Compare & Contrast

Sprinting with Horizontal jumps
Approach
OVERVIEWS

- Theoretical sprint acceleration models.
- Uniform, controlled acceleration.
- Stride length and stride rates should increase in harmony.
- Dynamic - stride numbers, proportioned sections.
- Uniform erection of posture – postural angles.
- Strike point locations relevant to C. of M.
- Foot dorsi-flexion
- Shin angles.
- Ground contact times lessen during approach – 2:1 at start; 1:1 at transition; 1:1.6 at top end speeds.
Coaching Conferences 2010

Steps to Success
Horizontal Jump Approach

Run

- Start with controlled acceleration contacts
- Use the contact time to impart force
- Preparation has a low starting position
- Knees are flexed to allow powerful drive motion
- Force exerted down through the feet which are positioned under the C of M
- Maintain low position initially
Horizontal Jump Approach
Run

- As hip extension takes place the torso rises gradually
- A straight line from ankle through leg and torso to head is targeted
- Limbs are synchronised to allow rapid force production
- Hands at front to shoulder level, upper arm at rear to shoulder level
Horizontal Jump Approach

Run

• Mid run-up strides are consistent. The horizontal velocity is established and maintained.
• The torso is carried in an upright posture with head held in natural alignment.
• Spatial awareness and ‘steering’ to allow accuracy on the board should take place naturally in the development of the approach. The final strides allow the athlete to fine tune the accuracy IF REQUIRED.
• Take off pattern MUST allow conservation of speed through subsequent contacts.
• The pattern of the last strides dictate horizontal speed and take off angle at the board.
100/200m Event Model Overview

Race Phases
- Drive
- Transition
- Max Velocity

> Speed Maintenance <
- Speed Endurance
- Specific Endurance
Drive Phase Mechanics

Start of Drive Phase:
- Shin angles at 45° to facilitate maximum displacement from blocks.
- Torso angle matches shin angle on foot strike (straight line head to toe).
- Extremely exaggerated arm action to counterbalance extreme forward rotations.

Key Coaching Points:
Other key points to focus on: 3. Arm action, 4. Good posture (straight back, head in neutral position relative to spine), 5. Piston legs and low heel recovery.

End of Drive Phase:
- Shin angle at foot strike is perpendicular to ground.
- Torso remains slightly inclined.
- Arm action still slightly exaggerated to counterbalance slight forward rotation resulting from incline body lean.

Centre of Mass (COM)

Block Clearance

Shin Angle 45°

Torso Angle

Negative shin angles & forward body lean facilitate rapid acceleration

+ 6-7° per Stride

+ 2-3° per Stride

0°

80°

90°
Transition Phase Mechanics

Shin Angle: 90°
Torso Angle: +2-3° per Stride

Rate of acceleration slows as forward body lean diminishes

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Summary

Make best use of GCT in first 7 steps.

Piston action for Heel recovery in drive phase

Dorsi-flexed Foot presentation to the ground

Upright Torso Angle for Top speed maintenance

Key to recovery phase is shape of the flamingo bird

Drills should accurately reflect the biomechanics of running
The Biomechanics of Sprinting

Know how to accelerate through the Drive and Transition phase?

Know how to maintain top speed mechanics

Know which drills DO and DO NOT develop good biomechanics

Know some activities to develop acceleration & top speed mechanics
Is there a need to develop these elements? If YES, identify practices to develop the phases below!

- To Develop Drive/Acceleration.
- To Develop Transition/Alignment.
- To Develop Maximum/Optimum Speed.
Development

- Acceleration
- Progress from 10m to 30m
- Check consistency at distance marks
- Transferable to runway
- Develop using weighted sledges
- Beware TECHNIQUE changes when upright posture is achieved – 7/8 strides
- Short hill runs 20/30m with plateau of 20m/30m as relaxed cadence
- Block starts + 10/15/20/25/30m
Development

- Transition?
- Flying starts – 5-20m into 20/30m
- Progress up to 50m
- Momentum/Flying starts up to 60m
- Power bounding
- Hollow/ In & Out Runs – combines all elements 20/20/20/20/20/20 to 30/30/30
- Plyometric Exercises – Speed bounding
Development

- Maximum Velocity
- Block starts + 10/15/20/25/30m
- Quick, low impact rebound work
- Hollow/ In & Out Runs – combines all elements 20/20/20/20/20 to 30/30/30
- Bend running – both directions for ‘cadence’ work – progress from lane 8- inside lanes – aids control of stride lengths.
- Plyometric Exercises – Speed bounding – Rate of Force Development
So, do we just sprint on the runway?

- There is NO accuracy to the end of a sprint.
- There is NO need to change force directions at the end of the sprint.
- There is NO need to have precise foot contacts at the end of a sprint.
- There is NO need to induce a RHYTHM change at the end of a sprint.
- There is NO need to control precise posture at the end of a sprint.
I suggest we don’t!

- YES to Consistent start – Precise contacts and control in Drive/Acceleration.
- Is there a TRANSITION? If not what happens and when?
- YES to an Upright shape before take-off preparation.
- YES to Take-off rhythm through final strides
- YES to Accuracy of final contact.
- YES to a Shape change to allow alternative force direction.