

Speed is a Skill

1

Video series content .. **Speed Dynamics:** Loren Seagrave / Kevin O'Donnell



The videos summaries are incomplete, but may assist you as you view the material.
Space is provided in which you can add further details.

Speed Dynamics Videos

Speed Dynamics: Drills for Speed

Speed Dynamics: Sprint Training 1

Speed Dynamics: Sprint Training 2

Speed Dynamics: High Hurdles 1

Speed Dynamics: High Hurdles 2

(See also: www.nwaswimaths.com ► Presentations)

Hurdles .. Teaching the Skills

Sprint Hurdles Analysis

Female Sprint Hurdles .. An Analysis

Also: Programs (various)

Offered are summary outlines of the content of the videos listed.

Time locations on the tapes are indicated to enable coaches and athletes to locate segments and drills.

The summaries present outlines rather than a thorough analysis; coaches should carefully review all information.



**The
harder
(and smarter)
YOU
work**

**The
harder
it is to
surrender**

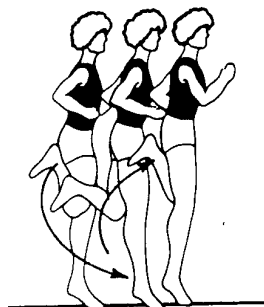
It's what you learn, after you think you know it all .. that counts

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Speed is a Skill

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SPEED DYNAMICS VIDEO SERIES

DRILLS FOR SPEED: (DS .. abbreviation that may be used in NWA Training Programs)

An eyeful is better than a mouthful

Introduction.

2:00 **Mission Statement:** Reduce Ground Time or Air Time by .01 seconds for every stride.

40 yards: 20 strides x .01 = .2 sec. improvement

100m: 50 strides x .01 = .5 sec. improvement.

1600m: 1,000 strides x .01 = 10 seconds improvement.

Benefits sought through: improved efficiency of movement; quickened neuromuscular response; heightened kinaesthetic awareness; increased general and specific strength and power capacities.

4:25 **Drills for Speed:**

1. Maximum Speed	2. Acceleration
3. First Step Quickness	4. Movement Skills

1. Maximum Speed

Modification of Motor Behaviour:

- 1.1 Ankling
- 1.2 Butt Kicks
- 1.3 "A" Series Drills
- 1.4 Fast Claw
- 1.5 "B" Series Drills
- 1.6 Straight Leg Shuffle & Bound
- 1.7 Shake Ups
- 1.8 Arm Action

Fast Leg Series:

- Single / Alternating Fast Leg
- Fast Leg / Ankling
- Fast Leg / Butt Kicks
- Continuous Fast Leg
- Command Fast Leg

2. Acceleration

1. Wall Drills ... Acceleration March.
 - 3-Step Wall Sprint
 - 5-Step Wall Sprint
 - Wall Sprint for Time
2. Partner Drills:
 - Hip Hold - Towel
 - Face-to-Face
 - Face and Chase
 - Face, Chase, Race

27:30 3. Acceleration Ladder

"Toe Up"

"Heel Up"

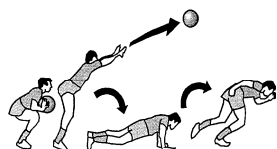
"Knee Up"

**"Step over the
opposite knee"**

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28:50

3. First Step Quickness

1. General Preparation Activities:
 - 1.1 Multi Throws .. various
 - 1.2 Medicine Ball .. various
 - 1.3 Static Resistance .. various
 - 1.4 Joint Stabilisation
 - 1.5 Pillar Strength
 - 1.6 In-Place Jumps
2. Falling Start Series:
 - 2.1 Falling Starts Upright
 - 2.2 Falling Starts .. Squat
 - 2.3 Falling Starts .. Bow
 - 2.4 Bow, Touch and Go!
 - 2.5 Stilted Starts
3. 3 or 4 Point Stance Starts .. various; Roll and Go!
4. Plyo Starts:
 - 4.1 Fall & Go!
 - 4.2 Lunge Starts
 - 4.3 Hop Starts
 - 4.4 Push-Up Starts
5. Partner Starts:
 - 5.1 Resisted
 - 5.2 Tow Starts
 - 5.3 Assisted Starts
6. Prone Starts:
 1. Belly and Go!
 2. Belly, Roll and Go!
 3. Back, Roll and Go!

38:00

4. Movement Skills

Braking / Re-acceleration / Conversion / Multi-directional Skills

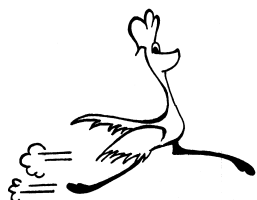
1. **Agility:** Windmill; Shuffle; C & A Skip; Seal; Double A Skip; Wide Outs; Side Slide; Fast Foot Karioka; High Step Karioka; Speed Skate; Speed Skate Lunge; Speed Skate Run; Lateral Hurdle Skips; Backwards Cycle; Backwards Skip.
2. Transition Drills ... directional changes / end with a sprint.
3. Complex Runs: Power Bounds; Speed Bounds; Run-Run-Bounds; 3-Step Bounds; 2-Count Bounds.
4. Cone Drills

47:00 End of Tape

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SPEED DYNAMICS VIDEO SERIES

SPRINT TRAINING 1: (ST1 .. abbreviation that may be used in NWA Training Programs)

An eyeful is better than a mouthful

Introduction.

- 3:50 **9 Components:** W/U; Pure Acceleration (first 1-2 steps); Transition; Maximum Velocity (after 4-5 secs; duration: 2-3 secs.); Speed Maintenance; Finish; Coast & Stop; Recovery & Restoration
- 6:20 Warm-Up .. incl. basic rules of proper running form.
- 8:26 **Maximum Velocity Phase**
Stride L v. Stride F. debate; 'effective stride length' / stride rate (frequency).
2-4 secs. duration "Ins and Outs"; Towing; Declines (1-2%).
- 16:40 **Motor Behaviour Focus:** Body Position; Recovery Mechanics; Ground Preparation; Impulsion; Arm Action.
Good Body Position = tight tummy; flat back; pelvis up.

"Toe Up, Heel Up, Knee Up ... stepping over the opposite knee"
(Toe up ... ankle dorsiflexed; from the moment of toe leaving the ground; reduce "dangle time")

Negative Foot Speed .. "Tree Example". Minimisation of breaking forces.
Contact below hip ... **keep the toe up.**

Arm Drive .. mechanics / factors; drive elbow backwards.
- 26:30 **Drills:** Ankling; Mach Drills (A-Skip, B-Skip); Fast Claw; Fast Leg; Alternating Fast Leg; Quick Rhythm Fast Leg; Tandem Rhythm Fast Leg; Single Fast Leg; Command Fast Leg; Karioka; "A"-Run; Backward Cycle; Shake Ups; Fast Feet.
- 36:30 Maximum Velocity Review
- 36:30 **Acceleration**
Hip angle; Knee Angle; Direction of Force.
- 38:50 How to improve acceleration?
- 40:30 Stick Drill: 40/10; 50/15.
- 42:00 Review of Acceleration
- 42:40 **Transition Phase**
- 43:45 **The Start** ... teaching sequence

Upright Standing Start; Falling Start; *Moye* Standing Start; *Moye* 3-Point Start; *Moye* 4-Point Start; Hop-Hop-Start; Rolling Relay Start; Crouched Start (Blocks).
Partner Starts; Towel Starts; Weighted Vest Starts; Resisted Starts; Harness Pulls.
- 51:10 **Speed Maintenance**
- 53:05 **The Finish** ... Trip Finish; Swim Finish.
- 54:45 **Coast & Stop**
- 55:28 **Recovery & Restoration**
- 57:06 **Writing Workouts**

*Only
Plenty
of
Perfect
Practice*

*Produces
Perfect
(Professional)
Performance*

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SPEED DYNAMICS VIDEO SERIES

SPRINT TRAINING 2: (ST2 .. abbreviation that may be used in NWA Training Programs)

An eye-ful is better than a mouth-ful

Introduction.

1:38 **The Search for Speed** ... *Speed is a Skill*

Speed Dynamics offers a multi-track program, simultaneously working towards gains in strength and power, aerobic capacity, skill acquisition, and neurological efficiency.

3:54 **Testing & Evaluation**

Establish the athlete's strength and power levels, speed levels, and **then** write **the training program that best suit the athlete.**

- Athlete Survey (statistical, personal, medical and volitional data);
- "Training Age": measurement of athletic experience expressed in years (total time spent in a structured athletic program).

Tests:

(i) **Stride Length / Stride Frequency**

Accel. Zone (15-20m) Test Zone (30m) Stride Length: distance between foot strikes in 30m test zone; measure both L and R strides.

Optimum Stride Length: $2.3 \times \text{Leg Length}$ (developing athletes)

Stride Frequency: $10 \text{ Strides} \div \text{Time} = \text{strides/second.}$

Excellent demonstrations and explanations.

8:30 (ii) **Acceleration Tests**

Sprint (max. speed effort) over 30m from a Standing or Block Start.

(iii) **Maximum Velocity**

Acceleration Zone (20-30m), then timed 30m Fly. ($30\text{m} \div \text{Time} = \dots \text{metres/sec.}$)
Elite Men: 12 m/s; Elite Women: 10 m/s; Boys: 10 m/s; Girls: 8 m/s.

Acceleration Differential: Standing 30m - Flying 30m
Elite: 1.0; Developmental: 1.2 - 1.4.

(iv) **Sprint Speed Endurance**

Acceleration Zone (20m); **then**, 60m max. speed effort, split taken at 30m and 60m.

Accel. Zone (20m) Start Watch 30m Split 60m Final Time

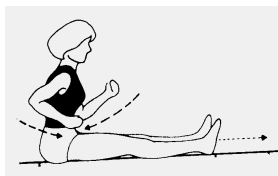
First 30m split (i.e. from watch start to 30m) + 3% = Second 30m split.
e.g. 3.0 (first 30m) + 3% = 3.09; Aim to achieve 3.09 for second 30m.

A clear and very interesting series of activities.

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(v) **Elastic Response**

Vertical Jump; Force Platform; 3 Vert. Jump Test; 4 Bounds + Jump; SLJ; STJ; Timed Hurdle Bounds over 5H.

(vi) **Upper Body Power**

Kneeling Basketball Throw.

(vii) **Aerobic Capacity**

12 Minute Run Test (alternative: Multi-Stage Fitness Test .. Shuttle Run)

14:30 **Basic Sprint Model / Advanced Sprint Model** ... Components.

15:45 **Ground Dynamics**

Discussion of Path of Centre of Mass ... wheelchair / runner comparisons.

Discussion of various strategies to improve maximum velocity capacity.

20:00 **General and Specific Strength and Power Improvements**

Body circuits for young athletes.

Weight Training .. **after** foundational strength achieved.

Elite Sprinters: less Ground Time than developing athlete; they apply greater forces in less time.

Plyometrics: In-Place Jumps: Pogo Jumps; Rocket Jumps; Tuck Jumps; Straddle Jumps; Split Jumps; Ski Jumps; Single Leg Jumps.

In-place Jumps: increase mass of the athlete by adding weight, e.g. vest, shot throws (2 Bounds/ Backwards Throw)

24:20 Short Jumps: Efforts of 5 or less responses: SLJ; STJ; Double Leg Jump; Multi-Count Alternate Leg Jumps; Hurdle Hops (Bounds).

25:00 Meso-Power Jumps: Increased number of repetitions (>5): Alternate Leg Jumps (10) .. Bounds; Straight Leg Bounding; Single Leg Jumps; 10 Hurdle Bounds; Speed Bounds; Run/Run/Bound ... in meso-power jumps, athletes must generate greater values of negative foot speed to avoid braking forces.

In the search for speed, the stimulus must be different to what the body is normally subjected to ... don't allow the stimulus to become stereotyped. Variations and progression are central to improvement.

26:50 **Contrast Training:** Aim is to fool the nervous system into performing at a higher level.

Resistance: Running Against the Wind; Hills (1% uphill gradients); Weighted Vests, Tyre Towing. Resistance must be <10% (such that concentration can be on technique, not the resistance).

Assistance: Ultra Speed Pacer; Running with the Wind; Downhill (1%).

31:30 **Ultra Speed Pacer**

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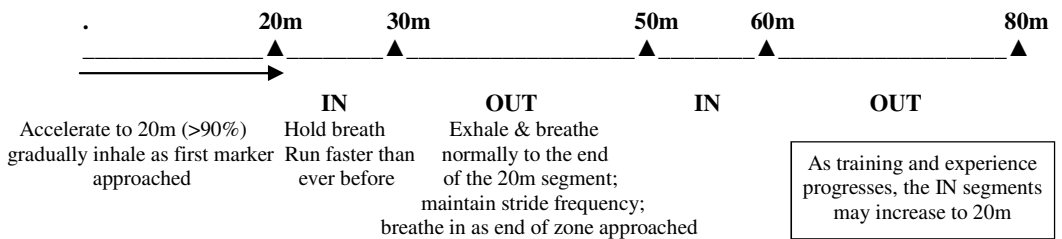
32:00

Implementing Contrast Training

Session Example: Warm Up; Resistance Sprints: 3 x 30m (accel. 15-25m); timed.
2-5 min. recoveries
3 x Assisted Sprints (30m); timed.
2-5 min. recoveries
3 x Normal .. the *real* sensation.

33:50

Ins and Outs



Holding breath during the "IN" phase increase the capacity to deliver force.

37:50

Acceleration

400 "The Hard Way"; Stick Drills; Hills; weighted cart sprints; weighted vests.

41:40

Multi-Throws Training

Underhand Forward; Overhead Backward; Hop/Hop/Throw; Hop/Hop/O-H Backward; Chest Pass Lunge; Squat Toss; Hammer Hip Throw; Drop Toss; Drop Chest Pass; Drop Forward/Backward Throw; Drop Backward/Backward Throw.

43:15

Cross Training

44:40

Compatible Training

- Speed Development sessions should not exceed 500m total volume.
- Allow 48-72 hours between speed development sessions.
- Schedule Extensive Tempo work after Speed Development to enhance recovery.
- Maximum Explosive Exercises can be incorporated with Acceleratin Training.

First know the rules of training before you attempt to break them.

46:20

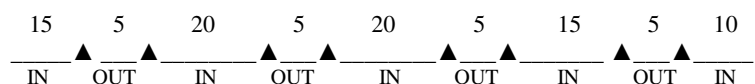
Example Weekly Schedules:

General Preparation Phase
Specific Preparation Phase
Competition Phase

49:20

Race Modeling (Example: 100 Metres)

Approach mirrors Training INS and OUTS.



51:40

Competiton Warm-Up

Start ► 5-15m .. max. effort on held breath; then INS and OUT modeling

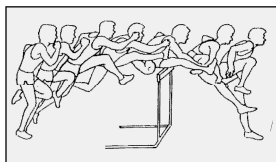
54:30

End of Tape

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19:10 **9 Components of (High) Hurdling**

1. Warm-Up.
2. The Start.
3. Pure Acceleration.
4. Take-Off Preparation.
5. Take-Off.
6. Hurdle Clearance.
7. Landing.
8. Re-Acceleration.
9. The Finish.

21:35 **The Warm-Up**

General / Specific; Training cf. Pre-Competition W/U (HH 2)

The Training Session Warm-Up: aims to increase muscle temperature; flexibility; stimulate the neuromuscular system through dynamic mobility activities; and, prepare the appropriate energy systems.

Activities: General ► Specific Skills: Simple ► Complex.

Types of Warm-Up: Compartmental (e.g. circuits); Continuous (e.g. drills mixed with running / skipping.)

Simple Continuous W/U.

26:00 **Extra Activities** to be incorporated at the discretion of the coach / athlete:

Hip/Glute: Hip Risers; Fire Hydrant; Extenders; Pick-Ups; Front Leg Swings; Front Leg Swings (Resisted); Lateral Leg Swings; Speed Skate; Lunges; Wide Outs; Trail Leg Pick-Ups.

Lower Back: Scorpion; Tucks; Cat Stretch; Sky Diver; Hyperextension; Plows.

Ankles & Shins: Ankle Roll; Shin Dance; PNF.

Quads & Hamstrings: Hurdle Seat Change A; Hurdle Seat Change B; Iron Cross; Lead Leg Plow; Lead Leg Pick-Ups; Crouched Butt Kicks; Mule Kicks.

Static Stretching: most appropriate at the end of a session.

After the Continuous Warm-Up ... specific drill sequences; preparation for hurdling and refinement of movements/skills.

31:30 **The Take-Off Phase**

What is the most important phase of hurdling? The *Take-Off Phase* determines the quality and duration of hurdle clearance.

Objectives of the Take-Off Phase:

1. Hurdle Clearance.
2. Optimise the Flight Parabola: long, low, fast projection of Centre of Mass.
3. Minimise Ground Time during Take-Off.
4. Re-acceleration of the C of M.

Improving the Take-Off:

1. Teach Task Specific Cues: “**BOOM!!** ta, ta, ta”; feel this rhythm; “explode” between the hurdles.
2. Increase Stride Length & Power (HH2)
e.g. explosive hurdle hops; SLB; speed bounds; power bounds; run-run-bounds.
3. Specific Drills: Str. Leg Cast & Grab; Wall Drill; ½ and 1 Step Hurdling.
4. (Develop) Steering Mechanism: initiation of take-off (Female: 2m; Male: 2.2m). Must be precise .. not too close to the H; variations according to H height and leg length (7½-8 foot lengths .. good approximation of the *ideal* spot).

The rhythm
of hurdling

*Your ears are
as important
as your eyes*

BOOM

ta

ta

ta

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39:45 **Take-Off Preparation Phase**

Gravity is a constant. As the athlete takes successive steps, the C of M is “caught” preventing it from “falling” further; (Sequence: Propel / Fall / Catch / Propel / Fall / Catch ..).

The aim is to reduce the “fall” of the C of M before the take-off is initiated; less force is thus required to change the direction of the C of M during the take-off phase. Strategies to achieve this outcome.

42:45 **The Hurdle Clearance Phase** (excellent analysis)

Lead Leg .. the first element; most important to keep “toe up” / foot dorsiflexed.

Take-Off Leg = Trail Leg; role of the Take-Off Leg is to project the hips “through” the hurdle by a full extension.

Note! Trail Leg does not begin its action until Take-Off task is complete (Trail Leg is “left behind” until the last second).

Aim is to minimise the three trail leg deviations that occur during hurdle clearance:

- External Rotation of the knee joint so the foot is “turned out”.
- Deviation of the thigh away from the mid-line of the body.
- Change of path through which the knee travels .. up, under the arm pit .. more evident in the Men’s HH.

Hurdle Clearance Arm Action: arm action is critical (balance). Three stroke rhythm.

Aim: Straight Line ... Take-Off Toe >> Lead Knee >> Lead Elbow
(ensures the optimum body angle at take-off)

Drills to be completed at speed over low barriers.

½ Hurdle Drills and 1-Step Hurdle Drills. Teeter-Totter Drill.

51:45 **The Landing Phase**

Minimisation of “braking forces” by producing zero “front side distance” at the point of landing ... aim for maximum negative foot speed at lead leg ground contact.

- Keep “toe up”; ankle dorsiflexed.
- Catch C of M at landing so that it is higher than at take-off.
- Re-acceleration: get off lead leg as quickly as possible; don’t “mush out”.

(i.e. don’t allow ankle joint to collapse)

Assisted drills over hurdles.

53:30 **The Re-Acceleration Phase**

Various Drills: “freeze frame”; plyometrics; run-run-bounds; assisted ½ hurdling.

55:00 **Frequency cf. Rhythm**

55:30 **The Acceleration Phase** ... the run to H1.

Comparison with normal Sprint Start mechanics.

The importance of achieving “hips tall”. (Refer to ST1)

56:58 **The Start / Finish**

Focus on a motor response (not sensory perceptions) e.g. “Quick Hands”.

60:00 End of Tape.

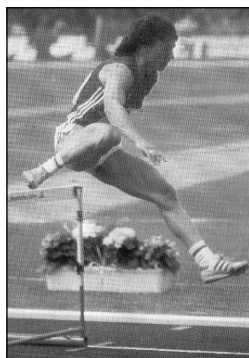
Before
You
Can
Achieve

You
Must
First
Believe

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SPEED DYNAMICS VIDEO SERIES

HIGH HURDLES 2: (HH2 .. abbreviation that may be used in NWA Training Programs)

An eyeful is better than a mouthful

Introduction: Speed development in hurdling; *Hurdling: a rhythmic sprint over barriers, requiring Speed, Strength, Power, Grace (and Courage).*

3:45 **Aim:** to construct an advanced model of hurdling, and detail a program to facilitate improvement in hurdling performance.

Review of the role of Stride Length / Stride Frequency. The performance characteristic most responsible for faster times is *Stride Frequency*.

Need to reduce, for every stride, the time spent on the ground and in the air.

Improving Stride Frequency:

1. Increase Strength and Power: enables athlete to apply more force at ground level in a shorter time.
2. Reprogram the Neuromuscular System: repeated high quality rehearsal of the specific movements involved in hurdling.

Pre-Tests: hurdlers score high on tasks that require: Co-ordination; Dynamic Mobility; Elastic Strength.

The fast(est) sprinters can become the fastest hurdlers.

Setting Performance Goals for Athletes:

	Developing	Accomplished	Elite
Female (100H)	100 + 2.0	100 + 1.5	100 + 1.0
Male (110H)	100 + 4.5	100 + 3.5	100 + 2.5-3.0

8:15 **Components of the Basic and Advanced Models:**
Hurdling is a collection of 11 separate accelerations.

Race Plans / Touchdown Times / Comparison of Touchdown Times with Race Plan.
Examples provided.

11:00 **Developing Technique**

Because early emphasis is on technique mastery rather than maximum speed, the athlete must beware of creating a "slow neuromuscular pattern". Be sure to include rhythm sprints over hurdles (low H: 20-30cm. / 6-7m.).

Short, concise units of such work allow enthusiastic, intensive responses.

14:00 Training v. Competition Touchdown Times. Competition often .1 faster; must reverse this situation ... demand times in training as fast (or faster) than in competition.
Adjust hurdle heights and spacings to encourage this response.

**Hurdlers
require:**

SPEED

Strength

Power

Co-ordination

Courage

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14:55 **The Acceleration Phase**

Aim: to increase the attack velocity at take-off.

- Strategies:
- Reduce hurdle height and distance;
 - Add strides (2) to the acceleration pattern; starting blocks in all runs; if no blocks, a "walk-in stride".
 - Choreograph the movements ... *Stick Drill*.

18:20 **The Stabilisation Phase**

Males achieve maximum velocity: H3; Females: H4 / H5.

Discount Hurdling ... adjust hurdles to achieve the desired touchdown times (work for no more than .1 improvement in each touchdown time ... if .1 is exceeded, adjust height and spacing).

With Men's HH (in particular), some time should be spent with the hurdle at race height ... but, don't neglect speed.

Extra Strides ... add 2 extra strides to the spacing between the hurdles:

Start ... 8 strides ... H1 .. 3 . H2 ... 5 .. H3 .. 3 . H4 ... 5 .. H5 .. 3 . H6 **Finish**

21:15 **Hurdle Rhythm Endurance**

Down and Back Drill; 3 x 4 Drill (on line, or, down and back) .. hurdle heights progressively reduced to protect hurdle rhythm; Circuit Hurdling.

23:15 **Strength & Power Development** ... specific movements

Trail Leg Cycle; Alternate Leg Walk-Overs; Over & Back; Lead Leg Stomp; Trail Leg Slide.

24:10 **Body Weight Circuit:** Example: Push-Ups; Plyo Jumps; Lat. Pull; Cradle; Tricep Press; Handstand Press; Military Press; Pull Ups; Dips; Prisoner Squats; Single Leg Squats; Partner Squats.

25:50 **Remedial Exercises:** Negative Leg Curls; Yogi's; Reverse Yogi's; Fish Flops; Wishbone; Reverse Wishbone; Medicine Ball Curls; Med. Ball Toe Toss; Hyperextension Pass.

27:35 **Strength Training for the Feet:** barefoot running and drills (grass).

28:35 **Abdominal Circuits:** Crunchers; Side Ups; Pikes; L-Overs; Roman Chair; Spotted Toe Touches; Whipper; Negative Tucks; Roman Side-Ups.

30:20 **Stabilisation Drills:** Crane (Freeze Frame); Alternate Leg Hops; Stuck Hurdle Hops; Barefoot Skips; Heel Lifts.

31:30 **Weight Training**

- Integration of muscle groups (rather than isolation): Olympic Lifts; Multi Jumps; Multi Throws; Medicine Ball Routines.
- Hurdling with a weighted vest ... low hurdle heights / moderate spacing.
- Hurdle Rhythm Bounding.
- Special Resistance: elastic bands.

33:00 **Shake Ups:** isolates optimum body position; *Hips tall; toes stay up; ankles dorsiflexed; back remains straight and steady.*

Speed
is
the
Key

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34:45 **Transition Drills ... Integration of Skills**

A series of explosive movements and counter movements always ending with an acceleration. Examples provided.

35:45 **Contrast Training**

1. Resistance Training: uphill (1%) ... incline hurdling; opposing force from behind; weighted vest; weighted pants (ankle weights).

More is not necessarily better ... normal performance should not be altered by more than 10%.

2. Assistance Training: running with the wind; slight downhill gradients; towing; *Ultra Speed Pacer*.

39:10 **Contrast Training Formula:** Sample Session ...

- 3 x Resisted Effort; 3 x Normal; 3 x Assisted Effort; 3 x Normal.

40:25 **Race Modeling**

Breath control increases capacity to apply force. Breathing checkpoints throughout the race.

42:50 **Sensory Optimisation**

Optical Fatigue: a sensory overload which causes a reduction in concentration, awareness and intensity of effort.

Sound / Rhythm *seeing with your ears*.

Contact Drills .. race simulations.

Soft-Top Hurdles.

46:25 **Compatible Training**

- Schedule units of hurdle training each day, but work should be concise, specific and monitored by the coach.
- Pursue only one performance objective in each hurdle session.
- Work to diversify the performance skills of the hurdler.
- Schedule no more than two (2) hurdle speed development sessions per week.
- It's not the amount, but the regularity that matters.

Sample Weekly Cycles

- | | |
|-------|--------------------------------------|
| 47:30 | 1. General Preparation Phase |
| 49:30 | 2. Specific Preparation Phase |
| 51:36 | 3. Competition Phase |

Worth analysing

*If you don't
stand for
something*

*You'll
probably
fall for
anything*

53:20 **Pre-Race Warm-Up** ... comprehensive suggestions.

60:00 End of Tape.