



**WRSC STUDY GUIDE
RESOURCE BOOK**

**POSITION PAPERS
"CLOSER LOOK" ARTICLES
RESOURCE ARTICLES**

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BENCH PRESS AND VARIATIONS

The BFS perspective on these important upper body core lift exercises



The first step in developing a safe athletic program is education, which includes traditional physical education classes and continuing education programs such as certifications.

Unquestionably, the bench press has become the most popular weight training exercise ever. Sure, the squat is right-fully called the king of lifts and will do more for athletic performance than any upper body exercise. And certainly you can't beat the power clean or other Olympic lifting movements for developing power. But the standard that everyone seems to use to measure the strength of an athlete is the bench press; thus the perennial question "How much can you bench?"

At BFS we recognize that the bench press can be a valuable exercise. Want stronger arms, chest and shoulders? The bench press is a must. And although there are bodybuilders who have gotten away with not performing the traditional bench press or have reached such levels of muscle that they need to focus on other exercises, the bench press is great for building size. At BFS, we have a little different perspective.

The BFS program is not a workout designed for power-lifters but rather for athletes who compete in multiple sports. Certainly we encourage making steady

improvements in this lift, but not at the expense of other exercises. To perform a dozen or more sets of bench presses several times a week, as is often the case with competitive power lifters, would detract from working on other lifts or additional aspects of athletic conditioning such as agility or speed. Plus, focusing on just one exercise performed in the same manner increases the risk of overuse injuries. Besides, any athlete who wants to be strong at all angles needs a larger selection of pressing exercises.

The technique of properly performing the bench press is described and shown in our instructional video series, but several points need to be made. First, a thumbless grip is often used by top power lifters. Such a grip positions the bar more in line with the lower arm bone, and the improved leverage is believed to help one lift more weight. The downside is that this grip carries with it a higher risk, as the bar can easily slip off the hands. That's why we cannot recommend a thumb-less grip in a high school environment.

Secondly, in an attempt to lift more weight, athletes often will use a wider grip, bounce the bar off their chest or use an extreme arch in their lower back. All these techniques carry a higher risk of injury, and as such we discourage their use. And although we do recommend a slight arch in the lower back, athletes with back pain or a history of back pain may have to perform the exercise with the back in a more neutral position with minimal arch.

Next, we are aware that thanks in part to assistive gear such as bench press shirts, enormous poundages have been lifted in this exercise – at the time of this writing several men have lifted over 1,000 pounds and two women have benched over 500. However, we see little reason, other than possibly to accommodate an injury that is being treated, to use such equipment, as it is not making the athletes stronger or improving their technique. Plus, the time it takes to use such equipment makes it impractical in the high school environment.

It must be stressed that the bench press is the most

dangerous exercise that can be performed in the weight-room – in fact, many individuals have died performing the lift. Serious injuries can result when spotters are not used or if they are improperly trained or are simply not paying attention.

A strength coach should not assume that an athlete knows how to spot – coaches should have all athletes demonstrate to their coaches the proper spotting techniques before they are allowed to lift. Although a single spotter is usually sufficient, BFS recommends three spotters (one behind the lifter and one on each side) whenever possible, especially when very heavy weights are used.

If an athlete is lifting by himself or herself, which we do not recommend, then the exercise should be performed inside a power rack with safety pins set at an appropriate height to catch the weight in case the athlete loses control of the lift or cannot complete a repetition. Again, we do not recommend an athlete perform this lift without a properly trained spotter.

Equipment should have firm upholstery to prevent the athlete from slipping, and the supports should have a wide yoke so the bar can be easily returned to the support upon completion. If an athlete is of a height that does not allow their feet to touch the floor without excessive arching, then weight plates or some other small platform should be placed under the feet so that the body is stable during the lift. Also, the barbell should have sufficient knurling to allow a firm grip, and chalk should be made available to prevent slipping.

Dumbbells can be used instead of a barbell for most bench press exercises. The advantages are a greater range of motion and the fact that the muscles that stabilize the shoulder must work harder. Also, because the dumbbells allow the hands to rotate during the lifts, there may be less stress on the shoulder (such as by rotating the hands so that at the bottom of the exercise they are in a neutral position: hands facing each other). However, this instability also means that less weight can be used; therefore, the effect on strength and muscle development is decreased.

Bench Press Variations

At BFS we believe that an athlete should use a variety of bench pressing types of exercises, including the towel bench press, incline bench press, decline bench press and unilateral bench press. Using these variations helps prevent overuse injuries by stressing the joints at different angles, and also can provide resistance in positions that more closely approximate those that occur in a specific sport.

Towel Bench Press. One of the criticisms of the bench press is that placing the bar on the chest places high levels of stress on the connective tissues of the shoulder, especially if performed several times a week. By limiting the range of motion of the lift by placing a rolled-up towel under the shirt, or using a round towel bench pad, the stress is minimized. As such, the lift can be performed more frequently – in the BFS off-season program one common workout design is to perform the standard bench press on Monday and the towel bench press on Friday; another advantage is this sequence can often be performed year-round. Further, as with the restricted range of motion of the box squat, the lift places less stress on the recovery ability and thus you could perform it the day before or even the day of a competition without adverse effects.

Incline and Decline Bench Press. An incline press, generally set to 45°, can be specific for putting the shot, and the decline press can be specific for certain swimming strokes. Because more weight can be used in the decline press than in the incline press and the conventional bench press, performing the decline press can build confidence. It's important, however, when using the decline press that the bench be designed with an anchoring apparatus for the legs so that the athlete does not slide during the lift.

Close-Grip and Reverse-Grip Bench Press. Moving in the grip when performing the bench press focuses more on development of the triceps. The reverse-grip bench press involves performing the lift with the palms facing the athlete (supinated grip). Made popular by Anthony Clark, a super heavyweight power lifter who broke the world record with this style, the reverse grip focuses more on development of the triceps. When an athlete performs this style, it is especially important for the spotters to be careful about removing the barbell



The incline press is a great variation of the bench press. From L to R: Melissa Leakehe, Taulai Maea, Shanece Leausa, Coach Heather Sonne.

from the supports and returning it, because the change in leverage makes it difficult for the athlete to do this by himself or herself.

Unilateral Press. This type of bench press, popular among football players, is performed on a special apparatus that enables the exercise to be performed from a standing position and also with one arm at a time. Because the shoulder blades are not pinned against the bench, the motion is more natural and places less stress on the upper body. And because it is performed from a standing position, more muscle groups are involved.

The bench press is a great upper body exercise to develop the chest, shoulders and triceps. The risk of injury and accidents can be minimized by paying special attention to using correct form, proper equipment and well-trained and alert spotters.

MORE ON THE TOWEL BENCH PRESS



As a result of doing many clinics and talking to many coaches and athletes, BFS became aware of this problem with the Bench Press. It seems that 75 percent of all athletes who Bench Press three times per week have “Bench Press Shoulder”.

Specifically, this is a dull to sharp pain in the front shoulder-joint area where the upper arm, chest, and shoulder meet. This pain comes from working out too often with too much weight. Typically, an athlete will do benches three times a week with maximum or near maximum poundages. The real stress to this shoulder-joint area comes when the bar is one or two inches from the chest. When you think about it, stretching and putting stress on the shoulder-joint area three times a week with maximum poundages is bound to cause problems.

To perform the Towel Bench all you need to do is put the Towel Bench Pad on the chest and bench or use the **BFS Bench Block** which makes switching athletes much more efficient. Bring the bar right down into the pad then drive up.

BFS highly recommends Towel Benches for three reasons. First, an athlete gets used to a heavier weight. Normally, ten to twenty more pounds can be used on the Towel Bench. This builds more confidence for new levels on the regular bench. Second, it brings variety into the routine. Variety is important as this helps an athlete overcome plateaus. We guarantee that every athlete will break at least 8 personal records per week, if our BFS Set-Rep System is used. Variety is the main reason we can make that guarantee. Third, and most important, Towel Benches will go a long way in preventing what is called “Bench Press Shoulder”, a mild to severe pain in the shoulder joints.

BFS POSITION PAPER

THE BOX SQUAT

The BFS perspective on this valuable lower body core lift exercise



Erich Mach (back spotter) teaching proper box squat form at a BFS clinic

The box squat is the most controversial lift in the BFS program and, for that matter, in weight training. The lift has experienced a roller coaster ride within the weight training community, with coaches either loving it or hating it. Some coaches believe the lift gives their athletes confidence and helps them stay strong throughout the season. Other coaches believe it creates excessive compression forces on the spine. This paper will help you make an informed decision about the box squat.

BFS has been promoting the box squat as a core lift for over 30 years. We believe it is one of the most effective exercises for developing overall strength and lower body explosiveness. However, during the first two decades after the BFS program was developed, we experienced our share of critics who failed to see the

value of the exercise and thought it was dangerous.

First it should be made clear that the box squat is NOT a mandatory exercise in the BFS program. The box squat is considered a “squat variation” and can be performed as the first exercise on Monday in the BFS off-season program or as the first exercise on Thursday in the in-season workout. We understand that there are coaches who simply refuse even to attempt this exercise, just as there are coaches who refuse to perform power snatches or full Olympic lifts because they believe they are too dangerous. And that’s fine. The BFS program is flexible, and if for whatever reason your coach simply refuses to use the box squat in your program, there are alternatives. Use another core lift instead, such as the front squat – or even the hip sled.

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 regular squatting 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 ascent. 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 the 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!

Answering the Critics

Regarding those who claim the box squat is dangerous, you should have no concerns about safety or liability if you follow our recommendations, which



Because so much weight can be used on the box squat, we prefer that three spotters be used on this exercise and that the hands of all spotters be lightly placed on the bar during the lift.

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 the spine.

One medical expert who has learned that a properly performed box squat is a safe exercise is Dr. Greg Motley, an orthopedic surgeon who specializes in arthroscopy, sports medicine and joint replacement at Southeastern Sports Medicine in Asheville, North Carolina. As a three-year starter at strong safety when he attended the University of Kentucky, he squatted 455



The 3-in-1 Squat Box is perfect for box squats because it's heavy-duty and adjustable. It also can be used for straight-leg deadlifts and the sit-and-reach flexibility test.

for three reps. With those qualifications, Dr. Motley is definitely one doctor who knows what serious athletic conditioning is all about.

When BFS clinician Bobby Poss first discussed the box squat with Dr. Motley, the doctor said he had never seen it performed and he was curious to know if the box squat might produce harmful compressive forces on the lower back. After reading all the literature Coach Poss gave him, Dr. Motley said, "Let's go down to the gym and give it a try."

If anyone would know if an exercise had a high risk of injury, it would be Dr. Motley. His athletic career caused him to undergo six surgeries from all the banging around that comes from being a strong safety in Division I football. He also has two degenerated disks. "So I would know if there were increased pressure on the lumbar spine," he says.

Not only did Dr. Motley perform the exercise with no pain, he ended up endorsing the exercise. "I went up pretty heavy that day, a lot heavier than I thought I could go – and I hadn't squatted in 10 or 12 years. "I think it's critical with the box squat – with all squats – that you have good technique and alert spotters. That being said, I think the box squat is a very, very good exercise."

Power lifters have embraced the box squat as part of their training, but many use a method that involves 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 power-lifting this technique may have merit, but for an athlete it appears to be in conflict 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.

It needs to be emphasized that the box squat does not replace the parallel squat. Because of the reduced range of motion of the exercise, performing box squats exclusively would cause chronic tightness in a gluteal muscle called the piriformis. Tightness in this muscle can affect an athlete's ability to move laterally.

BFS has persisted in recommending the box squat as an important squat variation in our total workout program. We have done so not to be different from all the other workout systems out there but because we know the box squat works!

THE PARALLEL SQUAT

BFS guidelines on the benefits and risks of this core lift exercise



The parallel squat is one of the most effective exercises that can be performed in a strength and conditioning program, but it is also one of the most controversial. Many of the concerns about the safety of the squat can be attributed to misinformation. This paper will discuss the benefits and risks of the squat so that coaches can make an informed decision about whether or not they should include it in their strength and conditioning programs.

The parallel squat is considered the king of all exercises because no other exercise works as many major muscle groups as effectively as the squat. It also stimulates the cardiovascular system positively and burns more calories in the same time period than any other exercise, and as such also can be a useful exercise for general physical conditioning. Consequently, at BFS we believe that if athletes did nothing but parallel squats, they would have a good weight-training program – not great, but good. Conversely, if they leave out the squats, minimize them, or perform them incorrectly, athletes may not be able to fulfill their athletic potential – especially in sports that have a high strength component, such as football or wrestling.

We believe that the parallel squat builds the foundation for great speed, regardless of the size of the athlete. A six-foot-four, 265-pound football player who has good athletic ability might be able to run a 40-yard dash in 4.6 seconds if he practices the squat. If that athlete does

some other type of free-weight exercise or substitutes an exercise machine for the squat, such as a leg extension, it is unlikely that he will achieve such results. Further, there are some machines and apparatus used for squatting that may do more harm than good. One example is the Smith machine.

One problem with squatting using a Smith machine is that although it may reduce the stress on the lower back because the athlete can lean backwards while maintaining balance, it places significantly higher shearing forces (i.e., forces that work to pry the joint apart) on the knees because the hamstrings are not as active during the exercise. Further, squatting with a barbell on a guided vertical (or slightly angled) path does not allow for natural compensations in the movement of the spine, a restriction that can place unnatural shearing forces on the spine.

It also should be mentioned that in four lawsuits in which sports-liability consultant Dr. Marc Rabinoff served as an expert witness, four individuals became paralyzed using Smith machines because they didn't know how to properly use the safety apparatus on these machines. That being said, it's not that machine exercises have no place in an athlete's training, as they are especially valuable in rehabilitation, but that we believe free-weight exercises such as squats should form the core of an athlete's training.

One myth about squats that has led many athletes and those interested in improving their appearance to avoid them is that they will widen the hips and cause the body to develop a "blocky" appearance. This idea was promoted by the famous late bodybuilding trainer Vince Gironda¹. Gironda was called the "Trainer to the Stars" because his clients included Hollywood celebrities such as Clint Eastwood, Cher and Denzel Washington. He also trained professional bodybuilder Larry Scott, who in 1965 won the first Mr. Olympia title, and Mohamed Makkawy, who twice placed second in the Olympia. Anatomically, the idea that squats widen the hips is not valid because the inser-



FIGURE 1: It is a myth that squats will make the hips wider and create a “blocky” appearance because the gluteus maximus muscle does not insert on the hips. Shown are Jesse Butterfield (left) and Chloe Van Tussenbroek (right), multisport athletes who have competed in the School Age National Weightlifting Championships. Jesse went on to become a professional model.

tion of the gluteus maximus muscle, one of the prime movers in the squat, is not on the hips (Figure 1)

Although most high school weight-training programs for athletes include squats, many coaches allow their athletes to squat way too high, use poor biomechanics, such as by allowing the knees to buckle (Figure 2) or leaning forward excessively, and spot improperly (Figure 3). These problems increase the risk of injury and decrease the effectiveness of the strength and conditioning program.

KNEES AND SQUATS

Are squats bad for the knees? Despite credible, peer-reviewed evidence to the contrary, this question is constantly raised, even by those who have no connection to athletics or physical education.

Much of the controversy originated from the belief that squats were harmful to the knees, an idea that was introduced by college professor Karl K. Klein and medical doctor Fred L. Allman, Jr. In 1961 Klein published a study that contained some questionable research methods and suggested that squats could

decrease knee stability and thereby increased the risk of knee injury. He later detailed his findings in a book he wrote with Dr. Allman, *The Knee in Sports* (Penn State Press, 1971, Figure 4).²

In the years that followed it was shown that there were flaws in the study, and the results could not be reproduced. Further, other studies showed exactly opposite results; namely, that weightlifters and powerlifters tended to possess tighter knee joints than control groups and were less susceptible to knee injuries. What is interesting is that Klein and Allman did not disapprove of parallel squats, which are recommended by BFS, but full squats as performed by Olympic lifters. However, few people have actually read Klein and Allman’s book, which says that parallel squats are fine and have benefits to athletic performance.

In the years that followed, weight-lifters, powerlifters and sport scientists were eventually able to convince the medical community and lay public that squats were not harmful to the knees and that competitive weightlifters and powerlifters did not have greater levels of knee instability than other athletes or the untrained population^{3,4}. Further, we at BFS contend that performing squats by descending under complete control to achieve a parallel position results in many positive changes, such as the following: The lower-body muscles become stronger and bigger, especially the quadriceps and hamstrings.

- The tendons become thicker and stronger.
- The knee ligaments become thicker and stronger.
- The entire articular capsule of the knee becomes thicker.
- The bones of the legs become stronger and slightly bigger because of increased capillarization. The cartilage of the knee becomes more resistant to injury.

These positive effects explain why athletes who do squats correctly have far fewer knee injuries than those who do not squat at all. Including squats in their program and performing them properly is especially important for female athletes, because they are up to five times more likely to suffer knee injuries than men are in sports such as basketball and volleyball. According to the American Orthopedic Society for Sports



FIGURE 2: Allowing the knees to buckle is a common error in squatting that must be corrected to prevent injury.



FIGURE 3: Examples of great spotting by high school athletes

Medicine, each year approximately 20,000 high school girls suffer serious knee injuries, most involving the anterior cruciate ligament, which helps stabilize the knee.

Proper squatting technique offers athletes the best defense against knee injuries. That being said, deep squats can present some danger to the knee joint, especially if the lifter comes down fast, is out of control or bounces at the bottom position. Common sense tells us that a football player who does deep squats with, say, 400 pounds is asking for problems if he comes down hard and bounces at the deep bottom position. But if an athlete lifting the same weight comes down under control to the parallel-squat position and then comes up, the knee joint should be in no danger whatsoever.

SQUAT DEPTH

Understanding the importance of depth in squats is imperative. We base our standards on a parallel depth or slightly below it. The high school All American standard is 500 pounds for males with heavy builds and 325 pounds for females with heavy builds. The all-state standard is 400 pounds for males and 235 pounds (think two plates and a collar) for females. BFS set those standards to help athletes and coaches understand when an athlete achieves something remarkable. Only an exceptional athlete with special understanding of how to do squats can reach those standards. If an athlete squats a foot high, or three inches high with 500 pounds, it is meaningless. Not a whole lot is really happening, and the athlete will miss out on great benefits.

The guiding principle in squatting is that it's necessary to squat so that the tops of the upper thighs are

at least horizontal to the floor so that the hamstrings and gluteal muscles are strongly activated. If you don't squat low enough, you only activate the quadriceps (front thigh muscles). It is our understanding that if an athlete does not squat low enough, this reduced muscle recruitment will not improve knee stability and may even decrease knee stability by creating muscle imbalances. And it should be noted that peer-reviewed research suggests that squatting to parallel does not increase the stress on the patellofemoral joint compared to squatting above parallel.⁵ 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.⁶

At BFS, we offer a simple test to help athletes and coaches determine the proper depth. It's called the marble test (Figure 5). If an athlete were to place an



FIGURE 5: A dowel can be used to help determine the proper depth of a squat.



FIGURE 6: Lifters with large thighs will have difficulty reaching parallel if the bottom of the thighs is used to determine parallel.

imaginary marble (or dowel) on the middle of the top of the thighs 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 (Figure 6).

Does BFS have any problem with an athlete squatting lower than parallel? Certainly not. All we are saying is that an athlete must squat to at least parallel to effectively work the ham-strings. As for the sport of powerlifting, the extraordinarily high poundages lifted by many of today's power-lifters suggest that there has been considerable leniency among some organizations as to what parallel is, along with the supportive gear that often can add hundreds of pounds to a power-lifter's best result in this exercise. Further, the hyper-wide stance used by many powerlifters, which reduces the forward movement of the knees and minimizes the involvement of the quadriceps, is not the athletic stance that BFS believes would have 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.

Because Olympic weightlifters squat all the way down (Figure 7), and in competition actually bounce out of the bottom position, why doesn't BFS recommend this style? After all, knee injuries to competitive weightlift-

ers are rare, especially compared to knee injuries in other sports. What is wrong with going all the way down?

If an athlete has a qualified Olympic lifting coach to work with them on this squatting method and the coach believes this form of squatting is superior, fine. The problem is when an athlete squats all the way down and relaxes, the knee joint opens up slightly, subjecting the connective tissues to stress levels higher than their tensile strength. In the case of weightlifters, who perform snatches and cleans bouncing out of the bottom position, the stress does not become excessive because they perform these lifts while keeping the muscles under tension.

Nevertheless, the reality is that a coach in high school may have 50 kids to work with at the same time, and it is difficult for any strength coach to give the one-on-one attention this type of squatting deserves, particularly in light of the fact that there are relatively few qualified Olympic lifting coaches in this country. Further, it's not so much that squatting deep injures the knees but that it places the lower back at a higher risk of injury.

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 high, unnatural stresses on the lower vertebrae of the back (L3, L4 and L5). Further, this stress is compounded by the compression forces on the spine, which are estimated to be six times greater at the bottom of a full squat than at the top (so that an athlete squatting 200 pounds would have 1,200 pounds of compression forces at the bottom).

Likewise, using a flat or tail-under back posture (as is



FIGURE 7: Weightlifters squat all the way down, but this depth is not necessary for most athletes and should only be used under the guidance of a qualified weightlifting instructor.

often taught in fitness classes to supposedly increase the involvement of the glutes) places excessive strain on the supportive tissues of the lower back. In his book *Facts and Fallacies of Fitness*⁷, the late Mel Siff warned against this technique: “Keeping the back ‘flat’ is common advice in the gymnasium training environment, yet its validity is rarely questioned. Actually, a flat back devoid of any curvature is not only virtually impossible for a normal person to achieve, but it also reduces the ability of the spine to absorb or distribute shock and stress effectively. The healthy spine is meant to have several different curvatures, whereas the straight spine suggests the presence of a specific type of pathology.” Again, if an athlete has exceptional flexibility and one-on-one coaching from a qualified Olympic lifting coach, it would be better to go with a parallel squat, or slightly below.

Next, there is the mistaken belief that squats invite adverse effects on the cardiovascular system because they cause a rise in blood pressure. It is true that blood pressure rises, but the effect is only temporary and the heart adapts positively to this stress by hypertrophy-

ing the left ventricle. It should also be noted that leg presses performed on a 45-degree angle increase the blood pressure significantly more than squats do. Of course, if an athlete has any cardiovascular issues, they must consult with their private health care practitioner about the effects that squats will have on their condition.

Finally, there is the argument that squatting all the way down doesn’t work the quads and hamstrings throughout the full range of motion. That’s true, but that’s why BFS has made glute-ham raises and lunges high-priority auxiliary exercises. Both of these exercises put minimal stresses on the lower back while working the quads, especially the vastus medialis (an inner thigh muscle that crosses the knee joint and is therefore key to maintaining knee stability) and all four heads of the hamstrings.

When BFS started 32 years ago, one of the most controversial aspects of our program was our promotion of the squat. Most of the controversies were a result of misinformation, which we can now 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 POSITION PAPER

SQUAT VARIATIONS

The BFS perspective on these valuable lower body exercises



The front squat is a great squat variation and is a key exercise for Olympic lifters. Shown here with great form is Lucia Angilau, a volleyball player from Hunter High School in Salt Lake City, Utah. Lucia has cleaned 150 pounds and vertical jumped 27.1 inches.

The back squat forms the core of leg training in the BFS program and is performed once a week, year-round, off-season and in-season. But throughout the year we also encourage the performance of what we call a “squat variation” exercise to supplement, not replace, the back squat. By adding such variety, coaches can customize the workouts to make them more sport specific, help prevent injury and keep motivation high.

We have already discussed the box squat in a separate position paper, so we will focus here on the pros and cons of the front squat and several multi-joint leg exercises such as the leg press.

FRONT SQUAT

Many strength coaches consider the front squat superior to the back squat as a leg exercise for athletes. In the front squat the quads work harder because the barbell is positioned on the front of the shoulders. In a survey of top European coaches the consensus was that the three best weight training exercises for sports

are the power snatch, the incline press and the front squat. However, consider that often coaches who are surveyed are working with athletes who have a base of training with the back squat.

One drawback to the front squat is it's difficult to perform higher repetitions because holding the weight on the shoulders compresses the chest and makes it harder to breathe. Performing more than five repetitions, or even three repetitions for some individuals, often leads to a breakdown in form and even blacking out.

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, 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. The BFS Flexibility Manual offers several exercises that will help improve the range of motion in these exercises. Often, however, just relaxing your grip as you hold the barbell and simply performing the exercise regularly will quickly resolve any flexibility problems associated with this exercise.

Another front squat 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 use significant weights. The issue with harnesses that support the weight in front of the body, such as the E-Z Squat and the Front Squat Harness, is that they often force the back into a rounded posture, placing unnatural stresses on the back and making it even more difficult to breathe.

The best alternative we've found to the traditional front squat involves the use of lifting straps, preferably a pair that has about a foot of length after being tied to the bar – note that the “quick release” straps Olympic lifters use usually don't work well for this technique. To perform this variation, place your shoulders under the



LEG PRESS



ANGLED BACK SQUAT

bar and grasp the straps with a neutral grip (i.e., palms facing each other). How high up to grab the straps depends upon the athlete's flexibility (the less space between the bar and your front squat-ting. The only drawback is it can be difficult to replace the bar onto the racks, so you should always have a spotter assist you. Eventually, by using straps you should be able to smoothly transition into regular front squats.

How much can you lift in the front squat? Generally, the ratio of back squat to front squat should be about 70-80 percent if you are going to equal depth in both exercises.

LEG PRESS

The leg press is performed on a horizontal or angled machine designed for this exercise. It emphasizes the quadriceps, especially the outer quadriceps muscle called the vastus lateralis. It also works the hamstrings and glutes, although not at the same intensity as the squat.

With the leg press, because the back is stabilized on the backrest there is minimal stress on the lower back. In fact, EMG studies show that the leg press reduces stress on the lower back by approximately 80 percent. This offers several advantages.

First, athletes with lower back injuries or medical conditions that make squatting painful or even impossible (such as with certain cases of scoliosis) can often perform the leg press without any discomfort. Second, the position assumed when performing the leg press is similar to that used in the start position for sprinting and in sports such as speed skating and ice hockey. The sprint position is definitely worth spending time

on because a lot of work takes place in sports where the trunk is inclined. Therefore, the leg press can be considered a sport-specific exercise for many athletic activities.

Injuries are rare when performing the leg press, but the major point is to "lock in" the lower back and not allow the weight to be lowered to a point at which the lower back is rounded at the bottom. Also, by starting at the top, the user can determine exactly how low to go and also can avoid injury from jerking the weight on the first rep to get the movement started.

When shopping for a leg press, it's best to select one that has a large footplate so you can place your feet in an "athletic" stance, a wider foot stance that has greater carryover to many sporting positions. Also, being able to place the feet higher up on the footplate increases the involvement of the glutes and hamstrings, thus reducing the stress on the knees.

ANGLED BACK SQUAT

The angled back squat is performed on a specially designed machine – many such machines are designed to allow you to perform both of these exercises on the same unit, such as the BFS 3-Way Hip Sled. With this exercise the weight is supported on the shoulders. Some machines are designed so that the exercise is performed with the athlete holding the weight at hip level (and are called hack squats), but this design often limits the amount of weight that can be used because greater grip strength is required.

The exercise closely resembles the motion of a back squat, so for most athletes the strength gained from this exercise will have a greater carryover to the back



HIP THRUST

squats. Also, the range of motion of this exercise is greater than that in the leg press. One EMG study on this exercise showed that compared with the squat, this movement had similar effects on the vastus lateralis, and even more strongly worked the glutes and biceps femoris (the lower hamstring muscle that is involved in knee flexion). This exercise also produced less involvement of the lower back muscles (erector spinae) compared with the squat, but more involvement than with the leg press. As such, when an athlete who has suffered from a back injury is cleared to perform back squats, a logical progression might be to start with a training cycle using the leg press, followed by the angled back squat, and finally the back squat.

Although we strongly encourage all athletes to squat, some athletes are uncomfortable supporting heavy weights on their shoulders. Athletes with shoulder injuries or back problems are in this group. Also, young athletes who don't have the emotional maturity to be trusted to squat properly with spotters should

not perform the squat and could be better off using the angled back squat.

As with the leg press, injuries are rare in this exercise, and the major precaution is to keep the lower back "locked in" throughout the exercise. A weight training belt will help in this regard, as it provides the user with feedback on improper form (e.g., when they are excessively rounding their spine).

HIP THRUST

The hip thrust is similar to the angled back squat and is performed on a special machine designed for this exercise. Because the athlete is facing the machine, it makes the exercise more biomechanically specific to many sports. This exercise is very popular among football players, especially linemen and running backs. It's also a great exercise for sprinters to improve their start. The same safety precaution applies as with the angled back squat: The lower back should be kept "locked in" throughout the exercise, and use of a weight belt is recommended.

After acquiring the basic equipment needed for a balanced strength training program (such as barbells, bumper plates, power racks, lifting platforms and benches), a wise investment would be in a multipurpose machine that allows the athlete to perform the leg press, angled back squat and the hip thrust. Except in the case of an injury that prevents an athlete from back squatting, these exercises should be used to complement the back squat, not replace it.

BFS POSITION PAPER

THE POWER CLEAN

Why BFS encourages all athletes to perform this valuable core lift exercise



Although the power clean has become a mainstay in the conditioning programs of most athletic programs, many coaches are still reluctant to incorporate it into their training programs. Alternatively, they may choose to perform the exercise from only a partial range of motion or they may discourage younger athletes from practicing it. Or, even worse, many coaches will not undergo the training to teach it properly. This paper will address all these issues.

The field of strength and conditioning has evolved, and now weight-rooms have become not only large but also overwhelmed with training fads promoted by sports celebrities and large marketing budgets. Swiss balls, wobble boards, foam rollers, suspension cords, kettle bells, strongman yokes, tires...every year a different new fad is brought forth in the hopes of getting an edge. The problem is not that these devices are with-

out any value but that they distract from the basics of developing stronger, more powerful athletes.

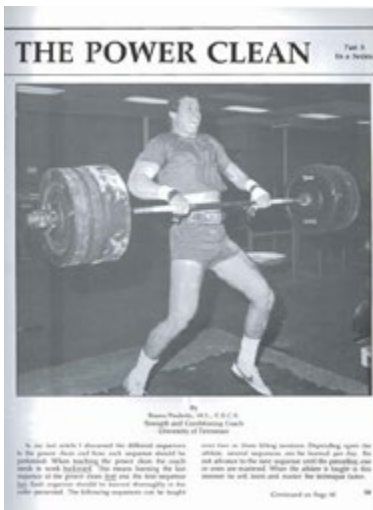
This is especially true in high schools. Often, two or three training sessions, about 45 minutes each, are all that can be devoted to workouts. During the season, two weight training workouts may be all that athletes can fit into their schedule. What's more, because most high school athletes compete in multiple sports, preseason periods often last only a few weeks. This means that for the majority of the year, an athlete may have only two training sessions a week, and sometimes fewer. Time is precious, and high school athletes must make every minute count.

Why Athletes Need the Power Clean

If you peruse the archives section of BFS magazine online, you'll see that from our very first issue in 1981 we have been promoting the power clean. In the early years, many individuals believed that the power clean had little value for an athlete or was too dangerous. Why? Perhaps, as with many other aspects of life, you have to follow the money.

Much of the criticism about the power clean came from companies that sold exercise machines, such as that of the late Arthur Jones, inventor of the popular Nautilus machines and one of the most prolific writers in weight training. Although machines have their place in strength and conditioning programs, especially in the area of muscle building and injury rehabilitation, many manufacturers of machines aggressively campaigned against power cleans as a marketing tool to sell more machines. After all, if you're outfitting a gym with platforms and free weights, these companies won't be able to sell you as many machines! But the fact is they were wrong.

A survey involving 137 Division I coaches found that 85 percent used Olympic lifting movements such as the power clean to train their athletes. In the NFL, that percentage was 88 per-cent. When BFS Editor in Chief Kim Goss was a strength coach for the Air Force



Since BFS magazine started publishing in 1981, we have featured many articles on the importance of the power clean for athletes.

Academy (1987-1994), he enlist-ed the help of the university’s math department to conduct an experiment to determine which strength training exercises had the highest correlation to the ability to play football. He compiled the results of the top three athletes on the depth chart for each position, as well as their maxes on numerous core and auxiliary exercises, for a three-year period. For defensive and offensive linemen, and in fact for almost all positions, the exercise that had the highest correlation to playing ability was the power clean. The reason is simple.

Linemen need to be able to express a high level of strength quickly. Because the power clean allows you to accelerate your limbs over a large range of motion, it’s one of the best exercises for improving what sport scientists call the rate of force development. This is in contrast to conventional power lifts such as squats, which for safety reasons require more time to decelerate the weight – in fact, the only time maximum force can be exerted is at the beginning of those exercises. And there is practical evidence in peer-reviewed journals supporting the idea that power cleans are a superior exercise for developing power.

For example, in 2004 researchers at the Department of Health and Exercise Science at the College of New Jersey conducted a 15-week study on weight-lifting exercises involving 20 Division III college players. One group focused on powerlifting (“PL”) exercises such as the squat, while the other group focused on Olympic lifting exercises such as the power clean. Although both groups showed improvements in the vertical jump, a standard test for athletic power, the authors noted, “Results suggest that Olympic lifting can pro-

vide a significant advantage over PL in vertical jump performance changes.” There are many physiological reasons for this, such as what type of muscle fibers the power clean works.

There are essentially two types of fast-twitch muscle fibers that can increase in size: the Type IIa and the more powerful Type IIb. **The Type IIb fibers respond better to explosive lifts such as the power clean;** and much of the massive development of the traps, lower back and hamstring muscles on Olympic lifters is due to the development of Type IIb fibers. So, if you want as much functional muscle mass as possible for sports, you need to perform the power clean.

But what about the idea that the power clean is dangerous? This subject of weight training safety is covered extensively in the BFS position papers on safety and liability and youth training. For example, the youth training paper reported that a study conducted in the United Kingdom found that the lowest injury rate was in the sport of competitive weightlifting, with a .0017 rate (0.17 percent). The authors noted the following: “Britain’s Schoolboy Championship has been staged annually for at least 18 years and has involved some 54,600 competition lifts (maximal or nearly so) and at least 54,600 lighter but still heavy warm-up lifts. In this period one boy suffered a concussion when he fell onto a weight after losing control, and another was bruised when he dropped a weight onto his upper back. In neither case has there been any evidence of a long-term consequence.... In short, there seems to be no rational case for continued widespread anxiety about weight training or weightlifting in children.”

It should also be noted that during a power clean the athlete not only must explosively lift the weight but also must catch it. In effect, doing power cleans teaches the athlete to rapidly control the impact, a.k.a. disrupted forces, that occur during the lift. When you consider the ever-increasing numbers of athletes suffering ACL injuries, you can see how valuable it is to be able to handle the dynamic, disrupted forces that occur to the ankle and knee during athletic competition. Further, the faster that athletes can handle these disrupted forces, the quicker they will be able to move on the court or on the field.

Finally, the Olympic lifts are “economical” exercises, meaning that they work many muscle groups simul-



Lusía Angilau



Lynn Weikel



Cyrene Ekezie Wittman



Hunter High School in Salt Lake City has a great girls weight training class that stresses the power clean. The class currently has five girls who have cleaned at least 150 pounds and ten who have cleaned 135. The AD and coach for the class is Heather Sonne.

taneously. To achieve a similar training effect with conventional exercises, an athlete would have to perform a leg press, back extension, calf raise, shoulder shrug, upright row and biceps curl – and even then they would be neglecting a few muscles. Time is a major limiting factor in many athletic programs, so it's important to use exercises such as the power clean that give you the most bang for your buck.

Is the Power Clean Safe?

One of the current trends among coaches is to have athletes perform the lift just from the mid-thigh position, also known as the “hang.” Addressing this issue is Bud Charniga, one of the best lifters in the US (he was only five pounds away from an American record in the snatch in the '70s) and an individual who has translated many Russian weightlifting textbooks and has talked to the world's best coaches at many international weightlifting competitions. He was asked why so many coaches prefer the hang variation of the power clean rather than lifting it from the floor.

“Why do many athletes only perform the hang clean? I believe it's because they don't develop the flexibility in the knee, hips and ankles, so they shorten the range of

motion. They shorten the range of motion – you don't have to worry about flexibility. The problem with doing it from the hang is that you tend to use your arms too much and you flex your legs less – so basically you're going to be lifting the weight with your upper body.”

Is the power clean difficult to teach? Certainly not, if you have the proper educational materials and coach-es who know how to teach it. BFS currently gives more than 400 clinics a year to young athletes and has been doing so for over 30 years. The power clean is taught in all these clinics, and we often see athletes who have never performed this exercise come away with sound technique that will quickly lead to gains in athletic performance. Further, at our certification clinics, we ensure quality instruction, because coaches must show not only that they can perform the power clean at these clinics but also that they can teach it. But coaches should not stop there.

For further help with teaching and performing this exercise, the US Weightlifting Federation offers clinics on how to perform not just the power clean but also the power snatch and the full variations of these lifts, the snatch and the clean and jerk. And Charniga, through his website sportivnypress.com, offers many

free translated articles about Russian weightlifting training methods. Charniga says that the whole point of doing those exercises is that

“they are complicated, and it requires coordination, flexibility, agility – all that comes together into a complete motion.” So, just as a football coach would not read one book in their entire career about how to coach their sport, a strength coach should make learning how to perform the power clean and its variations a lifelong learning process.

The power clean is one of the single most important exercises for achieving physical superiority, which is why it has always been a core exercise in the BFS program. Therefore, coaches should take the time to learn how to teach the power clean correctly so their athletes have the best chance to fulfill their potential.

STRAIGHT LEG DEADLIFT

The BFS perspective on a valuable stretching exercise



Along with the box squat, one of the most controversial exercises in the BFS program is the straight-leg deadlift. And as with the box squat, the opposition to the straight-leg deadlift is not based upon facts but upon a misunderstanding of the purpose of the exercise and its execution. This paper will clear up some of these misunderstandings.

One of the most important variables in designing strength and conditioning workouts for athletes is exercise selection. There are barbell exercises, dumbbell exercises, medicine ball exercises, plyometric jumping exercises and...well, you get the idea. In the high school environment, where there is often limited equipment and large classes, it's more practical from an administrative standpoint to keep the exercise choices to a minimum.

At BFS we've tried to keep the matter of exercise selection simple. We describe core exercises, such as squats, that are used year-round to develop strength. And then we have auxiliary exercises, such as glute-ham raises, that are used at specific times during the year depending on what sport an athlete participates in. These

auxiliary lifts simulate specific movements in sports or are performed as "prehab" exercises to work frequently injured muscles. Under the BFS system, a hex bar deadlift, which is a multi-joint exercise that uses a lot of muscle mass, would be considered a core exercise. This is in contrast to an isolation exercise, such as the leg curl, which would be considered an auxiliary exercise. The controversy surrounding the straight-leg deadlift arises when it is treated as a core exercise rather than as an auxiliary.

With a deadlift a tremendous amount of weight can be lifted (several power lifters have hoisted more than 1,000 pounds in this exercise), and as such, it is considered a strength exercise to develop the lower back, hamstrings, thighs, torso and trapezius. Usually it is performed for lower reps so that the heaviest weights can be used.

Because the barbell is positioned in front of the body's center of mass, often there is a temptation to round the back as the lift is performed. This practice places adverse stress on the spine and can easily result in injury. Although it is advantageous to have a training partner spot the lifter by placing one hand on the lifter's lower back and the other across the chest to ensure the back doesn't round, this takes considerable skill and some athletes may feel uncomfortable with this practice. As a solution, BFS decided to replace the deadlift with the hex bar deadlift, an exercise performed with a hexagonal barbell that weighs 45 pounds. The hexagonal shape allows the lifter to perform exercises from inside the encompassing bar. Hand grips strategically placed on the two ends of the bar enable the weight on the bar to be in perfect alignment with the athlete's center of mass, and there is less tendency to round the lower back.

Another aspect to consider with deadlifting is the power line. The power line is an imaginary line that runs straight through the lifter's center mass. Executing the deadlift movement through the power line enables the athlete to develop maximum power and reduces risk of injury. The farther the weight diverges from the power line, the more power the lifter loses. For exam-



FIGURE 2. The sit-and-reach test is a standard test used in physical education, and toe touch exercises are often used to develop flexibility. The straight-leg deadlift places the back and legs in the same position, as shown in these photos of common toe touch exercises and the sit-and-reach test.

ple, how long can you hold a 45-pound bar with your arms straight down and the bar resting against your thighs? Probably for a long time. Now try holding the bar about a foot out from your thighs. Doing that is much harder. The farther away the bar gets from center mass, the harder it is to hold and the more power is lost. In addition, because using the hex bar makes correct technique easy, a spotter is not necessary.

Although the deadlift can still be used in the BFS program as a core lift, we've found the hex bar deadlift to be a superior exercise. Because the torso is more upright than it is with the regular deadlift, compression forces on the spine and stress on the lower back are reduced. This difference makes it possible for athletes to work the lower back hard every week, whereas such frequency of training with the regular deadlift often causes over training. The hex bar also lends itself to performing shrugs in a superior way because the bar does not contact the thighs.

With the straight-leg deadlift, a straight bar is used and the bar remains in front of the body. Thus, potential power is reduced and the exercise lends itself to rounding the spine. As such, it should not be used as a strengthening exercise by being performed with heavy weights. Instead, it should be thought of as a stretching exercise.

Stretching the Truth

Figure 1

GRADE	MALES	FEMALES
Excellent	6" past heels	8" past heels
Good	2" past heels	4" past heels
Fair	2" short of heels	0" at heels
Poor	6" short of heels	4" short of heels

One of the standard measurements used in physical education is the sit-and-reach test. In a stretching program, as in weight training, measuring progress and setting records will help keep an athlete's motivation high. We recommend that athletes take the sit-and-reach test at least once a month.

The sit-and-reach test measures flexibility in the back of the legs (hamstrings) and in the lower back. To perform the test, sit on the floor with your legs together (putting your legs against a box will help keep you from moving). Reach as far as possible and hold for three seconds. If you are not using a BFS 3-in-1 bench, which has a built-in measuring stick, place a yard-stick with the six-inch mark at your heels and the one-inch mark closest to your body. Reach as far as possible and check results against the BFS standards for the sit-and-reach test, Figure 1.

If the sit-and-reach test is considered a standard measurement, then what could be controversial about using an exercise that simulates this movement to improve these results? (Figure 2) We believe there is no good reason for any controversy, as long as the exercise is not performed quickly or with heavy weights. Using heavy weights would create extremely high lumbar intradiscal pressure, especially in L2-L3 – such stress could cause lower back pain.

Our recommended technique for the straight-leg deadlift is to use a very light weight and perform every rep slowly, controlled and deep. Junior high boys and girls should use 45 pounds or less – that's 45 pounds total, not 45 pounds on each side of the barbell. Most high school female athletes should use between 45 and 65 pounds, and very strong, mature female high school athletes could use up to a maximum of 95 pounds. Very strong, mature male high school athletes could use up to a maximum of 135 pounds. The absolute max



FIGURE 2. The sit-and-reach test is a standard test used in physical education, and toe touch exercises are often used to develop flexibility. The straight-leg deadlift places the back and legs in the same position, as shown in these photos of common toe touch exercises and the sit-and-reach test.

any-one should use is 40 percent of their parallel squat. Perform two sets of ten repetitions, twice per week, and do not try to do a little more each week – keep the poundage the same.

Begin the straight-leg deadlift with a very slow and controlled movement. Keep your legs straight with the knees locked (not hyperextended) at all times. When you do a hamstring stretch, you can't bend the knee at all – same thing with the BFS straight-leg deadlift. You can pause at the bottom before coming back up. To get a **deeper stretch**, perform the lift while standing on a low platform.

As you can see, the straight-leg deadlift is not a strength- and muscle-mass-building exercise. Instead, it is primarily a stretching exercise that is similar to popular stretches and is used as a national standard in physical education testing. For these reasons, BFS considers the straight-leg deadlift a valuable exercise for any athlete.

BFS POSITION PAPER

PLYOMETRICS

Practical guidelines on how to implement this valuable training method



Plyometrics can have great value in improving speed, jumping ability and overall explosiveness. Athletes who work hard in the weight room but neglect all other forms of training, especially plyometrics, will not reach their potential. A major problem is that many coaches often underestimate the intensity of plyometrics and prescribe workouts that can lead to injury.

The exercise scientist regarded as the father of modern-day plyometrics is Professor Yuri Verkhoshansky, a brilliant Russian scientist who pioneered this type of training as a means of sports training to improve athletic performance. Verkhoshansky spent several years researching plyometrics as part of his postdoctoral work and published his first research study in 1964.

Verkhoshansky shared a considerable amount of his findings in plyometrics with Dr. Mel Siff, a sports scientist from South Africa with an extensive background in biomechanics and exercise physiology. According to the late Dr. Siff, the most effective type of plyometrics is what Verkhoshansky calls the shock training method (which is also referred to as classical plyometrics). Siff said that shock training “is a method of mechanical shock stimulation that forces the muscles to produce as much tension as rapidly as possible. It is characterized by an intense muscular contraction that is preceded by a relaxed state.”

Stepping off a box (not jumping, as the thigh muscles must be relaxed during the fall) and immediately rebounding upward upon landing is considered an example of a shock training exercise for the lower body. Performing Marine Corps push-ups where you clap your hands, land and then immediately perform another repetition is an example of shock training for the upper body.

One of the characteristics of shock training is a brief transition phase, which is the pause that occurs immediately after the eccentric phase ends and before the concentric phase begins. Such dynamic activity is required to take advantage of two processes: 1) the reflex increase in muscle tension caused by the sudden impact stimulus, and 2) the release of elastic energy stored in the tendons and muscles developed during the eccentric phase — energy that can be refocused to help an athlete jump higher and farther and run faster.

As illustrated in Figure 1, a delay as long as .25 seconds would prevent the athlete from being able to use that stored elastic energy, and the activity would have to be regarded as low- or medium-level plyometrics. Says Siff, “A useful visualization of shock training is to imagine that the surface being touched by the hands or feet during the plyometric contact phase is red-hot, so that any prolonged contact would be dangerous.” Verkhoshansky’s research has revealed that shock training is the most effective type of plyometrics. Just how effective?

In one 12-week study Verkhoshansky divided track and field athletes into two groups. The first group performed 1,472 low- and medium-level plyometric activities, including squats. The other group performed 475 jumps using the shock training method. Although the shock training group performed a third less work, these athletes showed greater improvement in reactive ability than the group using traditional methods. The intensity of plyometric training explains why the BFS box plyometric program is so effective even though it takes only 10 minutes **twice a week**.

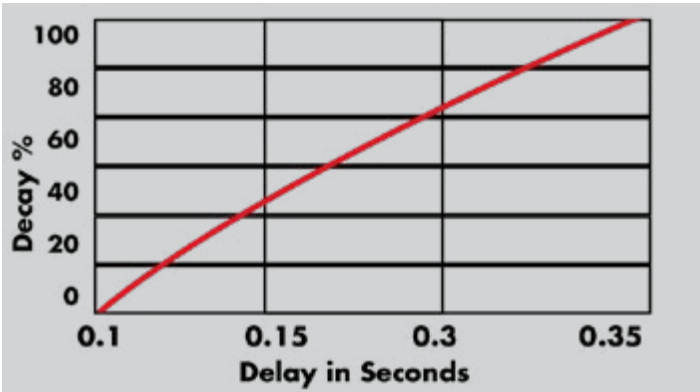


FIGURE 1.
A delay as long as just .25 seconds prevents the athlete from being able to use stored elastic energy, and the activity would have to be regarded as preparatory plyometrics.



FIGURE 2
Various heights of plyometric boxes enable athletes of all abilities to perform safe and effective plyometric exercises. With solid boxes, the feet safely slide down the box if the athlete misses, whereas with open boxes the feet can get trapped in an open plyometric box.

Considerable peer-reviewed research outside Russia is also available to prove that plyometrics works best when combined with strength training. For example, in a paper published in the Journal of Applied Sports Science Research in 1992, researchers conducted a six-week study on the effects of squatting and plyometrics on the vertical jump. The group that performed just the squat increased their vertical jump 1.3 inches, a significant improvement for six weeks. When plyometrics was combined with squatting, however, the increase was 4.2 inches! With scientifically documented improvements of that magnitude, you can see why plyometrics is an integral part of the BFS program.

Safe, Practical Applications of Plyometric Training

Plyometrics is a powerful tool for athletic training, but because it places such high levels of stress on the nervous system and on the joints, it must be approached with caution. This entails first developing a strength base with BFS core lifts and at the same time perfecting the technique of box jumping with lower boxes that we call readiness plyo boxes. This type of training may be classified as preparatory plyometrics because it does not produce a high level of muscle tension but helps condition the body and nervous system for more

intense forms of plyometrics. Thus, the squat could be considered a form of preparatory plyometrics because, although it involves a stretching and shortening of the quadriceps muscles, the speed component is relatively small, as is the stress on the joints.

Next, it's important not to perform plyometric box jumping on surfaces that are too soft, as this would interfere with the release of stored energy and diminish the intensity of the reflex stimulation of the muscles. Further, to help ensure the safety of the athlete, it is important to use solid boxes with a non-slip surface and a base wider than the top for maximum stability as shown in Figure 2, rather than the example shown in Figure 3, in order to prevent injury. Also, as the athlete progresses, he or she will need to use higher boxes.

Coaches looking to improve the explosive power and jumping ability of their athletes should consider investing in some plyometric boxes and reading all the material available from BFS on the subject. When plyometrics is used correctly and consistently, it is an extremely effective training method. And couldn't your athletes use an edge?

STRENGTH TRAINING FOR WOMEN

Guidelines for helping women fulfill their athletic potential



Team BFS member Maegan Snodgrass teaches the squat-style clean to Voinnie Pataialii from Hunter High School in Salt Lake City.

With all the information available about strength and conditioning, it's amazing that there are still many myths being promoted about women and strength training. You'll hear Pilates instructors claim that their workouts are better for women because their techniques will make muscles longer, like a ballerina's. There are highly paid celebrity fitness trainers who preach that women should only do light weights to tone. Some health care providers claim that heavy squats will damage a woman's knees, spine and possibly even their ability to bear children! And of course, there is the almost universal belief that all women athletes must do aerobic exercise to stay lean. All of these beliefs are nonsense, but the damage has been done.

The continual reinforcement of such misinformation about training women athletes by these so-called experts has trickled down to our schools. The result is that young women are given programs that are vastly different from, and usually inferior to, those given to men. This paper will discuss 10 myths associated with training young women so that coaches, athletes and their parents can understand how young women can achieve their full physical potential.

MYTH 1: Weight Training Makes Women More Masculine. Many women have avoided weights because of the ill-fated sport of women's body-building, which produced hundreds of Hulk-like females in the 1980s and still churns out a handful of new, chemically enhanced exhibitionists a year. The fact is the average woman cannot gain huge muscle without the assistance of muscle-building drugs.

Biologically speaking, most girls who train for strength or muscular gains will never acquire the degree of muscle mass associated with boys who lift weights simply because girls have much less of the muscle-building hormone testosterone compared to males. Women also possess only about 60 percent of the number of muscle-fiber nuclei that men have, which reduces women's capacity to build muscle.¹

It's true that strength gains are often associated with increased bodyweight, but this does not necessarily mean there is always an increase in size. Muscle tissue is denser than fat, so as a female athlete trains for strength, her body fat is likely to decrease while her muscle tissue increases, causing her overall bodyweight to increase or stay the same.² Also, many elite strength coaches have found that female athletes often experience their largest gains in muscle mass during the first year of training, with gains in strength in the following years coming primarily through neural adaptations.³

MYTH 2: Women Cannot Excel in Overhead Lifting, Chin-ups and Push-ups. The current world record in the clean and jerk for women is over 400 pounds, and now women are not only clean-and-jerking more than double bodyweight, but are snatching more than double bodyweight as well. In the squat, Becca Swanson holds the all-time best result in this lift, with 854 pounds while weighing 247 pounds. Such results prove that women can achieve exceptionally high levels of strength in the lower body. But what about the upper body?

Scientific research and empirical evidence suggest that women can make significant improvements in upper body strength if they decide to work on it. Young



BFS HIGH SCHOOL FEMALE ATHLETES OF THE YEAR

Sarah Cardinal

Valerie Davis

Jennifer Walter



Kiley Allosso



DeAnn Pertz



Donnerberg

girls will be seen in gymnastics facilities climbing thick ropes and performing multiple chin-ups and handstand push-ups. “As far as chin-ups are concerned, this is the exercise where women are actually closest to men when trained properly,” says Charles Poliquin, a strength coach who has worked with numerous women who have won medals in the Olympics and have broken world records. “They can attain, on a pound-for-pound basis, 85 percent of a man’s strength.” Poliquin notes that a female trainee (assuming she is not overweight) who is trained by a competent strength coach should be able to perform 12 chin-ups in three months. He also notes that pressing strength is typically less efficient in a woman, with the lifts often being 66 percent or less than a man’s in var-

ious pressing exercises.⁴ Incidentally, the world record for women in the bench press is 600 pounds.

One reason women generally do not excel in tests of upper body strength is that, historically, men, and boys as well, tend to perform more heavy labor than women do. Who climbs the tree to do the trimming, pulls down the broken fence, and wheelbarrows in the new sod? Girls and women do hard chores too, but much of the backbreaking stuff goes to the guys. So it may not be so much of a physiological issue as a cultural one.

MYTH 3: Aerobics Is the Best Way to Help Women Stay Lean. Women carry more fat and store it more efficiently than men, making it harder for them to

maintain a lean, athletic body. By increasing muscle mass and stimulating the release of natural biochemicals such as growth hormone, anaerobic activities such as weight training will raise a woman's metabolism (the rate at which a body burns calories) and will help her burn fat and stay lean, perhaps even more effectively than aerobics will. Further, aerobics produces cortisol, which has the effect of decreasing muscle mass and consequently her metabolism.⁵

Many women believe that in order to stay lean they must perform aerobics. The fact is weight training appears to be more effective than aerobic training in reducing fat. In fact, it's possible to over train so much with aerobics that the body actually gains fat. One study found that the aerobic instructors who taught the most classes had the highest body fat levels! Further, some types of aerobic training, such as spinning, can increase the storage of intramuscular and subcutaneous fat in the hip and thigh areas.⁶

MYTH 4: Weight Training Can Stunt a Girl's Growth. One reason this myth has survived may be traced to the decreasing height of women gymnasts. In her fascinating book about female gymnasts and figure skaters, *Little Girls in Pretty Boxes*, Joan Ryan writes that the average height of the gymnasts on the 1976 US Olympic Team was 5 feet 3½ inches, whereas the average height of the 1992 US Olympic team was 4 feet 9 inches.⁷ An uneducated assumption might be that the difference could be attributed to the ever-increasing intensity of the workouts these athletes perform. If you carried that argument to the next step, you'd expect that young girls who lift weights would experience the same reduction in height.

The fact is the average height of our top gymnasts has declined because of selection: Shorter athletes tend to be stronger, pound for pound, than taller athletes. This "relative strength" difference makes it more likely that shorter athletes will excel. Likewise, most figure skaters tend to be relatively short, even the men. A faulty analogy would be to say that if a child is short, they should take up basketball because most professional basketball players are tall.

As discussed in detail in articles published in *BFS* magazine, there is very little risk that weight training will stunt growth, either by prematurely closing growth

plates or by some other means.⁸ Further, weight training increases bone density, thereby decreasing the risk of women developing osteoporosis in later years.

MYTH 5: Women Cannot Train Like Men. One of the biggest challenges in designing strength training programs for girls at the high school level is that many girls have little or no weight training experience. It can be an intimidating experience for girls to be put in a coed class with boys who have had several years of weight training or, as stated earlier, more of a background in manual labor.

For these girls, it's best to start with a program of higher repetitions to help them learn and perfect proper lifting technique. This also makes sense from a biological perspective, as even with an equal level of weight training experience, women tend to be less "neurologically efficient" than men.⁹ What this means is that girls can enjoy good progress for a longer period of time on higher repetitions than boys because it is more difficult for girls and women to recruit the most powerful fast-twitch muscle fibers. Also, at the highest levels of training, such as the programs of Chinese weight-lifters, women tend to respond best to more frequent, but shorter, workouts than men.¹⁰

Science aside, from a practical stand-point a female athlete may be able to make better progress on the BFS program for an even longer period of time than a male athlete. So, whereas in college a male athlete who trains for one sport may do better on a sophisticated periodization model, a female athlete may do better on a workout program such as the Bigger Faster Stronger Total Program for Athletes.

MYTH 6: Women Are Not As Disciplined in the Weight room As Men. Many high school coaches find that they get much better results when girls train by themselves instead of in a coed environment. Perhaps this reflects a lingering social taboo that it isn't OK for girls to be strong or that there is something unfeminine about a girl training to be fit. However, many coaches today find that there is no issue with girls training with boys, and often the girls will even help with the spotting. Whatever the reason, it's expected that as these social stereotypes break down, more young women will become increasingly comfortable in coed weight training environments.

MYTH 7: Women Should Not Play Certain Sports Because of the Risk of ACL Injuries. In volleyball, basketball and soccer, it's been estimated that women can be as much as eight times as likely as men to injure the anterior cruciate ligament, or ACL, which helps stabilize the knee. According to the American Orthopedic Society for Sports Medicine, each year approximately 20,000 high school girls suffer serious knee injuries, most involving the ACL.¹¹ Several theories have been proposed to determine why women are at such a high risk, including the idea that women have less strength than men and therefore rely more on their ligaments than on their muscles for support, and a woman's wider pelvis causes a woman's thighs to angle inward and make her knees more vulnerable to injury.¹² What is commonly overlooked is that often women do not receive the same strength training programs as men, and as such may not be as prepared to handle the stress of high-level sports.

MYTH 8: Women Can't Train During Their Menstrual Cycle. Contrary to this archaic notion, women can train anytime, just as men can, provided their health is uncompromised. There are some studies suggesting that athletic performance may be inclined to rise at particular times during a woman's cycle, but research has produced no absolute conclusions. Training performance is always individual, and of course any medical concerns should be taken up with the appropriate medical providers available to the athlete.¹³

MYTH 9: Women Should Not Squat Because It Widens the Hips. This myth can be traced to Vince Gironda, a legendary bodybuilding guru who trained physique champions and movie stars. Gironda said that squats would widen the hips and detract from the aesthetic V-taper that bodybuilders like. According to Poliquin, there is no scientific or empirical evidence to corroborate the belief that squats widen the hips:

“When the gluteus maximus develops, it grows back, not out, because neither the insertion nor the origin is at the hip. If squats did widen the hips, Olympic lifters, who devote as much as 25 percent of their training volume to squats, would be built like mailboxes.”¹⁴

MYTH 10: America Has the Best Strength Training Programs for Women Athletes. For a number of reasons American women have been slow to begin programs designed to develop their optimal strength. This lack of serious strength training becomes most apparent when you look at the performance of our international-level female athletes in events such as the discus, shot put and javelin throw – sports that all require superior upper torso strength coupled with power from the hips, buttocks and thighs.

The fact that European and Eastern Bloc women dominate these power sports does not imply that they are made of tougher stuff, but it does mean that they use better training methods. American coaches are well aware of the benefits of long-term strength training programs: Progressive weight training programs and improved training facilities have been upping the poundages and increasing the strength of our male athletes for quite some time. But American athletic coaches have been reluctant to apply these same training techniques to our women athletes, and many of these women have themselves been reluctant to undertake a serious program for building muscular strength.

As social and cultural attitudes about strength training for women continue to become more positive, greater numbers of women will begin to pursue serious power training programs. Then we can look forward to a new influx of athletic talent who will continue to shatter the existing records for women strength athletes.

BFS POSITION PAPER

UNIFICATION

BFS guidelines on why and how to implement this important training concept



Unification is the concept that all high school and middle school athletes, and even some college athletes, will follow the same basic training philosophy. This means that regardless of the sport, all athletes will perform the same core weight training exercises, the same speed and agility exercises, and the same flexibility and plyometric exercises. BFS is a strong proponent of unification.

Unification provides a model of organization that reduces teaching time, prevents many administrative hassles and personality conflicts, and improves athletic performance year-round. Unification creates a positive environment that facilitates success for all participating coaches, teachers, athletes and students. Although unification is used primarily in the training of athletes, it is also appropriate for physical education classes.

The Specificity Challenge

Along with the benefits of unification, there are challenges; the greatest challenge is specificity of training. Specificity of training is defined as “the principle that physiological adaptations in response to physical training are highly specific to the nature of the training activity. To maximize benefits, training should be carefully matched to an athlete’s specific performance needs.” (1) In other words, coaches face a tough time in determining the “best” training for their athletes

because every athlete is unique and “performance needs” differ from athlete to athlete.

One factor that must be mentioned in any discussion of strength training for sports and how it applies to specificity of training is in the area of motor learning. To reach top levels, gymnasts and figure skaters spend large amounts of training time, starting at an early age. Michael Jordan was an exceptional basketball player, but he did not excel in baseball to the same degree because he did not practice baseball extensively at a young age. Regardless of how good a strength program is, if athletes in some sports do not practice this sport at an early age, they will probably not achieve the highest levels in their sport.(3)

Although determining which activities have the best transfer of training to a specific sport can be difficult, there are many sports in which sport specificity is easier to measure. One example is powerlifting.

In the sport of powerlifting, which consists of three lifts (squat, bench press and deadlift), the skill component is relatively low, whereas the quality of strength required is relatively high. Further, the basic tool used to develop strength (i.e., the barbell) is also used to perform that sport – you could say that the barbell is the sport. If a powerlifter wants to improve their bench press performance but also wants to avoid overuse injuries by only performing bench presses with a barbell, they could perform similar movements such as “bench press with dumbbells” or “incline bench press with a barbell.” After devoting one month to separately concentrating on each of these exercises, the powerlifter could test their one-repetition maximum (1RM) in the barbell bench press. If the bench press with dumbbells exercise produced a higher increase in the 1RM than the incline bench press with a barbell, the dumbbell exercise would be considered more specific.

It should be noted, however, that performance in the bench press often can be achieved with nonspecific movements – that is, focusing on training muscles, not movements. Here’s an example from the training

of elite athlete Jim McKenzie, a professional hockey player who was trained by strength coach Charles Poliquin. McKenzie went from a 280-pound close-grip bench press to 380 pounds in less than four months by focusing on corrective exercises – and for the first three months of this program he did not perform any bench presses. Coach Poliquin believed that McKenzie was able to achieve such unusual results because he had started out with low levels of strength in the muscles that externally rotate the shoulders, and this weakness had interfered with his ability to bench press. (5) Likewise, a swimmer who has round shoulders because she hasn't performed dry-land exercises for the muscles that externally rotate the shoulders might be more susceptible to shoulder injuries – and obviously, a shoulder injury would affect the swimmer's performance.

The fact that so many young athletes now train year-round in one sport – some high school hockey players, for example, will play year-round on club teams and practice more than 15 hours a week – has increased the likelihood of developing muscle imbalances from a large volume of sport-specific training. Thus, although performing activities with a high level of specificity is important to reach the highest level of performance, there may be a place for corrective exercises that are not specific to sport movements.

The Value of Auxiliary Exercises

To meet the needs of athletes who want special weight training exercises to improve a specific aspect of athletic performance or to correct muscle imbalances, BFS recommends applying the concept of specificity of training with the use of auxiliary exercises that are performed after core exercises are completed. These are usually emphasized during the preseason, when it is possible for athletes to devote more time to weight training.

In swimmers, for example, for the upper body the prime movers are the pectorals and latissimus dorsi; so lat pull-downs, chin-ups and dips would be the most sport-specific auxiliary exercises in the weight room. However, to avoid the round-shouldered posture common with over development of these muscles, seated rowing exercises would be a good choice for an auxiliary exercise.

Another example is volleyball. Volleyball places tremendous stress on the shoulders, from both hitting the ball over-hand and blocking. To develop power for the serve, lat pull-downs and various forms of chin-ups and pull-ups will be effective; to strengthen the shoulders for blocking, power snatches should be used rather than power cleans. For the ankles, use both standing and seated calf raises.

One final example is wrestling. Many coaches believe that the best strength training for wrestling is wrestling. While wrestlers can achieve high levels of strength in the sport without touching a barbell or dumbbell, they can reach higher levels much faster with a program such as BFS. For auxiliary exercises, neck exercises are obviously important, followed by exercises that improve pulling strength (rows and pull-downs) and grip strength (wrist curls and wrist rollers). Lunges would also be valuable for many types of take downs.

Diversifying the Athletic Portfolio with Unification

In an effort to achieve the highest levels in sport, athletes are specializing in sports at younger and younger ages. In a sport where most champions hit their peak in their late 20s, Naim Süleymanolu broke his first world record in weightlifting when he was just 15 years old. Soccer prodigy Freddy Adu was earning a half-million dollars a year when he was 14. Women's tennis and women's golf are flooded with teenagers eager to become the next Maria Sharapova or Michelle Wie. And who would have predicted LeBron James' spectacular success in the NBA as a teenager? Although early specialization can produce spectacular success, this approach to training does have a price.

While the aforementioned athletes might never have become as successful had they been multi-sport athletes, the average athlete who tries to emulate them by focusing on one sport often ends up quitting sports altogether. In fact, studies have shown that approximately 70 percent of athletes will quit organized sports by the age of 13! (6) At BFS, we believe that most high school athletes should play multiple sports, and there are many good reasons for this.

Most young kids do not know what sport they will



Performing exercises that use multiple muscle groups will help athletes reach the highest levels of physical superiority. Shown here is Maegan Snodgrass performing a difficult flip on the balance beam and clean and jerking a heavy weight.

eventually be best at. An athlete who matures early might have an advantage in youth football because of his size; but as his peers mature over time and begin to equal or exceed him in size, he might discover he has more natural talent for wrestling. Perhaps that tall, lanky girl who was put in basketball because of her height would be better off in swimming or a track and field event.

Of course, there are natural athletes who can seemingly excel in any sport. Dylan Rush, our 2005 High School Male Athlete of the Year, decided to accept a college scholarship for football, but he could have played at the Division I level in wrestling. (7) And the truth is, he intentionally chose a college without a wrestling program because he thought it best to avoid the temptation of trying out for the wrestling team. But physical phenoms such as Dylan Rush are the exceptions to the multi-sport rule that seems to hold for our kids: It is only by trying several sports over several years that young athletes will find out which sports they enjoy the most and which best suit their natural athletic gifts.

Injuries are another issue. Al Vermeil, a professional strength coach who has earned world champion rings in both football and basketball, says he is alarmed at the ever-increasing number of sports medicine clinics being established in this country. What is causing the rise in injuries that creates the need for these clinics? Coach Vermeil believes one of the factors is the misguided tendency to encourage kids to concentrate

on one sport at too early an age. (8) And he's right. According to a study by the Centers for Disease Control and Prevention, from 1997 to 1999 the highest rates of sports-related injuries were among kids ages 5 to 14. (9) and it's gotten worse since then.

Each year an estimated 3.5 million children under the age of 15 are treated for sports-related injuries, and 20 percent of school-age athletes miss at least one day of school due to sports-related injuries! (10) In the '70s and early '80s, millions of Americans were training with the goal of competing in a 26-mile marathon. As the number of chronic injuries to these athletes skyrocketed, many runners turned to triathlons, because dividing their training among three events (running, biking and swimming) reduced the associated training risks compared to focusing on just running. Specialization has its price.

Another advantage of multi-sport training is that it elevates the overall performance in other sports. The best young athletes in football may go on to help the basketball, baseball, wrestling and track teams at their schools. Because BFS stresses the benefits of multi-sport training, after our clinics we find not only does the football team do better but also that all sports - both men's and women's - benefit. Also, because these athletes play other sports, their teammates from other sports will often come out to support them at games. Everybody gets along. Finally, multi-sport athletes are often healthier from a psychological standpoint, as coaches do not fight over the best athletes in the school. It just isn't right to put athletes in the center of these power struggles, as the extra pressure takes the fun out of sports and may even be responsible for causing athletes to give up sports entirely. Sports should be fun.

A high school may have as many as seven different strength-training programs! The same goes for each broad area of training: speed, warm-up, endurance, agility, plyometrics and flexibility. Even the decision to not address some of those areas in a conditioning program is a coaching philosophy. For example, the baseball coach who does not make strength training an integral part of the in-season program and who never works with the athletes on how to run faster sends a negative message to his or her players.

Territorial struggles among coaches unnecessarily test the loyalty of the athlete. The result is that the coaches often force athletes to participate in only one sport, which adversely affects the overall quality of the school's athletic program. The unnecessary tension between coaching staffs is often the rule rather than the exception for high schools and small colleges.

With more than 30 million young people involved in organized sports, let's face it: Very few of our kids will wind up playing professional sports, playing on a Division I sports team or making it to a national level in amateur sports. That's why high school coaches should encourage most of their athletes to experience a variety of sports to find activities they can pursue for a lifetime. That way, everyone can be a winner.

With unification, a two- or three-sport athlete is able to move smoothly from sport season to sport season without interruption. Let's take the example of a football player who is also on the basketball team. After the football season, this athlete would not have to wait four to six weeks to get started on some unique basketball specific strength training program. He would just stay on the team's in-season program. Athletes don't have the Tiger basketball in-season program, they just have the school's in-season program. This approach makes the job easier for coaches because they don't have to waste time teaching several new or different lifting exercises. Also, the same warm-up (for example, the BFS dot drill) and flexibility exercises just naturally continue.

Junior high school athletes would follow the same guidelines. After they learn proper technique, seventh graders can do the same workouts as high school athletes. In fact, because the level of competition at the high school level continues to reach higher standards,

athletes must get into the weight room as soon as possible so that they don't fall behind. Just think of the advantages those young kids, who are maturing and developing on a unified, total program, will have when they get to high school! Faster Stronger system, all athletes perform the same basic program throughout the entire school year and during the summer. Confusion disappears, and less time is required to mentor coaches and physical education teachers. Coaches will also enjoy a spirit of teamwork with their colleagues, and the result is that athletes more easily achieve their goals. That's why it's no surprise to us at BFS when a school's athletic program does an immediate turnaround after we've set up a unified program for them at a BFS clinic.

From a financial standpoint, the BFS program enables each sport and the physical education department to combine their budgets to purchase the highest-quality products to achieve their goals. Further, having the entire physical education and athletic training staff unified presents a positive image to students, parents, administrators and the public. The school's reputation will be that "Everyone is on the same page!"

The BFS program combines the best of strength and conditioning from all over the world. The system recognizes the great differences between elite, pro and college athletes compared with those at the high school level. The BFS program is perfect for large numbers of athletes, block schedules, female athletes, junior high schools, in-season and off-season transitions, and the multi-sport athlete; and it creates great self-confidence and massive voluntary participation.

Unification: It just makes sense!

BFS POSITION PAPER

STRENGTH TRAINING FOR YOUNG ATHLETES

The risks and benefits of having preadolescent and adolescent athletes train with weights



Young athletes need to get a head start with the BFS Readiness Program.

When someone starts lifting weights seriously, we often say that this individual has been “bitten by the iron bug.” Just a few decades ago those who belonged to this group were primarily football players, body-builders and, of course, weightlifters and powerlifters. Now just about everyone, male and female, is infected with the iron bug. Basketball players lift weights to improve their vertical jump, sports medicine providers prescribe lifting to rehabilitate injuries, and even senior citizens hit the iron to improve their quality of life.

There are many ways to get strong. To this day our military forces still rely on strenuous calisthenics, such as push-ups and pulls-ups, to prepare our soldiers for duty. And there is no question that hard physical labor, such as working in construction or doing chores on a farm, can certainly increase strength and even add muscle mass. But decades of research have proven that weight training is, hands down, the single most effective way to build strength. With weight training, whether it is with free weights or machines, the muscles can be targeted with specific exercises and the resistance can be precisely controlled to achieve an optimal training effect.

In the field of athletic fitness, coaches know that weight training is the best way to improve an athlete’s power,

speed, flexibility, body composition and muscular endurance. Major colleges and professional sports often spend millions of dollars on weight rooms, and it’s rare that any high school in this country does not have some type of facility for resistance training.

Further, exercise scientists have conducted clinical studies that prove that any cardiovascular health benefits that occur with aerobic training can also be achieved with weight training. There also is research indicating that one of the most effective long-term solutions for preventing osteoporosis in women is to have them participate in activities that place a high level of stress on the bones during childhood and adolescence.¹ So it’s not a matter of if weight training is an effective way to achieve physical and athletic fitness but when it is appropriate to start pumping iron.

The Medical View

One article that is often cited in support of the opinion that weight training is not safe for young people is the position paper on strength training published by the American Academy of Pediatrics.² That article is not technically a research paper but is the opinion of a group of individuals – just as this BFS position paper is based upon the opinions of BFS coaches throughout the 44-year history of this organization. After presenting their summaries of the research, the authors of the AAP paper concluded, “Preadolescents and adolescents should avoid power lifting, body building, and maximal lifts until they reach physical and skeletal maturity.” Let’s take a closer look at the consequences of following such advice.

Although it depends upon the individual, “full skeletal maturity” may not be achieved until the age of 18 in males, and perhaps slightly younger for females³. The AAP opinion thus suggests that most male American football players should not lift heavy weights to prepare them for a strenuous contact sport such as football until they have graduated from high school. As for female gymnasts and figure skaters, who often retire

in their early teens due to the expense of competing in these sports, they are in effect being told not to lift weights to improve their athletic performance until several years after they have quit the sport. Is this wise? We don't think so.

Suggesting that a high school athlete can play football but should not be allowed to physically prepare himself for the stresses that occur in the game simply does not make sense. Although school districts try to maintain an equal standard of competition by having athletes compete against schools of approximately the same number of students, this is not enough to ensure that a reasonable level of safety will result between opposing players. Having a 6-foot, 225-pound line-man who power cleans 250 pounds, bench presses 300 and squats 400 (lifts that are common in many high school football programs) face off against an untrained, 175-pound lineman of the same height with no weight training experience cannot end well. Likewise, is it wise to expose young gymnasts and figure skaters to the extreme stresses in these sports without strengthening their muscles, tendons and ligaments with a progressive resistance training program?

Besides the lack of logic in this recommendation, the conclusions by the AAP do not appear to coincide with the research they cite in their article, as evidenced by these two comments: "Appropriate strength-training programs have no apparent adverse effect on linear growth, growth plates, or the cardiovascular system..." and "...strength training in youth may stimulate bone mineralization and have a positive effect the same athlete had pulled a muscle in the weight room from lifting a weight improperly.

Can Weight Training Stunt a Child's Growth?

One of the major concerns about weight training for young athletes is about its potential to damage the epiphysial (growth) plates, resulting in a failure to achieve normal height.

Addressing this subject in many of his publications and lectures was the late Mel Siff, Ph.D., an exercise scientist whose doctoral thesis examines the biomechanics of soft tissues. "It has never been shown scientifically or clinically that he periodic imposition of large forces

by weight training on the growing body causes damage to the epiphysial plates," says Siff in his book *Facts and Fallacies of Fitness*. "It is extremely misleading to focus on the alleged risks of weight training on children when biomechanical research shows that simple daily activities such as running, jumping, striking or catching can impose far greater forces on the musculoskeletal system than very heavy weight training."⁴

To illustrate his point, Siff compared the stress of squatting with that of running. "Suppose that one child runs a few hundred meters a day in some sporting or recreational activities. This can easily involve several thousand foot strikes in which the reaction force imposed on the body can easily exceed 4 times bodyweight with every stride. Now let another child do a typical average weight training session with 3-5 sets of squats (say, with 10 reps, 8, 6 and 4 reps), with bodyweight or more for the last set. That bodyweight is divided between the two legs, so that, even taking acceleration into account, the loading per leg is bodyweight or a little more, while the spine is subjected to the full load on the bar. In other words, the legs and spine in controlled squatting are exposed to significantly less force than in running and jumping. Normally, exercises such as squatting will be done no more than twice a week for a total of about 60 repetitions, while the running child will run every day and subject the body to those many thousands of impulsive foot strikes.

"It does not require much scientific knowledge or computational genius to see that the cumulative loading imposed by simple running activities on the lower extremities and the spine is far greater than the cumulative load of two or three times a week of weight training. Does this now mean that we are justified in recommending that children not be allowed to run, jump, throw or catch because biomechanical research definitely shows that such activities can produce very large forces on many parts of the growing body?"

Siff also notes that bone density scans have proven that youngsters who do competitive weightlifting (i.e., the snatch and the clean and jerk) have higher bone densities than children who do not use weights, and that clinical research has not shown any correlation between weight training and epiphysial damage. Further, an extensive Russian study on young ath-



Bobby Doyle, who plays football for the Naval Academy, is the son of BFS clinician Bob Doyle. At Chardon High School in Chardon, Ohio, Bobby earned three letters in track and football. Doyle's earlier BFS training had given him a head start in his college career. His numbers during high school include the following: 300-pound clean, 455 parallel squat, 500 x 10 box squat, and 34.2 seconds in the Dot Drill.

letes, published in a book entitled *School of Height*, concluded that heavy lifting tends to stimulate bone growth in young athletes rather than inhibit it.⁵

As with muscles, bones become stronger in response to stress, and the activities involving the highest levels of stress can encourage the formation of stronger bones. In one study involving 64 elite athletes in several sports (including swimmers, soccer players, runners and throwers), the athletes with the highest bone density in the femurs (upper leg bone) were weightlifters.⁶ Further, bones are better designed for resisting compressive loads, such as those that occur in the sport of weightlifting, as opposed to resisting the shear forces that are more common in sports such as soccer.⁷

One possible reason for the fear that weight training could stunt growth is that many of the participants in weight-lifting are not very tall, and may even appear shorter than they are because they possess more muscle mass than many other athletes. But consider that in gymnastics, the average height of elite athletes has steadily declined in the past several Olympics because shorter athletes tend to be more successful in this sport. So saying that weightlifting makes you shorter because many elite weightlifters are short would be like saying that basketball makes you taller because most professional basketball players are tall!

Is Weight Training Dangerous?

Risk of injury is another area of concern for some coaches and parents. In this regard, it's instructive to look at the many studies that have measured the rate of injuries associated with weight training compared to other sports. For example, a study published in the November/December 2001 issue of the *Journal of the American Academy of Orthopaedic Surgeons* cited research showing that in children of ages 5 to 14 years, the number of injuries from bicycling was almost 400 percent greater than from weightlifting!⁸ Also, in a review paper on resistance training for prepubescent and adolescents published this year in *Strength and Conditioning Coach* (Vol. 9, No. 3), author Mark Shillington reported in a screening of sports-related injuries in school-age children that resistance training was the nominated cause of 0.7 percent (or 1,576 injuries) compared to 19 percent for football and 15 percent for baseball.⁹ Further, the primary cause of injury in the studies we've examined is improper technique.

In the United Kingdom, a study by Brian P. Hamill showed that of the 22 sports surveyed, soccer had the highest injury rate, with 6.2 injuries per 100 hours of exposures (6.2 percent), followed by rugby with 1.92 injuries per 100 hours of exposure (1.92 percent). The lowest injury rate was in the sport of competitive weightlifting, with a .0017 rate (0.17 percent). In discussing competitive weightlifting in their country, the authors noted the following: "Britain's Schoolboy Championship has been staged annually for at least 18 years and has involved some 54,600 competition lifts (maximal or nearly so) and at least 54,600 lighter but still heavy warm-up lifts. In this period one boy suffered a concussion when he fell onto a weight



Having young women lift weights is one of the most effective ways of preventing osteoporosis in later years. Shown is Kelsey Weisheit, a former figure skater who could clean 15 pounds over her bodyweight when she was 12 years old.

after losing control, and another was bruised when he dropped a weight onto his upper back. In neither case has there been any evidence of a long-term consequence.... In short, there seems to be no rational case for continued wide-spread anxiety about weight training or weightlifting in children.”¹⁰

Renowned Russian sport scientist Vladimir Zatsiorsky in his book *Science and Practice of Strength Training* had this to say about the potential for injury in weight training: “The risk of injury for a well-coached strength training program has been estimated to be about one per 10,000 athlete-exposures” [with an athlete-exposure being defined as one athlete taking part in one training session or competition]. “Compared to tackle football, alpine skiing, baseball pitching, and even sprint running, strength training is almost free of risk.”¹¹ The simple truth is that weight training and the competitive lifting sports are among the safest activities an athlete can participate in, and this fact is known worldwide.

Siff said that it is ridiculous to condemn many sporting activities solely because of presumed increased risk of injury. “Many school sports place the bodies of youngsters in danger – it is the nature of sport and, if one is

going to take part in any physical activities, no matter how well controlled, there is going to be a greater risk of injury than if the kids sat in front of the TV,” says Siff. “On the other hand, the sort of heavy loading imposed on the child’s growing body may well equip it better to cope with the normal physical stresses of life, as is suggested by research which reveals a high incidence of back pain, spinal dysfunction, osteoporosis and arthritis among people who are sedentary.”

Although using lighter weights as recommended by many fitness and medical organizations seems the safest way to train, physics suggest otherwise. According to Siff, the lighter weights “can be accelerated more rapidly than heavier loads or in ways that deviate further from the body than heavy loads. This means that movement under these more modest conditions can produce much greater forces on the body, which is precisely what we are trying to minimize. We must not fall for the fallacy that training with heavy weights necessarily imposes greater forces and torques on the body. This simply is not true.”

Although there is an emphasis in strength and conditioning programs to develop the core muscles of the body to develop stability, it’s obvious to any-one who has ever performed a heavy squat that many of these so-called core muscles must work extremely hard to fight disruptive forces that occur during this exercise. Further, exercises such as the Olympic lifts (snatch and clean and jerk) and their many variations teach the athlete how to effectively control high-impact forces, just as a boxer learns to “take a punch” or a skier learns how to adjust their body position to maneuver on a course. As a bonus, exercises such as the Olympic lifts develop a high level of overall body coordination, which can help when learning new sport skills.

A Question of Supervision

Whether you look at research studies, practical experience or the basic laws of science, the fact is that properly supervised weight training is safe for kids and can help prevent injuries and increase performance. It’s not risk free, but it is certainly safer than most sports. To minimize the risk, BFS holds clinics not only to teach young athletes how to lift and spot properly but also to instruct coaches in how to teach proper technique. As

the proverb goes, “Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime.”

When looking at the issue of having young athletes weight-train from a legal perspective, coaches and teachers named in lawsuits must provide evidence that what they were doing was professionally correct according to current standards and that the injury was unforeseeable. For this reason, BFS recommends that anyone in the field of exercise instruction obtain a degree, whether it is an associate degree or a four-year degree in such areas as human performance and sport sciences, physical education, adult fitness or exercise science. Such an education would help a coach determine when an athlete is ready to advance into heavy weight training, as the fact is that athletes often mature at different rates. Thus, a 13-year-old girl may have the physical maturity of an 11-year-old girl, whereas another 13-year-old girl may have the physical maturity of a 15-year-old girl.

After earning a degree, the coach should then focus on becoming certified through organizations such as

BFS to learn the most current methods of training for athletic fitness. One such pro-gram is our Readiness Program, which is designed to teach the basics of weight training to young athletes, particularly those in middle school.

At BFS, we believe that a properly supervised weight training program is appropriate for young athletes, and that the best time to start teaching proper weight training, lifting and spotting techniques is in middle school. We also believe that the preponderance of research available on this subject shows that weight training does not present a high risk of injury, especially to the growth plates of young athletes. Finally, we believe that as our young athletes strive to achieve the highest levels in competitive sports, they must participate in serious training at a younger age than the champions of the past. For young bodies to handle the stress of this training safely, weight training is essential.

BFS POSITION PAPER

SAFETY AND LIABILITY

BFS guidelines to keep your athletes safe and minimize the risk of legal trouble



The first step in developing a safe athletic program is education, which includes traditional physical education classes and continuing education programs such as certifications.

There is a common but unfortunate belief that when it comes to the possibility of getting sued, coaches have little to worry about. After all, most coaches are dedicated to helping athletes achieve their physical potential and would never consciously do harm. Everybody understands that coaches should be held in high regard because they are teachers – so, isn't it reasonable to expect their good intentions would be rewarded with a degree of "legal immunity" in the justice system? Not quite. America is an increasingly litigious society, and coaches are just as vulnerable as anyone else to becoming involved in a lawsuit.

There is no guaranteed way to avoid lawsuits. The fact is you can be sued by anyone, at any time, for just about any reason. That's the way our legal system works. Your aim should be to not give anyone a reason to want to sue you but at the same time to put yourself in the best possible position to win a lawsuit should you be sued.

Legal Mistakes: The Big Three

There are three common approaches to dealing with the legal system found among high school administra-

tors, as well as coaches and physical education teachers. All these approaches should be recognized for what they are: mistakes.

1. Ignore the Law
2. Fear the Law
3. Manipulate the Law

Administrators may have taken one business law course in college, but they tend to not want to deal with legal issues because they're administrators, not lawyers; besides, they may figure the school district has lawyers and the insurance carriers have lawyers, so they should be covered. And since they don't deal with the law on a regular basis, they may opt to ignore it. That decision may not seem to matter – until someone gets hurt, and then the attorneys and courts and judicial system are involved, and all of sudden they say to the coach or colleague, "Why didn't you do that?" "Well, I didn't know." But they should have known, so ignoring the law is a major blunder.

Another mistake administrators often make is that they fear the law, partly because they don't understand it. If administrators are so afraid of being sued that they move into panic mode to do everything they can to never be named in a lawsuit, they may make decisions that compromise their athletic programs. This might be a misguided – and costly – choice to replace all the free-weight equipment with more-expensive machines. Or simply to eliminate a weight room completely from the athletic program. Or they may succumb to the argument that sports with the highest injury rates should be banned, such as gymnastics. But when you do that, the next sport in line moves up and becomes the high-risk sport. Eventually, as you keep banning sports, all you'll have left are checkers and chess! Dr. Marc Rabinoff, a full professor in the Department of Human Performance and Sport at Metropolitan State College of Denver, Colorado, notes that gymnastics is not, as many people believe, the sport with the most injuries, but the injuries we see in gymnastics are the most catastrophic ones. Says Dr.

Rabinoff, “You might see only one injury on a high school gymnastics team in five years, but that injury might be a broken neck. So it isn’t just the number of injuries that scares school administrators, it’s the severity of those injuries that causes them to try to cut those sports in their curriculum.”

So what do they do? They tend to manipulate the law in their mind; they think they are getting around it so they won’t get in a lawsuit. For example, an administrator at an inner-city school may say that because there are gangs here, you can’t wear red or blue or pink. But it really does violate students’ civil rights to dictate what kids in a public school can wear. An administrator who is working a sport venue is engaging in illegal profiling if he says that he doesn’t want a certain type of person coming into the building with or without a ticket because he “has a feeling” the kid may start a fight. Can’t do that, not if the kid has a ticket and it’s a public entity. It’s that sort of mental manipulation that gets administrators in trouble all the time.

Once you start playing with the law or you don’t bother to learn what the law is, then you put yourself at risk. Read your materials and school policies and ask your attorney so you know what the standard of care is in all areas of your profession. Make your decisions based upon what the law says – period!

Are You at Risk?

In the past, lawsuits against coaches certainly happened, but over the past two decades there has been a tremendous increase in the number of lawsuits against equipment manufacturers and weight room operators. Nowadays parents of athletes are not content to just sit back and look at coaches as if they couldn’t do anything wrong. For example, we’re seeing lawsuits that deal with how coaches are treating the athletes and even lawsuits involving sexual harassment. Most of these litigations, however, are related to duty, standards of care, instructor qualifications, failure to warn and lack of supervision, equipment design defects and deficiencies, and inadequate equipment maintenance.

To learn how the legal system works, it’s important to understand the concept of “duty.” Duty refers to the concept that there is a responsibility, a duty, of one person to another for their safety. In a lawsuit, the plaintiff first needs to establish that the defendant had a duty to

him or her at the time of an injury. No duty, no lawsuit.

After duty is established, the next step is for the plaintiff (the person suing) to show that the duty was breached and that the injury was a result of the actions of the defendants. Then the plaintiff must show that the breach actually happened at that facility, a legal concept known as proximate cause. Finally, the plaintiff must prove that there were damages. Many strength coaches and personal trainers believe that generally they are safe from lawsuits because people will go after the organizations the coaches or trainers work for, such as schools and health clubs. Not quite.

Dr. Rabinoff has served as an expert witness in more than 300 lawsuits involving coaches, physical educators, schools, health clubs and equipment manufacturers. He explains that plaintiff lawyers try to name as many defendants as possible to share fault, a concept known as the “deep pockets” theory.

He says also that in most states it is the responsibility of the court to determine the degree of responsibility each defendant has for the damages to the plaintiff. In a case Dr. Rabinoff worked on in 1997, \$2.3 million was awarded to the plaintiff, with \$1 million coming from one insurance carrier, \$750,000 from another insurance carrier, and \$850,000 from one manufacturer.

Education and the Law

From a legal perspective, coaches and teachers named in lawsuits must provide evidence that what they were doing was professionally correct according to current standards and that the injury was unforeseeable. One of the most common lawsuits against coaches is in the area of professional instructor qualifications, such as when a gym or health club has a staff of instructors without recognized academic degrees, certifications or appropriate courses in continuing education.

BFS recommends that anyone in the field of exercise instruction get a degree, whether it be an associate degree or a four-year degree in an area such as human performance of sport, physical education, adult fitness or exercise science. These types of programs are offered in colleges and universities throughout every state. It’s the longest course of study available to prospective trainers: You take actual college-level classes,



Glenn Morris (at left in foreground) and Dr. Marc Rabinoff (at far right) are two of the foremost experts on safety and liability that BFS consults to ensure that BFS programs follow the highest safety standards.

you actually do have to perform and you do learn the basics. After earning a degree, you can then focus on getting certified through groups in particular fields of expertise.

A certification represents a type of continuing education that provides documentation that you completed a course of study, you were tested and evaluated, and you are now certified to perform a particular task. A certification is a document that says you care, that you put out the effort, cost and time to learn, that you want to learn more and that you've achieved a measure of proficiency.

Are certification organizations liable for the actions of those who receive certifications from them? Says Dr. Rabinoff, "I sit on the boards of some of these certification organizations and I say, 'Look, at an entry level, if giving out information is what your certification is for, then go ahead and do it. However, if you say that this person can actually perform a skill, such as being able to mechanically spot a squat, that's different.'"

A certification may not reflect the person's actual competence unless you've asked the right questions and truly have measured the level of the person's knowledge. So far we haven't seen plaintiff attorneys

take on national certification organizations for being inadequate or incompetent in their programs, but I believe that will change. We could start seeing some lawsuits coming back to these organizations because the certifications weren't rigorous enough academically and, from a practical perspective, did not prove that the persons certified could actually do what they said they could do.

Unfortunately, most of the certifications for personal trainers, exercise leaders and strength coaches don't require their graduates to physically perform those skills. What they should be saying in these types of certifications is that in order for you to truly know, for example, how to safely spot a squat, you've got to practice spotting a squat. If a certification organization says that if you watch this video or read this textbook you're OK to go out and teach squatting, there's a problem. Says Dr. Rabinoff, "Think about it: If you knew of a medical school that did everything 'virtual,' would you want to be the first patient of a doctor who had just graduated from there? Would you want to be the first client of someone who had never pleaded a case in court, even though the person had graduated from law school and had passed the bar exam (which is a written exam)? Would you want someone who had just become a dentist to work on your teeth even if that dentist had the newest, best drill on the market but had never tried the drill before? I wouldn't!"

Throughout the fitness industry there are those who consider an academic degree to be unnecessary and a certification to be enough. Although that is certainly true in certain trades, the standard in the profession is still an academic degree (although there may be certain degree programs that have questionable practices, especially online programs). The fact is, if an organization is going to hire a coach for young men and women, it generally would be better to hire someone who went through four years of academic study, wrote papers and took practical exams, rather than someone who took a certification course over the Internet and became certified in a weekend.

Ultimately, it's not enough to have degrees or certifications; you must show that you are keeping current on what is going on in your field. Otherwise, it will be difficult for a school or health club to stand behind the skills and abilities of its instructional staff.

Paperwork: Waivers and Insurance

We all know athletes get hurt in sport. Professional physical educators have to do everything they can to ensure that an athlete can move on to a higher level. But you can't tell gymnasts, on only the second day of practice, to perform double twisting backs when they can't even do a forward roll. And just because a freshman is big and heavy doesn't mean he's ready to play on the varsity team, especially if he can't run 20 feet without gasping for air. There's always a learning curve, with intermediate steps that must be achieved and documented to show that the athlete is able to perform physically and mentally at that level. Otherwise, you're putting the athlete in jeopardy, and the risk of injury skyrockets. One of the most common mistakes coaches make today is that they rush their athletes too fast. As a matter of fact, if you talk to sports medicine doctors, most will tell you that 85 percent of the injuries they see are overuse injuries. That's because the trainees' muscles were not ready to do what they were asked to do.

Can't a health club or school avoid problems simply by hiring independent contractors? The answer is no – the trainee can still sue the health club. Says Dr. Rabinoff, “The owners and managers of a health club, for example, are saying to their clients that since their trainers are working in their facility and using their equipment, they support them being here; and when the club is named in a suit, the trainer will be named as well. That being said, I strongly recommend that a health club, or any organization involved in physical fitness, have an attorney review their contracts for independent employees to determine what their liability is.”

Regarding waivers, Rabinoff suggests they should always be approved by the legal counsel of the entity and always used each time a consumer, participant, guest user, or athlete enters a facility. “Along with the waiver, the entity needs to provide an assumption of risk statement. This must be written in clear, understandable language for the lay person to accept, know and acknowledge when they sign it. A club owner, coach, teacher or instructor should never assume because they have a waiver they are OK and do not need to do what is professionally accepted while operating their programs, classes and facilities.”

Despite our best efforts, accidents can occur that may result in litigations. That is what insurance is for. It is

important for coaches, physical education instructors and personal trainers to know if, how and where they are covered by insurance – high school coaches who do personal training in their homes probably will not be covered by their schools' insurance policy.

With many insurance companies you have to be a member of an organization to purchase the insurance. There are some carriers that offer personal liability insurance to those who are not members of a professional organization, but these are the exception. Usually the criterion to qualify for insurance is that you have to be a member of a professional organization, because that then validates the fact that you're getting the journals and suggests that you may be attending some seminars.

Instruction and Supervision

BFS is very cautious about recommending any new piece of exercise equipment because not every exercise, or every method of exercising, is good for everyone. Say you attach an elastic band to a barbell that you are going to bench press – you have to understand how that band works mechanically along with the muscle group that you're working. It's an entirely new variable. Likewise, coaches should not allow their athletes to use any exercise machine without understanding all its safety operation procedures.

Failure to understand invites disastrous results. Dr. Rabinoff participated as a forensic expert in two cases in which clients at a health club using Smith machines became quadriplegics. He says, “Some people believe the process of disengaging the bar and then rotating your hand forward or back to reengage the hook over the pin is the safety mechanism. That's not the safety mechanism! It's the operating mechanism of the apparatus, because you can't do a Smith machine exercise without disengaging and then reengaging the hooks. The safety mechanism is the adjustable stop at the bottom. If you have a Smith machine that doesn't have an adjustable stop, you've got a defective Smith machine because there's no safety mechanism on it.”

The fact is you can't blame an inanimate object for an injury. If the person who gets hurt never knew how to use a piece of equipment, you can blame whoever was responsible for letting them on that piece of equipment in the first place. Or if the person did know how to use the equipment, you can blame that same person

because they knew how to do it and didn't do it. And if the equipment was poorly designed, you can blame the manufacturer.

One popular misconception is that machines are safer than free weights. In fact, Dr. Rabinoff has found that about 95 percent of the litigations he has done are related to machines. "My conclusion after 25 years of testifying is that most people know that if you drop free weights you're going to get hurt, so we tend to be really cautious about using them. With machines, most people think that nothing could happen to them, so they become less safety conscious and tend to use more weight than they should. It seems people have this false sense of security with machines, but the fact is that machines are machines – they have moving parts that can cause injury if you do not use them properly: You have to insert the pins correctly, you have to read the warning signs and follow the instructions and so on. That's why machine manufacturers are getting better with their instruction plaques and warning statements they put on machines. It may be common sense to most people that you should not try to adjust a machine that is jammed, but to protect themselves, equipment manufacturers and gym owners need to take steps to make certain their clients are aware of such dangers."

Another legal issue concerns when to allow athletes who have been injured to resume play or practice. Often football players with minor injuries will go back into a game – how should coaches deal with these situations to avoid lawsuits?

This is a matter of common sense. There should be a system of checks and balances in athletic programs with a series of people who should have their say on whether an athlete is ready to come back: athletic trainers, team physicians, the athlete's personal physician and the coaching staff. All these individuals should be involved in determining whether an injured athlete can be allowed to play or practice, and at what level.

Additional legal issues of concern to coaches may deal with being involved in rehabilitating injuries and counseling students and athletes with mental health issues. If you are not trained beyond basic first aid to assess or rehabilitate injuries, then you should not assess or rehabilitate injuries. And if you are not trained in counseling individuals who are experiencing mental

health issues, then you should not be counseling individuals. Have a plan to refer these matters to the appropriate health care professionals.

Finally, those working in educational institutions must avoid violating "church and state" sections of the constitution. Although you may believe that it would be in the best interest of those you work with to share with them your spiritual beliefs, the professional standard in this profession is that a school is not the place for you to do this.

Weight room Design

With the popularity of weight training in this country, weight rooms may become overcrowded with equipment. What often happens is that companies that sell exercise equipment will do a free weight room analysis. Using a computer program, they will show how to put their equipment into your facility and lay it out to maximize available space. But if you're going to have weight equipment, you have to make certain there is adequate space; and that may mean checking with the manufacturers, rather than the marketers, to determine what the actual spacing needs are. And consider that there are standards in weight room design that should be referenced when designing weight rooms.

For example, there is a basic minimum standard of at least two a half feet to three feet of space around a piece of equipment. But that's just for most exercise equipment; with a treadmill, Dr. Rabinoff believes, you should have at least six feet behind the end of a treadmill, and at least three feet on each side. "What I've seen in cases that I've testified in is the gym owner lines up the treadmills looking out into the workout area, with the end of the treadmills facing a wall with maybe a foot behind them. I've done three cases where people have fallen off the treadmill, hit their heads on the walls and died of trauma! Also, if you don't have enough space between the treadmills, there is the risk that when someone gets on the treadmill and another gets off, they could hit each other."

What is the distributor's responsibility in regard to providing equipment that is safe? At BFS, we believe that if you're putting your name on something, then you should be responsible for what it is. If you're distributing equipment made in Taiwan and they used the wrong kind of bolt so if you get up to a certain poundage the bolt breaks and causes injury, then the distrib-

utor is partly responsible. It's just not a matter of who is making a piece of equipment but also who is selling and marketing it. If a company is misrepresenting the equipment it sells, that's fraud; there are many cases where distributors were sued because they misrepresented what their products could and could not do. As for using homemade equipment donated by some well-intentioned person, the best advice is "Don't." Often those who build such equipment do not know the standards in the industry (set up by the ASTM), and their equipment may fall short of meeting these standards. Further, there is the question as to whether accidents that occur with such equipment are covered by an insurance carrier.

At the high school level, there are increasing numbers of students in weight training classes and fewer PE teachers, so you have bigger classes and more stress on

the teachers. Many schools don't have a lot of money to update equipment, so there is a lot of older equipment that may not have been maintained appropriately. Unfortunately, many coaches simply don't do anything about safety until a kid gets hurt and files a lawsuit. The bottom line is that we can significantly minimize the risk of injuring athletes and getting sued by doing our jobs as coaches, teachers, administrators and club owners by making sure that each day we open that gym door is a new day with a higher standard of care.

BFS POSITION PAPER

SPORTS MEDICINE

The BFS perspective on how to deal with injuries to young athletes



Coaches and physical education instructors must know how to adjust their pro-grams as athletes mature. Team BFS member David Kandel recently turned 13 years old – these two photos were taken seven weeks apart.

With budget cuts and decreasing numbers of parents who have time to volunteer to help, the responsibilities of coaches in middle schools and high schools have increased enormously. A coach will wear many hats, from sports coach to strength coach to equipment manager to sports administrator. But one hat the coach should not try to wear is that of doctor.

With higher levels of sports competition come greater risks. Case in point: cheer leading. Acrobatic gymnastic lifts, along with tumbling and throwing fliers, have increased the physical demands on competitive cheerleaders. A study published in 2008 that looked at sport injuries in 2007 concluded that although only three percent of the girls in high school were cheerleaders, they suffered 65 percent of all catastrophic sport injuries among young women in high school.

Sports liability expert Dr. Marc Rabinoff, professor of human performance and sport at Metropolitan State College of Denver, has served as an expert witness in several cases in which cheerleaders suffered permanent injuries; in two of these cases the girls became paralyzed. Says Dr. Rabinoff, “Cheer leading has become

the number-one cause of injuries in young women, and the severity of their injuries can be as bad as anything you would ever see on a football field. The problem is that cheerleaders are performing increasingly difficult gymnastic stunts and movements, and many cheer leading coaches are not adequately trained to teach these skills.”

This is the dilemma: There is a high level of competition resulting in a greater risk of injury, but there is also a lack of funding to provide optimal sports medicine care. What can coaches do in preventing or responding to accidents, and what can they not do? Let’s examine this problem in three parts: standard of care, privacy issues and injury rehabilitation.

Emergency Care

Coaches should have forms on hand to document the details immediately after an accident occurs. Further, all coaching staff and assistants need to know the school’s emergency plan to deal with serious injuries, including the location of local hospitals and emergency rooms. Knowing that the details of an accident were carefully documented and that a school had an effective plan for dealing with an injury is a significant deterrent to a plaintiff pursuing a lawsuit.

One of the most common reasons coaches get sued is related to duty, which in the context of this discussion is the concept that one person has a special responsibility for the safety of an individual. Says Rabinoff, “In a lawsuit, the plaintiff first needs to establish that the defendant had a duty to him or her at the time of an injury. No duty, no lawsuit. If a duty is established, the next step is for the plaintiff to show that the duty was breached and that the injury was a result of the actions of the defendant. Then the plaintiff must show that the breach actually happened at that facility, a legal concept known as proximate cause. Finally, the plaintiff must prove that there were damages.”

It is reasonable to expect coaches to have a duty to provide emergency care for athletes in the areas of

CPR and first aid. It is also expected that coaches will be certified in these skills and keep their certifications current.

Regarding waivers, Rabinoff says a US citizen cannot waive their right to sue, but most likely it's not going to provide a coach with any legal protection – in fact, Rabinoff says that waivers had been signed in a majority of the 400 lawsuits in which he has testified.

Injury Rehabilitation

If a student is enrolled in a physical education class or a school sports program, what should a coach or physical education instructor do when they are told that the student had a previous injury? According to Rabinoff, the first step is to acquire documentation from the school's athletic trainer, if one is available, or the student's doctor that explains the exact injury, the mechanism that caused it, the prognosis and what the healthcare providers recommend for dealing with it. One conclusion might be, unfortunately, that this student may not be allowed to participate in a sport or certain forms of strength and conditioning due to this preexisting condition.

Ideally, you want to have some form of documentation from a medical expert that the injury in question has been sufficiently rehabbed. Otherwise, if you start training this student, then your actions fall into the category of performing rehab. There is a difference between preparing a student for a sport and rehabilitating a body part that has been damaged. They are two different training regimens, and each requires different approaches and qualifications for those prescribing and supervising these workouts. But unless a coach is certified or licensed to do rehab, then he or she should not be prescribing such exercises for a student.

"I have seen coaches and PE teachers on trial for similar actions, and even though they may keep their positions or be reassigned in the system, their names have been forever tainted with a negligence conviction from a jury verdict," says Rabinoff. "The last thing a coach or PE teacher wants is to have a jury find from the evidence that their negligence caused injury to a student."



Sports liability expert Dr. Marc Rabinoff is a professor of human performance and sport at Metropolitan State College of Denver. He has testified in over 400 lawsuits in the areas of athletic and physical fitness training.

Privacy Issues

A coach may have an interest in an athlete's medical history to guide their training, especially in the areas of strength and conditioning, but he or she is not entitled to their medical records. There are federal laws that protect an individual's right to keep their medical records private (from HIPAA, the Health Insurance Portability and Accountability Act). Says Rabinoff, "If the parents of this athlete agree to show you their child's medical records, that may be one exception (unless the athlete is older than 18, in which case the athlete would have to give his or her consent), but you cannot coerce your athlete to bring you their medical records. Just this one mistake alone could be grounds for a lawsuit against you and your school, and administrators could risk losing their jobs from violating the law in such a manner."

Even if you did have access to medical records, you'd still have to answer the question of how you are qualified to interpret them. Do you have a medical degree? Says Rabinoff, "I have testified in many cases in which coaches and personal trainers were extremely embarrassed when opposing counsel confronted them with this very question. For example, if you read a notation in some medical records that an athlete had spondylolisthesis, would you be able to understand the different ratings and types of this condition: grade 1 vs. grade 2, anterior vs. posterior? Or if you read where the athlete

had scoliosis, would you be able to explain to a jury the difference between thoracic curve scoliosis and lumbar curve scoliosis?”

Although a coach's intentions may be good, he or she cannot afford to be ignorant of the proper way to deal with an athlete with a preexisting injury. More importantly, knowing how to properly handle such a situation is in the best interests of the athlete's safety. And although you may not be able to avoid a lawsuit, you can win if you show you performed your job according to the current standards of care of your profession.

Regardless of how well an athlete is trained or the level of their sport skills, athletes will get injured. Such is the nature of sport. But professional coaches and physical educators need to understand their responsibilities in dealing with these injuries so that athletes can recover and then continue to progress to higher levels of athletic achievement.

A CLOSER LOOK AT THE BE AN 11 PROGRAM

Why young athletes need this great character-building program more than ever



At a BFS clinic in Snowflake, Arizona, BFS clinician Jeff Scurran inspires young men and women to set high goals and develop action plans to achieve them.

It's been said that talent prevails, but the deeper truth is that champions are not born but made. Think about Muhammad Ali winning Olympic gold as a light-heavyweight in 1960, then upsetting Sonny Liston to win his first world heavyweight championship in 1964, and defeating the seemingly unstoppable George Foreman 10 years later. Those were moments created of endless practice, encouragement and sacrifice.

Everyone dreams of victory, whether it's a tough running back or a shy teen trying out for a part in the school play. Talent and the desire to succeed are just the beginning. We know we should follow some sort of path to get what we want and that we will confront obstacles along the way. What we may not know is where the right path begins or how to prepare ourselves for the obstacles. And if we are unprepared, we may lose courage and get lost on the way.

That's where the Be an 11 program comes in. To help young people fulfill their potential, our program seeks to inspire them to set worthy goals, both athletic and personal, and helps them develop action plans to achieve those goals. Along the way, they learn about

the importance of making positive choices, keeping their self-respect and being team players and role models for others. The Be an 11 program is about being a success in all areas of life.

It All Began with a Number

The Be An 11 program grew out of an idea I had years ago while giving clinics. I would have the athletes perform a box squat exhibition to demonstrate how great our intensity can be when our teammates support us. I would pick out a junior on a team (if it was football, I'd usually pick a running back, as they are often the best athletes). Then I would put a heavy weight on a barbell and ask the athlete to perform as many reps as he could with his team-mates cheering him on. Every athlete chosen to do this would always do a lot more reps than they could do otherwise.

At first we did these exhibitions primarily with football teams. Many years ago I did a clinic for Coach Travis Farrar's team at Springhill High School in Louisiana. When it came time to do the box squat exhibition, I picked my athlete, and after several warm-up sets loaded the barbell to 400 pounds. Then I asked the team, "How many games are there in a football season in Louisiana?" They replied, "Fourteen." Then I said, "It's really hard to go 14 games, and this young man here is going to show us how hard it is to go 14 games by doing 14 reps on the box squat with this weight." That number worked fine, and during subsequent exhibitions I would always have the chosen athlete perform 14 reps in the box squat. (By the way, the year following the clinic at Springhill, the team went to their state championship.)

The complications began when we started doing clinics for other sports.

In basketball a high school team may play 26 games in a season, and in baseball, 30. So I began asking them, "On a scale of 1 to 10, what kind of effort should we give? What do you want to be known for?" Immedi-

ately one of the athletes would say, “Ten!” but inevitably someone else would top it by shouting, “Eleven!” at which time I would roar back at them, “Eleven? What a great idea! So let’s vote on it. On a scale of 1 to 10, how many want to be known as a team that gives a 10? How about an 11?” Their response would unanimously be “Eleven!” and that’s how Be an 11 came to be.

Who Is an Eleven?

If you are an Eleven, you are trustworthy and dependable. Elevens are people you can always count on. Elevens are goal oriented and they make success happen. They are morally strong. Elevens pull others up spiritually, mentally and physically. They are pleasant to be around in every situation and among all groups of people. Elevens are loving and respectful to others, especially their family members. Elevens make every effort to be great students – these young men and women are leaders and do the right thing all the time, even if criticized. They follow and believe in these three rules for success:

Rule #1: I am worth my highest goal. I deserve success. I will walk, talk, think and act like that successful person I want to be.

Rule #2: I will surround myself with positive people, places and things. I refuse to associate with any person, place or thing that creates negativity or mediocrity.

Rule #3: Nothing, absolutely nothing, will stop me from being an Eleven!

Anyone can be an Eleven. It is simply a matter of attitude. It is not a matter of talent or intelligence but a willingness to try continually to raise your personal bar of excellence.

Changing your attitude will change your life. You can guarantee yourself success with the right mental attitude. Those who give it their all every day are Elevens!

Almost everyone is an Eleven some of the time. However, let’s be realistic – no one is an Eleven all the time. The goal is to be an Eleven more of the time. For some, this goal might seem overwhelming. But there are hundreds of ideas and concepts to help. I believe that everyone can make the big time somewhere.

The BFS Be an 11 program brings many things to your attention that you may not have known or thought important. Think about these ideas and ideals and take some time to evaluate yourself in relation to them. Then you’ll be prepared to choose your personal destiny.

To learn more about the Be an 11 program, pick up a copy of the BFS Be an 11 Guidebook for Success.

A CLOSER LOOK AT THE BOX SQUAT

Why BFS considers this core lift a must in a total body program



The 3-in-1 Squat Box is perfect for box squats because it's heavy-duty and adjustable. It can also be used for straight-leg deadlifts and the sit-and-reach flexibility test. [Spotters are not shown but must be used in actual practice.]

BFS has been promoting the box squat as a core lift for over 30 years. It is one of the most effective exercises for developing overall strength and lower body explosiveness. However, during the first two decades after the BFS program was developed, we experienced our share of critics who didn't see the value of the exercise and thought it was dangerous. Then the powerlifting community rediscovered the exercise, with champions at all levels and even world record holders making it a mainstay of their training programs. Its popularity has been recently spreading to the elite strength coaches for all sports. Maybe, just maybe, this is an appropriate time to say, "We told you so!"

Before getting into the details of the box squat, we understand that there are coaches who simply refuse to even attempt this exercise. Fine. The BFS program

is flexible, and for whatever reason you simply refuse to use it in your program, there are alternatives. Use another core lift instead, such as the front squat. Or even the hip sled. But consider that this will be your loss, as 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. Oh, and there's one more thing.

Although you use more weight 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 the coaches who have won countless championships using the BFS program, you can even box squat heavy the day before an athletic competition without a decrease in performance. In fact, you will most likely perform better!

Regarding the critics who say 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. An athlete should not box squat 100 pounds above their parallel squat maxes.

The accompanying photos, one of which is taken from our exercise instruction DVD, show the correct position for performing the box squat.

The proper position of the spotters when the barbell is removed from the squat racks – we recommend that the spotters have their hands on the bar during the entire exercise, including when the barbell is removed and replaced on the squat racks.

The photo above, which doesn't have the spotters so you can see the athlete's lower body, demonstrates

perfect box squat technique. One of the keys to getting the most out of the exercise is not to simply plop down on the box, a technique that only works the quadriceps and puts the lower back at a high risk of injury. Instead, squat down and carefully sit on the box. Keeping your lower back locked in, you slightly rock back and then drive forward and up, rising on your toes. When performed correctly, you should experience the same feeling you do when blocking, tackling, rebounding, or releasing a track implement.

BFS has persisted in recommending the box squat as an important squat variation in our total workout program. It is one of the six BFS core lifts. We have done so not to be different from all the other workout systems out there, but because we know the box squat works!

A CLOSER LOOK AT THE PARALLEL SQUAT

Answering the critics, once again, about this essential BFS core lift exercise



BFS Vice President John Rowbotham teaches perfect squatting and spotting technique at a recent clinic he gave at

Sickles High School in Tampa, Florida.

When BFS started 32 years ago, one of the most controversial aspects of our program was our promotion of the squat. We stood by it then as one of the best exercises for athletes, and we stand by it now.

Much of the controversy originated from the belief that squats were harmful to the knees, an idea that was introduced by Dr. Karl K. Klein when he published the results of a study in 1961 that concluded that full squats could adversely affect knee stability. In the years that followed it was shown that there were flaws in the study, and the results could not be reproduced. Further, other studies showed exactly opposite results, namely, that weight-lifters and powerlifters tended to possess tighter knee joints than control groups and were less susceptible to knee injuries. And even though Klein in his later writings said he was not opposed to parallel squats, the damage had been done.

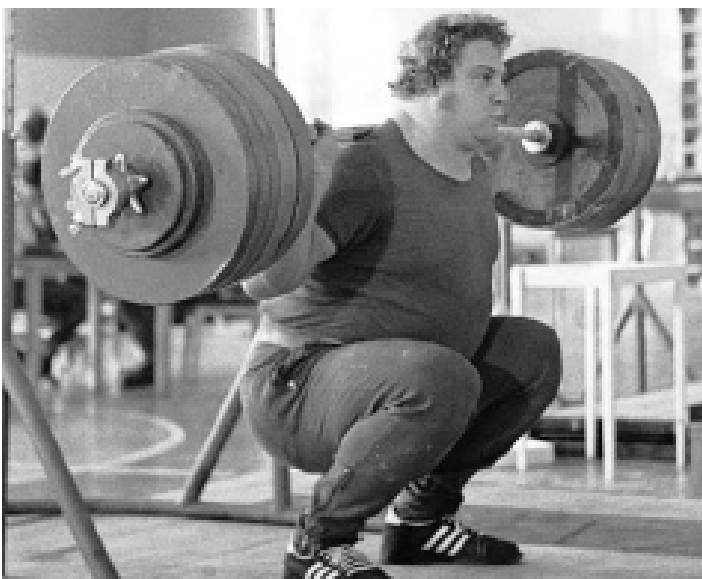
In the years that followed, weight-lifters, powerlifters and sport scientists were eventually able to convince the medical community and lay public that the squats were not harmful to the knees. Now the most appropriate motto about the importance of the squat exercise for athletes says to the effect, “If you don’t have the squat in your program, you don’t have a program!” However, the question still remained about just how low an athlete should squat: to parallel? below parallel? And how do you determine parallel?

How Low Should You Go?

The guiding principle in squatting is that it’s necessary to squat so that the top of the upper thighs are at least horizontal to the floor so that the hamstrings are strongly activated. The hamstrings (rear thigh muscles) are a key muscle in sprinting. If you don’t squat low enough, you only activate the quadriceps (front thigh muscles). Further, if an athlete does not squat low enough, then they will not improve knee stability; and many even decrease knee stability by creating muscle imbalances.

At BFS, we offer a simple test to help athletes and coaches determine the proper depth. It’s called the marble test. If an athlete were to place an imaginary marble on the middle of the top of the thighs during their deepest squat position, which way would the marble roll if it were real? If the marble rolls 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.

Does BFS have any problem with an athlete squatting lower than parallel? Certainly not. All we are saying is that an athlete must squat to at least parallel to effectively work the hamstrings. As for the sport of powerlifting, the extraordinarily high poundages lifted



If you use the bottom of the thighs to judge parallel, lifters with large legs such as Germany's Gerd Bonk would have to squat lower. In this photo, Bonk had squatted this weight three times (518 pounds), and then on his last rep tossed the weight overhead and dropped it in front of his body. Wow!

by many of today's powerlifters suggest that there has been considerable leniency among some organizations as to what parallel is, along with the supportive gear that can often add hundreds of pounds to a powerlifter's best result in this exercise. Further, the hyper-wide stance used by many powerlifters is not the athletic stance that BFS believes would have 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.

Since Olympic weightlifters squat all the way down, and in competition actually bounce out of the bottom position, why doesn't BFS recommend this style? After all, knee injuries to competitive weightlifters are rare, especially compared to other sports. What is wrong with going all the way down?

First, if an athlete has a qualified Olympic lifting coach to work with them on this squatting method and the coach believes this form of squatting is superior, fine. But the reality is that a coach in high school may have 50 kids to work with at the same time, but there are relatively few qualified Olympic lifting coaches in this country and it is difficult for any strength coach to give the one-on-one attention this type of squatting

deserves. Further, it's not so much that squatting deep injures the knees but that it places the lower back at a higher risk of injury.

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 high, unnatural stresses on the lower vertebrae of the back (L3, L4 and L5). Further, this stress is compounded by the fact that the compression forces on the spine have been estimated to be six times greater at the bottom of a full squat than at the top (so that an athlete squatting 200 pounds would have 1,200 pounds of compression forces at the bottom). Again, if an athlete has exceptional flexibility and one-on-one coaching from a qualified Olympic lifting coach, it would be better to go with a parallel squat, or slightly below.

Finally, there is the argument that squatting all the way down doesn't work the quads and hamstrings throughout the full range of motion. That's true, but that's why BFS has made glute-ham raises and lunges high-priority auxiliary exercises. Both of these exercises put minimal stresses on the lower back while working the quads, especially the inner thigh muscle called the vastus medialis (which crosses the knee joint and is therefore key to maintaining knee stability) and all four heads of the hamstrings.

Safety Precautions

In addition to proper technique, there is the issue of safety in performing the lift. Because relatively heavy weights can be used in the squat, it's essential that proper spotting be used. Although it's possible to squat safely with one spotter (standing behind the lifter), we prefer that three spotters be used (two at the side and one behind). In addition to spotting, the side spotters can judge spotting depth and technique and can encourage the athlete to break personal records. The instructional video that is now available on our website will demonstrate proper spotting technique.

Finally, proper equipment should be used. It's best to squat inside a power rack, with safety pins adjusted to the proper height. However, the safety pins should be thought of as more "death control," that is, a last-resort method of ensuring the safety of the athlete, as drop-

ping any barbell on these pins from more than a few inches can easily damage the barbell. Also, it's better to use Olympic barbells that have center knurling, to more properly secure the weight on the shoulders, and a stiffer barbell. The more flexible (and more expensive) Olympic bars are great for power cleans, but that same flexibility makes it difficult to control the barbell during a squat.

As we have done for the past 32 years, BFS stands behind the parallel squat as one of the most effective core exercises for improving athletic performance.

Again, it's difficult to show proper squatting and spotting technique in one short article or with a few photos; therefore we've posted a video clip of squatting technique (from our exercise instruction DVD) on our website. It will remain there until the publication of our May/June 2008 issue. Also, as detailed as this video is, nothing beats having a BFS clinic to ensure that athletes are performing the lift correctly and coaches know how to demonstrate and teach perfect technique.

A CLOSER LOOK AT THE HEX BAR DEADLIFT

Another great core lift for the serious athlete



The Lodi High School Girls Basketball Team went undefeated in the 2006-2007 regular season. The Hex bar deadlift is a key exercise in the Lady Flames' strength and conditioning program.

In the early years of BFS we recommended that athletes perform the straight bar deadlift as one of their core exercises to strengthen the lower back, hamstrings, thighs, torso and traps. And although we still like this exercise, we decided to replace it in our program with a better one: the Hex bar deadlift.

The Hex bar deadlift is a deadlift performed with a hexagonal barbell that allows the lifter to perform exercises from inside the encompassing bar. Handgrips strategically placed on the two ends of the bar enable the weight on the bar to be in perfect alignment with the power line at all times.

The power line is an imaginary vertical line that runs through the lifter's center mass. Executing the deadlift movement along the power line enables the athlete to develop maximum power and reduces risk of injury. The farther the weight diverges from the power line, the more power the lifter loses. For example, how long can you hold a 45-pound bar with your arms straight down and the bar resting against your thighs? Probably for a long time. Now try holding the bar about a foot out from your thighs. Doing that is much harder. The farther away the bar gets from center mass, the harder it is to hold and the more power is lost. In addition,

because the Hex bar makes using correct technique easy, a spotter is not necessary.

Because the torso is more upright with a Hex bar than with a regular bar, compression forces on the spine and stress on the lower back are reduced. This difference makes it possible for athletes to work the lower back more often every week, whereas such frequency of training with the regular deadlift often causes over training. The Hex bar also lends itself to doing shrugs in a superior way because the bar does not contact the thighs.

The Hex bar is a space saver. It is only 56 inches long, compared with the 86 inches of a regular Olympic bar. This compactness allows placement of many Hex bar stations in a small area. In addition, the shorter length of the bar gives the lifter more control and balance for a more efficient, high-intensity workout.

Hex bar workouts are also fast. When BFS Founder/CEO Dr. Greg Shepard did his first workout with a Hex bar, he did five sets of five reps, going up to 375 pounds. Says Dr. Shepard, "The workout took much less time than a squat or deadlift workout would have – only eight minutes. I was extremely sore the next day in my glutes, hamstrings and traps. I could hardly walk. The workout was just like a heavy parallel squat workout when

I hadn't squatted for a while, but my lower back felt great. I was impressed."



Because it is a safer lift and easier to perform, the Hex bar deadlift has replaced the straight bar deadlift in the BFS program.

No-Fear Deadlift

Conquering the fear of the deadlift is the purpose of using the Hex bar. The deadlift is a superb exercise for the lower body and torso, but for years fear has overshadowed the great benefits of the deadlift. Coaches and athletes have been leery of the heavy weight and difficult technique associated with the deadlift. The key to conquering this fear is proper technique. As with all lifts, proper technique will eliminate potential injury. With the Hex bar, executing great technique has never been easier. The Hex bar makes doing the deadlift easy and fun for anyone.

To perform the deadlift with the Hex bar or a high Hex bar, the lifter steps into the center of the hexagon and assumes the jump stance. The lifter then squats down and grabs the hand-grips on both sides of the bar, making sure to place the hands squarely in the middle of the handles for balance. The lifter lowers the hips, spreads the chest, locks the lower back in place, keeps the head up with the eyes forward, and puts the knees directly over the feet. The lifter then lifts the bar straight up through the power line using the legs.

Because of the unique design of the Hex bar, the lifter can keep the weight along the power line throughout the entire lift. Once the lifter has stood up completely, the first repetition is complete and the lifter is ready for the next rep. The lifter should proceed to a squat back down, again keeping the lower back locked in, the chest spread and the eyes on target. To minimize back strain, the athlete should use a touch-and-go style between repetitions. Pausing in the down position after each rep is not necessary or desirable. If the bar tends to tilt back and forth during the lift, offset the grip slightly (one hand slightly forward and the other slightly back).

As in all lifts, the head should be up and the chin stretched away from the chest. If the chin touches the chest, the entire body will become dangerously out of position. That technique reduces the amount of weight the athlete can lift and, more importantly, is dangerous and can cause injury to the lower back.

A variation of the Hex bar is the high Hex bar. They are identical except that the high Hex bar has elevated handgrips. The higher starting position allowed by the high Hex bar makes executing exercises easier for

beginning lifters and tall lifters. The high Hex bar also provides an excellent way to add variety to workouts.

As with all BFS core lifts, keeping records and setting goals are important. For male athletes, the BFS varsity standard for the Hex bar deadlift or spotted deadlift is 400 pounds, the All-State standard is 500 pounds, and the All-American standard is 600 pounds. Female



There are four basic types of Hex bars: the Hex bar, the combo Hex bar, the mega Hex bar, and the youth Hex bar.

The combo and mega Hex bars can be flipped over to accommodate taller athletes. The mega Hex bar weighs 75 pounds and is designed for exceptionally strong individuals and can hold over 800 pounds in plates. The youth Hex bar only weighs 15 pounds and is designed for young athletes.

athletes have a varsity standard of 235 pounds, an All-State standard of 325 pounds and an All-American standard of 415 pounds.

The straight bar deadlift is certainly not a dead exercise and is still performed in powerlifting competition, but the Hex bar deadlift is simply a superior exercise that is much safer to perform. As far as BFS is concerned, the Hex bar deadlift is here to stay!

A CLOSER LOOK AT THE STRAIGHT LEG DEADLIFT

A great stretching exercise for improving flexibility and speed



These two video screen captures, taken from the BFS Clinics Exercise Instruction DVD, shows the start and finish of the straight-leg deadlift.

Most athletes believe that the only value of stretching is that it reduces the risk of injury; and as a result, if they are not currently injured, they have little motivation to stretch. Sure, stretching is a vital part of injury prevention, but at BFS we believe stretching will also make you a better athlete and increase your speed. Let's look at some examples.

If a football player can improve flexibility in the hip flexor area by two inches, that alone may improve their 40-yard-dash time by 0.2 seconds. Think about this: Just by improving flexibility, a high school running back with a 4.7 forty could be a 4.5 high school running back – that could mean the difference between being good and being great, and could dramatically increase the chances of earning a college scholarship.

Now let's look at golfers. If a golfer can increase their upper body flexibility and get their golf club farther back during the back swing, they will be able to generate more speed on the club head and drive the ball farther. In fact, it's estimated that just a single inch in improved range of motion can translate into 10 yards of driving distance! The same principle applies to

tennis, as a greater range of motion in the upper body can dramatically increase how hard the athlete hits the ball.

In addition to advising athletes to use the BFS 1-2-3-4 stretching program, we recommend all athletes perform the straight-leg deadlift as an auxiliary exercise. Unlike the Hex bar deadlift, which develops strength and requires the use of heavy weights, we think of the straight-leg deadlift as a stretching exercise, and therefore only very light weights are used. And we can't emphasize this point enough.

We hear stories about high school athletes using as much as 400 pounds in the straight-leg deadlift, a sure way to seriously injure the lower back. The absolute max anyone should use in the straight-leg deadlift is 40 percent of their best parallel squat; and junior high school boys and girls should use 45 pounds or less. Do the exercise for two sets of 10 reps and keep the weight the same, working on increasing your range of motion a little each week. Eventually you could perform the exercise on a low platform to get a deeper stretch.

The accompanying photo stills, taken from our exercise instruction DVD, show the correct position for performing the straight-leg deadlift. Just as with a hamstring stretch, in which you can't bend your knees at all, the same is true of the straight-leg deadlift. Bending the knees would reduce the stretch on the hamstrings and lower back, which are the primary muscles the exercise is designed to work.

Keeping the legs straight (but not hyperextended), slowly bend forward from the hips; and as you reach farther, allow your upper back to round. Pause at the bottom briefly before coming up, and keep the bar close to the body throughout the entire movement.

The straight-leg deadlift is a safe stretching exercise that will not only decrease the risk of injuries but also make athletes perform better. Give it a try, and see why we consider this exercise a must in any athletic training program.

A CLOSER LOOK BOX JUMPING

A simple approach to plyometric training



Students at Whitmore Lake High School perform plyometric box jumping in their physical education classes. This school in Whitmore Lake, Michigan, was a BFS High School of the Year

It's a given that speed and jumping are key components of athletic training, and it's also a given that plyometrics is an effective way to develop both of these qualities. But how to implement a plyometric program, especially in a high school setting, is a bit of a mystery to many coaches. At BFS, we've developed a simple, but effective, plyometric training program that takes only 10 minutes, twice a week.

While it's true that strength training will improve jumping ability and running speed, even better results can be attained when strength training is combined with a plyometric box jumping program. For example, in a paper published in the *Journal of Applied Sport Science Research* in 1992, researchers reported the results of a six-week study on the effects of squatting and plyometrics on the vertical jump. The group that performed just the squat increased their vertical jump by 1.3 inches, the group that performed just plyometrics increased it by 1.5 inches, but the group that performed both squats and plyometrics increased their vertical jump by 4.2 inches!

The reason for the effectiveness of plyometrics is that this type of training involves maximal explosive contractions. Whereas weight training affects the muscles, plyometrics affects the nervous system. In effect, plyometrics teaches your muscles how to more effectively use their strength.

The BFS Plyometric Box Jumping Program consists of three parts: vertical jumps, standing long jumps, then box jumps. You start with one set of 10 quality vertical jumps followed by three sets of three reps of the standing long jump. This is your warm-up. Then you perform four sets of progressively more difficult box jumps:

- 1) Jumping off the boxes,
- 2) Jumping off the boxes and performing a vertical jump,
- 3) Jumping onto the boxes
- 4) Multiple box jumps.

That's it!

To properly run a plyometric box jumping program, coaches should make sure that athletes have access to boxes of various heights. Whereas the standard plyometric box for high school athletes is 20 inches, for middle school athletes, heavier athletes and athletes at a lower skill level it's best to start them on 10-inch Readiness boxes. For safety reasons, boxes should be solid rather than open, as the feet can get caught in an open plyometric box. Also, spotters should be used when attempting jumps of greater difficulty.

The details of the BFS Plyometric Box Jumping Program can be found in the BFS Resources link 2-6 BFS Plyometric Program.

A CLOSER LOOK AT ADVANCED BOX JUMPING



One of the most effective methods to improve explosiveness is plyometric box jumps, as applied in the third phase of the BFS Plyometric Program. And the most advanced form of box jumping is called depth jumps.

The Russians refer to depth jumps as “shock training.” In this type of box jump the idea is to step off a box (not jumping, as the thigh muscles must be relaxed during the fall) and immediately rebound upward upon landing.

One of the characteristics of shock training is a brief transition phase, which is the pause that occurs immediately after the eccentric phase ends (i.e., when the knees bend) and before the concentric phase (i.e, when the knees straighten) begins. Such dynamic activity is

required to release energy stored in the tendons and muscles developed during landing – energy that can be refocused to help an athlete jump higher and farther and run faster.

Shock training and all other forms of plyometrics can be extremely valuable training methods if used correctly. Don't let this valuable training method pass you by – seriously consider investing in some plyometric boxes and carefully reading all the material available from BFS on the subject.

JUMPING INTO PLYOMETRIC TRAINING

Plyometric training has been an essential part of the BFS Total Program since it's inception. Plyometrics have proved to be vital to championship programs across the country for 40 years!



Plyometrics benefit every sport because speed power and agility benefit every sport!

Plyometrics is a powerful tool for athletic training, but because it places such high levels of stress on the nervous system and on the joints, it must be approached with caution. Let's look at some specifics, starting with equipment.

In the middle school and high school environment, the most practical and effective form of plyometric training is box jumps. Box jumping workouts can be adapted to any strength level or age group, but there are some important guidelines that must be followed to make them effective and safe.

First, it's important not to perform plyometric box jumping on surfaces that are too soft. Using a soft surface interferes with the release of stored energy and diminishes the intensity of the reflex stimulation of the muscles. In other words, you can't jump as high if you takeoff from soft surfaces. However, you should avoid surfaces that have no give, such as concrete. A wood gym floor, or hard rubber or grass surface is ideal.

Next, to help ensure the safety of the athlete, it is important to use **solid boxes** with a non-slip surface and a base wider than the top for maximum stability. An **open metal box**, which is certainly convenient as they are lightweight, have a high risk factor as the athlete's feet can get stuck under the landing platform.

To properly run a plyometric box jumping program, coaches should have access to boxes of various heights. Whereas the standard plyometric box for high school athletes is 20 inches, for middle school athletes, heavier athletes and athletes at a lower skill level it's best to start them on 10- inch Readiness boxes. Never stack thick bumper plates on top a box to make it higher – this is an extremely dangerous practice.

One last point, which can't be emphasized enough, is to have spotters available for jumps that are especially high or challenging. For example, if athletes are performing a series of box jumps with the last box being the highest, two spotters should be available on either side of the athlete or spot him or her in the case of a mishap or miss. The organization should be such that as soon as an athlete finishes their last jump, they take



Plyometric boxes come in a variety of heights to allow for incremental gains as your athletes progress!

All these phases may sound like a lot to do in just 10 minutes, but you can do it if you are organized. Divide a class into two main groups; one group can work on speed while the other works on plyometrics. Divide the speed group in half, with one group working on technique and the other working on sprints. You can also divide the plyometric group into two groups. Half can be doing bounding, vertical jumps, and standing long jumps while the other half works on box jumping. This training can be tremendously productive and pay great dividends in improved athletic performance.

Box jumping bridges the gap between strength and power. Being able to squat 400 pounds (181 kilograms) is great, but that alone does not ensure explosive power. Box jumping can help the muscular system contract more quickly and with greater force. Box jumping works through a principle similar to the overload principle in weight training. As athletes gradually increase the resistance or the weight on the bar, they become stronger. Likewise, a gradual increase in the height of the plyometric boxes produces an increase in explosive power and jumping ability.

Coaches looking to improve the speed, power and jumping ability of their athletes should consider investing in some plyometric boxes and performing a progressive program of box jumping. When plyometrics is used correctly and consistently, it is an extremely effective training method that only takes a few minutes a week. It's a win-win workout!



the place of the spotter who jumped two places ahead of them. If that individual is too small or weak to be able to spot the next athlete, another athlete should stay back to help him or her.

The basic BFS Plyometric Box Jumping Program consists of three parts: vertical jumps, standing long jumps, then box jumps. You warm-up with one set of 10 quality vertical jumps followed by three sets of three reps of standing long jumps.

Next, you perform four sets of progressively more difficult box jumps: 1) jumping off the boxes, 2) jumping off the boxes and performing a vertical jump, 3) jumping onto the boxes and 4) multiple box jumps. That's it!

A CLOSER LOOK THE BFS DOT DRILL

Why this great warm-up exercise should be a part of every workout program

Grade	Boys	Girls
All American	Under 40	Under 45
Super Quick	40-49	45-54
Great	50-59	55-64
Average	60-70	65-75
Needs Work	Over 70	Over 75

TABLE 1: BFS Dot Drill Standards for Male and Female Athletes

One of the most complex and controversial topics in strength and conditioning is how to warm up properly. Dynamic exercise, aerobic training, PNF stretching – no wonder the typical high school coach often throws up their hands and just says, “Go run a lap!” At BFS, we’ve found a simple and effective method of properly warming up for lifting. It’s called the Dot Drill.

If nothing else, a warm-up needs to increase your body temperature, breathing rate and heart rate to the level of the activity you will be performing. This means you need to break a sweat, so static stretching is not what you need – after a work-out, yes, but not before. Certainly running around in circles or spending a few minutes pedaling a stationary bike will heat you up, get your blood pumping and make you breathe hard, but does this sound like the type of warm-up an athlete should use? Not quite.

At BFS, we believe that one of the best ways to warm up is by performing the Dot Drill. The Dot Drill is performed on a 2-foot-by-3-foot surface with five dots, as shown in Figure 1. There are five exercises in the Dot Drill, and the athlete performs each drill six times in the following sequence: Up and Back, Right Foot, Left Foot, Both Feet, and Turn Around. Detailed descriptions of each of these drills are included in the BFS book *Bigger Faster Stronger*, and in all our set-rep log books. We also have a free mini video course, the BFS Dot Drill, that shows the Dot Drill in action.

The Dot Drill is an ideal warm-up because not only does it fulfill all the basic requirements of a good warm-up, but it improves coordination, foot speed and agility as well. It also strengthens the ankles, an area of the body that could be considered a “weak link” in athletes, as they are frequently injured in athletics and often frustrating to rehabilitate. And because an athlete who injures an ankle is five times more likely to injure it again, it makes sense to include exercises that will prevent the ankles from becoming injured in the first place.

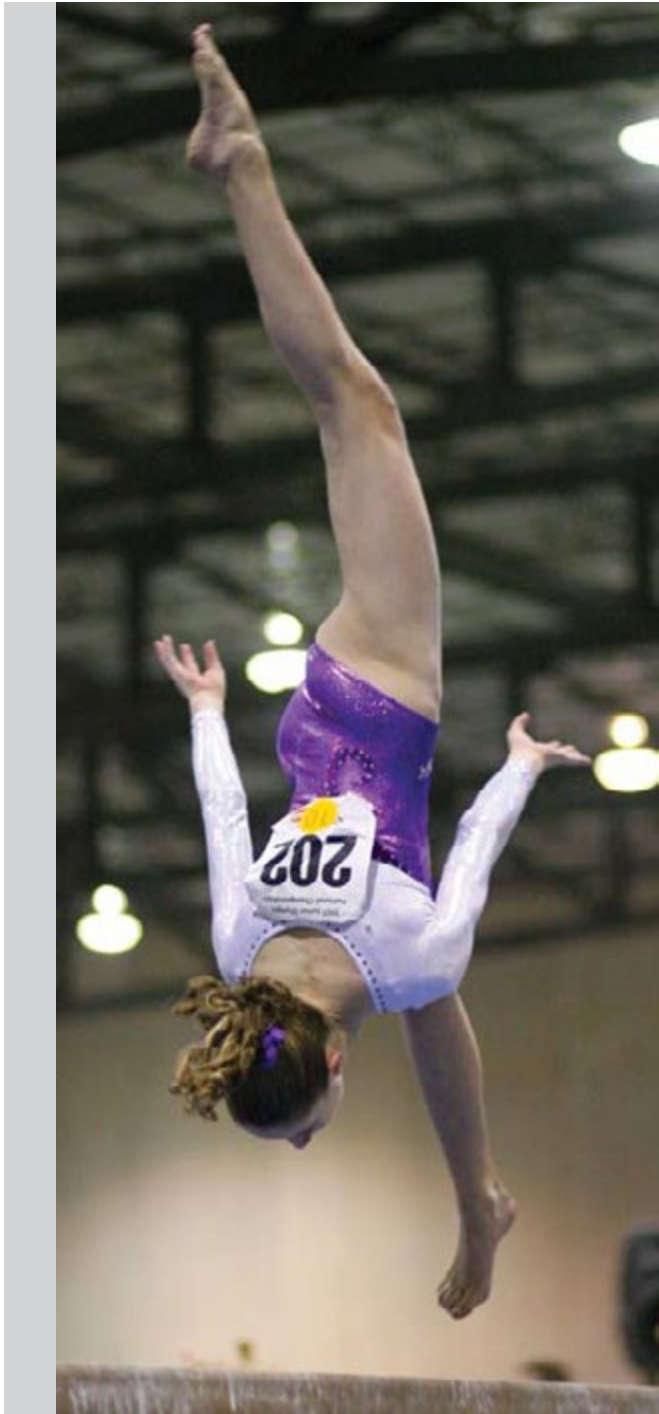
When athletes first attempt the Dot Drill, they often feel clumsy and find it extremely tiring. But these issues will pass, especially if the athlete commits to performing it six times a week. That may seem like a big commitment, but consider that the record for the Dot Drill is 33.37 seconds for boys and 37.77 seconds for girls. So, for most athletes, we’re asking for less than 10 minutes of work per week – an investment well worth the price.

At BFS, we’ve found that if you’re really serious about improving performance in any aspect of strength and conditioning, you have to test it. Whether it’s by how much you lift, how high you jump or how fast you run, you have to find a way to accurately measure performance so you can set personal records and then break those records. This is also true with the Dot Drill, and we recommend that athletes get tested twice a month and record the results. And to help the athlete determine how they are doing on the Dot Drill, BFS has established a set of standards for both girls and boys. Table 1 shows these standards.

We believe the BFS Dot Drill is a perfect warm-up for any workout program, for any athlete at any age. There are certainly many more ways to prepare the body for a workout, but for its simplicity and effectiveness, you can’t beat the BFS Dot Drill.

A CLOSER LOOK AT THE BFS FLEXIBILITY PROGRAM

Flexibility is as easy as 1-2-3-4



All athletes, not just gymnasts, need to stretch daily. Showing extreme flexibility is Mary Beth Lofgren, a Level 10 gymnast who represents the Olympus School of Gymnastics in Sandy, Utah and has competed in the last two Junior Nationals.

We've found, after giving thousands of BFS clinics over the past three decades, that stretching is the one component most often missing in an athlete's training. This omission is odd, considering the tremendous amount of research available on the value of stretching.

Athletes can gain several specific benefits by following the BFS 1-2-3-4 flexibility program. Here are a few:

- Increased joint range of motion
- Increased speed
- Improved overall performance
- Improved posture
- Decreased number and severity of injuries

BFS regards stretching as a separate exercise regimen, such as plyometrics and weight training. Stretching should not be thought of as part of a warm-up or cool-down for physical activity that athletes only need to do occasionally. They must stretch daily, in both the off-season and the in-season.

A stretching regimen involves serious work, concentration and adherence to proper technique. We want our athletes to look like sprinters when stretching, with every limb and joint straight and perfect. We use the Six Absolutes and ask, "Are the knees aligned; are the toes aligned?" Most coaches don't consider those important aspects of stretching, but attention to detail is what makes our program unique and, more importantly, what makes our program work.

We have created a stretching program that takes about 10 minutes per session and thoroughly stretches every major area of the body, especially the trunk, hips and legs. The program has been field tested in thousands of high schools and used by countless athletes of all ages, so we know it works. After athletes learn the program, they can stretch anytime, anywhere, and without a partner.

The BFS stretching program is as easy as 1-2-3-4. We say that because those numbers help everyone understand and remember the program. Specifically, the pro-

gram consists of 10 stretches, divided into four groups, performed in the following order:

1. On a bench
2. Standing
3. On a wall
4. On the floor

The numbers 1-2-3-4 refer both to the order in which the athlete performs each group of exercises and to the approximate amount of time, in minutes, the athlete devotes to each group of exercises. Thus, the athlete spends one minute performing stretches while sitting on a bench, two minutes while standing, three minutes in contact with a wall and at least four minutes (performing five stretches) while sitting on the floor.

Each stretch should be held for at least 30 seconds, although it's fine to hold a stretch up to 60 seconds to create a higher degree of relaxation. Stretches involving single limbs are performed for 30 seconds on each side for a total of one minute. Beginners have the option of holding each stretch for only 10 seconds, performing three sets per stretch to equal 30 seconds.

After a few weeks of BFS stretching exercises, athletes will begin to enjoy significant improvements in flexibility and overall athletic ability. Just 10 minutes of intelligent stretching each day is a pain-less way to move closer to your goals.

BACK TO THE BASICS WITH STATIC STRETCHING

BFS on developing a safe and effective stretching program



BFS clinician Jeff Surran uses a hands-on approach when teaching the BFS 1-2-3-4 Flexibility Program at BFS clinics.

It is our intention at Bigger Faster Stronger to provide coaches with a stretching program that not only benefits the athletes but also is useful in coaching situations where important considerations are time, facilities and number of athletes. After reviewing the potential benefits offered by a host of stretching programs, we decided that the most practical flexibility program for most young athletes would focus on the static stretching method.

The static stretching method is performed in the basic BFS 1-2-3-4 Flexibility Program, which has been used successfully by young athletes for over 38 years. This type of stretching involves maintaining a stationary

position in which the muscles are held at a greater-than-at-resting length. Some advantages to using static stretching with young athletes are that the techniques are extremely safe, can be mastered easily and can be performed without a partner.

The benefits of stretching go beyond injury prevention and rehabilitation. Many movements in athletics require exceptional levels of flexibility that may take years of stretching to develop and daily workouts to maintain. For example, if baseball pitchers can get their arms back a little farther, they will throw harder and faster because they can accelerate the arm over a longer distance. And if football players can improve flexibility in the hip flexors so their stride is longer, that alone may significantly improve running speed. Dr. Greg Shepard, BFS founder, estimates that a two-inch improvement in hip flexor mobility may improve a 40-yard-dash time by two tenths of a second.

The BFS 1-2-3-4 Flexibility Program is especially useful for increasing running speed. Kevin Devine, who was one of the fastest players in professional football, believes that stretching is key to developing speed. Says Devine, "If you don't stretch hard every day, you will never be as fast as you could be." Although Devine certainly has a genetic gift for running, he says he has made the most of his talents with stretching. "You stretch to win," he says. "It's that simple."



Static stretching is the most practical method of flexibility training for young athletes. Sheriann Decker, a former dance team member at Hunter High School, demonstrates several static stretches performed in the BFS 1-2-3-4 Flexibility Program.

Principles of Safe Stretching

Although static stretching can be one of the safest types of exercise, athletes should not stretch under certain conditions. For example, stretching the muscles around a recently fractured bone or around an area that has been recently sprained or strained, especially around the back or neck, is usually not a good idea. Here are a few other guidelines:

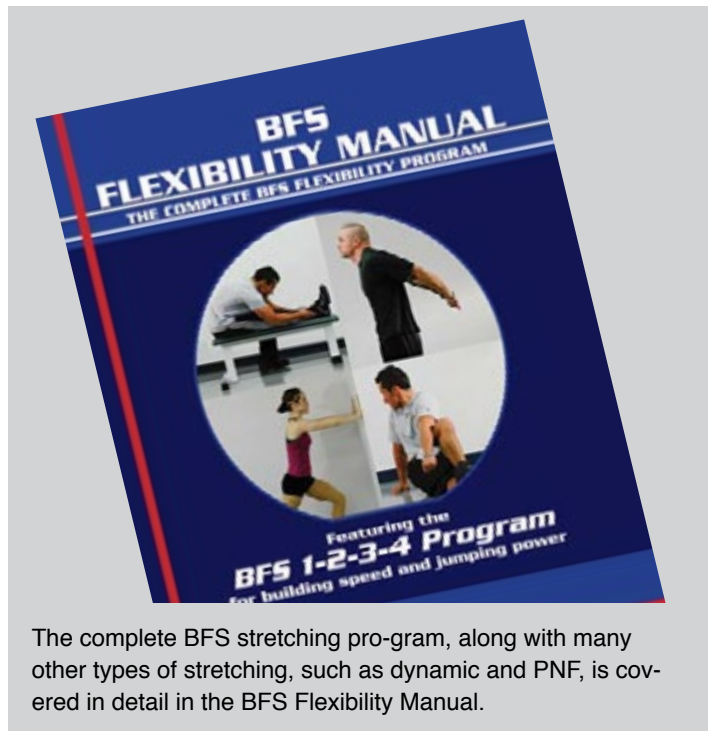
Warm up before you stretch. Stretching is not a warm-up. To avoid injury, you want your muscles to be warm before you stretch. The BFS dot drill is a perfect warm-up because it will help you break a light sweat.

Stretch in the proper environment. A firm, nonskid mat is ideal for stretching, and the area you're stretching in should be free of distractions so you can concentrate.

Stretch slowly and gently. Do not be forceful when you stretch. Always stretch slowly, moving gradually into each stretch and easing out of every stretch smoothly and slowly.

Listen to your pain. Do not force a joint to the point that you feel pain. You do need to be uncomfortable, but do not extend a joint beyond the point of discomfort. Never yank, pull or jerk, but do stretch hard. You should be sweating at the end of a stretching workout.

Concentrate on breathing. Proper breathing methods can significantly enhance the quality of your stretching program. Don't hold your breath. You should breathe normally, trying to ease deeper into a stretch during each exhalation.



The complete BFS stretching program, along with many other types of stretching, such as dynamic and PNF, is covered in detail in the BFS Flexibility Manual.

Don't overdo it. Although what constitutes overdoing it is always up for debate, you'll gain the greatest benefit from stretching by holding each position for at least 30 seconds. But for beginners, especially those who are extremely tight, performing three sets of 10-second holds is an effective alternative.

Personalize your routine. You should consider your individual needs when designing a stretching program. For example, if you are hypermobile in the knee joint, striving to increase the flexibility of your hamstrings may not be a good idea. If you are an athlete in a sport that requires exceptional flexibility in one area of the body – such as swimming, which requires flexible shoulders – you may want to add a few additional stretches for that area.

Vary your routine. You should occasionally vary the stretches you perform. We recommend that you experiment with these other stretches only after you have performed our standard BFS 1-2-3-4 Flexibility Program for several months.

Stretch after workouts. Most coaches and sport therapists agree that the best time to stretch is after a work-out, especially when it comes to preventing hamstring pulls. Dr. Michael Ripley, a specialist in flexibility therapy who has worked with 10 sprinters who won medals in the Sydney Olympics, says that after training, muscles often develop a higher level of tension than they had before the training. "This ten-

sion will cause muscles to shorten, and without post stretching I've found that over time this causes shortening of the athlete's range of motion. In my opinion it's most important to stretch immediately after the workout because you help keep the body symmetrical. In contrast, if you waited several hours, you'd have to stretch for a considerably longer time to achieve the same effects."

If the training environment is crowded and time is short, such as in a classroom situation, athletes would be better off stretching at home. If facilities are spacious and plenty of time is available, the ideal scenario would be to stretch after performing the dot drill and again at the end of the workout. Also, stretching in a group environment may be especially effective to ensure this important work gets done.

There are other effective methods of stretching, such as PNF and dynamic stretching. These are covered in detail in the BFS Flexibility Manual. In the meantime, consider that a goal of stretching should not be to become super flexible but to achieve balanced muscularity. We want to make strong athletes more flexible and flexible athletes stronger. When athletes have both assets going for them – flexibility and strength – they have a competitive edge.

A CLOSER LOOK AT THE GLUTE-HAM RAISE

The one-stop answer to training the posterior chain



The glute-ham raise trains the muscles on the entire length of the spine and both the knee and hip extension functions of the hamstrings.

What would the field of strength and conditioning be without buzzwords? Core training, functional training – every few years someone invents some new term that coaches start bringing up in everyday conversation. The latest buzzword term is posterior chain, which in the BFS dictionary translates into glute-ham raise.

The posterior chain refers to the muscles on the lower backside of your body, especially the glutes, hamstrings and calves. These muscles have garnered special attention from strength coaches because they are the major muscles used in jumping and running. In fact, it's estimated that approximately 40 percent of the power for sprinting and jumping comes from the glutes, and 25 percent from the hamstrings. Yes, squats will work the posterior chain, but better choices include power cleans, power snatches and deadlifts. But the best single exercise, your one-stop-shop-ping exercise so to speak, is the glute-ham gastrosoleus raise, or glute-ham raise for short.

A popular exercise among Soviet weightlifters, the glute-ham raise was introduced to the US by Bud Charniga, an elite weightlifter from the US. In 1979 Charniga visited Russia and found that every gym he looked in had a glute-ham station and that the exercise was an integral part of the training of Russian weightlifters. He saw that weightlifters often would perform some variation of the exercise twice in a workout, once before the workout with light weights as a warm-up, and again at the end of the workout with heavy weights as a strengthening exercise.

What's unique about the glute-ham raise is that it enables an athlete to train the muscles on the entire length of the spine and both the knee and hip extension functions of the hamstrings. This exercise is not possible with the back-extension benches found in most gyms, as the legs must bend to work the knee flexion. That's why our glute-ham bench has a curved hip pad rather than a flat one.

BFS Founders say that proof of the value of such exercises is in the reduction of injuries reported by those who attend BFS clinics, which teach a number of assistance exercises such as the straight-leg deadlift and glute-ham raise. "After one year, schools that have sponsored a BFS clinic average a 50 percent decrease in injuries,"

Whether you call it a posterior chain movement or a BFS auxiliary exercise, the glute-ham raise is a must for every serious strength and conditioning program.

A CLOSER LOOK AT OVERHEAD LIFTING

The value of jerks and push presses for athletes



The jerk is a total-body lift that helps athletes develop tremendous power. Here Ian Wilson is shown jerking a personal record of 423 pounds to win the 207-pound bodyweight division at the 2012 Senior Nationals.

By Kim Goss

BFS has always promoted the power clean as a core exercise for athletes, and the message has gotten across – the lift is now an integral part of the conditioning programs of the majority of high school and college strength programs. But it hasn't been easy, as the lift has had its share of critics, from those who promote single-set bodybuilding programs to some of the newer functional training gurus who believe that standing on

a large rubber ball is the best way to develop physical superiority. Now we can move on to promoting other lifts, such as the jerk.

Overhead lifting has always been a part of bodybuilding and strength training. In fact, many elite weightlifters of the past also competed in bodybuilding: Legendary Olympic weightlifting champion Tommy Kono competed in the amateur Mr. Universe; John Grimek was a Mr. America and also an Olympian in weightlifting; Mr. Olympia Sergio "The Myth" Oliva began as a competitive weightlifter for Cuba. But those days are over.

Today, it would be highly unlikely for a weightlifter to compete at a high level in bodybuilding because the level of competition is so much greater. Arnold Schwarzenegger was a seven-time Mr. Olympia, losing the title only once, in 1969 to Oliva. The caliber of bodybuilders now, however, would make it difficult for Schwarzenegger to even qualify to compete as a professional – yes, he was a bodybuilder ahead of his time, but there is a new standard today. At 6-foot-2 Schwarzenegger competed at 235 pounds bodyweight; at 5-foot-11, eight-time Mr. Olympia Ronnie Coleman reportedly competed at 305 pounds. The game has changed.

One reason the jerk has been overlooked by so many strength coaches is that overhead work as a whole has been downplayed in favor of the bench press. When the Olympic press was eliminated from competition after the 1972 Olympics, many bodybuilders and strength athletes lost interest in the sport of weightlifting.

In the BFS program the bench press retains its value as a core lift. Further, Charles Poliquin, one of the most accomplished strength coaches in the world, says that prone pressing exercises such as the barbell bench press should amount to about 20 percent of your total pressing movements. However, the exercise that we'd like to see become more popular in athlete programs is

the jerk, a lift of power.

The Power Factor

BFS talks about the idea of a power clean being a jump – likewise, the jerk combines a powerful leg drive with dynamic extension of the shoulders, upper back muscles and triceps. As a bonus, you get a rapid eccentric contraction of the legs during the split – the type of muscular contraction that occurs in a sudden change of direction, such as when a halfback makes a cut or when a basketball player fakes to drive to the basket.

Now let's look at some research from Dr. John Garhammer, Ph.D., a respected sports scientist who did pioneering work in the biomechanics of Olympic-style weightlifting. In his peer-reviewed study of Olympic lifting exercises published in 1980 in *Medicine and Science in Sports and Exercise*, Garhammer looked at power output, which is a measurement of the amount of work done in a specific period of time – in other words, it measures the most effective force for dynamic sports. What Garhammer found was that the power output for the jerk drive was higher than for the snatch pull and the clean pull in all nine bodyweight classes tested, and in several weight classes the forces exceeded those achieved in the second pull of the snatch and clean.

If you watch elite weightlifters on YouTube, you'll find that while the power clean is fast when the bar passes the knees, the jerk is performed so quickly that it can be described as “dip, drive and blink – the bar is locked over-head!” The result of this type of power training is that weightlifters have developed the ability to overcome inertia. Although it's expected that weightlifters can jump high, which is true, it also means they have what coaches often refer to as “first step” quickness.

Take the case of Mark Cameron, who is the lightest (at 240 pounds) American to clean and jerk 500 pounds. At the University of Maryland Cameron competed in a mock sprint against Renaldo Nehemiah, a wide receiver for the 1982 Super Bowl champions, the San Francisco 49ers, and the first to run the 100-meter hurdles under 13 seconds. Nehemiah won easily, of course, but for the first 10 yards Cameron was ahead.

Let's be perfectly clear – the best exercise for improving technique in the jerk is the jerk! Of course squats will give you the power to drive heavy weights overhead, but most of the assistance exercises that athletes use to improve the jerk actually make it worse. For example, exercises such as push presses (i.e., no re-bending of the knees or splitting of the legs) adversely affect technique in the jerk because it uses a different recruitment pattern of the upper body muscles. The push jerk (in which there is a re-bending of the knees but no split) is better. However, this lift causes the weight to be thrown forward, with the hips behind the bar rather than directly underneath the hips as occurs in the receiving position of the jerk.

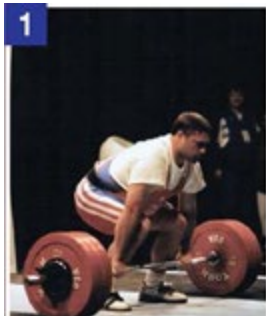
Many lifters perform jerks by taking the bar off squat racks (either in front of the neck or behind) to help improve the jerk, because cleaning the weight creates fatigue that can affect how much they can lift. The problem with this method is that after they clean the weight, their balance usually shifts forward and they have to adjust; this balance issue does not occur with jerks from the rack. Also, if you just add jerks after performing a clean, you save a lot of time because you only have to perform one exercise.

Specific directions for performing the jerk will have to be left for a future article, but I hope I've piqued your interest in learning more about this dynamic exercise.

BFS has developed six training principles called “Absolutes” that are amazingly effective in teaching perfect technique, not only in the weight-room but also in any sport. Learn the Six BFS Absolutes and you can elevate your strength and sport coaching abilities dramatically. The following are the Six Absolutes of perfect technique:

- Use an Athletic or Jump Stance
- Be Tall
- Spread the Chest (lock in the lower back)
- Toes Aligned
- Knees Aligned (knees over toes)
- Eyes On Target

The Six Absolutes – it's biomechanics, made simple!



Jump Stance, Toes Aligned, Knee Aligned, Spread the Chest



Jump Stance, Spread the Chest, Toes Aligned, Knees Aligned, Eyes On Target (above straight ahead)



Jump Stance, Spread the Chest, Toes Aligned, Knees Aligned, Eyes On Target



Jump Stance, Be Tall, Spread the Chest, Toes Aligned, Knees Aligned, Eyes On Target



Jump to Athletic Stance, Be Tall, Toes Aligned, Knees Aligned, Eyes On Target



Athletic Stance, Toes Aligned, Knees Aligned, Eyes On Target



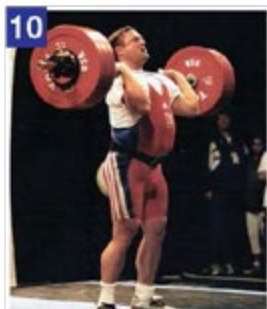
Athletic Stance, Toes Aligned, Knees Aligned, Eyes On Target



Athletic Stance, Be Tall, Spread the Chest, Toes Aligned, Knees Aligned, Eyes On Target



Athletic Stance, Be Tall, Spread the Chest, Toes Aligned, Knees Aligned, Eyes On Target



Step to Athletic Stance, Be Tall, Spread the Chest, Toes Aligned, Knees Aligned, Eyes On Target



Jump Stance, Be Tall, Spread the Chest, Toes Aligned, Knees Aligned, Eyes On Target



Jump Stance, Be Tall, Spread the Chest, Toes Aligned, Knees Aligned, Eyes On Target



Jump Stance to Split, Be Tall, Spread the Chest, Toes Aligned, Knees Aligned, Eyes On Target (now straight ahead)



Jump Stance, Be Tall, Spread the Chest, Toes Aligned, Knees Aligned, Eyes On Target



Squat Jerk Style

The majority of weightlifters use the split style of jerking weights overhead. However, there is another method called the squat jerk in which the athlete simply drops into a full squat position after cleaning the weight. The squat jerk style is demonstrated by these two elite international lifters, Olympic champion Guozheng Zhang from China (left) and Armen Ghazaryan from Armenia (right).

A CLOSER LOOK AT POWER BALANCE DRILLS

Unique exercises that develop dynamic flexibility



Marilou Dozois-Prevost, a 2008 Olympian from Canada, shows exceptional strength, balance and flexibility.

By Kim Goss

We admire Olympic lifters for their exceptional strength and speed, for sure, but also for their flexibility. Most people have difficulty getting into a snatch position holding only a broom-stick overhead, much less catching and balancing hundreds of pounds in this position. But the beauty of this sport is that the very exercises that require great dynamic flexibility also develop it. One series of exercises that fall into this category is what BFS calls power balance drills.

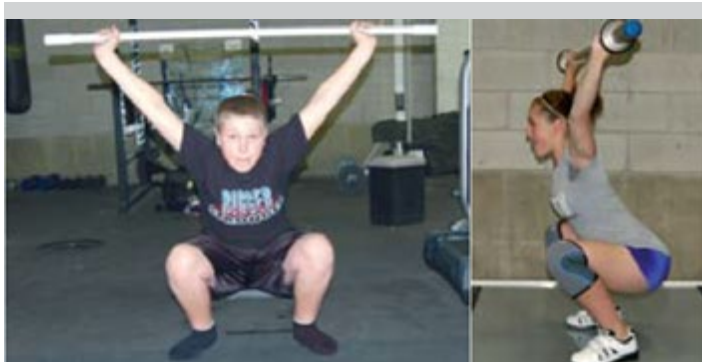
When balance comes into play during exercise, the body uses many different muscles. This factor is one of the primary reasons that athletes choose free weights over machines. For example, the prime movers in a standing-curl exercise are the biceps, but were it not for the stabilizing muscles in the back and hips, the lifter would fall over. With lunges, in the BFS program athletes should strive to step out to get a full stretch,

thereby learning to balance themselves power-fully in an awkward position. When an exercise uses the stabilizing muscles as much as the prime movers, we call this type of exercise power balance.

Tom Cross, who has been a strength coach at Mid-American Nazarene College, introduced BFS Founder/CEO Dr. Greg Shepard to the idea of including power balance lifts in the BFS program many years ago. As a result, BFS began including three of these lifts during our auxiliary lift presentations at BFS clinics.

Power balance drills are basically variations of the overhead squat, which simulates the position achieved in a full snatch. Holding a barbell overhead in a low squat with the trunk upright and heels flat on the floor requires considerable flexibility, and power balance drills develop this type of flexibility. In fact, the exercise is often used as a form of postural assessment in many physical education protocols – you’ll hear terms such as functional strength, dynamic flexibility and even neuromuscular efficiency to describe the qualities assessed during the overhead squat test.

In the field of corrective exercise, a postural assessment will look at how the body positions itself during movement. Any unnatural movement will be associated with a tightness or weakness in a muscle or group of muscles. Also, there may be an issue with the feet, and an



The power balance drills can be used to determine structural imbalances that can increase the risk of injury and affect athletic performance. The top photos show optimal positions; the bottom photos show imbalances.



Personal trainers such as John Connor (left) from Dublin, Ireland, use the overhead squat, also known as Power Balance Drill #1, in assessing structural balance. Strength coach Paul Dick uses the same exercise with his 4th graders, such as Stephanie Longfellow shown here.

individual who has excess pronation will create unnatural movement patterns during the exercise – in fact, if the positions improve dramatically when weightlifting shoes are worn, this may indicate that there is a structural problem with the foot.

For the overhead squat, if the knees buckle inward, this could be a result of tight adductors (inner thigh muscles) or weakness in the gluteus medius. If the individual cannot position their arms overhead properly, this could indicate tightness in the latissimus dorsi or a weakness in the muscles that help stabilize the shoulder blades, such as the rhomboids. From here, a specific corrective exercise program could be designed to strengthen the muscles that are weak and to stretch the muscles that are tight.

With this background, let's look at the three BFS power balance drills, discussed in order of difficulty.

Power Balance Drill #1

Perform a power snatch and stand erect in an athletic stance. Now squat all the way down while maintaining great balance and technique. Hold the low position for three seconds and then stand erect again.

Power Balance Drill #2

Place the bar on your shoulders as if you are going to do a back squat while using a snatch grip. Again, squat all the way down and balance yourself. Then see if you can press the weight all the way up. The challenge is to see if you can press the bar up from your shoulders while maintaining perfect balance.

Power Balance Drill #3

Do power balance drill #2, but this time see if you can press the weight up, hold it for three seconds, and then stand erect.

Use the 6 Absolutes

During all three drills, apply all the BFS Six Absolutes to help achieve ideal positions and develop what BFS refers to as a “kinesthetic feel” for the exercise. These are the BFS Six Absolutes:

1. Use an athletic or jump stance
2. Be tall



Power Balance Drill #1



Power Balance Drill #2



Power Balance Drill #3

3. Spread the chest (lock-in the lower back)
4. Align the toes
5. Align the knees (knees over toes)
6. Eyes on target

Canadian strength coach and Posturologist Paul Gagné also offers a tip in performing these drills: “Athletes must understand that the weight should be back, towards the heels. I also tell athletes they should focus on keeping the weight more on the outside toes to help keep their knees in line with their feet.”

For those with extreme flexibility problems, or for someone recovering from an injury, Gagné also suggests squatting to a high box, as this increases their body awareness. As the athlete improves, a lower box is used (using a BFS 3-in-1 Squat Box is ideal because it's adjustable). This technique can also be used for regular squats.

Several years ago, when BFS Editor in Chief Kim Goss owned a private gym in Dallas, he started working with Robert Pettitt III, Jr., a 14-year-old who had torn his ACL and MCL. Even with a special knee brace, Pettitt could not bend his knees more than 10 degrees without his injured knee buckling. Says Goss, "I started having him perform high box squats so that he kept his knees in alignment. When he could perform a perfect squat to this depth consistently, I used a lower box. Although Robert had very little weight training experience prior to working with me, in just a few months he was able to perform a rock-bottom squat with 355 pounds!" Later, Goss used these boxes with a high school girls weight training class he worked with at Hunter High School in Salt Lake City. This class, which was featured in the January/February 2010 issue of BFS magazine, had 12 girls who could power clean 135 pounds.

To make power balance drills even more challenging, Gagné often has his athletes use dumbbells or chains. He will start by having his athletes perform these exercises while squatting to a box. One progression he uses is to squat without any apparatus, then with a barbell, then with dumbbells, and finally with chains attached to the barbell.

Your athletes may never step onto a lifting platform and compete in a weightlifting competition, but all athletes can benefit from unique weight-lifting exercises such as the power balance drills.

A CLOSER LOOK AT THE POWER CLEAN

Why BFS considers this lift a must for serious athletes

By Kim Goss



For many years this BFS core exercise has been attacked by those who thought it had little value for an athlete, by those who thought it was dangerous and by those who thought it was too difficult to teach. They were wrong, and the survival of the exercise has benefited those who want to run faster, jump higher and be overall more powerful.

A recent survey involving 137 Division I coaches found that 85 percent used Olympic lifting movements such as the power clean to train their athletes. In the NFL, that percentage was 88 percent. High school football programs are also catching on, especially the ones that enjoy a tradition of victory. I know this from my personal experience as a strength coach.



When I was a strength coach for the Air Force Academy, I enlisted the help of the university's math department to conduct my own experiment to determine which strength training exercises had the highest correlation to the ability to play football. I compiled the results of the top three athletes on the depth chart for each position, and their maxes on our core and auxiliary exercises, for a three-year period. For defensive and offensive linemen, and in fact for almost all positions, the exercise that had the highest correlation to playing ability was the power clean. The reason is simple. Linemen need to be able to express a high level of strength quickly. Because the power clean allows you to accelerate your limbs over a large range of motion, it's one of the best exercises for improving what sport scientists call the rate of force development. This is in contrast to conventional power lifts such as squats, which for safety reasons require more time to decelerate the weight – in fact, the only time maximum force can be exerted is at the beginning of those exercises. And there is practical evidence in peer-reviewed journals supporting the idea that power cleans are a superior exercise for developing power.

Averin Collier power cleaned 310 pounds when he was a senior at Churchville-Chili High School in Rochester, New York. His explosiveness and football skills earned him a scholarship at Syracuse University. Greg Robinson, who has been the head football coach since 2005, said that Collier "is the top recruit that we have landed in my tenure at Syracuse."

For example, in 2004, researchers at the Department of Health and Exercise Science at the College of New Jersey conducted a 15-week study on weight-lifting exercises involving 20 Division III college players. One group focused on powerlifting exercises such as the squat, while the other group focused on Olympic lifting exercises such as the power clean. Although both groups showed improvements in the vertical jump, a standard test for athletic power, the authors said, “Results suggest that OL can provide a significant advantage over PL in vertical jump performance changes.”

For those athletes seeking to improve muscle mass, the power clean is also an effective exercise. Let me explain. There are essentially two types of fast-twitch muscles fibers that can increase in size: the Type IIa and the more powerful Type IIb. The Type IIb fibers respond better to explosive lifts such as the power clean; and much of the massive development of the traps, lower back and hamstring muscles on Olympic lifters is due to the development of Type IIb fibers. So if you want as much functional muscle mass as possible for sports, you need to perform the power clean.

But what about the idea that the power clean is dangerous? Again going back to my days at the Air Force Academy, I found that data collected from our athletic trainers showed that the total number of injuries for the first five years I coached there had decreased by 60 percent! I was the person solely responsible for designing the workouts for the football team, and one of the features of my workout programs was extensive use of the power clean. If this lift was so dangerous, how can one account for such results? I have a theory about this – and a story.

I was talking to a friend of mine, a bouncer who also competed internationally in judo, and he said that in a bar fight between a boxer and a martial artist, a boxer would almost always win. The reason, he explained, is that a martial artist could not take a punch, at least not to the extent that a boxer could. In effect, the nature of their sport was such that the boxer learned how to minimize the force of a punch – they had to, as in training they are continually receiving blows to the head. In contrast, martial artists seldom strike each other hard enough in the head to develop this skill.

Likewise, during a power clean the athlete not only

must explosively lift the weight but also must catch it. In effect, doing power cleans teaches the athlete to rapidly control the impact, a.k.a. disrupted forces, that occur during the lift. When you consider the ever increasing numbers of athletes suffering ACL injuries, you can see how valuable it is to be able to handle the dynamic, disrupted forces that occur to the ankle and knee during athletic competition. Further, the faster an athlete can handle these disrupted forces, the quicker they will be able to move on the court or in the field.

Finally, the Olympic lifts are “economical” exercises, meaning that they work many muscle groups simultaneously. To achieve a similar training effect with conventional exercises, an athlete would have to perform a leg press, back extension, calf raise, shoulder shrug, upright row, and biceps curl – and even then they would be neglecting a few muscles. Time is a major limiting factor in many athletic programs, so it’s important to use exercises such as the power clean that give you the most bang for your buck.

Is the power clean difficult to teach? Certainly not, if you have the proper educational materials and coaches who know how to teach it. BFS currently gives more than 400 clinics a year to young athletes, and has been doing so for over 30 years. The power clean is taught in all these clinics, and we often see athletes who have never performed this exercise come away with sound technique that will quickly lead to gains in athletic performance. Further, at our certification clinics, we ensure quality instruction, because coaches must show not only that they can perform the power clean at these clinics but also that they can teach it.

Despite its critics, the power clean has proven to be an exercise that can be safe, easy to teach and is one of the single most important exercises for achieving physical superiority.

A CLOSER LOOK AT THE POWER SNATCH

Another great BFS advanced auxiliary exercise



The power snatch works the same muscles as the power clean, but does so through a greater range of motion. Shown with great form in this exercise is Utah State University gymnast Maegan Snodgrass, who represented Team BFS when she broke the School Age American record in the snatch.

By Kim Goss

Those who say the BFS program does not have enough variety in exercise selection simply do not know the BFS program. Case in point: the power snatch. The power snatch is an advanced auxiliary exercise that can be used in place of the power clean, as it works essentially the same muscles and also develops explosiveness. The basic difference between the two lifts is that instead of bringing the barbell to rest on the shoulders, you flip the weight overhead. Also, you use a wider grip with the power snatch.

The reasons we recommend using the power clean first is that you use heavier weights, develop more muscle mass and it is easier for most athletes to learn.

But once you've mastered the power clean, the power snatch is relatively easy to master, as the movement is very similar.

There are several reasons to try the power snatch. First, it tends to be easier on the wrists and elbows than the power clean and requires less flexibility in the upper back. Some athletes, especially those with relatively long lower arms compared to their upper arms, find that racking the bar is extremely uncomfortable. There's no such problem with the power snatch.

The power snatch more aggressively works the muscles that externally rotate the shoulders. In sports such as baseball and swimming the muscles that internally rotate the shoulders often become overdeveloped in relation to those that externally rotate the shoulders. This imbalance contributes to an unnatural, round shouldered posture that makes the shoulders more susceptible to injury. Rather than performing several boring isolation exercises for the rotator cuff to deal with this problem, athletes can simply add the dynamic power snatch to their workouts.

Because a lighter weight is used, the power snatch is a much faster lift than the power clean. This makes it ideal for improving jumping ability. Also, because a wider grip is used, it develops the hamstrings, glutes and lower back muscles through a greater range of motion.

Finally, the power snatch is a really fun lift for athletes to perform, as the barbell travels extremely fast through a great range of motion. Give it a try sometime and we're sure you'll agree that the power snatch is a great lift to add to your program.

A CLOSER LOOK AT SHOULDER SHRUGS

Tips on getting the most out of this valuable exercise



Kicker Justin Sorensen, who is profiled in this issue, demonstrates the start and finish of the shoulder shrug.

The trapezius is probably the most underrated and neglected muscle in athletic training. This is a serious omission, because trapezius muscles are involved in elevating the shoulders, such as in a power clean, and stabilizing the shoulders in military presses and other movements. Further, the muscles help stabilize the neck and therefore play a valuable role in preventing injuries in sports such as foot-ball and wrestling.

From a functional standpoint, the trapezius muscle is shaped like a diamond and has three sections: upper, middle and lower. The strength of the trapezius muscles enables athletes to use extremely heavy weights in

shrugs, even heavier than the athlete can deadlift. As such, it's especially important for athletes to have perfect alignment when performing the exercise to avoid injury. The key faults are looking down (eyes not on target) and allowing the head to move forward. Also, the shoulders should move up and down – not rolled in a circle, as this not only can be hard on the shoulder structures but also tends to limit the range of motion of the exercise.

Shrugs can be performed holding a barbell in front of you, but the down-side there is the barbell tends to pull the shoulders and head forward. And because you can shrug more than you can deadlift with a straight bar, for maximum overload you would have to remove the barbell from supports (such as from inside a power rack). Holding dumbbells at your sides would be a better alternative from a postural standpoint, but it is difficult to use heavy weights with dumbbells because they are less stable.

The best alternative is to use a Hex bar, as the design of the bar positions your hands at your sides and the weight is more stable. To prevent the Hex bar from tilting back and forth, it helps to offset the grip slightly (one hand slightly forward and the other slightly back). And rather than performing the lift as a separate exercise, shrugs can be performed after the last rep of a set of Hex Bar Deadlifts.

If you want to “elevate” your program, be sure to include shoulder shrugs.

A CLOSER LOOK AT THE BFS CHAINS

Scientific research is confirming the ever-increasing value of lifting chains in helping athletes achieve their physical potential

By Kim Goss

The BFS program has been building champions for 25 years. Over this time the basic BFS training principles have changed little—after all, who would dispute the value of a respected program that produces hundreds of high school state championships in major sports? That's why when something is added to the BFS program, it's big news. The something new this past year is lifting chains.

Although widespread use of chains for weight training is a recent practice, chains have been around since the early days of modern resistance training, and over 30 years ago Nautilus inventor Arthur Jones wrote about experimenting with lifting chains. Jones didn't pursue chains, deciding instead to use a shell-shaped cam to vary resistance on his machines.

Although Jones is credited with popularizing variable resistance training, the need for such training was identified over 100 years ago. On October 15, 1901, Max Herz of Vienna was awarded a patent for his prototype of an “irregular-faced cam.” Many years later, Jones' writings on the subject reintroduced lifting chains to athletes and coaches. One such coach was Jim Schmitz.

Jim Schmitz, who was featured in our Spring 2002 issue, is one of the most accomplished Olympic weightlifting coaches in the world. In his early years as a weightlifter Schmitz experimented with lifting chains on core exercises, but decided that carrying heavy chains to the gym was simply too inconvenient. More recently, powerlifters—especially the elite athletes coached by powerlifting guru Louie Simmons—have been experimenting with chains.

The Straight Truth about Strength Curves

The theory of variable resistance is that because you're stronger (or weaker) at different points in an exercise, the best strength training devices should increase the resistance at the points at which you are strongest.

Herz explained in his patent how his “cam” would achieve this: “. . . in working with such apparatuses, during the whole movement, the muscles shall be exerted in accordance with their momentary tension or pulling force.” This meant there would be no sticking points so the muscles would be working hard throughout the entire lift.

A strength curve is a mathematical model that represents how much force can be produced at specific joint angles. An “ascending” strength curve exists when you can display more force as you extend the joints; exercises such as deadlifts, squats, bench presses and military presses have ascending strength curves. Chains would be valuable for these exercises because the increasing resistance during the strongest joint angles would make the exercise feel “smooth” through the entire movement.

A descending strength curve exists when you can display more force as you flex a joint. An adductor (inner thigh) pull with cables or a machine would have a descending strength curve, as you can display more force when the legs are closest together. Some exercises have ascending-descending strength curves, which means that you can display more strength at the mid-range of the movement. Chins and standing biceps curls are such exercises. Using chains for exercises with descending or ascending-descending strength curves would not be very useful, as the chains would apply the most resistance in the parts of the exercise where you would be weakest.

One important point to consider about strength curves concerns the effects of muscular fatigue. For a bench press, as the set progresses fatigue would make the athlete less strong at the finish of the exercise than at the start. Let's say an athlete can bench press 200 pounds and is trying to perform as many reps as possible with 160 pounds. For the first five reps the weight feels lighter at the finish, for the next five reps the weight feels even through the entire movement, and at about the 15th rep the athlete will only be able to lift the barbell a few inches off the chest but cannot finish the lift.

The practical application of the fatigue factor is that chains would not be appropriate for bodybuilding protocols that require high repetitions, such as reps of 12-15, because the resistance would be too heavy at the end range of motion. Because the BFS program emphasizes lower reps than do bodybuilding programs, chains would be a good training method, especially during the first week of the BFS training cycle, which uses set-rep protocols of 3x3. It would be less effective during the fourth week, in which sets of 10-8-6 are performed for many core lifts.

Moving Beyond Nautilus

When I trained for several months on the Nautilus machines in the early '70s, I was disappointed that the exercises never felt "smooth" throughout the entire lift. I was told by the gym instructors that this was because my earlier training with free weights had altered my natural force curves, and that extended Nautilus-only training would eventually make my muscles balanced and the exercises would feel perfect. In reality, I believe the problem was that the machines I was using had force curves that were designed on the basis of 1-rep maxes, not the multiple repetitions I was using and the manufacturers recommended.

There have been various attempts to provide appropriate resistance for all types of strength curves. One former Mr. Universe and gym owner changed his Nautilus machines to use circular pulleys and found they worked much better. David, an exercise equipment company in Sweden, designed its machines to adjust to the curves displayed during higher repetitions. In a David leg extension, for example, there would be minimal resistance at the end of the exercise, exactly opposite of how the cam works on a Nautilus machine. Another refinement was isokinetic machines, which allow the athlete to perform exercises at one movement speed. With such machines, resistance is applied only when movement occurs, so that no work is being performed during the isometric (pause) and eccentric (lowering) portions of the exercise. This is a major problem.

Research has shown that the eccentric portion of an exercise is the most effective type of muscular contraction for developing strength, and eccentric strength is important for developing the ability to control the

forces that occur in sports, such as landing during a jump in volleyball or basketball. "Also, because these machines only allow for one movement speed and because acceleration is an important component to the development and maintenance of power, these machines would be detrimental to athletic performance," says Jerry Telle, a personal trainer from Littleton, Colorado, who has done extensive research on strength curves.

Explosive Advantages

Chains improve explosive strength. In squats, chain training will teach you to drive to the top of the lift because you cannot reduce force as you can with a regular barbell. After a few weeks of training athletes with chains, coaches often report not only increases in 1-maxes, but also more acceleration while lifting, which can translate into a more explosive athlete.

In addition to adding resistance to squats and bench presses, chains are useful in quick lifts such as cleans, snatches and even jerks. One strong advocate of using chains for the quick lifts is Doug Briggs, a faculty member at New Mexico State University and president of the American Weightlifting Association. The idea to use chains occurred to him in May of 2002 when his team was training at Scott Warman's Pro-Gym in El Paso, Texas. "I was sitting on a bench looking at the chains hanging off of a bench press bar and the thought occurred to me that this might be something I could adapt to Olympic weightlifting," says Briggs.

Brigg's first thought was how to adapt the chains so that they wouldn't get in the way of the feet or interfere with the lift. To ensure safety, he believed it was important to have the chains attached as far as away from the inside collars of a barbell as possible.

THE BFS FIVE-DAY WORKOUT

A closer look at the classic BFS off-season and in-season workouts



Organization is key to a successful athletic program. One way that BFS helps coaches plan their athletes training is with hands-on clinics.

“Failing to plan is planning to fail,” was a motto used by legendary basketball coach John Wooden to lead his UCLA Bruins to 10 national championships. At BFS, we believe that if it’s good enough for Coach Wooden, it’s good enough for us!

One of the reasons for our success over the past 45 years is not that we have any secret exercises – after all, exercises such as power cleans and squats are used by many strength coaches – but that we teach coaches now to successfully plan their strength and conditioning programs, in-season as well as off-season. We call the BFS workout “The Total Program” because it provides specific guidelines on all aspects of athletic fitness: speed, power, strength, agility, flexibility and muscular endurance. What’s more, it’s easy to implement.

The basic BFS system for off-season training is set up on four-week cycles, each focusing on a different set-rep cycle:

Week 1: 3x3;	Week 2: 5x5;
Week 3: 5-4-3-2-1;	Week 4: 10-8-6 (or 4-4-2 for power cleans and deadlifts).

Table 1: BFS Off-Season Program (Outline)

MON	TUES	WED	THUR	FRI
Dot drill	Dot drill	Dot drill	Dot drill	Dot drill
Squat Variation	Sprint Work	Power Clean	Sprint work	Parallel squat
Bench Variation	Plyos	Hex bar deadlift	Plyos	Bench press
Auxiliary lifts	Flexibility	Auxiliary lifts	Flexibility	Auxiliary lifts
Flexibility	Agility	Flexibility	Agility	Flexibility
	Sprint tech		Sprint tech	

Table 2: BFS Off-Season Program (Sample Workout)

MON	TUES	WED	THUR	FRI
Dot drill	Dot drill	Dot drill	Dot drill	Dot drill
Box squat	Speed chute	Power clean	Sprint sled	Parallel squat
Towel bench	Box jumps	Hex bar deadlift	Box jumps	Bench press
Lat pulldown	Flexibility	DB lunge	Flexibility	Lat pulldown
Glute-ham raise	Plyo ramp	Dips	Plyo ramp	Glute-ham raise
SL deadlift	Ladder drills	SL deadlift	Ladder drills	DB lunge
Flexibility	Medicine ball	Flexibility	Medicine ball	Dips
	Sprint tech		Sprint tech	Flexibility

Table 3: BFS In-Season Program (Outline)

MON	TUES	WED	THUR	FRI
Dot drill	Dot drill	Dot drill	Dot drill	Dot drill
Squat variation	Sprint work	Power clean	Sprint work	Auxiliary lifts
Bench variation	Plyos	Bench variation	Plyos	Flexibility
Hex bar deadlift	Flexibility	Squat variation	Flexibility	Agility
Lat pulldown	Agility	DB lunge	Agility	Sprint tech
Neck machine	Sprint tech	Dips	Sprint tech	
	Flexibility		Flexibility	

During the week weight training is performed on Monday, Wednesday and Friday; speed, agility and plyometrics are performed on Tuesday and Thursday.

Table 4: BFS In-Season Program (Sample Workout)				
MON	TUES	WED	THUR	FRI
Dot drill	Dot drill	Dot drill	Dot drill	Dot drill
Box squat	Speed chute	Power clean	Sprint sled	Lat pulldown
Bench press	Box jumps	Towel bench	Box jumps	Dips
Hex bar deadlift	Flexibility	Box squat	Flexibility	Neck machine
Lat pulldown	Plyo ramp	Neck machine	Ladder drills	SL deadlift
Dips	Medicine ball	Glute-ham raise	Medicine ball	Flexibility
Glute-ham raise	Sprint tech	SL deadlift	Sprint tech	Plyo ramp
	Flexibility		Flexibility	Ladder drills
				Sprint tech

Table 1: shows the general outline of the workout

Table 2: provides an example of specific lifts and speed, plyometrics and agility drills that can be performed during a five-day, weekly class schedule.

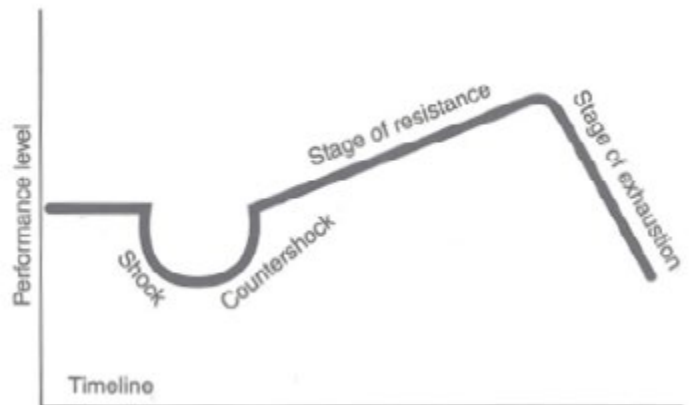
Athletes on the BFS **in-season program** perform core lifts only twice a week, which brings up the question “What do you do on the fifth day?” The answer is to perform auxiliary exercises that will not excessively fatigue your athletes, even if they have a game that same day. They would also perform the dot drill, flex-ibility, agility and sprint technique. The time also could be used to let the athletes have a free day with some quick games of basketball or dodge ball.

The more you get into the BFS Total Program and start implementing it with your athletes, the more you will discover how much flexibility is built into the work-outs.

Additionally, BFS offers many multimedia tools to help you master the BFS program, depending upon your learning style. We have set-rep logbooks, Beat the Computer software, instructional DVDs, an online learning center, clinics and certifications. And with 32 years of championship success stories, you know you’re using a proven system that will help you win!

A CLOSER LOOK AT 10-8-6 PROGRAM

Understanding the fourth week of the set-rep system



The BFS Set-Rep System is based upon the work of Hans Selye's general adaptation syndrome model, which shows how the body adapts to stress.

The BFS Set-Rep System is designed to provide the optimal balance of structure and variety to ensure that athletes continue to break personal records – not once a month, not once a week, but often with every single workout. Such an approach is self-motivating, as the continual improvements encourage athletes to train even harder. Let's take a closer look.

The BFS Set-Rep System is based upon the pioneering work of endocrinologist Hans Selye. Selye developed a model of how the body adapts to stress: Selye's general adaptation syndrome. Selye found that when an individual is exposed to stress (a weight training workout is considered a type of stress), the body adapts to it by going through several phases.

These phases are commonly referred to as shock, countershock, stage of resistance and stage of exhaustion. BFS determined that to optimally support this adaptation process, athletes must vary the sets, reps and exercises on a weekly basis.

The workout for the BFS Set-Rep System consists of four 1-week phases. Using the common scientific

terms of intensity (how much weight is lifted) and volume (how many total reps are performed), you can define the phases as follows:

- Week 1: high intensity, low volume
- Week 2: medium intensity, medium volume
- Week 3: high intensity/peaking
- Week 4: low intensity, medium volume

In more practical terms, this is how the workout is defined in terms of sets and reps:

- Week 1: 3x3
- Week 2: 5x5
- Week 3: 5-4-3-2-1
- Week 4: 10-8-6; or 4-4-2 for clean and deadlift

Week 3 is the most stressful set-rep combination on the nervous system, and following it with another such week could result in exhaustion, or, as it is commonly referred to, over-training. To avoid or at least minimize over training, BFS follows week 3 with a recovery week. And we believe the 10-8-6 workout is perfect to accomplish this goal.

A Brief History of the 10-8-6 Workout

Although we don't know where or when the 10-8-6 system originated, BFS editor-in-chief Kim Goss says he was first introduced to it in 1972 when he joined Bob's Athletic Club in Fremont, California.

Bob's Athletic Club, named after its owner, Bob Perata, was one of those basic, primarily free-weight gyms of the past where bodybuilders, weightlifters and the general population all trained together and everyone helped each other out. In fact, the loyalty and trust of the membership was such that members could purchase a key to the gym from Bob and train at any hour of the day or night. The most notable member of the gym was Ed Corney, who challenged Franco Columbo for the 1975 Mr. Olympia lightweight title. Corney appeared on the cover of Charles Gains' book *Pumping Iron* as well as on the poster for the movie.

Goss says that the 10-8-6 program is especially motivating for beginners because the decreased reps on the second and third sets enable heavier weights to be used – in effect, it gives the trainee the illusion of getting stronger throughout the workout.

At Bob's Athletic Club the majority of those who trained were primarily into general fitness and were not Mr. Olympia hopefuls such as Ed Corney, so three sets were enough for a beginner to make progress.

Often, trainees at Bob's club would use this program for a month and then would move on to another program for variety – sometimes a client would simply add another set, doing permutations such as 12-10-8-6 if they wanted more muscle mass, and 10-8-6-4 if they wanted more strength.

The 10-8-6 program can be described as a pyramid system: higher repetitions form the base of the pyramid, which then tapers towards a point of lower reps. A classical pyramid system would look something like the following pattern (which, although it doesn't typify a true pyramid in an architectural sense, is fine for illustrating the concept):

Reps	Percentage of 1RM
12	70
10	75
8	80
5	85
3	90
2	95

For the purposes of the 10-8-6 program, however, the difference between the number of reps in the first set and the reps in the last set should be no more than 4-5 reps. Thus, if your first set is 10 reps, you would not want to go below 5 reps in the workout. The pattern in the 10-8-6 program is known as a narrow pyramid. Conversely, a repetition bracket that is too "broad" – i.e., a wide pyramid – is spread over too many reps to be effective. The reason – as suggested by Tudor Bompa from Romania and other strength experts – is that in a wide bracket, the body has a hard time figuring out what exactly the training stimulus is. Bompa believes that the difference in the amount of weight used between the sets should be no more than 20 percent. So if an athlete uses 200 pounds on one set, then they should not perform so many reps that they could not use at least 160 pounds for any set. This respects a training principle known as the Law of Repeated Efforts.

Of course, a 10-8-6 set-rep scheme is not appropriate for all exercises, especially the Olympic lifts and their assistance exercises due to the technical nature of these exercises. This is why for exercises such as the clean and the dead-lift, we recommend a 4-4-2 protocol.

The 10-8-6 training system is a great workout, although we don't label it as the single best workout because such a workout doesn't exist. When it's used after week 3's stressful 5-4-3-2-1 workout, a week of 10-8-6 is just right.

CLOSER LOOK AT THE 3 X 3 WEEK

Below is a step-by-step example of an athlete who's been on the BFS Program for several months.

Week 5 3 x 3	3	220	8
Date 2-20-20	3	230	8
Actual	5	3+	9
		235	
Total	685		

Week 9 3 x 3	3	230	5
Date 3-21-20	3	245	6
Actual	6	3+	10
		270	
Total	735		

REP RECORDS		
	Previous	Today
MAX	265	
2	255	260
3	245	260
4	245	260
5	235	260
6	220	260
8	210	
10	205	

Editor's Note: This athlete makes his own choices as to the poundage he wants to attempt. Naturally, a coach can help. This athlete could have chosen different weights and it would have been perfectly OK. For example, he could have tried 250 on the 3rd set. He would not have broken his 2 Rep record but he might have broken his 8 Rep record. In any event, next month he must total more than 735 on his 3 x 3 set. And, this he will do because he is typical, Remember, we guarantee at least 8 records broken per week and 400 per year!

1. I come into the weight room with a game day attitude. I'm ready to smash some records!
2. It's been a whole month since I've done my 3 x 3 workout. Last month I totaled 685. I should be able to break that easily.
3. Today, I think I'll start with 230; that's 10 over last month and 15 under my 3 Rep record.
4. Piece of Cake' I'm on today' (Write down 230 on page 9 of BFS Set-Rep Log Book.)

5. I'm going up 15 pounds to 245 pounds for my second set.

6. Coach! My second set went easy again! (Write 245 down in Log Book.)

7. Now, I'm going to put 260 on the bar and go crazy.

I know I can get more than 3 Reps. Win baby' Come on!

8. Got six! Got six' Last month I could only get 5 at 235!

9. I smashed my 3 x 3 set record by 50 pounds for a total of 735!

10. I broke 1 set record and 5 Rep records' That's a total of six!

11. I feel great' We can win the Championship!

THE BFS OFF-SEASON WORKOUT

How the BFS program makes athletes better



The White River Tigers were featured in our May/June 2011 issue for putting up a 159-35 record, which included two state championships, in eight years. This year their roster includes nine seniors, and they opened the season with a 72-35 victory.

Regarding basketball, if you just went by the physiques of players from several decades ago, especially in the NBA, you would think that you were looking at a different sport. Gone are the days of teams comprised of a tall, lanky center supported by four smaller, quicker teammates. Now everyone is tall, everyone is quick – and unless you saw them in person, you wouldn't guess their size. LeBron James is 6' 8" and 250 pounds, and since 1990 there have been 13 NBA players, including superstars Shaquille O'Neal and Yao Ming, who have

BFS Off-Season Overview

MONDAY	WEDNESDAY	FRIDAY
Squat Variation	Power Cleans	Parallel Squat
Bench Variation	Hex Bar	Bench Press
Auxiliary Lift	Auxiliary Lift	Auxiliary Lift

weighed over 300 pounds. Indeed, today's professional basketball player is the living personification of our motto: Bigger, Faster, Stronger.

Although NBA players are exceptional physical specimens and do not reflect the typical body types of most mortals, their example has inspired countless young athletes in numerous sports to make strength training a key aspect of their training. The reason is that all things being equal, a stronger athlete usually wins.

Of course, if athletes only focus on powerlifting or bodybuilding methods during the off-season, they will be at a definite disadvantage compared to their competitors who have worked on the entire array of athletic fitness qualities. Athletes need to be able to run and jump; they need quickness, agility and muscular endurance. And the best way to do this is with the BFS Total Program.

The basic BFS system for off-season training is set up on four-week cycles, each focusing on a different set-rep cycle: Week 1: 3x3; Week 2: 5x5; Week 3: 5-4-3-2-1; Week 4: 10-8-6 (or 4-4-2 for power cleans or power snatches and deadlifts). During the week weight training is performed on Monday, Wednesday and Friday; speed, agility and plyometrics are performed on Tuesday and Thursday.

One aspect of the BFS program is that it is flexible, allowing coaches to use the exercises they believe will best benefit the team or an individual player. For example, because of the higher risk of ankle injuries in basket-ball compared to other sports, a coach may decide that the BFS plyo ramp would be a better agility exercise than ladder drills. Or that the military press would be a better auxiliary exercise than a barbell incline press. BFS offers guidelines, but ultimately it's

Table 1: BFS Off-Season Program (Outline)

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Dot drill	Dot drill	Dot drill	Dot drill	Dot drill
Squat variation	Sprint work	Power clean	Sprint work	Parallel squat
Bench variation	Plyometrics	Hex bar deadlift	Plyometrics	Bench press
Auxiliary lifts	BFS Flexibility	Auxiliary lifts	BFS Flexibility	Auxiliary lifts
BFS Flexibility	Agility	BFS Flexibility	Agility	BFS Flexibility
	Sprint technique		Sprint technique	

Table 2: BFS Off-Season Program (Basketball)

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Dot drill	Dot drill	Dot drill	Dot drill	Dot drill
Box squat	Sprint technique	Power clean	Sprint technique	Parallel squat
Towel bench	Box jumps	Hex bar deadlift	Box jumps	Bench press
GHR	Plyo ramp	GHR	Medicine ball	Straight-leg DL
Military press	PP sled – Contrast	Military press	PP sled – Strength	Power balance
Power balance	BFS Flexibility	Power balance	BFS Flexibility	BFS Flexibility
BFS Flexibility		BFS Flexibility		

the coaches who can make the best decisions for their players.

The accompanying tables show the general outline of an off-season workout, along with a specific program for basketball. For more information on how to perform these exercises, pick up a copy of Dr. Greg Sheppard's classic textbook, *Bigger Faster Stronger*. BFS also offers many multimedia tools to help you master the BFS program, depending upon your learning style. BFS also offers set-rep logbooks, Beat the Computer soft-

ware, instructional DVDs, an online learning center, clinics and certifications.

It may be true that talent prevails, but because sports have evolved at all levels, you can't just expect to "play yourself into shape" to stay in the game. It's not just about training harder, but training smarter.

BUILDING CHAMPIONS AMERICAN HERITAGE ACADEMY ELEMENTARY SCHOOL

American Heritage Academy Strength Coach Bob Giesey of Carrollton Texas implemented a strength program that starts with the 3rd graders and ends with the 12th graders.

By Bob Giesey, Strength Coach, American Heritage Academy

Not only does American Heritage Academy of Carrollton, Texas believe in implementing BFS programs at the high school and middle school levels, but we also believe BFS has a lot to offer our elementary kids as well. Starting in the 3rd grade, our kids learn to set goals, develop a good work ethic, and prepare physically for middle school athletics. Surrounding all of those objectives is FUN!

Since 1985 our children in the elementary grade have done essentially the same workout as a varsity or middle school student.

We teach the same flexibility, agility, drills, dot drills, speed improvement and weight lifting techniques using broom sticks and plastic PCV pipe. Each child is expected to master every technique perfectly. We have low-level contests to make it fun. We do this in groups each week and give T-shirts out for the best over-all group. When the kids enter middle school and advance to the training plates they are well trained.

We also get to know our kids prior to entering middle school. They are familiar with us and we see an easier transition especially with our athletic program.

Training begins with getting kids to our Summer Bigger Faster Stronger Conditioning Camp. We begin this the first Monday in June and run our camp for one month, five days per week. Each workout is two hours in length. Our varsity comes in at 7:00 a.m. followed by our middle schoolers at 9:00 a.m. and then the “ankle-biter’s” (grades 3-5) at 11:00 a.m. Every boy and girl receives a BFS T-shirt, certificate and commitment card during camp.

We begin all groups with short testimonies of what BFS can do for them. We progress to the BFS warm-up

program, comprised of Dot Drills, Jump Roping and Flexibility. We then go through our Championship Road consisting of various agility stations. After this we break the 70 children into two groups. Group I goes to Weight Training Technique. Group II goes to Speed Improvement. Halfway through, we switch. All techniques are taught exactly the same as what we teach our middle school and varsity athletes. Not only do the kids love BFS, but they are building a rock-solid foundation that will put them far ahead of other kids they will compete against in later years.

We feel the benefits of beginning at a young age verses beginning at a later age are overwhelmingly an advantage for the younger group of kids.

I am sure there are more benefits of this worthwhile program. I can only share our experiences with young people over the years that have led to the outstanding athletic careers in middle school, on to high school and the college / university levels.

THE BENEFITS OF BFS & ELEMENTARY AGE TRAINING

1. Develops a low-level competitive spirit through physical drills.
2. Excellent physical conditioning.
3. Develops a working attitude.
4. Teaches discipline that will positively impact their daily living and academics.
5. Builds teamwork.
6. Develops personalities.
7. Increases confidence.
8. Creates a sense of belonging to a group.

9. Improves communication, which, in turn, improves trust.
10. Teaches responsibility, which, in turn, improves caring for others and equipment.
11. Allows them to see how hard others are working to reach objectives.
12. Teaches respect.
13. Develops enthusiasm individually and as a group.
14. Teaches athletes to dream to achieve.
15. Teaches the value of commitment.
16. Helps them to be organized (dress, etc.)
17. Develops good decision making skills.
18. Teaches promptness.
19. Promotes participation in middle school and high school sports.
20. Makes an easy transition from grade school to middle school to high school.

BFS is a terrific vehicle for young children. Parents are highly supportive of the program. Our classes pack-out every summer with 70 in each of the three groups. These same kids come back to school in the fall with a high level of knowledge for a physical education class. For the kids going into summer baseball, football, cheer leading, gymnastics, basketball, volleyball, track or other sports, the BFS program is the best program they could possibly be in. Injuries have been few to none over the years with an occasional bump or bruise.

We sincerely hope that a coach in every community in America gives the kids a great chance to improve their physical skills and encourage fun at the same time by starting a BFS program for the younger children.

PERIODIZATION ANALYSIS

Timeless insight into the most effective way to train young athletes

By BFS



Periodization or BFS? We know what these athletes at Capital High School in Helena, Montana, believe as they show off their completed BFS Set/Rep Logbooks.

When we attended the NSCA Convention in Atlanta. We were particularly interested in listening to Dr. Michael Stone's two-hour presentation on periodization. He really knows his stuff, and we greatly respect his research and knowledge.

Some coaches have expressed that BFS is fine for high school but periodization is for college. Some have even said that standard periodization models are best for high school. My position is that the BFS Set-Rep System is also a periodized program and will produce the best possible results in both high school and college team sports.

Dr. Stone has used Hans Selye's General Adaptation Syndrome as a rationale for some of the components of his periodization model. We don't know the extent of Selye's influence on variation schemes with set-rep systems, but as far back as 1967 We have been writing and lecturing about Hans Selye and the importance of variation with sets and reps for strength gains. One of our professors at the University of Oregon taught about Selye and the body's adaptation to stress. We used these theories in developing systems of changing sets and reps by experimenting with variation, all of which culminated in the BFS Set-Rep System and BFS Total Program.

It's not important to know who first thought of using Selye's theories. What is important is to know that variation is the key to sustaining progress over a year or a career of training. Dr. Stone uses variation in his

periodization model, which is influenced by Russian/ East European research. Bigger Faster Stronger uses variation in a more compact periodization form that is constructed to meet the needs of American team sport situations with psychological considerations.

Dr. Stone began his address by speaking in terms of world champion-ships and also very elite advanced athletes. We believe we should consider what works best from a worldwide perspective, especially when it comes to individual performance that can be accurately assessed with a tape measure or a stop-watch. Too often, for example, we try to measure what's best by what team wins in a particular year.

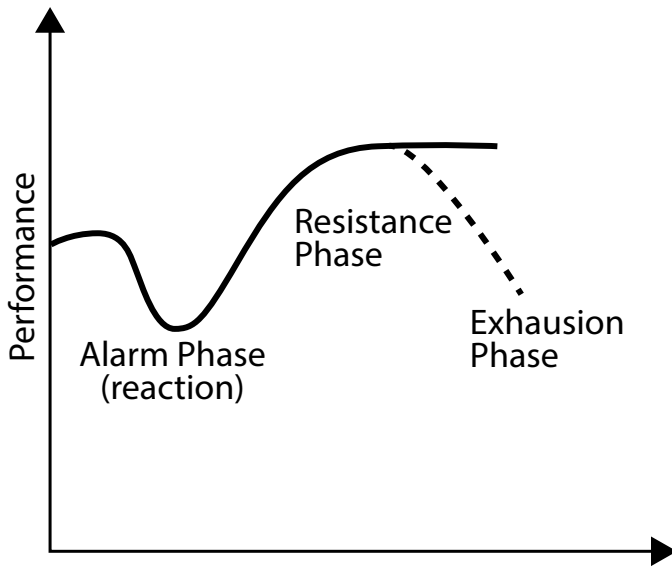
Dr. Stone stated, "Volume and intensity increase with age." This is true up to a point. Being involved with the Utah Jazz since 1981, we continually observe that volume and intensity should be decreased as the players get older than 25-30 years. We would suspect this is also true with throwers as they age, particularly when it comes to volume. Dr. Stone's statement is true in respect in going from high school to college.

One interesting idea that we had not considered before was Dr. Stone's suggestion concerning off-season volumes of strength and speed training. He suggested varying these against each other; for example, increase speed training intensity while decreasing strength training and then do the reverse for a period. This is smart. It is in keeping with Selye's guidelines of sustaining the "Stage of Resistance."

We also agreed with Dr. Stone's statement that "When you are tired, do not do a lot of technique work." The logic here, of course, is that a tired athlete may not be able to execute perfect form in whatever activity. Therefore, if they are forced to work on technique when tired, a glitch or two may occur and then possibly be incorporated later into the athlete's technique when they are fresh. Coaching is an art. You need to be aware of cycles and be perceptive in recognizing fatigue.

Standard periodization has terms that confuse many coaches. The following definitions may help: A macrocycle is the overall plan, which could be as long as a

GENERAL ADAPTATION SYNDROME



Hans Selye's General Adaptation Syndrome, from *Principles and Practice of Resistance Training*, 2007.

year. Mesocycles are smaller cycles within the macrocycle. Microcycles are tiny cycles within mesocycles. BFS incorporates these different cycles, but we have chosen not to label them to avoid confusion.

Standard periodization typically uses a yearlong macrocycle of maintenance during the in-season, culminating in a single peak performance. BFS has used, for more than 30 years, a yearly cycle divided into in-season and off-season periods, which are further divided into four-week cycles. Within these four-week cycles are four different weeks that could be called mesocycles. Dr. Stone has stated, "Periodization models depend on the training level of an athlete. The less-trained athlete's periodization model can be less complex." This is what we have done with the BFS program for both junior high and high school athletes.

There are two problems with a standard periodization model espoused by Dr. Stone for team sports. First, the practice of maintaining in-season is foolish in high school sports. What about the three-sport athlete? Are you going to maintain him or her all year long? We also submit that you should not maintain college football players in-season who are red-shirting or those who are not on the top two teams offensively or defensively. Why should a guy sitting on the bench just maintain? Why not maximize his potential and build for the future? This is also our concept with the Utah Jazz.

The Russian/East European periodization model was usually meant for individual athletes peaking for a specific event like the European or world championships. When do you peak in football? Is it game number five or ten? If you lose number five, you might not have any post-season games. In football every game is important. Dr. Stone, too, has wrestled with this problem. In BFS one of our attainable goals is to continually get stronger throughout the season. We are always stronger as a team at the end of the season than at the beginning. We feel this has its advantages come playoff time.

As Dr. Stone finished the first hour of his periodization discussion, which centered on seasonal sports like football, he made a statement that shocked me: "So a typical periodization program may not work." Indeed, our experience is that the standard periodization model must have adjustments made if it is to help athletes in team sports reach their potential. We have thought about these adjustments and implemented them with tens of thousands of athletes over the last 15 years. This system is now foolproof. I'm not saying it is the only way to adjust a standard periodization model for team school sports. However, we do want you, the reader, to know we have not seen anything come close to the BFS system for multi-sport athletes in a high school environment over one year or a career span of time.

We believe standard periodization models can be great for mature college athletes engaged in an individual sport such as track. With a few adjustments, a periodization program can also be great for athletes who are starters in a team sport like football. Fine-tuning with adjustments is the art of coaching.

The second half of Dr. Stone's presentation centered on the results of research studies on periodization. It was quite frustrating to listen to this segment. The studies chosen showed that periodization was better than systems using 3 sets of 6 reps, 5 sets of 6, or one set to failure. Well, of course it is. Anytime you vary your workout you are going to have better results than if you do the same thing day after day and week after week. At our BFS clinics we present this concept in the form of a question. Every time we ask it, every kid says that variation is better. That was what was so frustrating about Dr. Stone's choice of studies. Why do research on something everyone knows? We want to see research done on different adjustment possibilities within

periodization. Dr. Stone's response was, "There are still a lot of people that don't know variation is best. That's why I presented those particular studies."

Dr. Stone concluded, "It's not the work that is important but how you manipulate the variables." The studies presented found that multiple sets work better than one set. Variation groups do better than non-variation groups, and volume work is good only up to five weeks.

Dr. Stone concluded with two principles that BFS has taught for years. First, training sessions should not last more than one hour. Second, people use too many exercises – instead of additional minor exercises, what you need is more variation in the major exercises.

We should be finding out which kinds of variation are best or which variations of a particular major exercise are best. Here is one suggestion:

A typical standardization model will have athletes parallel squat twice per week. On Monday, heavy poundages with lower reps are done, whereas on Thursday lighter poundages with higher reps are done. We know that if an athlete were to do heavy parallel squats with great intensity involving a capacity workload two or three times per week, it would be too much to handle over an extended period. The body just can't recover properly. Plateaus are likely. The bodies of many athletes would just give out. Therefore, standard periodization recommends going heavy one day and lighter the next. These two different squat workouts or variations are known as microcycles.

Athletes in the Bigger Faster Stronger program also squat twice a week. The difference in our microcycle is that in addition to one heavy parallel squat workout, we use a squat variation for the second workout; for example, a box squat, front squat or an overhead squat with a snatch grip. As a football coach, We

wouldn't want to tell our players, "Okay, men, I want you focused and intense – but today is your light squat day." We believe our system is consistent with Dr. Stone's principle of "variation in a major exercise." Our athletes need to work hard, with great intensity. We can do that by using a squat variation.

Now, since we have used both the standard periodization model and the BFS squat variation model with thousands of athletes, I'm confident about how our proposed study would turn out. However, we would be thrilled if such a study were done.

In this study one group would do the standard periodization squat routine. Another group would do heavy parallel squats on one day like the first group but then on the second workout would do heavy box squats. We would stipulate that the box squats be done as prescribed by BFS and with great technique. The study would incorporate a pre-test and post-test on a variety of measurable components such as a parallel squat max, vertical jump, 40-yard dash and standing long jump and would measure recovery time in some way. The study would be tested at several intervals and would last at least 12 weeks but preferably a semester or a school year.

Now, if such a study turned out differently from our expectations, BFS would change its course in an instant. We exist and always will exist to help athletes reach their absolute potential. We want to give every team and every athlete the best possible chance of winning.

HOW TO ORGANIZE PLYOMETRICS AND SPEED WORKOUTS

Fine-tuning the Tuesday and Thursday off-season BFS workouts



Asa Adkins of Berrien High School shows the results of a total workout program as he easily jumps over a plyo box that is 48 inches tall!

It's been said that "All things being equal, the strongest athlete will always win." True, and that's why coaches place so much emphasis on the BFS Set-Rep weight training program, not just in the off-season but in season as well. But just focusing on the weights, such as power lifters and bodybuilders often do, is not enough.

BFS is called the "Total Program" because it has balance. Although a 400-pound bench press is impressive, the time it would take an athlete to develop the strength for such an accomplishment would take away from developing other athletic qualities – qualities such as speed, agility, flexibility, jumping ability and muscular endurance. Let's look at what the research says, for example, about jumping ability.

Many studies have been done that show that plyometrics combined with weight training produces superior results than weight training alone can produce. In a paper published in the *Journal of Applied Sports Science Research* in 1992, researchers conducted a six-week study on the effects of squatting and plyometrics on the vertical jump. The group that performed just the squat increased their vertical jump by an average of 1.3 inches – pretty good. When plyometrics was combined with squatting, however, the increase was 4.2 inches! With such results, it's obvious that box jumping should be a part of every athlete's workout.

But just as important as training to develop all these qualities with specific training methods such as box jumps is knowing how to organize them in a workout.

Ideally, year-round, athletes should devote two full days every week to activities that will help them run faster and jump higher. Usually Tuesday and Thursday are the best days, as during the off-season three days a week should be devoted to weight training, and it's usually best to have one day of rest between workouts.

The following are the major types of activities that should be performed on Tuesday and Thursday. [Since this is a complex subject beyond the scope of this article, refer to our books and online learning resources at biggerfasterstronger.com for details on how to perform each of these activities.]

Dot Drill. Always begin with the BFS Dot Drill. In addition to increasing body temperature and respiration, it stimulates the nervous system to react quickly – much more so than a simple jog will accomplish. Jumping rope can be used as a substitute for the dot drill, but the dot drill is superior, as it works the ankles dynamically and through a greater range of motion.

Sprint Technique. At BFS, we always emphasize perfect form to maximize athletic performance and also to avoid injury. Muscles are often pulled not simply because of lack of flexibility but due to a lack of coordination between the hamstrings and quadriceps. Also, there are many technique issues to consider, such the

BFS 8 Point Sprint Technique

Upper Body

- 1. Head:** Head should be upright.
- 2. Eyes:** Eyes should be fixed looking straight ahead

Torso

- 3. Back:** Back should be upright and slightly arched
- 4. Shoulders:** Shoulders should rotate vigorously with elbows fixed in a 90° angle
- 5. Wrist:** Wrist should simulate a whip action as the shoulder rotates back.

Lower Body

- 6. Legs:** Initial leg action is to lift forward then up. The lower leg should hang before planting.
- 7. Feet:** Feet should make the initial leg plant directly under the hips and not out in front of the body.
- 8. Knees:** On the follow-through or end of the leg drive the knee should fully extend.



Medicine ball exercises develop many important athletic qualities and are easily performed in a large group setting.

Medicine Ball Training. Medicine balls are versatile training tools that develop many athletic qualities. For example, medicine ball throws can develop the abdominal muscles and upper body power.

Stretching. Stretching should be performed every day, and it's best to stretch at the end of training sessions to keep the muscles loose. Also, because so many young athletes have issues with flexibility, some coaches like to have their athletes perform stretching immediately after the dot drill.

8-point technique system. Because running is such a complex activity, it should always be performed early in a workout.

Bounding. Bounding is a set of specific running drills that emphasize specific aspects of running, such as leg extensions or knee lifts. From a practical perspective, usually these drills are performed immediately after sprint training.

Box Jumps. Box jumping is a key to developing jumping ability and explosiveness for what coaches often refer to as “first-step quickness.” A plyometric box jumping program progresses from easy to more difficult drills, and a range of box sizes should be available to handle a variety of athletes. For example, young athletes and middle school athletes should start with the BFS readiness boxes, which are not as tall as the standard boxes. Also, you must perform box jumps early in a workout because if your legs are fatigued, you will not be able to recruit the fast-twitch muscle fibers that are trained with this type of activity.

Sled Work. We recommend two types of sleds: those that you push and which therefore emphasize the start by focusing on hip and leg extension; and those that you pull. Because these are extremely fatiguing, they should be performed at the end of a workout.

Now let's put these all together. Here are two sample workouts that, ideally, could be performed on Tuesday and Thursday:

Tuesday:	Thursday:
Dot Drill	Dot Drill
BFS 8-Point Sprint System	BFS 8-Point Sprint System
Bounding	Box Jumps
Box Jumps	Sled Drill
Medicine Ball Training	Agility Drills
Stretching	Stretching

Obviously, there are many ways to make these workouts more specific to a sport. For example, a football line-man or fullback may want to perform sled pulling twice a week, and a discus thrower would benefit from more medicine ball work. Also, due to limitations in space or equipment, often every athlete will not be able to perform these workouts exactly as prescribed. A coach may have to have one group of athletes perform box jumping while the other performs bounding exercises, after which they will switch.

As always, your best resource is BFS. Consider hosting one of our clinics or certifications. Our clinicians are available to help you design a program that is best for you!



RUNNING FASTER WITH THE BFS 8-POINT SPRINT TECHNIQUE SYSTEM



Sprinter Laura Murphy shows good form while performing power bounds. Murphy is a 15-year-old sprinter from East Greenwich High School in East Greenwich, Rhode Island.

Sprinting can be very technical, which is one reason most sprinters don't hit their peak until they are in their late 20's or even their 30's. But you can master the basics of running faster if you follow the BFS 8-Point Sprint Technique System. This system consists of the following eight points of sprint technique.

1. Your head should be upright. The back of your head should always be in line with your upper back. You will lose speed if your head is forward of your chest.

2. Your eyes should be focused straight ahead. With the exception of a sprint start when you are looking down, when you sprint your eyes should be focused straight ahead.

3. Your toes should point straight ahead. Many athletes can run fast with their toes pointed out, but you can usually run faster if they are straight. Practice keeping your toes straight on everything you do, including stretching. When you practice correctly on these little things, you will begin to see an improvement in your speed.

4. Your back should be upright and slightly arched. Remember the BFS Six Absolutes of Perfect Technique? Use them here. Be Tall and Spread the Chest!

5. Your shoulders should rotate vigorously, with the elbows at 90 degrees. You must keep the elbow angle at a right angle or about 90 degrees at all times. What does "rotate the shoulders vigorously" mean? It means a big and rapid shoulder rotation. Many high school athletes hold themselves back by being "pocket sprint-

BFS 8 Point Sprint Technique

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8. **Knees:** On the follow-through or end of the leg drive the knee should fully extend.

ers.” A “pocket sprinter” will stop the elbow and hand at their pocket or the middle of their hip.

6. Your wrists, fingers and hands should be loose. Do not make a fist, as doing so will make you tight. You need to always stay loose and relaxed while putting forth a maximum effort – not an easy thing to do, naturally. There are at least three acceptable methods

of keeping your hands, fingers and wrists loose. One method is to place the thumb on the middle finger, another is to keep the fingers straight but loose while trying to cut through the air like a knife, and the third option is to have floppy wrists (and execute a whipping action of the wrists).

7. Your feet should make the initial plant directly under your hips, not out in front of your body. A huge mistake many athletes make when trying to run faster is to reach out with their lead leg in a futile attempt to increase their stride length. When you reach with the leg in front of your body, your heel will touch the ground first. This effectively puts on the brakes, and you will run slower. You increase your stride length with the back leg drive.

8. Your forward leg should initially lift forward, not up. The lower leg should hang before planting with your foot and toes up. Your back knee should fully extend on the follow-through, or end-of-the-leg drive. Many athletes will never straighten the back leg. Every stride will be performed with a bent back leg. There is no way you can become fast with bent legs.

These are the basics of the BFS 8-Point Sprint Technique System. If you follow these simple guidelines and train consistently, you'll be amazed at how fast you can become.



POWER BALANCE DRILLS REVISITED

Correct round shoulders with variations of these powerful exercises



Overhead lifting is often avoided by many athletes due to shoulder injuries. Nikki Gnozzio was a Division I college field hockey player at Ohio University and a full-time weightlifter for Team BFS.

In recent years it's been the practice of many coaches to avoid overhead lifting when designing strength programs for athletes. It's not that coaches don't want their athletes to perform such powerful exercises but that they're concerned about worsening the shoulder injuries that so many athletes incur today. Let's look at the extent of the problem, some common causes and one practical solution.

A review in the June 2010 issue of the *Journal of Strength and Conditioning Research* noted that the most commonly injured area during resistance training is the shoulder. In one study referenced in the review approximately 36 percent of trainees had suffered shoulder injuries.

One condition that predisposes an athlete to a shoul-

der injury is round shoulders. In this posture there is an exaggerated curvature of the upper portion of the spine and excessive forward position of the shoulders (and often the head). More specifically, the upper back muscles known as the infraspinatus and teres minor and major will be stretched and internally rotated. This posture creates constant tension on these muscles because they must continually fight gravity. It also impairs flexibility, which disrupts normal functioning of the muscles and increases the risk of shoulder instability and dislocation.

So, what causes round shoulders? First, there is poor posture, both when sitting and standing. Spending endless hours hunched in front of a computer, using smart phones and playing video games is the fast track to developing a hunchback. Another cause of round shoulders is fallen arches, a condition identified when the subject is standing. Fallen arches are technically referred to as valgus, and the degree of the problem is based on a scale of 1 to 3, with a rating of 3 fulfilling the classic definition of flat feet. The collapse of the arches causes the legs to internally rotate, and this in turn causes the pelvis to tilt forward; in fact, anatomical compensations occur all the way up the spine and result in a round-shouldered posture. To learn specific exercises to correct flat feet, refer to "The Ultimate Guide to Fixing Flat Feet," an article in the January/February 2008 issue of BFS magazine.

Another problem is muscle imbalances caused by improperly designed workout programs. I find it interesting that many coaches consider BFS a power lifting program, when in fact the three competition power lifts – bench press, squat and deadlift (or hex bar deadlift) – are performed only once per week in the BFS workout. When the bench press and chin-up (or lat pulldown) are performed excessively, they can contribute to a rounded shoulder posture.

The risk from overworking the bench press is obvious because the pectorals and anterior deltoid muscles will pull the shoulders together, but what most coaches don't realize is that one of the primary functions of the lats is to internally rotate the upper arm. Swimmers and gymnasts often have round shoulders due to over



Attaching cables to resistance is one way to use the BFS Power Balance Drills to make dramatic changes in posture, especially round shoulders. Shown is Power Balance Drill #1.

development of the lats – this fact shows that stretching is not enough to overcome round shoulders, as these athletes often perform a considerable amount of stretching as part of their regular training.

A New Look at Power Balance Drills

As a test to determine potential shoulder problems as well as the cause of many current shoulder injuries, you can use power balance drills. These exercises simulate the position achieved in a full snatch. Holding a barbell overhead in a low squat with the trunk upright and heels flat on the floor requires considerable flexibility and stability, and power balance drills develop these qualities. In fact, the exercise is often used as a form of postural assessment in many physical therapy protocols – you’ll hear terms such as “functional strength,” “dynamic flexibility” and even “neuromuscular efficiency” to describe the qualities assessed during the overhead squat test.

You will find a detailed explanation of the three BFS power balance drills in the BFS Total Program book, *Bigger Faster Stronger*, 2nd ed. I’ll focus here on just the first one, Power Balance Drill #1, which is also known in weightlifting circles as the overhead squat. For this exercise you grasp a barbell with a snatch grip, power snatch it overhead (or you can remove the bar from a power rack, and jerk it overhead) and then perform a full squat.

One problem many beginners have is poor body awareness, and as such when they go into a full squat, the bar drifts forward. Over time this often corrects itself, but I’ll share with you one variation of this exer-

cise to accelerate progress that you can add to your list of auxiliary exercises.

This exercise requires the use of a cable pulley system with two low pulleys, such as the BFS Functional Trainer. Adjust the pulleys to their lowest setting, and attach the ends to a lightweight bar (one good choice is the Aluma-Lite bar, which weighs only 15 pounds). For the first set, use the lightest resistance possible. Stand in front of the barbell, facing away from the machine. Lift the weight overhead with a snatch grip, and then perform an overhead squat. Keep the body-weight back, towards the heels, and keep the weight on the outside of the feet for correct skeletal alignment (i.e., toes aligned, knees aligned); it also helps to think about spreading your hands apart and trying to push the floor apart with your feet.

Beginners with extremely poor flexibility can squat to a box first, and later use a lower box and finally no box as they get comfortable with the exercise; the adjustable BFS 3-in-1 Squat Box is ideal for this purpose. Athletes with especially tight ankles can place their heels on two small weight plates (or use weightlifting shoes), as this will incline the shins forward, enabling the athletes to stand more upright. A spotter standing behind the beginning trainee can assist them in getting the barbell overhead for the start of the exercise and can prevent them from falling backwards during the exercise.

When performing this exercise you’ll find that the resistance pulls the bar backward and into the correct position for exercise – it can also help beginning trainees get the feel of “locking in” the lower back. After



Using independent handles makes these power balance drills more challenging. Shown is Power Balance Drill #3.

performing a set or two with this exercise, trainees can then try the exercise with-out the pulleys attached – the immediate effect is often surprising. Later, by adding resistance, athletes will further strengthen the muscles that pull the shoulders back, along with stretching those that pull them forward. Athletes can perform all three power balance drills with this setup.

When you’ve mastered this exercise, rather than continually trying to increase the amount of weight you lift on it, move to another variation that uses independent cables to perform the exercise – you can actually do this with all three power balance exercises.

In fact, simply standing with your back to the machine and performing presses (palms facing out) will work the muscles that abduct the shoulders through a greater range of motion, while again stretching the muscles that adduct the shoulders. When you perform this type of exercise, try to press straight up (even back, behind the ears) and think of the BFS Absolute “Spread the Chest.” Many physical therapists have their clients perform this type of exercise from a prone position, requiring them to fight gravity to maintain proper alignment of the arms during the exercise, but

I advocate the standing variation because it provides body awareness (proprioception) that makes it more comfortable.

One more advantage of these exercises is that they don’t have to take up additional time in your workout. If you are performing overhead squats in your workout, make the first two sets the cable version. If you are performing military presses, use the cable version for 1-2 sets. These not only stretch the muscles that are tight and strengthen the muscles that are weak but also serve as a warm-up. Again, all three power balance drills can be performed with this variation.

Obviously there are many causes of shoulder injuries and poor posture, but adding these overhead squat variations to your workouts may be just the thing to help you stay healthy, stand tall and convey the look of a champion.

NUTRITION - WHAT'S FOR BREAKFAST?

Practical guidelines on what to eat for peak performance



It's been said that breakfast is the most important meal of the day, but why? Dinner is usually the largest and most complete meal of the day, so certainly a case can be made for it being #1. Let's see what the research says, and along the way, take a closer look at what athletes should eat, and not eat, on the first meal of the day.

First, consider that the word breakfast breaks down into two words, "Break" and "Fast." Thus, breakfast can be defined as the meal that "breaks" the "fasting period" of the last meal of the previous day. If you consume your first meal at noon, that's your breakfast! So forget about terms such as breakfast, brunch, and even liner (ah, the meal between lunch and dinner?) -- breakfast is simply the first meal of the day.

In looking at the science, many studies have been conducted worldwide that found a link between obesity and skipping breakfast. One of the largest was published in 2013 in the journal, *Circulation*. This study involved 26,902 men who were followed over 16 years. One of the most significant findings was that those who consumed breakfast had a significantly lower risk of coronary heart disease. However, "when" you have your first meal is not as important as "what" you eat.

Just because bacon, eggs, pancakes, and cereals are popular in the US, that doesn't mean that the rest of the world has caught on. If you woke up today in Europe, your breakfast might consist of fruit, jam, and pastry. In Korea, you might ask what the soup of the day is; and, in Finland, your morning routine might include tea and sandwiches. As for Japan, your first meal of the day probably looks like any other meal, perhaps consisting of a plate filled with salmon, pickled vegetables, and rice. That said, how does your breakfast stack up from a nutritional perspective?

Let's start with a standard diner affair of bacon, eggs, and orange juice. Eggs are high quality, protein-packed food, but eating eggs every day may cause food allergies. Bacon certainly contains protein, but it's not simply a slice of meat thrown on a frying pan – it is usually loaded with salt, food preservatives, and processed to the point where you'll be just as well off eating a hotdog. How about good ole OJ? Well, most of the orange juice products you'll find at grocery stores and restaurants are filtered, thus removing many of the nutrients and fiber, and packed with refined sugar that gives them the nutritional quality of a can of soda. OK, how about cereal?

Certainly, there are healthy cereals available. For example, oats contain fiber, antioxidants, and are packed with vitamins and minerals. Unfortunately, what you'll find in most cereal boxes are concoctions of modified corn starch, corn syrup, salt, gelatin, dyes and...well, you might be better off eating the box! But let's focus on sugar, which many commercial cereals are loaded with.

Processed sugar is a big issue for breakfast because it can establish a pattern of unhealthy eating, and overeating, throughout the day. Why? Because sugar causes a rapid spike in blood sugar, which is followed by a sudden and extended drop in blood sugar that can make you drowsy and affect your ability to concentrate. To return your blood sugar to normal your body will crave carbohydrates, creating a cycle of overeating throughout the day.

Now that we have some ideas about what's wrong with our breakfast, let's focus on how we can fix it.

A Breakfast for Champions

Two primary ingredients of a healthy breakfast are protein and “healthy fats,” such as the fats found in seeds, nuts, olive oil, and coconut oil. Fats not only contain important nutrients (including those that produce hormones), but also slows digestion to aid nutrient absorption, prolong satiety (such that you can go longer without hunger), and help stabilize your blood sugar to keep you alert.

If you think about it, in nature, protein and fats are often found together – meat, eggs, and milk are examples of high-protein foods that contain fat. Consuming protein by itself, such as a whey protein drink mixed with water, is not a good idea because it can cause gut issues, along with other health problems. In fact, in 1978, at least 60 deaths were reported to FDA or CDC from using a liquid protein diet!

At this point you may ask, “If my ‘Grand Slam Breakfast’ is not a home run, what can I eat?” Although providing detailed breakfast menus is beyond the scope of this article, here are a few meal planning strategies.

First, try to vary your protein sources to avoid food allergies. For example, on Monday, your primary breakfast protein could be eggs; Tuesday, turkey; Wednesday, ground beef; Thursday, chicken; Friday, fish. Simple enough!

As for healthy fats, nuts will get the job done. However, when we talk about nuts, we’re talking about foods such as macadamia nuts, cashews, and almonds. Peanuts, which do not grow on trees, are not nuts but legumes. For many, peanuts can trigger food allergies, which can have life-threatening consequences. Research presented in 2017 at a meeting of the American College of Allergy, Asthma, and Immunology suggests that peanut allergy in children increased 21 percent since 2010. If you’re not certain if you’re allergic to peanuts, or any other food for that matter,

get tested. Oh, and if you’re not nuts for nuts, consider seeds. Nutrient-packed seeds include pumpkin, sunflower, flax, chia, and sesame.

Now let’s talk about carbs.

According to our friends at the Centers for Disease Control, only 1 in 10 Americans consumes enough fruits and vegetables per day. For fruit, a cup of strawberries, an apple, orange slices, half a cantaloupe, and so on will get the job done – and if having fruit for breakfast doesn’t appeal to you, save it for a snack.

For vegetables, good high-fiber choices include cauliflower, spinach, celery, carrots, and broccoli. If eating raw vegetables doesn’t appeal to you, try steaming them or combining them in an omelet. Yes, we realize there is a school of thought that says you should not combine fruit with vegetables. However, the Academy of Nutrition and Dietetics added that there is no research to prove that consuming food groups separately will promote detoxification or help with weight loss.

As we have different tastes and food tolerances, it’s impossible to present an extensive list of healthy breakfasts you will like – you simply have to experiment. For example, you might try 3 ounces of smoked salmon with sliced cucumbers and tomatoes; a venison steak with a handful of cashews, an apple, and sliced carrots; or maybe a 4-egg omelet (with onions, pepper, tomato, mushrooms), a pink grapefruit, and a tablespoon of almond butter on spelt bread. Again, the idea is to think about starting your day with high-quality protein, healthy fats, and quality carbs from fruits and vegetables.

It’s New Year’s Resolution time, and one promise that will improve the quality of your life and improve athletic performance is to start your day with a nutritionally sound breakfast. As Tony the Tiger would say, “A healthy breakfast is Grrrrreat!”

WHATS FOR LUNCH?

Practical guidelines on what to eat for peak performance

During the weekday, parents have considerable control over what their kids eat for breakfast and dinner. For lunch, there are three options: eat at school, brown bag it, or – and this is the worst decision – hold out for

dinner. Let’s talk about it.

Although tightening school budgets make it a challenge, most schools take considerable effort, and

expense, to serve hot meals for lunch. Some schools, however, simply do not have the resources, and compromises must be made.

Organizations such as the American Heart Association and Voices for Healthy Kids are bringing awareness to the issue of healthy eating for young people.

A study published in JAMA Pediatrics reported that 10 percent of elementary schools and 30 percent of high schools offered branded fast foods weekly. With this trend, rather than the traditional way we think about school kids eating healthy, square meals, perhaps we should start thinking of these four basic food groups: McDonalds, Taco Bell, Burger King, and Pizza Hut! That's just sad – a smart business move, but sad. Let's move on to what the science, or at least the government, says about the noon-time meal.

The National Academy of Sciences (NAS) put together extensive meal plans for elementary schools, middle schools, and high schools. The following are the main courses of sample NAS menus, each servicing a different grade range:

Elementary School

1. Cheeseburger, 1.5 oz, on Whole Wheat Bun
2. Cheese Pizza, Whole Wheat Crust, 2 oz Cheese
3. Nachos Grande with Tortilla Chips, 2 oz (Note: no association with pop singer Ariana Grande)
4. Regular or Spicy Chicken Strips, 3 oz

Middle School

1. LF Hot Dog, 2 oz, with Chili, 0.5 oz, on Bun
2. Spaghetti, 1 oz WG pasta, with Italian Meat Sauce, 1 c, Grated Parmesan Cheese
3. Beef and Cheese Taco, 1.5 oz Beef Crumbles, 0.5 oz RF Cheddar Cheese, 2–7" Tortilla Shell
4. Spicy Texas Chili, 1.5 oz Ground Beef, 0.5 oz Kidney Beans, with Bread Stick, 1 oz

High School

1. Assorted Pizza, 6.3 oz
2. Cheese Lasagna, 1 oz, with Marinara Sauce, ½ c

3. Taco Salad, ½ c Taco Meat, 1 oz Shredded Cheddar, 0.25 oz Tortilla Chips, 1 c Dark Green Leafy Salad Blend

4. Sheppard's Pie, 2 oz Ground Beef, 1 oz Cheese, ½ c Mashed Potatoes, with Biscuit, 1 oz

Milk is, of course, the beverage of choice in all grades: low-fat, skim, chocolate, and for elementary school kids, flavored. Completing the meal are fruit and vegetable classics, such as fruit cup or carrot sticks.

Looking at the big picture, the government is trying to ensure that kids get a selection from these four basic food groups: meat, dairy, breads and cereals, fruits and vegetables. These categories were introduced by the United States Department of Agriculture in 1956. Good intentions, but from what we now know about the possible negative consequence of grains and many dairy products, not such a good idea. Let's explore why, and look at a better way.

Eating Like a Caveman

The basic problem with the traditional four food groups is that many processed wheat product are not healthy some milk products may need to be avoided as often these are associated with food intolerances (and don't worry, kids can get plenty of calcium from seeds and green leafy vegetables – and they can always take a supplement). A better alternative, although certainly not the only one, is to use a Paleo approach that focuses on these five food groups (with accompanying percentages of each):

Food Group Percentage of Daily Total

Lean Meats 27.5%

Seafood 27.5%

Nuts/Seeds 15%

Fruits: 15%

Vegetables: 15%

This breakdown does not suggest that you have to have all these food items represented in every meal; for example, if you have a lean meat you do not also have to have seafood – just so long as you get a protein source. And if you have fruit for lunch, you can have vegetables at other meals. Let's move on, breaking down these categories further, using examples of popu-

lar, contemporary foods:

Lean Meats

Beef Chicken

Pork Turkey

Seafood

Atlantic Salmon Flounder Catfish

Cod Pollock

Scallop Shrimp

Sole

Nuts/Seeds

Almonds Walnuts Brazil Nuts

Coconut Macadamia Nuts

Pecans Pumpkin Seeds

Pistachio Nuts Sunflower Seeds

Vegetables

Broccoli Carrot

Celery Green Cabbage

Iceberg Lettuce Onion

Potato Sweet Corn Cucumber

Fruits

Apple Banana

Cantaloupe Grape

Grapefruit Orange

Peach Pear

Strawberry Watermelon

Here is a sample lunch, following a Paleo approach:

Pork Lunch	Qty (G)	E (KCAL)
Broiled lean pork loin:		86 205
Vegetable Salad with Walnuts:		
Shredded Romaine Lettuce	68	10
Sliced Carrots	61 26	
Sliced Cucumber	78	10
Quartered Tomatoes	246	52
Lemon-juice Dressing	31	8
Walnuts	11 7 0	
		Total 381

As you can see, there are no wheat or dairy products represented, and it's heavy on protein. Unfortunately, although it's certainly possible to brown bag this type of salad, the broiled pork loin is quite a challenge as school cafeterias usually don't have mini-ovens to heat home lunches. But there is a way to compromise.

Creative Lunch Planning

If a school uses a cafeteria-type set-up, a student can select choices from the five Paleo categories. If the selection is large enough, and seconds are allowed on certain items, you're in business. If not, you need to get creative.

Because schools usually publish their lunch menus, a parent can look at the choices provided and then make up the deficiencies by brown bagging those missing foods. For example, a smaller cooler could contain sardines (pack toothpaste and a toothbrush!), turkey bacon, some cashews, raw vegetables, and fruit – perhaps even a healthy protein bar (yes, there are a few that are low in sugar). This fill-in-the-blanks approach will enable a student to go through the cafeteria lines with their friends and sit down to eat with them so they don't feel like an outsider (or a tree-hugging "health nut").

Finally, please consider that BFS is not taking a stand that the Paleo diet is the only healthy option available for young people. Rather, we support organizations such as the American Heart Association in getting you



Kenderick Farris is a US weightlifter who competed in three Olympic Games. Farris was able to compete at an elite level while consuming a diet emphasizing plants.

Supported by the testimonials of many elite athletes, including US weightlifter Kendrick Farris, a 3x Olympian, the film presents the idea that it's possible (although challenging from a meal-planning perspective) to be healthy and perform at the highest levels of athletic competition using a plant-based diet.

Schools mean well, and often with low-income families, a school lunch is the best meal a young man or woman may have during the day. The bottom line is that having a good lunch is important, so let's make the most of this time and focus on providing young people with healthy food choices!

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to consider thinking “outside the lunch box” and look for healthy alternatives to traditional school lunches. One alternative approach are the plant-based diets, which have become popular since filmmaker James Cameron released his documentary, *The Game Changers*.

THE BFS NUTRITION SYSTEM QUICK OVERVIEW

RULE #1: Stay away from the Five Lethal Foods: Soda, French Fries, Potato Chips, Pastries/cookies and Candy.

RULE #2: Make water, juice or milk your drink of choice. During competition, make water your drink of choice. We do not endorse sport drinks.

RULE #3: PRE-GAME MEALS: There is some evidence which would indicate that carbo loading before a competition may not be the best. The Kenyans do not. Some athletes who have a propensity for cramps

are probably at greater risk when they load up on Carbs and drink acid type drinks like soda, juice or sport drinks.

RULE #4: In general, we downplay the use of supplements. We vigorously oppose the use of Steroids and Andro, which is now close to being officially classified as a Steroid. We absolutely are against GHB.

BFS NUTRITION: A CHANGE FOR THE BETTER

Since when did it get so difficult to figure out what to have for lunch?

Every time I go to a bookstore I see rows and rows of publications promoting the latest diet. There are low-carb diets, high-protein diets and even high-fat diets. There are diets associated with universities and medical centers, and diets endorsed by celebrities. Despite all this attention to proper nutrition, Americans eat more poorly than ever.

Just how bad is the typical American diet? Since 1979 the US government has sponsored a major research project to identify preventable health threats and to establish national goals to reduce these threats. The project is now called Healthy People 2010 and involves 350 national organizations and 270 state agencies. According to this government-sponsored research, only **three percent** of Americans eat at least three servings of vegetables daily, only **28 percent** consume two servings of fruit, and **64 percent** consume more than 10 percent of their calories from saturated fat. That's pathetic!

Worst of all are the consequences that poor nutrition has had on the American people, especially on our young people. Currently **11 percent** of children and adolescents are obese. Because obesity is linked to poor overall health and 17 chronic diseases, most children born this year will have shorter lifespans than their parents and one out of three will develop diabetes. Further, 40 percent of children ages five to eight years old show at least one sign of heart disease.

Exercise, which is vital to good health, has been the focus of BFS since our company started 44 years ago. Thousands of high schools have used our workout programs and hundreds of schools have won state championships in numerous sports after implementing the BFS program. We have always emphasized good nutrition for our athletes.

Although we see value in supplements, BFS believes that no supplement will compensate for a poor diet. Food comes first, and we offer articles from experts in the field of nutrition on how to eat properly. Although there are many excellent diet programs available, we do not endorse any single program. Rather, we present the best nutrition programs available and have you choose the program, or combination of programs, that is best for you.

Now let's talk about supplements. Go to a newsstand and pick up any muscle magazine. Between photos of heavily muscled men and artificially "enhanced" women in provocative poses, you'll find countless ads for supplements. Following even the basic ideas the writers and advertisers promote, it's easy to figure out that the average trainee would need to spend several hundred dollars a month on supplements. This just has to stop.

The BFS position on nutrition is that people need to first eat well and then consider a multivitamin/mineral supplement. We recommend such a supplement because, according to a study published in the June 19, 2002, issue of *The Journal of the American Medical Association*, it is difficult to obtain all the essential nutrients from diet alone. Of course, for any medical condition that requires a specific nutrition therapy, BFS recommends consulting a health care practitioner trained in this field.

The goals of the Healthy People project are critical for the health of Americans, and BFS is ready with a plan to help achieve them. Won't you join us?

BFS PROGRAM AIDS

BIGGER FASTER STRONGER



DOT DRILL - THE WARM UP

The BFS Dot Drill not only warms-up your muscles but it also increases your agility. The Dot Drill will be hard at first. It is tiring and you may appear clumsy. However if you will do it six times a week, in a very short time, improvement will come rapidly. You can have quick feet in a month or two.

Each athlete should set two goals. The first goal is to do the Dot Drill 6 times per week and the second goal should be to increase speed. BFS Dot Drill Video available.

To do the Dot Drill, five dots need to be placed on the floor. It works best if 4" round dots are painted on the floor. Some coaches paint many stations for larger groups. An athlete at home can use anything approved by his/her parents to mark the dots (i.e. masking tape). BFS sells a Dot Drill Pad that has a great non-slip surface with integrated dots visit biggerfasterstronger.com for more information

THE DOT DRILL IS MADE UP OF FIVE DIFFERENT DRILLS, EACH DONE SIX TIMES.

1. UP AND BACK

- Start with feet on A and B.
- Now jump quickly to C with both feet
- Then jump and split feet to D and E.
- Come back the same way jumping backward.
- Repeat 5 more times.

2. RIGHT FOOT

- Your feet from up-and-back should end on dots A and B.
- Now go to dot C with your right foot.
- Now go in order: Dot D, E, C, A, B.
- Repeat 5 more times.

3. LEFT FOOT

- You will end the right foot drill on Dot B.
- Now go to dot C with your left foot.
- Now go in order: Dot D, E, C, A, B.
- Repeat 5 more times.

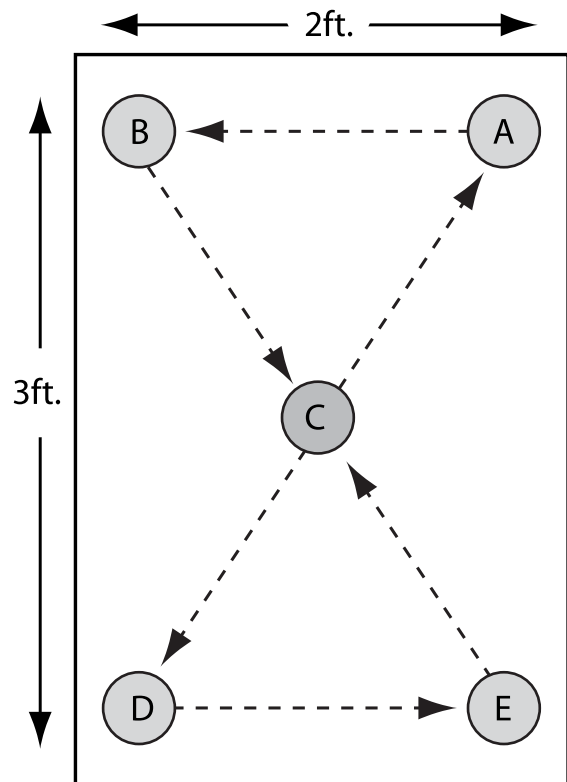
4. BOTH FEET

- You will end the left foot drill on Dot B.
- Now go to C with both feet.
- Now go in order with both feet: Dot D, E, C, A, B.
- Repeat 5 more times.

5. TURN AROUND

- You will end the Both Feet Drill on Dot B.
Now go to C with both feet.
- Now go to dots D and E spread apart both feet as in the up-and-back (Drill #1).
- Now quickly jump 180° clockwise to face the other way. You should still be on D and E.
- Hit C with both feet and then A and B with feet split.
- Now turn quickly again with a 180 spin to the left with your feet still on A and B.
- Repeat 5 more times.

DOT DRILL DIAGRAM



DOT DRILL STANDARDS

Under 50 seconds:	Super Quick
50-60 seconds:	Great
60-70 seconds:	Average
70-80 seconds:	Need work
Over 80 seconds:	Slow

BOOST AGILITY AND QUICKNESS

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Each exercise should be held either once for 30 seconds or for 3 repetitions of 10 seconds each. The stretch should not be done with a bounce but worked in a slow and controlled manner. Stretch every day and work with intensity. **The 1-2-3-4 stands for One Minute on the Bench, Two Minutes in the Air, Three Minutes on the Wall and Four Minutes on the Floor.**

1 ON THE BENCH

Hamstring & Back Stretch

Keep leg locked at knee and toes vertical. Switch to the other leg after 30 seconds.



2 IN THE AIR

Latissimus Stretch

Cross your hands and raise your arms above your head and as far back as possible.



Pectoral Stretch

Cross your hands behind your back, raise your arms up and back as far as possible. Stand tall.



3 ON THE WALL

Calf Stretch

With hands on the wall for balance, move hips forward and push back heel down. Keep leg straight. Switch after 30 seconds.



Achilles Stretch

Same as Calf Stretch but slightly bend knee, keep heel 1" off the ground & squat down increasing load on Achilles tendon.



Quadriceps Stretch

Take one hand off the wall, and grab foot. Pull leg straight up and away from buttocks. Knee should be at a 90° angle

4 MINUTES ON THE FLOOR

Abdominal Stretch

Lay flat on the floor, put hands on the floor shoulder width apart, extend elbows creating an arch in the back. Relax.



Adductor Stretch

With feet as far apart as possible, grab ankles or feet and pull the torso slowly toward the floor. If you can't reach your toes then place two fists on the floor behind you and push forward.



Groin Stretch

Sit with bottom of feet together, grab feet or ankles, pull in and press down with elbows on the thighs toward the floor.



Gluteus Maximus Stretch

Twist torso with opposite arm. Press knee firmly with arm, forcing the knee to the other side of the lower leg then switch after 30 seconds.



Hip Flexor Stretch

Place front foot two feet in front of knee, place hands on knee and force hips forward and down. Spread the chest - eyes straight ahead. Make sure the front lower leg is perpendicular.



INCREASE YOUR RANGE OF MOTION

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BUILD EXPLOSIVE STRENGTH

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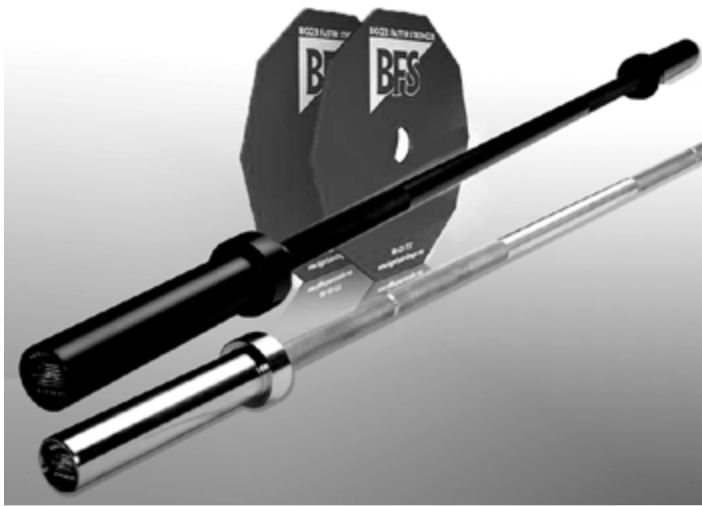


GROUND BASED DRILLS

Category	Description
Overview	Plyometrics - Teaching the body to use it's strength in an efficient and effective way. Plyometric training involves maximum explosive contractions performed as quickly as possible. The focus of plyometrics is to decrease contact time and increase height on each jump.
Balanced Development	Helping Students to utilize the strength they have developed in the weight room and transfer it to movement/ physical activity and sports performance.
Plyometric Components	Eight areas to train and focus on: 1. Jumping with a focus on Height 2. Jumping with a focus on Height & Contact Time 3. Jumping Straight Ahead 4. Jumping Laterally 5. Jumping with both feet 6. Jumping with one foot at a time 7. Upper Body Position and Plyometric Drills 8. Landing with Proper technique
Ground Based Jumping Drills	Progressing from beginning to advanced drills (Ground Based is the first step) - Items to jump over: Cones, Foam Blocks, etc...
Drill 1	Vertical Jump for Height - 1.Both Feet - 2.Right Foot - 3.Left Foot (3 x 5 of Each Drill - work up to 15 reps each)
Drill 2	Vertical Jump for Height & Speed - quick off the ground / short contact time - 1.Both Feet - 2.Right Foot - 3.Left Foot (3 x 5 of Each Drill - work up to 15 reps each)
Drill 3	Split Stance Vertical Jump for Height - 1.Both Feet - 2.Right Foot - 3.Left Foot (3 x 5 of Each Drill - work up to 15 reps each)
Drill 4	Split Stance Vertical Jump for Height & Speed - quick off the ground / short contact time - 1.Both Feet - 2.Right Foot - 3.Left Foot (3 x 5 of Each Drill - work up to 15 reps each)
Drill 5a	Both Feet - Front to Back (over single implement) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x 5 of Each Drill - work up to 15 reps each)
Drill 5b	Both Feet - Straight ahead (Progressive - over multiple implements in a row) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x Each Drill - work up to 5 x Each Drill)
Drill 6a	Right Foot - Front to Back (over single implement) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x 5 of Each Drill - work up to 15 reps each)
Drill 6b	Right Foot - Straight ahead (Progressive - over multiple implements in a row) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x Each Drill - work up to 5 x Each Drill)
Drill 7a	Left Foot - Front to Back (over single implement) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x 5 of Each Drill - work up to 15 reps each)
Drill 7b	Left Foot - Straight ahead (Progressive - over multiple implements in a row) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x Each Drill - work up to 5 x Each Drill)
Drill 8a	Both Feet - Lateral - once facing each direction (over single implement) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x 5 of Each Drill - work up to 15 reps each)
Drill 8b	Both Feet - Lateral - once facing each direction (Progressive - over multiple implements in a row) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x Each Drill - work up to 5 x Each Drill)
Drill 9a	Right Foot - Lateral - once facing each direction (over single implement) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x 5 of Each Drill - work up to 15 reps each)
Drill 9b	Right Foot - Lateral - once facing each direction (Progressive - over multiple implements in a row) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x Each Drill - work up to 5 x Each Drill)
Drill 10a	Left Foot - Lateral - once facing each direction (over single implement) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x 5 of Each Drill - work up to 15 reps each)
Drill 10b	Left Foot - Lateral - once facing each direction (Progressive - over multiple implements in a row) for 1.Height - 2.Speed - 3.Combo of Height & Speed (3 x Each Drill - work up to 5 x Each Drill)
Cognitive Development	Have athletes react to stimulus at end of every drill (Sound, color, adaptation - ball, etc...)
*1 to 3 Drills per workout - Do Not Over Train / Progress from Drills 1 to 10, 1 = Beginner / 10 = Advanced	

LIGHTWEIGHT TRAINING EQUIPMENT

New lightweight barbells and bumper plates signal a new era in sports training for women athletes



Shown above, an Ultra-Lite Bar and BFS Training Plates. These training essentials make it easy for any women to begin training.

The Ultra-Lite Bar provides an excellent way to move up. With a weight of 30 lbs. it's 15 lb less than a typical Olympic Bar. Shown here with BFS 10 lb. Bumper Plates, another training essential from BFS.

By Laura Dayton

Like the Nehru collars and striped stovepipe polyester pants of the 60s, there are some things us old folks remember but just don't like to talk about. For coaches, a period they'd like to forget is when weight training was frowned upon. Hard as it might be to believe today, there was a time in our not too distant past when coaches believed weight training made athletes slower, ruined their endurance, wreaked havoc with their coordination and made the poor souls so muscle-bound that they couldn't comb their hair.

We laugh at such nonsense now, because we know better. However, there is one aspect of weight training that is still shrouded in the same type of antiquated and often ignorant thinking. That area concerns women and weight training, and in that regard, it's often still a man's world.

Many male coaches simply don't really know what to do with women. Do you train them like bodybuilders,

but assure them that they can't build big muscles—despite what those women physique stars look like on late-night ESPN? Do you tell them to perform ultra-high reps for toning? Do you make sure they do lots of aerobics so they won't, as one famous European weightlifting coach once remarked, “acquire the body of a man”? Or, do you do what BFS does, which is teach them how to become better, faster and stronger?

A Better Way to Train

The biggest problem for women is that weight training by traditional bodybuilding methods (i.e., two-to-three exercises for three sets by 10 reps for each body part), may produce a masculine-looking physique. Sure, without the aid of steroids women will always be smaller versions of their male counterparts, but bodybuilding can impart some undesirable attributes in women athletes. However, bodybuilding training is not the most effective way to develop female athletes, or male athletes for that matter.

Explosive weight training movements, such as the power snatch and the power clean (a BFS core lift), are what will give today's female athletes the edge. Further, these lifts will not develop Arnold Schwarzenegger-type physiques! However, Olympic lifting for women has been a hard pill for many coaches to swallow.

Strangely enough, the very sport that had the most difficult time accepting the fact that women should perform Olympic lifting was Olympic lifting itself. Through a slow but progressive evolution of opinions and rules, women will, for the first time, be eligible for medal competition in the upcoming Olympic Games. This is a significant milestone, considering that women have been participating in Olympic lifting events for several decades, but have never been medal-eligible and for years were hampered by a set of rules that discriminated against them.

It took many years for the Olympic lifting federations to recognize that women needed a separate set of



Through a program of incremental progress, like the BFS Total Program, women can safely increase strength and athleticism to excel in athletics and life.

rules. Like male coaches who are bewildered over how to train their female athletes, the decision-makers in weightlifting dealt with the problem by having women follow the same rules as the men. This decision didn't do women any favors.

The Evolution of Acceptance

In weightlifting, each athlete is given three attempts in each of the two lifts, the snatch and the clean and jerk. The first hurdle that women faced was the rule that they must increase their weights by five kilos (11 pounds) between their first and second attempts. That may not seem like much, but it can be a major ordeal for the average female.

To keep the math simple, we'll use a 99-pound female who is trying to snatch her bodyweight (something that even our super-heavyweight Mark Henry didn't accomplish in the 1996 Atlanta Olympics). Our female lifter would most likely start with 83 pounds (37.5 kilos) for her first attempt, for the simple reason that anything less would be ludicrous. For her second attempt she would have to jump to at least 94 pounds (42.5 kilos), then finish with 99 pounds (45 kilos). Coaches who are used to athletes who weigh closer to 200 pounds than 100 pounds may see nothing wrong with such a progression. However, if the same increases were imposed proportionately on a male trying to snatch 300 pounds, he would have to start with 255 pounds followed by 285, a jump that would be regarded as excessive when you consider the technical differences between lifting the two weights. Then for his final attempt, he would jump 15 pounds to reach 300, a jump that in a tight competition many coaches would consider excessive.

To their credit, the international weightlifting powers eventually recognized this problem and allowed 2.5-kilo (5.5-pound) jumps between the first and second attempts. These small increments made it easier for beginning-level women to compete, and also made for more interesting competitive strategies for both men and women lifters.

Also to the sport's credit, after a brief period in which a record had to be broken by 2.5 kilos (5.5 pounds), it went back to allowing world records to be broken by .5 kilos (1.1 pounds) to enhance the sport's progression. As an analogy, can you imagine how the 100-meter sprint (or for that matter any running event in track and field) would be affected if all world records had to be broken only in increments of five seconds?

Injury-Proofing the Female Athlete

In recent years many individuals have tried to instill a fear in athletes and coaches that Olympic lifting was dangerous—and heaven forbid that a woman compete in the sport! The appropriate way to train, according to some, was very slowly. As for exercise selection, they insisted the emphasis should be on nonspecific bodybuilding movements, and the less emphasis on free weight lifts the better.

Responding to such propaganda is exercise scientist Dr. Mel Siff, who did his Ph.D. thesis on the biomechanics of soft tissues. According to Siff, the basic activities that occur in most sports, such as running and jumping, “can impose far higher forces on the body than are encountered in weightlifting.” Thus, if you tell athletes they can’t do lifts such as the power clean because of ballistic loading, then you should likewise tell them not to play sports, period. And if you tell athletes never to lift weights overhead as in a push press or jerk, then you should not allow them to throw footballs or baseballs either.

Siff also emphasizes that the danger of weightlifting prematurely closing the growth plates of young girls is exaggerated, since running and jumping can impose even greater loads on the bones and joints. If we were

to take this myth seriously, then we would have to restrict all girls and boys to walking and swimming!

Another factor not considered by the slow-training proponents is that Olympic lifting can help prevent injuries by properly developing the nervous system. Siff says these same people make the mistake of concentrating on how much weight is being lifted. “The most important thing in regard to injury-proofing the athlete is proper development of the central nervous and motor control systems. From my research and experience, I have found that accidents and injuries often have a lot to do with motor control, technique and skill, and not so much with weak tissues.”

THE ANSWER FOR THE BUSY COACH: COMPUTER-AIDED WORKOUTS

How the BFS Beat the Computer App can save you time.

The screenshot displays a software interface for a weekly workout schedule. At the top, it reads 'East Side High School Weekly Workout Schedule for the week of November 10, 2008 Bigger Faster Stronger'. Below this, there is a section for 'Athlete Information' with fields for Name (Smith, Ryan), ID Number, Grade/Period (11 2), Sport / Positions (FOOTBALL), and Workout Schedule (BFS-B). The interface includes 'Notes on the Workout' with instructions for core and aux lifts. The main part of the form is a logbook for two days, 'Day Number 1' and 'Day Number 2'. Each day has a table for 'Core Lifts' and 'Auxiliary Lifts'. The 'Core Lifts' table has columns for 'Set 1' through 'Set 5' and a 'New weight' column. The 'Auxiliary Lifts' table has columns for 'Set 1' and 'Set 2' and a 'New weight' column. Exercises listed include Power Clean, Front Squat, Incline Bench Press, Lat Pull Down, Parallel Squat, Bench Press, and Hex Bar Deadlift.

A sample in-season workout using the BFS Beat the Computer system.

In our current economy, schools are being forced to downsize personnel, thereby increasing the administrative responsibilities of the remaining staff – including coaches and physical education instructors. And although weight room supervisors know the importance of writing workouts and keeping accurate reports on athletes' progress, this task can consume an inordinate amount of time, particularly when large numbers of athletes are involved. The solution is to use computer software, such as the BFS Beat the Computer system.

When BFS developed the BFS Set-Rep Logbook 30 years ago, individual athletes were able to efficiently record their progress and set goals for their next training session. It was a good system that motivated athletes to train harder, but for large groups of athletes, coaches realized that a well-designed software program would be better. For this reason, Richard Knowley, director of computer programming at BFS, and BFS Founder/CEO Dr. Greg Shepard translated the BFS program into a software program.

Based on an athlete's current maxes for each exercise, Knowley's software program sets up challenging workouts. The innovative software provides the unique benefit of motivating athletes to exceed the computer's expectations – and that's why Knowley named the program Beat the Computer.

In addition to specifying work-outs, the BTC program calculates individual and team reports. This enables coaches and athletes to compare an athlete not only to current team members but also to the all-time leaders on the team and to BFS national standards. The program produces individual progress reports on all the major exercises and field tests in the BFS program. Each athlete's report is divided into three categories: The Ironman Ranking shows the athlete's performance in the core lifts, while the Power Ranking compares the field tests and ranks them according to national standards, school grade level and the ranking in the school. Finally, the Recommendations category assesses the results and provides recommendations such as paying more attention to diet or flexibility.

The next goal of the program is to show athletes how they compare to current and past members in individual results. Athletes can choose to print a report that takes any of the bench marks from the individual reports and provides Top 10 lists of all the major core lifts and field tests, or they can select a report that provides a historical perspective by producing Top 10 lists of the best-ever performances in those tests in the history of the school.

With the ever-increasing responsibilities involved in coaching, BFS wanted to find a way to motivate athletes and reduce paperwork without sacrificing quality coaching. Beat the Computer App is the perfect solution. Isn't it time you stepped up to the next level with this high-tech coaching tool?

WHAT COMPUTERIZED AIDS CAN DO FOR YOUR COACHING

Make your job as a coach easier with the BFS Beat the Computer Software



The athletic achievements of Portage High School in Portage, Pennsylvania, a school that uses the Beat the Computer program. Head football coach Gary Gouse is shown here giving his football players their workouts.

“If you can’t measure it, you can’t manage it. If you can’t manage it, you can’t accomplish it.”

This is a motto BFS has employed right from the start, because we know that a key method of ensuring continual results is to have a goal every time you train. If you’re doing a Dot Drill, you want to complete the entire series in less time. If you’re performing a bench press, you want to perform more repetitions or lift more weight than you did last time. The problem, especially when working with large groups, is administering the program to ensure that athletes all have specific goals every time they train. Enter the BFS Set-Rep Logbook.

These manual workbooks were developed nearly forty years ago to enable athletes to record their progress and set goals for their next training session. When used properly, the system is a perfect way to produce highly motivated athletes who strive for personal bests every training session. However, a manual system is time consuming, especially if a coach wants to closely monitor all his or her athletes’ progress – or, for that matter, the overall progress of a team. For these reasons, 15 years ago BFS enlisted the help of Richard Knowley, director of computer programming at BFS.

Working with BFS, Knowley improved the BFS program by translating it into a computer-aided system. By simply inputting an athlete’s current maxes, the computer would set up challenging workouts. The innovative software brought an additional and unexpected benefit by motivating athletes to exceed the computer’s expectations. This unique feature inspired Knowley to call the program Beat the Computer.

Computer Generated Top Ten Lists
www.bfsonline.com

Top 10

East Side High School
Top 10 scores among Current Athletes
in the

Parallel Squat		
1st	JIMMY LEWIS	2/11/2003 9th 270 lbs
2nd	JARED TRANE	2/10/2003 9th 225 lbs
3rd	RYAN SMITH	2/03/2003 9th 225 lbs
4th	CODY RAJAR	1/06/2003 9th 205 lbs
5th	JOSEPH BRASON	2/06/2003 9th 200 lbs
6th	FRANK MCKAY	2/09/2003 9th 195 lbs
7th	JONATHAN MORSE	2/11/2003 9th 180 lbs
8th	GARRIST ROUTH	3/24/2002 9th 180 lbs
9th	AUSTIN LAKE	2/03/2003 9th 180 lbs
10th	DANIEL FAIRBORNE	2/03/2003 9th 180 lbs

BFS Beat the Computer

The computer can produce Top 10 lists of the results of current players or All Time Top 10 reports of the best-ever performance to a historical perspective of a school’s workout program (Figure 6).

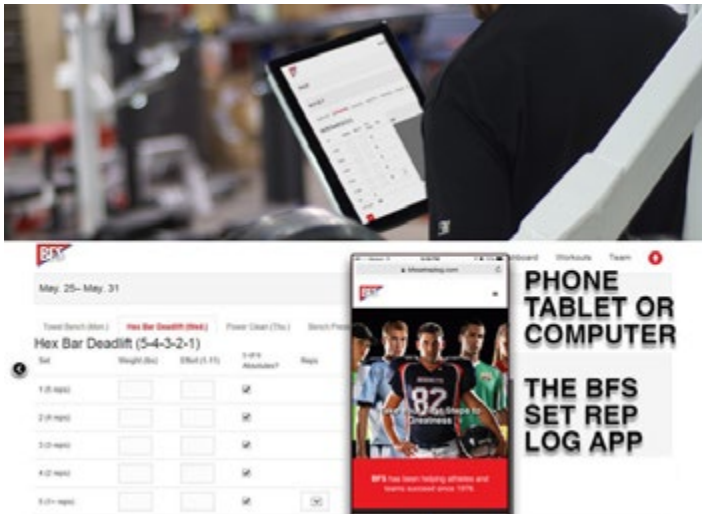
The Beat the Computer program was a hit, freeing coaches from painstaking administrative work. Then BFS decided to take the program to the next level with individual and team reports, so that coaches and athletes could compare an athlete not only to current team members but also to the all-time leaders on the team and to BFS national standards. The result was Knowley’s Athletic Achievement Software, which was eventually combined with the Beat the Computer and called **Beat the Computer Pro**.

The first goal of this latest software is to produce individual progress reports on all the major exercises and field tests in the BFS program. Each report is divided into three categories – Ironman Ranking, Power Ranking, and Recommendations.

The Ironman data shows the athlete’s performance in the core lifts, while the Power Ranking compares the field tests. The ranking, based on a score of 1 to 10, divides the results into a point value based on national standards, school grade level, and the ranking in the school. Finally, the report contains a computerized assessment area that provides recommendations based upon the athlete’s results, such as paying more attention to diet or flexibility.

The next goal of the program is to show athletes how they compare to current and past members in individual results. Athletes can choose to print a report that takes any of the benchmarks from the individual reports and provides Top 10 lists of all the major core lifts and field tests, or they can select a report that provides a historical perspective by producing Top 10 lists of the best-ever performances in those tests in the history of the school.

THE BFS SET REP LOG APP FOR PHONE, TABLET, AND COMPUTER



Technology has become an integral part of the high school educational system, such that many classes don't have books or handouts. This is the inspiration for the set-rep app that can be used for a smartphone, tablet or laptop. Before getting into the details of this BFS Set/Rep Log App, let's look at why BFS believes that logbooks are so important.

One hallmark of workouts that are successful in making athletes bigger, faster and stronger is a thoughtful balancing of all aspects of conditioning. A big part of the success of BFS over the past four decades can be attributed to the BFS Set-Rep Logbook. It's a training tool that has proven essential in managing the challenges of working with young, multisport athletes. Besides helping athletes fulfill their physical potential, there are also psychological benefits.

A research study that looked at the psychological benefits of using the BFS program was conducted at Dulaney High School in Timonium, Maryland. The personality test administered was the Piers-Harris 2,

With the ever-increasing responsibilities involved in coaching, BFS wanted to find a way to motivate athletes and reduce paperwork without sacrificing quality coaching. We think we've found that answer with Beat the Computer Pro. Isn't it time you stepped up to the next level with this high-tech coaching tool?

which provides insight into an individual's self-concept and is often used to help identify at-risk youth.

Psychologist David Schlenoff found that the girls using the BFS workout experienced significant improvements in many areas that fell under the category of happiness, such as cheerfulness. During this period of evaluation Dulaney's athletic teams experienced success virtually across-the-board for both boys and girls sports, including a state championship. With such results, Dulaney took the next step and integrated the BFS program into their curriculum as a for-credit class.

With the advancement of technology and the push for integrated PE program, BFS set about developing an app for the BFS Set Rep Logbook.

By basing the app on the web, we would be able to offer this software across any device or operating system with a web browser. Under the direction of BFS clinicians, pilot schools were recruited to ensure the app worked smoothly. After a year of testing the app was ready to launch.

The app keeps the simplicity of our Set-Rep Log books while providing the management functions and portability of a phone app. Predefined weekly schedules are included with recommended core and auxiliary lifts for all major high school sports. However, you can customize your weekly schedule using any lift on any day, and add any lifts you want.

Coaches or administrators will love this app because they can see the essential data on their teams and athletes at a glance. Such data includes scores, records broken, and trends for any one athlete or any team.

Likewise, athletes can enter their own scores on their phone or tablet and immediately see how many records they've broken and their performance trends. It's also easy to scroll back and see what you did for any lift any week in the past.

The BFS Set/Rep Log App requires a connection to the Internet and an email address for each administrator, coach and athlete. The program runs in any standard web browser on computers (PC and Mac), tablets, or smart phones. The program is provided as a yearly subscription, and there are no restrictions on the number of teams in any version.

Just like our Set-Rep Log books, the program (overseen by the coaches) guides each athlete in which lifts to do, and how many sets and reps to do each week.

APPS, COMPUTER PROGRAMS, OR LOG BOOKS - MOTIVATION AND PROGRESS IS THE BENEFIT OF RUNNING A TOTAL PROGRAM

When looking through the BFS catalog, some coaches are surprised to see it continues to offer manual set-rep logbooks. After all, isn't this the Information Age, where paper, in general, is following the path of vinyl records...and 8-track tapes...and cassette tapes, and CDs? Certainly, computer-aided workout systems, including our own Beat the Computer program and Set Rep Log App, have earned their place in athletic training and physical fitness programs. When coaches are working with large groups, the usual situation at high schools, computer systems such as these are essential in managing data to produce team and class ranking systems.

The Beat the Computer (BTC) and Set Rep Log App (SRLA) programs are particularly valuable because they give athletes specific goals each time they work out to help ensure continual progress – automatically producing athletic evaluation reports. Still, as will be explained later, there are good reasons to have athletes complete the original BFS Log-books by hand. The BTC, SRLA, and BFS Set-Rep Logbooks are all great for encouraging progress and making it easy to track. The fact that athletes can make progress every single workout is a major reason that coaches and PE teachers appreciate the BFS Total Program. More specifically, the program enables every athlete to make personal records, often several personal records, every

The weight lifted for each set is determined by the individual athlete based on their past performance for that lift. If you want a complete computer-generated workout, along with Top 10 Lists, Power Rankings, Ironman Rankings, all based on the BFS Set-Rep system, you should invest in the BFS Beat the Computer Pro Computer Program.

The BFS Total Program is so popular among coaches and PE teachers because it ensures that progress can be made every single workout. More specifically, it enables every athlete to make personal records, often several personal records, every single workout – even in-season. And now, with the BFS Set/Rep Log App, you can take your workouts into the computer age.

single workout – even in season. This is in contrast to many of the periodization schemes.

Periodization vs. BFS

When BFS began developing its training system, news started trickling in about elaborate training programs called “periodization” developed by Eastern European coaches. Although the elaborate tables, charts, and graphs associated with these programs were certainly impressive, BFS immediately recognized the problems associated with such training systems.

While BFS recognized that for single-sport athletes these programs did have their advantages and were obviously successful, periodization programs were not practical when coaches were working with multiple-sport athletes at the high school level – especially those in team sports. First, these periodization programs usually focused on peaking for only a few competitions a year. If you're a football coach, under this system which game would you peak for? The obvious answer is the state championship, but how do you get into the championship game if your players are in poor form during the playoffs? The periodization solution to this issue would be to go into a “maintenance” phase, but athletes don't get bigger, faster, or stronger during maintenance workouts. Also, what about multi-sport



Dr. David Schlenoff, psychologist, Baltimore County Public Schools Dr. Schlenoff is a licensed psychologist and certified school psychologist and is BFS certified. He has served as a psychological consultant to Runner's World magazine, has published material on the role of a therapeutic running program in rehabilitation, on jogging therapy for psychiatric inpatients, and on numerous other topics.

athletes, which is what most high school and younger athletes are? How are athletes expected to get stronger if they are lifting light weights, year-round? The answer is that they can't. In addition to those problems, BFS found for a high school coach that it was difficult to motivate young athletes if they had to wait weeks to see progress. Rather than just keeping records for 1-repetition personal bests, BFS expanded the program to include personal records for multiple repetitions, total weight used in an exercise, and total weight used for all sets in an exercise. The result is that even when athletes have an off-day and can't make a record in how much weight they use for a single lift, they can still set a record for the amount of work they perform.

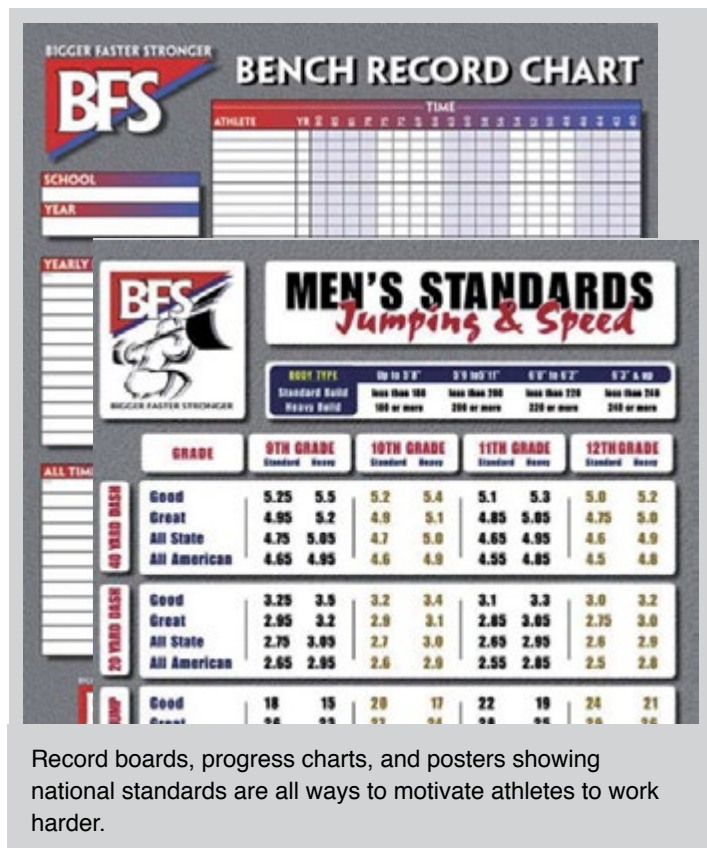
Setting daily records have additional benefits, as was confirmed by Dr. David Schlenoff. A licensed psychol-

ogist and certified school psychologist in the Baltimore County Public School system, Dr. Schlenoff often works with students who have learning or emotional problems. Several years ago he had the opportunity to work with a girls-only high school weight training class that used the BFS Program. Schlenoff found that the girls worked hard and made great progress on the BFS Program; they also experienced unexpected benefits in their attitude.

Says Dr. Schlenoff, "What was even more noticeable was a palpable air of happiness that seemed to permeate the weight room as these girls eagerly awaited their opportunity to work out. They each seemed very proud of their progress. Perhaps this seeming happiness derives from learning how to set realistic, attainable goals and from reaching those goals. Perhaps it derives from being part of a group with a shared interest – we know that girls are typically more socially oriented than boys. Perhaps it derives from the endorphin release that has proven to be attributable to physical exercise – or maybe it's just plain fun!" It feels great to check off individual items on a "to-do" list, and the same satisfaction occurs when young athletes physically write down their records. This is why the classic logbook has a special place in the BFS Program. Sometimes tried-and-true works best.

HOW GOOD IS GOOD? BFS STANDARDS

The BFS standards bring relevance to achievements



(Editor's note: *Having been involved with BFS for nearly a quarter of a century, I find it interesting that a lot of coaches I've talked to have kept every issue of BFS magazine. The reason is that much of the information, particularly the training physiology and ideas about character development, is timeless. To prove it, we've decided to reprint this article about strength standards written by BFS more than two decades ago. As you read it – or re-read it, depending on how long you've been following BFS – note the standards that BFS expected from his athletes, such as the 250-pound power cleans and 500-pound dead-lifts. Compare those lifts to your standards, and if your athletes don't measure up, consider making BFS a part of your future.*)

I first started thinking about standards in 1964 when I trained my first group of high school athletes.

I felt, at the time, if 20 football players could bench press 200 pounds or more, you could win a state championship. As I shared my idea, others scoffed. "It's a lot more complicated than that," they said.

I was naive. They were right, of course, but I also felt that I was on the right track. I just had to dig a little deeper. I began to observe good high school, college and pro football players (San Diego Chargers). I also observed the world's best throwers (discus, hammer, shot put).

I always made it a habit to ask these great throwers what they could lift, how fast they could run and how high they could jump. I matched these results with how far they could throw. Sometimes an individual thrower would try to add a lot of weight and strength in order to improve throwing performance. Almost every time with the elite strength/throwing athlete, this strategy did not work. In other words, if a thrower could already parallel squat 600-plus, power clean 350-plus and bench 450-plus at a bodyweight of 270 pounds, would gaining 20-30 pounds while increasing his strength by 15-20 percent make a difference in throwing performance? With discus throwers and hammer throwers, it rarely made a difference, and sometimes it actually hurt their performance. With shot putters, this increase made only a little difference. The downsides were the tremendous stress on the body to make such gains and also the chance for injury. Often agility and speed would be lost. I learned there was a limit on the profit-ability of strength and weight gains.

By 1970 I had the elite performance standards I felt were essential for success at the highest level for big men involved in football or track. These standards are still relevant over 30 years later: parallel squat 600, bench 400, power clean 350, deadlift 600, forty 4.6, vertical jump 35 and standing long jump 10-6. I figured a 6-foot-5 man with good, but not necessarily great, athletic ability could weigh 270 pounds and achieve the above performance standards.

I was a football strength coach at Oregon State ('65), University of Oregon ('67) and Brigham Young University ('71-'73). This helped me fine-tune elite standards with skill athletes. I coached at the high school level from 1967 to 1971. At Sehome High School in Bellingham, Washington, we had bunches of athletes who could parallel squat 400, bench 300, power clean



Even flexibility should be tested to ensure athletes are performing daily stretching to run faster, jump higher and help prevent injury.

250 and deadlift 500. We had 50 players run between 4.5 and 5.0 in the forty. These results helped pave the way for the high school standards. A feature story was done on these players in the old Bob Hoffman Strength and Health magazine. We easily won the mythical state football championship. We were the smallest school (1,400) in the biggest classification. The other team had minus 77 yards rushing, but at that time in history most teams did hardly anything in strength training.

I also coached the throwers at Sehome. We had 11 guys who could throw the discus between 140 and 180 feet. If you could not throw 155, you were on the JV team. I don't think any high school before or since can match that.

Those standards gave me a direction and, more importantly, an expectation. Later, through working with Stefan Fernholm, the Utah Jazz and my partners Rick and Bob, we added the Sit & Reach and Dot Drill standards. We also have improved our ability to accurately test these standards through tools such as the Just Jump, Safety Squat and Speed Trap. We also developed standards for women and younger athletes. In addition, we have a graduated scale of excellence to help all athletes achieve with a step-by-step formula of excellence through standards.

When I coached high school foot-ball, I expected every varsity high school football starter and thrower, except some skill athletes, to achieve at least the All-State standards. At the Division 1 college level, I would now expect every starting lineman to parallel squat 600, bench 400, power clean 350 from the floor, dot drill 45 seconds, run 4.6 on defense and 4.8 on offense, vertical jump 35 inches on defense and 33 inches on offense, standing long jump 10-6 on defense and 10-0 on offense, and Sit & Reach five inches past the toes.

As I've been telling athletes for many years, "If you can't or won't achieve our highest standards, you will hold our football team back. If you are a thrower at the college level and you can't or won't do at least the defensive lineman starter requirements, you can't compete at the national level. You see, a thrower is different from a line-man because nobody can make up for your weaknesses. I just can't say it any plainer than that.

"Achieving these standards is what we have to do to make our success happen. We will spend the necessary time and effort to get there. I can't guarantee that we will win a state or national championship. But I can guarantee that we will never lose because we lack strength, speed, explosive power or quickness. We will be bigger, faster and stronger. We will be extremely confident in that fact. I will do everything in my power to help you achieve these reachable standards. If everyone will do their part, we will physically dominate our opponents."

MEN'S STANDARDS: STRENGTH & POWER

Dedicated to Helping Athletes Succeed Since 1976

BODY TYPE				
	Up to 5'8"	5'9" to 5'11"	6'0" to 6'2"	6'3" & up
Light Build	Less than 130	Less than 140	Less than 155	Less than 169
Medium Build	130 to 179	140 to 199	155 to 219	170 to 239
Heavy Build	More than 180	More than 200	More than 220	More than 240

NOTE:

- Beginning lifters should focus on technique not weight
- Athletes 6'3" to 6'6" tall should reduce lift requirements by 10%
- Athletes over 6'6" tall should reduce lift requirements by 20%

GRADE	9TH GRADE			10TH GRADE			11TH GRADE			12TH GRADE		
PARALLEL SQUAT												
Body Type	Light	Med.	Heavy	Light	Med.	Heavy	Light	Med.	Heavy	Light	Med.	Heavy
Good	200	225	250	220	240	265	240	260	280	260	280	300
Great	250	275	300	275	295	315	300	315	330	325	335	350
All State	275	315	350	300	335	365	325	355	380	350	375	400
All American	300	350	400	330	380	430	360	410	460	390	445	500
POWER CLEAN												
Body Type	Light	Med.	Heavy	Light	Med.	Heavy	Light	Med.	Heavy	Light	Med.	Heavy
Good	125	155	185	135	165	190	150	175	195	160	180	200
Great	150	185	220	160	195	230	175	210	240	195	225	250
All State	175	220	260	190	230	270	210	250	285	225	265	300
All American	200	250	300	220	270	315	240	285	330	260	305	350
BENCH PRESS												
Body Type	Light	Med.	Heavy	Light	Med.	Heavy	Light	Med.	Heavy	Light	Med.	Heavy
Good	110	135	160	120	145	165	135	155	170	145	160	175
Great	125	155	185	135	165	195	150	180	205	160	190	215
All State	150	175	205	165	195	220	180	210	235	195	225	250
All American	160	200	240	175	215	260	195	240	280	215	260	300
HEX BAR DEADLIFT												
Body Type	Light	Med.	Heavy	Light	Med.	Heavy	Light	Med.	Heavy	Light	Med.	Heavy
Good	250	300	350	275	325	375	300	345	390	325	365	400
Great	300	350	400	330	380	425	360	420	460	390	445	500
All State	325	390	450	355	415	475	390	440	490	420	485	550
All American	350	415	480	385	445	500	420	470	520	455	530	600

MEN'S STANDARDS: JUMPING & SPEED

Dedicated to Helping Athletes Succeed Since 1976

BODY TYPE				
Light	Up to 5'8"	5'9 to 5'11"	6'0" to 6'2"	6'3" & up
Standard Build	Less than 120	Less than 135	Less than 150	Less than 160
Heavy Build	120 or more	135 or more	150 or more	160 or more

GRADE	9TH GRADE		10TH GRADE		11TH GRADE		12TH GRADE	
40 YARD DASH								
	Standard	Heavy	Standard	Heavy	Standard	Heavy	Standard	Heavy
Good	5.25	5.5	5.2	5.4	5.1	5.3	5.0	5.2
Great	4.95	5.2	4.9	5.1	4.85	5.05	4.75	5.0
All State	4.75	5.05	4.7	5.0	4.65	4.95	4.6	4.9
All American	4.65	4.95	4.6	4.9	4.55	4.85	4.5	4.8

20 YARD DASH								
	Standard	Heavy	Standard	Heavy	Standard	Heavy	Standard	Heavy
Good	3.25	3.5	3.2	3.4	3.1	3.3	3.0	3.2
Great	2.95	3.2	2.9	3.1	2.85	3.05	2.75	3.0
All State	2.75	3.05	2.7	3.0	2.65	2.95	2.6	2.9
All American	2.65	2.95	2.6	2.9	2.55	2.85	2.5	2.8

VERTICAL JUMP								
	Standard	Heavy	Standard	Heavy	Standard	Heavy	Standard	Heavy
Good	18	15	20	17	22	19	24	21
Great	26	23	27	24	28	25	29	26
All State	29	25	30	26	31	27	32	28
All American	32	27	33	28	34	29	35	30

STANDING LONG JUMP								
	Standard	Heavy	Standard	Heavy	Standard	Heavy	Standard	Heavy
Good	7'6"	7'0"	7'9"	7'3"	8'0"	7'6"	8'3"	7'9"
Great	8'3"	7'9"	8'6"	8'0"	8'9"	8'3"	9'0"	8'6"
All State	8'9"	8'3"	9'1"	8'7"	9'6"	9'3"	10'0"	9'6"
All American	9'3"	8'9"	9'7"	9'1"	10'0"	9'7"	10'6"	10'0"

DOT DRILL								
	Standard	Heavy	Standard	Heavy	Standard	Heavy	Standard	Heavy
Good	69	74	66	71	63	68	60	65
Great	64	69	61	66	58	63	55	60
All State	59	64	56	61	53	58	50	55
All American	49	54	46	51	43	48	40	45

WOMEN'S STANDARDS: STRENGTH & POWER

Dedicated to Helping Athletes Succeed Since 1976

BODY TYPE				
	Up to 5'2"	5'3" to 5'5"	5'6" to 5'8"	5'9" & up
Light Build	Less than 85	Less than 95	Less than 110	Less than 125
Medium Build	85 to 120	95 to 135	110 to 150	125 to 160
Strong Build	More than 120	More than 135	More than 150	More than 160

NOTE:

- Beginning lifters should focus on technique not weight
- Athletes 5'9" to 6'1" tall should reduce lift requirements by 10%
- Athletes over 6'1" tall should reduce lift requirements by 20%

GRADE	9TH GRADE			10TH GRADE			11TH GRADE			12TH GRADE		
PARALLEL SQUAT												
Body Type	Light	Med.	Strong	Light	Med.	Strong	Light	Med.	Strong	Light	Med.	Strong
Good	85	100	115	95	110	125	105	120	135	115	130	145
Great	120	145	165	130	155	175	145	165	185	160	180	195
All State	150	180	205	160	190	225	175	200	245	190	215	265
All American	180	240	265	195	250	285	220	270	305	240	290	325
BENCH PRESS												
Body Type	Light	Med.	Strong	Light	Med.	Strong	Light	Med.	Strong	Light	Med.	Strong
Good	60	70	75	70	80	85	80	90	95	90	100	105
Great	75	85	95	85	95	105	95	105	115	105	115	125
All State	90	110	125	100	120	135	110	130	145	120	140	155
All American	100	130	155	110	140	165	120	150	175	130	160	185
POWER CLEAN												
Body Type	Light	Med.	Strong	Light	Med.	Strong	Light	Med.	Strong	Light	Med.	Strong
Good	60	70	75	70	80	85	80	90	95	90	100	105
Great	75	85	95	85	95	105	95	105	115	105	115	125
All State	90	110	125	100	120	135	110	130	145	120	140	155
All American	100	130	155	110	140	165	120	150	175	130	160	185
HEX BAR DEADLIFT												
Body Type	Light	Med.	Strong	Light	Med.	Strong	Light	Med.	Strong	Light	Med.	Strong
Good	140	175	205	150	185	215	160	195	225	170	205	235
Great	180	220	255	190	230	265	200	240	275	210	250	285
All State	200	250	295	210	260	305	220	270	315	230	280	325
All American	225	280	330	240	295	345	255	310	360	270	325	375

WOMEN'S STANDARDS: JUMPING & SPEED

Dedicated to Helping Athletes Succeed Since 1976

BODY TYPE				
	Up to 5'8"	5'9 to 5'11"	6'0" to 6'2"	6'3" & up
Standard Build	Less than 120	Less than 135	Less than 150	Less than 160
Heavy Build	120 or more	135 or more	150 or more	160 or more

GRADE	9TH GRADE		10TH GRADE		11TH GRADE		12TH GRADE	
40 YARD DASH								
	Standard	Heavy	Standard	Heavy	Standard	Heavy	Standard	Heavy
Good	5.9	6.1	5.85	6.05	5.8	6.0	5.75	5.9
Great	5.6	5.8	5.55	5.75	5.5	5.7	5.45	5.65
All State	5.3	5.5	5.25	5.45	5.2	5.4	5.1	5.3
All American	5.0	5.2	4.95	5.15	4.9	5.1	4.8	5.0

20 YARD DASH								
	Standard	Heavy	Standard	Heavy	Standard	Heavy	Standard	Heavy
Good	4.0	4.2	3.95	4.15	3.9	4.1	3.85	4.0
Great	3.7	3.9	3.65	3.85	3.6	3.8	3.55	3.75
All State	3.3	3.5	3.25	3.45	3.2	3.4	3.15	3.35
All American	3.1	3.3	3.05	3.25	3.0	3.2	2.9	3.1

VERTICAL JUMP								
	Standard	Heavy	Standard	Heavy	Standard	Heavy	Standard	Heavy
Good	11	9	12	10	13	11	14	12
Great	15	13	16	14	17	15	18	16
All State	19	17	20	18	21	19	22	20
All American	22	19	23	20	24	21	25	22

STANDING LONG JUMP								
	Standard	Heavy	Standard	Heavy	Standard	Heavy	Standard	Heavy
Good	5'0"	4'9"	5'2"	5'0"	5'4"	5'2"	5'6"	5'4"
Great	5'6"	5"	5'8"	5'4"	5'10"	5'6"	6'0"	5'8"
All State	6'3"	6'0"	6'6"	6'3"	6'9"	6'6"	7'0"	6'9"
All American	7'3"	7'0"	7'6"	7'3"	7'9"	7'6"	8'0"	7'9"

DOT DRILL								
	Standard	Heavy	Standard	Heavy	Standard	Heavy	Standard	Heavy
Good	76	81	74	79	72	77	70	75
Great	66	71	64	69	62	67	60	65
All State	56	61	54	59	52	57	50	55
All American	51	56	49	54	47	52	45	50

STANDARDS FOR READINESS GRADUATION

BFS Bigger Faster Stronger		READINESS RECORD CARD		Name: _____			
		Height: _____		Weight: _____		Age: _____	
Pds.	Box Squat	Towel Bench	Power Clean	Hex Bar Deadlift	Parallel Squat	Bench Press	
15							
20							
25							
30							
35							
40							
45							
50							
55							
60							
65							
70							
75			Girl's Graduation				Girl's Graduation
80							
85							
90							
95							
100							

Pds.	Box Squat	Towel Bench	Power Clean	Hex Bar Deadlift	Parallel Squat	Bench Press
105			Boy's Graduation			Boy's Graduation
110						
115						
120						
125						
130						
135						
140						
145					Boy's Graduation	
150						
155						
160						
165						
170						
175		Dot Drill	Time / Date	/ /	/ /	/ /
180		Sit & Reach	+/- Inches / Date	/ /	/ /	/ /
185		Vertical Jump	Inches / Date	/ /	/ /	/ /
190		Standing Long Jump	Inches / Date	/ /	/ /	/ /
195		20 Yard Speed	Seconds / Date	/ /	/ /	/ /
		40 Yard Speed	Seconds / Date	/ /	/ /	/ /

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BFS Readiness Record Cards and knowledgeable coaches and teachers guide students and athletes through graduating from the BFS Readiness Program to the BFS Total Program set rep system

Graduation is based on your performance; not age. This is as is should be. Some people mature faster than others and some learn technique faster. Graduation requirements somewhat favor the bigger and heavier athlete. You will see below a male athlete must do 2 sets of 10 reps with 145 pounds on the squat. Since everyone starts with 45 pounds and goes up at a maximum rate of 5 pounds a week, it will take a minimum of 20 weeks to graduate.

We justify this philosophy, as graduation means the athlete is now ready to begin the regular BFS program. This regular BFS program requires a much more strenuous mature frame. The total BFS program will allow everyone to reach their potential soon enough. Graduation requirements are based on three lifts; the parallel squat, bench press, and power clean. An athlete must pass all three lifts to graduate. The box squat, towel bench and hex bar deadlift are not tested for graduation requirements. However, they are just as important as the others.

Rules For Readiness Graduation

1. To ensure proper lifting techniques and reduce liability, ALL students/Athletes must graduate from the BFS Readiness Program before entering the BFS Set-Rep System or Beat the Computer.
2. The Graduation Requirements should be supervised by a BFS Certified Strength Coach.

BFS Readiness Graduation Standards		
Event	Male	Female
Squat 2 sets of 10 reps	145 lbs.	105 lbs.
Bench 2 sets of 10 reps	105 or 90% of body weight	75 or 90% of body weight
Power Clean 2 sets of 5 reps	105 or 90% of body weight	75 or 90% of body weight

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