

USTFCCCA Technical Seminar
High Jump
Part II

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I. Takeoff

A. Vertical velocity of center of gravity at end of takeoff phase

Range of analyzed jumps at 2006 USA Outdoor Championships

Men: 4.15 – 4.50 m/s

Women: 3.40 – 4.70 m/s

Tora Harris: 4.50 m/s

Chaunte Howard: 4.70m/s

Scott Sellers: 4.30 m/s

Kaylene Wagner: 3.40 m/s

B. Horizontal velocity of center of gravity over the last two steps

Men: Penultimate 7.0 – 8.2 m/s
Takeoff 7.0 – 8.0 m/s

Women: Penultimate 6.3 – 8.0 m/s
Takeoff 6.1 – 8.0 m/s

Tora Harris: Penultimate 8.2 m/s
Takeoff 8.0 m/s

Chaunte Howard: Penultimate 8.0 m/s
Takeoff 8.0 m/s

Scott Sellers: Penultimate 7.8 m/s
Takeoff 8.0 m/s

Kaylene Wagner: Penultimate 6.4 m/s
Takeoff 6.3 m/s

C. Height of center of gravity at start of takeoff phase

Men: 43.0 – 48.0%

Women: 46.0 – 49.5%

Tora Harris: 45.0%

Chaunte Howard: 46.0%

Scott Sellers: 47.5%

Kaylene Wagner: 47.0%

D. Takeoff time

Men: .15 - .18 seconds

Women: .14 - .21 seconds

Tora Harris: .15 seconds

Chaunte Howard: .14 seconds

Scott Sellers: .17 seconds

Kaylene Wagner: .21 seconds

E. Length of last step

Men: 1.81 – 2.18 meters

Women: 1.62 – 2.01 meters

Tora Harris: 1.94 meters

Chaunte Howard: 2.01 meters

Scott Sellers: 2.14 meters

Kaylene Wagner: 1.99 meters

Jesse Williams: 1.81 meters ('04)

F. Vertical velocity at start of takeoff phase

Men: (-.2) – (-.5) m/s

Women: (-.6) – (0) m/s

Tora Harris: (-.4) m/s, '01 (-.7) m/s

Chaunte Howard: (-.3) m/s

Scott Sellers: (-.5) m/s

Kaylene Wagner: (-.3) m/s

Jesse Williams: (-.2) m/s

G. Takeoff distance

Men: .94 – 1.50 meters

Women: .73 – 1.22 meters

Tora Harris: 1.50 meters

Chaunte Howard: 1.22 meters

Scott Sellers: 1.48 meters

Kaylene Wagner: .83 meters

Jamie Nieto: 1.48 meters

H. Final direction of run-up

Men: 37 - 51°

Women: 30 - 48°

Tora Harris: 46°

Chaunte Howard: 44°

Scott Sellers: 50°

Kaylene Wagner: 46°

I. Direction of longitudinal axis of the foot with respect to the horizontal force made on the ground during the takeoff phase

Men: 17 - 46°

Women: 12 - 43 °

Tora Harris: 35°

Chaunte Howard: 42 °

Scott Sellers: 17°

Kaylene Wagner: 35 °

J. Takeoff Goals

The takeoff leg “fires” into the ground. Ideally we desire as large a force as is possible, exerted through as large a range of motion as is possible, making it necessary for the center of gravity to go through a long vertical range of motion during the takeoff. We desire then, a low center of gravity at takeoff but also a quick takeoff to facilitate rotation about the bar.

1. Relationship of vertical velocity at end of takeoff with horizontal velocity of center of gravity in takeoff stride
2. Push through, Pull (hip extension)
3. Free leg “swing”

K. Body positions at touchdown of takeoff leg

1. Takeoff foot

- Direction of longitudinal axis
- Distance from bar

2. Relationships of hips / shoulders relative to bar

3. Inside shoulder

4. Plant leg / degree of knee flexion

5. Body lean

- Lateral
- Backward

Note: At end of takeoff phase elite jumpers are approximately 10° beyond vertical

II. Bar Clearance

A. At the completion of the takeoff three rotations commence

1. Forward somersault – caused by angular momentum produced by checking of linear motion
2. Lateral somersault – caused by center-fleeing force
3. Rotation about vertical axis – twisting angular momentum

B. Arms / Free Leg – Styles

Wide sweeping arm motions and long free leg (clockwise rotations) interfere with forward somersault angular momentum.

Typically, these athletes will take off closer to the bar and will need to be more “gymnastic” in order to rotate about the bar. There will be more “drape” which is often times thought to be more aesthetically appealing.

C. Approach and takeoff will dictate what must happen on top of the bar.

III. Standing Vertical Jump / Three Step Vertical Jump

<u>10/03</u>	<u>Standing Vertical Jump</u>	<u>Differential</u>
Erin Aldrich	24"	6.5"
Ifoma Jones	22"	-
Cari Long	23.5"	7"
Karol Rovelto	22"	8"
Tisha Waller	27.5"	-
Charles Clinger	30.5"	14.5"
Kyle Lancaster	28"	9.5"
Nathan Leeper	34"	8.5"
Jamie Nieto	33"	10.5"
Matt Hemingway	26"	9.5"

Standing Vertical Jump / Three Step Vertical Jump (Cont.)

10/05 vs 10/06

Differentials

10/05

10/06

Kaylene Wagner

8"

9"

Scott Sellers

7.5"

10"

Kyle Lancaster

12"

12"