

Coaching Away an Athletes Speed By Lee Taft

It has often been said athletes are born with speed and that it cannot be taught. Although I disagree with this statement, it is funny how the same people who make this statement coach their athletes to not be speedy with the methods they use. Of course I understand this is unintentional, but none the same- the methods are not working.

There is no question that we all were born with the abilities to move quickly and efficiently. Obviously there are exceptions to this rule, but for some reason many coaching styles over the years have taken away our natural abilities and substituted them with artificial movements that are much slower and less efficient. This is a case of not truly understanding biomechanical abilities and laws of physics which govern our movements.

How many times have you seen a coach tell an athlete to NOT cross their legs when moving laterally, but yet the coach is asking the athlete to stay with an opponent that is moving quicker than the athlete can shuffle. This occurs all the time. The athlete should use a crossover step which allows the athlete to move quickly laterally by freeing up the legs and feet to be more explosive and efficient. But what most coaches will see is the athlete crossing their feet, when in reality they are actually turning their hips and running. Once again this is a case of not understanding movement economy.

Probably one of the most common speed technique disagreements in the industry is the use of a counter step when quickly moving forward from an athletic stance. The group that calls this a “False Step” is basing their movement on what they think they see and not what actually is occurring. Let me explain. When a person gets startled they kick into a fight or flight mode. This is the body’s way of preparing to attack or escape. Now this certainly is not always a life threatening situation, but just the same it is a heightening of the systems to react quickly. It does not get any more pure than that. The body wants to protect itself so it does what is quickest and most efficient to move.

When the body needs to move quickly it will instinctively position itself to move most efficiently. This can be changed over time because of poor mobility, flexibility, or body control but it does not mean the body doesn’t still react. How does this apply to acceleration in sport? When an athlete receives feedback or gets a stimulus from a play in a game or by a command and the feedback the athlete gets from this stimulus requires the athlete to quickly move in any direction, the athlete will instinctively reposition the feet to accelerate the body in a direction. Remember, this ability comes from the innate fight or flight system we all have. So when an athlete needs to react quickly they automatically reposition the body to attack or escape.

So if this ability is innate and the body naturally does it then why do so many coaches try to manipulate it? Once again, we go back to the lack of understanding of biomechanical and physical laws which govern our movement. What they see is the athlete taking a step in the opposite direction of travel. This to them appears to be counter productive, when in

reality it is much more productive and efficient. In the following section I will give some examples of movement patterns that require this counter movement to occur and what is actually occurring in the body.

The Plyo Step

Many years ago I came up with the term plyo step to describe the counter movement of one leg in the opposite direction of travel to propel the body in its intended direction. So what is the plyo step? It is a repositioning of the feet behind or laterally on the frontal plane to quickly move the body in a new direction. The reason I called it the plyo step was because it took advantage of the stretch shortening cycle so commonly referred to when speaking of plyometrics. When the foot drives down and away into the ground the center of mass gets moved quickly and forcefully in a new direction. The other important component to the plyo step, when accelerating forward, is the repositioning of the shoulders. In order for the action reaction forces from the foot to ground contact to be fully accepted and used by the body there must be a straight line from the foot through the shoulders and head. If the shoulders stay high or upright when the plyo step occurs there will be an energy leak at the level of the hips. This will diminish the take off.

A very important thing to remember about the plyo step is that it is only used when the body needs to reposition the feet to gain an advantage for acceleration from its present foot position. A case in point would be a track and field sprinter. They would never use the plyo step because they can position their feet in blocks to push off. Another example of an athlete that would not use the plyo step would be a baseball player stealing base. When a baseball player takes a lead and gets into a lead stance they should have positioned the feet wide enough to be at an optimal push off position- so no need to use a repositioning step, or plyo step.

The Hip Turn

The same time I started investigating the plyo step for acceleration in front of or on the frontal plane, I also started investigating a better way to open up and move backwards from the frontal plane. I named this movement the Hip Turn. I must emphasize that neither of the actions that occur in the plyo step or the hip turn was invented by me. I simply put a name to them and encouraged the use of them. They were already instilled in our bodies from birth. It just takes time for these movements to become efficient.

The hip turn was emphasized by me because I felt the pivot move was too slow and presented some danger to the ankle, knee, and hip. When an athlete must open the hips to retreat using a pivot, as taught by many, it is much slower due to the friction caused by the foot and ground plus the center of mass doesn't move in the new direction of travel quickly and efficiently using a pivot. The pivot can present some serious danger to the athletes that play sports on grass or dirt with cleats. If the cleat gets stuck as the athlete is attempting to pivot any of the hip, upper or lower leg joints can be injured. The hip turn on the other hand, because it is natural, releases the foot from its present position and repositions it aggressively on an angle to propel the body in its intended direction.

Because the hip turn released the contact of the ground it takes away the potential injury due to a pivot. Plus, the aggressive repositioning that occurs increases the acceleration of the athlete.

The Directional Step

When an athlete must move quickly to the right or left, like a baseball player stealing base or getting back to the base, there is a step that should occur to ensure greater power during acceleration. The directional step is a term I use that refers to the quick turning action of the lead foot when moving in that direction. If an athlete must take off quickly and move to his or her right, the backside leg or left leg in this case is the starting leg. It starts the center of mass moving to the right.

To help you understand what I am referring to, I want to explain action reaction forces. When an action occurs in the body or into the ground there is an equal and opposite reaction that comes back. So when the arms move quickly to one side of the body to cause an action, the reaction goes through the farthest foot from the direction the arms traveled. The same goes for a leg action. If the knee quickly lifts the opposite leg that is in contact with the ground receives the reaction of the knee lifting. This in turn creates a greater force into the ground of the supporting ground leg.

When an athlete moves quickly to the right the left leg supplies the initial force with help from all the actions occurring with the arms and lead leg. The lead leg will quickly turn so the toe is pointing in the new direction. This directional step is subtle in most cases. In other words, there is not a huge lifting action. If there was a large lifting action it would be counter productive due to time wasted.

There are two methods that are commonly taught when it comes to turning and running. The first is to pivot on the lead leg and the second is to drive off the lead leg at the same time as the back leg, all while the toes are pointed straight ahead. Neither of these takes advantage of the body's natural action and the corresponding reactions. The directional step is a natural action taken by athletes so why coach them out of it?

Research

I have never really needed research to prove to me that my methods were correct. This is because I have used them for nearly 20 years with outstanding results. But I do like to see research that proves what I have been preaching works.

In the Journal of Biomechanics, 2001 G.A. Kraan, J. Van Veen, C.J Snijders, and J. storm performed a study of 3 different acceleration positions using a force plate. The 3 different positions of acceleration are an athletic stance with no step back, and athletic stance allowing a step back (plyo step), and a standing track start with one foot in front of the other. In summary, they found that the plyo step, which they called a paradoxical step, had a greater impact on an athlete's acceleration in terms of force and impulse time. The

other two take offs, a parallel stance with a rolling action forward not allowing a paradoxical step and a staggered stance. They found that the plyo step was most used by the participants and that the results of the plyo step were justified as the most effective method.

Now, the above research doesn't specifically test the hip turn and directional step, but the natural movement that occurs in the two would substantiate to me they are most effective as well due to similar laws of movement. The real test is to put an athlete into a random situation where they must react and move as quick as possible. In most cases they will reposition the legs and feet to move quickest, if they do not it can be due to balance at the time of the reaction.

I want to finish this article with one final comment. I wonder how many athletes lost out on greater potential due to a coach taking away what comes natural. This is not a condemnation of coaches- it is a comment of coaches not understanding how humans move best. Sometimes what you think you see isn't what is actually happening. Taking a step in the wrong direction may be just the ticket to success.

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