

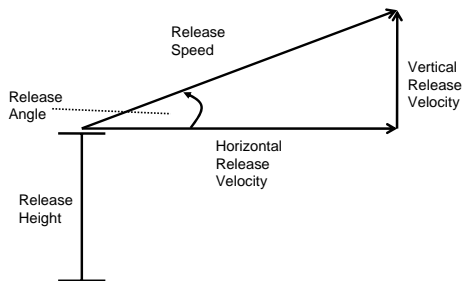
A BIOMECHANICAL REVIEW OF THE JAVELIN THROW

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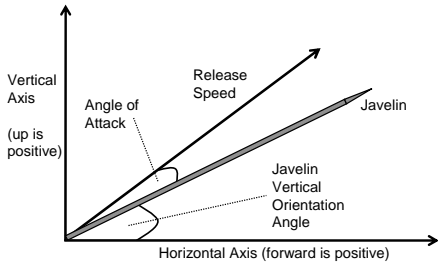
The Release

- Release speed = most important factor for long throws
- Develop maximum speed at release
- Correct direction and orientation of release speed and javelin
 - Vacuum Flight Distance
 - Aerodynamic Distance

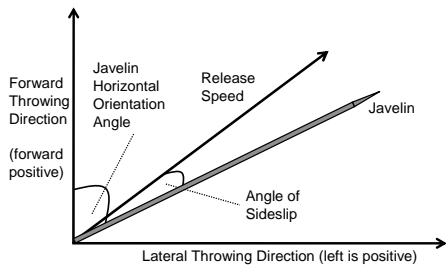
Release Parameters



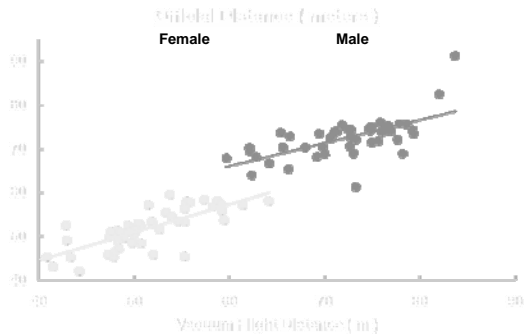
Vertical Release Velocity



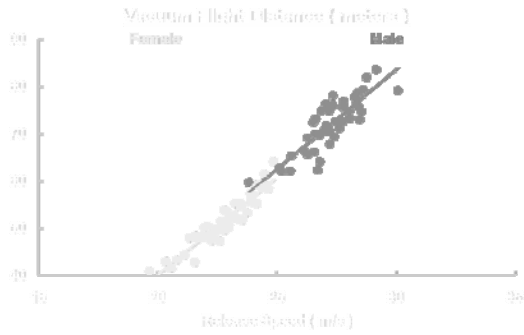
Horizontal Release Velocity



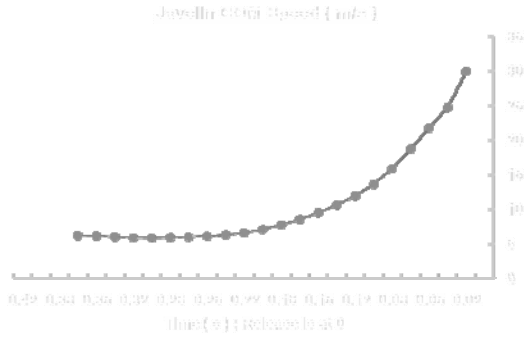
Official and Flight Distances



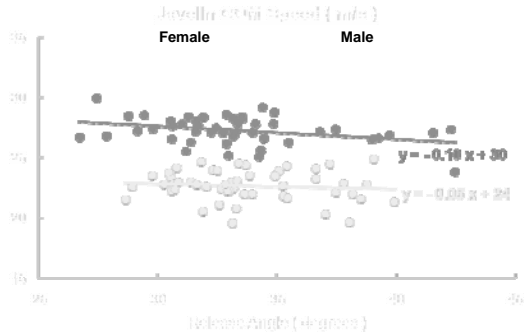
Release Speed & Flight Distance



Release Speed Generation



Release Speed and Angle



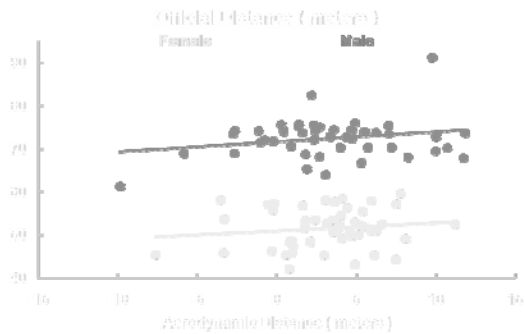
Release Angles

- ◎ Orientation of Release Speed
 - Horizontal & Vertical
 - Relationship between speed and angle
- ◎ Orientation of the Javelin
 - Horizontal & Vertical
- ◎ Angles of Attack and Sideslip
 - Aerodynamic factors
 - Wind and air resistance

Javelin Aerodynamics

- ◎ Environmental conditions, e.g. altitude
- ◎ Speed
 - Relative speed of javelin and air (squared)
- ◎ Area in contact with the air
- ◎ Aerodynamic characteristics of the javelin

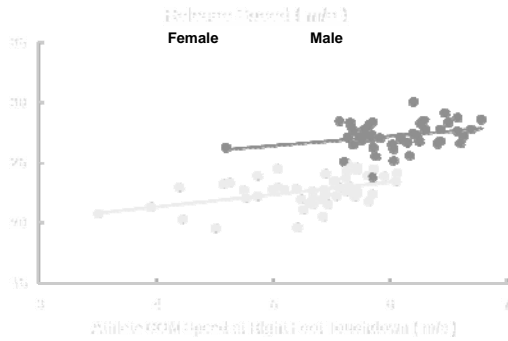
Official & Aerodynamic Distance



Runway Speed

- ◎ Turn Runway Speed into Release Speed
- ◎ Appropriate technique
- ◎ Right Foot Touchdown
 - Minimize braking
 - Maintain runway speed
- ◎ Left Foot Touchdown
 - Powerful block
 - Transfer linear speed to rotational speed
 - Pivot about a solid base

Runway Speed & Release Speed



Temporal Rhythm

- ◎ Right Foot Touchdown
 - The Single-Support Phase
- ◎ Left Foot Touchdown
 - The Delivery Phase
- ◎ Release

- ◎ Minimize braking in single support
- ◎ Maximize effectiveness of the block
- ◎ Setup by a good runway approach

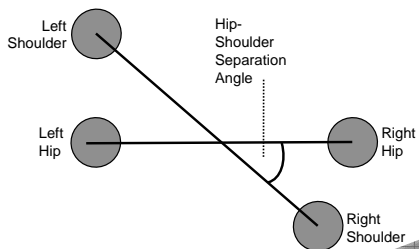
Left Leg Angles

- ◉ Left Knee Flexion Angle
 - Limited motion indicates a powerful block
- ◉ Left Leg Angle
 - Angle between the ground and a theoretically straight left leg
 - Pitched forward and upward over the block
 - May be able to increase vertical velocity while maintaining horizontal velocity and javelin orientation

Hip-Shoulder Separation

- ◉ The angle between the line of the hips and the line of the shoulders - represents trunk twist
 - Trunk twist is used when converting linear motion to rotational motion
 - Can increase the speed of each segment in order away from the trunk out to the javelin in a whipping motion
 - May be important not to prematurely twist the trunk

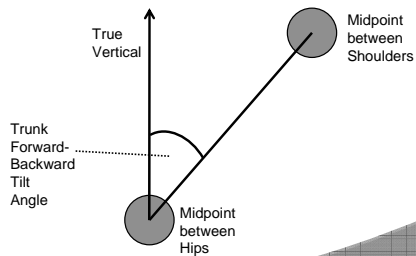
Hip-Shoulder Separation



Trunk Forward-Backward Tilt

- ◉ Lean of the torso relative to the true vertical in the direction of the front of the torso
 - Describes the orientation of the trunk – line of the hips, shoulders, and feet
 - Indicates trunk motion during throwing procedure – possible loss of speed
 - Can alter the orientation of the javelin without arm motion

Trunk Forward-Backward Tilt



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Video and
Discussion
