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Oly Optimization

Olympian Chad Vaughn explains ideal positioning for success in the Olympic lifts.

By Chad Vaughn

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As a spectator at the 2011 Reebok CrossFit Games, I couldn't keep the coach in me from slipping out during all the barbell movements.

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As he breaks the bar from the ground, Vaughn has his shins slightly forward to distribute his weight properly.

It was easy to see the increase in the quality of weightlifting technique and leg strength, even from just the year before. I believe strength and technique will continue to increase through the next couple of years until everyone participating has the technique and positions of an elite-level weightlifter and an uncommon level of leg strength. These will be necessary for optimal efficiency through low-weight/high-rep barbell workouts, energy conservation throughout consecutive days of maximal exertion, and better results in one-rep maxes.

With regard to technique, this all-important efficiency will require the use of more core (hips and legs) and less extremities (arms). This is of the utmost importance as the arms are in great demand with a high amount of pull-ups, push-ups, muscle-ups and more scattered throughout any CrossFit competition. Proper positioning and movement of the bar and body will lead to efficient technique. Good technique means the bar is close to the body throughout its journey up the leg until the athlete achieves complete extension and applies that power to move the bar.

Easier said than done, right?

Top-Down Positioning

So how does one accomplish these positions and movements? Well, the critical position you must learn to create is vertical shins with the bar right above the kneecap as you complete the leg drive from the floor.



Note Vaughn's shins are now vertical as the bar reaches the knees, putting him in great position to finish the pull.

This is important and necessary because it accomplishes moving the body around the bar rather than the bar around the body. If the shins/knees are forward at this placement, then you have to consider the forces on the bar. It had to have gone forward and around the knee, and therefore the bar continues this forward momentum the rest of the way up.

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From here, you will either have to chase the bar with the body to contact and get under or muscle it up with the arms with the bar away from the body. In either case, there will likely be that inefficient jump forward (unless you are strong enough to pull it back in, which would indicate to me that you are capable of much more if you can learn to avoid fighting against yourself).

From this vertical shin position you will be able to stand, extend and jump under the weight with the bar automatically and naturally closer to the body. This should be done from the knee, without the knees thrusting forward or re-bending, as this will also cause forward movement of the bar and body, loss of position and loss of momentum.

For those who create forward momentum and continue to jump forward, there are a number of cues we can give to hold this off, but it will be necessary for these athletes to exaggerate their movement to prevent the knees from coming forward at all. (Exaggerations are usually used to create movement that represents a “meeting in the middle” between two extremes.) One example of a cue I would give for this would be for lifters to feel themselves back on the heels for as long as possible as they stand to complete extension. In watching an elite lifter from here, you will see the knees come forward slightly—but look at that only as a shifting and not a re-bending.

To initially find this all-important spot at the knee, let's start from the top. Stand straight up with the bar in the hands (snatch or clean grip), with the arms hanging and relaxed. Then, with a very slight bend in the knee and without letting them bend any further, lower the bar to that specific position right above the kneecap, as if you are doing a Romanian deadlift.

The amount of knee bend required to create vertical shins with the bar above the kneecap will be a little different for each person. Please realize that this vertical shin position requires the knees and shins to be so much further back than most people think, and it is hard for many to get to it without gaining flexibility in this specific range of motion. For most, if the hamstrings aren't screaming at you, then you are probably not there. Those blessed with flexibility might not feel much, but there should definitely be a lot of tension in the muscle. In either case, it will be necessary to use this movement as an exercise/tool to improve flexibility and build general muscle memory with the bar and the body in the proper positions.



Susannah Dy/CrossFit Journal

The bar starts off close to the body and skims the shins on the way up.



Susannah Dy/CrossFit Journal

Keep your shins vertical and the bar above the kneecaps before exploding to complete extension.



Chad Vaughn

Foot position: The feet are in a stance of flexibility, about shoulder width apart, toes slightly turned out.



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Start position: The shin angle is slightly forward to accommodate mid-foot body-weight distribution. The hips are lower than the shoulders to activate the legs. The back is set and tight. The shoulders are over and slightly in front of the bar.

Set up for Success

To get to the right position from the floor, we want a start position that will allow for the easiest transition. It's important that we avoid any extra and unnecessary movement of the body as we stand with the weight, and we want to pay specific attention to the back angle as the bar moves from the floor to the knee. Because we want the back angle to remain constant through this range of motion, the best way to find your ideal back angle from the floor is to take a picture or video from the side with the bar above the knee, the shins vertical and the back tight. Then, match that angle at the floor.

There are always exceptions to the rule, of course, so in a few cases we would use educated instincts of look and feel or a system of trial and error to find the best positions. In either case, some will struggle to get to this position or to create this specific back angle from the floor, especially with proper posture. This is usually due to problems of awareness or flexibility. Give some athletes a few reps and their bodies will do what's needed. Most who seem to lack flexibility are simply locked up by their stance or body-weight distribution.

When I work with any athlete for the first time, I always start by setting him up with a proper grip and foot position.

This stance is always about shoulder width apart with toes slightly turned out—a position of flexibility. Once we get to the lift from the floor, I usually end up moving many people's feet out even further. This is all about allowing the athlete to set the back, create closeness of the bar, and more easily move the body out of the way for an in-line bar path.

Of course, you don't want to be too wide, but it is far more common for athletes to have the feet in too narrow and to believe this is necessary. Think about an extreme example of narrow feet with toes straight forward, which usually noticeably hinders overall flexibility and therefore the ability of the athlete to set and tighten the back with good posture. If you are one who is blessed with excess flexibility, you will likely not be able to tell the difference no matter what your stance is, but this extreme example will still cause trouble when flexible athletes try to create the most efficient body movement and bar path. With the feet straight, they will either have to work harder to accommodate that bar path by flaring the knees out (rather than having the knees naturally come back as they drive from the floor out of a position of flexibility) or risk lifting around the knees, which will create forward momentum and take the bar away from the body.

Toes Forward?

Many of us are learning some benefits about a stance with straight feet (i.e., extra torque). I get it. I am on board and love the info. As a matter of fact, I play with it from time to time, particularly in the back squat, mostly as a warm-up and/or stretch. But, to me, you have to pay attention to sport specificity. For the CrossFitter, the Oly lifts fall into that category, and they show up in workouts regularly. So, if one's feet are going to jump out for the catch of the snatch or clean with toes slightly turned out in the body's most flexible, upright position at rock bottom, that is the stance I would recommend to strengthen those positions as much as possible, specifically in the front and overhead squats.

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Furthermore, for these two squats (and even the back squat for that matter), if a particular foot position decreases postural quality in the slightest in any position of the movement, then you have to consider if it is worth using, at least for the time being. For the majority, any gains from straight feet will simply not outweigh the loss of posture and flexibility from the floor, which will create a loss of position throughout the entire lift and negatively affect bar trajectory.

On another thought, some will reason that their vertical-jump stance must be the best, most powerful foot position to aid in throwing a barbell in flight overhead. But, for starters, jumping up with your body weight is quite different than jumping under a barbell; the latter is far more about positioning.

Also consider this: why do you squat with a wider stance and with the toes slightly turned out? Obviously because it allows for more flexibility and the creation of a tight, quality position. And we lift the most weight when we use the best postures. I realize that many athletes lift more in the deadlift, but not usually without that “crapping dog” positioning!

Where's the Weight?

As for body-weight distribution, many lift with the weight too far toward the heels. Using another extreme example, placing the body weight excessively on the heels creates vertical shins and high hips, with the back parallel to the floor. If the shins are already vertical right from the floor, it will be mathematically impossible to replicate that back angle with the bar above the knee and the shins still vertical. With the back parallel to the floor as the bar comes off the ground, the distribution of the weight will be highly disadvantaged and will require most of the work to be done by the back. Furthermore, if the back is rounded—as is common with the decreased flexibility created by this position—we are talking about multiplied detriment.



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Above knee: Weight distribution is now toward the heels. The shins are vertical. Ideally, the back angle/shoulder position is a copy of what it was with the bar on the floor.

In addition, with your weight predominantly on only part of the foot, you can reason that you are using or activating only part of the rest of the body.

Look at your start position in terms of geometry: you need optimal angles of the shins and the back.

Look at your start position in terms of geometry: you need optimal angles of the shins and the back. With the shins, to increase the ability to set the back, shift the body weight to mid-foot (or evenly distribute it throughout the entire foot) and activate more lower-leg musculature (quads, glutes and even calves). A good back angle will do many of the same things but will also create better distribution of the weight being lifted throughout the entire body (the back and the legs mostly).

These angles and overall start position will be different for each person because of different limb lengths and body types, but the basics remain the same:

- You need a stance of flexibility.
- The body weight should be at mid-foot.
- You need a matching back angle with the bar on the floor and with the bar above the knees with vertical shins.
- The back must be tight.
- The shoulders should be slightly in front of the bar.

These points are especially important when learning the proper movement of your body, and they will help keep the bar close to your body.

Faults and Fixes

When coming off the floor, it can be difficult to master the transitions required to create that vertical shin position with the bar above the knees. Even out of the proper start position, the subsequent movement has to be learned and then hammered into muscle memory.

Of course, many faults can occur. It's easy to put too much emphasis on just getting the knees out of the way, which usually leads to excess back movement where the hips rise

faster than the shoulders. This means, among other things, that some of the energy that could/should be going into the bar is going into the body.

Remember what's happening in regard to body-weight distribution on the foot during this portion of the lift: the weight is at ideally mid-foot in your start position and at the heels by the time you clear the knee with the barbell. Use this as a cue and feel for the shift as you drift your entire body (not just the knees) back to the heel as you move the weight from the floor to the knee. This movement will actually need to be excessive or strongly exaggerated for most. Be aware that the more you sweep the weight back, the more downward pressure there will be on the chest/shoulders, so make sure you compensate here with extra upward pressure while drifting.



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Mid-thigh: The weight is now drifting back toward mid-foot as the lifter is standing to go into extension. The bend in the knee was produced at the end of the leg drive (above the knee), though the knees have slightly shifted forward as the lifter positions to extend and exert optimal power. The shoulders are still covering the bar.

Also, some will go into the jump too soon. This means that the leg drive is not being completed, the back is standing too soon and the bar is going around the knees. If the focus on drifting back doesn't fix this as well, then try to feel the shoulders stretching out over the bar longer.

In conclusion, I am not saying that this is *the* technique. There are even world-record holders who will set up and subsequently move their body and the bar differently. Nevertheless, the technique I'm describing is by far the most common and the one presuming the greatest overall efficiency while requiring the highest level of skill.



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Full extension: *The hips have completely opened, and the body has gone through and beyond a natural standing position with the heels raised, shoulders shrugged and chest rising. This full extension is comparable to what the body looks and feels like as it is just leaving the floor in a vertical jump. However, the next move from here in getting under a barbell is of course “jumping down” as the body moves back and around the bar while the arms pull and push it underneath.*

Look at it in terms of squat strength compared to Oly-lift capabilities, as one example. One lifter might be able to realistically reason that if he can double a certain weight in the front squat in training, then he has a good chance at being able to clean and jerk it in competition—but this requires a high level of skill and efficiency in getting almost everything out of the strength the lifter has.

A lifter on the other extreme will have squat capabilities that are in great excess of his current Oly numbers. The more “excess” strength one has, the more one can get away with less ideal technique; i.e., lifting around the knees but still being able to move quickly and land in the ideal spot after the jump under by overcoming that forward momentum or loss of position with great strength.

In either case, by mastering the skill of moving your body efficiently and quickly with heavier and heavier weight, any other physical skill you wish to achieve becomes easier and easier to accomplish. As additional benefits, consider the increased energy conservation through a WOD and increased potential in 1RMs!

Remember as well that this is a discussion on only one part of the snatch or clean. What do your catch positions look like? Are they as smooth as they could be? How are you interacting with the bar to get there? And what are you doing to prepare your body for this reception?

More to come!



About the Author

Chad Vaughn is a two-time Olympian, a seven-time national champion and an American Record holder in the sport of Olympic weightlifting. He was introduced to CrossFit in 2008 and began working within the community in early 2010. Chad is now part owner at CrossFit Centex, where he holds weekly weightlifting classes while doing occasional seminars throughout the U.S. Chad has a natural, matured understanding of how the body best moves and is highly motivated to help anyone interested find their “perfect snatch” and heaviest clean and jerk.



Mike Markentin/CrossFit Journal