

Sports' perfect 0.4 seconds

How Stephen Curry is reinventing shooting before our eyes

By [David Fleming](#) | ESPN The Magazine Originally Published: April 1, 2014



ESPN Illustration Curry has made more threes at a higher rate than anyone through five seasons.

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IT BEGINS WITH a miss.

The yellow digits of the Staples Center game clock blink down to 6:35 as Clippers guard Willie Green's three-pointer from the right corner sails exactly where his feet are pointed. The shot ricochets, hard, off the front of the rim to the backboard and into the waiting hands of Golden State's Draymond Green, who lands, turns and pushes the ball to guard Steph Curry. In the next seven seconds of the second quarter, Curry will reveal the art and science behind the best shot in NBA history.

Gliding toward halfcourt, Curry turns his left shoulder back to Green & catches the pass softly with his right hand, letting gravity bring the ball down to the 1st key: his dribble.

Curry, 26, is the eldest son of Dell Curry, who himself shot 40.2 percent from three-point range during a 16-year NBA career, mostly in Charlotte, that ended in 2002. From a very young age, Steph learned how to shoot at the knee of a master, throwing tiny tantrums when he couldn't accompany his father to Hornets practice -- not because he wanted to see his dad's famous friends but because he wanted to

work on his shot. Much like that of Tiger Woods, Barry Bonds and Peyton Manning before him, Steph's drive to perfect the complex mechanics of his sport was born from a powerful, subconscious urge to mimic, and then metamorphose, his father's smooth and vertical three-pointer.

At 9, Curry was the smallest kid on his rec league team, brought off the bench only when his coach needed to shoot defenses out of the zone. "The zone buster," Curry says with pride. "It all developed from there."

What's on display at this moment, however, as he floats across the midcourt stripe, is something no one ever talks about: Curry's ballhandling skills. Those he got from his 5'3" mother, Sonya, a lovely, strong-willed woman who played point guard in high school and volleyball at Virginia Tech, where she met Dell. "If I dribbled four times, that was about my limit -- I had to shoot it or pass it," says Dell. "We knew early on Steph could shoot with good form. But he was a better ballhandler before he was a shooter, and people miss that. What he can do shooting off the dribble? Those are my 'wow' moments. That's his mother."

Curry's 1st dribble up court is in front of his right foot. In between his 1st & 2nd dribbles, he surveys the court. A perfect diamond has formed. Teammate Steve Blake is flying up the left wing, while Clippers guard Darren Collison trails Curry by 2 steps down the middle. Curry doesn't care about either right now. He's reading the huge bright-blue sneakers of the lone man back on defense, 6'9" Danny Granger; he's waiting, hoping, that the forward will instinctively sag down from the top of the key to protect the rim of his home court from an easy layup or a thunderous dunk.

This is where Curry's preternatural poise, instincts and intelligence manifest themselves: in his shot selection. As Larry Bird once did, Curry seems to understand what a defender will do before the player himself knows. It's an increasingly crucial skill, given that desperate defenses, like that of the Clippers at this moment, often will try to disrupt the slight Curry (6'3", 185 pounds) before he finds his shooting rhythm. "Everyone else reacts, Curry anticipates & reads, brilliantly," says David Thorpe, ESPN NBA analyst & executive director of the Pro Training Center in Clearwater, Fla. "That's where Steph is best, maybe the best in the NBA: finding that opening where there doesn't appear to be one. That's the art in all this. Because it doesn't matter how great your shot is or how pure your mechanics are if you can't ever get open."

Curry still isn't sure about Granger. He needs to be. This is an important shot for the Warriors. They've missed 12 of their last 13 from the field & already trail the far more physical Clippers 37-33. Nursing a right quad strain, Curry is 1-for-4. It's also a potentially historic shot for Curry. In 2012-13, he set an NBA record with 272 three-pointers in a season. At this moment, the fifth-year player leads the league again with 199 threes while also having the third-highest three-point percentage in NBA history (43.8). A make from beyond the arc will give Curry the franchise record for consecutive games with a three-pointer (54). It will also make him just the 6th player in history to hit 200 threes in back-to-back seasons.



"I love everything about shooting," says Curry, "but mostly that perfect form, when your body is in rhythm from the time you plant your feet to the time you release the ball. When it happens, everything is very smooth and calm from your feet through your release. Everything moves through you like a wave, almost. It's a beautiful thing."

Curry looks a millisecond longer. Granger glances to his right at Blake on the wing. That's all Curry needs. His second dribble is across his body to the outside of his left foot. Still moving at full speed, Curry absorbs and banks all his lateral motion and forward momentum, planting his feet softly, at the very edge of the red three-point line, as if stepping into a pair of slippers -- toes and feet perfectly aligned to the target. Then, borrowing a move from Hall of Famer Jerry West, Curry compresses his right knee, hip, torso, elbow and wrist into a perfectly stacked vertical coil before adding an almost imperceptible amount of extra force to his final dribble. Most shooters set their feet, focus on the rim, compress their lower body and then lift and launch. Curry eliminates any wasted time and energy by riding that final, slightly higher bounce up off the floor, instantaneously triggering his shooting motion.

"He's not just the purest, greatest shooter to ever play the game," says Adam Filippi, the Bobcats director of international scouting, whose book on shooting techniques has been translated into four languages. "His elevation-type shot is redefining and revolutionizing the art of shooting."

The game clock reads 6:31. The ball rises up Curry's body into the ideal shooting pocket just below his chest, while his middle finger and forefinger -- his shooting fork -- search instinctively for a seam at the center of the ball. As the ball continues its ascent, his right palm bends back flat until the skin of his wrist begins to wrinkle. The last thing Granger or any defender wants to see in this situation are the 16 Hebrew characters that Curry, in June, had tattooed on the inside of his shooting wrist. By the time that message from Corinthians (love never fails) flashes, it's too late.

The ball rests on Curry's fingers, off his palm. His thumbs form a T on the left side of the ball. His entire right arm, tucked tight to his ribs, continues to rise with near-perfect 90° uniformity: shoulder to elbow, elbow to wrist, wrist to fingertips, like a waiter using a palm to carry a heavy tray of dishes back to the kitchen.

Curry doesn't see it -- there's no way he could -- but the Clippers' Glen Davis, a 289-pound power forward, is closing fast from behind. The guard needs to hurry. A huge key to Curry's accuracy is his ability to maintain biomechanical form under duress, & that all hinges on the integrity of his right elbow. The farther it flails to the outside (shooting coaches call it chicken-winging), the less likely he is to score. As a kid, Curry mastered tight-elbow discipline by lying in bed & throwing a balled-up sock as close to the ceiling as he could, without touching it, hundreds of times a night.

Keeping that elbow in as his body rises, Curry seamlessly transfers the kinetic energy from his coiled lower body, first to the vertical portion of his shot and then to the levers (arm, wrist and fingers) that control the force and trajectory of the ball. The more economical his movement, the more efficient and accurate his shot. But perfect mechanics aren't enough. They must be so ingrained in his muscle memory that his motion can be flawlessly repeated in nearly all circumstances.

That alone, says Warriors coach Mark Jackson, is what sets Curry apart from both peers and predecessors. "We haven't seen anybody else with his ability to be a great shooter across the board," he says. "Meaning, stop and pop. Meaning, off motion. Meaning, pick-and-roll. Meaning, split the pick-and-roll and shoot off one leg. Meaning, step back and shoot over two guys trapping. Meaning, any way you can name how to shoot a basketball, Steph Curry is a great shooter. We have never seen anybody on that level. Steve Nash played at a high level, a two-time MVP and an incredible shooter -- this is a different level. Reggie Miller, incredible shooter. Chris Mullin, incredible shooter. Guys I played with, Dale Ellis, Dell Curry, incredible

shooters. But they didn't have the total package. They aren't coming off a trap and lifting from 30. This guy just has no limits."

Shooting touch is a bit of a misnomer. It isn't bestowed, it's built, through ungodly, torturous repetition -- shot by shot, day by day, year by year, until the complex kinetic chain of movements is burned into the muscles. Curry has never lacked the motivation for that kind of solitary lab work. Barely six feet and 150 pounds as a senior at Charlotte Christian School, he received no scholarship offers from major schools and instead chose tiny Davidson College, north of his hometown of Charlotte. Two years later, still unable to grow a mustache, Curry single-handedly led the Wildcats to the Elite Eight. "I have heard what people say about me ever since high school," he says. "I'm too small to play in college, then same thing in the NBA. I'm not gonna be able to play point guard, then I'm not a true point guard, and even this past October, I still find it funny that GMs voted me the third-best shooting guard. I haven't reached my potential yet. So I hold myself to a higher standard; it's a conscious mission to figure out ways to constantly make myself better."

That includes firing up to 1,000 shots before every practice. It also includes a game-day shootaround ritual in which Curry fires long twos and threes from seven perimeter stations, never moving from one to the next until he sinks 10 of 13 shots. On a good day, the whole exercise takes less than nine minutes. An hour or so before the game comes a vigorous routine that lasts anywhere from 15 to 30 minutes and focuses on ballhandling, lefthanded shooting, visualization and, on the Warriors' home court inside Oracle Arena, a final series of four shots from 60 feet down the baseline, launched all the way from the tunnel that leads to the locker room. He usually makes half.



But the real trick before tip-off, says Curry, is to step on the court and forget it all. "There's so much flying at you during the game, there's no time to think, Oh, am I elbow in? Did I bend my knees enough?" says Curry. "You have to rely on the fact that you put the work in to create the muscle memory and then trust that it will kick in. The reason you practice and work on it so much is so that

during the game your instincts take over to a point where it feels weird if you don't do it the right way."

1 of Curry's shot barometers is his left hand. He keeps it "paralyzed" throughout his motion, allowing it to guide & balance the ball but never pushing, directing or spinning it. The left hand is the gatekeeper, protecting the ball &, when it's time, swinging open, with the fingers pointing to the flight path, to allow the shot to pass through.

The game clock now reads 6:30. Davis is close enough that Curry feels the rumble of his giant footsteps. As Curry extends his legs and begins to lift off the court, one of the more remarkable traits of the game's best jump shot comes into view: It's not a jump shot at all. Not even close. Classic jump-shooters, like Ray Allen, use a more athletic, two-part process, elevating high above defenders and then launching the ball at their apex with a flatter shot arc -- around 45 degrees. Curry's toes, however, barely leave the earth. Instead, he releases the ball as he is still rising, accomplishing in one movement what most shooters must do in multiple, deliberate steps. By doing this, Curry adds 10 degrees of arc to the flight of his ball, making it nearly impossible to block. (Only 33 of Curry's 1,189 shots this season, through March 27, were blocked.) It also translates into 19 percent more space inside the rim for Curry's ball to travel through, according to ESPN's Sport Science. This is the moment where the art and science of Curry's shot intersect with his mechanics to create something wholly original -- even revolutionary. All the best parts of his motion evolved from his alleged shortcomings. Curry's slight stature requires his shot to be fast. Fast requires that the mechanics must be flawless *and* give him a lower release point for more arc. More arc translates to ... well, the Clippers are about to find out.

Without ever taking his eyes off the rim, Curry moves to finish his shot. From his toes through his torso to the top of his head, his body is so vertical, he looks as if he's coming down from the ceiling, not jumping toward it. His shooting elbow passes shoulder height, still at a perfect 90-degree angle. And when his arms are straight and extended overhead -- elbow over eye, shooters call it -- the left hand opens. The path of the ball, like the elbow, stays clean and true, riding the beginning of a Vitruvian arc; it doesn't hitch backward over the crown of his head or veer to the side.

Now the wrist begins its flexion. The ball lifts off the tip of his index finger, then off the tip of his middle finger. His palm falls, his fingers now extended to the floor. The left arm stays perfectly still. The head never moves. They are the ballast maintaining Curry's horizontal balance in midair.

To Curry's right, referee Gary Zielinski shoots his left hand into the air to signal three. Granger flails toward Curry. Only 0.4 of a second elapses from the time he starts his shot to the time he releases it. (It takes a human eye about 0.3 to blink.) The shot comes so fast, in fact, that Collison, now at the top of the key, seems to stumble sideways out of sheer surprise. An average NBA player needs almost 0.6 of a second to shoot. The 0.2 Curry saves with his mechanics and release buys him more than three feet of extra space. He needs it. Just after the ball leaves Curry's fingertips, Davis lunges at him from behind, swiping his right hand across Curry's midsection.

One of the few thoughts that Curry allows when he shoots is a reminder to hold a high, straight-armed "swan neck" follow-through -- elbow straight, palm down, fingers dangling as if the rim were his own giant cookie jar. It's a tribute, of sorts, to his pops. But at Staples Center, from behind, it looks more like Michael Jordan's iconic pose after his series winner in Utah. The clock reads 6:29 as Curry's shot, still rising toward its peak of 14 feet, passes directly over Granger halfway down the key.

Before the game, boyish smile on his face, Curry had laughed, shrugging his shoulders and saying, yeah, he knows the second the ball leaves his hands. As his shot now begins its descent toward the rim, he drops both arms behind his back, palms up, chest out, like a bullfighter. Yeah, he knows. "There's a difference between shooters and shot makers," says West. "This kid is a shot maker."

A little boy seated two rows behind the Warriors' bench, with a wavy shock of black hair and a T-shirt that reads if i ruled the world, raises both arms in unison with the ref. He knows too.

The yellow digits of the game clock blink to 6:28.

It ends with a swish.

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