The Squat Exercise—Is It Right for Your Volleyball Players?

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The squat is probably the most controversial exercise in strength and conditioning. Bad for knees, bad for backs, great for improving vertical jump, the king of all exercises — opinions of the squat are as different as the gyms you find them in.

So what’s the truth? Is the squat an exercise all volleyball players should include in their conditioning program, or an exercise to be avoided at all costs?

First, let’s examine the squat. A squat is typically thought of as the exercise where a bodybuilder loads obscene amounts of weight on a barbell and grunts out 10-12 reps with the bar crushing their shoulders behind their neck. This is indeed a squat. What if a volleyball player holds a medicine ball above their head and proceeds to lower their hips until their thighs are parallel to the floor? What if there is no weight and a toddler drops their diaper to the ground to pick a ball? Yep, still a squat.

Brandon Johnson, NSCA-CPT, a strength training instructor for Weber State University points out, “What do little kids do all day? They squat and stand, squat and stand. From the time a child first stands, they know how to squat correctly. The human body is made to squat.”

The truth is that much of the negative feelings toward squats stem from preconceived notions of what a squat is. People have seen powerlifters and body-builders lift heavy weight and with or without evidence assume such an exercise is going to lead to injury. Obviously, if a less advanced athlete tried to squat hundreds of pounds without the strength or technique needed, they would quite likely hurt themselves. The key to safety is proper form and gradual progression. There are dozens of varieties of squat, and all have their time place. In this article, I will address the risks and the benefits of squats as well as cover several squat varieties we frequently use for our volleyball athletes. It is beyond the scope of this article to go into depth on correct squat technique. Working with a certified trainer or strength coach is a much better and safer way to learn to squat than reading an article. If you already know how to squat, I encourage you to implement the ideas in this article.

Risks

Many coaches feel that squats are dangerous and have a high potential for knee and lower back injury. Studies by one researcher, Karl Klein, were done in the early 1960s that suggested full squats (defined as squatting to the point where the tops of the thighs are parallel to the floor or below) were detrimental to knee stability. In The Squat Exercise in Athletic Conditioning: A Position Statement and Review of the Literature, T. Jeff Chandler, EdD, CSCS and Michael H. Stone, PhD, CSCS make the point, “It should be noted that Klein’s criticism was of ‘full squats’ and that he recommended ‘parallel squats’ (Chandler).”

In fact, the majority of studies done on the squat show that both parallel and full squats actually promote knee stability. Many strength and conditioning coaches realize full squats are very beneficial for assessing and improving flexibility. As a general guideline, the deeper you go, the less weight you should use. In their nine point position statement, the National Strength and Conditioning Association (NSCA), one of the leading organizations worldwide in strength and conditioning research, states: “Squats, when performed correctly and with appropriate supervision, are not only safe, but may be a significant deterrent to knee injuries.” and also, “Weight training, including the squat exercise, strengthens connective tissue, including muscles, bones, ligaments and tendons (Chandler).” The NSCA also agrees that excessive training, overuse injuries and fatigue-related problems do occur with squats but can be avoided by good exercise program design. This is in fact true of any exercise. Without smart program design, the athlete can be injured just as easily from most exercises.

The NSCA position statement also addresses back injuries by saying, “While squatting results in high forces on the back, injury potential is low with appropriate technique and supervision (Chandler).” As with the knees, the squat also increases core stability and strengthens the surrounding muscles that stabilize the spine.

Benefits

A good athletic stance is basically a type of squat. In Athletic Body in Balance, world renowned physical therapist Gray Cook, PT, CSCS writes, “Improving the deep squat and going deeper through the full range of motion will improve movement when shifting weight from left to right. It will also improve the ability to quickly get into the universal athletic ready position, which is somewhere between deep squatting and standing erect (Cook).” Cook and strength and conditioning industry leader, Mike Boyle, MS, ATC, CSCS agree that inability to perform a deep squat likely points to flexibility issues. “Athletes who cannot body-weight squat to a position with the thighs parallel to the floor are deficient in either ankle, hip, or hamstring flexibility (Boyle).” By holding a dowel outstretched overhead, shoulder flexibility can also be assessed. Many people don’t realize that lifting weights through a full range of motion is actually one of the best ways to increase flexibility. By including squats in an exercise program, an athlete can simultaneously improve leg strength, and hip, knee and ankle range of motion.

The squat is also an excellent mimic of correct jumping form. When teaching our athletes to jump safely, we begin with the countermovement phase, which is essentially a squat. From the bottom of the squat, the athletes explode up into the jump. We will not do any jump training with our volleyball players until they master the body weight squat. Many athletes, and females especially, let their knees come together as they jump. This is a direct

Brandon Johnson, NSCA-CPT performs a full back squat

Perfect squat demonstrated byAsher Gagestein, the author’s nephew and future star of the AVP.

Brandon performs a parallel back squat

The author demonstrates a poor squat. Inability to squat without the heels leaving the floor and knees coming significantly past the toes is a sure indication of poor flexibility or core stability.

Competitive Edge Fitness intern, Angela Voratsady demonstrates great squat form.
result of instability of the knees. Not only will this eventually lead to knee pain, it is also an energy leak, where some of the power that could be going into a higher jump is instead being lost as stress on the knee joint. Squatting with correct form will help build stability in the knees, train the body to powerfully extend the hip, knee, and ankle joints together, and quite simply result in a more efficient and higher jump.

When the knees come in either during jumping or squatting as the author demonstrates, they lack needed stability.

The eccentric portion of the squat (lowering movement) teaches the musculature of the legs, hips, and lower back the body to function differently than in any sporting event (unless some part of the sport requires lying on the floor). Early fatigue also becomes a problem without adequate leg strength. Together, these will result in the deterioration of performance during exercises and an increased chance for injury. The more an athlete can correctly squat, the better they are able to soften the landing and keep their knees healthy.

The squat is also one of the greatest exercises for building total leg strength core strength. The simultaneous extension of the hip, knee, and ankle joints as required for the squat is extremely specific to volleyball and most sports. In this movement all muscles of the leg and core are required to work together as a unit.

Tips for Healthy Squats

1) Learn from a qualified instructor. Don’t attempt to learn how to squat from a magazine article. Find someone who know how to squat, and who will make sure your technique is good. Poor technique is one of the reasons squats get a bad rap.

2) Always ensure an adequate warm-up prior to squatting with heavy weight. Another common reason people get hurt with any type of lifting is neglecting to warm-up appropriately. I recommend 5-10 minutes of mobility work followed by several progressively heavier light sets before attempting a challenging set. Beginning with light sets also reinforces the correct movement pattern and will help your form on heavy sets. Bodyweight squats are a fantastic warm-up exercise for mobility work. This is a great way to train the range of motion without worrying about your knees.

3) Proper progression is crucial. Don’t move on to a more complex squat until you have mastered the basic squat. Don’t try the barbell squat until you can do a bodyweight squat correctly. World renowned fitness expert Alwyn Cosgrove, CSCS puts it best by saying, “You have to earn the right to use weights!” When you do earn the right to use weight, take it gradually. Don’t let pride get the best of you and sucker you into trying to squat more than you can. Nobody is impressed by the athlete on the injured list.

4) Because like any exercise, the squat can lead to overuse injuries if incorrectly programmed, we recommend only doing heavy squats one day a week. There are various effective methods to train the legs two to three times a week without constantly subjecting the body to excessive load. This is considered unloading. One strategy is to use one day as a heavy squat day and the next leg workout as a single leg training day. With single leg lifts, such as the step-up, lunge, split squat, or single leg squat, the athlete can still be extremely challenged with substantially less weight. Another strategy is to use one day as an unstable day, where athletes still perform a variety of squats, but on an unstable surface, such as balance disks, an Airdex pad, a BOSU or balance board. “Unstable-surface work forces the athlete to lift lighter while also developing balance and proprioception. The unstable surface also requires the athlete to concentrate on technique and weight distribution to be successful.”

5) It is also important to change heavy day exercises frequently to avoid overuse. By performing different variations of the squat, the body is challenged in slightly different ways with each and will not become overtrained and chronically fatigued as easily. We typically change squat variations on our heavy day every couple of weeks with our advanced athletes and every four weeks with our beginning or intermediate athletes. We cycle through different variations of squats and are usually stronger than our previous bests when we return to the lifts again.

6) Don’t follow the body-building philosophy that you must always go to failure on your lifts. The vast majority of injuries in the weight room and on the court occur when the athlete is tired and fatigued.

Squat Variations

As mentioned above, we frequently mix up our squats for maximum effectiveness. Here are some of our favorite squats to improve performance in volleyball.

Back Squat
Heavy, Unstable, or Speed Day

Tried and true, the back squat isn’t just for football players and power-lifters! Back squat demonstrated by the author.
In the front squat, the bar is held in front with the elbows up and the bar resting on the shoulders. The front squat places more load on the quadriceps than the back squat and requires a more upright torso. Athletes will likely start with much less weight than in the back squat, but within a few months should be able to work up to about 80% of their back squat weight. Front squat demonstrated by the author.

Box Squat
Heavy, or Speed Day

The box squat is a great way to introduce athletes to squatting. Requiring them to sit down on the box and then stand up from the seated position, teaches them to push their hips backwards as they lower and minimizes forward drifting of the knees. Box squats are also a great way to develop incredible sheer strength. By making the athlete sit down on the box, their momentum is eliminated and they must rely entirely on strength to stand back up. We use this exercise frequently with all level lifters. Use a box approximately as high as the athlete’s knee. An 18 inch box usually works fine. Box squat demonstrated by Christian Heritage High School outside hitter, Tessa Pitts.

Dumbbell Squat Press
Heavy Upper Body, Unstable or Speed Day

The squat press is a great total body exercise that emphasizes powerful extension of the body as in a block. We usually use this exercise to unload the legs and train challenge the shoulders simultaneously. This exercise is usually unstable enough without adding an unstable surface! Squat press demonstrated by Tessa Pitts.

Overhead Squat
Heavy Upper Body or Unstable Day

This exercise is one of the most challenging squats we perform. It requires excellent flexibility of the shoulders and incredible core strength. We use it too as an unstable exercise without the need for an unstable surface. Even with light weight, this exercise requires tremendous leg strength. Overhead squat demonstrated by Weber State University strength training instructor and Competitive Edge personal trainer, Brandon Johnson.

Staggered Stance Squat
Single Leg or Unstable Day

The staggered squat is actually almost a single leg exercise. It is very volleyball specific, and as with stepping into a pass, most of the weight will be over the front leg. Be sure alternate which leg is in front. Because of the position of the knees, we avoid using heavy weight on this exercise, but it is still a very good squat to implement in your program. Staggered squat demonstrated by Brandon Johnson.

More Information Please!
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