

Slow Sprinters Can Be Champion Hurdlers

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The intent of this presentation will be to draw particular attention to the techniques that are required for the emerging hurdler to develop to the elite level.

The 100 meter hurdles for girls and the 110 meter hurdles for boys is a sprint event. Acceleration mechanics and strength development are a key element and necessary for success.

Key objective:

We will attempt to demonstrate that your slower sprint athletes can be very successful in the short hurdle races by focusing on the training modalities that emphasize stride length development over frequency improvement.

“Unfortunately, like in many other endeavors, we too often cling to what we know rather than constantly examine and evaluate what we are doing to get the results we are achieving.

This all-important self-evaluation enables us to selectively discard ineffective practices and replaces them with better ones.” Gary Winkler

Case Study

Caleb Wilt

110 Meter State Champion

Division II 2015

13.79

Wind + 0.7 mps

Athlete Profile

Athletes Name: Caleb Wilt
School: Miami Trace High School
Year: 12
Height: 6'1"
Weight: 175

Athletic Background: Football, basketball, track, summer baseball
7th – 11th Track only his Senior Year

100 Meter: Avg. 11.4-11.6
200 Meter: 23.5
400 Meter: 50. Split on 4 x 400

History

Soph: State Prelim in 110 meter hurdles
Jr.: State Final in 300 hurdles
False started in 110 hurdles at the regional final
Sr.: Finals @ State in 110 and 300 hurdles
State champion in 110 @ 13.79

Rule of thumb: The differential in your athletes hurdle time and 100 meter time is normally at 3+ seconds.

Caleb was able to decrease that significantly to around 2.4 seconds.

Question: How did he do that?

I. A comparison of the mechanics in sprinting and the fundamental characteristics of hurdling.

A. Sprinting Characteristics

1. Coordination
 - a. Sprinting is a skill at very high rates of movement
 - b. It requires great coordination
2. Speed
 - a. The ability to move the limbs at a high rate
 - b. The ability to express power through those movements
3. Strength/Power
 - a. To overcome inertia in as short a time as possible
 - b. A sprinter should train the primary muscles involved in sprinting
4. Flexibility/mobility
 - a. A high degree of flexibility is necessary at the hips and ankles
 - b. Decrease in muscle resistance will allow easier movement and a greater range of motion
5. Reaction Time
 - a. Sprinters possess shorter reaction times than others
 - b. Very important in the start
6. Psychological Traits
 - a. High Self image
 - b. Aggressive
 - c. Confidence
 - d. The ability to relax in competitive situations

B. Hurdling Characteristics

1. Hurdling is sprinting over hurdles, not jumping
 - a. Traditional Rotary Mechanics must be modified for success.
2. Hurdle Clearance is accomplished by transferring speed vertically at take-off.
 - a. Maintaining Horizontal Momentum requires pulling mechanics as well as pushing mechanics
3. A shortened last stride will accelerate the body at take off
 - a. We call this a cut step
 - b. Eliminates braking forces

4. A forward lean at take-off will help transfer any vertical momentum into a flat, parabolic flight.
 - a. A correct and efficient parabola will aid in their racing rhythm.
5. At take-off, the lead leg creates a short but powerful moment of inertia by leading with the knee.
 - a. An efficient folding of the lead leg
6. Eye focus is a key to maintaining velocity.
 - a. Focus should always be on the next hurdle
7. In order to accomplish rapid clearance the lead arm and trail leg should be short and quick levers.
 - a. Improper arm action will cause stabilization issues
8. Maintaining forward lean is necessary until the lead leg touches down.
 - a. Must return to a sprint posture
9. Improving hurdle speed will happen by increasing the efficiency of the hurdle clearance and the stride rate between the hurdles.

II. Fundamentals in speed development

A. Elements to be considered

1. Stride frequency
 - a. The rate at which the athlete can execute the stride cycle
2. Rotary Running
 - a. A concept in which the legs of the athlete rotate underneath the hips in a circular or rotary type of action.
 - b. The athlete can increase his or her rate of execution of the stride cycle.
 - c. This is achieved by shortening the lever system and the moment of inertia of the legs about the hips.
 - d. Rotary running is characterized by a high heel recovery close to the gluteus with the foot passing near the hamstring and over the opposite knee.
 - e. Incomplete lower leg extension and a projection of the hips up and over the knees
3. Stride Length
 - a. The distance an athlete can project his or her center of mass forward through the execution of the stride cycle
 - b. We call this displacement

Question??

When considering the 2 key elements in improving speed; stride frequency and stride length, which one should the competent coach focus his training attention?

4. Comparison in speed vs hurdle improvement
 - a. How long does it take to improve frequency?
 - b. How long does it take to improve displacement?

Quote by Tudor Bompá

“Flexibility can be improved day to day.”

“Strength can be improved week to week.”

“Speed can be improved month to month.”

“Work can be improved year to year.”

Let's compare speed vs. hurdle improvement

*USATF research tells us that the prep sprinter should see a yearly improvement of .05% to 1%

YEAR

Freshman	11.60		11.60
1%	<u>- .12</u>	1.5%	<u>- .17</u>
Soph.	11.48		11.43
	<u>- .12</u>		<u>- .17</u>
Junior	11.36		11.26
	<u>- .12</u>		<u>- .17</u>
Senior	11.24		11.09

*Research says that a prep hurdler should improve 2% to 3% yearly.

Year	@2%	@2.5%	@3%
Freshman	16.00	16.00	16.00
	- .32	- .40	- .48
Soph	15.68	15.60	15.52
	- .31	- .39	- .47
Junior	15.37	15.21	15.05
	- .30	- .38	- .45
Senior	15.07	14.83	14.60

III. Training Methods Used with Caleb Wilt

A. Identify the Weaknesses first

1. Take off step (cut step development)
2. Eliminate lead leg collapse at touchdown
 - a. Develop the ability to prepare the body to receive the impact at touchdown
 - b. Isometricly
3. Getaway stride was too long
 - a. Kicking the leg – driving it down
 - b. Folding at the knee – tight vs. wide
 - c. Flexing the ankle – planter flex vs. dorsiflex
4. Change the start to a 7 step approach
 - a. Improving acceleration
5. Change the step frequency
 - a. Train the neuro system to operate at a higher level.
 - b. Training is cumulative. Think long term.

B. Engineering a Plan

1. A 40 week program
 - a. The multilateral training philosophy
2. Perfect Hurdling Technique
3. Getting Stronger and more explosive
 - a. Focus on the drills that call for applying more force into the ground
 - b. Capturing ground reactionary forces.

Quote: “The ground is a launching pad. It is always there. Use it.”

It’s really rather easy to make my athlete strong. It’s hard to teach them to apply that strength and capture the reactionary forces.

4. Improving ground contact times by 1/100 of a second.

Example:

8 strides to the first hurdle

4 strides are long G.C. pushing (accelerating)

Normally the hurdler will take 37 more steps in their race:

4 to hurdle 1	= 4
3 x 9 in between	=27
And 6 to the finish line	=6
	37 ground contacts

A 1/100 improvement will mean 37/100 or .37 improvement by decreasing the G.C.T. by 1/100

How do you accomplish this?

Take slack out of the system

Capture those reactionary forces

5. Rhythm Unit Training

Known as Step Frequency Management

- a. The main tactic for teaching rhythm is to adapt the hurdle spacing to the step length yielding the desired frequency.
 1. Use rhythmic units as goals
 2. Constant take off distance must be maintained
- b. Rhythm goals for Caleb Wilt

Hurdle PR	14.00
Time to Hurdle 1	- 2.30
Run in to finish	- 1.60
	10.10 seconds

*Distance between hurdles is 9.14 meters

*9.14 meters x 9 hurdles = 82.26 meters

*82.26 meters divided by 10.10 sec = 8.14 mps

*10.10 seconds divided by 9 = 1.12 seconds or rhythm units

My goal is to run 1.0 rhythm units so I space my hurdles @ 8.14 meters or 26'8" apart.

When adaption takes place in 14-21 days I will lengthen the hurdle spacing by 10 cm or 4" and continue to train.