

# Tricks of the Trade for the Sprints, Hurdles & Relays

A Collection of the Best Articles from Physical Education Digest

**Dick Moss**



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# *Tricks of the Trade for the Sprints, Hurdles and Relays*

*By Dick Moss*

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*Physical Education Digest  
Head Office:  
PO Box 1385, Station B.,  
Sudbury, Ontario, P3E 5K4, Canada  
Tel/Fax: 705-523-3331  
Email: [coach@pedigest.com](mailto:coach@pedigest.com)  
[www.pedigest.com](http://www.pedigest.com)*

*U.S. Mailing Address  
Box 128, .....*  
*Three Lakes, Wisconsin, 54562, USA*

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This book is  
dedicated to my  
wife, Terry...  
still crazy after  
all these years!

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## Introduction

If you're looking for a resource that will teach you everything there is to know about sprinting, hurdling and relay running...then oops! This is the wrong book.

This book, as with most of the Tricks of the Trade series, is not a comprehensive resource. Instead, it's a collection of practical tips, hints, ideas and reproducible charts that you can use to solve common problems, teach coaching concepts, and impart performance cues that will make your athletes better at their sport.

Think of it as a clinic in your computer.

If you're like most coaches who've attended weekend clinic, you feel your time and money was well-spent if come home with a useable tip or two. Well, this ebook contains a whole duffel-bag full of such tips. It's essentially a *Best-Of* book, using the most useful track articles from the past 17 years of Physical Education Digest.

The focus is on practical, not theoretical. They were chosen because they made me say "Hey that's neat!" Or, "Hey, I could use that!"

Take them, use them, print out the reproducible charts and graphs. And most of all—enjoy coaching, enjoy teaching and enjoy the sport!

*Yours in track,*

*Dick Moss, Editor, Physical Education Digest*

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## About the Author

For the past 18 years, Dick Moss has worked as the Editor/Publisher of Physical Education Digest. He is also the head coach of Track North Athletic Club and the Laurentian University Women's Cross-Country running team, in his hometown of Sudbury, Ontario, Canada. As a middle-distance runner in the 1970's, he was an All-American at the U. Of Wisconsin and a member of the Canadian National team.



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# *Technique Tips and Tricks*



## *Fast-Claw Drill Teaches Ideal Sprint Technique*

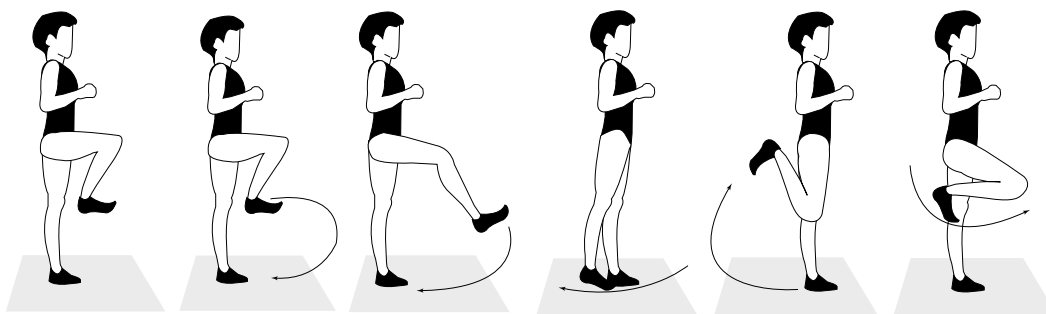
The Fast-Claw Drill is one of the best ways to teach optimal sprint technique. If practiced on a regular basis—for example, as part of your warmup routine—your runners will soon be able to feel the difference between good and incorrect technique.

### **How to Perform**

The drill is a standing rehearsal of one leg's complete stride cycle. Here are the important elements:

1. Your students stand next to a wall, in a “standing tall” upright position. They place one hand against the wall to stabilize themselves, and lift their outside leg into a high-knee sprinting position. Make sure their lower leg is tucked under their thigh, and their ankle is “cocked”—that is, their toes are pulled as high as possible up towards their shin (for more on why the ankle should be cocked, see the Biomechanics article in this issue).
2. Students extend their lower leg forward, then pull their heel back and down, accelerating their foot as it approaches the ground beneath their center of gravity. A good coaching cue is to tell them to “claw” the ground beneath them.

*A stationary drill that's effective in teaching the elements of optimal sprinting technique.*



Claw-Back Drill

3. They skim the ball of their foot against the ground beneath their body; then, with ankle cocked, lift their heel as fast as possible behind them until it contacts their buttocks.
4. They then drive their knee forward and upward. With ankle still cocked, their foot “steps over” their opposite knee (passes the support leg with the foot above the level of the support-leg’s knee).

Their knee drives forward and upward until it reaches the starting position. Students hold this position for the count of 3, then repeat.

### **Additional Pointers**

Students perform 10-15 repetitions with each leg. Begin in slow motion, until you’re confident they’re performing the drill correctly.

Once this stage is reached, the drill should be performed very quickly, with an emphasis on: accelerating the foot backward into the ground, a quick heel lift to the butt, and an explosive forward drive of the knee.

When you find a technical deficiency in your runners’ actual sprinting technique, instruct them to imagine how it feels when they are performing this drill. For example, a runner with low heel lift and can be instructed, “OK, brush your backside with your heels, just like in the drill.”

**Reference:** Loren Seagrave & Kevin O’Donnell , **Sprint Training Video, Volume 1**, Speed Dynamics Videos, 1991.

[\$59.95 U.S., + shipping. Available from M-F Athletic Company, 11 Amflex Drive, PO Box 8090, Cranston, RI, 02920, USA 401-942-9363 or 1-800-556-7464 in USA and Canada].



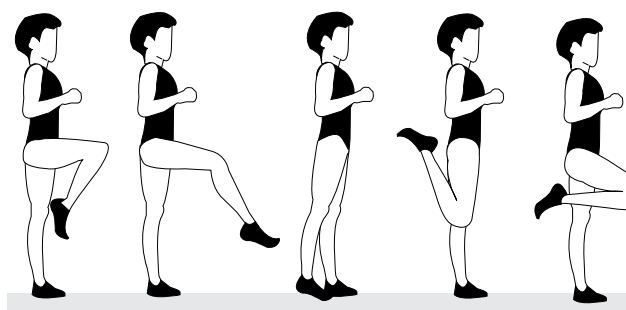
## Why Sprinters Should “Cock their Ankles”

As discussed in this issue’s Track article, the Fast Claw drill requires a cocked ankle position throughout most of the stride cycle.

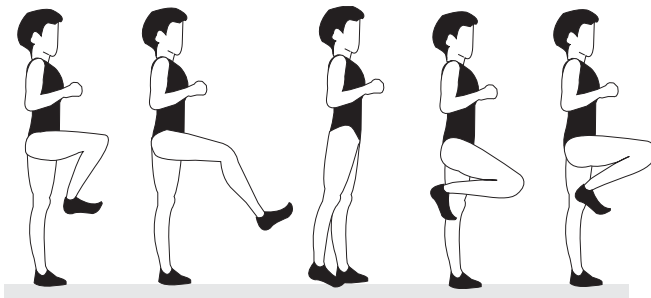
This cocked ankle is an important element in sprinting. Here’s why:

1. The cocked ankle shortens the length of the leg, reducing the energy needed to move it back and forth (basic physics states that a short lever is easier to move). A foot with toes pointed down extends the overall length of the leg.
2. In the initial “ground preparation” segment of the stride cycle, cocking the ankle allows contact with the ground to occur beneath the body’s center of gravity. In contrast, a pointed toe causes foot contact to occur *in front* of the center of gravity, producing a braking action that slows the runner on each footstrike.

*Three reasons why the ankles should be cocked during certain segments of the stride cycle.*



*Incorrect Technique—  
Toe Pointed*



*Correct Technique—  
Ankle Cocked*

In optimal sprinting technique, the foot is powered backwards into the ground with the ankle cocked—the toes are extended just before contact.

3. According to Seagrave and O'Donnell, cocking the ankle assists the hamstrings in bending the leg (i.e. pulling the heel towards the backside). This reduces the workload on the hamstrings, delaying the point in the race at which they become fatigued.

**Reference:** Loren Seagrave & Kevin O'Donnell , **Sprint Training Video, Volume 1**, Speed Dynamics Videos, 1991.

[\$59.95 U.S., + shipping. Available from M-F Athletic Company, 11 Amflex Drive, PO Box 8090, Cranston, RI, 02920, USA 401-942-9363 or 1-800-556-7464 in USA and Canada].



## Which Leg Goes Forward in the Blocks?

Your first step in teaching students to use the starting blocks is to determine which leg should be forward.

Most people have a dominant leg—in the same way that they're right or left-handed. The dominant leg is usually stronger and is the natural take-off leg when they jump.

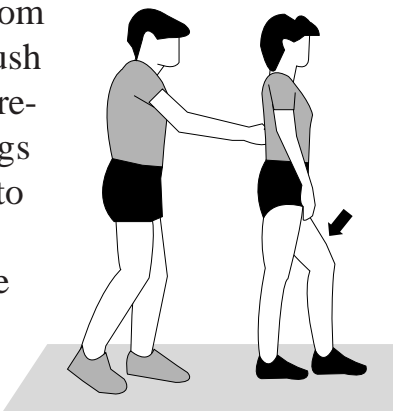
It should be placed forward in the blocks because the forward leg provides the greatest amount of force over the longest period of time.

Here are three ways to determine this dominant leg.

### 1. Push from Behind.

Ask your students to line up side-by-side, facing away from you. Give them a slight push from behind and ask them to remember which of their legs moves forward in response to the push.

Most people will move their dominant leg forward in response to an unexpected push from behind. This leg should be used in the forward block position.



*Push from Behind Method*

### 2. Arm Cross Test

Loren Seagrave and Kevin O'Donnell suggest this method in their video, *Sprint Training #1*?

Ask your students to cross their arms in front of their body as quickly as possible (as if they were hugging themselves). The arm that ends up closest to the body is the “quick” or dominant arm, and the *opposite* leg should assume the forward block position. For example, if the

*Three ways to determine which leg your students should place forward in the starting blocks..*

right arm reacted fastest the left leg should be placed forward in the blocks.

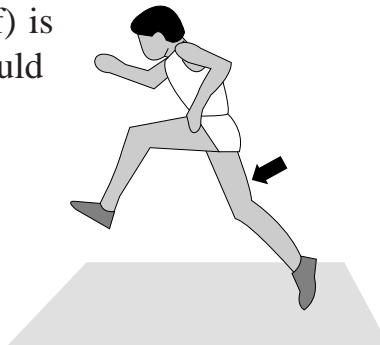
Why? According to Seagrave, the “quick” arm reacts faster due to neurological programming. He believes the quickest arm should be placed opposite the front leg when in the blocks, because the backward drive of this arm initiates the front leg’s backward push against the forward block. This drive should be initiated by the arm with that’s programmed to react the fastest.



*Arm Cross Method*

### **3. Hippity Hop**

Ask your students to take a few jogging steps and to jump into the air when they feel ready. Their take-off leg (the leg that pushes off) is probably the dominant one and should be placed in the front block.



*Jog & Jump Method*

### **4. Ask Them**

If all else fails, your student may simply tell you what does and doesn’t feel natural.

### **References:**

1. Dick Moss (Editor) **Physical Education Digest**, Sept-Nov’92.
2. Loren Seagrave & Kevin O’Donnell, Speed Dynamics [c/o Speed Dynamics, \$59.95 U.S., 26250 Euclid Ave. #509, Euclid, Ohio, USA 44132 216/731-0003].



## *“Crack” Drill Develops Knee Extension and Leg Drive From the Blocks*

Three factors that have been identified as important in determining a good start from the blocks are high knee drive, an explosive backwards drive of the legs, and an elastic action of the feet and ankles against the track—almost like that of a plyometric bound or depth jump rebound.

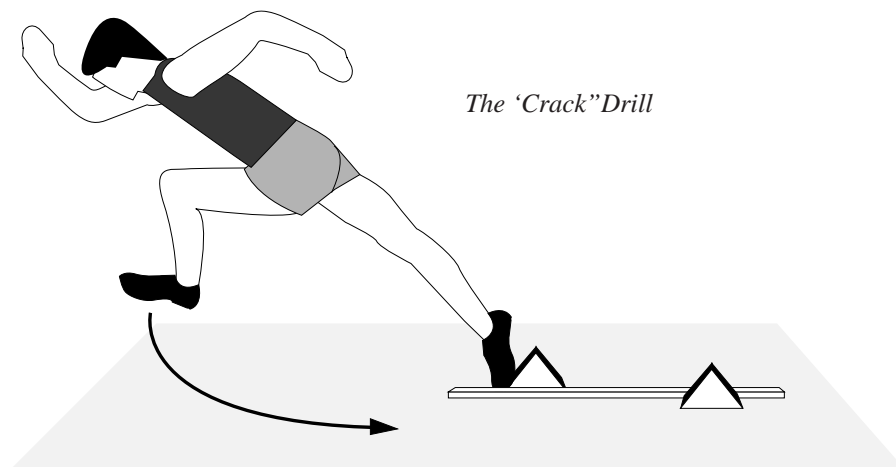
Here’s a drill that focuses on these three elements of starting block technique.

### **Crack Drill**

Your students perform a regular start from the blocks, but focus on two particular aspects of the technique:

1. They drive the knee of the back leg (the leg that’s in the back block) forward and as high as possible. Their body should be at about a 50-60 degree angle from the ground and they should attempt to touch their chest with their thigh.
2. They pause momentarily, trying to hold their thigh

*A drill that focuses on the knee lift, backward drive and elastic rebound of the back leg when coming out of the starting blocks.*



close to their chest, then drive the leg down and back as hard as possible—striking the ground with an active foot-plant, almost as if they are breaking an egg.

3. As this leg is driving back against the track, their opposite leg drives forward. They accelerate forward as fast as possible, attempting to keep the contact between their feet and track as bouncy and powerful as possible.

### **Advantages**

The momentary pause that occurs after the back knee is driven forward/upward forces your athletes to focus on high knee lift, and allows this leg to push backward against the track with greater than normal force. The coaching cue “crack an egg” will give your students the feeling of using an “elastic” rebound of the ankle and foot against the track.

**Reference:** Remi Korchemny, “A new concept for sprint start and acceleration training.” **New Studies in Athletics**, 7:4, 1992 pg. 65.

[\$30 U.S., \$25 U.S. for certified coaches of National Coaching Assns., c/o IAAF Publications Dept., 3 Hans Crescent, Knightsbridge, London, SW1X 0LN].



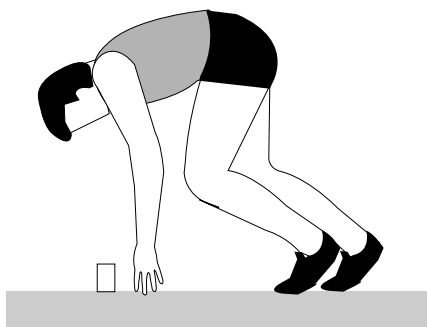
## *Matchboxes Keep Your Sprinters Low Out of the Blocks*

It's common for novice sprinters to prematurely lift the shoulders and torso as they drive out of the starting blocks. This directs some of the force they've generated *upward*, instead of *forward*, reducing the effectiveness of the start.

A trick to keep your sprinters low as they drive from the blocks is to place a matchbox in front of each hand as they assume their starting stance.

If they don't knock the matchboxes over as they explode from the blocks, they've lifted their shoulders too early.

The presence of the matchboxes will keep your athletes thinking about staying low—it will also help them to focus on a quick hand reaction to the sound of the gun.



*A matchbox placed in front of their hands will indicate whether your sprinters are lifting prematurely as they drive out of the starting blocks.*

**Reference:** Frank Dick (Director of Coaching, British Amateur Athletic Board), **Sprints and Relays**, British Amateur Athletic Board, 1987.

[About \$15.00 U.S., Available from Track & Field News, 2570 El Camino Real, Suite 606, Mountain View, CA 94040, USA, 415/948-8188].

## *Focus on the Elbows to Fight Fatigue*

Most coaches advise their runners to concentrate on a particular part of their body when they become fatigued during a race.

Common examples are to concentrate on knee lift in the latter part of a sprint or to focus on arm swing during the home stretch of a middle distance event.

Arms and knees are both good focal points, and they work very well for some people. But here's a less obvious alter-native you may find works even better — the elbows.

### **Why Focus on the Elbows?**

Actually, the backward drive of the elbows is a logical focal point for runners. As the saying goes: move your arms and your legs will follow. And the backward movement of the elbows corresponds to the backwards drive of the opposite leg; the portion of the stride that actually propels the body forward. In both generating speed and combating fatigue, this is the most effective portion of the running motion on which to focus.

### **An Easier Focal Point**

Also, runners seem to find it easier to focus on the elbows when they become tired and have difficulty concentrating. There is a greater kinesthetic awareness in the backwards motion of the elbows, since the range of motion in that direction is quite limited.

And when tired, moving the el-

*The backwards motion of the elbows is an excellent mental cue for runners fighting fatigue or attempting to generate speed.*

*Elbows,  
Elbows,  
Elbows!*



bows backwards is easier than lifting the knees or swinging the arms forward and upward. The result is a greater feeling of success from their mental (and physical) effort: very important when your runners are tired.

So give the "elbows" cue a try. It may provide your runners with the mental edge they need the next time they're fighting it out down the homestretch.

From an interview with Dr. Wendy Jerome, May, 1987.

Dr. Wendy Jerome is a professor of Sport Psychology at Laurentian University, in Sudbury, Ontario. A consultant with the Canadian National Ski, Figure Skating and Synchronized Swimming Teams, she is also a former national coach with the Canadian Track and Field Team.



## Long-Arm Demonstration

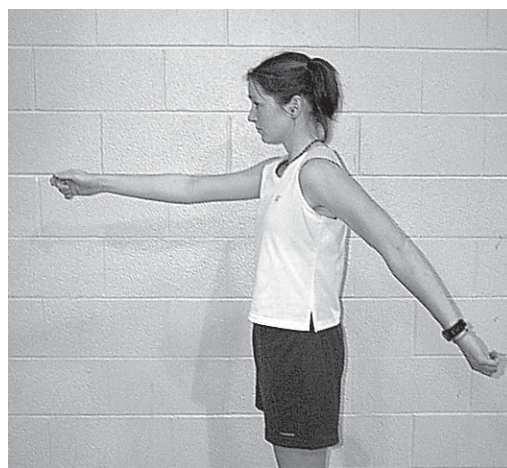
Running with “long arms” is a common technique error. It means keeping the arms at an angle that is greater than 90 degrees. Maintaining a 90 degree angle as the arms move past the hips is important because it essentially makes the arm only as long as the elbow. Basic physics decrees that a shorter lever is easier to move than a long one.

### Arm-Swing Demonstration

To prove this point to beginners, have them try the arm-swing test. Instruct your students to stand in front of you and simulate the running arm-action by loosely swinging their extended arms back and forth from the shoulder. Tell them that the shoulder is the pivot point for the arm-swing.

Once everyone has the hang of swinging their extended arms back and forth, tell them you want them to swing their arms as fast as possible. However, on your cue, they should bend their arms to 90 degrees. Practice once or twice at a slow speed so they understand.

Then try the demonstration: with arms extended, your students move their straightened arms back and forth as quickly as possible. On your cue, they bend them to 90 degrees and keep moving them as fast as they can.



*Begin by Swinging Straightened Arms*



*On the Signal, Bend the Arms at the Elbow*

*A demonstration that will show your students the benefits of running with arms bent at a 90 degree angle.*

They'll notice a significant increase in the speed their arms will move, and a reduction in the effort required to move them. Repeat several times and tell them to focus on the difference in feeling.

### **Variation**

A slight straightening of the arms once past the hips is OK and can put some emphasis into your athletes' leg drive. A little extra bending once in front of the body is also fine. The emphasis should be on having the arms bent to 90 degrees as they move past the hip.

Dick Moss (Editor), **Physical Education Digest**, Fall 2000.



## *Have Them Sit for Better Arm Action*

Crossing the arms past the center-line of the body is a common error in running. It's an inefficient technique because it wastes energy moving the arms in a direction that's not straight down the track. It also may cause over-rotation of the upper body, another waste of energy.

Ideally, your students' arms should move straight forward-and-back or angle inward only to the midpoint of the body, extended.

### **Quick Fix for Crossing Arms**

Here's how to give your students the feeling of a more efficient forward arm action.

Have them sit on the floor with legs outstretched and perform a fast running arm action. Emphasize that they should brush the side of their hip with the palm of their hands as the arms pass back and forth.

By placing the hands in a position outside the hips, the legs will block the arms from crossing immediately in front of the body. The easiest action is to follow the outside of the legs in a forward direction.

The other advantage of this seated position is that it allows your students to focus totally on their arms—the legs are eliminated as a distraction.

**References:** Jon Junkin. Jon Junkin is the Sprints/Hurdles coach with the Track North Athletic Club, in Sudbury, Ontario, Canada.

*Runners who cross their arms too far across their body can correct the problem by practicing the running arm action while in a seated position.*



*Running Arm Action Drill*

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## *Rubber Bands Produce Better Arm Action*

Here's a way to correct students who keep their arms too straight or bent when running.

### ***Problems—Arms Too Straight***

Running with the arms too straight (greater than a 90° angle at the elbow) is an inefficient use of energy and results in a slower maximum running speed.

Why? Students who run with straight arms are increasing the length of the lever (the arm) that must be moved back and forth. Any physicist will tell you this takes more energy.

Also, a longer lever can't be moved as quickly as a shorter one, so such runners are reducing their maximum stride rate.

### ***Problems—Arms Too Bent***

Runners who keep their arms too bent (less than a 90° angle at the elbow), have a tendency to tighten their arm and shoulder muscles—which, again, costs extra energy.

Their arm action will not be as hard-driving, and they often compensate for their shorter arm length by rotating their upper body excessively.

### ***Ideal Technique***

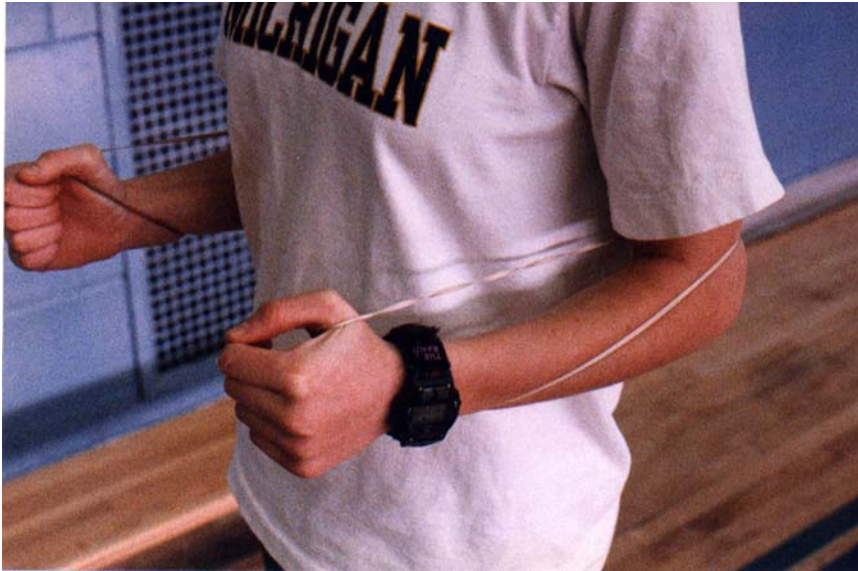
Ideally, your runners' arms should be at a 90° angle as the arm passes by their hips. If they wish, they can open up somewhat as they drive backwards past the hips, and some sprint coaches advocate bending the arm upward at the elbow as the upper arm moves forward beyond the hips.

The key point, however, is the 90° angle at the hips.

### ***Correcting Arm Angle with a Rubber Band***

Some students have real difficulty in maintaining a 90°

*A rubber band connecting the upraised thumb and elbow will help maintain the correct hand position and elbow angle when running.*



*Placement of Rubber Band*

angle with their arms. Here's an easy, inexpensive prop that will help them to assume and hold the correct position.

Have them place their arm in the correct  $90^\circ$  position, then hook a rubber band over their up-raised thumb, and, pulling back underneath their forearm, place the other end of the rubber band behind their elbow.

Simply have them run with these rubber bands in place. The pressure from the band will help them keep their arms in the correct position. They will also receive instant feedback (proprioception) if they attempt to open or close their arm angle, since the stretch from the rubber band will change.

And, by instructing your runners to keep their thumb point-



*Using Rubber Bands to Develop Good Running Arm Action*

ing upwards, you will develop the correct palm-in hand position that avoids the palm-down flapping that is so common and reduces elbow-drive and arm power. Rubber-band running sounds strange, but it really works!

Dick Moss, (Editor), Physical Education Digest.



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## *How to Increase Stride Length*

Runners often feel they can run faster by consciously increasing their normal stride length. And many coaches can be heard in practice instructing their athletes to “Stride out a little more!”

Unfortunately, according to a recent study performed at Wake Forest University, conscious effort is not an effective way to develop a longer stride.

### ***The Study***

The experiment compared runners using their regular stride length, with trials in which they consciously lengthened or shortened their strides.

It was found that any conscious change in stride length reduced running efficiency and made the runners feel like they were working harder.

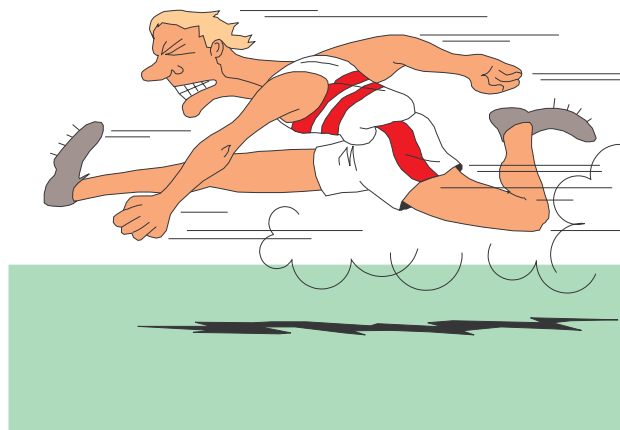
### ***Explanation***

The researchers believe that over time, runners naturally develop the stride length that is most efficient for them, considering such factors as level of strength and flexibility.

Since strength and flexibility are limiting factors, attempting to increase stride length without increasing these attributes simply reduces efficiency.

In other words, instructing your athletes to concentrate on “striding out just a little

*Instructing your runners to consciously increase their stride length will actually reduce running efficiency.*



*Telling Runners to Consciously Increase Their Stride Length is Ineffective*

bit more,” is not an effective method for improving running speed and can actually hurt performance.

### ***How to Develop a Longer Stride***

This is not to say that a longer stride is never desirable. But it should be developed through increased strength and flexibility work. In addition, the nervous system must be trained to accommodate a longer stride. Exercises such as plyometric drills and downhill running are effective methods of developing these new motor patterns.

### ***Concentrate on Stride Frequency When Tired***

The researchers also noted that it is usually a reduction in stride length that causes running speeds to slow in the latter part of a race. This occurs because the act of running and the resulting fatigue produces a progressive tightening of the muscles and tendons.

They believe that the best way for runners to maintain pace when tired is to focus their concentration on increasing stride frequency not stride length.

Since the length of stride in a tired runner is determined by tightened muscles and tendons, attempting to increase stride length is wasted effort.

**Reference:** Kate Delhagen, “Health watch: Stride right.” **Runner’s World**, January 1988 (\$19.95 U.S. 12/yr.).



## *Windmilling Keeps Them Upright After a Dip Finish*

Many races are decided at the finish line, and your runners will have an advantage if they can master a dip finish—a technique in which they bend forward at the waist as they're crossing the line. This technique, if timed correctly, can advance your athlete's shoulders across the finish line ahead of an opponent.

Regardless of the technique used, dip finishes have a major shortcoming—your runners' center of gravity is placed so far forward that they run the risk of falling flat on their face.

As a result, many runners are reluctant to use—or even to practice—a dip finish. Fortunately, there is a technique that will help your dip-finishing runners maintain their balance.

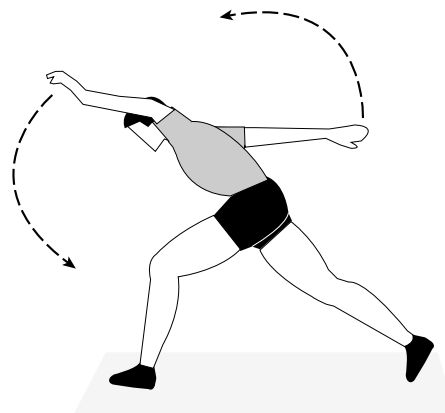
### *The Windmill*

If your runners feel they are losing their balance, instruct them to swing their arms overarm and forward, rotating them windmill fashion. This movement helps the upper body to rotate backwards, preventing a nasty face-plant.

### *Cross-Country Application*

This same principle can be used by cross-country runners who are running downhill and feel as if they are going to tip forward. Have them windmill their arms forward until they regain their balance.

*Windmilling the arms forward will help your runners maintain their balance after a dip finish.*



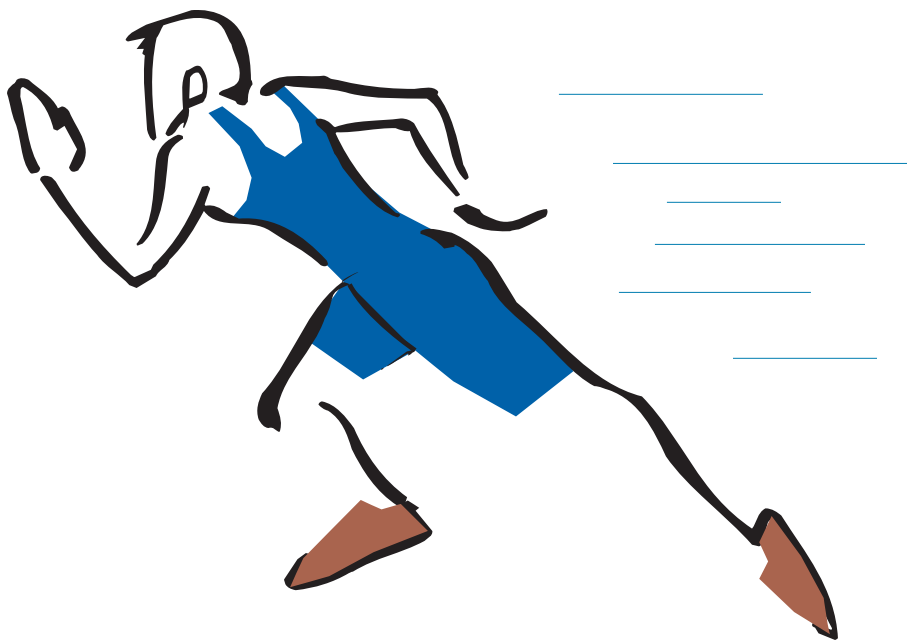
*Windmilling the Arms*

**Reference:** Tom Ecker, **Basic Track and Field Biomechanics**, Tafnews Press, 1985.

[Second edition is available for \$17.50 U.S. from **Tafnews Press**, c/o **Track & Field News**, 2570 El Camino Real, Suite 606, Mountain View, CA, 94040, USA, 415-948-8188, Fax: 415-948-9445].

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# *Tricks of the Trade for Sprinting*



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## *A Method to Determine Where to Set the Starting Blocks*

Once you've determined which leg goes forward in the starting blocks (see PE Digest, Fall '92), the next step for beginning sprinters is to determine where to set the blocks—that is, how far from the starting line the left and right block should be set.

Determining block positions can be very time consuming — especially if you're teaching it to a large class. So here's a quick way to ballpark where starting blocks should be set.

### **Method**

Have your students kneel behind the starting line in an approximate “On Your Marks” position: hands below the shoulders on the track, and the front knee lifted off the track.

- Have them lower their front knee to the ground, then move it forward or backward until it's almost touching the starting line. When the knee is at the line, mark where that leg's foot touches the ground—that's where you'll place the front block.
- Then have them place the knee of the back leg beside the toes of the front foot and mark the position of the back foot's toes. This is where you'll set the back block.

### **Adjustments**

If you have time, you can make further adjustments. Have your students set up their blocks, then rise into a “set” position. Adjust the back block forward or back until the front leg can assume a 90 degree angle and the back leg a 120 degree angle when in the set position.

*A quick  
method for  
determining  
starting  
block posi-  
tions for  
beginning  
sprinters.*



*Drop Forward Knee  
to Start Line*



*Place Back Knee  
Beside Front Foot*



*Mark Location of Front  
and Back Foot for Blocks*

### **Starting Point**

This method provides a starting point only. As your sprinters become more experienced, they may prefer a different spacing, such as a bunched start position, in which the blocks are much closer together.

However, for beginners and for PE class situations, this gives you a quick, easy method for establishing the block spacing for each student.

Dick Moss (Editor), Physical Education Digest, 1999.



## *Better Arm Action Out of the Starting Blocks*

A fast backward drive with the arm that's opposite the front leg (the *Reaction Arm*) is an important factor when starting out of the blocks.

This backward drive of the elbow initiates the front leg's backward thrust against the blocks. If the elbow drive is fast and full, it will ensure powerful movement and full leg extension against the blocks.

This article will discuss a tip to produce faster arm reaction out of the blocks and a drill to ensure full backward movement with the elbow.

### ***Weight Shift Affects Arm Speed***

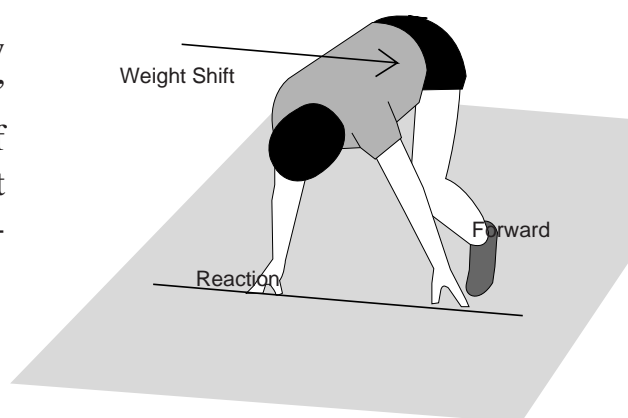
When your sprinters are in their "set" position, instruct them to make a slight sideways shift of their body weight towards their forward leg. This will place more of the body's weight over the arm that's closest to the front leg.

This weight shift will allow them to react faster with their opposite arm (the arm that drives backwards on the gun) triggering movement of the front leg, which provides most of the power when starting out of the blocks.

### ***• Why It Works***

Why does this weight shift allow a faster arm reaction? In the "set" position, the hands support much of the body's weight. This weight presses down on the hands, providing resistance against which the backward-driving arm must move when the gun goes off. By relieving the reaction arm of some of this resistance, it is able to move faster in response to the gun.

*While in the "set" position, a lateral weight-shift towards the forward leg will allow for faster arm reaction to the starting gun and reduce side-stepping out of the blocks.*



*A Weight Shift Towards the Side of the Forward Leg*

### • **Preventing Side-Stepping**

There's a second beneficial effect of a sideways weight shift. It places the center of mass more directly in front of the lead leg—the leg that provides the greatest amount of power for the longest length of time.

As a result, the center of mass will be propelled in a straighter line down the track. This may eliminate some of the side-stepping that often occurs when sprinters come out of the blocks.

### **Drill for Full Elbow Extension**

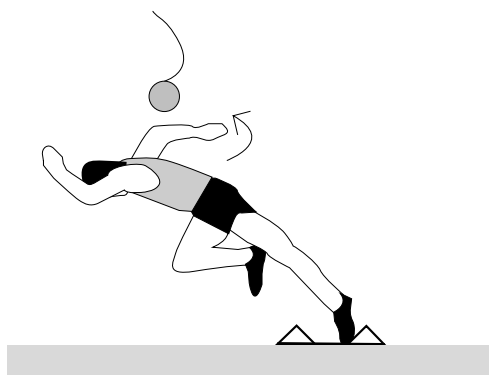
Since the movement of the opposing arm and leg are synchronized, a fast, full-range backward movement of the arm will produce similar movement in the opposite leg.

The following drill can help to develop this quality in the backward-driving arm.

With your sprinters in their “On your marks” position, place a knotted sweatsuit or pendulum ball behind the shoulder of the reaction arm (the arm opposite the lead leg that moves backward in reaction to the gun).

Move them through “Set” and fire the gun. In response, they should forcefully drive their elbow back and strike the ball.

Once contact is made they should quickly drive the same arm forward—a good coaching cue is to tell them to react as if the ball is red-hot and this forward movement of the arm is a reflex action away from the hot ball.



*Elbow Drive Drill*

**Reference:** Drill by Loren Seagrave, in: Terry Crawford & Bob Bertucci, **Winning Track & Field Drills for Women**, West Point, NY: Leisure Press, 1985.

[Approximately \$11.95 U.S., c/o **Leisure Press**, P.O. Box 3, West Point, NY, 10996].

Loren Seagrave is the former coach of four NCAA championship track teams and is co-author of the highly acclaimed “**Speed Dynamics**” instructional video for sprinters (see advertisement on inside front cover of this issue).



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## *Arm Reaction Drill From the Blocks*

The arms are shorter and lighter than the legs. As a result, they're able to react more quickly. In fact, sprinting, studies have shown that arm movement precedes leg movement by a split second.

Since the arms “drive” the movement of the opposite leg, a quick reaction of the arms is critical in getting a fast start out of the blocks. Unfortunately, many beginners don't realize the quick reaction, violent force or range of motion that the arms should generate at the report of the starter's pistol.

The following drill is an excellent way to train a correct and instant reaction of the arms to the starting gun.

### ***Arm Action Drill***

Have your students assume the “on your marks” position. Blocks can be used but aren't necessary.

Instruct them to remain in a kneeling position as you say “Set,” then give a clap as a signal to start. The following instructions pertain to a sprinter whose left leg is forward in the blocks.

On the clap, your students instantly drive the right arm backward. Focus on quick reaction and forceful elbow drive.

The left arm drives forward to a point where the hand is about even with the top of the head—this is an exaggerated movement that beginners seldom perform since the arms don't rise above the head when running upright. Students remain

*A drill that teaches the correct and instant reaction of the arms to the starting gun when performing crouch starts.*



*Start Position*

in their crouch position and do not move their legs at any point in the drill.

Perform several repetitions of this single movement, concentrating on instant reaction, powerful arm action and a correct range of motion.

### **Progression**

Once your students get the hang of it, add a second arm action, so that the right arm drives back, then forward and vice versa for the left arm.

Continue the progression until your students take three, then four or more rapid arm movements.

You can even have them verbalize as they drive their arms: “Boom.” Then “Boom, boom!” Then “Boom, boom, boom!” Finally, “Boom, boom, boom, boom.” They can imagine these cue words (or alternate words, such as “Drive”) during actual starts to recall the feelings of rapid arm action.

The final step in the progression is to perform some actual running block starts, attempting to coordinate the same arm actions with the legs.



*Boom...*



*Boom*

Dick Moss (Editor), **Physical Education Digest**, Spring 1998.

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## *Low Starting Block Angle is More Effective*

When teaching students to use the starting blocks, we usually spend our time adjusting the distance between the front and back block, but ignore the *angle* of the blocks' foot plates.

However, a recent study has shown that block angle can have a tremendous impact on starting speeds.

Surprisingly, a low block angle—as low as  $30^\circ$ —can produce faster starts. This is a lower angle than is traditionally used.

### **The Study**

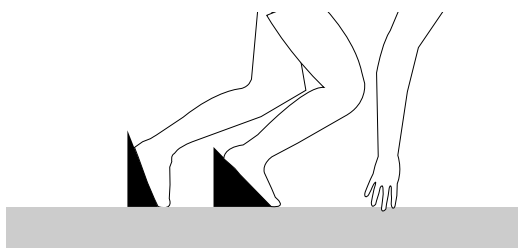
The study, conducted at the Free University in Brussels, involved 3 female and 14 male athletes. They were all trained sprinters whose best 100m times varied from 10.4 to 11.9 seconds.

The subjects used their own preferred distance between the blocks and the starting line. They all used a back block angle of  $70^\circ$  but tested three angles with the front block:  $30^\circ$ ,  $50^\circ$  and  $70^\circ$ . Each sprinter made 3-5 full blast attempts at each block angle and the results were measured.

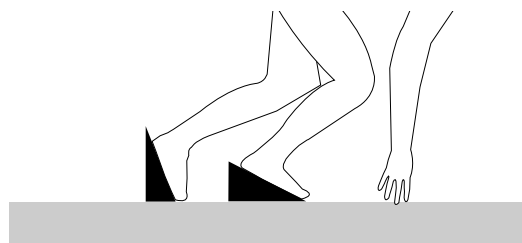
### **Results**

The lower the block angle, the faster the starts became.

*Starting block angles that are lower than those traditionally used (down to  $30^\circ$ ) produce faster sprint starts.*



*Conventional Starting Block Angle— $70^\circ$  Back Block and  $50^\circ$  Front Block*



*Lower Starting Block Angle— $70^\circ$  Back Block and  $30^\circ$  Front Block*

In fact, starts from 30° were 24% faster than from the 70° angle and 5% faster than from the 50° angle. Both differences were deemed significant.

### **Explanation**

The lower block angle creates faster sprint starts because it places the ankle joint in a more effective position. The lower the blocks, the more the ankle joint becomes dorsiflexed—the ankle position in which the toes are pulled closer to the shin. (This flexing action is sometimes called “cocking the ankle”).

Dorsiflexing the ankle pre-stretches the calf muscles and achilles tendon. The effect is similar to that of stretching a rubber band: the more the muscles and tendons are pre-stretched, the harder they snap back, and the greater the force the foot will apply against starting block.

In a sprint start situation, the lower the block angle (down to 30°), the greater the achilles and calf muscle stretch, and the greater the force the ankle joint can generate.

### **Practical Recommendations**

Of course, this information is useful only if you have starting blocks with adjustable foot plates—although you could attach a wooden filler to existing blocks to reduce the block angle.

Even blocks that do adjust may not drop all the way to a 30° angle. For example, our blocks here in Sudbury, Ontario were used in the 1988 World Junior Track Championships and even they don't drop all the way to 30°.

However, if your blocks *do* adjust, the lowest angle (down to 30°) should produce the fastest starts.

And although only the front block was tested in this study, it seems logical to assume that the back leg would also benefit from a lower block angle.

**Reference:** Nathalie Guissard, Jacques Duchateau & Karl Hainaut, “EMG and mechanical changes during sprint starts at different front block obliquities.” **Medicine and Science in Sports and Exercise**, November 1992.

[\$75 U.S., \$115 U.S. in Canada, c/o the American College of Sports Medicine, 401 W Michigan St., Indianapolis, Indiana, 46202, USA].



## *Improving the Sprint Start*

One of the challenges in teaching athletes to run faster is that it involves reprogramming the muscles and nervous system to go beyond their previous limits.

This can be a problem because the body simply doesn't know how it "feels" to run with greater power or a faster cadence.

One way to give your runners the kinesthetic sense of faster movement is by using sprint-assisted training methods. These methods reduce the normal resistance usually experienced in running, allowing your athletes to experience the way it feels to run more quickly.

Here are two sprint-assisted drills that you can use to increase running speed and acceleration out of the starting blocks.

### ***The Downhill Start***

Have your sprinters practice sprint starts down a slight grade. A smooth, grassy slope is suitable for this drill, and you'll find that the softer grass surface will also reduce some impact stress from your runners' legs.

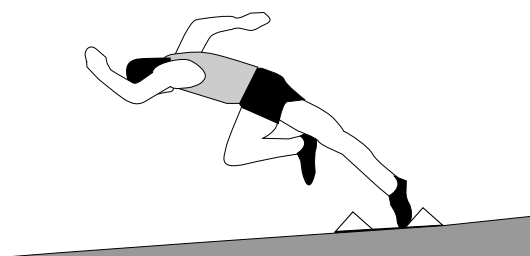
It's important that the downward grade be very slight: 3 to 5 degrees is ideal. Steeper slopes will increase stride rates but at the cost of a reduction in stride length.

### ***Catapult Starts***

Attach two lengths of surgical tubing (rubber hose) to a belt around your sprinter's waist or to a shoulder harness.

The tubing, 10 to 15 metres (30' to 50') in length, should be attached to pegs located ahead and to the sides of the runner (see diagram below). You could also arrange for

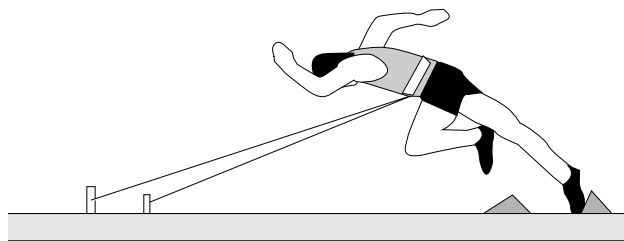
*Two sprint-assisted starting drills that will increase your runners' ability to accelerate from the starting blocks.*



*Downhill Sprint Start*

two assistants to hold the the ends of the tubing.

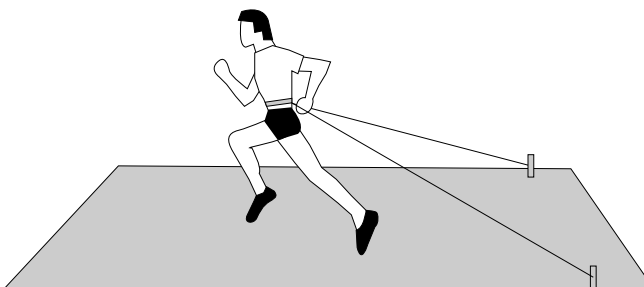
Have your runner move backwards into the blocks so the tubing is stretched. An assistant can be assigned to hold onto the runner's hips from behind. This will help to keep him in place until the "GO" is given.



*Catapult Start Using Tubing*

The tubing will catapult the runner out of the blocks, forcing him to move his legs at a stride rate faster than he would normally be able to achieve.

Once past the pegs, the tubing will provide resistance against which the sprinter can run. The tubing should be stretched until it provides a level of resistance which can be comfortably held. Have your athlete hold this position for several seconds while running with high knees, then slowly return to the start.



*Running Against Tubing*

If you have assistants holding the ends of the tubing, they can run behind the sprinter as he advances, which also provides resistance. Or, they can let go of the tubing once the sprinter passes them and all resistance from the tubing has been released.

As you can see, you can use this drill as either a combination resistance/sprint-assisted drill, or as a sprint-assisted drill alone.

**Reference:** Aleksandr Goldrin, "Starting drills for sprinters." *Kehakultuur*, Vol. 47, #2 (Estonia); translated in *Modern Athlete and Coach* (Australia), January 1988.

(\$16 U.S., 4/yr, 1 Fox Ave., Athelstone, S.A., 5076, Australia).



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## *Mental Focus When in the Blocks*

When in the “set” position in the blocks, many students attempt to concentrate on the impending sound of the gun. This seems logical.

However, it’s a focus that can actually slow reaction times. By concentrating on the gun, your students are introducing a second step in the reaction process. First, they must perceive the sound of the gun. Then they can react.

### ***A Better Focus***

In fact, a better tactic is to forget the gun and concentrate only on the first movements that must occur with the gunshot. When the gun goes, these movements will occur automatically, bypassing the first time-consuming “perception” step.

For example, sprinters might focus on driving one elbow back and the other forward. Experienced sprinters, who have patterned their starting movements, may instead concentrate on a feeling or mental image, such as anger, or the feeling of being a coiled spring.

You can allay any fears your beginners may have by telling them that they will *definitely* hear the gun whether they’re listening for it or not.

*Sprinters should avoid concentrating on the sound of the starter’s pistol when in the blocks.*



Dick Moss (Editor), Physical Education Digest, Winter 1998.

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## *Acceleration and Speed-Endurance Test for Sprinters*

Two vital components of sprinting include rapid acceleration and speed endurance. The latter is the ability to maintain top speed once it has been reached.

A single 120 yard run can help you identify whether your sprinters are weak in one of these areas so you'll know what type of work to emphasize in practice.

### **Setup**

Mark off a 120 yard stretch and locate markers at the 40 and 80 yard (meter) points. Place assistants at the 40 & 80 markers and also at the finish line. Their job will be to move a flag or other indicator when the runner passes their marker.

You'll need a watch which will allow you to take several "split" or cumulative times.

### **Execution**

When your athletes are ready, ask them to sprint as fast as possible from a crouch start until they cross the finish line. They can start whenever they feel ready, and you must start your watch at their first movement out of the blocks. Press the split timer on your watch when your assistants indicate the runner has reached the 40 yard, 80 yard and finish line markers.



Once completed, you'll have data that will help you determine your sprinters' all-out 40 yard dash time in addition to their acceleration and speed endurance abilities.

*Analyzing different sections of a 120 yard run can provide information about your sprinters' acceleration and speed endurance abilities.*

### Determining 40 Yard Dash Time

The time it took your athlete to run from the start-line to the 40 yard mark (“A”) is your runners’ 40 yd. dash time, an important statistic for many sports in which quick bursts of speed are important. Football is a good example and 40 yard time is a vital scouting statistic for most football players.

This is also a good measure of your runners’ starting ability out of the blocks.

### Analyzing Acceleration Abilities

You can get a feeling for your runners’ *acceleration* abilities by comparing their 40-yard time (“A”) to their time from the 40-yard to the 80-yard marker (“B”). The latter is their “flying” 40-yard time and indicates their speed when running at full throttle.

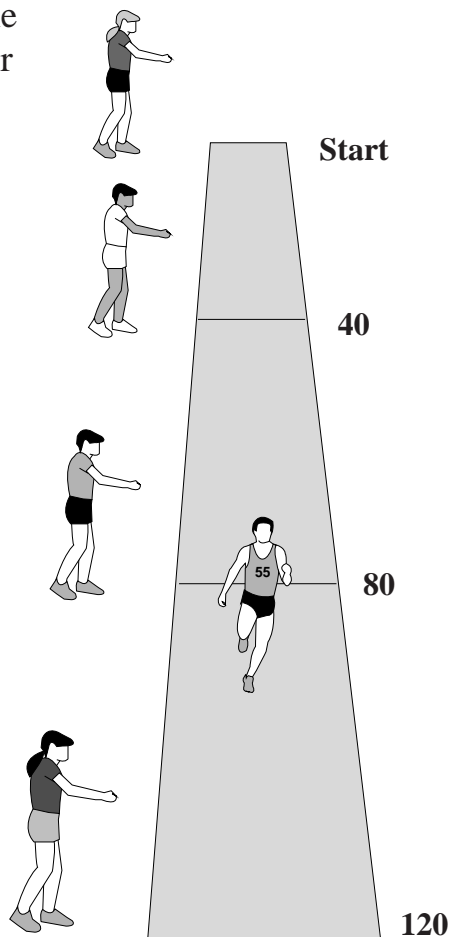
You calculate this value by subtracting their “flying 40-yard time” from their 40-yard “stationary-start time.” The difference is the time it took them to get to full speed.

$$\begin{aligned} \text{Acceleration} &= A \text{ minus } B \\ &= (0 \text{ to } 40 \text{ time}) - (40 \text{ to } 80 \text{ time}) \\ &\text{ie } 5.1 - 4.1 = 1.0 \text{ seconds} \end{aligned}$$

For example, if your runner’s time from the start to the 40 yd mark was 5.1 seconds, and the time from the 40 to the 80 yard mark was 4.1, then the difference is 1.0 second. In other words, it took this runner 1.0 seconds to get up to full speed.

In general, it shouldn’t take your athletes more than .7 seconds to accelerate to full speed. If they take longer (as did the person above), then their ability to accelerate should be improved.

Slow acceleration could explain why your sprinters are a step behind coming out of the blocks, your basketball players lose the race for loose balls or your baseball players have difficulty stealing bases.



*This 120-Yard Test Provides Valuable Information About Your Athletes' Starting, Acceleration & Speed-Endurance Abilities*

Training methods for acceleration include developing explosiveness through weight training and plyometrics, and improving the nervous system with overspeed training

### **Calculating Speed Endurance**

Another quick calculation will indicate the level of your athletes' *speed endurance*: their ability to maintain top speed once they reach it.

Poor speed endurance is responsible for sprinters fading in the final stage of their races. In other sports, symptoms include basketball players losing their foot-speed towards the end of a game, football players being tackled from behind on a long run and baseball players losing speed as they approach home plate.

To determine your runners' speed endurance from this test, you must calculate their time from the 80 to the 120 yard mark ("C"). Then subtract their 40 to 80 yard time ("B" or flying 40) from this figure.

$$\begin{aligned} \text{Speed End.} &= C \text{ minus } B \\ &= (80 \text{ to } 120 \text{ time}) - (40 \text{ to } 80 \text{ time}) \\ &= 4.4 - 4.1 = .3 \text{ seconds} \end{aligned}$$

For example, if your runner's 80 to 120-yard time was 4.4 seconds and his flying 40-yard time was 4.1, his speed-endurance time was .3 seconds. In general, if there is more than a .1 second difference, your runner's speed endurance should be improved.

Methods for improving speed endurance include pickup and acceleration runs and maximum speed runs for 10 to 60 seconds.

A strategy you could use is to start with a moderate number of these runs, recording the distance, number and recovery time. Then gradually increase the number of repetitions over a period of six or more weeks.

Reference: George B. Dintiman (EdD), Robert Ward (PED), **SportSpeed**, Champaign: Leisure Press, 1988.

[Available in Canadian book stores for \$17.95 Cdn. or in the U.S.A. from **Leisure Press**, a division of Human Kinetics Publishers, Inc., Box 5076, Champaign, Illinois,



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## *“Stick Drill” for Better Acceleration*

To generate maximum acceleration out of the starting blocks, your athletes must start with relatively short strides, then gradually increase the length of stride as full speed is approached. Short strides are better for generating power and overcoming inertia. Longer strides will maintain faster speeds once momentum has been built up.

It's almost like gearing up on a ten-speed bicycle. You start with a low gear and a short-quick leg action for power, then, as you reach faster speeds, you gradually change to higher gears but with slower leg movements that cover more ground.

Unfortunately, many sprinters don't realize how this concept of gradually increasing stride length feels. Many attempt to overstride too soon in the race and lose some of the explosive power that will get them to top speed faster.

The stick drill will teach your students the proprioception (how it feels) of a correct acceleration stride pattern. If performed often enough, they will naturally assume this pattern in their races. The result should be better sprint times.

### ***The Stick Drill***

Since it often takes 12 strides to reach full speed, cut 13 wooden sticks, two-three feet in width. Use any kind of wooden trim or thin scrap lumber.

The sticks should be placed on the track using a very specific spacing. To start, use a “40+10 cm” pattern. That is, place the first two sticks 40 cm apart. The second two sticks should be 50cm apart. The third pair of sticks should be 60 cm apart etc.

*A drill using sticks placed at increasing distances apart, that teaches sprinters how it feels to gradually increase stride length as they accelerate.*

Your sprinters take a standing start with the ball of their lead foot just in front of the first stick. They then lean their hips forward and begin sprinting as fast as possible, placing their feet just ahead of each stick. When they finish, they gradually decelerate.

A full 12-stick sprint will cover about 13 meters using the “40+10cm” spacing.

You could run 3-4 sets of 3-4 reps with 90 seconds to 3 minutes recovery between reps and 8-10 minutes between sets. This will cover about 16.5 meters.

### Progression

Once your students have mastered this spacing, increase the distance between sticks using a “50+15cm” pattern. That is, start with 50 cm between sticks, then increase to 65cm, then 80cm etc.

Eventually, you can work with your sprinters to customize this drill using the spacing that is optimal for them, depending on power levels, leg length etc. However, these spacing patterns are a good place to start and will teach them the concept of gradually increasing strides.

### Setup Aid

To make it easier to set up this drill, tape spacing marks on the track for future reference. If you’d prefer not to do this, write the following distances on a piece of tape and attach it to your tape measure. Alternatively, you could make marks right on your tape measure.

Place a stick at the following centimeter marks. This will give you the appropriate spacing for twelve strides (13 sticks).

“40 + 10cm spacing”

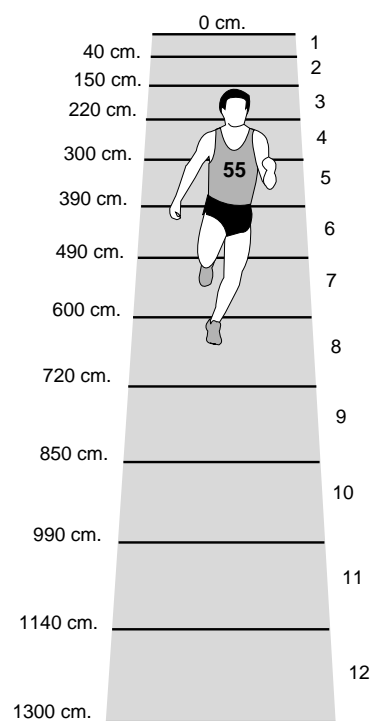
Place a stick at:

0cm, 40cm, 150, 220, 300, 390, 490, 600, 720, 850, 990, 1140, 1300 cm.

“50 + 15cm spacing”

Place a stick at:

0cm, 50cm, 115, 195, 290, 400, 525, 665, 820, 990, 1175, 1375, 1590, 1820.



The “Stick Drill”  
Using 40 + 10cm  
Spacing

**References:**

1. Loren Seagrave & Kevin O'Donnell, **Speed Dynamics Sprint Training Video**, Volume 1.

[c/o Speed Dynamics, \$59.95 U.S., 26250 Euclid Ave., #509, Euclid, Ohio, USA 44132 216/731-0003. For more information, see the Speed Dynamics advertisement in the Sept91 issue of P.E. Digest].

2. Brent McFarlane, **The Science of Hurdling**, Canadian Track & Field Association, 1988.

[Approximately \$25 U.S. Available from Track & Field News, 2570 El Camino Real, Suite 606, Mountain View, CA, USA 94040 415/948-8188].



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## *The Phosphate Recovery Test for Repeatable Short Sprint Ability*

The *Phosphate Recovery Test* is a way to measure improvement in your athletes' ability to produce a short, intense effort then recovery quickly for further all-out exertions.

This test is normally used for sports such as soccer, basketball, volleyball, rugby, tennis and hockey. In these sports, the movement is generally short and explosive, lasting from between five and ten seconds per effort. These quick bursts are followed by a short recovery period then further all-out efforts.

Typical fitness tests, such as the 12-minute run and single 40-meter sprints measure speed and endurance, but not the ability to repeat short, intense efforts. As a result, the *Phosphate Recovery Test* (named because it measures the ability of the body to replenish the ATP-CP energy system) is a more useful test for such stop-and-start sports.

However, it can also be a useful test for speed endurance in sprinters.

The test was first introduced in 1984 by Australians Dawson and Roberts. It has since been refined using feedback from coaches who've used the test.

### ***Repeated Effort Test: Concept***

The test involves running a series of sprints with 30 to 40 seconds between start times.

There are two methods for administering the tests, depending on the number of athletes you are working with and the equipment you have available. We'll discuss each version separately.

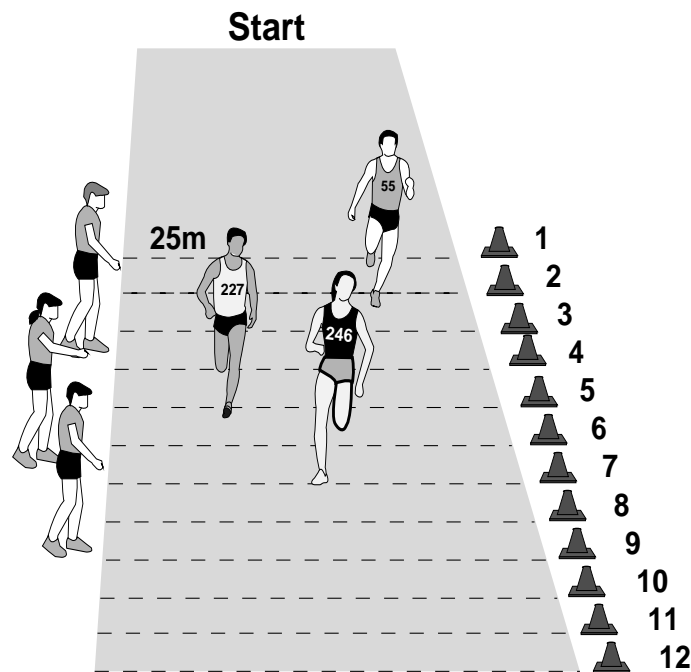
*A test that indicates your athletes' ability to perform brief, repeated, all-out sprints.*

### Method #1: Sprinting Over Time

The first version involves eight to ten repetitions of five-second sprints, with a new sprint starting every 30 seconds. Each sprint must be run full-out: no pacing or saving energy for the last repetition is allowed.

This test requires only one or two stopwatches and can be run with many athletes simultaneously.

To set up this test, establish a start line, measure 25 metres from that spot and mark the location with a cone. Then place an additional cone every two metres from that 25-meter mark. On average, you might require ten or twelve cones (you may wish to alter the start and end marks and number of cones depending on the level of your athletes).



Method #1: Sprinting Over Time

The test requires your athletes to sprint as fast as possible for a total of five seconds, and to make a note of the number of the cone they reach in that time. The athletes then return to the start line. They will perform 10 sprints, with a new sprint starting every 30 seconds.

You can test half of your team at a time: divide your group into pairs, with one athlete running while the partner records the number of cones reached.

The coach can operate the watch and whistle. Blow the whistle and start the watch at the beginning of the first sprint, then five seconds later to signify the end of the first sprint, then 25 seconds later to signify the start of the second repetition. Repeat this for ten repetitions. You could just let your watch run continuously, or you could immediately reset at the end of each timing period.

## Scoring the Test

This is more a test of the ability to recover than a measure of pure speed. As a result, your athletes' score will take into account both the total number of pylons reached and the decrement in performance as the test continues. It sounds complicated, but it really isn't. Here's how to score the test:

1. Record the score on each sprint. If the athlete reached the fifth pylon, record 5 points.
2. Record the *Best Single Score*. This is the highest score attained on any single repetition.
3. Add up all the points to get the *Total Score*. This, and the best single score are good indicators of explosive speed.
4. Find the *Decrement Scores* (the reduction in sprint performance caused by fatigue) by subtracting the score on each repetition from the *Best Single Score*. For example, if the athlete reached the ninth pylon on his best attempt, subtract the score on each repetition from nine.
5. Add up all these decrement values to get the *Total Decrement*.
6. Find the *best possible score*. This is your best single score multiplied by the total number of sprints. In this case,  $9 \times 10$  attempts = 90.
7. Calculate the *Percentage Decrement* by dividing your *Total Decrement* by the *Best Possible Score*.

Two examples are shown below. As you can see, Fred was faster, since his best sprint took him to the **ninth** pylon. However, his phosphate recovery abilities were not as good as Bob's since his decrement in performance was 36% versus Bob's 18%.

Name		Repetition										Best Single Score	Total Score	Total Decrement	Percent (%) Decrement
		1	2	3	4	5	6	7	8	9	10				
Fred	Score	9	8	8	7	7	6	6	6	5	4	9	66		
	Decrement	0	1	1	2	2	3	3	3	4	5			24	36%
Bob	Score	7	7	7	6	6	6	5	5	5	5	7	59		
	Decrement	0	0	0	1	1	1	2	2	2	2			11	18%

Calculations for Fred's Test: **BEST SINGLE SCORE:** Best Attempt on any rep (= 9). **DECREMENT:** Best Single Score - Score on each Rep (i.e. Rep #2 =  $9 - 8 = 1$ ).  
**TOTAL SCORE:** Sum of scores on each rep (i.e.  $8 + 8 + 7 + 7 + 6 + 6 + 6 + 5 + 4 = 66$ ). **TOTAL DECREMENT:** Sum of all decrement scores ( $0 + 1 + 1 + 2 + 2 + 3 + 3 + 3 + 4 + 5 = 24$ ) **PERCENT DECREMENT:** Total Decrement  $\div$  Total Score ( $24 \div 66 = 36\%$ ).

## Interpreting scores

You can use these scores to gauge improvement by comparing scores for an athlete as the season progresses.

From tests using adult soccer, field hockey and Australian football players, it has been found that decrement scores indicate the following levels of repeated effort ability:

**Good** = Less than 20% decrement  
**Average** = 20-30% decrement  
**Below Average** = 30-40% decrement  
**Poor** = More than 40% decrement

One other point. If you have an athlete who achieves a zero decrement score, it's an indication that s/he did not give an all-out effort on every sprint. Some level of decrement will always occur if your athletes are giving a full effort on every repetition.

### ***Method 2: Sprinting Over Distance***

Instead of sprinting for a 5 seconds, you could have your athletes sprint over 40 metres and measure the time this takes. This reduces the need for pylons, but it does require a stopwatch for each athlete.

Start the watch when the athlete's foot first touches the ground ahead of the start line.

Although the score will be in seconds instead of "pylons," the scoring is basically the same and will still result in a percentage decrement.

### ***When to Apply the Test***

You can start repeated effort testing early in the season, to give you information about your athletes' fitness levels and provide you with a baseline measure for future tests.

However, give your team two to three weeks of training before the test. Since it involves full-out sprinting, injuries are likely to occur if it is performed too early.

After the first test, it can be repeated every 4 to 6 weeks.

### ***Correcting Poor Results***

If you have athletes with poor scores, you can improve their repeated effort fitness by having them perform short sprint training.

In fact, the format of the test can be effective training itself: for example, 2-3 sets of 8-10 five-second or 40m sprints, with 2-3 minutes recovery between sets.

### ***Reproducible Scoresheet***

A sample score sheet is shown on the previous page. Feel free to photocopy it for your own use.

**Reference:** Brian Dawson & Tim Ackland (U. of Western Australia), Clint Roberts (Chisholm College, Australia) & Steve Lawrence (Western Australian Institute of Sport), “Repeated effort testing: the phosphate recovery test revisited.” **Sports Coach (Australia)**, April-June 1991.

[\$20 Australian (surface mail), \$30 (airmail), 4/yr., Published by the **Australian Coaching Council**, c/o Sports Coach, P.O. Box 176, Belconnen, ACT 2616, Australia (06) 252-1550].



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## *“Pacing” in the 100m Sprint*

Here are some assumptions that sprinting coaches have made for many years:

1. The 100m should be just an all-out, fast-as-you-can sprint from start to finish.

Right? Well—not according to some of the world’s most advanced sprint coaches.

2. It’s important to breathe deeply through-out the entire race.

Right? Again, not exactly: these coaches believe there are certain times when it’s advantageous to breathe, and certain times when holding the breath will increase the amount of force that can be applied against the track.

Top coaches such as Brent McFarlane, Canadian National Hurdles coach, and Loren Seagrave, former coach of Ben Johnson and four NCAA championship women’s teams, believe the 100m should be broken up into 15- 20 meter all-out blasts, separated by 5m “recharging” periods. The breathing pattern should correspond to these “in” and “out” sections.

### ***Nervous System Recharging***

According to Seagrave and Speed Dynamics Videos co-presenter, Kevin O’Donnell, the nervous system cannot sustain maximum firing rates for an entire 100m. To combat this nervous system fatigue, short five-meter recharging segments can be inserted into the race. “Recharging” should not be interpreted as slowing the pace. Rather, these segments are brief, five-meter periods in which speed and stride cadence are maintained but maximum effort is briefly relaxed.

### ***Recharge Method***

Here’s how it works. As your sprinters come out of the blocks, they should give a maximum effort as they

*Sprinters can divide their 100m race into 4-5 bursts of all-out speed, separated by short, free-wheeling breaks that allow the nervous system to recharge.*

accelerate. This is referred to as an “in” segment. After the first 15 meters is completed, they take a brief five-meter “out” segment in which they “freewheel”—maintaining stride rate and speed but running at slightly less than an all-out effort.

This is followed by a 20 meter “in” segment in which they attempt to run faster than they ever have before. It’s followed by another five meter “out” segment. This sequence is repeated to the finish line (see diagram #1).

By the time the race is completed, your athlete will have run 4-5 segments at a full-out pace, separated by 3-4 brief recharging segments.

### **Breath Control—Concept**

Your sprinter’s breathing should be controlled and coordinated with each of these segments. To summarize, they should hold their breath during the all-out “in” segments and breathe normally while recharging.

Why? It has been found that holding the breath increases your athletes’ ability to apply force by increasing chest cavity and inter-abdominal pressure. This provides greater stability for the spine.

In addition, breath holding, also called the *Valsalva maneuver*, increases blood pressure inside the cranium, which improves the ability to recruit motor units. Holding the breath will allow your sprinters to apply additional force while running all-out during their “in” segments. In many ways, this is an instinctive technique. People hold their breath while straining to open jar tops or while lifting heavy weights.

And oxygen—hence breathing—plays a minor role in the 100m because the energy sources used in the event are mainly anaerobic.

### **Breath Control During a Race**

As your sprinters rise into their “set” position in the blocks, they should take a breath and hold it through the start and the first 15 meter “pure acceleration” segment of the race.

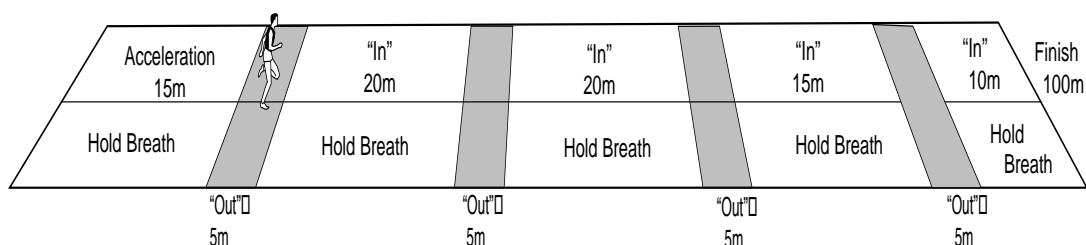
They then exhale and breathe normally for the next five meter “out” segment.

They hold their breath through the next 20 meter “in” sec-

tion. This pattern of breath-holding during the effort sections and breathing normally during the recharge sections continues until the race is completed.

### Overview

Diagram #1 illustrates this race model for a developmental-level athlete. With an elite sprinter, the “in” sections are longer.



**Diagram #1:**

*Race model for 100m race (Developmental athlete)  
Elite athlete would use the following breakdown:*

### How to Train For This Model

You can use “Ins and Outs” training to prepare your 100 meter runners for this type of race plan.

Beginning within the first three weeks of training, train your sprinters to separate bursts of speed with little “breaks”.

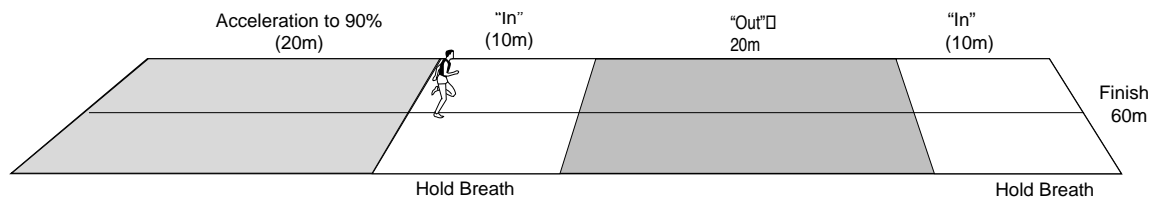
Your sprinters start with a 20 meter acceleration, in which they build up to a 90% of maximum speed. They gradually inhale during this acceleration zone.

When the first pylon is reached, they hold their breath and try to run faster than they ever have before. This continues to the next pylon, 10m away. They then exhale and breathe normally as they freewheel for the next 20 meters. They repeat one more *in* and *out* section for a total of 60 meters of *in and out* running and 20 meters of acceleration.

### Periodization

Here’s how to plan your ins and outs training for progression throughout the year.

Your athletes use an “in” zone of 10m and an “out” zone of 10m for the first four to six weeks. In the second 4-6 weeks of training, they use 15 meter “in” and 15 meter “out” sections. In



### *Ins & Outs Training*

the final 4-6 weeks of training, they can use an “in” zone of 20m and an “out” zone of only 10m.

More advanced runners can use extra “in” and “out” phases so they are running over 90 meters or even 120 meters.

**Reference:** Loren Seagrave & Kevin O’Donnell, **Speed Dynamics Sprint Training Video**, Vol. II.

[c/o Speed Dynamics, \$59.95 U.S., 26250 Euclid Ave. #509, Euclid, Ohio, USA 44132 216/731-0003. For more information see the *Speed Dynamics Advertisement* in the Fall’91 issue of P.E. Digest].

Brent McFarlane (Canadian National Hurdle Coach), Sprint training seminar, Ontario Track & Field **Association Symposium**, Kincardine, 1991.



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## *Construct Your Own Indoor Sprint Facility— In the Hallway*

Most northern track coaches are only too familiar with the rigors of indoor training. This usually means practices in school hallways and sprinting without spikes.

### Hall-Running Dangers

There are definite disadvantages to this arrangement: hallways are hard and shin splints are common. Running mechanics are different—without spikes, your runners are less able to forcefully pull their feet back beneath them as they run, which is critical in producing power during the stride cycle. This is a particular disadvantage for sprinters and hurdlers for whom technique and power are vital.

And finally, wearing flats all winter makes the first few weeks outdoors—on spikes—risky in terms of injury because your runners haven't been able to *gradually* become accustomed to wearing spikes throughout the winter.

Fortunately, a rubberized sprint strip will allow your runners to sprint full-bore down your school hallways wearing spikes and using perfect technique. The following setup is used for winter training by Brent McFarlane, head track coach at the University of Waterloo in Ontario (and the head coach of the 2000 Canadian Olympic track team).

*A portable, rubberized sprint strip can convert a school hallway into an indoor training track.*



*Running on a  
Rubberized Sprint Strip*

### Rubberized Sprint Strips

You can purchase rubberized runways from companies such as M & F Athletics (no, we have no affiliation). They're not cheap: the cost for a 1/2 " thick, 50m (155 feet) long x 3-foot wide strip from M & F Athletic (as of January 26/00) was \$1039.50 U.S. plus shipping. Shipping varies, of course. Prices in the U.S. would certainly be less. However, the strips last forever and are a great investment.

The length of the strip you purchase will depend on the length of your hallway and the amount of money you can afford.

### Setup

The strip can be laid permanently in a hallway, or you can roll it up after each practice. However, a roll weighs a LOT, and it's more convenient to simply leave it on the floor of a seldom-traveled hallway. After a while, it will become dirty and actually blend in with the floor—you won't even know it's there.

At both ends of the strip, place two high jump pits, on-end and back-to-back against the wall (if your strip doesn't extend to both ends of the hallway, just place the mats on one end, against the wall).

### How to Use

Your sprinters can then sprint full-out to the end of the strip. As they approach the pits, they jump up, spin in the air and contact the pits backwards. Be sure they practice this at slower speeds. Once they get the hang of it, it's a safe way to decelerate... and most runners really enjoy smacking into the mats!

A short sprint strip set up in this way will allow you to practice sprint starts



*Jump Backwards Into the Mat to Decelerate*



*It's Effective... and a Lot of Fun!!*

with spikes, hurdles and also long jumps into high jump pits laid flat on the floor.

You can also perform speed-endurance workouts by having your athletes sprint to the end of the strip, bounce off the mat and sprint back down towards the start. If you have mats on both ends of the strip, you can perform any distance in increments—even over hurdles (i.e. homemade PVC hurdles can be cleared from either direction safely).

Dick Moss (Editor), **Physical Education Digest**, 2000. From a conversation with Brent McFarlane, 1997.

[“Instant Runways“ can be purchased from M-F Athletic Company can be contacted at 11 Amflex Drive, PO Box 8090, Cranston, RI, 02920, USA 401-942-9363 or 1-800-556-7464 in USA and Canada].



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## 400m Pacing Tables

For most middle distance/distance events, 400m speed is a limiting factor. The faster your 400, the faster your 800 potential. The faster your 800, the faster your 1500 can be, and so on.

But if you have a situation like ours, winter lingers forever and there's precious little time once we hit the track to develop 400m speed. As a result, we train for it during our winter hallway sessions. Then, when we finally get on the track, the nervous system patterning for this fast pace is already in place and our athletes are almost immediately accustomed to running at their target 400m pace. This drastically reduces our transition time from indoor to outdoor training.

### **Developing 400m Speed Indoors**

Every Saturday, we run hallway sprints with our athletes attempting to hit their target time for the 400m—but over a shorter distance. For example, our first sprints are 60 meters (6-10 reps, with 2-3 minute recovery for our middle distance runners). Over a number of weeks, we increase the distance to 100m.

We first estimate our runners' goal time for the 400m. For example, during her competitive season, we think Becky will run a 58.0 in the 400 and Fred, a 52.0. Using the chart provided, we can determine their split times for most distances from 20m to 200.

Our runners run their sprints, attempting to run these times and we relate each repetition to their 400m time. For example, if an athlete runs an 8.4 second 60m, we tell them they've run 56/400m pace. This helps them to relate to their ultimate goal — a faster 400m come outdoor season.

*A system for developing and monitoring 400m pace during the early indoor season.*



**Other Factors**

If you are in a training phase where aerobic development is your focus and you wish to avoid anaerobic conditioning, run sprints of 60m or less—you’ll develop nervous system conditioning, but will not stress the anaerobic system.

**400m Split Time Sheet**

On the next page is a reproducible sheet you can use to keep track of your runner’s 400m pace workouts. At the top, is a split chart for 20m-200m distances.

On the bottom of the sheet is a chart for keeping track of your runners’ results. On the left is a column for names, then 10 columns for times. If you wish, you can use two rows per athlete, recording an actual time over the distance on the upper row, then a 400m conversion on the lower row.

Names	Times:					
LYNN J.	13.8	14.2	15.0	13.0	14.2	15.1
(400 PACE)	55.0	57.0	60.0	52.0	57.0	52.5

*400m Split-Time Chart Showing 80m Sprint Times & Related 400m Pace*

Dick Moss (Editor), **Physical Education Digest**, 2000. Dick Moss is also the head coach of the Track North Athletic Club in Sudbury, Ontario, Canada.





## 400m Rhythm Workout

The 400m is a difficult event because it's run close to, but not exactly at, top speed. A good sense of pace and rhythm is crucial.

Here's a workout that John Smith, world record holder in the 440 yard dash and now a coach at UCLA, uses to develop the correct sense of pace and rhythm in this demanding event.

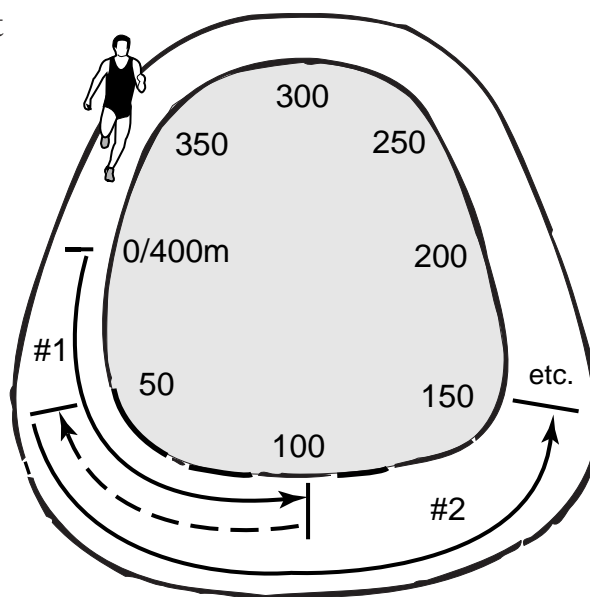
### The Workout

The workout consists of 7 x 100m sprints, run at race pace, with a 50m jog recovery between each. The interesting aspect of the workout is that the series of 100's will eventually take the runner completely around the track, so the turns and straights are negotiated just as in an actual 400m race.

### Procedure

Begin the workout at the start of a 400m race. From this point, have your sprinters run a 100m at race pace. For example, if you want your runners to run a 52 sec/400, have them aim for 13 seconds on each 100.

After this 100, they jog back 50m, to the 50m mark, and run another 100 in 13 seconds (finishing at the 150m mark). They then jog back 50m to the 100m mark and sprint to the 200m mark. This pattern continues until they cross the finish line on the final (7th) repeat.



*A workout which prepares 400m runners for race-pace and rhythm by running a lap in 100m sections.*

### **Variations**

Early in the season, you might wish to start with a less stressful version of this workout. Simply have your runners start at the 100m mark instead of the start of the 400m. This workout will consist of 5 x 100m sprints instead of seven.

Or for some progression, you can increase the difficulty of the workout. Speed up each 100m and/or decrease the number but increase the length of the repetitions

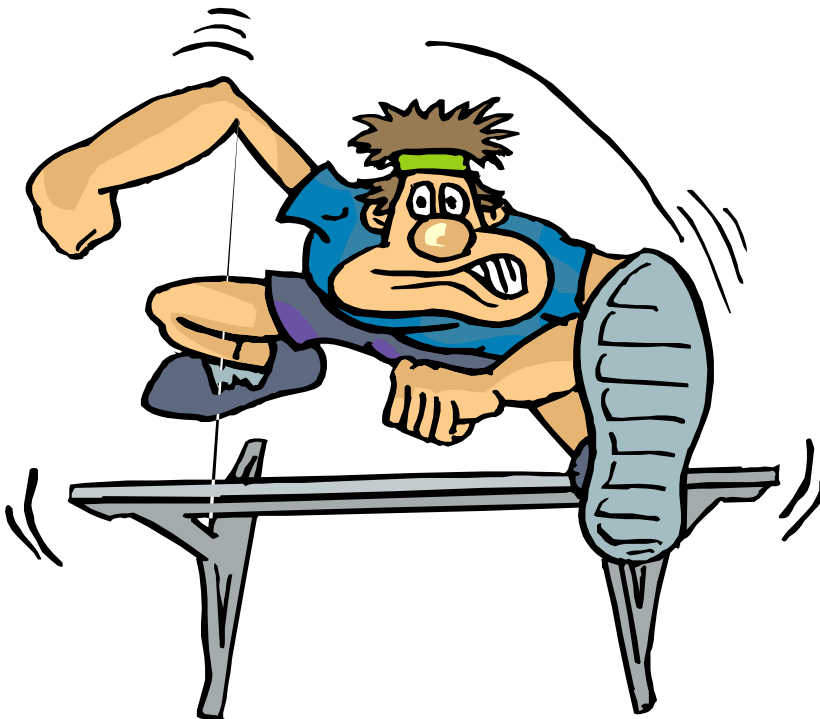
**Reference:** John Smith (UCLA Sprint Coach & World/Olympic Record holder), **Sprints, Starts & Relays Video**, Championship Books and Video Productions.

[\$39.95 U.S., **Championship Books and Video Productions**, PO Box 1166, ISU Station, Ames, Iowa, 50014, USA, Toll-free: 1-800-873-2730, Fax: 515-232-3739].



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# *Tricks of the Trade for the Sprints, Hurdles and Relays*



## *Box Drill Teaches Hurlers the Correct Lead-Leg Action*

Beginning hurdlers often float over the hurdle because of their lead leg action.

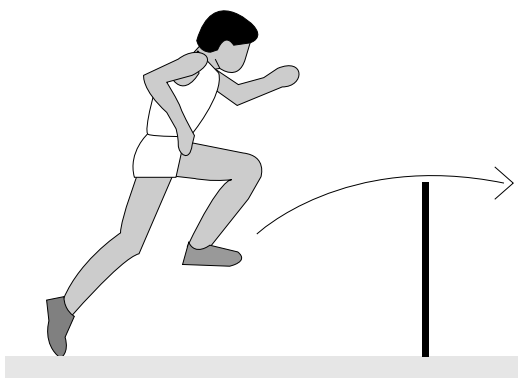
They initiate the lead leg motion with their foot, not their knee, swinging the foot upward first, and leaving the swinging leg open instead of tightly bent at the knee.

This forces the hurdler's body upward—producing a high, slow, floating trajectory over the hurdle.

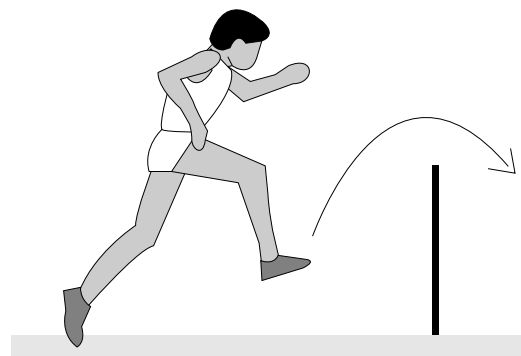
A better technique is to lead the action with the knee, swinging it upward while keeping the heel tucked tight to the backside. When the knee is above the height of the hurdle, the lower leg snaps forward. The result is a low, flat trajectory over the barrier.

You can use cardboard boxes to force your beginners to abandon this bad habit of leading with the foot instead of the knee.

*Placing boxes in front of the hurdles will prevent your students from initiating their lead leg action with their foot instead of their knee.*



*It's Better to Lead With the Knee, Not the Foot*



*Leading with the Foot, Instead of the Knee—Produces a High, Slow Trajectory Over the Hurdle*

### Lead leg Box Drill

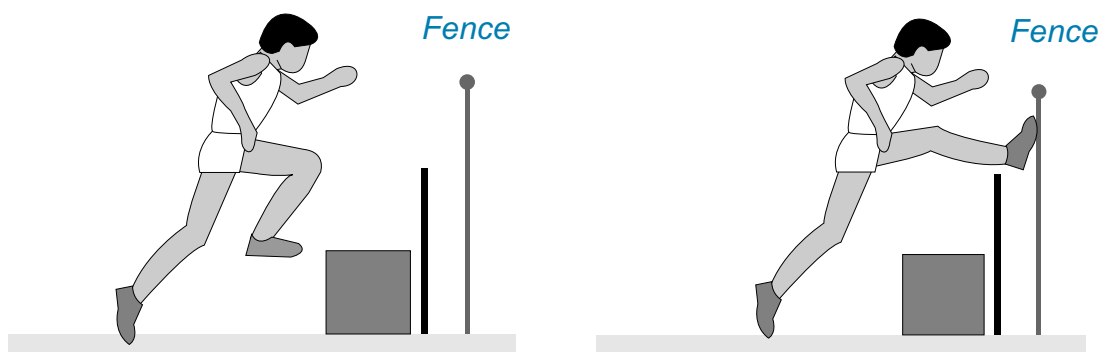
Place a hurdle against a wire fence or a mat placed against a wall. Find a cardboard or pizza box about 18” high (1 1/2 feet or .5 metres) and place it 18” in front of the hurdle.

Your student stands about four feet from the hurdle and falls forward, kicking the lead leg up and forward so that it contacts the fence just above the hurdle.

Be sure normal arm technique is used and watch the contact point of the foot over the hurdle—it should be near the hurdle’s center. If it isn’t, your student isn’t driving the lead leg directly forward.

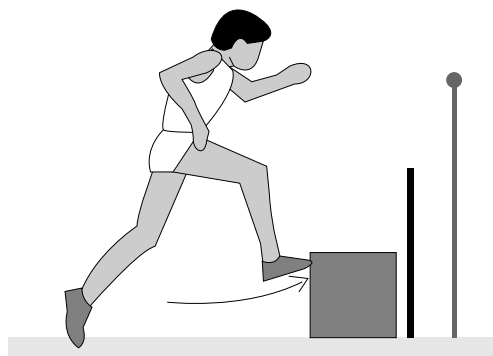
The presence of the box will force your hurdlers to lead with a high-knee action and kick their foot forward only after the knee is high. If they attempt to lead with their foot, they’ll kick the box.

You can use this drill two to three times per week for 3-4 sets of 15 repetitions.



*Box Drill Forces Your Hurdlers to Lead With a High Knee*

*If Your Hurdlers Lead with their Foot, They'll Kick the Box*



**Progression**

You could also place boxes in front of your hurdles during actual hurdle running, as a reminder that the knee should initiate the lead leg action. The boxes will provide instant feedback when it doesn't.

**Reference:** Adapted from Steve Silvey (Head Coach, Blinn College, TX), "Hurdle drills." **Texas Coach**, November 1992.

[\$13 U.S. , \$15 U.S. in Canada, 9/yr, P.O. Drawer 14627, Austin, TX, 78761, (512) 454-6709].



## *Drill to Keep the Trail-Leg Heel Tight Over the Hurdle*

An important element of good hurdle technique is a compact trail leg over the barrier. That is, the heel of the trail leg should be kept tight to the buttocks as it crosses the hurdle.

If it's allowed to extend as it crosses, it increases the length of the lever that must be moved forward. This is basic physics: with the same amount of force, a longer lever moves more slowly.

An extended trail leg may also produce a counter-action from other areas of the body: possibly lateral body lean, and/or a high trail-leg arm. And, in certain circumstances, an extended trail leg might even infringe on an inside lane, causing disqualification. This is most likely with 400m hurdlers while running around a bend.

Here's a drill that will teach your students the correct position of the trail-leg heel as it crosses the hurdle.

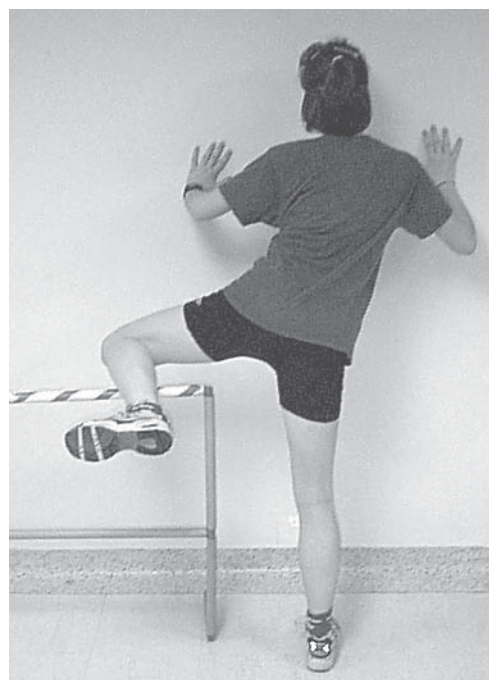
### **Setup**

Have your students lean against a wall. Place a hurdle sideways beside each student and have them place the instep of their trail leg on top of the hurdle.

Instruct them to pull the trail leg forward, dragging their instep along the hurdle. They continue pulling forward, finishing with a high knee in front of the body. They then perform more repetitions of the movement.

This drill forces good trail leg mechanics: heel tight to the buttocks, and knee

*A drill that teaches hurdlers to keep their trail-leg heel tight to the buttocks as it crosses the hurdle.*



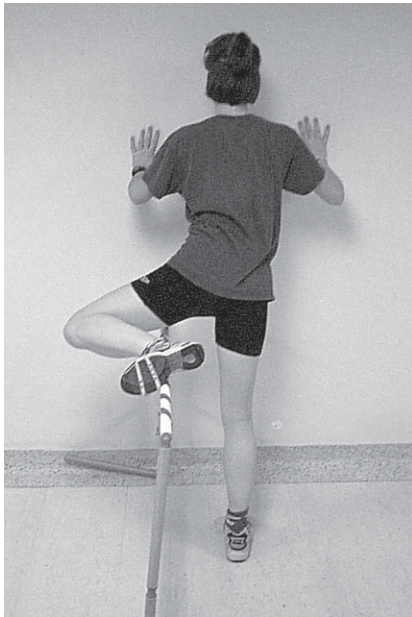
*Extended Trail Leg—  
Heel Not Kept Tight to  
Backside*

pulled beneath the armpit. And it's a great specific flexibility exercise for the trail leg.

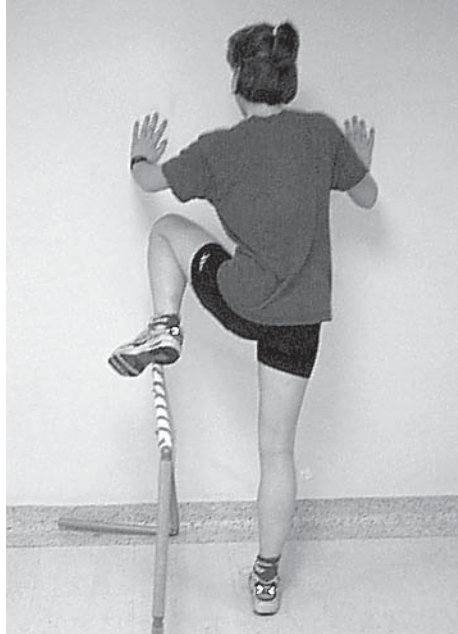
**Variation**

To develop extra flexibility, angle the hurdle so the front is higher than the back. This forces an even higher pull of the knee beneath the armpit.

*D.M.*



*Place Instep of Trail-Leg on Top Edge of Hurdle*



*Pull Trail-Leg Forward, Dragging Instep Along Top of Hurdle*

**Reference:** Loren Seagrave, **Speed Dynamics Level III Hurdles Seminar**, Cleveland, Ohio, November 1995.

[For a list of Speed Dynamics seminars, contact PO Box 21850, South Euclid, Ohio, 44121, USA 1-800-732-5503].



## Hurdle Take-off Drill

You can describe a skill a hundred times, but sometimes the only way to get an athlete to understand is to let them experience it first-hand.

That's the advantage to this drill. It allows your hurdlers to actually feel the "hips tall," "high lead-leg knee," and "low take-off angle," that are vital to successful hurdling.

### The Drill

Instruct your hurdlers (one at a time), to face you and place both hands on your shoulders while they cock their lead-leg ankle upwards and bend their lead-leg knee for a good high-knee hurdling position.

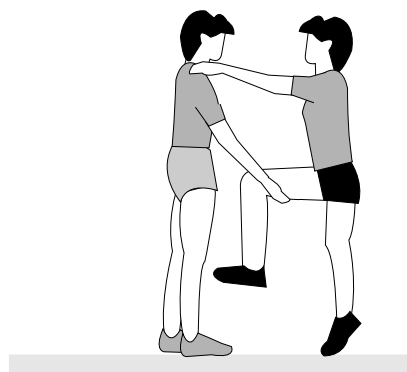
Grasp the hamstring of their lead-leg just above the knee and slowly move backwards, supporting their weight, until they've assumed a good forward-leaning position. By extending their back leg and keeping the upper body rigid, their hips will remain "tall" and they will be able to experience an ideal low-angle take-off position.

Perform this drill several times and ask the athlete to "feel" this position so they can copy it when attacking actual hurdles.

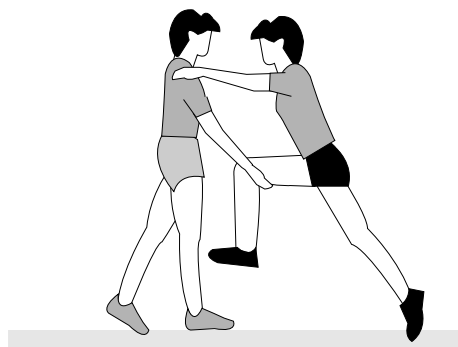
**Reference:** Terry Crawford & Bob Bertucci, **Winning Track and Field Drills for Women**, Leisure Press, 1985.

[May be available from **Human Kinetics Publishers Inc.**, In Canada: 475 Devonshire Rd, Unit 100, Windsor, Ontario, N8Y 2L5, 1-800-465-7301. In U.S.A.: Box 5076, Champaign, Illinois, 61825, 1/800-747-4457].

*A drill that will let your athletes experience the ideal take-off position when hurdling.*



*Hurdle Take-Off Drill:  
Step 1*



*Hurdle Take-Off Drill:  
Step 2*

## *Estimate Hurdle Potential from 100m Times*

While the hurdles are highly technical, they're also a speed event, and your hurdlers' potential is limited by their ability in the full-out 100m.

In fact, their 100m sprint time will help you estimate their potential in the sprint hurdles. Here's how.

### ***Estimating Hurdle Potential***

To estimate 100m hurdle potential for females, take their best 100m sprint time and:

- 
- Add 2.0 seconds for developing hurdlers.
  - Add 1.5 seconds for accomplished hurdlers (3+ years of experience).
  - Add 1.0 seconds for elite hurdlers.
- 

To estimate 100m hurdle potential for males, take their best 100m sprint time and:

- 
- Add 4.5-5.0 seconds for developing hurdlers.
  - Add 3.5-4.0 seconds for accomplished hurdlers (3+ years of experience).
  - Add 2.5-3.0 seconds for elite hurdlers.
- 

For example, a female hurdler with less than 3 years experience and a 100m sprint time of 12.8 has enough speed to run a 14.8 100m hurdle time. After several years of refining her hurdle technique, she should have the potential to run 14.3.

See the chart on the next page to estimate your hurdlers' potential based on their 100m sprint times. The chart can be used for a number of athletes, or to monitor the development of a single hurdler.

 D.M.

**Reference:** Loren Seagrave & Kevin O'Donnell, **Sprint Training Volume 1**, Speed Dynamics Videos, 1991.

[\$59.95 U.S. Available from Speed Dynamics, PO Box 21850, South Euclid, Ohio, 44121, USA.. Tel: 1-800-732-5503].

*How to  
calculate  
your  
hurdlers'  
potential  
performances  
based on  
their 100m  
sprint times.*



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## *Correct the Lead Leg with Line Hurdling*

A common fault with beginners in the hurdle events is the tendency to bring the lead leg *around* and over the hurdle instead of straight up and over. This error in technique is commonly called “slinging” the lead leg.

There are several reasons why this may occur.

### **Low Knee Lift**

One reason for this error is a lack of knee lift with the lead leg. If the knee isn't high enough, your hurdlers might feel they won't clear the hurdle when they snap their lower leg forward. As a result, they try to cheat by bringing the foot around and over.

*Coaching Focus:* You can see if this is a problem by checking the angle of the thigh as the runner approaches the hurdle. Ideally, it should be at more than a right angle if they wish to clear the barrier when their lead leg snaps forward.

### **Take-Off Point Too Close**

Another reason for slinging the lead leg could be that the take-off point is too close to the hurdle. Not wishing to kick the cross-bar as their lead foot moves up and outward, runners who take off too close to the hurdle may move their leg sideways and up.

*Coaching Focus:* To identify this problem, watch the point of take-off and the clearance over the hurdle. For example, if your athletes float over instead of maintaining a low, flat trajectory, it could be an indication that they're taking off too close.

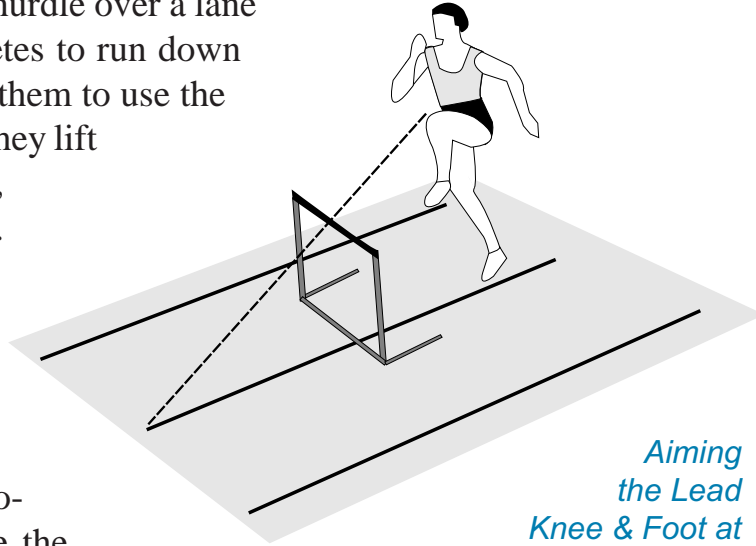
### **Undeveloped Motor Skill**

Finally, your athletes may simply be having trouble coordinating the correct movement. Here's a coaching cue that will help them to develop the correct movement pattern with their lead leg.

*Three reasons why your hurdlers may be bringing their lead leg around and over the hurdle instead of up and over.*

*Coaching Cue:* Place the hurdle over a lane line and instruct your athletes to run down the line at the hurdle. Tell them to use the line as a focal point: when they lift their lead knee at take-off, they should aim it at the line. And when their lead foot comes down over the hurdle, it should touch down on the line.

This will give your athletes a visual cue they can focus upon that will produce the correct action.



*Aiming  
the Lead  
Knee & Foot at  
the Lane Line*

#### **References:**

1. Brent McFarlane, **Understanding the Hurdle Events**, Toronto: Ontario Track and Field Assn., 1981.  
(\$6 Cdn., Coaching Assn. of Canada, 333 River Rd., Ottawa, Ont., K1L 8H9).
2. Tom Tellez & Mike Takaha, "The hurdles from start to finish." **Texas Coach**, March 1988.  
(\$10 U.S. , \$12 U.S. in Canada, 9/yr, P.O. Drawer 14627, Austin, TX, 78761, (512) 454-6709).



## *Peaking Schedule for Sprinters and Hurdlers*

On the next page is the taper I use for sprinters and hurdlers to prepare for championship competitions. It's based on Charlie Francis' program for elite athletes. (Within a drug free setting!)

If your athletes have done the work and you want them to be bang-on when the big day hits, try this program. It may take a few tries to understand your athletes' body and mind, but it has worked with some success for my group.

### ***Be Flexible***

Keep in mind that we often modify our workouts based on feeling, visual observation and instinct. As athletes try to peak, it's important for both the coach and athlete to communicate openly about how the athlete feels and to constantly modify the program based on this interaction. It's an amazing thing to see athletes hit their peak.

### ***Examples***

This 10-day taper is the same peaking schedule used by 6-time Ontario High School (OFSSA) hurdle champion Lisa Duffus, 1994 OFSSA 100m hurdle champion Francis Sealy, as well as recent OFSAA Champions Krissy Liphardt, Stanley Samuel, Jennifer Mayhue and Shelley-Ann Brown, as they prepared for OFSAA and the Canadian Junior Championships.

Using this programme Francis Sealy set a Canadian Junior meet record of 13.84 seconds, and Lisa Duffus placed second with a personal best 14.05. Both qualified for the World Junior Championships in Portugal, where they again ran close to personal bests.

*A highly successful peaking schedule for elite hurdlers and sprinters.*



With modifications for event specificity, Jennifer Mayhue won the 1995 Canadian Junior 400m Championship, and Stanley Samuel placed 3rd in the men's 400m. In the summer of 1997, Krissy Liphardt and Shelley-Ann Brown both won Canadian Junior Medals in the sprints and hurdles.

### **A Few Tips**

1. Allow for a great deal of modification in each workout. At this point, less, at high quality, is far more important than quantity.
2. Listen to your athletes. If they feel great, send them home with a confident smile. More work is not necessary at this point.
3. Rest and regeneration are vital for optimal performance.
4. Stay away from new training stimuli and certainly avoid making technical changes. *W h e r e* they're at in training, is where they're at on race day.
5. Prepare to pull back on the reins, as your athletes will start getting pretty excitable in these last 10 days, which, I believe, is a sign of a successful taper.



*👤 Dave Hunt  
Contributor*

Dave Hunt is the University of Toronto Sprints and Hurdles Coach and has been a coach with the Canadian National Junior Team.

See Peaking Schedule on the next page:

# Peaking Schedule for Sprints & Hurdles

*Begin each workout with a warmup and finish with a warmdown.*

MONDAY (Day 1)	TUESDAY (Day 2)	WED. (Day 3)	THURSDAY (Day 4)	FRIDAY (Day 5)	SATURDAY (Day 6)	SUN. (Day 7)
<p><b>1. Speed Drills</b><sup>1</sup> (Accelerations, stick drills, assisted sprinting etc).</p> <p><b>2. Speed/Acceleration</b> From Blocks (see below):</p> <ul style="list-style-type: none"> <li>Sprinters: 4 x 40m</li> <li>Hurdlers: 4 x 3H</li> </ul> <p>Full blast, 2-3min recovery.</p> <p><b>3. Speed Endurance</b></p> <ul style="list-style-type: none"> <li>Sprinters: 1 x 80m, 100m, 120m, 150m</li> <li>Hurdlers: 1 x 6H, 8H, 8H + 30m, 8H + 50m (run 8 hurdles, then keep sprinting for an extra 50m)</li> <li>@ 100%, Full Recovery of 10-12 min between reps</li> </ul> <p><b>4. Strength</b><sup>2 &amp; 3</sup> Circuit: Medball exercises and Running A's.</p>	<p><b>1. Power Speed</b><sup>3</sup> 3 x 20m of A's, B's, C's (March, Skip, Run).</p> <p><b>2. Weights</b><sup>4</sup> 3 x 8 reps of 5 exercises.</p> <p><b>3. Tempo Running</b> 8 x 200m on grass @ 60-80% of maximum 2-3 minute recovery</p>	REST	<p><b>1. Speed/Acceleration</b> From Blocks (see below):</p> <ul style="list-style-type: none"> <li>Sprinters: 4 x 40m</li> <li>Hurdlers: 2-3 x 2-3H @ 100%, 2-3min recovery</li> </ul> <p><b>2. Speed Endurance</b></p> <ul style="list-style-type: none"> <li>Sprinters: 2 x 80m</li> <li>Hurdlers: 1-2 x 6H @ 100%, 12-15min recovery.</li> </ul> <p><b>3. Special Endurance</b> 2 x 150m @ 95-100% (15-20min rest)</p>	<p><b>1. Strength</b><sup>4</sup> Weights: 2 x 10 reps of 4 exercises.</p> <p><b>2. Tempo Running</b> 8 x 100m on grass @ 60-80% of maximum. 2-3 min recovery.</p> <p><b>Feel Great!</b></p>	<p><b>1. Special Strength</b> 3 x 4 hurdles hops.</p> <p><b>2. Speed Drills</b><sup>1</sup> (Accelerations, stick drills, assisted sprinting etc).</p> <p><b>3. Speed/Acceleration</b> From Blocks (see below):</p> <ul style="list-style-type: none"> <li>Sprinters: 4 x 25m</li> <li>Hurdlers: 4 x 2-3H @ 100%, 2-3min recovery.</li> </ul> <p><b>4. Speed Endurance</b> Sprinters: 1-2 x 80m, 120m Hurdlers: 1 x 6H + 30m, 8h + 30m @ 100%, 20min rest between reps.</p> <p><b>5. Power Speed</b><sup>3</sup> 2-3 x 10m of A's, B's, C's</p>	REST
MONDAY (Day 8)	TUESDAY (Day 9)	WED. (Day 10)	THURSDAY	FRIDAY	SATURDAY	SUN.
<p><b>1. Power Speed</b><sup>3</sup> 4 x 20m A's, B's, C's</p> <p><b>2. Weights</b><sup>4</sup> 3 x 8 reps of 4 exercises.</p> <p><b>3. Tempo</b> 4-6 x 150m on grass @ 60-80% of maximum 2-3 min recovery.</p>	<p><b>1. Speed Drills</b><sup>1</sup> (Accelerations, stick drills, assisted sprinting etc).</p> <p><b>2. Speed/Acceleration</b> From Blocks (see below):</p> <ul style="list-style-type: none"> <li>Sprinters: 2-3 x 40m</li> <li>Hurdlers: -3 x 3H @ 100%, 2-3min recovery</li> </ul> <p><b>3. Tempo</b> 6 x 100m on grass @ 60-80% of maximum, 2-3 min recovery.</p>	<p>REST Travel To Championship</p> <p>Feel Fantastic!</p>	CHAMPIONSHIP DAY 1	CHAMPIONSHIP DAY 2	CHAMPIONSHIP DAY 3	<p><i>Adapted from Charlie Francis by Dave Hunt</i></p>



- Speed Drills include:** 2-3 x 10-15m of *Speed Dynamics* drills, A's, B's, C's performed as Single-Leg Claw-Back Drills (Step over ankles). [See *PE Digest*, Winter '94]. Single-Leg, Double-Leg, Tripling, Left Left Right Right, Alternate, Full Claws (Step over knees).
- Medball exercises include** 1-2 sets of 3-5 exercises for each of the following muscle groups. Select from: **1. Upper Body:** 15-30 reps of alternate hand pushups; bench-ups; close hands; chest passes; triceps passes; shot puts; etc. **2. Abs:** 30-60 reps (doubled) of chinnies; twist gives; twist and throws; catch, twist and throws; rowing; curl and chest passes; curl and triceps passes; etc. **3. Back and Butt:** 15-30 reps of low back passes; side-leg throws; butt raises on ball; side situps, etc. **4. Hamstrings:** 15-30 reps of partner hamstring curls; bench butt raises; backward kicks or throws; straight leg bounds; etc. **5. Quads:** 15-30 reps of front straight kicks; side straight kicks; step lunges; squats, step-ups; good mornings; V steps; V jumps, etc. **6. Ankles:** 15-30 reps of A's, B's, calf raises, alternate leg jumps, ankle only hops, etc.
- Definition of "A's," "B's" and "C's":** A's = High knee marching, skipping, running; B's = High knees with extension of lower leg; C's = "B's" with one leg, hurdle trail leg action with the other leg.
- Strength exercises vary with each programme, but this time of the season typically consist of the following exercises:** squats, hamstring curls, power cleans, pull-downs and bench press.

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# *Tricks of the Trade for the Relays*



## “*Flank Drill*” for Better Relay Exchanges

Most runners practice relay exchanges on their home track using semi-relaxed drills that involve only a few teammates. As a result, they may lose concentration when they get into the melee of a competitive relay exchange.

You can improve your runners’ ability to concentrate in competition through a race simulation called the Flank Drill.

### **Flank Drill**

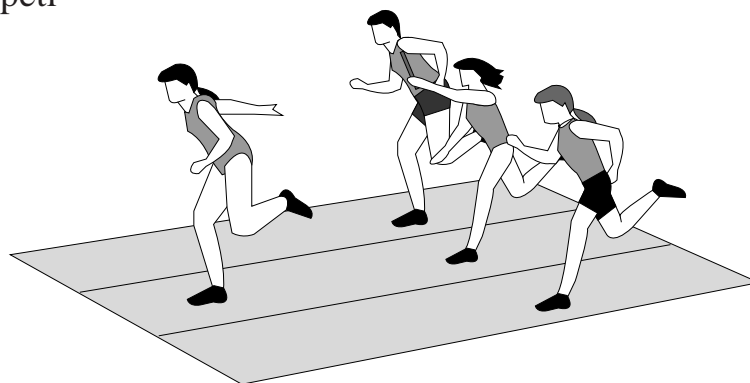
Run a regular relay exchange with the incoming runner carrying a baton and the outgoing runner in the exchange zone. The difference is that you place an extra runner on each side of the incoming athlete.

The goal of these runners is to distract the baton carriers. They sprint beside the incoming runner, yelling “Stick” just as opponents would in a race. They can also wear bright clothing to increase their distracting influence. They continue sprinting full blast through the exchange zone even after the exchange takes place.

The outgoing runner receives the baton, runs 10-20 metres past the exchange zone and decelerates.

Besides simulating competitive conditions, this drill gives your athletes (and you) instant feedback on whether the speed of the baton decelerates during the exchange because you’ll be able to compare the progress of the baton relative to the constant speed of the flanking

*How to simulate the confusion of competition and provide instant feedback on the speed of the baton through the exchange zone.*



*Flank Drill*

sprinters. You can give your relay team the goal of making sure that no ground is lost to the flanking runners during the exchange.

**Reference:** Henry Anderson (Iraan HS), "Sprint and mile relays." Texas Coach, April 1992.

[\$13 U.S. , \$15 U.S. in Canada, 9/yr, P.O. Drawer 14627, Austin, TX, 78761, (512) 454-6709].



## *Place the Relay Baton at an Angle*

When performing the downsweep relay passing technique, outgoing runners extend the receiving arm backward and parallel with the ground. This usually places the hand with the fingers pointing directly backward. Incoming runners often make the mistake of placing the baton straight forward over the fingers of the receiver. A baton placed like this is difficult to grasp because the hand cannot close naturally around it.

This is a common cause of missed exchanges in which the baton appears to have been placed properly but is never grasped by the outgoing runner.

### How to Correct

You can avoid this problem by instructing your relay runners to angle the baton slightly inward (i.e. towards the inside of the passer's forearm) as they pass the baton.

This will place the baton so it contacts the receiver's palm between the thumb and index finger—allowing a quick flexing of the fingers for a safe grip.

*The incoming runner should angle the relay baton slightly inward for the safest contact with the receiver's hand.*



*A Baton Passed Over the Fingers is Difficult to Grasp*



*Angle the Baton So it Makes Contact Between the Thumb and Index Finger*

**Reference:** John Smith (UCLA Sprint Coach & World/Olympic Record holder), **Sprints, Starts & Relays Video**, Championship Books and Video Productions.

[\$39.95 U.S., Championship Books and Video Productions, PO Box 1166, ISU Station, Ames, Iowa, 50014, USA, Toll-free: 1-800-873-2730, Fax: 515-232-3739].



## *Determining Your Relay Teams' Potential Times*

Would you like to estimate how your 100m and 400m relay teams stack up against their competition? Or find out how close to their potential they are running? Here's how to estimate your relay teams' potential best times.

### ***Estimating A 4x400m Relay Time***

A top-notch 400m runner can run about .7 seconds faster in a relay than in an open race.

This is because a running start is faster than starting from the blocks due to the extra effort required to overcome inertia. Also, about .1 seconds of this difference is because a relay runner doesn't actually run the whole 400m — the extended arms of the passer and receiver cover part of the distance.

So, to estimate the potential time of your 4 x 400m relay team, add the four runners' personal best 400m times from out of the blocks. Then, subtract 2.1 seconds to calculate their potential best relay time (2.1 = .7 seconds times *three*, since the lead runner does not receive a flying start).

**4 x 400m potential = Total times — 2.1 secs.**

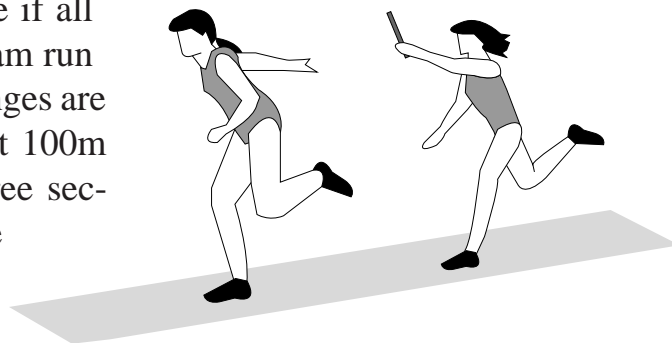
For example, Mary's best open 400m time is 58.8, Joan's is 62.2, Denise's is 64 and Martha's is 60.1. Their total time is 4:05.1. Subtract 2.1 and their best potential time is 4:03.0 if hand-offs are good and everyone runs their best.

### ***Estimating a 4 x 100m Relay Time***

The average time for a hundred-metre runner may be as much as one second faster in a relay than from the blocks, even though they must negotiate turns, which causes some reduction in speed.

*How to estimate the potential times of your 4 x 400m and 4 x 100m relay teams, based on their personal best times from a stationary start.*

So, to determine an ideal time if all the athletes in your 4 x 100m team run at their best and the baton exchanges are good, add the four personal best 100m times together, then subtract three seconds (only *three* seconds, since the lead runner starts from the blocks).



$$4 \times 100m \text{ potential} = \text{Total times} - 3.0 \text{ secs.}$$

For example, if you have four runners whose total times add up to 44 seconds, their potential relay time is  $44 - 3 = 41.0$ .

### **Uses Of These Estimates**

These estimates will give your runners some tough but attainable goals for which to aim during their competitive season. And they can give you some hard information on how much time your teams are losing due to bad handoffs.

**Reference:** Bert Nelson (Editor), Dave Johnson (Co-Editor), **Track & Field News' Little GoldBook**, Los Altos: Tafnews Press, 1984.

[\$7.50 U.S. Available from **Track & Field News**, Box 296, Los Altos, CA, USA, 94022].



## *The Silent Relay Exchange*

In verbal relay exchanges, the incoming runner determines when to make the handoff, and signals the outgoing partner to lift his hand to accept the baton.

In fact, stand by any sprint relay exchange zone, and you'll hear a variety of verbal signals: "Hut! Stick! Go! Now!" Often, what you'll hear however, is the same signal ("Stick!") repeated several times and simultaneously by a number of teams. It can definitely be confusing and if accompanied by the noise of a loud crowd, such verbal signals can get lost altogether.

Just ask the members of the medal-contending Jamaican 4 x 100 relay team in the finals at the World Athletics Championships this summer. Crowd noise was so loud that one of the outgoing runners completely missed his signal and the exchange was botched.

However, there is an exchange technique that is precise and does not rely on verbal cues. Called the Silent Exchange, it uses a pre-determined stride count to determine the timing of the handoff.

### ***The Silent Exchange***

First, determine a "start" checkmark. The exchange occurs after the outgoing runner has taken his seventh stride. It will be 18-28 foot lengths for guys (this allows your runners can pace it off using their feet instead of using a tape measure). Somewhere in this range will be the start mark. Use trial and error to determine the spot where the seventh stride coincides with the perfect exchange.

The seven strides is based on coach Richard Tucker's

*The silent relay exchange employs a handoff on the outgoing runner's seventh stride.*



experience with the men's high hurdles. He realized that every 110m hurdler consistently takes seven strides to cover the 13.72 meters to the first hurdle (although some will take eight shorter strides). This 13 meters fits nicely within the 20 meter exchange zone and the 10 meter acceleration zone. He reasoned that if hurdlers can run a consistent 13.72 meters in seven strides, so can relay runners.

This concept works for girls too, but they will cover less distance in their seven strides—probably closer to the 13.0 meters they must cover to the first hurdle in their 100m hurdle race.

### ***Outgoing Runner's Responsibilities***

The outgoing runner watches for the incoming runner to pass the start mark. Once the start mark is crossed, the outgoing runner immediately accelerates to full speed and counts his strides (two-four-six-seven!) When he hits his seventh stride, he reaches back with his receiving arm and accepts the baton.

### ***Incoming Runner's Responsibilities***

The incoming runner sprints into the exchange zone at full speed. As soon as he sees his partner make his first movement, he starts counting strides. At the third stride, he shifts his gaze upward to the exchange hand, and on the seventh stride, places the baton in that upraised hand.

**Reference:** Richard H. Tucker (Rushville High School, Illinois), "A silent treatment for your sprint relay team." **Sprints & Relays**, 5th Edition, Jess Jarver (Editor), Tafnews Press, 2000.

[\$18.00 U.S., Available from **Track & Field News**, 2570 El Camino Real, Suite 606, Mountain View, CA 94040, USA, 415/948-8188].



## *Bottle Drill for the Push-Pass Relay Technique*

The push-pass is a relay exchange technique that is easy to learn and effective at all levels of competition. This technique feels more natural for most runners than the up-sweep or down-sweep techniques, and it provides a larger, more visible target for the incoming runner. Most runners find that pushing the baton forward is more accurate than lifting or lowering it.

### ***The Push-Pass Technique***

In the push-pass, the receiver snaps the arm back towards the incoming runner with the hand at about shoulder-height, fingers spread and pointing down, and the palm facing back. A coaching cue you can use is, “Show your palm to your teammate.”

The arm is not lifted directly behind the shoulder—it’s angled slightly outward giving the baton a path right down the middle of the lane. Because the outgoing runner will be sprinting next to the inside or outside of the lane (depending on which exchange it is), an angled exchange arm will place the hand in the middle of the lane.

The incoming runner pushes the baton forward into the outgoing runner’s palm, between the thumb and the index finger. The baton is pointing to the sky when the exchange is made.

One of the keys to the technique is a good hand and arm position from the outgoing runner. Here are some ways to develop the correct position. Be sure to practice these drills with both hands.

*Drills using large plastic pop bottles that teach the correct receiving position for the push-pass relay exchange technique.*



*Bottle Drill*

### **Bottle Drill**

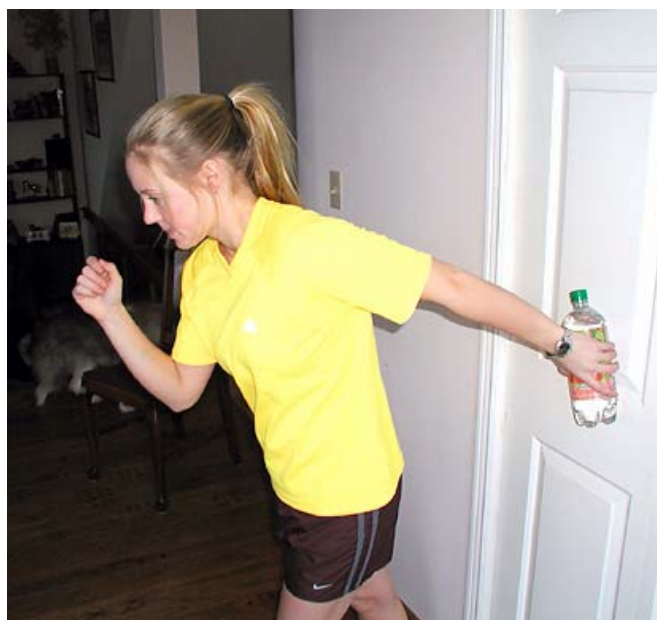
This drill uses large plastic pop bottles (i.e. two liter). Place an empty bottle on a table. Your runners stand in front of the table and slightly off to the side —just as if they're ready to receive a baton pass.

They pump their arms several times, as if running, then reach backwards, palms facing back, pick up the bottle, then pump their arms several times more. The size of the bottle forces them to assume the correct hand position.

In a variation of this drill, a teammate stands behind and pushes the bottle into their hand.

### **Wall Drill**

Using the same bottles, your runners stand in front of a wall with a bottle in one hand. They pump their arms several times, then drive the hand backwards (and slightly out). They release the bottle so that it bounces off the wall (they must be standing close) and back into their hand.



*Wall Drill*

**Reference:** Joseph Rodgers (Project Coordinator), **USA Track & Field Coaching Manual**, 2000.

[\$21.95 U.S., \$32.95 Cdn.

Available from **Human Kinetics Publishers Inc.** In Canada: 475 Devonshire Rd, Unit 100, Windsor, Ontario, N8Y 2L5, 1-800-465-7301. In U.S.A.: Box 5076, Champaign, Illinois, 61825, 1/800-747-4457].



## *Formula to Determine Relay Runners' Go-Marks*

Determining go-marks for the 4 x 100m relay is an interesting task. Your athletes can practice only a few repetitions at the full 100m distance before they become too fatigued to establish accurate marks.

As a result, they usually establish their marks based on trial and error, using sprints over shorter distances—unfortunately, at running speeds that seldom resemble a competitive effort. In fact, such shorter sprint efforts may find your sprinters accelerating as they enter the exchange zone, although they would actually be decelerating if they'd run the full distance in a race.

So how can you be more precise in determining the go-marks for your relay runners? Tom Ecker, in his book *Basic Track and Field Biomechanics*, has devised a formula based on competitive efforts.

### **Go-Mark Formula**

Have your athletes run a full-out time trial over 100m. Using assistants, time their first 26m and their last 25m. These times will help you determine their go-marks.

Determine the placement of your runners, then plug their times into the following formula:

$$G = \frac{75(O - I)}{I}$$

G = Go-mark distance, in *feet*.

O = Outgoing runner's time for the 1st 26m of his/her time trial.

I = Incoming runner's time for the final 25m of his/her time trial.

The above formula will give you the go-mark for a

*A formula for determining 4 x 100m relay go-marks, based on timed portions of a full-out 100m race.*

fast exchange, within 4.5 meters of the end of the exchange zone. If you want a slower (less acceleration distance for the outgoing runner) but less risky exchange, measure the first 21m and final 20m of your athletes 100m time trial and use the following formula:

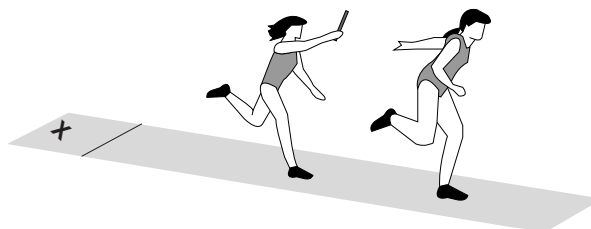
$$G = \frac{60(O - I)}{I}$$

G = Go-mark distance, in *feet*.

O = Outgoing runner's time for the 1st 21m of his/her time trial.

I = Incoming runner's time for the final 20m of his/her time trial.

This formula will result in a baton exchange in the middle of the exchange zone.



### Example

Here's an example. We'll calculate the go-mark for a faster exchange, using an outgoing runner with a time of 3.8 seconds in the first 26m of the 100 time trial. The incoming runner's final 25m time (in the 100m) was 3.2 seconds.

$$G = \frac{75(3.8 - 3.2)}{3.2}$$

$$G = \frac{75 \times .6}{3.2}$$

$$G = 14 \text{ feet}$$

Your outgoing runner would then begin sprinting when the incoming runner crossed a mark 14 feet before the acceleration zone.

### ***Be Sure to Test the Marks***

These marks won't be perfect, since timing errors may occur and competition conditions can vary. However, they should give you a good starting point for determining your go-marks.

**Reference:** Tom Ecker, **Basic Track and Field Biomechanics** (1st Edition), Tafnews Press, 1985.

[Second edition is available for \$17.50 U.S. from **Tafnews Press**, c/o **Track & Field News**, 2570 El Camino Real, Suite 606, Mountain View, CA, 94040, USA, 415-948-8188, Fax: 415-948-9445].



## *A Quick Method to Determine Takeoff Marks for the 4 x 200m Relay*

Runners in the sprint relays often determine their takeoff mark using foot-lengths. This allows them to determine their takeoff mark by “stepping it off” instead of using a tape measure.

Often, the runners on your 4 x 100m team are the same athletes who run on your less-frequently contested 4 x 200m team. As a result, they may not practice their 4 x 200 exchanges very often.

Here’s a quick and easy way to step off their takeoff marks for the 4 x 200, based on their marks in the 4 x 100m.

### **Ballpark Method**

To determine takeoff marks in the 4 x 200 relay, have your runners measure the distance to the takeoff mark in the 4 x 100m (i.e. in foot-lengths), divide it by two, and add two foot-lengths.

So, if Fred’s takeoff mark in the 4 x 100m is 24 foot-lengths away, have him use a mark for the 4 x 200 that is  $12 + 2 = 14$  foot-lengths away.

This provides an estimate only. Trial and error will be required to make the takeoff location more precise.

**Reference:** Richard H. Tucker (Rushville High School, Illinois), “A silent treatment for your sprint relay team.” **Sprints & Relays**, 5th Edition, Jess Jarver (Editor), Tafnews Press, 2000.

[\$18.00 U.S., Available from **Track & Field News**, 2570 El Camino Real, Suite 606, Mountain View, CA 94040, USA, 415/948-8188].

*A formula to determine takeoff marks in the 4 x 200m relay, based on distances used in the 4 x 100m relay.*



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# *Games for Sprinters and Hurdlers*



## “Little Thieves” To Develop Sprinting Ability

Here’s a game that will develop your students’ sprinting ability.

It’s especially useful for situations in which they must be aware of their surroundings while running, and for sports in which they may have to sprint, slow down, then accelerate again.

### Setup

Establish four teams of four to eight students. You can play in the gym or on a field.

Place a hula hoop at each corner of a square so the hoops are between 12 and 20 meters (or yards) apart.

Into each hoop, place four beanbags or small balls (or bags of Portland cement if your football players are participating). One team lines up behind each hoop.

### How to Play

The object of the game is to steal the beanbags from the hoop of the diagonally opposing team.

The players on each team take turns sprinting to the opposite hoop, taking a single beanbag, then racing back and placing it in their own hoop. Once the beanbag is

*A four-team  
running  
contest  
that develops  
sprinting  
ability and  
sports vision.*



placed in the home-hoop, their next teammate starts.

Players aren't allowed to protect their home-hoop or impede a runner's progress.

Once the game is underway, there will actually be four players running simultaneously and crossing at the same spot, so caution your students to be careful as they approach this intersection. In many instances they'll be forced to sprint until they near the crossing point, slow down until it is clear, then accelerate again. This is a good way to develop acceleration and better sports vision.

The first team to accumulate six beanbags is the winner.

Reference: Sharon Foster (Writer & Program Developer), **Instructor's Handbook: Timex Run, Jump, Throw Program**, Canadian Track & Field Assn., 1985.

[c/o Canadian Track & Field Assn., 1600 James Naismith Drive, Gloucester, Ontario, Canada, K1B 5N4].



## “Meet in the Middle” Sprints

Here’s a variation of standard wind sprints that will help your students improve their speed. It can also be used in other sports such as hockey, football, basketball—any activity in which speed is important.

### Execution

Place a flag or pylon at the 50-meter mark of a 100m straight (or at the mid-point of a shorter distance). Place a line of runners, in adjacent lanes, at both ends of the 100m.

On your whistle, the first two runners sprint towards each other and attempt to be the first to reach the mid-point pylon. They then walk or jog to the opposite line of runners.

### Advantages

This drill has some advantages over regular side-by-side sprints. It’s competitive, but the slower athletes don’t feel like they’ve been “beaten,” because their opponent isn’t running beside them—they are running in the opposite direction. This allows you to mix runners of different abilities and sexes in the drill (although it’s most effective if the partners are of equal ability).

You can also allow athletes of different ability to run against each other by allowing the slower runner to start closer to the mid-point. The two runners are so far away from each other that this head-start isn’t obvious.

And the drill is fun because it gives your runners a sensation of great speed as they approach and pass each other.

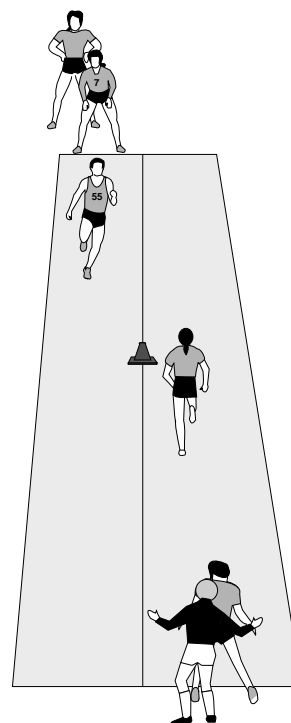
### Tempo Run Variation

You can also use the drill on “tempo” days when you don’t want full-blast sprints. For such workouts, you could ask the two partners to run at a slower pace and to time their runs so they both reach the center pylon at the same time.

**Reference:** Dr. Wolfgang Lohmann (PhD, Author), Peter Klavora (PhD, Editor), **Running Jumping Throwing for Youth**, Sports Books Publisher, Toronto, 1990.

[Approximately \$15 Cdn., Available from Sports Books Publisher, 278 Robert Street, Toronto, Ontario M5S 2K8].

*A variation of side-by-side wind sprints in which two runners at opposite ends of a straight attempt to beat each other to the center mark.*



*“Meet in the Middle”  
Sprints*

## “Switch” for Speed and Agility

“Switch” is a good game for developing your students’ speed, agility and reaction time.

Its emphasis on quick starts and short sprints also makes it useful as a conditioning game for basketball, football, soccer and track.

### **How to Play**

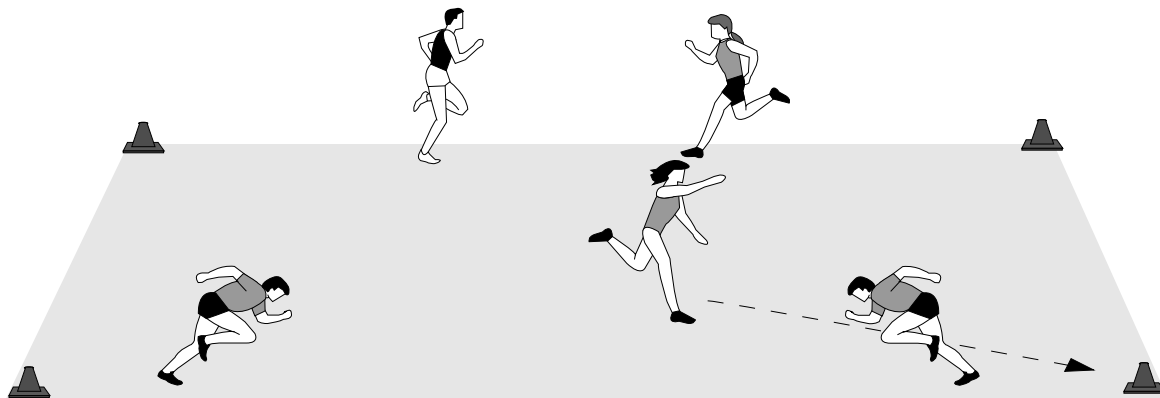
Place a student at the four corners of a square that you can mark using pylons. A fifth student (“It”) stands in the center of the square.

The perimeter players must attempt to switch places with each other, using subtle signals and fakes to keep “It” off balance.

“It” attempts to reach one of the corners left vacant by the perimeter players who are trying to switch. If he/she reaches it before the perimeter player, the corner is “captured” and one of the perimeter players then takes the center position.

If the perimeter players make four successful switches, rotate an outside player into the middle. Keep the game moving by requiring at least one switch attempt every 15 seconds.

*A game in which players at the corners of a square attempt to switch places before the center player can reach their vacated corner.*



Switch

If your players are too many or too few to make groups of five, use a triangle, hexagon or other shape instead of a four-cornered square.

**Reference:** Rick Anfenson (Edgerton ES, Kalispell, Montana), “Switch.” **The Great Activities Newspaper**, November/December 1990.

[\$15 U.S., 5/yr., P.O. Box 51158, Durham, North Carolina, USA 27717, (919) 493-6977].



## Square Hopping for Fast Footwork

*Square hopping* is an activity that combines several elements that are important for the athletic development of children: quickness, agility, fast footwork, jumping ability and arm strength.

### Setup

Arrange your class into groups of five, with one student standing at each corner of a 10-15 foot rectangle. The remaining student is “it.”

Give a light medicine ball to one of the corner players.

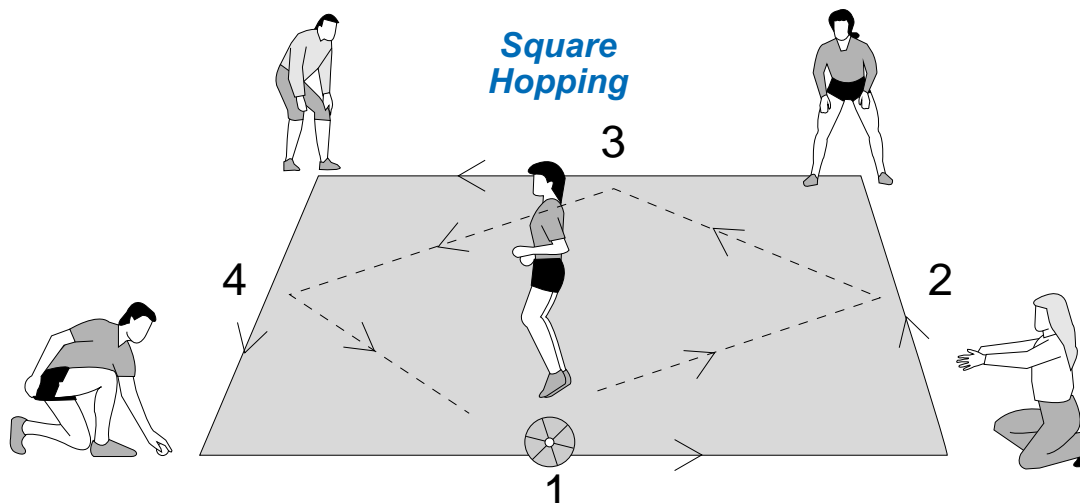
### How to Play

“It” stands between the student with the medicine ball and her nearest partner. The student rolls the ball along the ground and “it” must jump over the ball with feet together, then run to get between the student who is catching the ball and *her* nearest partner.

The student who catches the ball must wait until “it” is in position, then roll the ball to the next corner of the rectangle.

Continue for several circuits of the rectangle or until “it” becomes tired, then switch roles.

*A drill that develops fast footwork, conditioning, leg power and agility.*



### **Benefits**

The students who are “it” must move very quickly in both forward and lateral directions, learn to turn their body to face the thrower, and leap into the air to avoid the ball. Agility, quickness and leg power are all developed.

The players on the corners will develop some arm strength from passing the weighted medicine ball.

The game is fast and fun and your students will enjoy it. I use it with my track club’s youth program for grades six to eights. However, it would also be suitable in class or in a varsity sport such as soccer, football or basketball where quick footwork is a must.

Dick Moss (Editor), **Physical Education Digest**, September/October 1990.



## *Run a World Record Every Time*

Here's an idea that will give your runners some perspective about how fast the world's best really are.

Have your runners perform a timed run over a specified distance (i.e. a 200m or 400m in track). Blow your whistle when your watch shows the world's record time for that distance.

On the whistle, your athletes must stop and see how far they've gone in comparison to the world's best.

Aside from providing some interesting perspective, your students will be able to tell their friends and family that they ran a world record time (they don't have to say they didn't perform it over the world record distance).

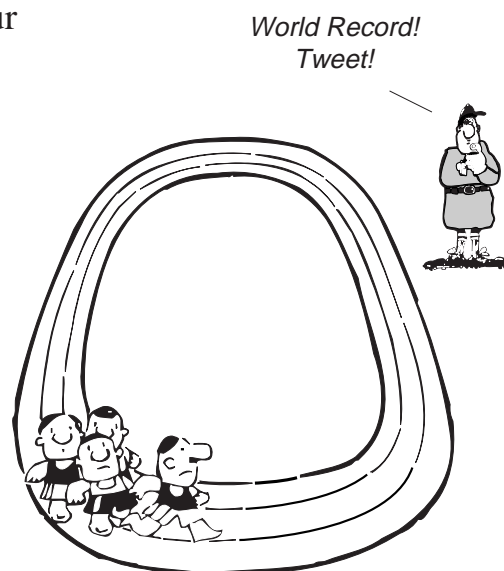
### ***Time Trial Idea for Varsity Athletes***

You can use this concept during time trials to show your varsity athletes their current progress versus their personal goal for the year.

Have your athletes run a time trial over their distance, stopping them when your watch shows their goal time. Your students will be able to see how much farther they have to go in the same time to reach their goal.

This is a different perspective from the usual, in which time is the variable: (they compare the time it takes to cover a specific distance). Here, it's the distance covered that's the variable (they compare the distance covered over a specific time period).

*An activity in which students see how far they can run in the world record time.*



### **Sample World Records**

Here are some sample world track records, as of September 1994:

	<b>Women</b>	<b>Men</b>
100m .....	10.49 .....	9.85
200m .....	21.34 .....	19.72
400m .....	47.60 .....	43.29
800m .....	1:53.28 .....	1:41.73
1500 .....	3:50.46 .....	3:28.86
Mile .....	4:15.61 .....	3:44.39
3k .....	8:06.11 .....	7:25.11

Dick Moss (Editor), Physical Education Digest.

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## Spicing Up Sprint Starts

Sprint starts and acceleration drills are a part of every track unit and varsity practice. But, as with any repeated drill, this type of work can become boring.

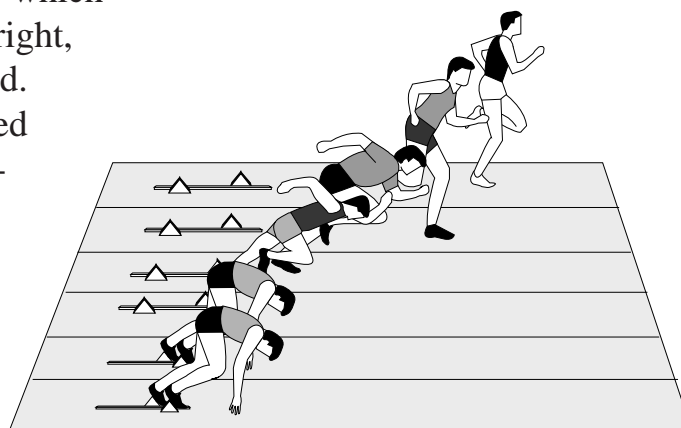
Here are three ways to spice up sprint starting drills to maintain your students' interest .

### **Waterfall Starts**

Your students line up in block-start position, side-by-side at the start line. When you give a signal, the student farthest to the left starts. As soon as this student moves, the student to the right begins, which triggers the next student to the right, until the whole group has started.

What you'll get is a staggered formation of sprinters, all starting in sequence one after the other.

You can also use this drill in practice, placing the fastest starters in the positions that start last (i.e. farthest to the right). This gives the slower starters a head start and makes the faster starters work harder to catch up. It's also a good way to equalize sprints for groups with athletes of different ability.



*Waterfall Start*

*Three ways  
to make  
starting drills  
more fun for  
sprinters.*

### **Scream Race**

This drill is noisy, so don't do it right beside your school or if you have a migraine.

Your students assume their positions on the starting line. Give them the commands, "On your mark, get set, go!" When you say, "On your mark," they should take a deep breath. When you shout, "Go," they start yelling,

and continue yelling as they sprint forward. They don't inhale and they sprint until they run out of breath.

They mark the spot they ran out of breath and attempt to beat that mark on subsequent attempts.

### **Shout Starts**

Use this drill to surprise a student teacher, assistant coach or a student who has gotten a little cocky. It involves a conspiracy in which all the participants, except the intended victim, know what is going on.

Inform all the conspirators to shout at the top of their lungs when the next sprint is started. It will scare the heck out of the victim.

🏠 D.M.

### **References:**

1. L.F. "Bud" Turner & Susan Lilliman Turner, **P.E. Teacher's Skill by Skill Activities Program**, Parker Publishing Company, 1989.

[\$27.95 U.S. + shipping. Available from Prentice Hall Business & Professional Publishing, PO Box 11071, Des Moines, IA 50336 USA Tel: (Toll Free) 1-800/288-4745 Fax: 515/284-6719].

2. Dick Moss (Editor), **Physical Education Digest**, Spring (March)'93.



*Shout Start*

