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Squat Fix: Falling Backward

CrossFit HQ's Russell Berger and Pat Sherwood dissect a common problem: athletes who fall backward when learning the air squat.

By Andréa Maria Cecil

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All images: Dave Re/CrossFit Journal

The Problem

Longtime CrossFit trainers have seen it more times than they can count: an athlete falls on his butt at the bottom of the air squat.

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The hips go back and down, but then the chest falls. When he tries to regain a neutral midline, it's time for someone to yell "timber!"

But why does it happen? And how can it be fixed?

The Causes

Pat Sherwood, a Certified CrossFit Coach (CF-L4) and former member of CrossFit's Level 1 Seminar Staff, blames butt crashes on one thing: ankle mobility.

"You take those same people and put them in a pair of women's high heels ... they would look like a catcher at home base. Their torso would be vertical," he said.

He added: "If their ankle is at 90 degrees, too much of their weight is going backward. They're going to compensate by really leaning forward at the waist."

A trainer sees that fault and cues the athlete to lift the chest, Sherwood said. And the athlete can do it, he noted. But without proper range of motion in the ankles, the athlete will fall backward.

Only a small percentage of people are able to get into the correct position after one cue, and that's probably because they have the requisite ankle mobility and hadn't realized their bodies' capabilities, he said.

"But most people don't have that mobility, so they fall over."

Russell Berger, on Seminar Staff since 2009, sees the fault when athletes try to keep the foot flat on the ground and raise the chest up to maintain a neutral spine.

Those two points of performance "can be difficult to do at the same time, especially with the untrained," he said.

What Berger typically sees is athletes pulling themselves to the bottom of the squat first and then trying to arch their backs as much as possible.

At that point, the athlete is taking an unbalanced position, not moving anything else and shifting his or her weight to the posterior half of the frontal plane, he explained.

The intentions are good, but this course of action is "an unrealistic way of gaining better movement."

"That's why it's important to arch the back and maintain it on the way down rather than squatting down real low and then arching the back," Berger said.

Ultimately, it's a balance problem.

"Something is loading too much backwards," he said.



If mobility isn't an issue, it's possible the athlete simply doesn't know where his or her body should be in the squat. Tactile cues from the trainer can often help.

This usually means the athlete is trying to raise the chest at the bottom of the squat without pushing the hips forward to right himself.

If the hips are pushed forward and an athlete runs into the ankle issues Sherwood referenced, he or she will be forced to raise the heels—another form error.

A rarer scenario is a long femur.

"If an athlete has unusually long femurs, all of a sudden that pushes his entire torso to the posterior, to the rear. In order to compensate for this, the athlete will usually be leaning quite far forward with their chest," Sherwood said. "Now we're asking for superhuman type of stuff."

Long femurs make ideal positions difficult.

"It's certainly hard to have a really beautiful squat," Sherwood said. "Not impossible. But the odds are stacked against you."

Aja Barto, a three-time CrossFit Games athlete who stands at 6 foot 5, has an impressive air squat, Sherwood noted.



Note the difference in angle at the ankles. On the left, the athlete is able to flex at the ankles and keep the chest upright. On the right, the athlete is struggling to maintain balance and keep her chest up. If her ankle mobility is very poor, she will have difficulty getting into the correct positions.

But Seminar Staff member E.C. Synkowski, who is 6 feet tall, has struggled with her squat for about seven years, he added, because of her leg length.

The Solutions

To begin correcting the fault, Berger recommended the trainer ask the athlete to raise the chest earlier during the descent. The athlete could also grab onto a pole, pull-up rig or squat rack while squatting to keep the torso upright, he offered. Or the athlete could hold a weighted object while squatting or squat in front of a wall.

The goal is to teach the athlete to get the chest up and drive the hips back and down.

Watch the descent and correct any forward lean on the way down so the athlete never gets into a poor position, Berger advised. Still, he added, "that's not always a luxury you have."

If the chest is far forward, begin by ensuring you're communicating well with the athlete.

"They may not know what I'm asking. They may not know how to use the muscles in the back or how to turn them on," Berger explained.

In this case, it might be necessary to use a tactile cue with a knuckle, demonstrate the desired position or have the athlete practice flexion and extension of the spine to connect with the correct muscles.

"To get a beautiful air squat, it could take years," Berger noted. "(But) I could get you to stop falling on your butt pretty quickly."

He encouraged trainers to take a flowchart approach in their coaching.

"Take it one step at a time and go down the path until you reach a dead end, and then back up."

And tackle the big issues first, he said.

Sherwood's advice: First, stop wearing Olympic-weightlifting shoes.

"Why does everyone squat better in Olympic-lifting shoes than regular shoes? It's because of the heel," he explained.

He continued: "Leave the Olympic-lifting shoes on the shelf. Squat more."



Pat Sherwood uses this drill to increase range of motion at the ankles, and there are others like it. Improved dorsiflexion will often allow athletes to make positive changes in torso angle in the squat.

Specifically, Sherwood recommended a stretch sequence he himself does in his warm-up.

With the athlete's back toward the wall, have him or her squat as low as possible with the wall supporting the butt. The feet can be anywhere from 1 to 6 inches away from the wall, depending on the athlete's build, Sherwood said. At this point, the athlete should keep the heels up off the floor enough so that a finger could easily slip beneath.

"Then I would take a 45-lb. dumbbell ... I would rest my elbows on my knees and hold the dumbbell with one head of the dumbbell in each hand," Sherwood said.

Slowly, the heels begin to come down.

"I've found that to be personally very helpful!"

Sherwood also cautioned against simply throwing athletes to wall-facing squats in this particular case.

Doing so is going to fix an immature squat caused by lack of kinesthetic awareness—the kind of squat Berger talked about—"but if it's some sort of mechanical impingement

stopping you from that range of motion, that's not going to help."

If the toes are close to or touching the wall, the knees simply cannot go forward, therefore promoting a bad squat, Sherwood said.

"The biggest thing is just squat and squat often, and think about how you're squatting. It's easy to squat relatively lazy—most people do that all the time. ... If you're doing 1,000 squats and (they're) all in that comfortable range of motion, you're not going to get any better."



About the Author

Andréa Maria Cecil is a CrossFit Journal staff writer and editor.