Technical and Skill Aspects of Sprinting

Biomechanics, Training Theory and Motor Behavior

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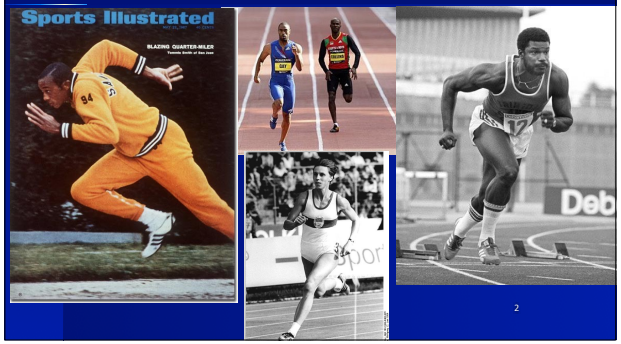
Is there a new model of Sprinting?



Motor Learning and Biomechanics

Motor learning is a change, resulting from practice or a novel experience, in the capability for responding. It often involves improving the smoothness and accuracy of movements.

Biomechanics is the movement science field that applies the laws of mechanics and physics to human performance, in order to **gain a greater understanding** of performance in movement events through modeling, simulation and measurement.

They are not one and the same!

Warning!!

- Beware of conformational bias
- Utilize deep study of new trends and reports
- Sample diverse practitioners and projects
- Realize some of the classics and old guys weren't that far off
- Beware of marketing and internet **gurus**
- Be careful with inferences

Strategies

- Leverage variables to gain speed
- Lever and axes systems
- Timing systems, alarm theory
- Momentum factors
- Speeds
- Support Phases
- Flight Phases
- Pathways of limbs and athlete's C of G

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Motion Analysis: What to Watch and Cue

- Inter-athlete study
  - –gender, training age, cultures, evolutions
- Intra-athlete study
  - –fast runs, poor runs, weather issues, evolution
- Event History and Evolutions
  - –film, studies, interviews, reports and texts

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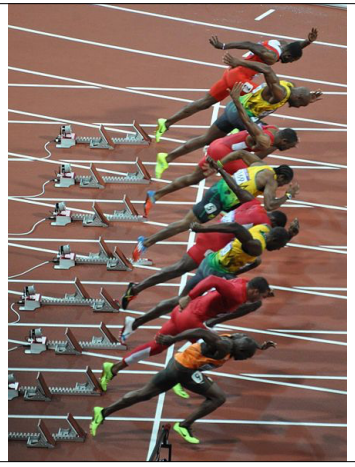
Acceleration Mechanics, A Complex Skill Set

Starting Positions

- Starting on the Move
- Stationary starts
- Spinal Engine
- Joint and Muscle Order
- Projection Angles and Force Application
- Stride Rate
- Stride Frequency
- Total Body Axis to Ground Angles
- Appendage Positions and Transitions
- Ground Contact, Amortization and Flight Times



Top End Speed Mechanics

- Posture
- Strike Landmarks for the Foot
- Arm Positions and Angulation Factors
- Leg Angulation Factors
- Dorsi-flexion Paradigm
- Hip and Shoulder Axis Undulation and Oscillation
- Ground Contact and Flight Times
- Joint Stiffness Mechanisms
- Direction of Force Application
- Limb Repositioning Times and Factors

Is There a Technical Model?

- Common denominators of positions, movement schemes and vectors.
- Intra and Inter athlete studies are critical. Ditto Longitudinal study.
- Logic, common sense and replicability are critical coaching tools.
- Cue systems must be rationally utilized.

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Seeing Motion

- In real time
- Stop action
- Varied speed
- Reverse action
- Perspectives: frontal, rear, panning, above

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photo:Jeff Cohen
trackfield
image


JAMAICA
BOLT


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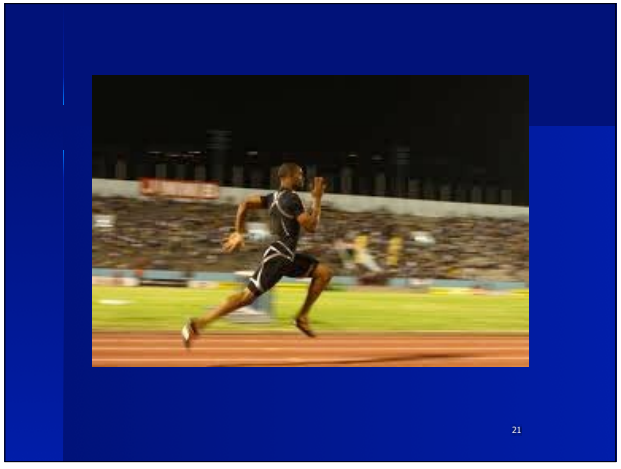

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Teaching Imperatives

- See **landmark positions** and **actions** during ground contact and mid-flight phases
- Identify the worst or most powerful **virus** and attack it first
- Realize that finding and fixing the key virus will most likely **clear several other sub-viruses**

Cueing

- External versus internal
- Rhythm and limb awareness
- Mass versus distributed feedback
- Time specific: phases, cycles and years

Cues and Motor Behavior Considerations for Changing Skill Sets

- Error Detection and Correction
- Research on Drills
- Alarm Theory
- Spatial Awareness
- Temporal Awareness
- Learning Types
- Environmental Factors
- Negative Transference
- Fatigue
- Stimulation, Adaptation, Stabilization and Actualization

Training Theory Considerations

- Acceleration, Speed and Speed Endurance as Compatible and Complementary Tasks
- High Neuromuscular Demand, Power, Strength and Work Capacity as an Order of Ergonomics
- A Weekly Format for Developing Acceleration, Speed and Agility Factors
- A Base of What? Work Capacity Specificity
- Acceleration and Speed are Complex Skill Sets