How to Armor-Plate Your *Lower Back*

Secrets to decreasing the risk of lower back injuries in athletes

A strong lower back is needed to make great tackles, such as this one of Joe Cerrone of Wayland High School in Wayland, Massachusetts. Wayland went 13-0 in 2006 and 10-2 in 2007.

BY **KIM GOSS**

"How much can you deadlift?" is a question not commonly heard in the sports media when it comes to inquiring about an athlete's strength. After all, the deadlift is a lift that the lay public may not relate to easily, especially when it's compared to commonly performed exercises such as the bench press. And you can just forget about trying to explain a back extension, much less a reverse back extension. But the fact is, having a strong lower back is essential to athletic performance, and for many athletes the lower back is a weak link that prevents them from achieving their highest goals.

The point of this article is to describe some effective exercises for strengthening the muscles of the lower back, not to explain how to assess lower back injuries and design appropriate rehabilitation programs. This is because lower back pain is a complex subject that often goes beyond simply strengthening muscles. If addressing lower back pain were a simple matter, then gymnasts – athletes who perform extensive abdominal training and stretching exercises – would not have such a high rate of injuries. And the facts are that many gymnasts do not train the abdominals correctly and the resulting muscle imbalances may

contribute to back pain.

Before getting into the lower back exercises, however, I'd like to discuss six reasons that so many athletes often complain of lower back pain:

1. Excessive sport-specific training. To compete at the highest levels, athletes often decide to specialize in a single sport at a young age. At BFS we recommend that with the exception of certain high-skill sports such as gymnastics and figure skating, athletes should participate in multiple sports. Doing so will prevent many of the muscle imbalances that contribute to injuries, especially overuse injuries. For example, if an athlete decides to swim or play baseball year-round, they could develop a round-shouldered condition that could contribute to injuries to the shoulders.

2. Improper abdominal training. The big buzzword in sports conditioning is "core training," and as a result there has been a big emphasis on abdominal exercises for athletes. Unfortunately, most of these exercises emphasize the internal (shortened) range of the abdominals and hip flexor movements. If you look at the posture of gymnasts, for example, you often find that their emphasis on these exercises contributes to an excessive arch in the lower back, a posture that places unnatural stresses on the spine. As an analogy, Canadian strength coach and posturologist Paul Gagné says that performing just external-range exercises for the abdominals would be like performing biceps curls but not going all the way down in the exercise. "The result would be that their arms would always be slightly flexed, shortening the tendons and ligaments – these types of individuals often end up tearing their biceps."

3. Poor exercise technique. At BFS we recommend compound exercises such as power cleans and squats, but there is considerable technique involved in performing these exercises correctly. Performing a power clean or squat with a rounded back, for example, could easily cause a disk problem, as the muscles of the lower back cannot protect the spine. There are some valuable lower back exercises that involve rounding the lower back, but these are performed with very light weights (often just the empty bar) and are not recommended for those with disk injuries.

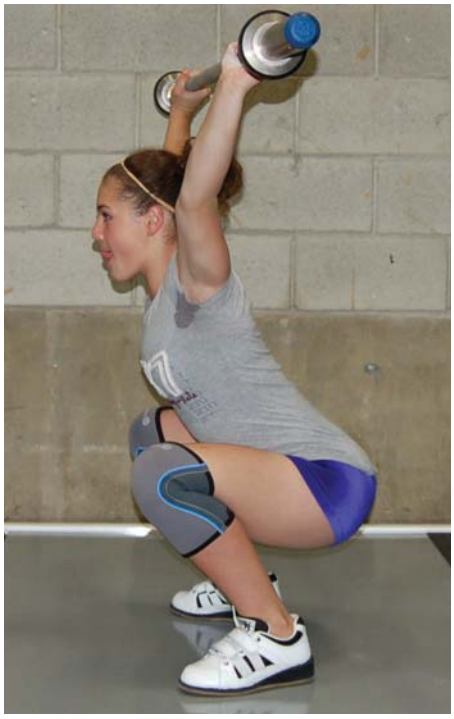
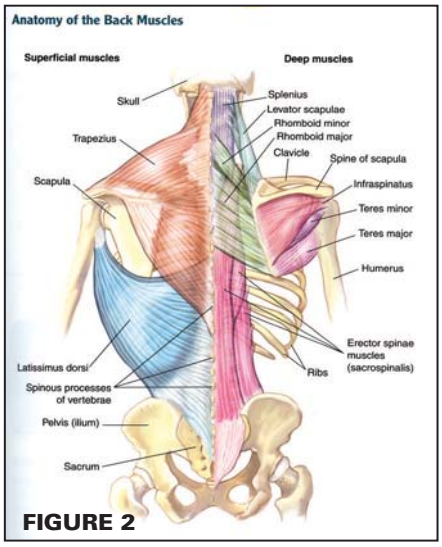


FIGURE 1
The overhead squat is an excellent exercise for developing postural awareness of the spine. Demonstrating this exercise is 14-year-old Baylie Divino, a Level 10 gymnast who can do a one-step vertical jump of 24.7 inches.

4. Poor exercise selection. Machines have their place in the training of athletes, but focusing on machines commonly neglects training for the lower back muscles. Also, focusing on stability types of exercises, such as those performed with Swiss balls, often distracts the athlete from performing more effective strength training exercises that will contribute to sports performance and being able to withstand the disrupted forces that occur in sport that can contribute to injury.

5. Poor sport biomechanics. The highest injury-rate sport for young women in high school and college is – get ready – cheerleading. Why? According to sports-liability expert Dr. Marc Rabinoff, one reason is that cheerleaders are being taught skills that their coaches are not qualified to teach – skills that should be taught by gymnastics instructors. Likewise, if a football player is taught improper tackling and blocking techniques, the risk of injury to the lower back is increased.

6. Poor posture. Athletes with poor posture increase their risk of lower back injury. When the pelvis is not aligned properly, the muscles and supporting structures are subject to excessive stress. For example, if an athlete's pelvis is rotated forward (anteriorly), during a squat the disks of the back could face high levels of shearing forces that could result in injury. One primary cause of poor posture is problems with the foot, and this concern often needs to be addressed (such as with orthotics or postural insoles) to treat or prevent back pain.



From *Bodybuilding Anatomy* by Nick Evans, Humankinetics.com.

FIGURE 2

One excellent exercise to improve posture by improving an athlete's awareness of their spinal posture is the overhead squat (Figure 1). For beginning-level athletes, this can be a great warm-up exercise prior to performing squats or power cleans.

Training the Lower Back

The major muscle group that athletes should focus on developing is the erector spinae. It consists of three parallel sets of muscles (iliocostalis, longissimus and spinalis), and the entire length of the spine, from the sacrum to the occipital bone on the neck (Figure 2). The erector spinae is involved in extending and laterally flexing the vertebral column, and it helps maintain the proper posture of the spine when lifting. And according to Canadian strength coach Charles Poliquin, the erector spinae exhibits an exceptional "irradiation effect," which means that if you strengthen these muscles they will have a positive influence on increasing the strength of many other muscle groups. Strengthen your erector spinae, and your squat will increase – as will your military press and your power clean.

Before getting into specific lower back exercises, it's important to understand that the erector spinae consists of both high-threshold motor units (fast-twitch muscle) and low-threshold motor units (slow-twitch muscle). This means that for complete development, an athlete should perform back exercises for low reps with heavy weights and also high reps with relatively lighter weights. With that background, let's look at three basic categories of lower back exercises: deadlifts, reverse back extensions, and back extensions.

DEADLIFTS. The deadlift, as performed with a straight barbell in the sport of powerlifting, is a basic movement that will effectively strengthen the lower back. But according to Gagné, with the straight bar the weight is out in front of you and this can create high levels of shearing forces on the spine. Gagné advises, "It would be better to perform the deadlift with a Hex bar, as it is easier to maintain the proper alignment of the spine."

REVERSE BACK EXTENSIONS. According to Gagné, the best exercise for the erector spinae is the reverse back extension, especially for those athletes with postural problems. "About 90 percent of the professional hockey players I coach have excessive anterior tilt of the pelvis and chronic tightness in the lower back. They need to focus on working the low back with a neutral spine and only in the external (lengthened) range, so on a reverse back extension they would only lift the weight three quarters of the way up and work on bringing the legs under the hips at the bottom of the movement – having a machine that has the chest pad tilted downward will facilitate this stretch [Figure 3]. Lifting the legs to parallel, as many powerlifters recommend, will place adverse stress on the L3 to L5 vertebrae by causing the spine to hyperextend."

Another advantage of the reverse

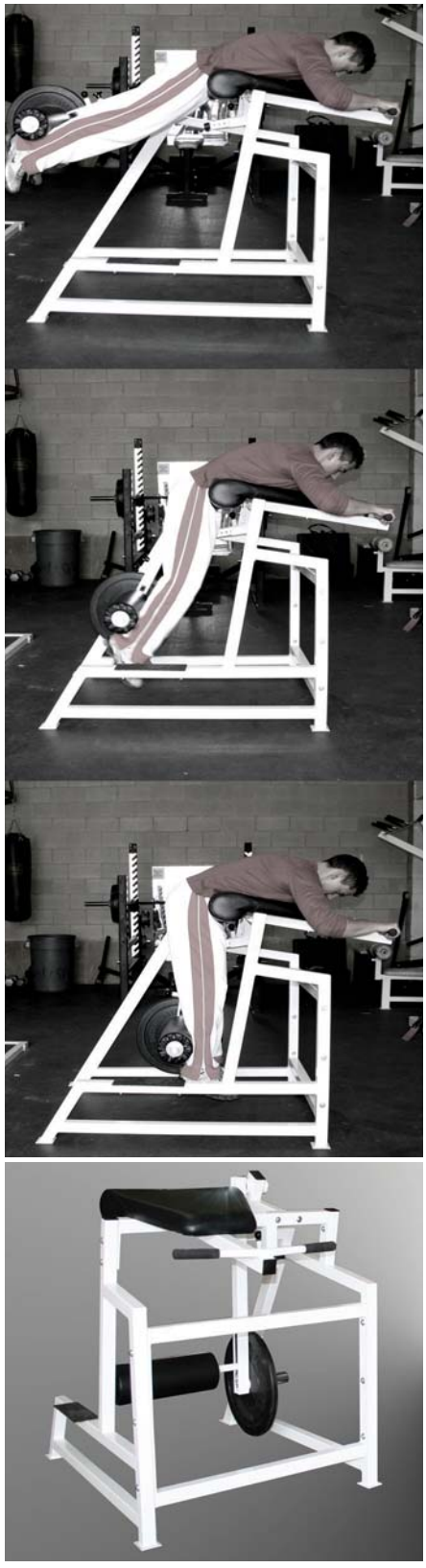


FIGURE 3
Having a reverse back extension machine with the chest pad tilted downward and starting from a lengthened (external range) position makes it easier to work the spine in a neutral position

back extension is that it places minimal compressive forces on the spine, especially when compared to seated back extension machines. Research conducted by Alf Nachemson of Sweden in 1975 showed that leaning forward about 15 degrees from a seated position can nearly double the compressive forces on the L2-3 vertebrae. "Further, the seated back extension machines focus on strengthening the erector spinae in the internal range, which should not be the priority for most athletes, especially those with back pain," says Gagné.

Gagné adds that not having the feet in contact with the floor (as with a deadlift) or pressing against a foot plate (as with a back extension) is less likely to cause discomfort for athletes who appear to have one leg shorter than the other. "Often the problem of having one leg shorter than the other is due not to a difference in limb length, but to a rotation of the pelvis due to improper foot alignment. Before using conventional lower back exercises such as Hex bar deadlifts or the back extension, I would correct the feet with Posturology methods. Also, when I introduce back extensions to these athletes, I would remove the footplate to minimize the risk of shifting the pelvis." Gagné says that to help correct muscle imbalances common in those with a rotated pelvis, he will often perform reverse back extensions with one leg at a time.

BACK EXTENSIONS. These are the next exercise group to use for the erector spinae. Back extensions strengthen these muscles in the internal (shortened) range. Back extensions also strongly affect the gluteal muscles.

Two common errors in the back extension are lifting the torso above parallel (hyperextending the lower back) and not using enough resistance in the exercise. Soviet weightlifters were commonly seen using several hundred pounds in this exercise, with the barbell placed on the back of the shoulders.

Rather than holding a weight across your upper back, which is difficult to balance, you can use an excellent alternative that is described in a book by Frans Bosch and Ronald Klomp entitled *Running: Biomechanics and Exercise Physiology Applied in Practice.* With this variation, you place a straight barbell or a Hex bar with Olympic plates on the floor in front of the glute-ham developer, with the bar directly over your shoulders.

Grasp the bar with straight arms, and then straighten your torso until it is parallel to the floor (Figure 4). The height of the Olympic plates limits the range of motion of the exercise, but to increase the range you can use smaller-diameter plates or use a wider grip. The exercise can also be performed emphasizing one leg at a time by placing one leg on top of the roller pad (with the other underneath).

Although lower back exercises will never match the popularity of bench presses or biceps curls, they are essential for achieving the highest levels of performance. Sometimes, those who cross the finish line first are those who train not harder but smarter! BFS

FIGURE 4
This variation of the back extension allows you to use heavy weights. Weightlifter Maegan Snodgrass, shown demonstrating this exercise, can perform this exercise with over 220 pounds for repetitions!