



Hard “Core” Training *Made Simple*

The next step in functional abdominal training

BY KIM GOSS

that is, despite the good intentions of those providing it, simply incorrect.

Showing exceptional abdominal development is Baylie Divino, a Level 9 gymnast who represents the Olympus School of Gymnastics in Sandy, Utah.

In this article, we’re going to separate the *facts* about abdominal training that will make athletes better from the *fallacies* that will cause them more harm than good.

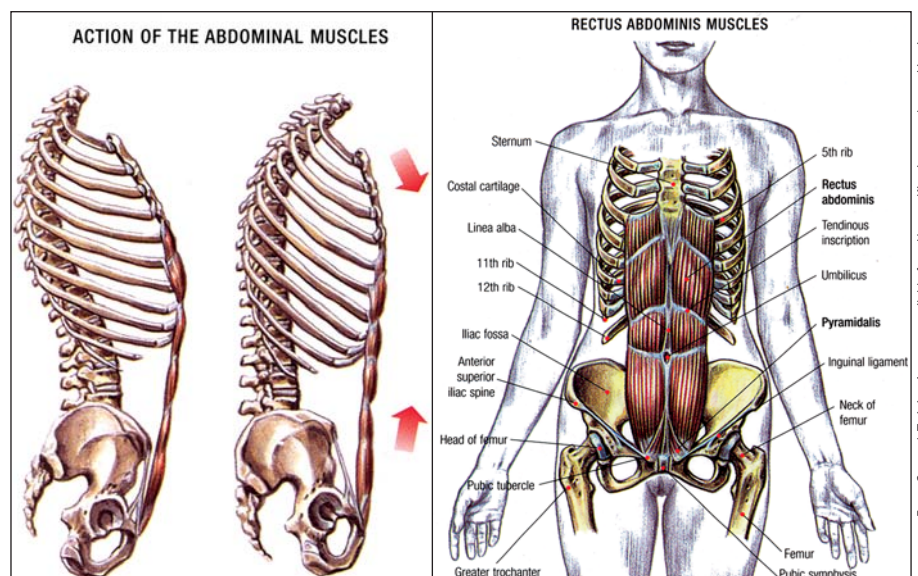
To learn how to properly train the abs, you must understand the distinction between internal- and external-range exercises. Let’s use the analogy of a biceps curl. If you were to perform a biceps curl starting with your arms

straight and you stopped the movement when they reached 90 degrees, that would be considered the external range of the exercise. If you were to start from 90 degrees and curl the barbell to the top position, that would be considered working the muscle in the internal range.

In abdominal exercises, a crunch would be considered an external-range exercise for the rectus abdominus, the primary abdominal muscle that runs down the front of the torso. One of its primary functions is to flex the spine. Much of the core workouts you see being performed with Swiss balls or

When it comes to the thick abdominals of a professional bodybuilder – made even more pronounced by their razor-sharp muscularity – why, you could lose your fingers between those lumps of muscle! But the sad truth is that often the abdominal muscles of professional bodybuilders, along with those of most athletes, are often nonfunctional. Further, the training used to develop those impressive six packs may increase an individual’s risk of injury and chronic back pain and may result in poor posture.

There is no question that core training is the hottest topic in physical therapy and athletic fitness today. There are countless seminars, books and videos on training the abdominals, special machines to work the abs, and classes in health clubs that focus solely on training the midsection. Unfortunately, there is much information on the topic



The rectus abdominis flexes the spine and when properly trained helps prevent excessive forward rotation of the pelvis.

From Strength Training Anatomy, available from Human Kinetics, www.humankinetics.com.

during group exercise classes work the external range. A Swiss ball crunch, even though it works the rectus abdominus through a greater range of motion, is still an external-range exercise.

Now, visualize the start position of a bent-leg sit-up. But instead of starting the exercise with your back on the floor, you would start at the top position (with your abdominals fully contracted); and instead of going all the way down, you would lower your trunk only halfway down. This short-range exercise would be considered an internal-range exercise. Further, any movement that focuses on the abdominal area below the bellybutton (i.e., subumbilical), such as the pelvic tilt exercise, would be considered an internal-range exercise.

The Price of Ignorance

Posturologist Paul Gagné, a Canadian strength coach who has worked with Olympians and professional athletes in football, golf and hockey, says that developing a balance between external- and internal-range exercises plays an important role in maintaining proper posture. “When a volleyball player, basketball player or gymnast lands, he or she needs good posture if the spine is to properly control the high-impact forces. Any excess or lack of curvature of the spine compromises the proper shock-absorbing qualities of the spine and as such may contribute to injury. Not being able to properly deal with the disrupted forces that occur with landing can significantly increase the risk of a spinal fracture.”

The excessive lumbar curvature displayed by some gymnasts may be due in part to focusing too much on external-range exercises, says Gagné. In terms of athletic performance, when the pelvis is rotated forward due to muscle imbalance, the lower portion of the

rectus abdominals becomes chronically stretched and is therefore difficult to contract, thereby impeding sports performance. “All macro movements in sports depend on micro movements,” says Gagné. “So, performing hanging leg raises to strengthen the hip flexors for running or gymnastic movements is fine, provided all the segments of the torso are strong enough to properly coordinate the activity.”

It would seem that performing abdominal exercises that also work the hip flexors, such as full sit-ups and hanging leg raises, take care of any muscle imbalances because they work so many muscles. However, if an athlete is weak in the internal range, the stress on the hip flexors increases. This can increase the risk of injuring these muscles and even surrounding muscles such as the adductors. “I’ve worked with over a hundred professional hockey players, and I’ve found that those athletes with a history of groin pulls always have abdominals that are relatively weak in the internal range,” says Gagné.

Another fallacy Gagné points out about abdominal training is the belief that exercises performed on a Swiss ball will work the abdominals harder because the surface is unstable. “For a beginner this is true, but research shows that there is not an increase in recruitment of muscle fibers with an advanced athlete. Further, the balance required to perform Swiss ball exercises forces the individual to use lighter weights, and as a result they will get less of a strength training effect.” Gagné adds that for an athlete with posture characterized by an excessive forward tilt of the pelvis, such as is common with gymnasts, performing crunch-type exercises on a Swiss ball will place harmful shearing stress on the spine that could result in serious injury to the disks.



Photo: Richard Luna

Divino, who has been training for only three years, competed in the 2008 Junior Nationals.

Finally, Gagné says that there is no single repetition protocol that would be considered optimal for training the abdominals. “According to muscle biopsies, the abdominals are 50/50 fast twitch/slow twitch – you need to do both high reps and low reps, focusing on one type more than the other depending upon your goal. For example, for gymnasts in their early preparation I would focus on small, segmental exercises in both the internal and external range, performing each exercise for about 45 seconds. The closer to a competition, I would focus on anterior chain exercises, such as hanging leg raises, and explosive exercises, such as medicine ball throws, for sets lasting no more than 15 seconds.”

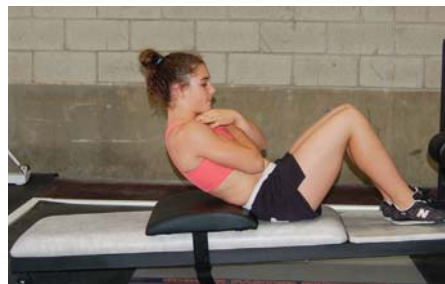
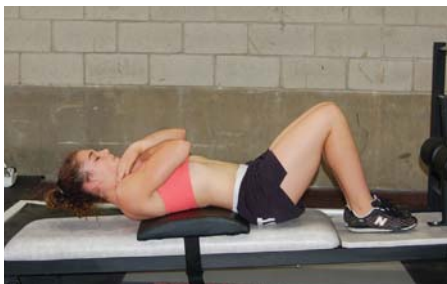
The following are several exercises that focus on working the abdominals from an external range, starting with the easiest and progressing to the hardest. This will give you a good start. Finally, consider that abdominal training is important, but seldom do athletes of any level in any sport need to spend more than 15 minutes three times a week on core training. Train hard, train fast, but most important of all – train smart! **BFS**

ABS – THE RIGHT WAY Here are several external-range exercises, from easiest to hardest, that work the external range. The higher the difficulty, the more the hip flexors are used during the exercise.

Ab Mat Crunch

This is the first external-range exercise I usually have my athletes perform, as the hip flexors are not strongly involved. It's a variation of the crunch that uses an abdominal training tool called an Ab Transformer™, available through BFS. This mat has a curved surface, which increases the range of motion of the exercise. If an Ab Transformer is not available, a rolled-up towel placed under the lower back is the next-best alternative.

Keep your knees bent and your hands across your chest – do not place your hands behind your head, as this creates tension in the neck. Tuck in your chin slightly, exhale, and curl your trunk to the position shown. Return to the start, but do not allow your head to touch the floor, as you want to create continuous tension on the abdominals.



Single-Leg Jackknife

This variation of the classic jackknife sit-up is a good beginning-level exercise to work the abdominals and hip flexors in a coordinated movement. The exercise starts with one leg bent and the other leg straight, held a few inches off the floor. The arms are held along the sides, hands pointed towards the feet; and the head is lifted slightly off the floor. From this starting position, lift your trunk and free leg simultaneously, and then slowly return to the start. Do not allow your head or the foot of the working leg to touch the floor during any part of the exercise, as keeping them off the floor provides continuous tension on the abdominals. Perform an equal number of repetitions for both legs, and use ankle and wrist weights to increase the difficulty of the exercise.



Reverse Crunch

The reverse crunch works the rectus abdominus throughout a full range of motion with little involvement of the hip flexors. The range of motion of the exercise can be increased with an Ab Transformer (or towel) as shown, but it's best to start by performing it without these devices, as the increased range of motion may be too intense for beginners.

Position yourself on a sit-up board, facing away from the rollers, and grasp the handle. Keep your arms slightly bent to minimize the stress on your shoulders. Bend your knees so that your upper thighs are perpendicular to the floor; your feet should be off the floor and should not touch the floor throughout the exercise. Exhale, and then lift your hips up and towards you to the position shown, which represents a complete contraction of the rectus abdominus. To increase the difficulty of the exercise, perform it on an incline or use ankle weights.



Reverse Crunch, Legs Straight

This exercise is similar to the reverse crunch, except the legs are held straight. It can be performed with an Ab Transformer (or towel), but beginners should perform it without these devices, as that variation may be too intense. Start in the same position as for the reverse crunch, but with your legs straight and perpendicular to the floor. Exhale and lift your hips straight up and then return to the start; do not allow your legs to move towards your head. To increase the difficulty of the exercise, perform it on an incline or use ankle weights.



Bent-Knee Pullover

In many athletic movements, including sprinting, the abdominals are held relatively stationary while the arms swing. The pullover exercise simulates this activity.

Bend your knees and hold a weight plate in front of you, arms slightly bent, and lean back slightly. Do not lock your knees under a support. Keeping your arms bent, exhale and pull the weight behind your head as shown; return to the start in the same manner. To make the exercise more difficult, lean back more and use a heavier weight. When the resistance you are using becomes so heavy that you topple over, place your ankles over the roller pad on the sit-up pad and pull your legs down and towards you to anchor your torso.



Piston

This exercise resembles the dragon-flag exercise made popular in *Rocky*; and in addition to strengthening the abs, it also gives the lats a good workout. Lie faceup on a sit-up board, facing away from the rollers. Grasp the handle, arms slightly bent, and then pull your knees to your chest as shown; this is the start position. Inhale (as this exercise requires a high level of stability), extend your legs out and up, and then return to the start. Increase the difficulty of the exercise by increasing the incline or by using ankle weights.

To perform the knee-up, which is the easier version of the exercise, start from a hanging position with your back flat, not arched. Inhale and then pull your knees straight up to the finished position. To perform the Vertical Leg Raise, simply perform the exercise with your legs straight and lift them to the position shown.



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