

**Courtesy of Gary Hall Sr., 10-time World Record Holder, 3-time Olympian, 1976 Olympic Games US Flagbearer and [The Race Club](#) co-founder.**

*This is part five of a five part series. Here is [part one](#), [part two](#), [part three](#), and [part four](#).*

While arguably the most important part of the start is the speed of the underwater dolphin kick once the swimmer is submerged, this series pertains to the technique from the starter's command to take your mark up until the body is submerged.

We have discussed the two different basic techniques of track starts, weight forward and weight back, and the importance of coupling motions in improving the outcome of both techniques.

However, there are five more important techniques to a great start that are often overlooked and that deserve discussion. Those are; the position of the stance, the position of the back foot, the hyper-streamline of the arms, the hip lift and the pointing of the feet.

## 1 – POSITION OF THE STANCE

The question of from where a swimmer should start his position, once the command from the starter to take the mark occurs, is controversial. I recall painfully watching the start of the 100 m freestyle in the 2004 Olympic Trials, when my son, Gary Hall Jr., began from a full standing position, only to hear the beep go off before he had reached down and grabbed the front of the block. He was the last one off the block and broke out well behind the others. Unfortunately, the error may have cost him a position on the Olympic team for the 100 m freestyle.

With swimmers using the weight back start, it is particularly important to establish a stance with the hands relatively close to the front of the block, as it takes even more time to shift the weight to the back foot. Most of the elite swimmers of the world today will position their feet on the block, then bend down with the arms relaxed and hands dangling near the front of the block, or loosely holding on to it, in order to avoid the mishap of pulling backwards when the beep happens. The challenge is that a muscle that remains too long in a stretched position loses its potential for contraction. A swimmer does not want to remain in the cocked position any more than a baseball player wants to remain in a position with the bat cocked for too long of a time before the pitch. In other words, if a swimmer takes his mark and gets into the stretched, cocked position too early and remains there too long, the muscles will not contract as strongly, nor perform as well.

On the other extreme, it is not worth the risk, particularly with a weight back start, to begin the stance from a standing position, as it takes too long to get into the cocked position. Therefore, although this theory is unproven, the best position may be somewhere in the middle.

Whether using weight forward or back, I like to position the swimmer's stance with the arms hanging down, but with the hands just below the knees, rather than near the block. First, this is a more comfortable position to be in than hanging all the way down, while waiting for the starter's command. Second, it seems to position the swimmer's hands close enough to the front of the block in order to bend down the rest of the way, grab the front of the block, and shift the weight backward without staying in that stretched position too long nor arriving so late as to miss the beep. The position seems to be the best compromise between the two extremes.

## 2 – THE POSITION OF THE BACK FOOT

Whether there is a back foot wedge on the starting block or not, it is important to not be flat footed with the back foot. In other words, the foot should rest on the ball of the foot with the heel an inch or so off of the plate. The propulsion from the feet is derived from the front of the foot, not the back. With the heel slightly off the wedge, at the sound of the beep, the heel should drop down slightly then spring forward, producing greater power than if held down the entire time. Similar to doing a standing jump, the leg will produce more power with some downward motion first, rather than being held still prior to the start. If the heel is too far off of the wedge, it doesn't seem to do as well.

## 3 – HYPER STREAMLINE AT ENTRY

The hyper streamline position is defined as having the chin on the chest, arms placed behind the head (as far as possible) squeezed together as closely as possible, pulled forward as far as possible, with the hands overlapped, aligned with the forearms, wrist over wrist, and with the fingers squeezed together. While there is some controversy among coaches as to which streamline position produces the least amount of frontal drag, it is interesting that virtually every elite swimmer enters the water in this same hyper streamlined position.

Since the frontal drag forces are proportional to the square of the swimmer's speed, and that the speed of all swimmers at entry is approximately 15 mph, some 3 times faster than world record speed in the 50 m sprint, it is extremely important that the swimmer assumes the position of lowest drag coefficient at this critical time. The fact that nearly all of the elite swimmers are in the same hyper streamline position at the entry tends to support that this position causes the least frontal drag.

One concern of some swimmers and coaches is whether there is enough time to extend the head forward as the swimmer leaves the block and still return it to the flexed, chin-down position before entering the water. Since the head lift should be done quickly in order to produce as much kinetic energy from this motion, there is plenty of time to fully extend the neck and return the chin back to the chest before entry.

## 4 – THE HIP LIFT

One of the most often overlooked techniques of a great start is the hip lift, right before entry. Lifting the hip slightly (perhaps 20 degrees), articulating the upper body forward (or downward), enables the swimmer to enter the water without going too deep and without causing too much splash. The amount of splash is roughly correlated with the drag caused at entry. The greater the splash, the more drag or resistance, and the more the swimmer will decelerate.

Without lifting the hip, or by keeping the body straight, the body will go too deep on the start. To avoid this, swimmer's often bend the knees at entry. Either way, it will result in a slower start. After the hip lift occurs before entry, the upper body should enter the water at a 20-30 degree angle with the surface and the legs should be nearly parallel to the surface. For breaststroke starts, where the swimmer can go deeper, slightly more articulation of the upper body, or hip lift, is acceptable.

One can practice this motion on the deck of the pool by standing upright in the hyper streamlined position, then pushing the hips backward and the upper body forward to reach a 20-30 degree angle. This simple motion will enable swimmers to enter the water cleanly at the right depth and retain more speed.

## 5 – POINTING THE FEET

Perhaps the most common mistake I see on the start is failure to point the feet at entry. In a recent study in Germany, measuring passive drag forces of a swimmer, they found that the relaxed feet (hanging down) causes 40% more frontal drag than with the feet pointed backward. That was significantly more increase in frontal drag than any other bad body position that they tested. When a swimmer relaxes the feet off of the start, they will be hanging downward. If the swimmer does not make the effort to point them backward just before entry, the hanging feet will cause a huge splash and an increase in frontal drag. Even if everything else on the start is perfect, the hanging feet at entry will 'kill' a good start.

At [The Race Club](#), before we even begin to teach the other techniques of a great start, we always start from the side of the pool with the swimmer practicing entry with a hyper streamlined front end and pointed feet at the back end. Both are critical to getting a fast start.

If you want to develop a better start, there is no substitute for practicing lots of starts. Don't wait until a few days before competition to refine your technique. A great start requires many subtle but significant motions and positions. It takes time to develop and master each of these techniques to the point where you will be able to perform them well during the competition.

Practice makes for perfection.

I also recommend that you have an experienced start coach and/or a slow-motion video of your dive, so that you can analyze each aspect of those that we have discussed. At [the Race Club](#), we spend a considerable amount of time helping swimmers improve their starts, as it is so valuable, particularly in the sprints.

It is a bit disconcerting to start your race well behind your competitors. Let us help you get your races off on the right foot...or left foot, whichever is stronger.

Yours in swimming,