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Reinforcing Good Squatting Technique: Corrective Teaching Techniques

Last year I wrote an article that stressed the importance of the back squat and how it related to sport. For instance, virtually all sports, with the exception of water sports, cycling, and polo, are “ground-based,” meaning the athlete’s legs are in contact with the ground throughout the duration of the sports activity. The prime movers of sprinting and jumping are the knee and hip extensor muscles, which are the prime movers involved in squatting. Developing strength in these prime movers through a biomechanically similar pattern has been shown to improve running speed and jumping ability over time in a number of populations, not the least of which are trained athletes.

Another point I stressed greatly in my article was the importance of back squatting through a full range of motion or parallel position (tops of the thighs just break 90° angle). First, to develop maximum hip or knee joint strength, the joint must be worked through a full range of movement. Total leg strength is critical to athletic performance, as well as to the protection of the knee joint. Second, an optimal neuromuscular training effect is not realized in the partial squat. When you execute a full squat, the knee joints are close to maximum flexion. Recovering from this requires greater quadricep, hamstring, and glute muscle fiber recruitment than does a partial squat. In this respect, the deeper the squat, the greater the neuromuscular involvement, thus creating greater overall training benefits. Thirdly, overuse of the partial squat leads to over-

development of the quadriceps at the expense of the hamstrings and glutes and decreased knee joint stability. The result is an imbalance in the hamstring-to-quadricep strength ratio, which can contribute to both knee and hamstring injury.

Since I made a point in the past article to have athletes squat parallel, I thought it might be fitting to share with you some corrective, teaching techniques I use when working with incoming freshman or junior college transfers who haven't been taught proper form and technique when executing the back squat. Moreover, these corrective techniques can and should be performed in place of the traditional back squat until the athlete has mastered the movement. Aside technique, flexibility may be a limiting factor in allowing an athlete to squat correctly. If so, a comprehensive stretching and dynamic flexibility program should be administered in conjunction with the corrective teaching exercises.

The Classic “Quad Squatter”

This is the athlete who “dips” or squats with the knees. Typically, this style of squatting doesn't allow the athlete to reach parallel eventually causing quadriceps-to-hamstring imbalances, while placing a tremendous amount of sheering and dislocating force on the knee joint.



Corrective Teaching Technique

Have the athlete start facing backwards in the squat rack. Place a plyometric box or bench in front of the squat rack. Have the athlete un-rack the bar and step up to the box, leaving about 2-3 inches between the athlete's toes and box. Next, have the athlete squat down, not allowing the knees to push or touch the box. The point being the athlete needs to understand to reach back with the hips first and have the knees follow, stressing the quad, hamstrings and glutes more effectively while preventing undue stress on the knees that may lead to patellar tendonitis.



Forward Flexion Squatter

This is the athlete who “drops” his/her chest or flexes forward at the waist too much when going down into the squat position. Typically this style of squatting causes the athlete to roll-up or fall forward on the toes, placing far more stress on the lower back than the quads, hamstrings and glutes. This style of squatting can eventually lead to lower back injury.



Corrective Teaching Technique

Have the athlete assume a normal starting position. Place a PVC pipe or broomstick in front and center of the athlete's body at about 5-6 inches from his or her face. Next, have the athlete squat down, not allowing the face to come in contact with the pipe. This will prevent the athlete from dropping the chest too much when squatting. Some forward flexion is needed in order to maintain the athlete's center of gravity, but too much can place undue stress on the athlete's back.



NOTE: *In conjunction with poor form and lack of flexibility, the athlete may additionally be suffering from a weak lower back and abdominals. If this is the case, special attention and/or extra supplemental work will be needed to get these specific muscle groups up to par.*

Technique, as with any exercise, is the most important factor when squatting. If an athlete is training with bad technique then it doesn't matter what supplemental exercises they perform or how well you periodize their rep and set scheme. The inevitable result will be the athlete's maximum squat weight will only go so far and injury will be the end result.

Another squatting exercise I use to reinforce good squat technique is the *box squat*. Many times for the incoming freshman or junior college transfer, the hamstrings aren't quite developed and sitting back into the traditional back squat proves very difficult. Training on the box allows

the athlete to sit back onto the box to a point where the shins are perpendicular to the floor. This places all the weight and stress on the hips, glutes, and hamstrings and less on the quads. This is done in an effort to bring the hamstring-to-quad ratio up to par while at the same time reinforcing good squatting technique.



Aside from performing the box squat to reinforce good squatting technique, the exercise itself has restorative qualities. It allows an athlete to squat twice a week without causing over-training or overuse injuries because the exercise is performed with a sub-maximal load (50-75% of 1 repetition maximum). Another advantage the box squat provides is the athlete will never have to guess how low he or she is squatting. It will always be the same. Traditionally, when you take a novice lifter and start adding weight on their backs, their squats start getting higher and higher. On the other hand, with the box squat the athlete will always be low enough.

At present you may have heard from some coaches that box squatting is dangerous. When someone talks about the danger of box squatting, it's apparent they simply don't know how to perform or coach the lift correctly. Granted if an athlete is trying to bounce off the box or use more weight than they can handle, then there are certainly dangers to the spine. When performed correctly, as with any exercise, the box squat is safe.

The box squat exercise is also specific to what is known in exercise as *compensatory acceleration*. This means you must apply as much force as possible to the barbell (i.e. pushing as hard and as fast as you can in the upward phase of the box squat). If you squat 400 pounds and are training at 200 pounds, then you should be applying 400 pounds of force to the barbell. As I mentioned earlier, the weight used will be sub-maximal in the 50% to 75% repetition maximum range. This method of training isn't used to develop maximal strength but for the improved rate of force development. By maximizing force development along with strength development associated with regular squatting, you will be able to jump higher and run faster. However, if maximum force and speed are not maximized when performing the box squat, you can expect little or no change in performance. So, ultra concentration is a must. Likewise, rest intervals are very short. Typically, reps and sets range between 6-10 of two repetitions. This set and rep scheme style ensures maximum effort while minimizing form breakdown. Rest intervals between each set should be limited to only 45-60 seconds rest, thus taxing the lactic acid system and never allowing the muscles to fully recover.

BOX SQUAT TABLE GUIDE

| <u>PERCENT OF 1 REP MAX</u> | <u>REPS PER SET</u> | <u>REST BETWEEN SETS</u> |
|-----------------------------|---------------------|--------------------------|
| 55-75% | 6-10 sets x 2 reps | 45-60 seconds |

Next in order is how to safely and effectively perform the box squat. First thing you need is a box. When selecting a box most athletes need one between 12 and 14 inches high. Also, pick one that's big enough to support you while you sit. Once you've chosen a suitable box, you are ready to squat. Your first step is getting the bar out of the rack. Arch the back out of the squat rack and set the feet while keeping the back arched, abdominals squeezed, and upper back and arms tight. Keeping the back arched and abdominals squeezed places the lower back in a "bullet-proof" position for injury. So, provided you maintain the arched back and tight abdominals, there

is no way to injure your lower back. Be sure to squeeze the shoulder blades and keep the arms tight. This creates a natural “shelf” for the bar to rest on. The athlete’s foot stance is crucial in the box squat. Using a wide stance places the load and stress more on the glutes, hips, and hamstrings.

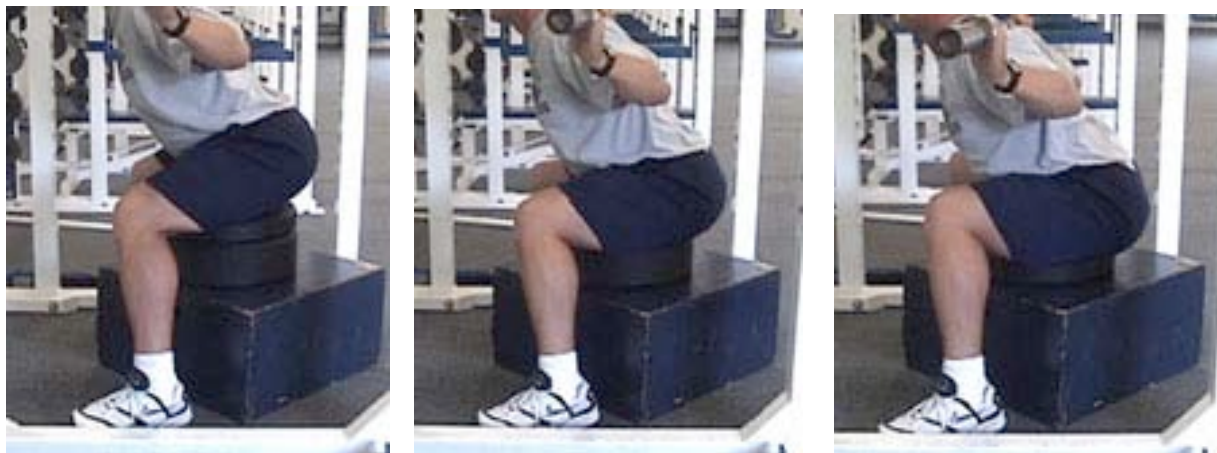
To start the box squat, I want the athlete’s hips to begin the motion, not the knees (quad squatter). Again, when the knees bend first, the load is shifted downward; you need the load going backward. Remember, you want the bar to travel in a straight line. Keep pushing the hips back as you squat down. If you are “sitting back” correctly you will feel tension develop in the hamstrings. Keep sitting back until you reach the box.



When you reach the box you want to sit down and relax the hip flexors while keeping every other muscle tight---back arched, abdominals squeezed, upper back and arms tight. By relaxing the hip flexors and sitting on the box you are able to break up the concentric and eccentric workload of the squat. This causes you to squat from a static contraction to a dynamic contraction. This is one of the best ways to develop explosive strength. The athlete should avoid falling down on the box and trying to bounce off. You want the athlete to come down in a controlled motion, pause on the box for a second, and explode upward. While driving up still keep everything tight. Drive the head back into the bar, forcing the knees and feet out, while pulling with the elbows. Likewise, keep the shoulder blades squeezed together while making sure to hold your air in the bottom and slowing blow it out as you explode through the top.



When prescribing the box squat to an inexperienced athlete, you will notice that when they reach back to sit down on the box they will uncontrollably fall. This is an immediate red flag for you as a coach or athlete. This demonstrates the athlete lacks the strength to support the weight simply using the glutes, hamstrings, hip and erectors. This test can be administered and observed simply using an unloaded squat bar. If this is the case with one or more of your athletes there is a solution. Take your box and place some Olympic bumpers or extra pieces of wood on the box, thus raising the total height of the box itself. Then have the athlete squat down until they can come down in a controlled manner using correct form. As the athlete's form and strength improve remove the riser plate until a parallel box squat can be executed.



In closing, I hope the corrective teaching techniques I discussed in this article proves useful when working with men and women athletes. Remember, to initially use a light load when working with novice lifters so that proper form can be established. This will allow the joints and their surrounding musculature to develop the proper motor pathways and flexibility needed to perform the lift properly and safely. Maximizing form and technique when squatting will correspondingly develop strength and power in a functional way for your sport. Good luck in your pursuit toward athletic excellence!