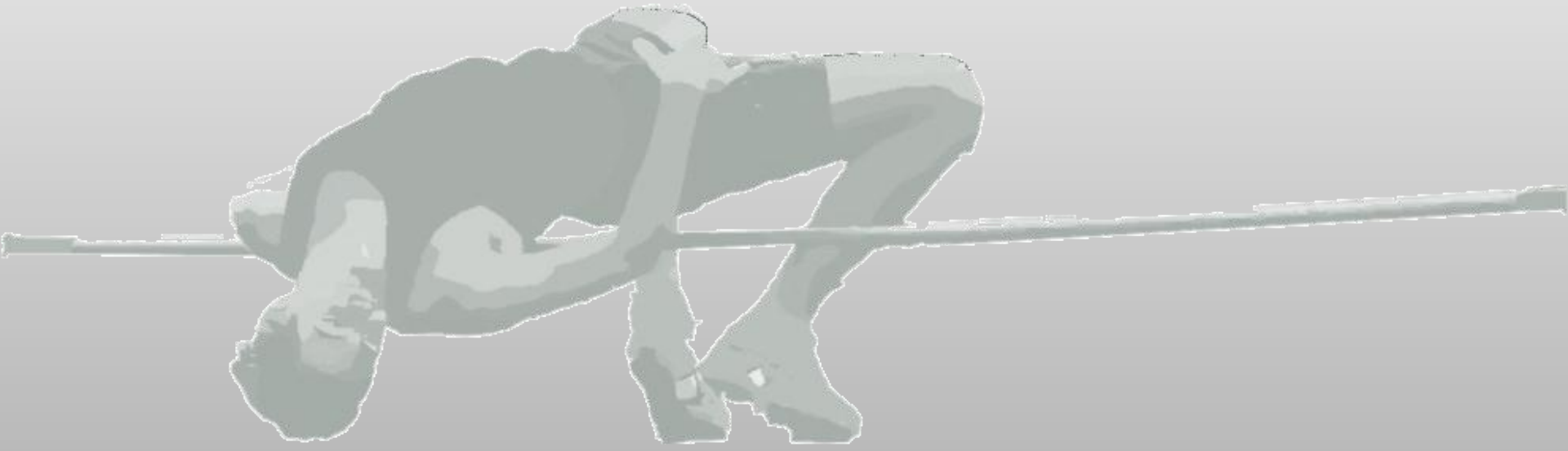
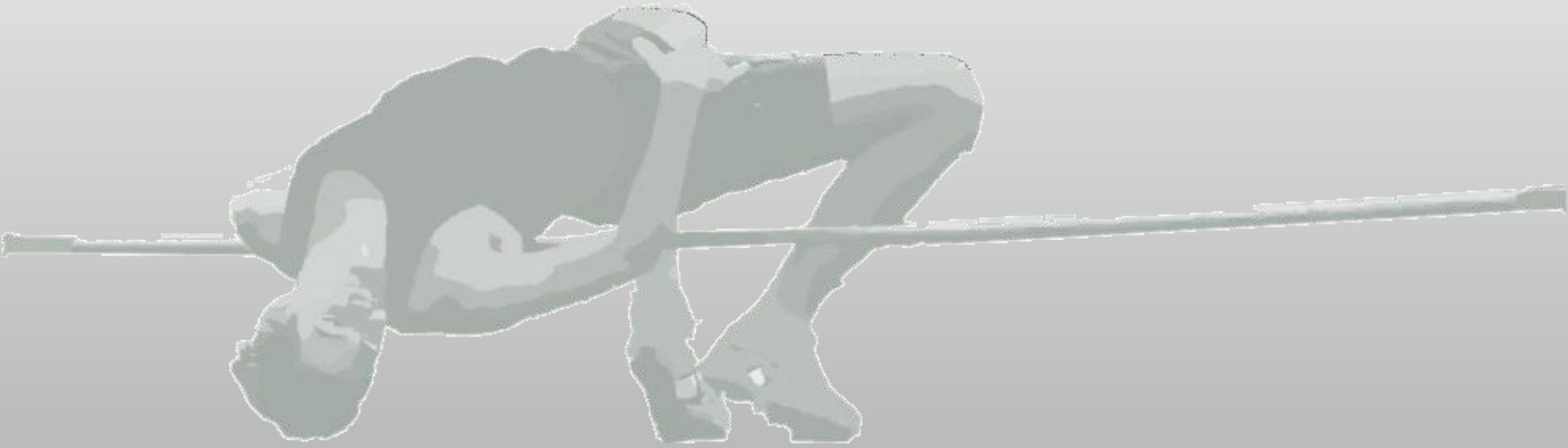
SESSION 1: HIGH JUMP TECHNIQUE AND TECHNIQUE TRAINING

Matt Burns



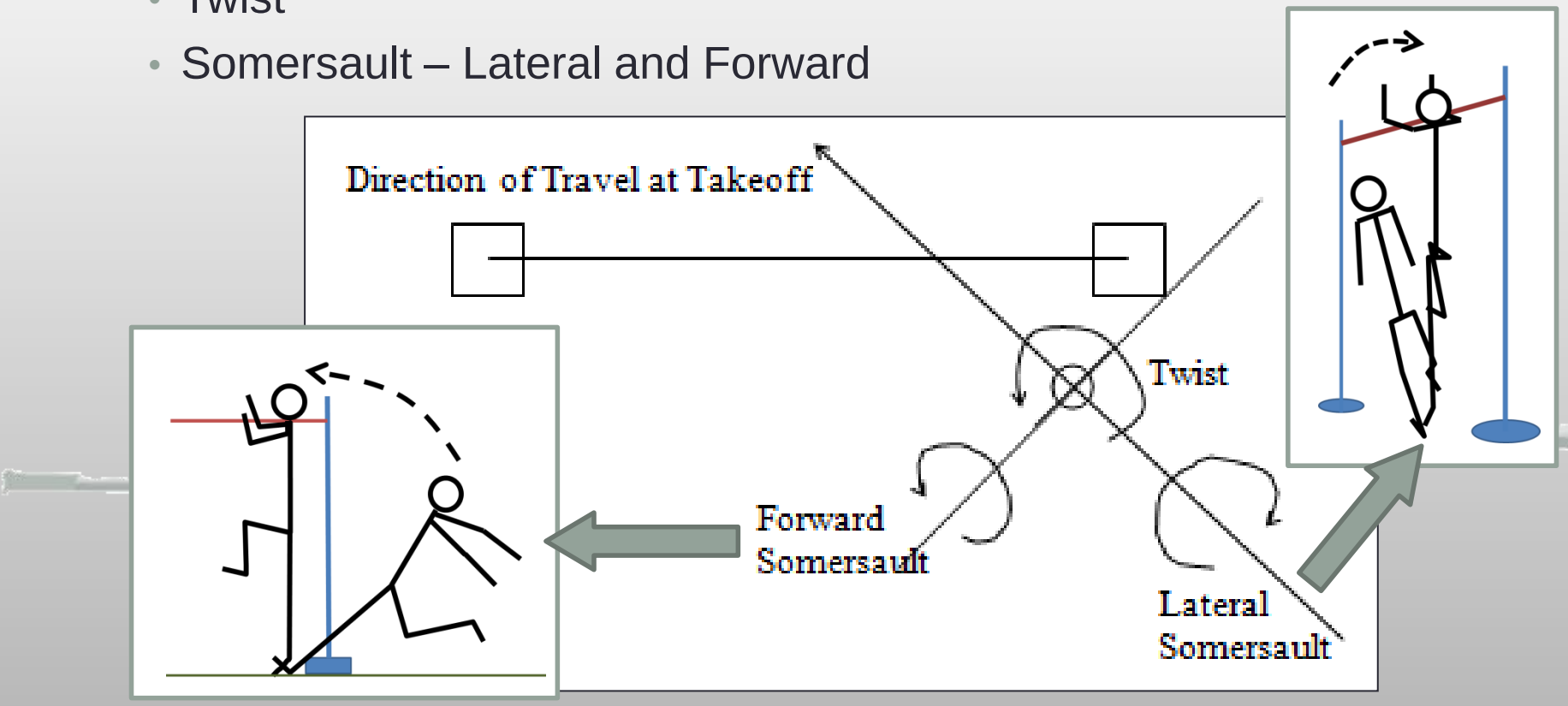
Overview

- Physics Behind the High Jump
- Approach, Takeoff, and Bar Clearance
- Deciding What's Important in a Jump (to change or not to change)
- Training/Practice



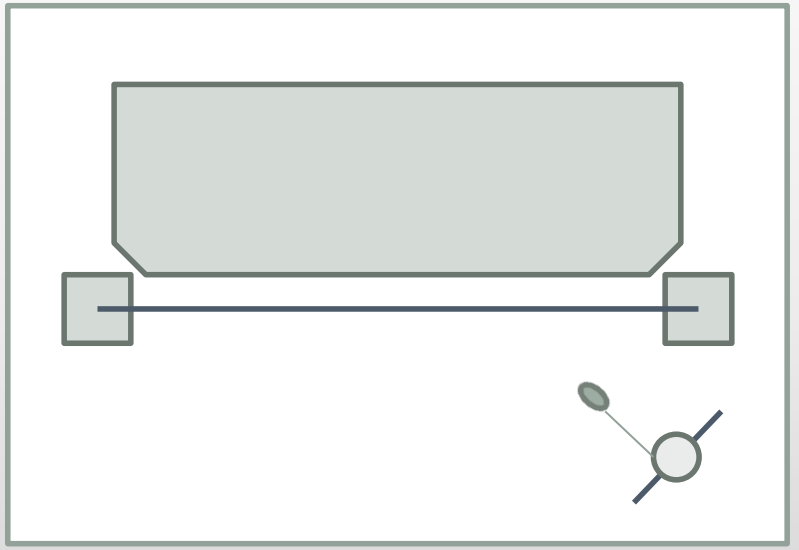
High Jump Physics

- Rotations are all created from the approach and takeoff. No rotations can be created after takeoff.
  - Twist
  - Somersault – Lateral and Forward

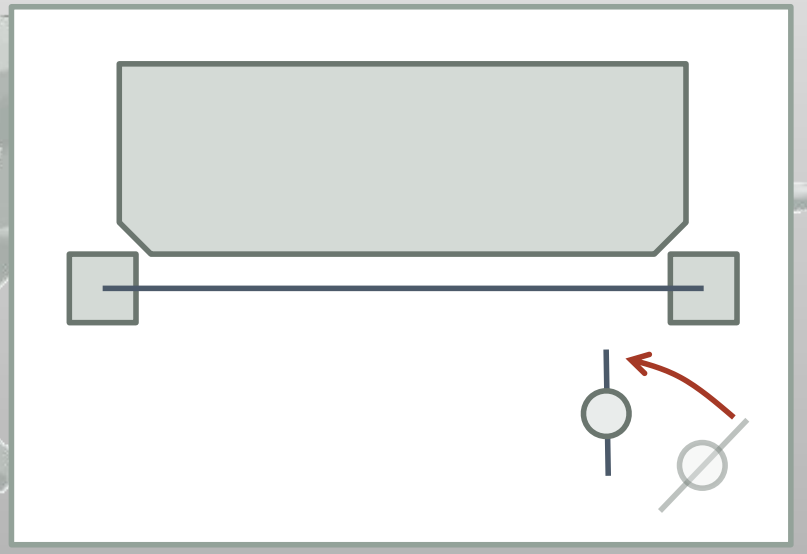


Positions In the Jump

1. **Takeoff Foot Plant**
Takeoff foot and shoulders at 30° to 45° to bar.



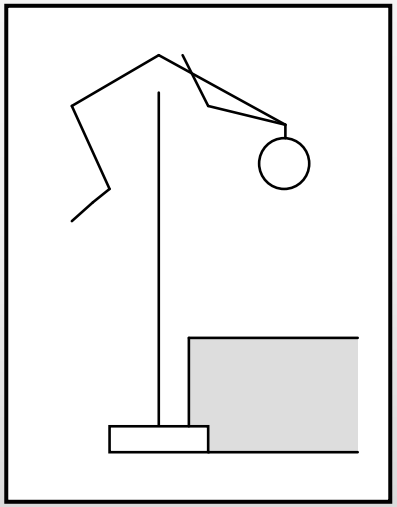
2. **Takeoff**
Shoulders rotated to 90° to bar and lead knee driven parallel or slightly away from bar to generate the needed twist rotation.



Positions In the Jump

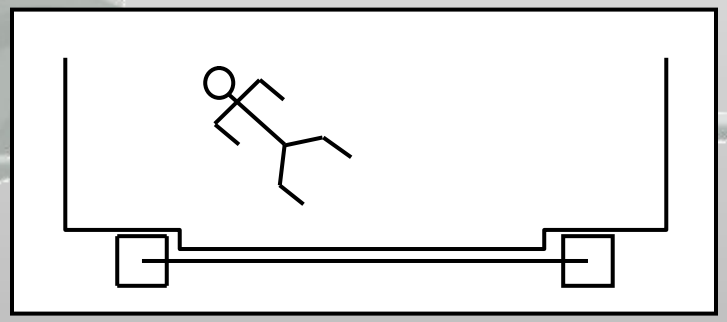
3. Layout

Head/feet below bar. If executed ideally, the center of gravity will pass below the bar.



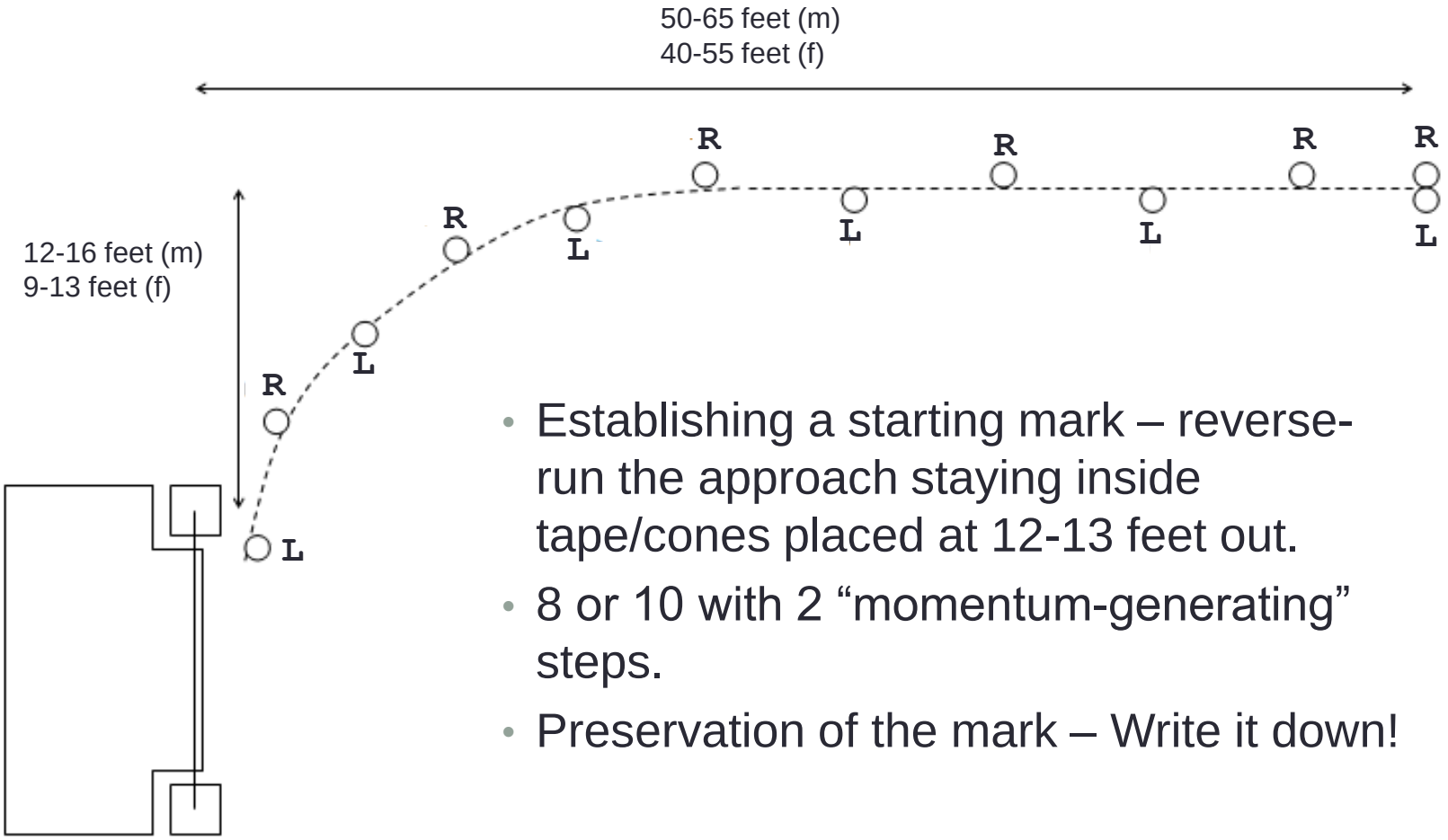
4. Landing

Shoulders should hit mat first with back facing takeoff spot.



Approach

Goal: Place the jumper in the same spot relative to the bar with the same body leans and at the same speed on every repetition.



- Establishing a starting mark – reverse-run the approach staying inside tape/cones placed at 12-13 feet out.
- 8 or 10 with 2 “momentum-generating” steps.
- Preservation of the mark – Write it down!

Foot-plant and Takeoff

- Vertically*
- Takeoff leg (plant leg) experiences very little flexion
- Lead leg driven parallel to or *slightly* away from the bar
- Arms driven parallel to or *slightly* away from the bar

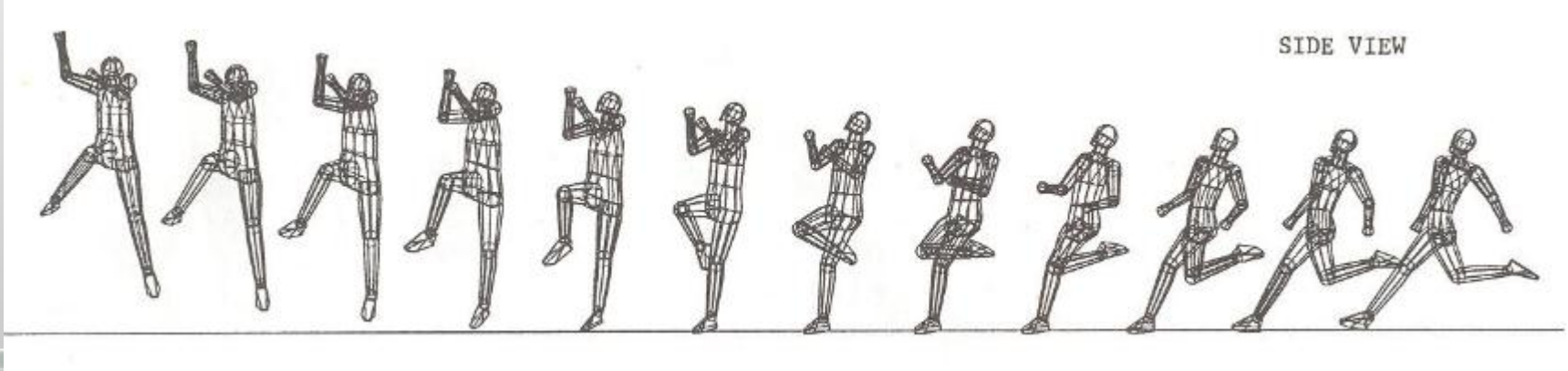
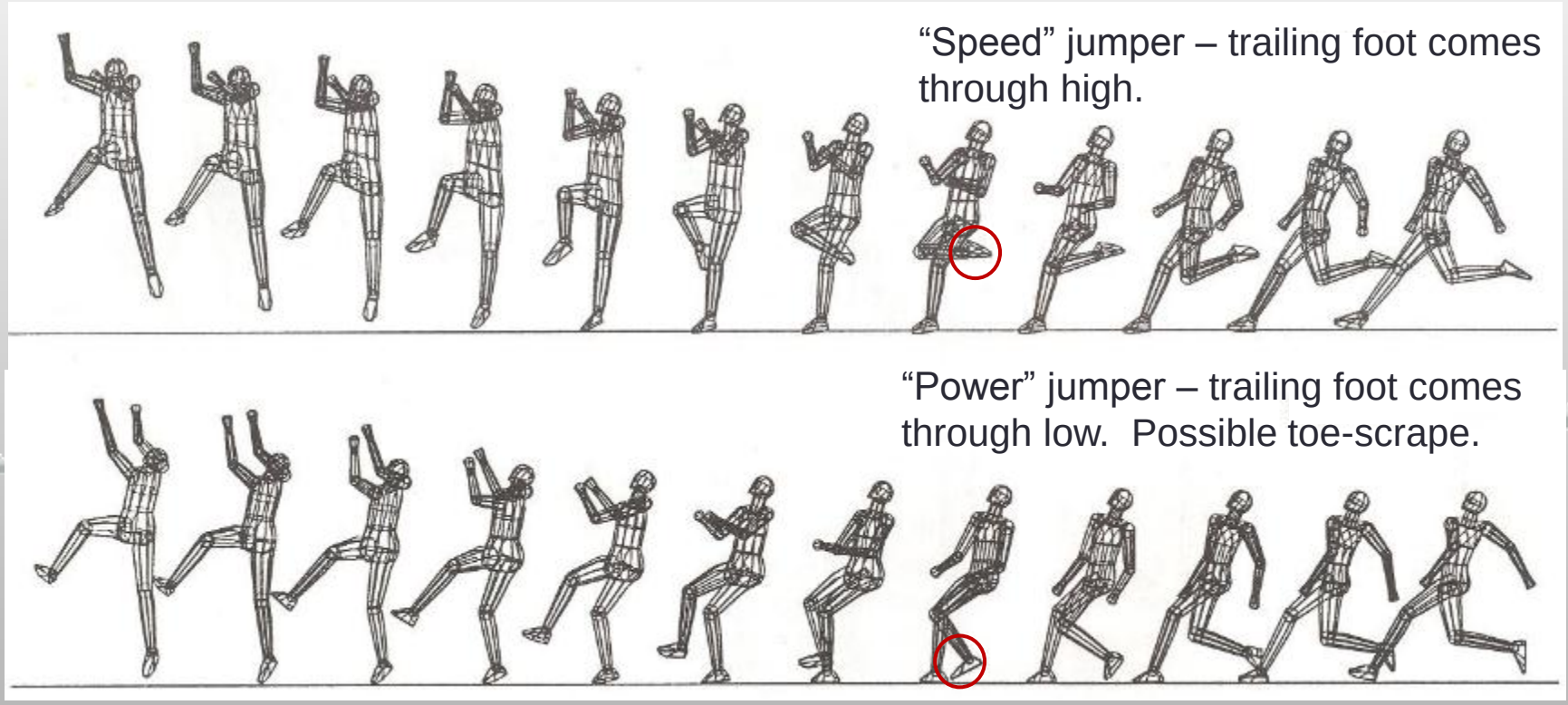


Image from: Dapena, Jesus. “The Rotation Over the Bar in the Fosbury-Flop High Jump.”

*The queue to the jumper is to takeoff vertically, but in reality the takeoff is 10-20 degrees beyond vertical.

Approach Speed at Takeoff

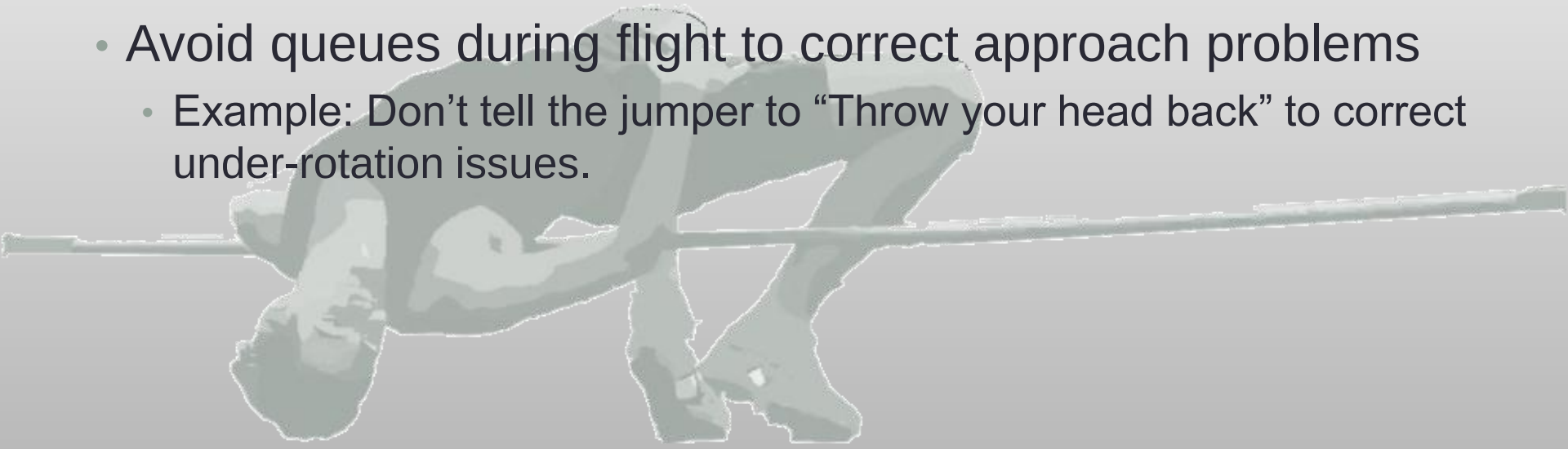
- Regardless of whether a jumper is a “speed” or “power” flopper, a faster jumper is a higher jumper… up to a failure point. Find the failure point!



Images from: Dapena, Jesus. “The Rotation Over the Bar in the Fosbury-Flop High Jump.”

Flight Phase & Bar Clearance

- Goals
  - Keep everything (arms, legs, hands, head) out of the way of the bar.
  - Keep everything close to the axis of rotation to speed up rotations.
- “Let it happen.” Very little can be done at this stage to save a bad approach or takeoff.
- Avoid queues during flight to correct approach problems
  - Example: Don’t tell the jumper to “Throw your head back” to correct under-rotation issues.



Deciding What's Important - *Primary Importance*

- Consistent approach velocity and cadence.
- Maximized approach velocity.
- Proper and consistent takeoff location.
- Correct body-position (leans) at takeoff foot plant.
- Correct takeoff position (knee-up, shoulders at 90° to bar).
- Proper landing position (indicates correct rotations).

Deciding What's Important - *Secondary Importance*

- Head position during layout
  - High bars can be cleared with your head up

Dick Fosbury

Dwight Stones - 1983

Deciding What's Important - *Secondary Importance*

- Arm Position during layout

There is considerable variance among the best jumpers in the world. Important thing is to keep the arms away from the bar.


Kostadinova


Stefan Holm


Matt Hemingway 2000

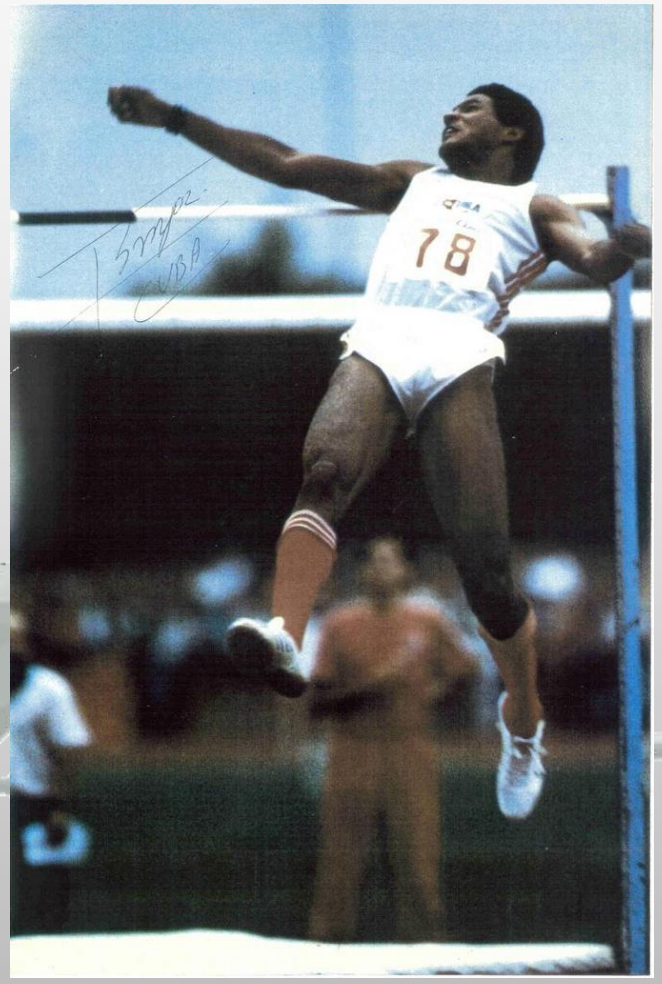

MH 2004


Sotomayor 1989

Deciding What's Important - *Secondary Importance*

- Lead knee action during ascent – straight vs. bent. (straight legs slow rotation)

Blanka Vlasic

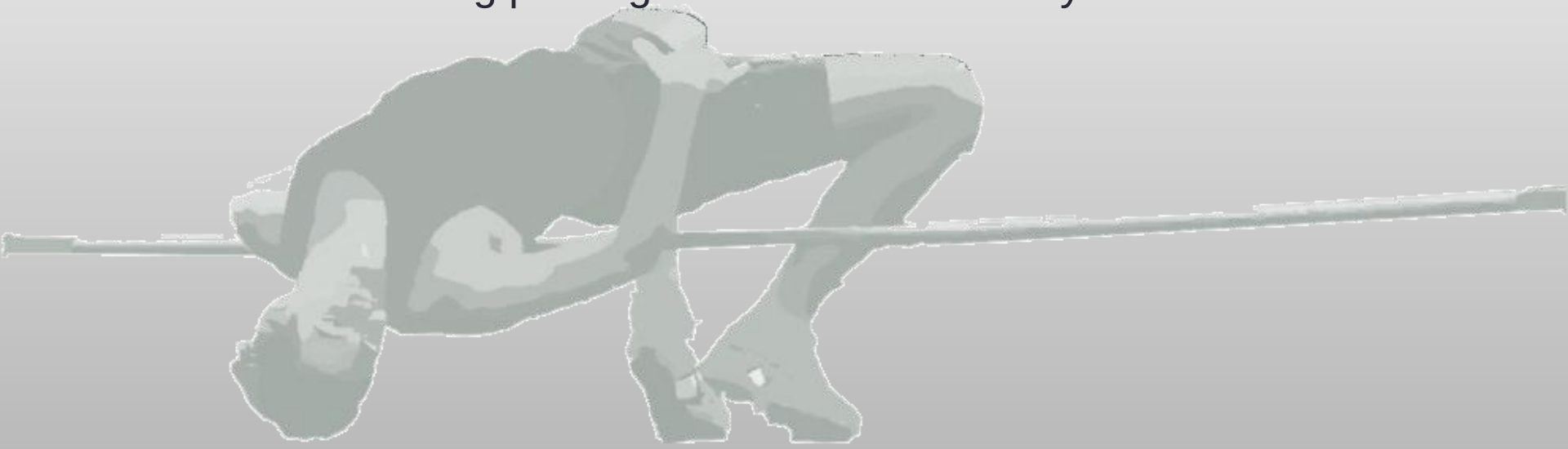


Sotomayor

Deciding What's Important - *Not Important*

- Arm drive technique – Athletes have succeeded with all three common varieties.
  - Double Arm
  - Single Arm
  - Cyclic

  It is important to have some consistent arm drive technique, but I have seen nothing proving one is better than any other.



Approach Training

- The execution of a consistent, correct approach is the single most important task in the event.
  - In competition, an approach that ends with a “go around” is unacceptable.
- Approach work must be the start of *every* practice that involves high jumping.

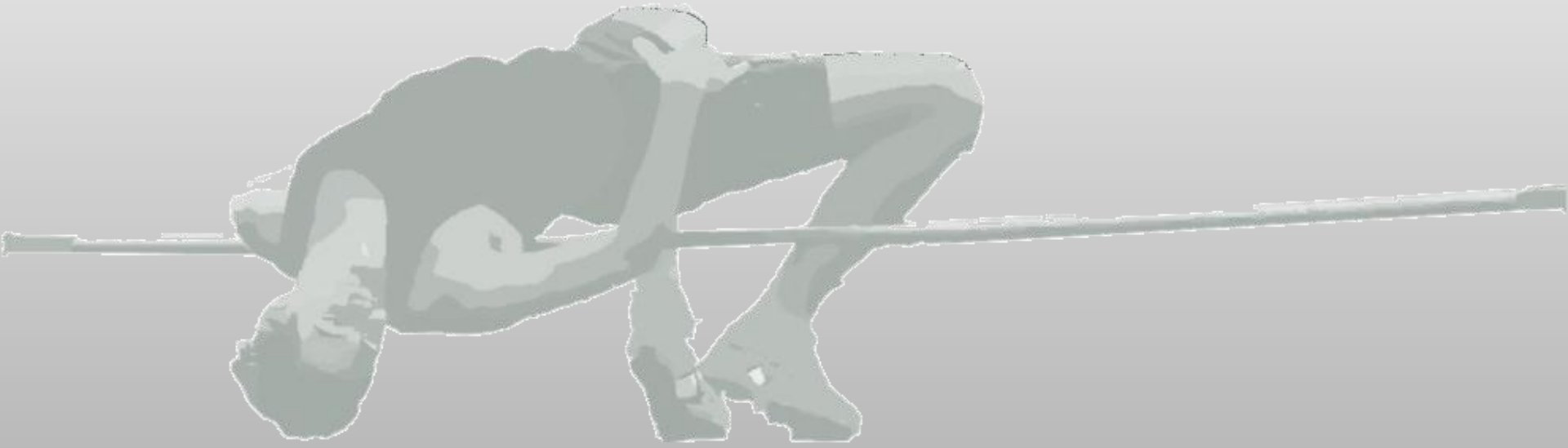
A practice approach is a full approach but instead of attempting a jump, the athlete pops up under the bar placed at a high (goal?) height.

Approach Training (Cont.)

- Approach work is not a warm-up for the jump workout. It should be watched and analyzed by the coach as much as any jumping is. Look for:
  - Good running technique.
  - Running along the curve – no cutting.
  - Accelerating into the takeoff foot-plant.
  - Consistency in takeoff foot position and coaching mark.

Approach Training (Cont.)

- Common mistakes during approach work
  - Failing to attack the curve (lazy, slow)
  - Failing to prepare properly (should be the same as if the athlete was jumping). Visualize a successful approach.
  - Popping up and landing on the ground in front of the bar instead of running under the bar.

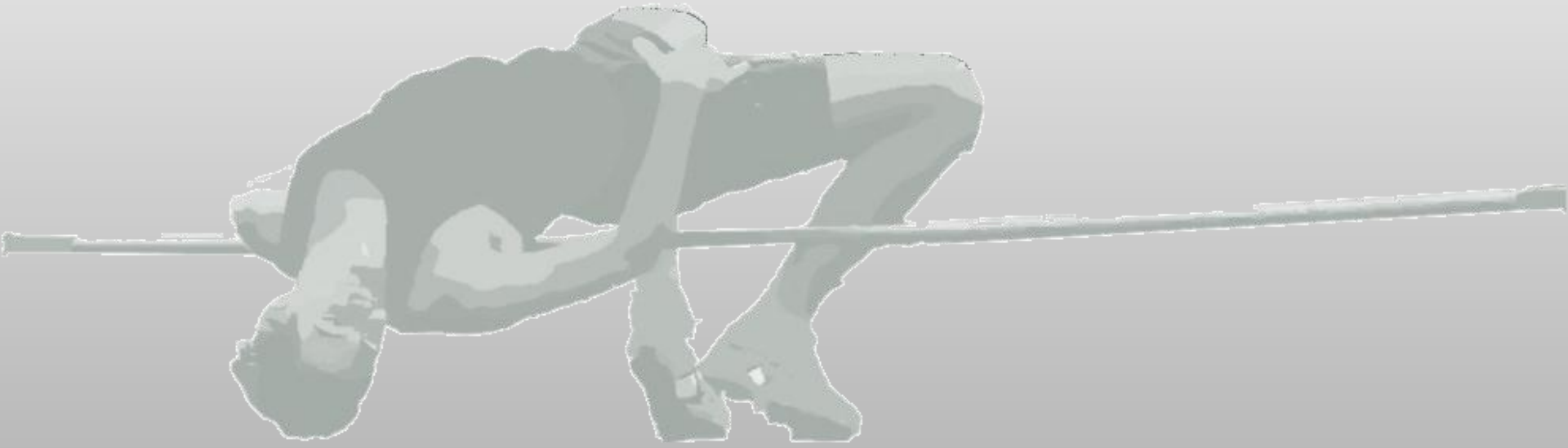


Coaching Marks in Practice

- At the starting point, 8 or 10 steps from take-off. Ideally, the athlete will take a couple lead-in steps to this mark.
- Optional if needed:
  - 4 steps from the take-off – interim checkpoint for the athlete/coach. NOT a “cut” point.
  - Takeoff – 3-foot strip parallel to bar (practice only)
- Try to avoid overuse of any visual queue that can’t be used in a meet.

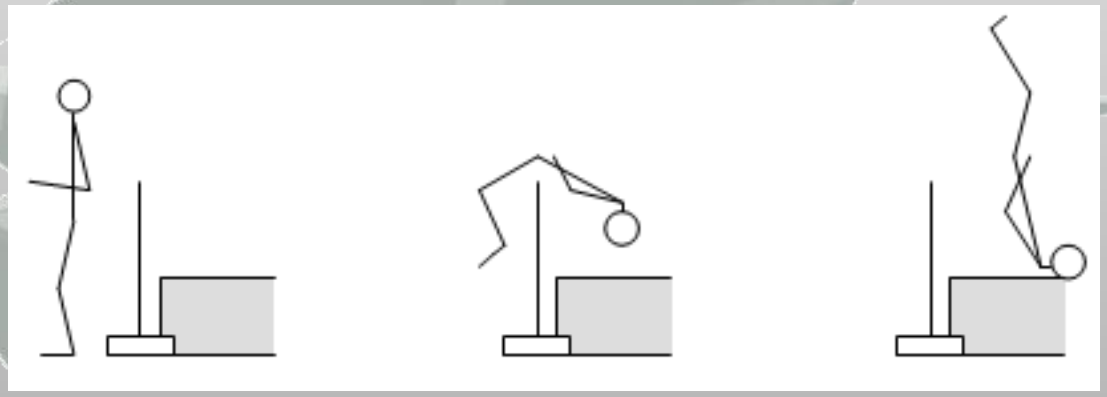
Technique Practice

- Know the goal of the practice and do the appropriate drills
  - Approach deficiency? Then just do approaches w/o jump or w/ scissor jump.
  - Takeoff position problems? Do short approach jumps.
  - Arm/Head positions or bar clearance issues? Do standing back-overs and/or short approach.



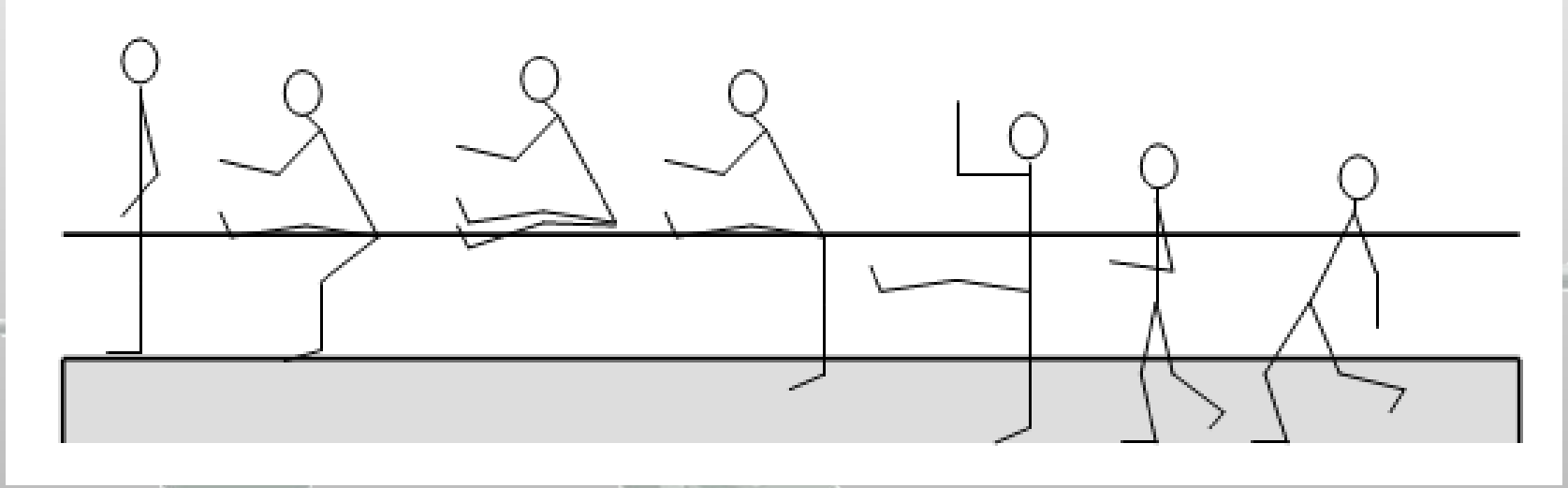
Technique Practice (Cont.)

- Back-Overs
  - Flight position practice (head, arms)
  - Over-exaggerate rotation - athlete should roll over their shoulders in the pit and end on their knees, facing the bar.
  - Negatives – make sure the athlete does not carry these over into the event:
    - Artificially produced rotations by throwing head and arms back and into pit.
    - Jumping into pit.



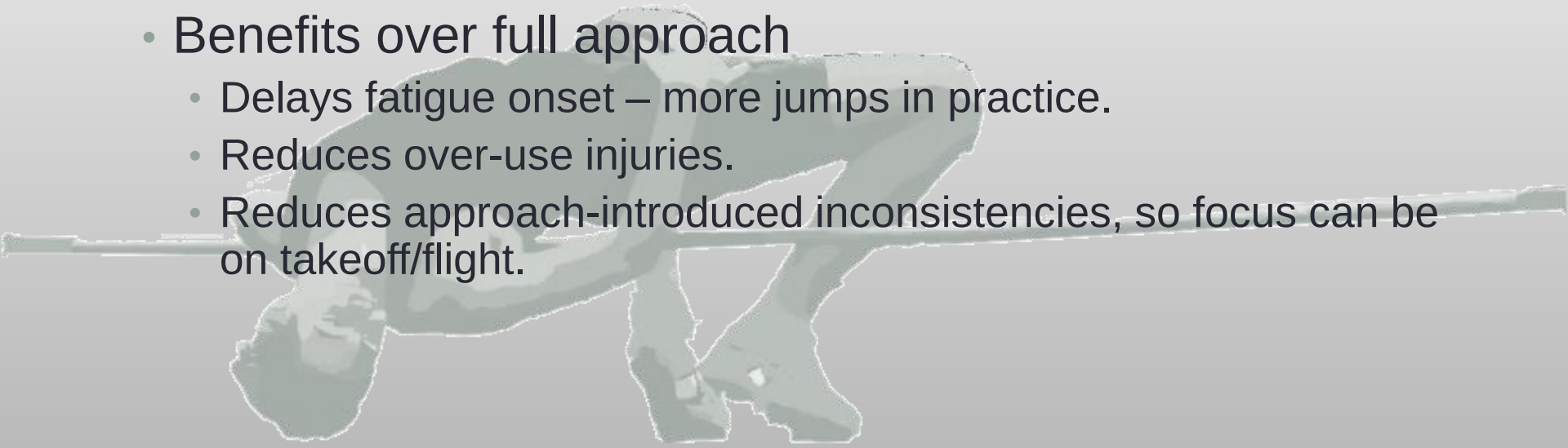
Technique Practice (Cont.)

- Scissor Jumps
  - Good for practicing a genuine full approach with out the pressure/stress of clearing a high bar with a layout.
  - Transitional drill to convert their full approach work into jumping event.



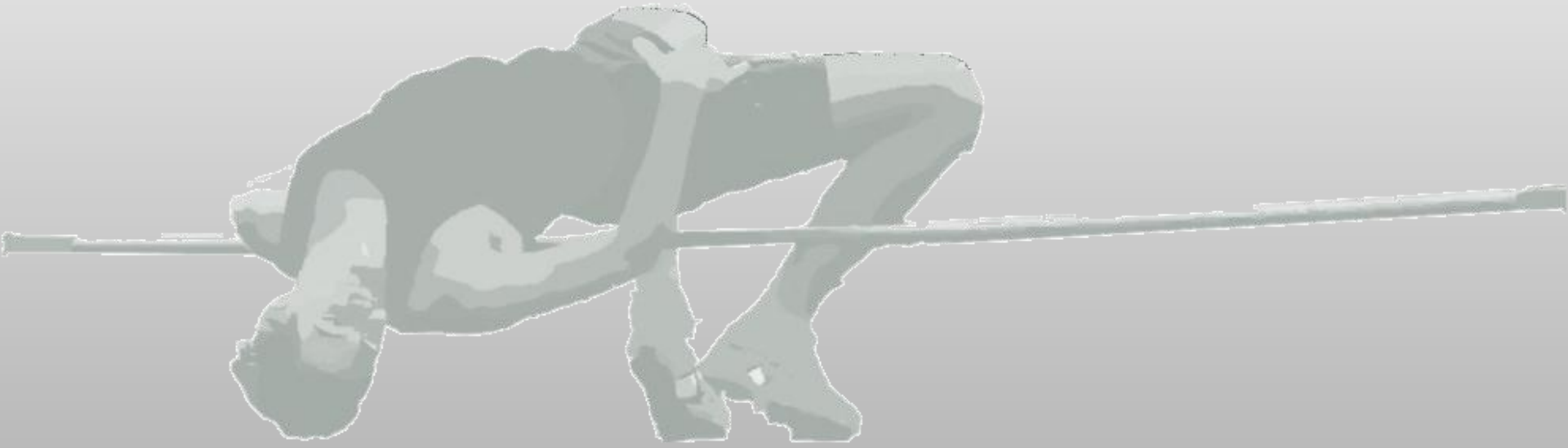
Technique Practice (Cont.)

- Short approach jumps
  - Short approach options
    - “Minnesota” 4-step (running into a 4-step)
    - True 4-step
    - 6-step varieties of above
  - Takeoff, flight, and layout practice
  - Benefits over full approach
    - Delays fatigue onset – more jumps in practice.
    - Reduces over-use injuries.
    - Reduces approach-introduced inconsistencies, so focus can be on takeoff/flight.



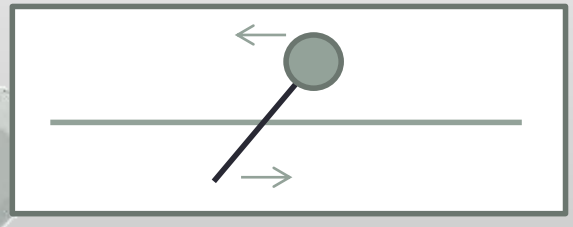
Technique Practice (Cont.)

- Full Approach Jumps
  - Transition what was learned with the short approach into a full speed jump.
  - Competition preparation.
  - Approach refinement.
  - Build confidence in actual event.



Technique Practice (Cont.)

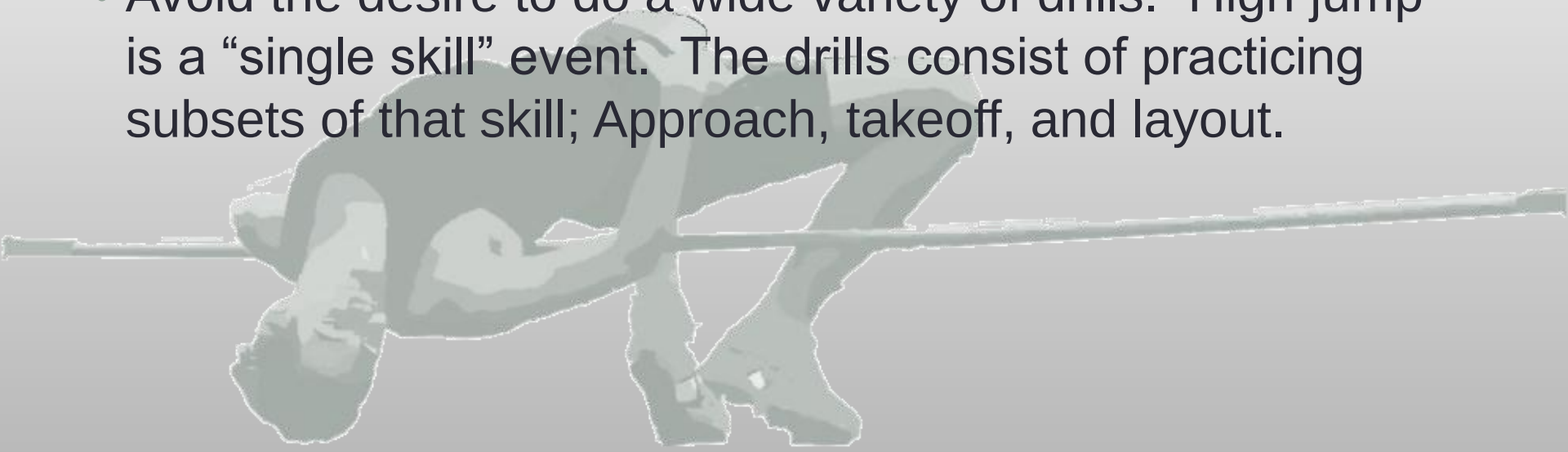
- Common Rotational Problems
  - "Sitting" over the bar.
    - Insufficient somersault - Ensure no cutting on the approach. Ensure J radius is not too large. Ensure approach speed is maximized. Ensure proper leans away from the bar at foot-plant. Last resort is mega-doses of back-overs with the final roll to knees.
  - Body not at 90° to bar during layout .
    - Jumper is throwing head back into the pit.
    - Little to no backward lean when take-off foot is planted.



  - Hip closest to the bar at takeoff is lower than the other while clearing bar.
    - Increase twist rotation – Drive the lead knee up and to the bar height on a parallel-to-bar trajectory or drive the knee slightly more away from the bar.

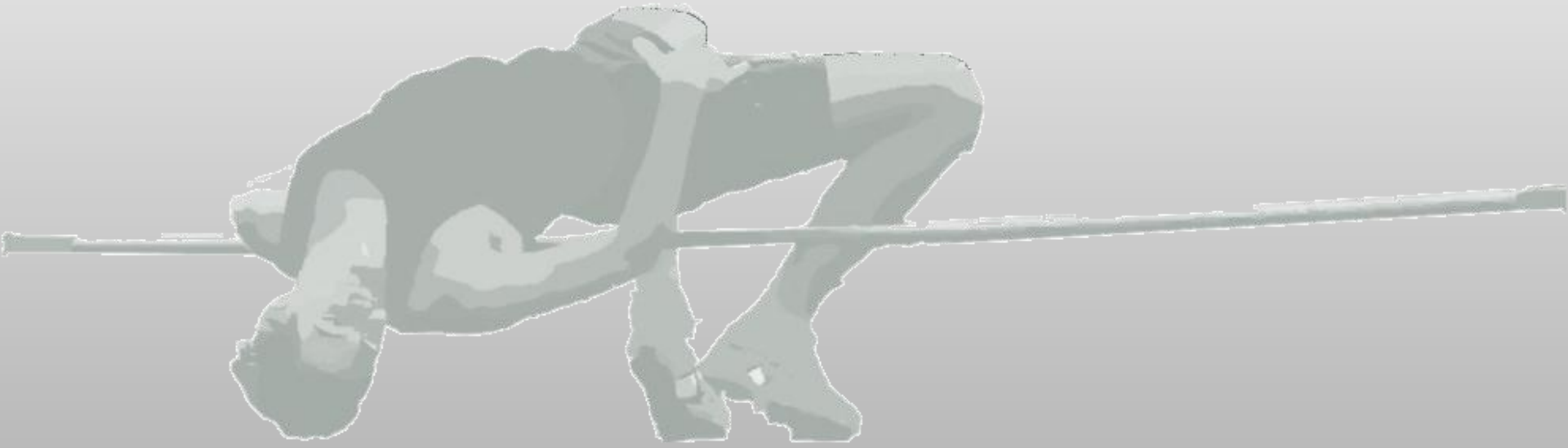
HJ Practice – Common Mistakes

- Repetition of jumps simply for the sake of repetition. Every jump should have a purpose/focus, which is likely different per athlete.
- Jumping too many days/week. Maximum should be 3 days, *including the meet*.
- Avoid the desire to do a wide variety of drills. High jump is a “single skill” event. The drills consist of practicing subsets of that skill; Approach, takeoff, and layout.



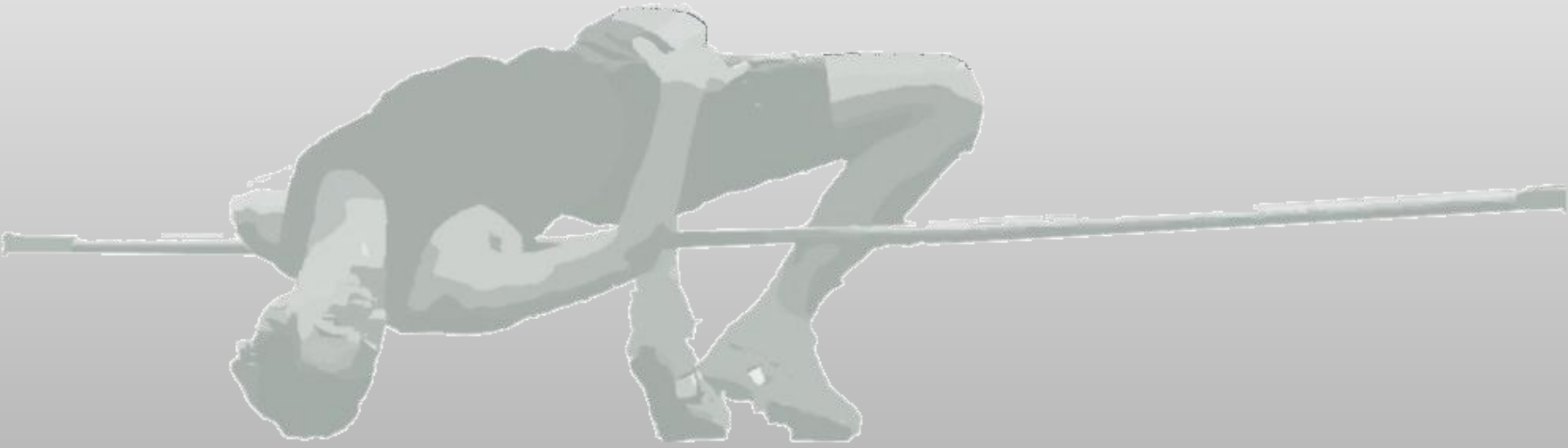
Paralysis of Analysis

- When the athlete is given too many queues – complete failure.
- Per jump: 2 Queues is usually 1 too many.
- Per practice: Focus on one, maybe two, things per jumper per practice.



Video Analysis

- Important that athletes SEE themselves jump.
  - I have explained something to an athlete for weeks without success, only to have them say “Oh, now I see what your talking about” after showing them a 10 second video of themselves just once.

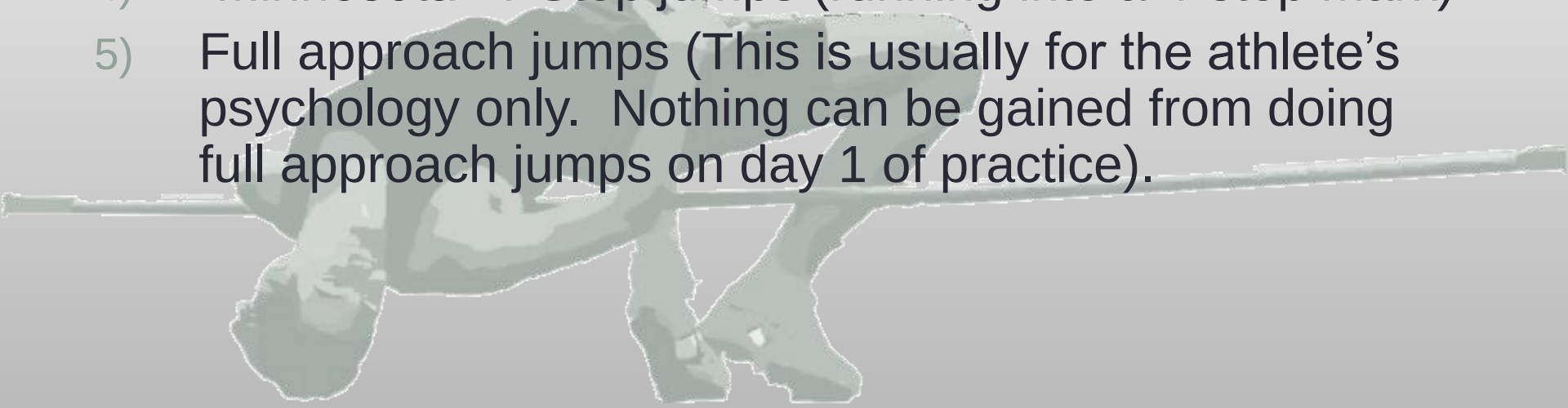


Where to Get More Information – *HJ Technique*

- Jacoby, Ed and Bob Fraley. Complete Book of Jumps. Human Kinetics, 1995.
  - Good Overview/Starter
- Dapena, Jesus. "The Rotation Over the Bar in the Fosbury-Flop High Jump." Track Coach, Vol. 132, 1995. 4201-4209.
  - Available free at http://www.coachr.org/rotation.htm
- Dapena, Jesus. "Biomechanical Studies in the High Jump and the Implications to Coaching." Track & Field Quarterly Review, Vol. 92, No. 4, Winter 1992.
  - Available free online. Google the article title (path too lengthy).
- Martin, David E. The High Jump Book. Tafnews Press, 1982.
  - Excellent book for an advanced athlete

High Jump Practice – First Day of Season

1) Full approach work. It gives them an idea of what the goal is and what the final jump will look like w/o the difficulty of actually jumping.
2) Full approach scissor jumps – very low bar.
3) Standing back-overs. Finishes the jump w/o the variability of the approach.
4) “Minnesota” 4-Step jumps (running into a 4-step mark)
5) Full approach jumps (This is usually for the athlete’s psychology only. Nothing can be gained from doing full approach jumps on day 1 of practice).



High Jump Practice – Subsequent Days

1. 10x full approaches – ALL HJ practices start with 10 good quality full approaches at a high bar with a light pop-up off the takeoff foot with the jumper going under the bar into the pit.
2. 5x back-overs – A back-over is only successful if the jumper lands on their upper back/shoulders and backward-rolls over to knees in the pit. This forces them to emphasize the rotation.
3. 4 step jumps or full approach – 4-step if working on takeoff or body positions in the air. The latter if working on approach speed or curve run or looking to gain confidence.