Coaching Considerations for the Barbell Squat — Part II

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Editor’s Note: This is the second article in a two-part series on the back squat exercise.

As with most weight training exercises, technique must be mastered when performing the barbell back squat. In fact, proper technique is especially important when performing the squat since most athletes eventually use very heavy weights. Strength and conditioning experts agree that an organized teaching progression is necessary for beginners (1). Part I of this two-part series included the appropriate hand grip, barbell position, head and foot positions and foot contact when performing the back squat.

Flexibility and proper technique with very light resistances are the first concerns when teaching the back squat.

Proper Torso Angle

When performing barbell squats, the athlete should maintain “the torso as close to vertical as possible” (1). It has been demonstrated that the most successful athletes performing the squat exercise in competitive lifting maintain a more vertically erect torso than less successful lifters (3). However, the strength and conditioning professional should be aware that a certain amount of forward lean is necessary to obtain proper squat performance. Comparisons of torso angles for the high bar (barbell on the trapezius muscle), low bar (barbell on the posterior deltoids), and front (barbell on the anterior deltoids) squats show that the most erect torso occurs with the front squat, while the low bar squat results in the greatest forward lean.

Figure 1. Proper body positions for three types of parallel barbell squats. (Modified from Fry, et al.) (2)

Photo 1. Proper torso angle for a low bar squat.

Photo 2. Practice proper technique with light weights or a stretching stick.
Many beginning lifters confuse keeping a straight back with keeping the torso completely vertical. The result can be seen in Photo 3, with the athlete unable to descend in a balanced position. Novice athletes should be instructed to use a light forward lean. On the other hand, some athletes will lean forward excessively (Photo 4). Many weight machines designed to mimic the squat motion will permit inappropriate body alignments when performing barbell squats, which explains in part, the low transfer of squatting strength from machines to barbell for many athletes. Practicing proper squat position with light weights, improving flexibility and performing relatively high repetitions will help develop proper squat technique. Beginning lifters should not increase training loads until proper squat technique has been mastered.

**Keeping the Back Straight**

The back should be rigid and slightly arched (1) as shown in Photo 5. A rigid back provides for the efficient transfer of force from the lower body to the barbell, which is supported by the upper body. This position also permits the increase of intra-abdominal pressure to assist the muscles in supporting the vertebral column in this rigid position (3).

Novice athletes often permit the back to round (i.e. vertebral flexion) as shown in Photo 6. This flexion is often observed during bench squats (Photo 7) when athletes have a tendency to relax and incorrectly let the bench stop the
descent during the exercise. For this reason, some strength and conditioning authorities do not recommend bench squats.

Besides verbal instructions, several successful methods may be used to help athletes assume proper back position. Using a very light weight, the athlete stops in the bottom position; the coach then places a straight stick, rocking it back and forth along the spine to demonstrate that the back is not straight (Photo 8). This method is effective for athletes who do not realize how rounded their back has become. A simpler method is to lightly tap or place a hand on the back to remind the athlete to correct his back position (Photo 9).

**Squat Depth**

There are many variations of the barbell squat, making it a common core exercise in numerous situations. Like any resistance exercise, proper range of motion is required to obtain the desired training effect. An area of particular confusion with the squat exercise is how far the athlete should descend. The actual desired depth of the squat should be decided by the strength and conditioning coach responsible for the program. However, confusion exists regarding what constitutes a parallel squat, a full squat, a half squat, etc. As a result, a wide variety of ranges of
motion are used for this exercise. Based on the definitions presented in the recent NSCA position paper on the barbell squat (1) and related documents (2), the following descriptions of squat depth are presented in Photo’s 10 through 14.

Photo 13a. Full squats for the back and front.

These descriptions do not conform exactly to the rules for competitive lifting used as criteria for squat depth in many programs. However, the use of the squat depth photos may provide a reference point for determining proper squat depth for your athletes.

The Lunge

The lunge is a commonly used assistance exercise for the barbell squat. Although many athletes perform the lunge, most perform it incorrectly, thus limiting the effectiveness of the exercise. Photos 15 and 16 show the athlete stepping into the lunge and lowering himself to a proper terminal position. There are several key points to observe in Photo 16 (6). First, the torso is vertical, with the hips directly under the bar. Many lifters allow a forward lean to occur, thus decreasing the role of the hips and legs. Second, at the bottom of the motion, the knees are directly over the toes. A stride that is too long (Photo 17) or too short will make this position difficult to attain. Also, some athletes will use a correct stride length, but fail to lower themselves to the correct depth. Third, the trail leg has only a slight bend at the knee. If the trailing leg is allowed to bend too much, the training effect is shifted away from the lead leg. This often occurs when the stride is too short. To avoid potential injury, athletes should let the knee of the trailing leg make contact with the ground.

Beginning athletes may benefit from performing split squats, which are the same as the lunge without the stride. Instead, the athlete starts from the position in Photo 15, eliminating the step. It is easier to maintain balance while performing split squats, and the athlete will be assured of a correct stride length for each repetition.

An advanced form of this exercise is the side squat or angle lunge (Photo 18) (7), which is excellent for many sporting events that require lateral lunging movements (volleyball, tennis, wrestling, etc.). Only light weights should be used for this version of the lunge until the athlete is capable of maintaining balance, and able to lower themselves to the proper length.

References


Photo 14. Bench squat depth is higher than a parallel squat. (Note: the bench squat is not recommended by many authorities).

Photo 15. Proper stride length for the lunge exercise: this is also the starting position for a split squat.
Photo 16. The bottom position for the lunge exercise; note the vertical back, the lead knee directly over the toes and the extended trail leg.


Photo 17. This athlete’s stride is too long and will have difficulty descending to the correct depth.

Photo 18. The side squat.