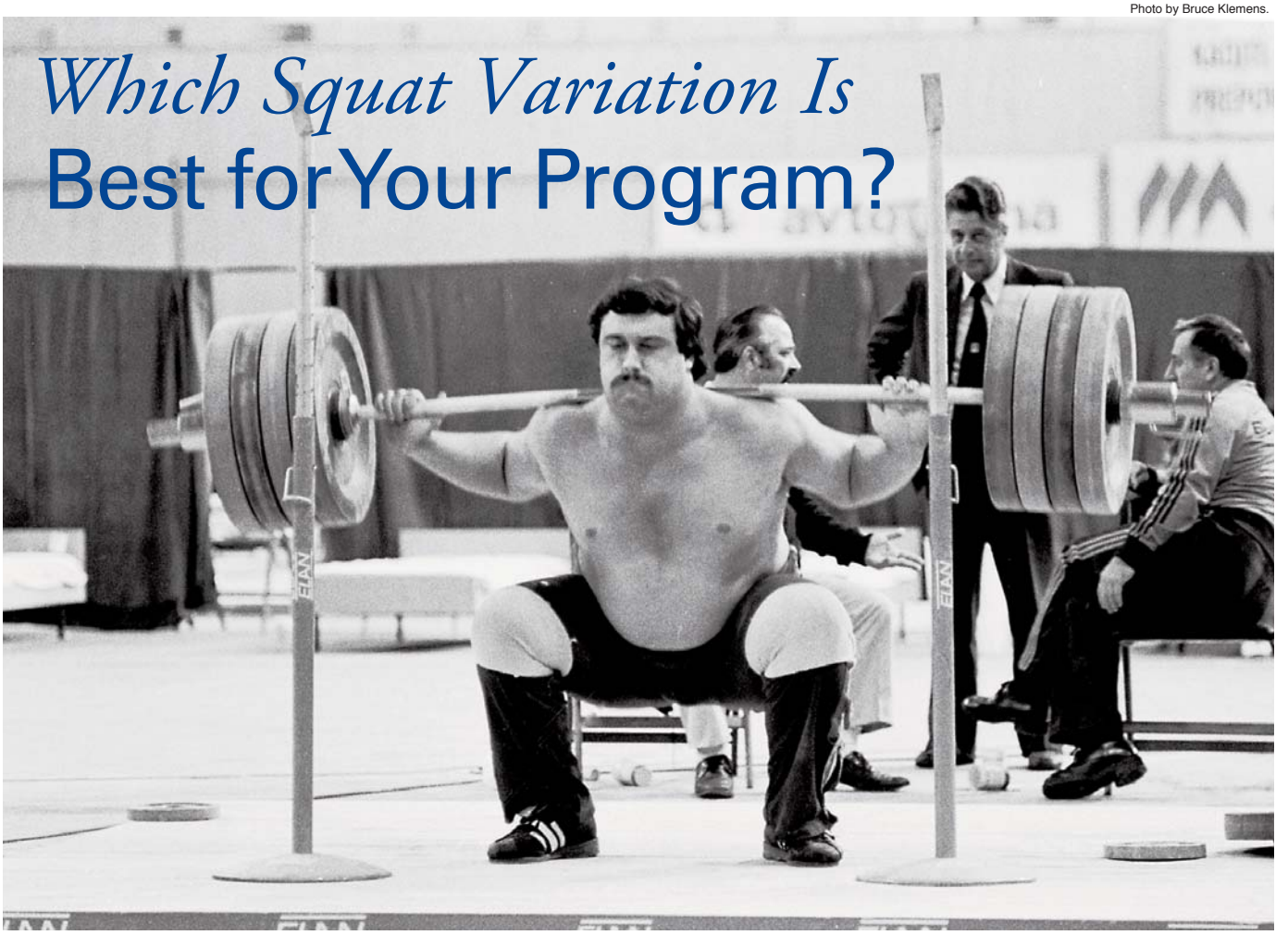
Photo by Bruce Klemens.

Which Squat Variation Is Best for Your Program?



Antonio Krastev of Bulgaria snatched 476 pounds in 1987, a record that has yet to be broken. Although it seems that Krastev is squatting high, this is deceiving because his legs are so large. However, you'll note that his hamstrings are below parallel, so this is a great squat by BFS standards.

A closer look at back squats, box squats and front squats

Ever since Dr. Greg Shepard founded BFS in 1976, he has been promoting the squat as the foundation of any athletic fitness program. Coach Shepard's efforts have succeeded in debunking the myths promoted by misinformed sport coaches and medical professionals who insisted that squats damage the knees, stunt growth and make athletes slow. Now in his 70s, Coach Shepard can enjoy his retirement knowing he helped create a paradigm shift in how athletes should train to achieve physical superiority.

Coach Shepard's opinion, which is well supported empirically and in research, is that no other single exercise works as many major muscle groups as effectively as the squat and no other exercise is as effective in preventing knee injuries. He also believes that the parallel squat builds the foundation for great speed, regardless of the size of the athlete. In fact, Coach Shepard believes that if the only lift athletes did was the parallel squat, they would have a good weight training program – not great, but good. Conversely, if athletes leave out the squats, they may not be able to fulfill their athletic potential, especially in sports that have a high strength component, such as football or wrestling.

Having made our case, let's take a closer look at some squat variations that are especially valuable for athletes.

Parallel Back Squat and Full Squat

The guiding principle in squatting is that it's necessary to lower yourself to a point at which the tops of your upper thighs are at least horizontal to the floor so that you strongly activate

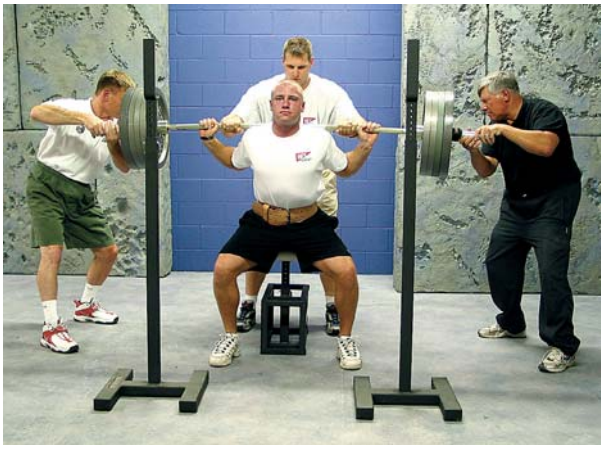
your hamstrings and gluteal muscles. If you don't squat low enough, you only activate the quadriceps (front thigh muscles); the insufficient muscle recruitment will not improve knee stability and may even decrease knee stability by creating muscle imbalances.

Peer-reviewed research suggests that squatting to parallel (compared to squatting above parallel) does not increase the stress on the patellofemoral joint. Finally, squatting to parallel is necessary to allow for a natural movement of the sacroiliac (SI) joint. Improper function of the SI joint is associated with many types of lower back pain.

At BFS, we offer a simple test to help athletes and coaches determine the proper depth for squats. It's called the marble test. If an athlete were to place an imaginary marble (or dowel) on the top of the thighs (in the middle) during their deepest squat position, which way would the marble roll? If the marble would roll towards the knees, the athlete is not squatting low enough. If the marble would stay stationary or roll towards the lifter's hips, the depth is fine. What you'll find by using this standard is that the bottom of the thighs has to be *below* parallel at the bottom of the squat. The marble test is better than judging the position of the bottom of the thigh, as athletes with large legs would be required to squat considerably lower.

BFS has no objection to an athlete squatting lower than parallel. All we are saying is that an athlete must squat to at least parallel to effectively work the glutes and hamstrings. Having said that, unless an athlete has exceptional flexibility and proper supervision, what often happens when an athlete squats all the way down is that their lower back will round. Rounding places extreme stress on the lower vertebrae of the back (L3, L4 and L5). Unless an athlete has exceptional flexibility and one-on-one coaching from a qualified Olympic lifting coach, it would be better to just squat parallel.

What about the hyper-wide stance used by many powerlifters? This style of stance reduces the forward movement of the knees and minimizes the involvement of the quadriceps, but it is not the athletic stance that BFS believes has the best carryover to athletics. Another way to think about this is to say that powerlifters are trying to lift the heaviest weight possible over the shortest distance possible, whereas at BFS we are trying to lift in such a manner as to have the best carryover to athletics.



The box squat is an extremely valuable exercise but should only be performed if well-trained, alert spotters are available.

Having made our case that the back squat is the king of all exercises, consider that there are many other valuable variations of this exercise that can help take an athletic training program to the next level. Let's explore three of them.

Box Squat

The box squat is the most controversial lift in the BFS program. Within the weight training community as a whole, coaches tend to either love the box squat or hate it.

We believe the box squat is unparalleled for overcoming plateaus, building hip strength and hip tendon strength, improving lower body explosiveness, and developing the confidence to handle heavier weights and thereby continuously break personal records. One of the reasons an athlete can use more weight in the box squat compared to a regular squat is that touching the box dissipates the kinetic energy created during the descent, energy that the athlete must normally overcome to change directions and begin the accent. But one of the main reasons we like the exercise is it is useful for helping to maintain strength in-season.

Although you use more weight in a box squat than in a regular squat, the reduced range of motion of the box squat allows you to recover quickly from the exercise. Just how quickly? Based upon the feedback of coaches who have won countless championships using the BFS program, an athlete can box squat heavy the day before an athletic competition without a decrease in performance. In fact, we've found that athletes usually perform better!

Regarding claims that the box squat is dangerous, you should have no concerns about safety or liability if you follow our recommendations, which include focusing on perfect technique (rather than on using the heaviest weights possible) and using three attentive spotters. Further, if an athlete is able to use more than 100 pounds in a box squat compared to a parallel squat, that athlete needs to use a lower box. When an athlete uses more than

100 pounds over their best parallel squat, then it is possible they are using a weight that their trunk muscles cannot safely handle to protect their spine.

Powerlifters have embraced the box squat as part of their training, but many use an excessively wide foot stance and a technique of sitting back so the shins are parallel to the floor. This is not a natural position, because for the body to move forward, the shins must incline forward. For the sport of powerlifting this technique may have merit, but for an athlete it conflicts with the law of specificity. This law says that the best exercises for a sport are those that most closely approximate the movements that occur in that specific sport.

We want to emphasize that the box squat does not replace the parallel squat. Because of the reduced range of motion in box squats, performing them exclusively would cause chronic tightness in the piriformis, a gluteal muscle. Tightness in this muscle can affect an athlete's ability to move laterally.

Nikki Gnozzio, squatting; Brittanie Mastricola, spotting.

Squatting inside a power rack with properly adjusted crossbars is the safest way to squat. Shown here are the front squat and the back squat. The front squat can be performed without a spotter because the weight can be easily dumped forward, but we always recommend at least one spotter for the back squat.

Front Squat

Many strength coaches believe that the front squat is a better leg exercise for athletes than the back squat. One reason is that since the barbell is positioned on the front of the shoulders rather than on the back of the shoulders, the quads work harder. At the very least, the front squat should be considered a key auxiliary exercise for any athlete. In fact, in one survey of top European coaches who were asked to name the three best weight training exercises for sports, the consensus was the power snatch, the incline press and the front squat.

One drawback to the front squat is that because holding the weight on the shoulders compresses the chest and makes breathing more labored, it's difficult to perform higher repetitions in this exercise. Further, holding the bar in this manner can cause pain in the wrists and elbows if you have relatively long forearms or tightness in the wrists or – the primary problem – tightness in the upper back or shoulders. Possible solutions include working on upper body flexibility, holding the bar on your fingertips (with elbows high), crossing your arms in front of you (which has the disadvantage of being difficult to balance), and tying lifting straps around the bar and holding the ends (see "Pain-Free Front Squats," published in our Nov/Dec 2006 issue, for details on how to use straps in this manner).

When Coach Shepard founded BFS 37 years ago, one of the most controversial aspects of the program was our promotion of the squat. The source of that early bias against squats was misinformation, which we now can resolve with scientific research. Our original claim was that the parallel squat is one of the best exercises for athletes, and we continue to stand by it 100 percent! BFS

Coach Karen Kuplicki, Olympus School of Gymnastics, Sandy, Utah.

Pain-Free Front Squats

Here's a practical way to perform this valuable exercise without wrist pain

BY **KIM GOSS**

Many strength coaches believe the front squat is a better leg exercise than the back squat for athletes. One reason is that since the barbell is positioned on the front of the shoulders rather than on the back, the quads work harder. At the very least, the front squat should be considered a key auxiliary exercise for any athlete. In fact, in one survey of top European coaches who were asked to name the three best weight training exercises for sports, the consensus was the power snatch, the incline press and the front squat.

As for how much emphasis the front squat should receive in an athlete's training, that's up to the strength coach. At BFS, we believe that the back squat should be the primary leg exercise for a young athlete; with the front squat, box squat and hip sled as key auxiliary exercises. For more experienced athletes with a good base of strength built from years of back squatting, more emphasis could be placed on sport-specific exercises such as front squats and lunges.

One drawback to the front squat is that because holding the weight on the shoulders compresses the chest and makes breathing more labored, it's difficult to perform higher repetitions in this exercise. Performing more than three repetitions often leads to a breakdown in form and even the possibility of blacking out. But a more important question to ask about this exercise is not whether it can replace back squats but why don't more coaches prescribe front squats for their athletes? The answer is pain.

The best way to hold a barbell in a front squat is to use the same grip as you would in a power clean, which is with your hands supinated (palms down) and elbows held high. Unfortunately, to hold the bar in this manner can cause pain in

the wrists and elbows if you have relatively long forearms or tightness in the wrists or – the primary problem – tightness in the upper back or shoulders.

It's not that no one has tried to find a solution. Sure, the hardcore Olympic lifters simply say, "Deal with it! Flexibility will come." But others will offer special exercises, such as holding the bar while a training partner presses up on your elbows. Some will say, "Just relax your hands and hold on to the bar with your fingertips, being certain you keep the elbows high."

Another technique is to cross your arms in front of you. This method works, but balance can be especially difficult to manage – often you have to focus so much on balancing that it can be hard to put a lot of intensity into the exercise. There is actually a device called the Sting Ray, manufactured by the same company that produces the Manta Ray, designed to more securely position the bar with this type of lift. BFS sold this at one time; but the feedback we received from many of our customers was that it was awkward to use, so we discontinued selling it.

We've also tried several other devices, such as the E-Z Squat and the Front Squat Harness. These devices consisted of a harness that attaches to the front of the body and allows the weight to be supported on hooks; the athlete holds on to handles for support. The issue with this equipment is that it encourages a rounded back posture, making it even more difficult to breathe. Also, we found that with the E-Z Squat, because the elbows are pointed down with this device, it is possible to jam the elbows into the knees at the bottom position.

The best alternative we've found to the traditional front squat, and one that we unfortunately cannot take credit for (or for that matter make a lot of money from suggesting), involves the use of lifting straps. Yes, lifting straps.

The Lifting Strap Solution

The type of front squat I'm about to describe requires the use of two lifting straps, preferably a pair that has about a foot of length after being tied to the bar – some of the "quick release" straps Olympic lifters use won't work well for this exercise. Simply hook the straps around the bar at shoulder width or the position that you would normally use for a front squat. Generally, this is the same width as your power clean grip.

To perform the exercise, place your shoulders under the bar and grasp the straps with a neutral grip (i.e., palms facing each other). How high up you grab the straps depends upon your flexibility (the less space between the bar and your hands, the better). From this position, simply lift the weight off the squat racks and begin front squatting. You'll find that you can keep your elbows high and the weight securely on your shoulders with this method. The only drawback is it can be difficult to replace the bar onto the racks, so you should have a spotter assist you.

To give you an example of how well this method works, teen weightlifter Maegan Snodgrass' best front squat last summer was 193 pounds at a bodyweight of 135 pounds. However, she injured her wrist in gymnastics so we decided not to put extra stress on her wrists with front squats, preferring back squats instead. This summer we tried the front squat with

Bruce Kemens photo

US Marine and Olympian Tom Gough shows great form in the front squat. Unfortunately, beginners often find that the front squat puts excessive stress on the wrist and elbows. (Bruce Klemens photo)

straps. On her second workout she easily did 198 pounds, and three workouts later she did 231 pounds! "From the very first time I tried this exercise, the bar felt very secure on my shoulders and I felt no stress on my wrists," says Maegan.

The reason there is less stress on the wrists is twofold: the upper arms do not have to be bent back as far as with a regular front squat; and the wrists are in a neutral position, as opposed to the supinated position (palms up) used with regular front squatting. In fact, there are many reasons this method of front squatting may be superior to regular front squats.

Crossing the arms in front is one alternative method of performing the front squat. A device called the Sting Ray was designed to make this variation even more comfortable, but many athletes found it awkward to use.

The Lifting Strap Advantage

For many athletes, wrist injuries can be devastating. If baseball players injure their wrists, they simply cannot play. When BFS interviewed Oakland A's coach Bob Alejo in the 90s, he said that he often avoided introducing his athletes to certain Olympic lifts because of the additional stress on the wrists, especially with those athletes who had no background in the lifts.

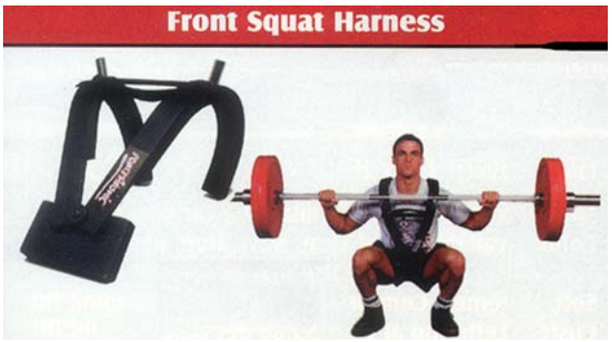
The problem is, a wrist injury can be devastating to any athlete; and for those with a history of injury to this area, the regular front squat may not be an appropriate exercise. For Olympic lifters, who perform a high number of repetitions on snatches and clean and jerks, there is already plenty of stress on the wrists without thinking of adding even more. So, it seems only natural to ask why not give the wrists a break with lifting straps? In Maegan's case, she was healing from her wrist injury and could perform only a limited number of Olympic lifts, so the additional stress of regular front squats was out of the question. Our approach was simply to have her perform back squats until her wrists could handle the additional stress of front squats.

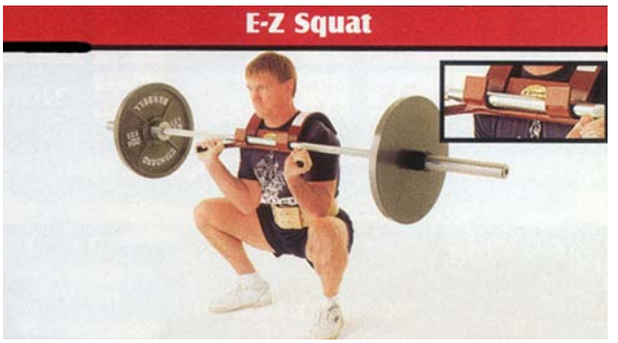
Another advantage of this exercise is that if you are not capable of performing front squats, this technique will improve your flexibility until such time as you are able to perform them. Start by holding the top end of the straps; and as your flexibility improves, move your hands close to the bottom. Eventually you should be able to smoothly transition into regular front squats, if this is your desire.

Instead of tying the straps around the wrist, with this exercise you tie the strap around the bar. Adjust the strap so that it is equal to the grip you would use in the front squat; the further away your hands are from the bar, the less stress on the wrist. Now you're ready to squat. Demonstrating the exercise is 17-year-old Maegan Snodgrass of Team BFS. At a bodyweight of 135 pounds, Meagan has front squatted 231 pounds using this technique.

Just one more word about straps: At BFS we've experimented with several different types of straps, and some of the best we've found are called Super Grips. They are made of rubber woven throughout the strap to increase durability and provide the most secure grip for your hands, and the rubber sticks to the bar much better than leather or cloth straps do. They're also 18 inches long, which is great for front squats, as the "quick release" straps are often too short to provide the best grip.

How much can athletes lift in the front squat? We've heard reports of numerous top superheavy weightlifters such as Paul Anderson, Vladimir Marchuk and Mark Henry – going all the way down and using no special

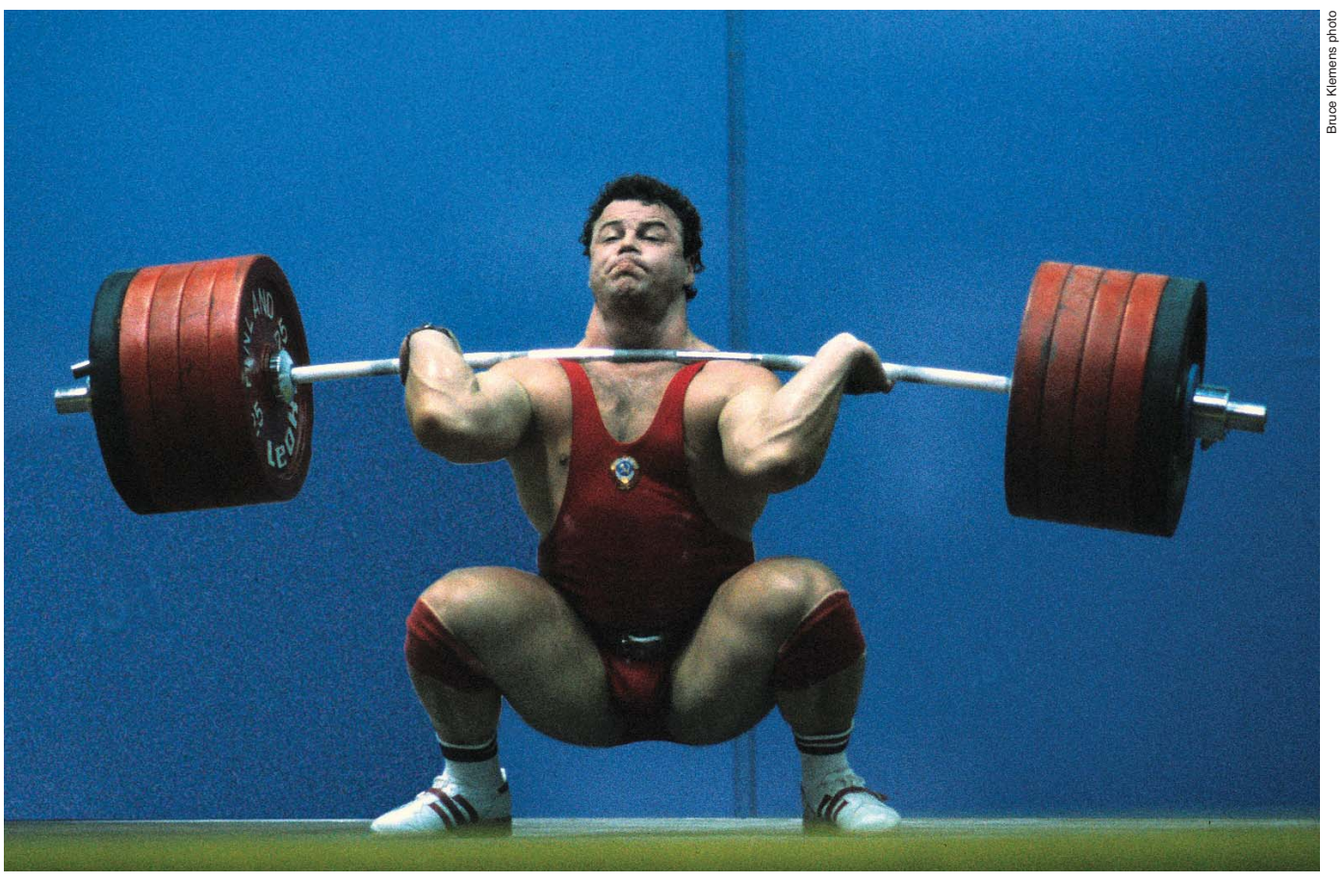




Occupying a space in BFS's "Land of Misfit toys" are the Front Squat Harness (left) and the E-Z Squat (right). They reduced stress on the wrists and elbows, but made it difficult to keep the lower back in proper position.

equipment – use over 700 pounds in this exercise. Three-time Olympic champion Pyrros Dimas of Greece and Dursun Sevinc of Turkey, both weighing 187 pounds, had reportedly lifted more than 600 pounds in this exercise. Generally, however, the ratio of back squat to front squat should be about 70-80 percent if you are going to equal depth in both exercises.

The front squat is a superior exercise, and many coaches even prefer it to the back squat. At BFS, we've promoted it as a key auxiliary lower-body exercise because it has advantages in leg development and, in some cases, sport specificity. Whether you make the front squat a major part of your training or just throw it into your workout occasionally for variety, using lifting straps will help make performing front squats a lot easier – and pain free as well. BFS



Bruce Klemens photo

Alexander Kurlovich of Russia was one of numerous champion weightlifters who could front squat 700 pounds or more. This photo, taken 19 years ago, shows him cleaning 586 pounds.