the body and the other arm powerfully retracts into the ball. Lower body works in conjunction with the upper body so that the end position is supported by the legs and the elbow of the arm that's on the ball.
3. Descend back to the start position before immediately rotating explosively up to the other side.
4. Repeat for the designated number of reps.

Twisting Lunge (Walk)

1. Standing with Good Posture, take a step forward with the non-dominant leg so that the shin is perpendicular to the ground when the thigh is at parallel. Simultaneously, twist upper body in the direction of the forward leg. Knee should track over foot throughout the movement. Torso should remain upright and the trailing leg should be bent with the knee almost touching the floor (as flexibility/strength allow) while ball of foot stays in contact with the ground.
2. Pushing through the heel, move forward to a standing position and repeat on the opposite side.

Lunge (Walk) Arc

1. Standing with Good Posture while holding a weight on the side of the dominant leg, take a step forward with the non-dominant leg so that the shin is perpendicular to the ground when the thigh is at parallel. Simultaneously, arc weight over the head from the dominant side to the non-dominant side so that it ends up outside the hip of the forward leg. Knee should track over foot throughout the movement. Torso should remain upright and the trailing leg should be bent with the knee almost touching the floor (as flexibility/strength allow) while ball of foot stays in contact

with the ground.
2. Pushing through the heel, move forward to a standing position and repeat on the opposite side.

ABDOMINAL-SPECIFIC MOVEMENTS

EXAMPLE EXERCISES

Four-Point TVA Stance and Progressions

1. Get on hands and knees with the hands directly beneath the shoulders and the knees directly beneath the hips. Bend arms slightly at the elbow so that the back is parallel to the floor. I recommend use of a dowel to ensure maintenance of a neutral spine. The dowel rod should touch the sacrum, the thoracic spine between the shoulder blades, and the back of the head.
2. Take a large diaphragmatic breath in through the nose and allow the belly to expand and the navel to drop away from the spine. Exhale and then activate the TVA to draw the navel in toward the spine as far as possible without flexing the spine/losing neutral spinal curvatures or compensating/cheating in any way. The only part of the body which should visibly move is the navel. It may help to concentrate on activating the pelvic floor musculature. (Women: Perform a kegel. Men: Pull your testicles up toward your head).
3. Hold this position until it's necessary to take another breath. Then repeat the process for the designated number of reps/breaths.

OR

1. Get in shortstop position with the hands on the knees. Knees should be bent slightly and spinal curvatures should remain in neutral (i.e. don't round the lower back).
2. Take a large diaphragmatic breath in through the nose and allow the belly to expand and the navel to drop away from the spine. Exhale and then activate the TVA to draw the navel in toward the spine as far as possible without flexing the spine/losing neutral spinal curvatures or compensating/cheating in any way. The only part of the body which should visibly move is the navel. It may help to concentrate on activating the pelvic floor musculature. (Women: Perform a kegel. Men: Pull your testicles up toward your head).
3. Hold this position until it's necessary to take another breath. Then repeat the process for the designated number of reps/breaths.

OR

1. Stand with Good Posture.
2. Take a large diaphragmatic breath in through the nose and allow the belly to expand and the navel to move away from the spine. Exhale and then activate the TVA to draw the navel in toward the spine as far as possible without flexing the spine/losing neutral spinal curvatures or compensating/cheating in any way. The only part of the body which should visibly move is the navel. It may help to concentrate on activating the pelvic floor musculature. (Women: Perform a kegel. Men: Pull your testicles up toward your head).
3. Hold this position until it's necessary to take another breath. Then repeat the process for the designated number of reps/breaths.

Lower Abdominal Series # 1—Pelvic Tilt

1. In supine position with knees bent, feet on the floor, and a blood pressure cuff pumped to 40mmHg (or a hand) placed opposite the navel in the small of the back, gently draw in the navel.
2. Flatten the lower back into the cuff (or the hand) by posteriorly rotating the pelvis using the lower abdominals to raise the pressure on the cuff to 70mmHg. Try to keep the hamstrings completely relaxed as they can also rotate the pelvis posteriorly. But if they do the work, the lower abdominals won't.
3. Breathe naturally as the pelvis is held in this position. Return to start and repeat for the designated number of reps.

Lower Abdominal Series #2A

1. In supine position with knees bent, feet on the floor, and a blood pressure cuff (or a hand) placed opposite the navel in the small of the back, pump the cuff up to 40mmHg.
2. Gently draw the navel in and then flatten the lower back into the cuff (or the hand) by posteriorly rotating the pelvis using the lower abdominals to raise the pressure on the cuff to 70mmHg. Try to keep the hamstrings completely relaxed as they can also rotate the pelvis posteriorly. But if they do the work, the lower abdominals won't.
3. Pivoting at the hip, lift one leg up until the thigh is perpendicular to the body and the knee is at 90 (or less if the exercise needs to be made easier) while maintaining the pressure on the cuff at 70mmHg, varying no more than +/-5mmHg throughout the exercise.
4. Lower the leg back to start position and then repeat the movement on the opposite side.

Lower Abdominal Series #2B

1. In supine position with knees bent, feet on the floor, and a blood pressure cuff (or a hand) placed opposite the navel in the small of the back, lift the legs until the thighs are perpendicular to the body with the hips at 90 and the knees at 90. Note: the angle at the knee can be decreased to make the exercise easier if necessary.
2. Pump the blood pressure cuff up to 40mmHg.
3. Gently draw the navel in and then flatten the lower back into the cuff (or the hand) by posteriorly rotating the pelvis using the lower abdominals to raise the pressure on the cuff to 70mmHg.
4. Lower one leg back to the floor as you maintain the pressure on the cuff at 70mmHg, allowing the reading to vary no more than +/-5mmHg throughout the exercise.
5. Raise the leg back up and perform the same movement on the opposite side.
6. Repeat for the designated number of reps.

NOTE: All of the Lower Abdominal Series are best performed with a blood-pressure cuff placed opposite the navel and inflated to 40 mmHg (or 30 mmHg if lumbar curvature is deficient). The athlete would then increase the reading on the dial 30 mmHg by posteriorly rotating the pelvis to increase the pressure. For Lower Abdominal #2A and #2B, the leg movements should be performed with no more than 5 mmHg fluctuations above or below starting pressure (i.e., 60 or 70 mmHg).

Forward Ball Roll

1. In prone position with forearms on a physio ball, elbows at 90 and positioned underneath the shoulders, gently draw the navel in toward the spine.
2. Push the ball forward by extending the arms as far as you can without losing the neutral curvatures of the spine. Lumbar spine will work but should not be the focus of the effort. Exercise can be descended by performing the movement from the knees as necessary.
3. Pause at the end R.O.M. before returning to start position and repeating for the designated number of reps.

Oblique Cable Twist

1. Standing with Good Posture, feet wider than shoulder width, and with a cable machine on the non-dominant side of the body, rotate torso so that hands are in front of the chest, grasping a handle attached to the cable. Dominant hand should be on first and non-dominant hand should be on top.
2. Rotating along the axis of the spine, twist torso toward the dominant side. Movement should be initiated by the core, and the only reason the hands should move is because the chest moves first. Slowly return to start position by reversing the motion. Concentrate on a powerful positive and a controlled negative.
3. Repeat for the designated number of reps before performing the movement with the opposite set up position in the opposite direction.

Oblique Raise

1. Lying on the side of the body with the forearm perpendicular to the torso and the elbow directly underneath the shoulder, lift the hips off the floor until the body is one straight line from ankles to ears.
2. Hold for the designated time period or do reps as prescribed. Note: exercise can be descended by bending the underneath leg which shortens the lever arm as the body is supported between the elbow and the knee.

Oblique Raise External Shoulder Rotation

1. Lying on the side of the body with the dominant forearm perpendicular to the torso and the elbow directly underneath the shoulder, lift the hips off the floor until the body is one straight line from ankles to ears. The elbow of the non-dominant arm should be glued to the superior side of the body with the hand across the abdomen, grasping a very light dumbbell.
2. Hold this elevated position and externally rotate the non-dominant arm up as far as

strength and flexibility will allow. Try not to let elbow deviate far from the body. Note: exercise can be descended by bending the underneath leg which shortens the lever arm as the body is supported between the elbow and the knee.
3. Very slowly return the non-dominant arm to the start position and repeat for the designated number of reps while maintaining the elevated position.
4. Perform the movement on the opposite side.

Oblique Raise Abductor

1. Lying on the side of the body with the dominant forearm perpendicular to the torso and the elbow directly underneath the shoulder, bend the dominant leg at the knee so that the lower leg is perpendicular behind the body.
2. Lift the hips off the floor while simultaneously abducting the non-dominant toward the ceiling as far as strength and flexibility allow.
3. Hold this elevated position and externally rotate the non-dominant arm up as far as strength and flexibility will allow.
4. Pause end R.O.M. before slowly returning to the start position and repeating for the designated number of reps.
5. Perform the movement on the opposite side.

Supine Lateral Ball Roll

1. Seated on a physio ball, roll body down until the ball supports the head and shoulders. Feet are on the ground with the shins perpendicular to the floor. Arms should be out at the sides of the body like a tightrope walker or. A dowel rod can be placed across the chest and in both hands for cueing (it should remain level and in contact with the chest at all times. Additionally, the thumbs should never be activated to hold onto the dowel rod). Maintain TVA function (i.e., navel drawn in slightly) to avoid over-recruitment of the lumbar erectors. Note: if lateral movement is sufficient to bring head off the ball, tongue should be placed on the roof of the mouth in the physiological rest position.
2. Shuffle over to the non-dominant side while maintaining the hips in an elevated position and the rest of the body in perfect alignment. Pause at end R.O.M.
3. Return to center and then shuffle over to the dominant side before pausing again.
4. Move back to the center position and repeat for the designated number of reps.

Stabilizer Series

1. In prone position with forearms on the floor, elbows at 90 directly underneath the shoulders, activate core musculature to maintain neutral spinal curvatures supported between the toes and forearms. This position can be held for time or progressing to the following steps if proficiency allows. If it's difficult just to maintain the above position, descending the exercise can be accomplished by moving from the toes to the knees.
2. Take dominant arm off the ground (and if strength will allow, the opposite leg, too) for the designated time.
3. Return to start position and then repeat on the opposite side.

Bosu Prone Leg Lift

1. In prone position with arms outstretched and hands placed shoulder width apart on a Bosu, lift one foot off the ground by extending at the hip (not the knee). Keep core activated so that lateral deviation of the Bosu/body is kept to a minimum.
2. Return to start position and repeat the movement on the opposite side, alternating for the designated number of reps.

Push Up Row

1. In prone position with arms outstretched and hands placed shoulder width apart and holding two dumbbells (the movement can be performed without the dumbbells, using just the hands if necessary), lower the body toward the floor until the upper arm is approximately parallel with the floor.
2. Return to start position by extending the arms.
3. Lift one dumbbell off the ground and pull it to the chest so that it just touches the rib cage. Keep core activated so that lateral deviation of the body is kept to a minimum. If necessary, move legs wider to give a more stable base of support.
4. Return to start position and perform the movement on the opposite side before repeating the push up followed by the two rows again for the designated number of reps.

Prone Low Crawler

1. In prone position with forearms on the two physio balls of equal size, elbows at 90 directly underneath the shoulders, activate core musculature to maintain neutral spinal curvatures supported between the toes and forearms.
2. Push the ball in contact with the non-dominant arm forward by extending the non-dominant arm.
3. Return the arm to the original position and repeat the movement with the dominant side.
4. Bring the dominant side back to the starting position and then repeat for the designated number of reps.

NON-AXIAL-LOADING LEG MOVEMENTS

EXAMPLE EXERCISES

Supine Hip-Extension

1. Lie face up with feet on the ground in the sit up position. Arms can be out to the sides of the body like a tightrope walker or, as proficiency allows, closer to the body until they are crossed over the chest. Maintain TVA function (i.e., navel drawn in slightly) to avoid over-recruitment of the lumbar erectors.
2. Lift the pelvis off the floor by pushing through the heels and activating the glutes, the hamstrings, and the lumbar erectors. The last inch of the movement in the elevated position may be the most difficult, but it is equally important.
3. Lower the pelvis back to the start position and repeat for the designated number of reps.

Supine Hip-Extension Back on Ball

1. Seated on a physio ball, roll body down until the ball supports the head and shoulders. Feet are on the ground with the shins perpendicular to the floor. Arms can be out at the sides of the body like a tightrope walker or, as proficiency allows, closer to the body until they are crossed over the chest. Maintain TVA function (i.e., navel drawn in slightly) to avoid over-recruitment of the lumbar erectors.
2. Lower the glutes toward the floor while maintaining the shins perpendicular to the ground.
3. Push through the heels to raise pelvis back to the start position, making sure to contract the glutes in addition to the hamstrings and the lower back. The last inch of the movement in the elevated position may be the most difficult, but it is equally important.
4. Repeat for the designated number of reps.

Supine Hip-Extension Feet on Ball

1. Lie supine with legs on a physio ball and arms out at the sides perpendicular to the body, palms up. Activate TVA (draw navel in slightly) to avoid over-recruitment of the lumbar erectors.
2. Lift pelvis off the ground by contracting the glutes in addition to the lower back and hamstrings, until the shoulders, hip, and ankles are in line.
3. Lower to start position and repeat for the designated number of reps.

Supine Hip-Extension Knee Flexion

1. Lie supine and place the legs on a physio ball with the arms out at the sides, palms up and perpendicular to the body. Activate the TVA (draw the navel in slightly) to avoid over-recruitment of the lumbar erectors.
2. Lift the pelvis off the ground by contracting the glutes in addition to the lower back and hamstrings, until the shoulders, hip, and ankles are in line.

3. Flex the knees and pull the heels toward the glutes as far as possible.
4. Extend the legs to return the ball to the start position.
5. Repeat for the designated number of reps.

Unilateral Supine Hip-Extension Back on Ball

1. Seated on a physio ball, roll down until the ball supports the head and shoulders. Feet should be on the ground with shins perpendicular to the floor. Arms can be out at the sides like a tightrope walker or, as proficiency allows, closer to the body until they are crossed over your chest. Maintain TVA function (i.e., navel drawn in slightly) to avoid over-recruitment of the lumbar erectors.
2. Take the dominant leg away from the floor by extending the knee to keep the leg parallel with the ground.
3. Lower the glutes toward the floor while maintaining a perpendicular shin of the leg on the ground.
4. Push through the heel and raise the pelvis back to the start position, making sure to contract the glute in addition to the hamstring and the lower back. The last inch of the movement in the elevated position may be the most difficult, but it is equally important.
5. Repeat for the designated number of reps before repeating on the opposite side.

Unilateral Supine Hip-Extension Knee Flexion

1. Lie supine and place the legs on a physio ball with arms out to the sides, palms up and perpendicular to the body. Activate the TVA (draw the navel in slightly) to avoid over-recruitment of the lumbar erectors.
2. Lift the pelvis off the ground by contracting the glutes in addition to the lower back and hamstrings, until the shoulders, hip, and ankles are in line.
3. Take the dominant leg away while keeping the pelvis level and in an elevated position.
4. Flex the knee and pull the heel toward the glute as far as possible.
5. Extend the leg to return the ball to the start position.
6. Repeat for the designated number of reps before repeating on the opposite side.