

Sprint Acceleration and Maximum Velocity

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Introduction

Most American athletes come in with misunderstandings of technique and the goals of sprinting. For example, many fail to understand that they must power out of the blocks instead of going for speed! Coaches have to be careful to get athletes to trust them and use models, images, video, etc. to convince them of the need to learn the proper mechanics and structure of the sprinting model. **The coach must put it to the athletes in the way that they can understand it, not the way that coach knows it.**

The Acceleration Model

It is necessary to teach all athletes how to sprint 100 meters proficiently, even though they may never run it in a meet. The reason is that **all acceleration activities in jumps, sprints and hurdles are a variation of the 100m pattern. If you are successful at 100m, they you can make subtle variations to meet the demands of the specific event.**

General Preparation

This is the vital period for posture and rhythm awareness. Acceleration is powerful, but not quick! The 55m has no penalty for an overly quick acceleration pattern – those accrue after 55-60 meters in the 100m! Never train for indoor distances, but teach acceleration for the outdoor event. Discipline is vital – contrary to notion that the faster the acceleration phase and quicker the high velocity, the faster one can run. The athlete has to be much more powerful than that! Look at the example of Leroy Burrell in the “0” step. Athletes must do as he did when he set the world record – continue to powerfully extend completely from the hips through the shoulders! Even though it feels slower, it puts the athlete in the desired position for acceleration. Another problem is that when athletes do this, there is an initial performance decrease – this is possible for them to deal with if the coach warns them. Technique and rhythm will improve and performance will be improved. Carl Lewis is perfect to view as the model starter! He would have received no medals at 50m or 60m – he was not slow out of the blocks, but the first to completely understand the acceleration pattern and be powerful out of the blocks and maximize acceleration, pushing aggressively from the blocks. All great sprinters since have modeled this – Burrell, Christie, Bailey, Greene, etc. Reaction time is also overrated – the coach should teach them to react as effectively as possible (train in a subconscious way via exercises) – but not to encourage guessing (false starts should never be tolerated) nor beating people out of the blocks. The result of this mentality is the generation of acceleration problems.

“Wear different hats” - Athletes must adapt. Sprint training may be Monday, but hurdling Tuesday brings a different acceleration pattern, different sensibility, intensity, etc., one that is quicker – shorter – not as intense as the 100m acceleration. This is a difficult task, but necessary.

Acceleration Phase Modeling

At Tennessee the athletes utilize tape for patterning to choreograph the steps at least three times per week. One day it serves as a warmup to the intense training activity of the day, but two times it is the major component of the workout. Many fast sprinters still struggle with the pattern after 3-4 years. Inconsistent performance usually results from inconsistent acceleration patterns in those races.

Intensity

Intensity of the acceleration is manipulated in training. Data and research show that accelerated steps are completely proportional and easy to sense and see in the rhythm – it will look and sound the same. But the difference is that Maurice Greene covers much more distance on his first step than the 12 year old with the same sense of acceleration rhythm. But they can both be proportionally the same if both are accelerating effectively. In training, it is possible to reduce the patterns 12-18 per cent to keep the intensity low and teach posture and rhythm. When athletes master that, then they can put more intensity – extend the model – into the accelerations by means of a chart. Accelerated stride length is not related to stature – it does not matter whether one is tall or small! Air time is the same – .24 seconds. For example, the race between Jones and Pintusevich-Block saw the latter cover 2 more inches at the 22nd step than Jones! She was producing more force at the time!

Technical Mastery

At Tennessee, athletes start the acceleration (“tape”) drill with a 12-14 stride progression; every 2 weeks it is extended by 2 strides (up to 22 strides). Athletes do not advance on their acceleration ladder until they can run through 8-10-12 repetitions perfectly! Mastery must be demonstrated before progression (they are videotaped often). Coach them away from the dysfunctional tendencies – poor posture and too much speed. Some will not push or apply force – the hips will not project forward to make the ladder marks. They fall further behind. The second group are the reachers or landers who cast their foot out and land instead of getting foot down quickly with an acute shin angle. The shin just before contact should be parallel to the total body lean.

Measured Tools

Using a proportional chart, the coach can keep the proper rhythm and mechanics at a lower intensity for any athlete at any speed for 22 steps. Putting down a string of marks takes the guesswork out of it, and filming is even better. Cues – Look for full extension of knee-hip-shoulder, front shin angle relationship with body angle, and recovering shin angle to be less than to parallel to the track for the first few steps. At the “on your marks” and “set” positions, the lead toe should be directly under the hip. It is also vital to start the ladders at the precise mark – ex. start with the toe at a line!

Maximum Velocity Mechanics

Posture at maximum velocity must be erect, not leaning forward. The ball of the foot must land under the hip, but mechanically the ball is going to land right under the shoulder no matter what! If you want the foot placement under the hips, the shoulders better be over the hips!!! Get athletes to feel the hips under their shoulders. This is a major problem for American athletes who have the perception, conscious or otherwise, that you must lean forward or bend at the hip to run faster! Forward lean is a function of acceleration mechanics, not maximum velocity.

Rule no. 1 – RUN TALL!

While standing, put the knee-toe in a running posture, and extend up on ball-toe to feel the position. Get athletes to pose that posture with aid and then to get into that posture with no assistance. When one asks most American sprinters, they will say that they do not feel that position when they are at maximum velocity! Walk, march, step over low sticks, low hurdles, etc. But be careful to stay tall! Chest up, knees up, and hips up at their highest at the same time – avoid dropping the hips to raise the knees! The same goes for lateral hurdles. The coaches at Tennessee are obsessive about the hip-knee posture. It must be driven into the athletes. Also, spend time coaching kids to avoid reaching out and pulling; instead, focus on athletes getting their feet back down on the track! There is no way for athletes to tell themselves or feel three commands – knee up – cast foot out – bring it back under! It is not possible. Carl and Leroy used to always say they just needed to get their foot down faster! As they lifted their knee, they immediately got their foot back down on the track quickly, forcefully and violently! These athletes still have perfect rotational mechanics when viewed in slow-motion! Coach aggressively that as soon as you are at the top of the stride, think knee up, foot down!

Force Production Emphasis

It is also vital to teach that all action in sprinting is downstroke – there is no upstroke in sprinting – arms, legs, everything are DOWN! Put em down, put em down!!! All of the accent of the dance is on the downstroke. The word we use as a cue is the Hard Z position at the top with the toe up and knee up. Use the Hard Z and March. Running fast should feel no different than a fast March! It is interesting that athletes always want to do MORE than that, as if it is too simple! But it is the ability to do the simple things well at higher and higher intensities, and this becomes the story of the successful development of a sprinter.

Emphasis on Teaching/Transmitting Information

It is not so much the activity or workouts that a coach uses in training, but it is the teaching that goes on in the session and how it is received by the athlete, how the workout is administered, how the gaps are bridged and information is conveyed. Simplicity is also important; success often comes from doing fewer things more thoroughly.

Maximum Speed Phase

The Wicket Drill (banana hurdles) 3 sets of 3 Wickets are placed at 3 set intervals (for example, 1st three 1.45m apart each; next three 1.52m apart each; 3rd set 1.59m apart each). The athlete moves into the series of wickets with a 4 stride build up so that they are virtually upright at the first wicket with the goal of upright posture, knees-hips-toes up, and downstrokes through the wickets. There are tape marks placed between the wickets as targets for foot placement. In addition, there is a mark placed 5m past the last wicket to carry the athlete through the last step before deceleration.

Ultimate Goals of Acceleration Pattern Training

One of the goals of the Acceleration patterning and Maximum Speed patterning drills is to program the athlete to the extent that they can reproduce the pattern without the tape marks, cones, wickets or whatever. At Tennessee the athletes use contrast training in sprint patterning by doing the exercise perfectly on the tape marks or through the wickets, and then going to a lane without the aids and executing the pattern on their own! Then they go back to the marked pattern and then return to the unmarked lane. The final goal is to put the acceleration and maximum speed patterns together for the athlete. This is done by marking the acceleration pattern with tape for the 1st 12 steps, then placing wickets between tapes 9 and 10 or 10 and 11 and then extending the pattern of wickets in the same manner as in the Maximum Speed Wicket Drill. The goal is to go from a crouch start in spikes through the acceleration phase and into the maximum speed phase. Once the athlete has performed this successfully, they can also use the contrast method and move to an unmarked lane to execute this pattern perfectly from start through maximum speed phase on their own!

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