

# Theory and Training for the 400m Hurdles

**Scott C. Roberts**

*Women's Sprints/Hurdles/Jumps Coach*

University of Alabama



# Necessary Attributes

- Strength of an 800m runner
- Hurdling ability of the sprint hurdler
- Visual steering ability of the horizontal jumper

Successful competitors have come from the sprint, hurdle, jump and middle-distance ranks



# 400h Selection Criteria

- **Sprint Ability**-Speed is always the primary limiting factor in any speed & power event.
- **Strength**-Both maximal strength & strength endurance are required.
- **Aggressive Mental Attitude & Concentration**-Must be aggressive & be able to concentrate on negotiating the barriers.
- **Dynamic Mobility**-Mobility within the hips to efficiently perform the hurdling motion .

# Performance Qualities



## In Order of Importance

- **Ability To Apply Force@ Takeoff**-To move through the hurdle and minimize deceleration.
- **Ability To Hurdle With Both Legs**-To take the hurdle smoothly without slowing down.
- **Ability To Maintain Consistent Rhythm**-To have the special strength and technique to run over 10h with the least amount of breakdown.
- **Ability To Manage Race Distribution Efficiently**-To not run too fast and die or too slow and not be in the race.



# Start and Approach to First Hurdle

# Start and Approach to First Hurdle

- 22-25 steps to first hurdle (women)
- 20-23 steps to first hurdle (men)



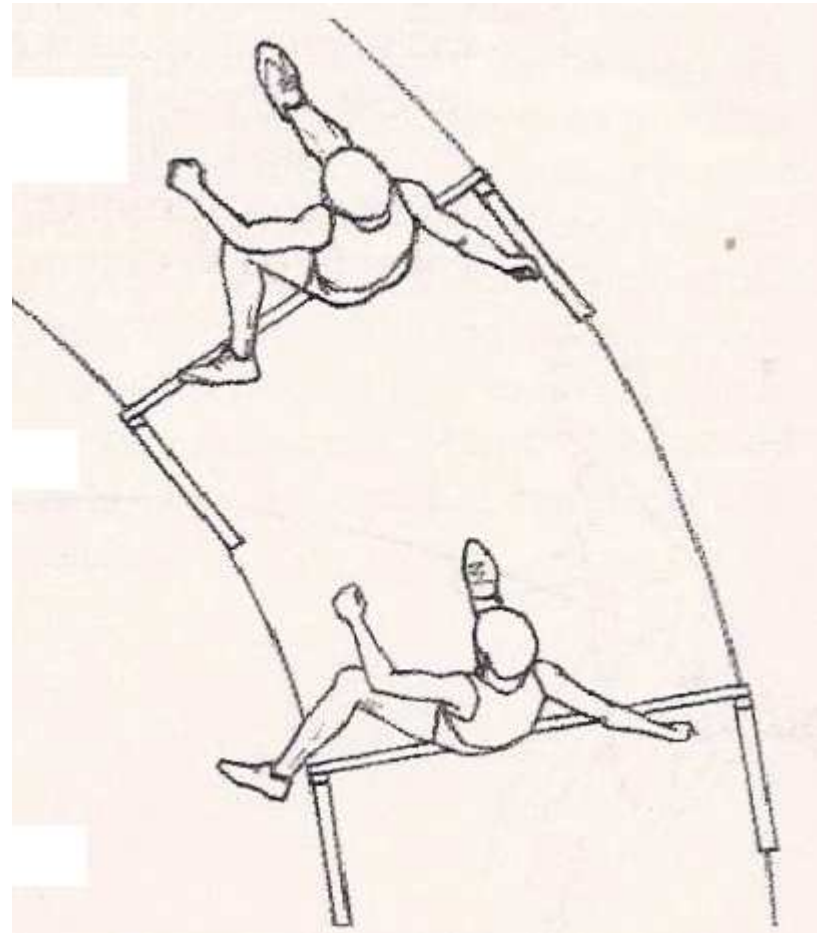
# Start and Approach to First Hurdle

- Attack the first 4-5 strides in the same way as in normal acceleration from blocks
- Should accelerate the last few strides into each hurdle (at least 10m away)
  - “Sprint 3 strides on and 3 strides off the hurdle”
  - The last stride prior to each hurdle should be shorter & quicker than the previous strides. (Cut Step)



# Start and Approach to First Hurdle

- **Left-leg lead**
  - is preferred on the curve
  - allows athlete to run on the inside of the lane.
  - Keeps athlete from pulling the trail leg over the inside of the hurdle during clearance.
- **Right-leg lead**
  - Must allow for the trail leg to clear the hurdle w/out being off to the inside of the lane (which causes disqualification)
  - Must run towards the middle or outside of the lane to allow the trail leg to clear over the hurdle



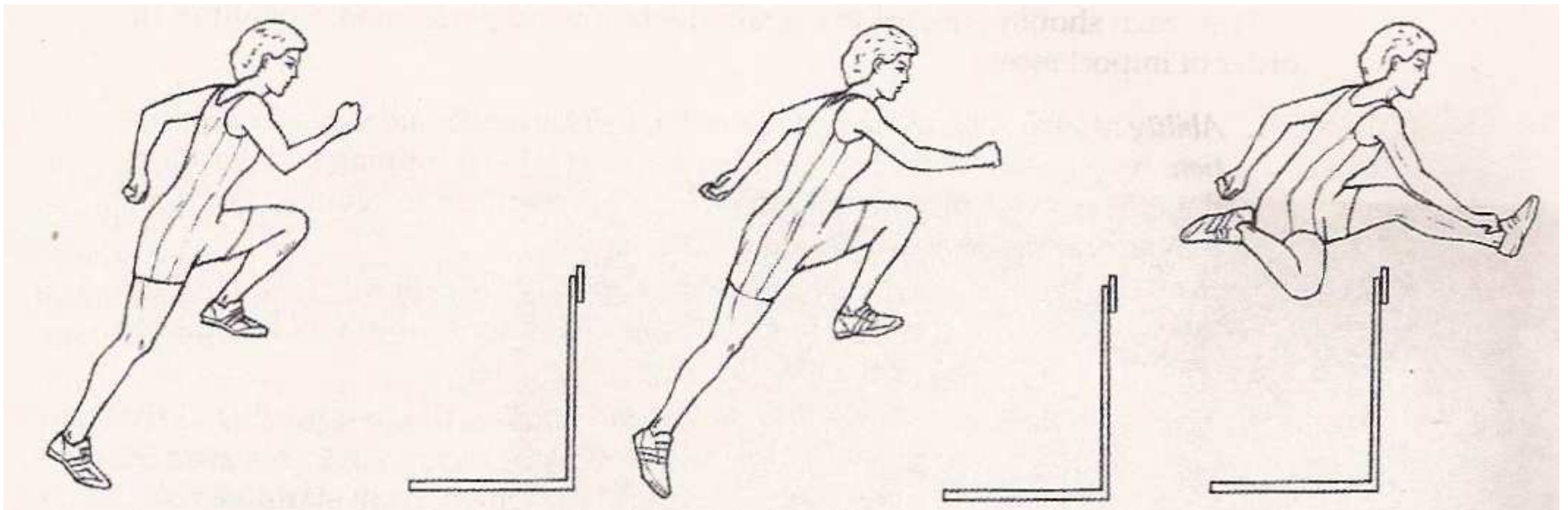


# Takeoff

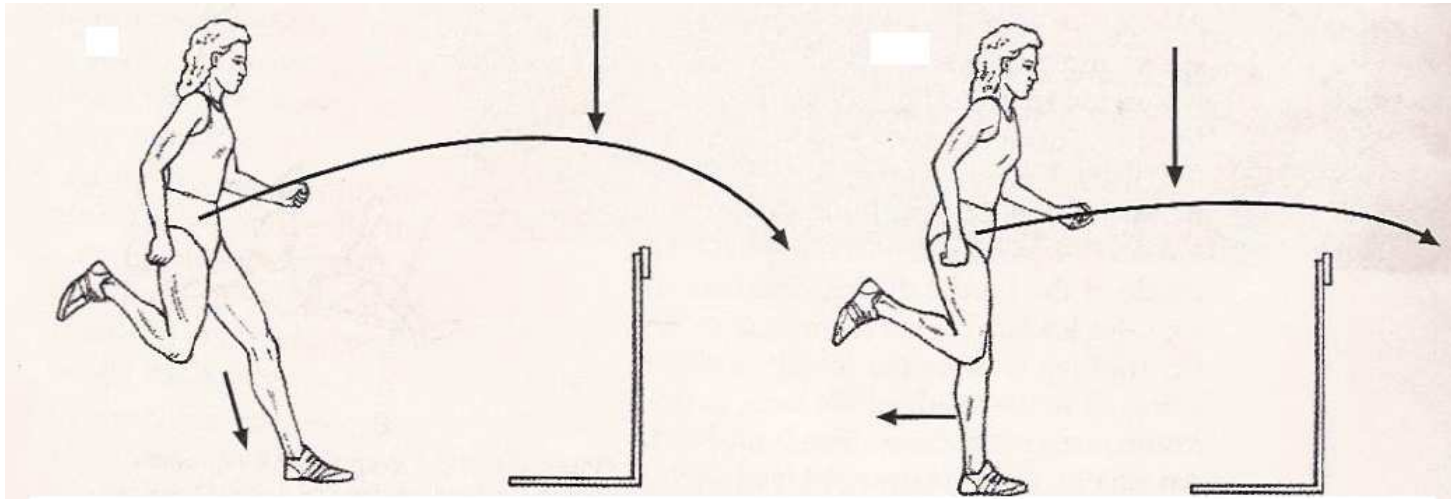


# Takeoff

- Must lead with the knee, NOT the foot
- Stay aggressive and sprint through the hurdle.



# Takeoff



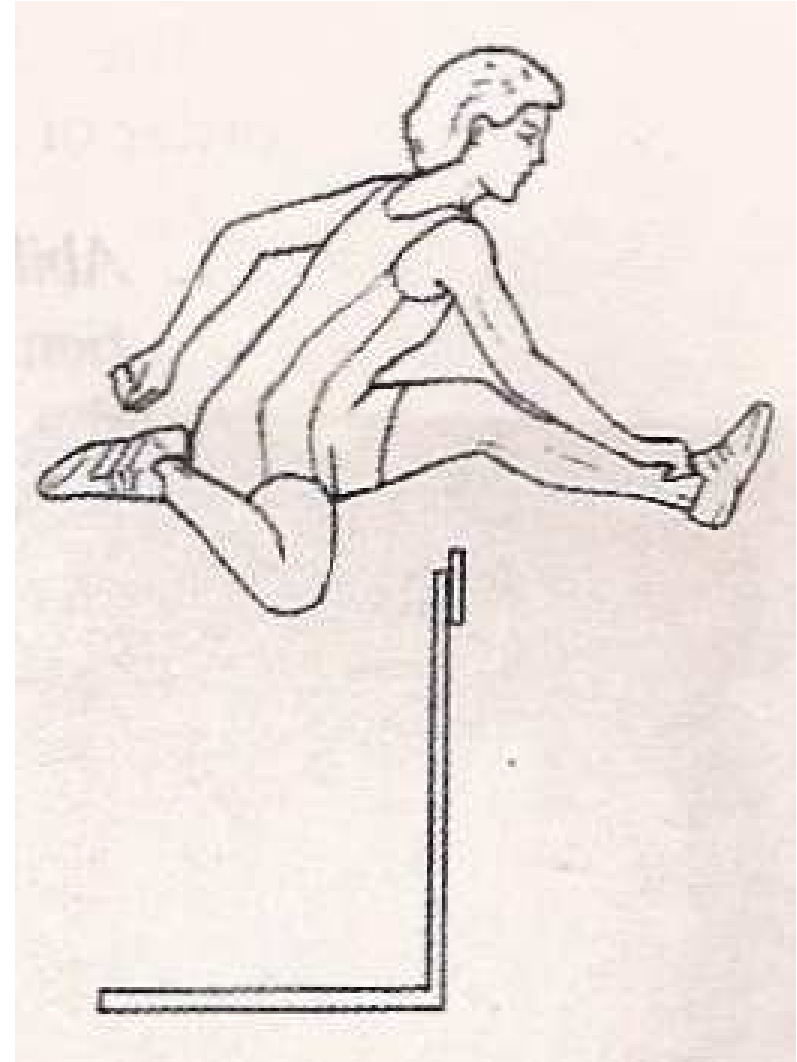
- **Active Landing**-will shorten the last stride which will prevent planting or breaking.
- **“Cut Step”**-will be about 1.9-2.0m from the hurdle.

# Hurdle Clearance

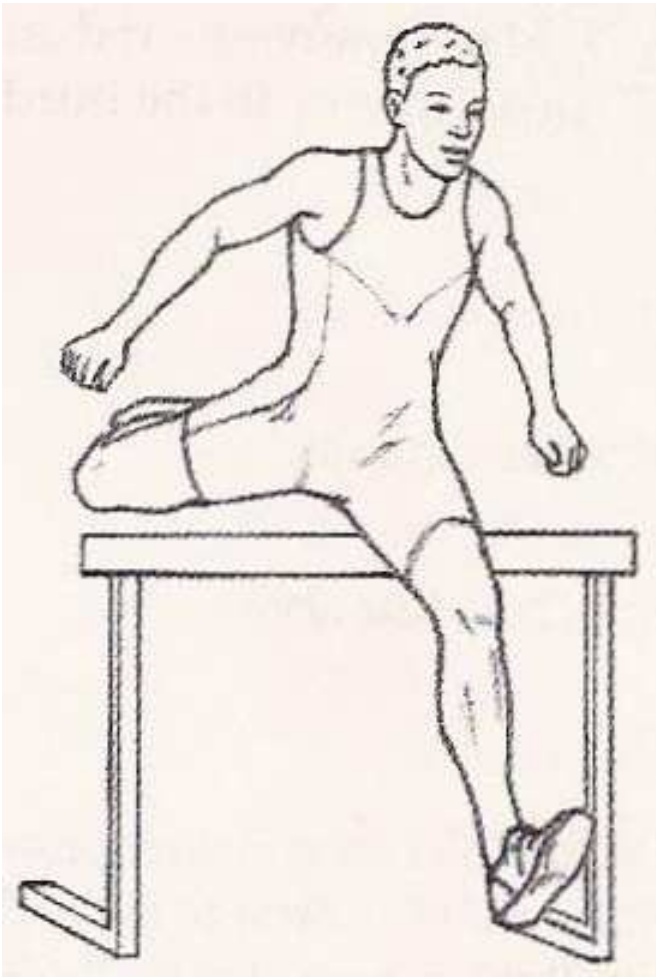


# Hurdle Clearance

- Lower hurdle height than the sprint hurdles requires less body lean over the hurdle
- Parabolic flight of the hurdler's COM doesn't deviate from normal sprinting action as much as high hurdler's.



# Hurdle Clearance



- 400m hurdler doesn't need to be as aggressive in "snapping" lead leg back to the ground.
- Complete recovery of trail leg ensures an active landing of lead leg.

# Racing

- Must have a good sense of pace.
- Must understand the race plan and stride pattern.
- Staggered start may make it difficult for runner to gauge position.
- Race pressures and sense of panic can disrupt the planned stride pattern.



# Racing

Pace Judgement-1st 1/2 of race run 2 seconds faster than 2nd 1/2.

Take split at hurdle 5 and add 1.8-2 seconds. This yields 200m time.

- *Take the athlete's best 200m and add 2.5" to it. This yields a target time for first 200m.*
- *Then take target time and add 3.0" for the finish time.*
  - *-There should not be a difference between the 200's larger than 5%.*
  - *The 4th hurdle is at 150m or 3/8 of the race. The touchdown time at this hurdle is a valuable indicator of the distribution of effort during the early stages of the race.*





# Racing

- 1st 4 Hurdles-Can mark the takeoff for the first 4 hurdles (put down cones & tape mark-- then just cones-- eventually remove the mark completely.)
- There should be no deceleration over these hurdles-even splits.
  - Differentials of .20 or greater constitute a problem. May need to change down or correct form problem. (Example: 4.38-4.48 is ok. 4.38-4.58 is a problem.)



# 400m Hurdle Split Chart

	50-51	52.0	53.0	54.0	55.0	60.0	61.0	62.0	63.0	64.0
Time at Landing after 1st Hurdle	6.0 Dif- ference	6.1 Dif- ference	6.3 Dif- ference	6.4 Dif- ference	6.5 Dif- ference	6.8 Dif- ference	6.9 Dif- ference	7.0 Dif- ference	7.0 Dif- ference	7.1 Dif- ference
2nd Hurdle	10.2 4.2	10.4 4.3	10.7 4.4	10.9 4.5	11.0 4.5	11.5 4.7	11.7 4.8	11.9 4.9	11.9 4.9	12.0 4.9
3rd Hurd	14.4 4.2	14.7 4.3	15.1 4.4	15.4 4.5	15.5 4.5	16.2 4.7	16.5 4.8	16.8 4.9	16.9 5.0	17.0 5.0
4th Hurdle	18.6 4.2	19.0 4.3	19.5 4.4	19.9 4.5	20.1 4.6	20.9 4.8	21.4 4.9	21.8 5.0	22.1 5.2	22.2 5.2
5th Hurd	22.8 4.2	23.3 4.3	23.9 4.4	24.4 4.5	24.7 4.6	25.9 5.0	26.5 5.1	27.0 5.2	27.4 5.3	27.6 5.4
6th Hurd	27.1 4.3	27.7 4.4	28.4 4.5	29.0 4.6	29.4 4.7	31.1 5.2	31.7 5.2	32.3 5.3	32.8 5.4	33.1 5.5
7th Hurd	31.5 4.4	32.2 4.5	32.9 4.5	33.7 4.7	34.2 4.8	36.5 5.4	37.2 5.5	37.8 5.5	38.4 5.6	38.9 5.8
8th Hurd	35.9 4.4	36.8 4.6	37.6 4.7	38.5 4.8	39.1 4.9	42.0 5.5	42.8 5.6	43.5 5.7	44.2 5.8	44.9 6.0
9th Hurd	40.4 4.5	41.6 4.8	42.5 4.9	43.4 4.9	44.1 5.0	47.7 5.7	48.6 5.8	49.5 6.0	50.2 6.0	51.0 6.1
10th Hurdle	45.1 4.7	46.5 4.9	47.5 5.0	48.4 5.0	49.2 5.1	53.7 6.0	54.7 6.1	55.6 6.1	56.4 6.2	57.4 6.4
Total Time	50.5 5.4	52.0 5.5	53.0 5.5	54.0 5.6	55.0 5.8	60.5 6.8	61.6 6.9	62.6 7.0	63.5 7.1	64.7 7.3

# Racing

- Establish stride pattern as part of the race plan for the 400 hurdles.
- 13-17 steps taken between the hurdles.
  - Stronger athletes may take fewer steps
  - All normally take more steps between hurdles later in race
  - Plan suited for individual athlete (flexible)



# Racing

## *Stride length*

- 17 strides require 6'1"
- 16 strides require 6'6"
- 15 strides require 7'0"
- 14 strides require 7'6"
- 13 strides require 8'0"
- 12 strides require 8'9"

Use talcum powder or sand  
on the track to measure  
stride length

# Racing

Transitions- Hurdle 6-8 (generally speaking, is where the change downs occur.)

- **Single alternate-Example:** Left lead hurdler transitioning from 13 strides to 14 strides, requiring him to alternate legs for the duration of the race.
- **Dual Alternate-Example:** Hurdler leading with left leg & taking 13 strides between would take 14 strides & use a right lead leg, then 14 again to get back to preferred left lead leg, & then finish the race with 15 strides between, taking all remaining hurdles with his left lead leg.
- **Double Cut down**-Used by the inexperienced hurdler who is unable to hurdle with his/her alternate lead leg. *Example:* hurdler is taking 13 strides between hurdles & leading with his/her left lead leg then cuts down to 15 strides between.



# Talaya Owens-2<sup>nd</sup>-58.12 movie

- Example of a right leg lead.



# Teaching/Training Guidelines for the Hurdles

- Biomotor quality development is essential to improving hurdle performance.
  - speed related qualities
  - strength, power,
  - flexibility, and mobility



# Teaching/Training Guidelines for the 400 Meter Hurdles

- The 400 hurdles pose unique demands.
  - Training will resemble 100 or 110 program
  - Training will resemble 400 or 800 meter program.
- Endurance abilities are important
  - BUT do not ignore the development of:
    - acceleration ability
    - absolute speed
    - power





# Teaching/Training Guidelines for the 400 Meter Hurdles

- Split the race at each hurdle.
  - **Touchdown times.**
    - Diagnosis of problems and in performance prediction.



# Teaching/Training Guidelines for the 400 Meter Hurdles

- Some training should be done over barriers, so that certain segments of the race are rehearsed.
- Additional hurdle work should be done to improve hurdle technique. **BOTH LEGS**



# Progressions for the Approach to the First Hurdle

- Approaches from the Crouch Start
- Cheated Approaches (7 step drill)
- Stick Drill Approaches
- Approaches from Blocks



# 7 Stride Drill

- Hurdles are set so that the same stride length that is required to run 15-17 strides is used in seven or nine strides.

- Example:**

<u>Distance between hurdles</u>			<u>Touchdown Distance</u>		<u># of strides used in the race</u>
35m	-		3m =32	/	15 = 2.13 x
<u># of strides you want to use in practice</u>			<u>Touchdown Distance</u>		<u>Distance between hurdles in practice</u>
7 = 14.91	+		3m =		17.91m



# Progressions for Between-Hurdles Running

- Cheated Hurdling
- 10 Step Hurdling
- Alternate Lead Leg Hurdling



# Progressions for the Hurdle Takeoff

- The Wall Drill
- Cheated Hurdling
- Alternate Lead Leg Hurdling



# Progressions for the Hurdle Clearance

- Hurdle Walkovers
- Hurdle Skipovers
- Cheated Hurdling
- 5 Step Hurdling with each leg
- Alternate Lead Leg (4 Step) Hurdling

