300 IM Hurdle Race Distribution and Training

Keith Klestinski
Head Track & Field Coach
Marquette University High School
Klestinski@muhs.edu
USATF Level I and II Sprints, Hurdles, Relays
USOC/USATF Emerging Elite Coaches Camp Participant

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Coaches: YOU must become a student of the hurdles event and encourage your athletes to become students of the hurdles as well!
Limiting Factors “Trainable Aspects

Long Hurdles

With several compromises due to the fatigue factor, the key to long hurdle performance is, like the short hurdles, achieved through decreasing hurdle clearance time by decreasing ground contact time as well as the time required to negotiate the barrier.

As in the short hurdles, it is evident that both the General and Specific Performance Descriptors point to the fact that success in the long hurdle race is determined by the ability of the athlete to generate great amounts of explosive strength at the proper time. It is also apparent that, due to the fatigue factor, the long hurdler must compromise many of the variables in an effort to economize the hurdle effort. The most successful long hurdler is the one who is able to produce the most economical performance, while having the training level to minimize the compromises to the greatest extent possible.

Generally, the proper mechanical application of this strength results in an elite performance that is characterized by a brief hurdle clearance, small hurdle stride length, and superior body position coming off the hurdle.

Ralph Mann, Ph. D.

Hurdle Technique

Good Posture

– Eyes Up and Forward
– Shoulders Square
– Hips Square
– Stay Relaxed – Not Ballistic

Rotation Issues

– Mark the Take off Point in Practice (learn to feel it)
– Economy of motion/COM/Parabola
– Lead with the Knee (Don’t Swing)
– Thumbs Up
– Lead Hand Chin Extended Hand Does not Cross Center Line!
– Shoulders High and Forward
– Don’t Lean!
– Accelerate Into and Off the Hurdle
– Off Leg hurdling is critical!

Off Leg Hurdling is Critical!
Training Priorities

OBJECTIVES OF TRAINING:
Train the energy systems and Biomotor Abilities used in the race! Address all energy systems over hurdles when possible. **Train the Athlete where they Live!**

Develop Sprinting Ability/Power
- Acceleration
- Maximum Velocity
- Power Development
- Maximum and dynamic Elastic strength

Develop Speed/Strength Endurance
- General Endurance
- Tempo
- Speed/Rhythm Endurance
- Lactacid power and capacity

Hurdle Technique
- Rhythm Development
  - Practice a programmed stride pattern

Acquire and Refine Steering Ability
- Varying hurdle spacing and approach practice

Race Modeling
- Utilize Touchdown Time and Race Distribution

300 Hurdle Training Philosophy

To Count or Not to Count Steps?

Train Both Legs
- Left leg lead is great if you can do it,
  (esp. on curve)

Must Teach Rhythm
- (Reduce Interval - Race Adrenalin)

Lower the Hurdle
- Distribute energy
- Always Finish! (cone)

Touchdown Times are Key
- Mark take off point (learn to feel it)

Work on Steering Ability/Adjustments
**Practice Plan**

- Continuous Warm-up*
- Wall Drills*
- Hurdle Stretches*
- Running Drills*
- Hurdle Drills*
- Hurdle Workout
- Running Workout
  - Energy System Focus
- Off Track Work/Toys
- Cool Down*
- Weights

* every workout or meet

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**Race Plan Based on Your Model**

- **Preparation Factors:**
  - Evaluation of Prior Races
  - Time of The Season
  - Correction Plan (from video)
  - Pre-Race Plan (week prior)
  - Stride Pattern or Approach
  - Race Goal or Goals

- **Race Day Factors**
  - Weather
  - How Does the Athlete Feel
  - Lane Assignment
  - Other Races That Day
  - Warm-up
  - Review/Adjust Plan
WHAT IS HURDLING?

HURDLING IS A RHYTHMIC SPRINT OVER BARRIERS

Our focus, first, last and always must be establishing and maintaining SPEED between and over the hurdles!

IS THAT ALL THERE IS TO KNOW?
Well, since you asked...

Clearance
Block
Frequency
Starting
Strength
Getaway
Confidence
Step
Hurdle
Trail
Rhythm
Speed
Velocity
Force
Power
Lead
Stride
Ground
Leg
Endurance
Acceleration

Do I need to know all of that?
Where do I start?
What should I focus on?
LET'S FIGURE OUT WHAT WE CAN ACTUALLY COACH

Understand the **Limiting Factors** in Hurdling

**Unalterable - I'm GOOD but not THIS GOOD!!!!**
- Genetic Potentials
- Body Type
- Physical Laws (Newton’s Laws, Gravity - Einstein’s Relativity)
- Rules (Distance, Interval, Hurdle Height)

**Maybe Alterable - OK, Maybe a Little??**
- Weather (Wind)
- Equipment (Spikes, etc.)
- Running Surface (Ground Contact Factors, Friction)

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**Eureka!!!! Highly Alterable Factors**
- Training of Biomotor Abilities

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**I CAN DO THIS!**

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**Highly Alterable Trainable Factors**

**Biomotor Abilities**

- Power
- Strength
- Coordination
- Speed
- Endurance
- Mobility
- Mental

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Adapted from Ralph Mann, Ph.D. and Brent McFarlane
Wow, I’m starting to feel better about this.

Can you break it down even more?

Yes! Let’s focus on what’s most important

So, what’s most important?

The holy grail of long hurdle training

This is where long hurdlers live

Power

Strength

Coordination

Speed

Endurance
The Holy Grail of Sprint Hurdle Training
This Is Where Sprint Hurdlers Live

- Speed - Acceleration
- Speed - Max Velocity - Hurdle Rhythm
- Speed Endurance - Hurdle Rhythm Endurance
- Force Development
- Power - ability to apply force!
- Technical Model - Skills - Specific Hurdle Drills
- General End. Work Capacity, Tempo, Speed Endurance, Special Endurance I, Special Endurance II

Why Are Strength, Power, Speed and Coordination So Important????

Because if you can’t apply adequate FORCE in the correct TECHNICAL POSTURES you cannot run (or hurdle) fast and speed will not be maximized!!!!!

Ground Force Application

“Force applied at ground contact is most important determinant of running speed!”
Michael Young

Importance of Posture

“The First most important aspect of speed is Posture!”
Tom Tellez

Stride Frequency vs. Stride Length

Stride Frequency Increases as Ground Force Application Increases!

Stride Frequency \( \times \) Stride Length (Fixed Value in Hurdles)

Stride Frequency = Rhythm

Maintenance of Rhythm is Paramount!

Thus we must improve stride frequency through improved ground force application and posture.
OK, GREAT. BUT, WHAT HAPPENED TO THE OTHER TWO?

NOTHING HAPPENED TO THEM. THEY ARE STILL VERY IMPORTANT AND WE NEED TO ADDRESS THEM DAILY IN OUR TRAINING.

THEY ARE JUST NOT THE **MAIN** FOCUS.

LONG HURDLERS DON’T LIVE HERE ALL THE TIME, BUT THEY VISIT FREQUENTLY.
The Coach should help their Athletes:

- Establish and Monitor Goals
- Practice Mental Rehearsal
- Learn Relaxation Techniques
- Develop a Positive Attitude
- Be Driven in Practice
- Strive for Excellence
- Develop Confidence
- Accept the Risk of Failure
- Be a Team Player – Contribute to Something Larger than Themselves
- Focus on the Present
- Be a Good Person

Mental

**Highly Alterable Trainable Factors**

**Trainable Biomotor Abilities**

**Mobility**: The ability to move a joint actively through a range of motion.

**Flexibility**: Flexibility is the range of motion in a joint or group of joints, or, the ability to move joints effectively.

**Dynamic Mobility Exercises**

- Continuous Dynamic Warm-Up Routine Prior to Practice
- Hurdle Mobility Drills/Circuits
- Fence Drills
- Joint Flexibility Drills
- Scissors, Side Scissors, Cycling
- Skipping/Mach Drills
- Hip Mobility Circuits
- Range of motion exercises
- **Static Flexibility (Stretch) at end of workout**

Athletes who ignore this component of their training will produce less power, have shorter stride lengths and lesser stride frequency that an opponent of equal skill.

Often the most overlooked component of speed and hurdle training!
Highly Alterable Trainable Factors
Trainable Biomotor Abilities

**Coordination:** The ability to move parts of the body in harmonious function with precision and accuracy toward a specific objective.

**Posture** - Watch Form AT ALL TIMES (even Dynamic Warm-Up to Cool down)
Symmetry, Range of Motion, Elasticity and Reflexivity

**Technique/Skill**
- Sprint drills
- Hurdles
- Acceleration Patterns/Ladders
- Block Start Progressions
- Agility
- Balance

- Hurdle Mobility
- Games
- Block starts
- Technical running
- Video analysis and correction

“It takes 21-28 days for adaptation to take affect. That means that you need 3-4 weeks of doing a specific technique/drill/exercise before your body learns the neuromuscular pathways to do it again and again without a cognitive thought effort.” Boo Schexnayder
Highly Alterable Trainable Factors
Trainable Biomotor Abilities

**Speed:** The ability to move the body or parts of the body through a given range of motion in the least time

Speed is a motor quality that demands a high degree of coordination; therefore it must be developed and cultivated early in an athlete’s development and emphasized in the training program.

- Acceleration (0 – 30m)
- Max Velocity (30 – 60m)
- 90-100% Effort
- Neural/Technical/Power Emphasis

**Am I Training the Athlete Where They Live?**
**They HAVE to Live HERE!!!!**

_In order to develop faster acceleration and top speeds, one must practice running at top speed!_

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**Acceleration Development**
- Distances: 10-40m
- Low volumes: <400m
- Full recovery: 1’ for each 10m run
- Maximal effort: 95-100%

**Sample Speed (Acceleration) Workouts**

**Without Hurdles**
- 4 x (15m, 25m, 35m) from blocks w/ 1’ per 10m run recovery
- 2 x 30m tire pull w/ 3’ recovery
- 16 x 20m hill sprints w/ 2’ recovery
- Other ideas: Falling Starts, Starts from Back, Med Ball Starts, Combine Starts, Other Resisted

**Push Mechanics Development using Prowler Type Sleds**

**Towing “Powerpull” Sled (or other device) from Start Position**

**With Hurdles**
- 8/10 Step Starts

<table>
<thead>
<tr>
<th>Boys</th>
<th>Girls</th>
<th>Ex</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 steps</td>
<td>12.5 m</td>
<td>12 m</td>
</tr>
<tr>
<td>10 steps</td>
<td>16 m</td>
<td>15.5 m</td>
</tr>
</tbody>
</table>

**Hurdle Acceleration Pattern Development**
Maximum Velocity Speed Development

- Distances: varies depending on means
- Low volumes: <400m
- Full recovery: 1' for each 10m run
- Maximal effort

Sample Speed (Maximum Velocity) Workouts

Without Hurdles

- 8 x (10m flies w/ 30m sub-max run-in) w/ 3.4' rest
- 4 x 75m Sprint-float-sprint (30m, 20m, 25m)
- 4 x (55m, 45m) w/ 5'/7' rest
- 12 x Stadium runs with vertical push emphasis
- Broken Hurdles (ex. Sprints over H1,H3, H5, H7)
  Spacing- Women- 11-12.5 meters, Men- 12-13.5 meters

With Hurdles

Flying Runs – Ins and Outs – Assisted Runs

Rhythmic Unit Development Work

Sample Speed (Max Velocity) Workouts

Without Hurdles

- Flying 30’s
  3 Sets X 3 Reps @ 95-100% 3/6’ Rest
  ![Flying 30's Diagram]

- Ins and Outs
  3 Sets X 3 Reps @ 95-100% 3/6’ Rest
  Variations: (A/10/20/10/D), (A/15/15/15/D), (A/20/20/20/D), (A/20/10/20/D)
  ![Ins and Outs Diagram]

With Hurdles

Rhythmic Unit Training

- Assisted Sprints
  Late Season: 30-50m assisted sprints
  4 Sets X 3 Reps @ 95-100% 3/6’
Highly Alterable Trainable Factors
Trainable Biomotor Abilities

POWER: The ability to exert a maximal force in as short a time as possible, as in accelerating, jumping and throwing implements.

A powerful athlete can apply his/her strength quicker, generating more acceleration.

To increase running speed an athlete must apply more force in a shorter period of time!

- Increases stride length and frequency
- Minimize horizontal braking forces
- Increase vertical propulsive forces
- Critical for Maximum Velocity – Hurdle Rhythm!

Forces applied to the ground are the most important determinant of running speed. POWER DEVELOPMENT should be the MOST EMPHASIZED area of training!

Highly Alterable Trainable Factors
Trainable Biomotor Abilities

Power is Fast Force!

\[ P = \text{Fast Force!} \]

\[ \text{Force} = \text{Mass} \times \text{Acceleration} \ (F = M \times A) \]

\[ \text{Work} = \text{Force} \times \text{Distance} \ (W = F \times D) \]

\[ \text{Velocity} = \text{Distance} / \text{Time} \ (V = D/T) \]

\[ \text{Power} = \text{Work} / \text{Time} \ (P = F \times D / T) \]

**Power Development**

- Olympic Lifts (Cleans, Snatch, Jerks), Quick Triple Extension, ROM
- Quick Pushes (Bench, Presses)
  - Pushes are not generally considered power exercises, but by emphasizing speed of movement you can develop good upper body power with these exercises
- 4-6 Reps with speed emphasis, 80-90% intensity
- Plyometric Activities
- Multi-throws with med balls, shot puts
Highly Alterable Trainable Factors
Trainable Biomotor Abilities

Endurance = Ability to maintain a desired workload
- Aerobic Conditioning (Assists Recovery)
  - Interference effect? *(Where do they Live?)*
- Work Capacity

Energy System Focus
- Speed Endurance (All Hurdlers Live Here!)
- Special Endurance I (Long Hurdlers Live Here!)
- Special Endurance II (Long Hurdlers Visit Here!)

- Tempo Running
  - Intensive
  - Extensive

- Continuous (Circuits)
  - General strength circuits
  - Med-ball circuits
  - Jumping circuits
  - Weight lifting circuits

Key Energy Systems for the 300 Hurdles

TRAINING THE *ANAEROBIC GLYCOLYTIC* ENERGY SYSTEM:

**Speed Endurance:**

- 2-3 sets (2-5 reps each)
- 80-115m each; 400-800m total volume
- 90-100%
- 5-6’ rest
- "Up and Backs" 4-6 hurdles up and 4-6 hurdles back (opp. Lanes)
- "Triples" Start over hurdles 1-3, walk back 1, then 2-4, walk back one….al the way around.
- "Hill Work" low angle sprint form
Speed Endurance Development
- Anaerobic Glycolytic
- 60-150 meters
- 90%+
- 7 to 20 seconds
- 2-3 Sets of 2-5 Reps (2'-5')(8'-10') Recovery

Sample Speed Endurance Workouts

With Hurdles
- Runs over 12 hurdles from blocks with proper spacing (discount height)
- Runs over 13 hurdles using 7.5 meters between each hurdle (discount ht.)
- 100 meters hurdles with hurdles 5, 6, 7 removed
- Down and Backs using the spacing and hurdle heights below.

Sample Speed Endurance Workout

With Hurdles

Up and Backs (Mangiacotti Model)
12 Hurdles (6 Up and 6 Back) at spacing and heights below.
Try to retain form and speed at 90%+. Enough rest to maintain form.
Key Energy Systems for the 300 Hurdles

TRAINING THE ANAEROBIC GLYCOLYTIC ENERGY SYSTEM:

Special Endurance I:

“Guts” Start over 1 x 2 walk back, start over 2 x2, start over 3 x2, start over 4 x2. 1 x 300 over Hurdles and finish! (1080 volume) Walk back recover with rest between new sets. Quality!!!

“Champion Drill” 3 X(first 5 hurdles at 20m, last 3 at 35m, time the 100 to the finish – 85-90% to last 100 then 95%+ to Finish.

“The Difference” 5 X 160 over hurdles 3,4,5,6 @ 95-100% with 10’ Recovery

Start Line is 10 Meters Before the H2 Mark on the Track (45 m start). Finish Cone at 10 m after H6

Key Energy Systems for the 300 Hurdles

TRAINING THE ANAEROBIC GLYCOLYTIC ENERGY SYSTEM:

Special Endurance I:

1 set of 3-8 reps
150-300m ea; 900-1500m total volume
90-100%
9-15’ rest (“near full”)

Critical Zones” Hard start over 1-3, jog recovery, hard over 6-8, walk recover.

Repeat 200’s” over the first or last five hurdles (can use this to predict race times – Take average time of the repeat 200H’s/2 x 3 = projected time 27/2(13.5)x3=40.5 (Early Season 5-6 w/3’R, Late 2-3 w/6’R)

“Quality Small Ladders”
**Key Energy Systems for the 300 Hurdles**

**TRAINING THE LACTIC ACID ENERGY SYSTEM:**

**Special Endurance II:**
- 1 set of 1-3 reps
- 300-600m ea; 450-1000m total volume
- 90-100%
- 15-30’ rest (“full”)
- 400 Hurdles using 6-8 hurdles
- Runs over 7, 8, 9 hurdles from blocks
- Missing Segment hurdles 123..678
- ”2 x 4’s” (starts over first 4 hurdles, float middle 100, do last 4) done at 400 distance
- Quality High Ladders

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**Highly Alterable Trainable Factors**

**Trainable Biomotor Abilities**

Strength: The ability to apply force

- **General Strength** (Body weight exercises, Core work, Stability Work, Calisthetics, Hill Running, Steps)
- **Maximum Strength** (Static Lifts, High Weight, Low Rep, Large Muscle Groups)
- **Power** (Olympic Lifts, Jerk Movements, Lower Weight Faster Movement, Triple Extension, Med Ball, Weighted Jumps, Pushing Drills)
- **Reactive (Elastic) Strength** (Multi-Jumps, Plyometrics, Joint Stiffness and Stabilization)
- **Strength Endurance** (Hills, Pushing Drills, Circuits: Strength, Jump, Throw)

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Work a Continuum Beginning with General Strength – Be very Cautious Coaches and Really get to know the Strength Abilities of your Athletes!

That Said, this area is a GOLD MINE for Improvement and CRITICAL!!!
## Highly Alterable Trainable Factors

### Trainable Biomotor Abilities

<table>
<thead>
<tr>
<th>Variable</th>
<th>Max. Strength</th>
<th>Power</th>
<th>Hypertrophy</th>
<th>Endurance</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load (% of 1RM)</td>
<td>80-90</td>
<td>45-60</td>
<td>60-80</td>
<td>40-60</td>
<td>30</td>
</tr>
<tr>
<td>Reps per set</td>
<td>1-5</td>
<td>1-5</td>
<td>6-12</td>
<td>13-60</td>
<td>1-5</td>
</tr>
<tr>
<td>Sets per exercise</td>
<td>4-7</td>
<td>3-5</td>
<td>4-8</td>
<td>2-4</td>
<td>3-5</td>
</tr>
<tr>
<td>Rest between sets (mins)</td>
<td>2-6</td>
<td>2-6</td>
<td>2-5</td>
<td>1-2</td>
<td>2-5</td>
</tr>
<tr>
<td>Duration (seconds per set)</td>
<td>5-10</td>
<td>4-8</td>
<td>20-60</td>
<td>80-150</td>
<td>20-40</td>
</tr>
<tr>
<td>Speed per rep (% of max)</td>
<td>60-100</td>
<td>90-100</td>
<td>60-90</td>
<td>60-80</td>
<td>100</td>
</tr>
<tr>
<td>Training sessions per week</td>
<td>3-6</td>
<td>3-6</td>
<td>5-7</td>
<td>8-14</td>
<td>3-6</td>
</tr>
</tbody>
</table>

Table reproduced from Siff, 2003

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## Complementary and Compatible

### Trainable Biomotor Abilities

- **Training elements for a given session should be paired to be both complementary and compatible.**

- **Complementary** = when used together create a stimulus greater than the sum of the parts.

- **Compatible** = elements are ones which are similar in nature.

- **Each biomotor capacity should be addressed in every single training session.** The amount of exposure to each ability depends on the athlete and where they are at in their development and training:
  - Each element of training should generally follow the same theme.
IMPORTANT: You must allow 48-72 hours between workouts of high neuromuscular demand

Pairing Complementary and Compatible Biomotor Abilities

<table>
<thead>
<tr>
<th>Neuro-Muscular (Neural) Theme</th>
<th>Fitness (Metabolic) Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination</td>
<td>Body Circuits</td>
</tr>
<tr>
<td>Acceleration</td>
<td>Med Ball Circuits</td>
</tr>
<tr>
<td>Max Velocity – Hurdle Rhythm</td>
<td>Abdominal Circuits</td>
</tr>
<tr>
<td>Plynometrics</td>
<td>General Strength Exercises</td>
</tr>
<tr>
<td>Olympic Lifts</td>
<td>Extensive Tempo</td>
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<tr>
<td>Specific Strength</td>
<td>Fartlek</td>
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<tr>
<td>Speed Endurance</td>
<td>Aerobic Training</td>
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<tr>
<td>Hurdle Rhythm Maintenance</td>
<td></td>
</tr>
<tr>
<td>Intensive Tempo</td>
<td></td>
</tr>
</tbody>
</table>

Thanks to Mike Young for these Suggestions!

Complementary and Compatible
Pairing the Trainable Biomotor Abilities

High Intensity (Neural) Days
- Coordination / skill:
  - Sprint drills
  - Hurdle mobility
  - Technical training
- Flexibility: dynamic flexibility
- Strength:
  - Maximal strength
  - Olympic lifts
- Speed:
  - Acceleration development
  - Maximum velocity
  - Speed endurance
- Endurance:
  - Addressed indirectly or through speed endurance

Low Intensity (Metabolic) Days
- Coordination / skill:
  - Sprint drills
  - Hurdle mobility
  - Technical training
- Flexibility: static flexibility
- Strength:
  - Weight lifting circuits
  - General strength
- Speed: indirectly addressed
- Stamina / endurance:
  - Tempo running
  - General strength
  - Med-ball circuits

Thanks to Mike Young for these Suggestions!
Complementary and Compatible Training Example

<table>
<thead>
<tr>
<th>Day</th>
<th>General Prep</th>
<th>Specific Prep</th>
<th>Pre-Competition</th>
<th>Competition</th>
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<tbody>
<tr>
<td>Mon</td>
<td>Neural</td>
<td>Neural</td>
<td>Metabolic</td>
<td>Metabolic</td>
</tr>
<tr>
<td>Tue</td>
<td>Metabolic</td>
<td>Metabolic</td>
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<tr>
<td>Wed</td>
<td>Neural</td>
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<td>Thu</td>
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<tr>
<td>Fri</td>
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<tr>
<td>Sat</td>
<td>Met or Neural</td>
<td>Met or Neural</td>
<td>Met or Neural</td>
<td>Neural</td>
</tr>
<tr>
<td>Sun</td>
<td>Rest</td>
<td>Rest</td>
<td>Rest</td>
<td>Rest</td>
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</table>

ENERGY SYSTEM TRAINING BREAKDOWN FOR SPRINT AND HURDLE EVENTS

<table>
<thead>
<tr>
<th>Training Type</th>
<th>Length of Rest</th>
<th>Component</th>
<th>Energy System</th>
<th>% of Predicted Power</th>
<th>Rest Interval (Reps/T)</th>
<th>Daily Volume (RPM)</th>
<th>Daily Volume (RPM)</th>
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</thead>
<tbody>
<tr>
<td>100/110 M Hurdles</td>
<td></td>
<td></td>
<td>Anabolic</td>
<td>30 - 50%</td>
<td>1.3 - 2.5 min</td>
<td>300/400 RPM</td>
<td>300/400 RPM</td>
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<tr>
<td>300M Int. Hurdles</td>
<td></td>
<td></td>
<td>Anabolic</td>
<td>30 - 50%</td>
<td>1.3 - 2.5 min</td>
<td>300/400 RPM</td>
<td>300/400 RPM</td>
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</tbody>
</table>
Mangiacotti Triangle Training Method

Tempo Triangle

- Extensive Tempo
- Intensive Tempo
- Special Endurance I
- Special Endurance II

Mangiacotti Triangle Training Method

Speed Triangle

- Acceleration
- Max V & Acceleration
- Speed Endurance, Max V, & Acceleration
# Mangiacotti Championship Season Plan

**Beginning of the Season**

- **Acceleration, Max V, and Intensive tempo**
- **Acceleration and Extensive Tempo**
- **Acceleration, Max V, and Speed Endurance**

Special Endurance I & II are the main focus

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## Triangle Training Practical Application

<table>
<thead>
<tr>
<th>Week</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>Tempo Triangle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Acceleration</td>
<td>Danza Tempo</td>
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<tr>
<td>Week 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rest</td>
<td></td>
</tr>
<tr>
<td>Week 4</td>
<td>SPRC Indoor</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rest</td>
<td>Rush - Cast</td>
</tr>
<tr>
<td>Week 5</td>
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<td>TFA</td>
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<td>Acceler &amp; Max</td>
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<tr>
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<tr>
<td>Week 8</td>
<td>Trestino Field</td>
<td></td>
<td></td>
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<td></td>
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<td>Marquette Final</td>
<td>Rush</td>
<td>Relief</td>
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<tr>
<td>Week 10</td>
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<td></td>
<td>Rush</td>
<td></td>
</tr>
<tr>
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<td>SPRC Indoor</td>
<td>Sprint</td>
<td>Sprint</td>
<td>Sprint</td>
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<tr>
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<td>VAAA Regional</td>
<td>Sprint</td>
<td>Sprint</td>
<td>Sprint</td>
<td>Sprint</td>
<td>Sprint</td>
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<tr>
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</tbody>
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---

**Marquette Hurdles 2013**

- **Tempo Triangle**
- **Speed Triangle**

**Varsity Season Plan Shell**

- **Week 1**: Tempo Triangle
- **Week 2**: Acceleration
- **Week 3**: Danza Tempo
- **Week 4**: Rush - Cast
- **Week 5**: Acceler & Max
- **Week 6**: Special Tempo
- **Week 7**: Trestino Field
- **Week 8**: Sprint
- **Week 9**: Sprint
- **Week 10**: Sprint
- **Week 11**: Sprint
- **Week 12**: Sprint
- **Week 13**: Sprint

---

**Special Endurance**: I & II

---

**Training Practical Application**:

- **Tempo Triangle**
- **Speed Triangle**

---

**Marquette Hurdles 2013**:

- **Week 1**: Mancinelli @ Paddock on Lake Millersville
- **Week 2**: Penn State East

---

**Varsity Season Plan Shell**:

- **Week 1**: Rest
- **Week 2**: Rest
- **Week 3**: Rest
- **Week 4**: Rest
- **Week 5**: Rest
- **Week 6**: Rest
- **Week 7**: Sprint
- **Week 8**: Sprint
- **Week 9**: Sprint
- **Week 10**: Sprint
- **Week 11**: Sprint
- **Week 12**: Sprint
- **Week 13**: Sprint
Our Main Challenge as High Hurdle Coaches?

Apply consistent foundational training to our athletes that will specifically address the important biomotor abilities necessary for High Hurdle Success.

Important Note: This does not mean that we will ignore the other four biomotor abilities in our training!

Trainable Biomotor Abilities

Combine Knowledge of Biomotor Abilities, Energy Systems and Compatible and Comparable Training to make a GREAT PLAN!
Competition Specifications – “The Rules”

BOYS
- height 36 inches

GIRLS
- height 30 inches

ALL
- blocks to 1st hurdle 45 m
- between hurdles 35 m
- hurdle 10 to finish 10 m

<table>
<thead>
<tr>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>Finish</th>
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</thead>
<tbody>
<tr>
<td>45m</td>
<td>80m</td>
<td>115m</td>
<td>150m</td>
<td>185m</td>
<td>220m</td>
<td>255m</td>
<td>290m</td>
<td>300m</td>
</tr>
</tbody>
</table>

Identification of Hurdle Prospects

- Testing (Speed, Jumps, Throws, Endurance, Strength)
- “Freshman Circus” – Try them all!
- Video Analysis
- Other Coaches/Other Sports
- Phy-Ed Classes
- Sprinters (Don’t just take what’s left!)
- Jumper/Vaulters

- Coachable Athlete
- Hard Worker
- Open to Trying Hurdles
- Good Sprinting Speed
- Explosive Strength
- Flexible
- Power Indications (Dunk?)
- Adequate Height
- Coordinated
- Tunnel Vision
- Ability to Focus
- Aggressive out of the Blocks
- High Self Image
- Confident
- Can Handle Adversity
### Distribution of Effort
**Touchdown Time Training**

<table>
<thead>
<tr>
<th>Target Time</th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>Finish Time</th>
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<tr>
<td>36.6</td>
<td>6.9</td>
<td>10.3</td>
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<td>26.7</td>
<td>31.2</td>
<td>35.4</td>
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<tr>
<td>38.0</td>
<td>6.3</td>
<td>10.6</td>
<td>14.8</td>
<td>19.1</td>
<td>23.2</td>
<td>25.2</td>
<td>27.7</td>
<td>32.2</td>
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<td>40.8</td>
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<td>20.1</td>
<td>24.6</td>
<td>26.7</td>
<td>29.4</td>
<td>34.3</td>
<td>39.3</td>
</tr>
<tr>
<td>42.2</td>
<td>7.1</td>
<td>11.6</td>
<td>16.1</td>
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<td>25.5</td>
<td>27.6</td>
<td>30.4</td>
<td>35.5</td>
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<tr>
<td>43.7</td>
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<td>12.0</td>
<td>16.7</td>
<td>21.5</td>
<td>26.4</td>
<td>28.6</td>
<td>31.5</td>
<td>36.7</td>
<td>42.1</td>
</tr>
<tr>
<td>45.2</td>
<td>7.6</td>
<td>12.4</td>
<td>17.3</td>
<td>22.2</td>
<td>27.5</td>
<td>29.5</td>
<td>32.5</td>
<td>38.0</td>
<td>42.5</td>
</tr>
<tr>
<td>46.6</td>
<td>7.8</td>
<td>12.8</td>
<td>17.8</td>
<td>22.9</td>
<td>28.3</td>
<td>30.5</td>
<td>33.6</td>
<td>39.2</td>
<td>44.9</td>
</tr>
<tr>
<td>48.8</td>
<td>8.0</td>
<td>13.2</td>
<td>18.4</td>
<td>23.6</td>
<td>29.0</td>
<td>31.4</td>
<td>34.6</td>
<td>40.4</td>
<td>46.3</td>
</tr>
</tbody>
</table>

### Race Plan Based on Your Model

<table>
<thead>
<tr>
<th>Hurdle Clearance</th>
<th>Distance Before Hurdle</th>
<th>Distance Beyond Hurdle</th>
<th>Per Cent Before Hurdle</th>
<th>Per Cent Beyond Hurdle</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Elite&quot; Hurdler</td>
<td>3.50m/11' 6&quot;</td>
<td>2.22m/7' 4&quot;</td>
<td>1.28m/4' 2&quot;</td>
<td>63.50%</td>
</tr>
<tr>
<td>Average&quot; Hurdler</td>
<td>4.02m/13' 2&quot;</td>
<td>2.44m/8' 0&quot;</td>
<td>1.58m/5' 2&quot;</td>
<td>60.60%</td>
</tr>
<tr>
<td>Poor&quot; Hurdler</td>
<td>4.54m/14' 11&quot;</td>
<td>2.65m/8' 8&quot;</td>
<td>1.89m/6' 2&quot;</td>
<td>58.40%</td>
</tr>
</tbody>
</table>
Establishing Hurdle Rhythm

Do not need to cover entire distance to establish 300 m hurdle rhythm.

Run the following distances over 4-5 hurdles (Veney):

<table>
<thead>
<tr>
<th>Steps</th>
<th>Touchdown (Time)</th>
<th>30m Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>19.80m(17.95)</td>
<td>30m Approach</td>
</tr>
<tr>
<td>16</td>
<td>21.00m(19.00)</td>
<td>30m Approach</td>
</tr>
<tr>
<td>15</td>
<td>22.20m(20.07)</td>
<td>30m Approach</td>
</tr>
</tbody>
</table>

Stride Length Work:

Number of strides between hurdles and necessary stride length:

- 17 strides - 6’ 1”
- 16 strides - 6’ 6”
- 15 strides - 7’ 0”
- 14 strides - 7’ 7”
- 13 strides - 8’ 2”

Distribution of Effort

The hurdler's distribution of effort throughout the race can be effectively measured by the coach by using a stopwatch to determine the "touchdown times." These times can be charted and reviewed with the hurdler to evaluate his or her race. It's important to note that every hurdler, from beginner to world-class, loses velocity over the course of the race, as denoted by increasing touchdown times. Major discrepancies in the chart of a race can point to errors in judgment of transitions and late-race adjustments, as well as where fatigue sets in.

The 4th hurdle in the 300m race is at the 150m mark, or precisely 1/2 of the way through the race. The touchdown time at this hurdle is an especially valuable indicator of the distribution of effort during the early stages of the race.

Ideally, the differential in times for the first and second half of the race should be no more than 5% and Best and Worst Rhythmic Unit Efforts that Differ no more than 2 seconds. or about 2.0 seconds in a 40-second effort or 2.5 seconds in a 50-second effort. Another good indicator, however, more difficult to obtain, is the 200m split at 2/3 of the way through the race.
Distribution of Effort

Examples of 5% Variance

<table>
<thead>
<tr>
<th>300m Time</th>
<th>1st 150m</th>
<th>2nd 150m</th>
</tr>
</thead>
<tbody>
<tr>
<td>50.00</td>
<td>23.75</td>
<td>26.25</td>
</tr>
<tr>
<td>48.00</td>
<td>22.80</td>
<td>25.20</td>
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<td>46.00</td>
<td>21.85</td>
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<td>42.00</td>
<td>19.95</td>
<td>22.05</td>
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<tr>
<td>40.00</td>
<td>19.00</td>
<td>21.00</td>
</tr>
<tr>
<td>38.00</td>
<td>18.05</td>
<td>19.95</td>
</tr>
</tbody>
</table>

"We found out that, particularly in the heats, the first half of the race was often run too fast, so that athletes ended up with a rapid decrease in speed in the second half. Furthermore, this was often coupled with mistakes made in the race rhythm. It is quite clear that the position held by the athlete after the 5th hurdle has a limited relationship to the position held at the finish line.

Generally the athletes achieved their maximum speed between hurdles 2 and 3 and only those able to control the decrease in speed, especially during the last few hurdles, produced the best Performances. We would like to stress the importance of the second half of the race.

The Best Performances were obtained by those athletes with the lowest time differential between the second and the first half of the event, and the worst and the best hurdle unit."
Mid-Race Position and Best/Worst RU Differential

Table 12

<table>
<thead>
<tr>
<th>Athlete</th>
<th>45m</th>
<th>80m</th>
<th>115m</th>
<th>150m</th>
<th>185m</th>
<th>220m</th>
<th>255m</th>
<th>290m</th>
<th>300m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taylor A.</td>
<td>52.2%</td>
<td>49.8%</td>
<td>53.0%</td>
<td>47.0%</td>
<td>50.0%</td>
<td>53.0%</td>
<td>52.5%</td>
<td>50.0%</td>
<td>52.5%</td>
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</table>

Adam Pischke – Greater Metro Conference Outdoor 2003 - School & GMC Record 38.7 h

<table>
<thead>
<tr>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>45m</td>
<td>80m</td>
<td>115m</td>
<td>150m</td>
<td>185m</td>
<td>220m</td>
<td>255m</td>
<td>290m</td>
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</tr>
<tr>
<td>6.11</td>
<td>4.01</td>
<td>3.98</td>
<td>4.27</td>
<td>4.44</td>
<td>4.46</td>
<td>5.10</td>
<td>5.07</td>
<td>1.26</td>
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<tr>
<td>10.12</td>
<td>14.10</td>
<td>18.37</td>
<td>22.81</td>
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<td>32.37</td>
<td>37.44</td>
<td>38.70</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Fade = 1.96s (5%)</td>
<td>52.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>
Athlete: Adam Pischke
Meet: Greater Metro Conference Outdoor
Date: May 27, 2003
Place: West Allis Hale

<table>
<thead>
<tr>
<th>Time</th>
<th>Finish</th>
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<tbody>
<tr>
<td>38.7</td>
<td>1st</td>
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</table>

<table>
<thead>
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<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
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<tbody>
<tr>
<td>45m</td>
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<td>115m</td>
<td>150m</td>
<td>185m</td>
<td>220m</td>
<td>255m</td>
<td>290m</td>
<td>300m</td>
</tr>
<tr>
<td>6.08</td>
<td>4.08</td>
<td>4.26</td>
<td>4.26</td>
<td>4.31</td>
<td>4.76</td>
<td>4.97</td>
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<td>1.38</td>
</tr>
<tr>
<td>10.16</td>
<td>14.42</td>
<td>18.68</td>
<td>22.99</td>
<td>27.73</td>
<td>32.72</td>
<td>37.92</td>
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<td>R</td>
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</tr>
<tr>
<td>47.6%</td>
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<td>15</td>
<td>17</td>
<td>17</td>
<td>17</td>
<td>4</td>
</tr>
</tbody>
</table>

**Preferred Race Model**

**300 M Hurdles Velocity**

**Energy Util./Fade**
1st 180 = 47.5%
2nd 180 = 52.5%
Fade = 5.1%

**Fade**
1.92s (4.8%)
Tom Andreoni – 2006 GMC Relays - 39.4 h (PR)

<table>
<thead>
<tr>
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<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>Finish</th>
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<tbody>
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<td>115m</td>
<td>150m</td>
<td>185m</td>
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<td>255m</td>
<td>290m</td>
<td>330m</td>
</tr>
<tr>
<td></td>
<td>6.41</td>
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<td>4.36</td>
<td>4.44</td>
<td>4.68</td>
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<td></td>
<td>19.57</td>
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<td>24.05</td>
<td>28.80</td>
<td>33.40</td>
<td>38.13</td>
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<td>L</td>
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<td>49.2%</td>
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<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>4</td>
</tr>
</tbody>
</table>

Fade = .66s (1.6%) - 50.8%

300 Meter Race Analysis

Athlete: Tom Andreoni
Meet: GMC Relays
Date: May 03, 2006
Place: West Allis Hale

<table>
<thead>
<tr>
<th></th>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>Finish</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>40m</td>
<td>80m</td>
<td>115m</td>
<td>150m</td>
<td>185m</td>
<td>220m</td>
<td>255m</td>
<td>290m</td>
<td>330m</td>
</tr>
<tr>
<td>Step Pattern</td>
<td>R</td>
<td>R</td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>L</td>
<td>R</td>
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<tr>
<td>Block Decode Time (mS)</td>
<td>6.41</td>
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<td>4.44</td>
<td>4.68</td>
<td>4.71</td>
<td>4.60</td>
<td>4.71</td>
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<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>4</td>
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<tr>
<td>Velocity</td>
<td>7.02</td>
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<td>8.05</td>
<td>7.84</td>
<td>7.48</td>
<td>7.33</td>
<td>7.61</td>
<td>7.38</td>
<td>7.54</td>
</tr>
</tbody>
</table>

Average Velocity 300m: 7.94

Off Between Best and Worst 100m: 9.08

Best: 7.66

Energy Dist/Fade

<table>
<thead>
<tr>
<th></th>
<th>1st 150 = 49.2%</th>
<th>2nd 150 = 56.8%</th>
<th>Fade = 1.7%</th>
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<tbody>
<tr>
<td>Time Difference/Fade</td>
<td>7.37</td>
<td>20.03</td>
<td>1.7%</td>
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</tbody>
</table>

Preferred Race Model

300 M Hurdle Velocity

Velocity Peaks

Hurdle Unit

[Chart of 300 M Hurdle Velocity]
Tom Andreoni – 2006 WIAA Regional - 40.8 h

Start

<table>
<thead>
<tr>
<th>H1</th>
<th>H2</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>H6</th>
<th>H7</th>
<th>H8</th>
<th>Finish</th>
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<td>4.13</td>
<td>4.33</td>
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<td>38.91</td>
<td><strong>40.78</strong></td>
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<td>R</td>
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</tbody>
</table>

Fade = 2.38s (5.8%) 52.9%

23 15 16 16 16 16 16 17 5

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300 Meter Race Analysis

Athlete: Tom Andreoni
Meet: WIAA Regional
Date: May 22, 2006
Place: West Allis Hale

Time: 41.12
Place: 2nd

<table>
<thead>
<tr>
<th>H1</th>
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<th>H3</th>
<th>H4</th>
<th>H5</th>
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<th>H7</th>
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<td>8.24</td>
<td>6.36</td>
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</tbody>
</table>

Fade = 2.38s (5.8%) 52.9%

Average Velocity 11.8
Difference Between Best and Worst 111
Correlation 0.91
Area 190 0.69

---

1st 150 = 47.1% 2nd 150 = 32.9% Fade 8.8%
1st 150 = 18.32 2nd 150 = 23.58 Fade 5.28
What are the Considerations for these Two Athletes in Their Training?

Identification of Hurdler Types (Speed, Power, Rhythm)

**Power Speed**
- Consistency
- Recognition of Lactate threshold
- Avoiding >2 sec Diff.
  - Best/Worst RU
- Don’t Want to Mute Aggressiveness
- Play on Strengths – Psychological benefits of smoking opponents early
- Work on ability to hurdle with both legs
- Take off distance concerns
- Ability to adjust quick
- Less room for error

**Rhythm**
- Pace Runner – Will he take chances at some point?
- Stride length is King.
  - Work it as he is highly trainable in that area.
- Work on enhancing speed and special endurance.
- Distribute but gain more capacity
- Will he get STUCK in a Rhythm – shock him periodically to challenge the pattern and break out
- Fight urge to be overly aggressive.
- Must have high focus level and patience.
- Must trust the training
What are the Considerations for these Two Athletes in Their Training?

Identification of Hurdler Types (Speed, Power, Rhythm)

Race Distribution of Elite Male 400m Hurdlers Posted on 05 May 2013 by Daniel St Paul

http://www.visuaalperformanceanalysis.com/sports-blogs/race-distribution-elite-male-400m-hurdlers-part-1/

Trainable Biomotor Abilities

Combine Knowledge of Biomotor Abilities, Energy Systems and Compatible and Comparable Training to make a GREAT PLAN!