INCORPORATING SPEED, POWER, AND STRENGTH DEVELOPMENT INTO YOUR SPRINT PROGRAM

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Combination of Science, Experience, and Observation

Must Build Trust with your Athletes
  - Teach why we do what we do

**Must Trust Yourself**

Speed & Power Based Training Program

100 In / 100 Out Philosophy

Perfect Practice

Track and Field = Sprint / Throw / Jump
IF YOU COULD
JUST KEEP AN
OPEN MIND...

YOU'D SEE THAT
I'M ALWAYS
RIGHT!

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Ask Questions

- Have Your Sprinters Ever Looked Like Runners?
- Why?
# Energy System Requirements for Sprinters

## Energy System Training Breakdown for Sprint and Hurdle Events

<table>
<thead>
<tr>
<th>Terminology</th>
<th>Length of Run</th>
<th>Component</th>
<th>Energy System</th>
<th>% of Predicted Performance</th>
<th>Rest Interval Between Reps/Sets</th>
<th>Daily Volume Ranges 100/200/110/100mH</th>
<th>Daily Volume Ranges 400/400mH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Absolute Speed</strong></td>
<td>20-60m</td>
<td>Speed (s) Anaerobic power</td>
<td>Anaerobic Alactic</td>
<td>90-95%</td>
<td>3-5 / 6-8 min</td>
<td>300-800m</td>
<td>300-900m</td>
</tr>
<tr>
<td><strong>Speed Endurance</strong></td>
<td>50-80m</td>
<td>Alactic Short Speed End. (ASSE)</td>
<td>Anaerobic Alactic</td>
<td>90-95%</td>
<td>1-2 / 5-7 min</td>
<td>300-800m</td>
<td>600-1200m</td>
</tr>
<tr>
<td><strong>Speed Endurance</strong></td>
<td>80m</td>
<td>Glycolytic Short Speed End. (GSSE)</td>
<td>Anaerobic Glycolyte</td>
<td>90-95%</td>
<td>1 / 3 min</td>
<td>300-800m</td>
<td>600-1200m</td>
</tr>
<tr>
<td><strong>Speed Endurance</strong></td>
<td>0-150m</td>
<td>Speed Endurance (SE)</td>
<td>Anaerobic Glycolyte</td>
<td>90-95%</td>
<td>5-6 min</td>
<td>300-800m</td>
<td>400-1000m</td>
</tr>
<tr>
<td><strong>Special Endurance I</strong></td>
<td>150-300m</td>
<td>Long Speed Endurance (LSE)</td>
<td>Anaerobic Glycolyte</td>
<td>90-95%</td>
<td>10-12 min</td>
<td>600-900m</td>
<td>600-1200m</td>
</tr>
<tr>
<td><strong>Special Endurance II</strong></td>
<td>300-600m</td>
<td>Lactic Tolerance (LAT)</td>
<td>Lactic Acid Tolerance</td>
<td>90-95%</td>
<td>15-20 min Full</td>
<td>300-500m</td>
<td>900-1200m</td>
</tr>
<tr>
<td><strong>Intensive Tempo</strong></td>
<td>100-600m</td>
<td>Anaerobic Capacity (ANC)</td>
<td>Mixed Aerobic Anaerobic</td>
<td>80-85%</td>
<td>30s - 5 / 3-10 min</td>
<td>600-1800m</td>
<td>1000-2500m</td>
</tr>
<tr>
<td><strong>Extensive Tempo</strong></td>
<td>200-800m</td>
<td>Aerobic Capacity (AC)</td>
<td>Aerobic</td>
<td>40-79%</td>
<td>45 - 2 min</td>
<td>1400-2500m</td>
<td>2400-4000m</td>
</tr>
<tr>
<td><strong>Continuous Tempo</strong></td>
<td>1600-6400m</td>
<td>Aerobic (AC)</td>
<td>Aerobic</td>
<td>40-60%</td>
<td>Heart Rate 130-150</td>
<td>1600-3200m</td>
<td>3200-6400m</td>
</tr>
</tbody>
</table>
Critical Training Factors to Improve Sprint Performance

- Strength >>>Greatest Impact on Force Output
  - Static
  - Dynamic
  - Elastic
- Flexibility
- Mechanics / Coordination >>>Greatest Impact on Max Velocity and Speed Endurance
- SPEED!!
Supportive Training Qualities to Improve Performance

- **Strength / Power Endurance**
  - More Important in Longer Sprints

- **General Endurance**
  - More Emphasis in Off-Season / Recovery Days

- **Mental Training**
  - More Important in Longer Sprints
Primary Training Emphasis for Sprints

- **Start** = Block Clearance + 1st two steps
  - ***Most Important Segment***
  - Ability to Overcome Inertia
  - Max Force Effort
  - Maximize Horizontal Force

- **Transition** = 3rd step >>> 10th or 11th step (approx. 20m)
  - **Power** = Directional Force x Velocity
  - Reach approx. 80% of Vmax
Primary Training Emphasis

- Max Velocity (30-70m)
  - Top End Speed Improvement
  - Maximize Vertical Force
- Speed Endurance (60-100m+)
  - Ability to Maintain Speed
  - Emphasize Coordination and Mechanics
Neuromuscular Training Qualities for Sprints (CNS)

- **Strength = 100% Intensity**
  - Static Lifts
  - ATP-CP: Blocks-10m

- **Power = 100% Intensity**
  - Olympic Lifts, Multi-Jumps, MB Throws, Box Jumps (up)
  - Alactic Anaerobic: Accelerative Transition (10-20m)

- **Power Speed = 100% Intensity**
  - Olympic Lifts, Box Jumps (up & down), MB Throws w/movement (hops, bounds, accels)
  - Alactic Anaerobic (20-30m) = Reach 80% of Vmax
Neuromuscular Training Qualities for Sprints (CNS)

- **Speed (Elastic Power)** = 95-100% Intensity
  - Depth Jumps, Hurdle Hops, Bounds, MB Throws
  - Alactic (Vmax phase: 30-70m)

- **Speed Endurance** = 90-100% Intensity
  - Alactic (60-75m) and Glycolytic Anaerobic (60m F / 75m M -200m)
Ask Questions

- Why do we EVER Train Sprinters below 90%+?

- Why Not Train Exclusively at 95%+?
Neuromuscular Training Modalities (CNS)

- Acceleration Development (High CNS)
  - GPP>>>Comp
  - 10-40m Sprints
  - 2pt. / 3pt. / 4pt. / Blocks / ½ Starts
  - Acceleration Lines -
    - Vince Anderson – Vanderson@TAMU.edu
Resisted Runs (Med-High CNS)
- SPP>>>Pre-Comp
- Short Hills (20-60m or < 6 sec.)
- Sled Pulls (10% BW) – 20-40m
- Wt. Vest Runs (Vmax Focus) – Vertical (10% BW)
Max Velocity Development (High CNS)

- SPP>>>Comp
- Hit it for 1-2 seconds / Off (Do Not Stereotype Speed)
- Vmax Wickets – Vince Anderson
- Fly-Ins (20-30m Accel + 20-30m Vmax Flys)
- Sprint/Float/Sprint (20-30m Accel + 10-20m Vmax + 10-20m Float + 10-20m Vmax) 50-90m Total
Neuromuscular Training Modalities (CNS)

- Speed Endurance (Med-High CNS)
  - Pre-Comp>>>Comp
  - Extended Flys (40-50m Acceleration + 20m Vmax)
  - 3-4 Sets x (2-3 x 60m) 2:00 Rep Rest / 4:00 Set Rest
  - 3-4 x 80m – 150m
    - Can also be done Sprint/Float/Sprint Style
Neuromuscular Training Modalities (CNS)

- Olympic Lifts (High CNS)
  - GPP>>>Comp
  - Cleans / Snatches / Jerks
  - Hang / Floor / Box
- Static Lifts (High CNS)
  - SPP>>>Pre-Comp
  - Squats / Lunges / Deadlift // Split / Front / Back / SL / 1/4
- Ballistic Lifts (High CNS) – N/A w/ Younger Athletes
  - Pre-Comp>>>Comp
Multi-Jumps (Horizontal / Vertical Focus) (High CNS)
- GPP>>>Comp
- Horizontal – PWR Skips / SLJ / DBL Leg 3-5 Hops / STJ
- Vertical – PWR Skips / Hurdle Hops / Bounds / SL Hops
Neuromuscular Training Modalities (CNS)

- Multi-Jumps (High CNS)
  - Vertical – PWR Skips / Hurdle Hops / Bounds / SL Hops

- Multi-Throws (Medball) (High CNS)
  - GPP>>>Comp
  - OHB / BLF / HH-OHB / Sq. Press / SL Throws / Lateral
Supportive Training Qualities

- General Endurance (Capacity & Power)
- Anaerobic Glycolytic Training (Capacity & Power)
- General Strength
- Mobility / Dynamic Flexibility
- Synergistic Muscle Development / Stability
- Endocrine System Development (Restoration)
- Core Development / Stability / Endurance
Supportive Training Modalities

- **Tempo Extensive Runs (< 75%) – Low CNS**
  - 5 sets x (3 x 100m) @ 15-17 sec / 1:00 Rest / 3:00 Set Rest (1500-3000m)

- **Tempo Intensive Runs (80-90%) – Med CNS**
  - 5-8 x 300 @ 42-52 sec / 3-6:00 Rep Rest (1500-2400m)

- **Special Endurance Runs – Med-High CNS**
  - 500-400-300m ladder @ 85%+ / Rep Rest (8-15:00)
  - 3 x 250m @ 90%+ / Rep Rest (8-15:00) (750-1500m)

- **General Strength Exercises (Bodyweight)**
  - Squats / Lunges / Push-ups / Low-Walks / Pull-Ups / Dips / Core Exercises
Supportive Training Modalities

- **Medball Series**
  - OH / Chest / Squat Throw / Hip Toss / MB Good-Morning / MB V-Sit / Partner Exchange Hip / Torso Circles / Kneeling Throws / Seated Roll and Throw

- **Body-Building Series**
  - Low Weight Circuit (8-12 Exercises x 10 Reps x 24 total sets)
  - Short Rest Intervals / High Reps / Fatigue on the Last Few Sets

- **Prehab Exercises**
  - Bands / Bodyweight / Physioball
  - Hip Flexion & Extension / Adductors / Abductors / Glute Medius & Piraformis / Low Back
Supportive Training Modalities

- Dynamic Flexibility Exercises (Warm-Up)
- Hurdle Mobility Series
- Core Stability Series (Planks)
- Core Strength Exercises
- Core Endurance Exercises
Barriers to Sprint Success

- Over-Emphasis of Endurance Training
  - Special and Speed Endurance
- Not Allowing Recovery for Adaptations to Occur (Super-Compensation)
  - Microcycle / Mesocycle / Macrocycle

- Over-Training
- Coaches Unwillingness to Change and Teach Their Athletes
Foundational Training

- **General Strength Development**
- Speed Development
  - Acceleration Focus (10-30m)
  - Vmax Prep (Stair Runs / Pwr Skips)
- **Power Development**
  - Medball Throws
  - Olympic Lifts (Light / Fast)
  - In-Place Multi-Jumps
- **General Endurance**
  - Tempo Extensive / Long Hill Runs (200m+)
Specific Preparation

- **Speed Development**
  - Acceleration
  - Vmax

- **Strength Training**
  - **Absolute Strength Development**
    - Static Lifts
  - General Strength – Endocrine System (Restoration)
  - Bodybuilding – Endocrine System (Restoration)

- **Power Development**
  - Olympic Lifts
  - Multi-Jumps
    - Horizontal Focus – Acceleration Day
    - Vertical Focus – Vmax Day
  - Multi-Throws
Specific Preparation

- **General Endurance**
- **Tempo Intensive Runs**
  - 80-90% Intensity
  - Medium Rest (4-6:00)
  - Medium Intervals
  - Emphasize **GOAL = 90%+**
- **Special Endurance Runs**
  - 90%+ Intensity
  - Long Rest (8-15:00)
  - Longer Intervals / Breakdowns
Pre-Competition

- Event Specific
- Speed Development
  - Acceleration – Blocks >>> 40m
  - Completion Runs – Blocks >>>60-80m
  - Vmax Development
- Speed Endurance Development
  - Alactic and Glycolytic SE
- Race-Modeling
  - 95%+ Intensity’s @ Shorter than Race Distance
  - Split Runs (200+200) w/ 1:00 Rest
Pre-Competition

- Special Endurance Runs (90%+)
- General Endurance (Year-Round)
- Strength Training
  - **Power Development**
    - Olympics – Decrease Volume / Increase Intensity
    - Ballistics – Introduce / Low Volume
    - Increase Multi-Jump Volume
    - Increase Multi-Throw Volume
  - **Low Volume Static Lifts** – Single Leg / Med-High Intensity
  - Bodybuilding – Low Volume
  - General Strength - Low Volume
Event Specific
Event Race Rhythm
Speed Development
- Acceleration >>> 40m
- 95%+ Intensities
- Completion Runs / Race Modeling
- Speed Endurance (Low Volume – 300-450m)
General Endurance (Low Volume)
Special Endurance (Low Volume) / Less Often
Strength Training

- Power Development – SPEED!!
  - Olympics
  - Light and Fast
  - Short/Explosive Movements (Hang / Box Position)
  - Ballistics – Low Volume
  - Multi Throws – Low Volume
  - Multi Jumps – Low Volume
- General Strength - Low Volume
- No Statics
Pre-Comp / Comp Example

- **Monday**
  - Combo - Multi-Jumps (Prior to Acceleration Work)
  - Acceleration Development / Extended Runs
  - Strength Training – Med-High Intensity/Volume
  - MB Throws

- **Tuesday (Low-Med CNS)**
  - General Endurance Tempo Runs OR
  - Special Endurance Runs – Low Volume
  - General Strength exercises / Medball series / Hurdle Series / Core
Pre-Comp / Comp Example

- **Wednesday (Low or Med/High CNS)**
  - General Endurance Tempo Runs if Special Endurance on Tues – Low CNS
  - Special Endurance or Speed Endurance Runs if Tempo on Tues – Med-High CNS
  - Strength Training: Bodybuilding Lifts
  - Core Stability Focus - General Strength

- **Thursday (Low or High CNS)**
  - Similar to Tuesday (Low CNS) if High CNS on Wed
  - Similar to Wed options (Med-High CNS) if Low CNS on Wed
  - Could do a few accelerations to prep if Competition on Friday
Pre-Comp / Comp Example

- Friday
  - Competition or Pre-Meet Day
  - Similar to Monday with Very Little Volume OR
  - V-Max Dev. if needed and No Competition OR
  - Speed Endurance if not done earlier in week and no competition OR
  - Race-Modeling if needed and no competition
  - Strength Training
    - Similar to Monday / One day Higher Intensities with medium speeds and one day Lower Intensities with High Speed until Competition period.
    - Competition Period – All High Speeds / Very Low Volume
Saturday
- Competition OR
- Restoration / Similar options to Tues or Thurs
- Add what’s needed if no competition
  - Tempo Extensive / General Endurance / Hills / Special Endurance Runs / Short Rest Speed Endurance / Race Modeling

Sunday
- Restoration
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- **Pat Henry** – Texas A&M
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- **Heather Woody** – Heather Woody Unlimited Coaching
Great Resources

- Mann, Ralph, *The Mechanics of Sprinting and Hurdling*.
- Pfaff, Dan, *Concepts and Applications for Developing Biomotor Qualities to Enhance Short Sprint Finishes*.
- Shexnayder, Boo, *Development of Speed in the Horizontal Jumper*.
- USTFCCCA Academy
ON IOWA...GO HAWKS

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*Thank you USTFCCCA Equipment Partners