

# High Jump Technique and Training

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### **Notes**

The contents of this document are meant to be supporting text to a verbal presentation. The text does not contain all of the information that is presented, but is to act as a reminder of the general concepts taught during each of the sessions. This document can be downloaded from <http://www.mjtrekkers.com/mbhj>. Any questions or comments should be directed to the author/presenter at [mjtrekkers@gmail.com](mailto:mjtrekkers@gmail.com).

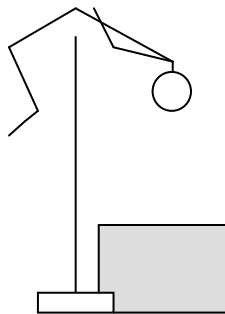
## Chapter I. Technique and Approach

### The Physics Behind the High Jump

To understand the high jump and what an athlete must do to successfully train for and execute a jump relies on a fundamental understanding of the physics that are in play during the jump. The high jump relies on the concepts of angular momentum perhaps more than any other track and field event, so I will take some time to go over these concepts. They can be presented with an incredible amount of complexity. I've seen papers on high jump technique written that are sprinkled with variables, formulas, and the most technical of physics terms. I will attempt to present the technique in a more understandable way using the language of English instead of mathematics.

#### The Goal

The goal is that the athlete has their back completely to the bar at the peak of their jump, and that their feet and head droop over the bar as their hips clear the height. This is often termed the arch or layout.



#### The Rotating Jumper

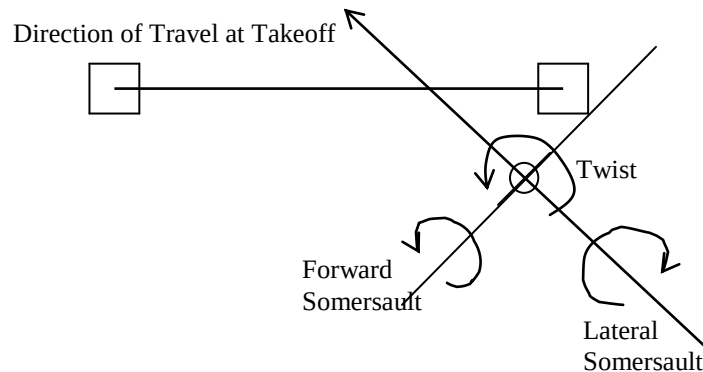
When a high jumper takes off, the athlete is generally facing the bar and, obviously, in an upright position. A good jump will typically end with the jumper landing on their head/shoulders with their back to their takeoff spot. Two different types of rotations are necessary to make that transition, a **twist**, and a **somersault**. The somersault can further be broken down into a lateral and forward somersault.

The twist is generated by the lead knee, arms, and shoulders driving either parallel to or slightly away from the bar at takeoff. For a left-footed jumper approaching from the right side, this is the right knee driving to the left of the direction of travel. This results in a “spin” that puts the jumper’s back to the bar at his peak. The continuation of this rotation on the way down causes their back to be completely facing the original takeoff spot when they land in the pit upside-down.

The somersault is generated by the angles of the jumper’s body with respect to the ground at the start of the takeoff phase (when the takeoff foot is planted). There are two

angles to consider, the angle that the jumper is leaning back (in the opposite direction of the run-up) creates the forward somersault, and the angle that the jumper is leaning into the curve that was being run (lean away from the bar) creates the lateral somersault.

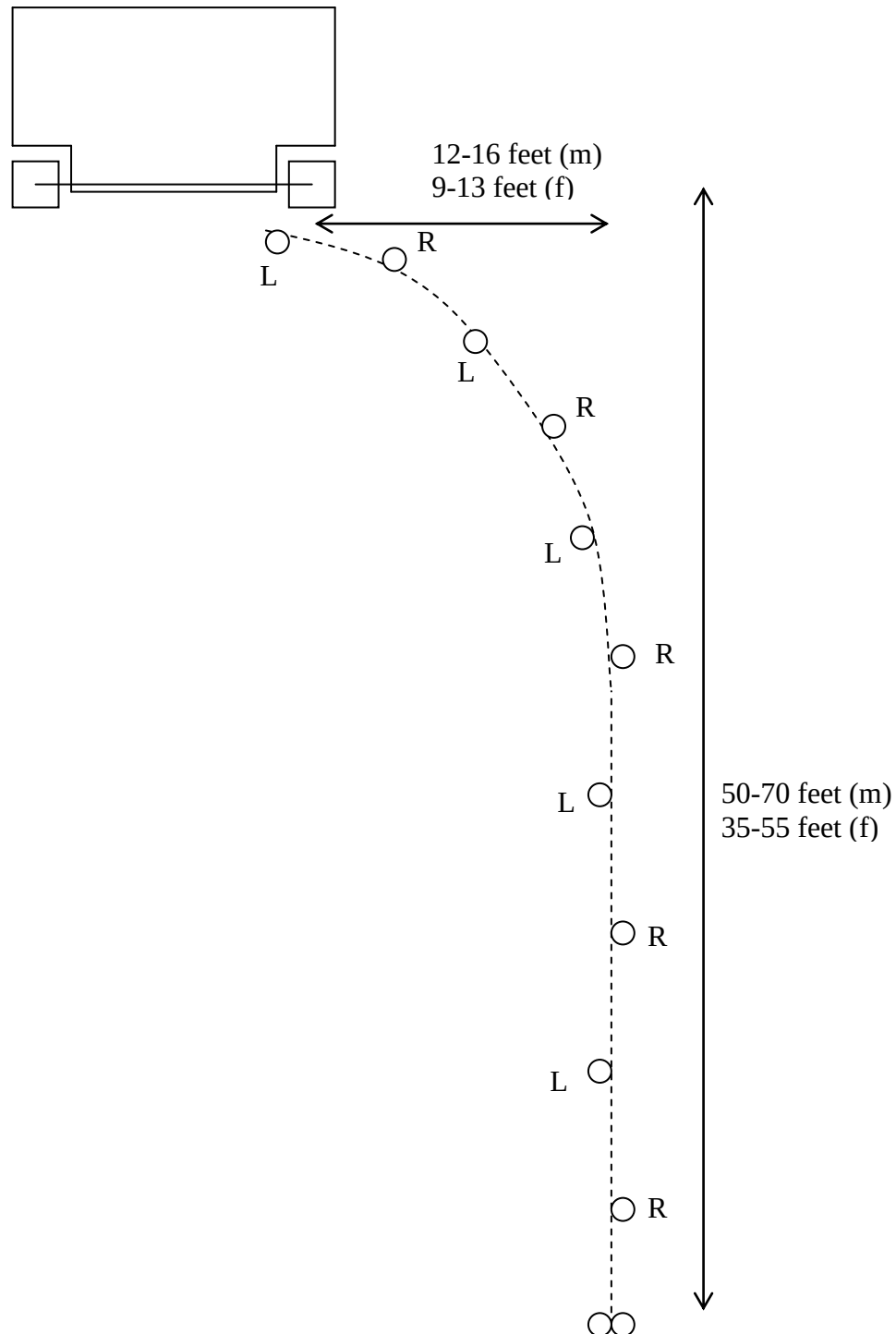
The following figure visually shows the different rotations necessary in the high jump. Note that the forward and lateral somersault will combine to form a single rotation around an axis parallel to the bar.



To correctly end up on the head/shoulders with their back to the spot of the takeoff, the athlete will need to complete a 180-degree somersault rotation combined with a 180-degree twist rotation during the flight phase. If any of these rotations are missing or disproportionate to the others, a technically unsuccessful jump will result. These rotations are almost completely caused by activities on the ground - the approach, and the takeoff. Very little can be done once the athlete has left the ground to correct rotation problems. No new rotations can be created in the air. A brief discussion of symptoms of rotation problems will be discussed in the “Technical Work in Practice” section later.

## The Approach

The approach is the most important aspect of high jumping. I have seen countless jumpers who had great jumping ability habitually miss relatively easy heights because of inconsistent or ineffective approaches. The role of the approach is to place the jumper's takeoff foot in the same spot relative to the bar standard with the same body leans on every repetition of the approach. This is most commonly achieved through a 'J' shaped approach (when viewed from above) consisting of 8-10 strides.



The approach should be run using a normal accelerating stride pattern. Jumpers should not be trying to “bound” steps on their approach.

### **Establishing a Starting Mark**

The easiest way for a beginning jumper to establish a starting mark is to start at their takeoff spot, generally just inside the near standard and approximately 30”-36” out from the bar and run a “reverse-J” back to what their real starting point would be. A coach or fellow athlete should count off 10 steps as they stride away from the bar at the rate of an easy run and mark their 10<sup>th</sup> step. This will be a rough estimation of their starting mark. It is often helpful to have somebody stand on a line perpendicular to the bar about 15 feet to the right of the right standard and about 70 feet back, to act as a target for the athlete to run towards. This prevents the athlete from generating too wide of a curve. After establishing this preliminary mark, with the bar removed or at a very low height, the jumper should start at their newly determined starting point and accelerate toward the bar following the ‘J’, with the first 5-6 steps being straight and the final 4-5 being curved toward the bar. I used a 6-4 (straight-curve) approach during the first couple of years of jumping, and then shifted to more of a 5-5. I tend to coach young athletes to do a 6-4 approach to avoid them subconsciously turning the ‘J’ approach into a single gradual curve toward the bar.

- **General Guidelines for Approach Measurements**

A male athlete should have the straight portion of their approach between 12 and 16 feet out from the standard. Faster running jumpers will be more toward the 16-foot measurement and slower-running jumpers will be closer to 12 feet. A female athlete typically has a mark between 9 and 13 feet out. Distance back from the bar usually ranges from 50 to 65 feet for males. Shorter jumpers will be closer to 50. Taller jumpers will be closer to 65. These numbers will also be lower for the female athlete. An athlete at 65 or more feet may be “bounding” too much in their approach and can probably be helped by shortening up the approach and forcing them to run the approach instead of bound it.

- **Preservation of the Mark**

Once a starting mark has been determined and refined to the point that the athlete can successfully clear a bar from a good takeoff position, write the measurements down. Starting mark establishment will likely take an entire practice session, so don’t waste that time losing the measurement. Every high jump practice and competition should start with the athlete measuring out their starting mark. The “reverse-J” approach should not be used again to establish a starting mark by that athlete due to the time and effort it takes to refine that mark into a suitable starting point. As soon as I see an athlete running a reverse-J before a competition I can accurately predict that that athlete will be struggling with approach problems all day. Make fine-tuning changes to the approach starting point throughout the year as needed.

## **Executing the Jump – The Takeoff**

One of the most difficult things to get a young athlete to do is to takeoff “vertically”. In reality jumpers takeoff on a trajectory that is a few degrees toward the bar, but generally it is termed vertical and the cue to the athlete is “takeoff vertically”. What needs to be avoided is an obvious trajectory toward the bar. Beginning jumpers have the feeling that they need to jump onto the mat. The momentum created by the approach run is more than enough to carry the athlete deep into the pit. The only cases where I’ve seen athletes come up short and nearly not make the mat are 1) The jumper is braking into the takeoff plant resulting in a loss of most of the momentum achieved during the run up, or 2) Their approach angle is too shallow such that they are running nearly parallel to the bar when they take off. Both of these problems should be corrected with changes to the approach, not changes to the takeoff.

The jumper should be “tall” when they plant their takeoff foot. The plant leg should flex very little at the knee, as strength and speed are lost as the knee flexes.

The lead leg (right leg for a left-footed jumper) should be driven upwards parallel to the bar, and thus slightly to the left of the final approach direction. Simultaneously, the arms will be driven parallel to the bar, again to the left of the final approach direction. Note that a line drawn through the shoulders from above will be perpendicular to the bar at takeoff. The athlete’s back should not be turned toward the bar before leaving the ground. This line drawn through the shoulders should also be parallel to the ground. Many jumpers tend to drop the shoulder nearest the bar (right shoulder for a left footed jumper) at takeoff. If anything, the opposite should be true. The shoulder nearest the bar being slightly higher than the other is acceptable.

## **Speed at takeoff**

A faster jumper is a higher jumper, but the athlete must be able to handle the higher speed. A jumper’s comfortable, default, approach speed is likely slower than their plant leg can physically handle. An athlete should be encouraged to run faster and faster on successive jumps in a practice session to find out their optimal speed. As speed is increased, at some point the plant leg will buckle or the jumps will get lower instead of higher. The athlete should then back off of that speed slightly. Too many jumpers just run too slow to generate the rotations or height necessary to clear a bar, not because they can’t handle the faster speed, but because they just don’t know they should be running faster.

## Bar Clearance

Once the athlete has left the ground there is really very little that the athlete can do to save a bad approach or takeoff. Remember that once the takeoff has been completed and the athlete is in the air, no rotations can be created. Ideally the athlete will clear the bar in a backward arching posture with very little action taken in the air. I sometimes hear coaches try to correct flight problems by telling their athlete to do this or that while they are in the air. The most common comment is made to the athlete with his hips lower than his head as he clears the bar (appears to be “sitting over the bar”). “Throw your head back” is too often said to this athlete. What you then have is an athlete sitting over the bar with his head back. In reality, this is an under-rotation problem that should be fixed with the approach. Only a few things can be done in the air to help in bar clearance.

Most importantly, get everything out of the way that could hit the bar on a good attempt. That’s usually the head, hands, elbows, or feet. Once airborne, the head should not be dropped until it has cleared the height of the bar. Once in the arch position, the hands and arms should be alongside the body with possibly one hand reaching down for the pit or toward the feet, under the bar, to emphasize the arch. After clearing the bar, the feet should be kicked up quickly. It is difficult for the athlete to watch for a queue as to when to kick. That timing usually comes from repetitions in practice, but a well-trained jumper can take a peak at the bar as they clear it to assist in kick-out timing.

The other thing to remind the athlete while in the air is that everything should be tight and close to their center of gravity. Legs should never be straightened during flight until the bar has been cleared. On the way up the knees should be bent to increase the speed of the rotation around the bar. The lead knee will already be bent due to the takeoff position. It should be kept that way. The takeoff leg should gradually come up into a bent position alongside the lead leg. Similarly, arms should be tight to the body or wrapped around toward the feet, not only to get them out of the way of possibly knocking the bar off, but to keep them from slowing rotations. Keeping arms and legs as close to the center of gravity as possible is the only way to increase the speed of rotation once the jumper has left the ground. It is the same principle that causes a spinning ice-skater to increase their spin speed dramatically by pulling their arms and legs close to their body.

## Video Analysis

The many intricacies of proper high jump technique can best be seen through slow motion replay. I encourage all coaches to periodically video their athletes high jumping (approach through landing) and then review the video with them before the next jumping session.



## Chapter II. High Jump Technique Training

### Training for Approach Consistency

#### Practicing the Approach

At the start of every practice, once the starting mark is down, the athlete should run 10 or more approaches without a jump at the end. A well-coached and practiced athlete should rarely, if ever, approach the bar in competition and not jump. You will sometimes see athletes that constantly approach the bar for a competitive jump then slam on the brakes at the end of their jump and go back and try again. This type of inconsistency in the approach leads to a kind of “lottery” mind-frame in the athlete as they near the bar, not having any confidence in themselves actually hitting a single takeoff spot consistently and considering it more a stroke of luck if they do hit it. In reality, the jumper that stops their approach short of the bar must have decided to stop 4 or 5 steps away from the bar, before they even had a chance to see where their takeoff would have been. There is no way that an athlete running a properly executed accelerating approach can decide to stop short of the bar on steps 9, 8, 7, or maybe even 6 into a 10 step approach. The forward momentum is so great that deciding to abort a jump that late into the approach will result in them running underneath the bar or falling into the pit upon trying to stop. Those that stop short do so because of a lack of confidence in their approach, not because there was anything wrong with that particular approach. They gave up on it before they could find out.

To instill confidence in the approach run, it must be practiced, and practiced beyond the point of just warming up for layouts. It only takes 3 or 4 approach runs before an athlete is generally ready to take some jumps, but more should be done. I always start a jumping practice with at least 10 full approach runs. On more than one occasion I've had a practice never progress beyond running approaches. Always force the athlete to take more approaches, and give them something to focus on, beyond just warming up for the jumps.

#### Things to focus on during approach runs:

- **Good running technique**  
*The technique should be that of a sprinter. The athlete's heels should not touch the ground until the final 1 or 2 steps. Simple straight-line accelerations should be used to teach jumpers running technique that they can use in their approach.*
- **Running along the curve – no “cutting”**  
*Many athletes have a tendency to run their 6 steps on a straight line, then make a hard cut for the bar and run their final 4 steps directly at the bar. The gradual curve of the approach is the only way to get the appropriate leans at takeoff for good somersaulting rotation over the bar.*
- **Accelerating into the takeoff foot-plant**

*Tempo is very important so that the athlete is not decelerating into the takeoff. The cadence should slowly increase as steps 1 through 10 are executed so that they are moving the fastest just before takeoff. Some athletes have a tendency to sprint their straightaway steps, then coast their curve. This deceleration will slow rotations necessary to rotate the lower body over the bar. In this case, an athlete should slow down their first few steps instead of trying to further increase the speed of their last few steps. It is also difficult to decelerate into an explosive activity like a high jump takeoff. An explosive takeoff is much easier to achieve when coming off an explosive final 3 steps of the approach.*

- **Consistency in takeoff foot position and coaching mark**

*Perhaps the most important aspect of the approach is that it should consistently result in the athlete's takeoff foot being in the same position with respect to the bar for every approach taken with only a few inches of tolerance.*

### **Common approach run mistakes:**

- **Not attacking the curve**

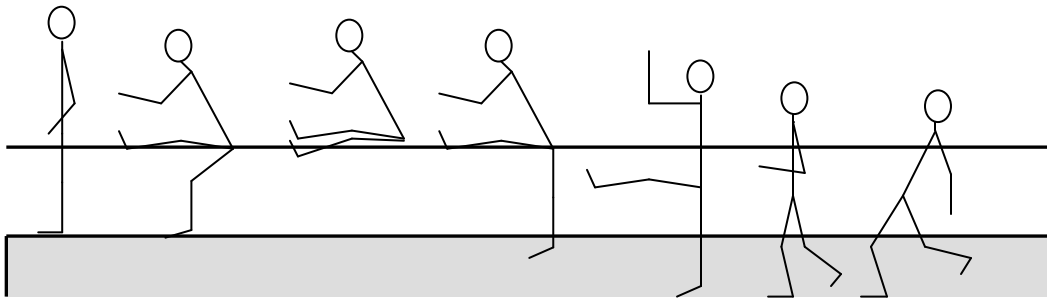
*Oftentimes an athlete running approaches will become lazy on the final strides as he knows there is no jump at the end. This should be cured by placing the bar at a high height (year's goal?) and having the jumper visualize attempting that bar, until the final step, where he aborts the jump and runs or hops underneath the bar onto the mat.*

- **Jumping in front of a bar**

*A common attempted cure to not attacking is to have the athlete actually jump at his takeoff spot and land on his feet on the ground in front of the bar. I often see this in high school meet warm-ups before a competition, which leads me to believe they are probably doing it in practice. This should be avoided. The only way for an athlete to land on their feet in front of the bar is if they severely decelerate going into their "jump". This is the opposite of what should be worked on while doing approaches.*

## Adding to the Approach - Scissor Jumps

To make the transition from running approaches to doing layouts in practice, it is oftentimes beneficial to add a transitional drill between the two. A scissor jump is completed by executing the normal approach and takeoff, so that the athlete lands on their lead foot in the mat after clearing the bar.



This is a good drill to use to practice attacking the bar in an approach without having to worry about the technical aspects of a layout. It also can be used to emphasize the vertical takeoff position. Once the athlete has mastered the drill, the bar can be raised to force the athlete to attack the bar to generate the speed necessary to clear the bar.

## Coaching Marks

As the athlete is developing their consistent approach, it may be helpful to place some tape in a couple key spots along the approach. This is of course in addition to the mark that signifies the start of the 8 or 10 step approach.

- **Curve Start**

The point at which the 6<sup>th</sup> step hits the ground is vital as this is the point at which the athlete will begin their curve toward the bar<sup>1</sup>. If there is as little as a foot of aberration in this foot placement, this can directly translate to inconsistency in the takeoff foot placement of an equal amount, and thus a likely unsuccessful jump. A small piece of tape placed at this point during practice (and competition if allowed) can be used to make sure the athlete is running the first 6 steps consistently. This mark is one that is ok for the athlete to look at and aim for during their approach, as hitting it will give them confidence that they are in the right spot heading into their final four steps.

- **Takeoff**

The takeoff mark should always be a long piece of tape placed parallel to the bar about the athlete's arm length from the bar. Depending on jumping style and speed of approach this mark may be closer or farther from the bar than arm's

<sup>1</sup> The athlete begins to lean or anticipate the curve on the 5<sup>th</sup> step contact, but the feet don't divert significantly from the straight part of the approach until after the 6<sup>th</sup> step.

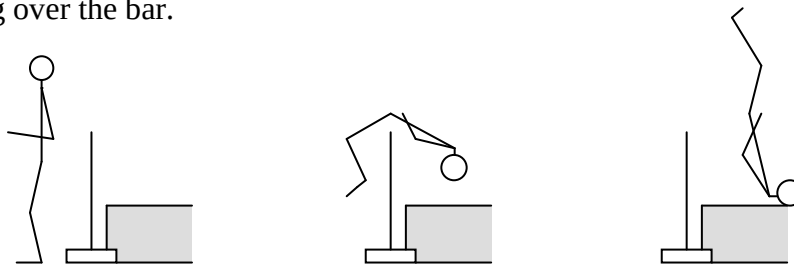
length. The tape should be 2-3 feet long, and it should be considered acceptable to have the athlete's foot at takeoff anywhere along the length of that tape, but not more than a couple inches closer or further from the bar. I've seen coaches try to draw a box with tape that the athlete's takeoff foot should be in, or a small piece of tape that is laid perpendicular to the approach direction at the takeoff spot. Both of these methods create such a constricting and finite target, that the athlete will typically spend their last few steps watching the mark and as a result decelerating into the jump as they concentrate more on putting their foot in an exact location instead of aggressively attacking the bar. A long strip of tape can typically be seen in the athlete's peripheral vision so they focus more on the jump and less on sticking their foot in one exact spot.

## Practicing and Refining Technique

There should always be a line drawn between technical work and approach work. **If the goal is to clean up an approach deficiency**, then full approaches should be run with either no takeoff (run underneath a high bar onto the mat), with the bar at a very low height to take the stress of clearance out of the jump, or a scissor jump. **If the goal is takeoff position or flight technique**, generally full approaches are not recommended, but a short approach should be used. This takes the pressure off of the athlete during the approach, making it an informal “sub-approach” with 4 or 6 steps, allowing them to concentrate on the takeoff and flight. I have found the following drills the most useful in practicing technique.

### Back-Overs

A “Back-over” is used to get the athlete used to the positions he should be in while traveling over the bar.



The focus of the drill is two-fold and is not necessarily enhanced by a higher bar. These can be done effectively at a low bar height allowing the athlete to easily clear it. The athlete should be focusing first on the position of the head, hands, arms, and legs during the layout and second on a strong kick following clearance to clear the lower body of the bar. Once the athlete is comfortable with the drill, the bar can be raised to expose flaws. One thing to remind the athlete with this drill is that, unlike a jump with an approach, where you jump vertically, you must jump into the mat. There is a real risk of the athlete jumping straight up and landing more or less on his head/shoulders in the spot from which he took off if there is no penetration into the pit. Because of this risk, when doing this drill, the mat should be pushed under the bar as close to the athlete as possible to still allow an unimpeded jump. This drill should not be used to diagnose or help rotation problems. Rotation should be mostly ignored as it is being artificially created (jumping into the bar and throwing the head back) since there is no approach, although this can be helpful to give the feeling of rotation that they should feel on a real high jump.

### Short Approach Jumps

The full approach jump takes a lot of effort and can quickly fatigue a practicing athlete. The repetition of such a long approach and high-speed takeoff can also aggravate common overuse injuries like shin-splints. For these reasons, a shorter approach is useful to work on technique in practice. An athlete will easily be able to take twice as many short approach jumps than full approach jumps in a practice session before becoming fatigued. There are two styles of short approach jumps that can be used.

**Minnesota 4-Step:** To execute what I call the Minnesota 4-step, first put a starting mark on the ground where the athlete would typically be four steps out from the bar on their full approach. Then the athlete should jog or stutter step into the approach such that their left foot hits the mark. The four steps are then R-L-R-L(takeoff). The 4-step starting mark will likely need to be adjusted slightly from their full approach 4-step-out mark. I've found the MN 4-step approach to be the most useful in working on takeoff and bar clearance technique.

**True 4-Step:** To work on attacking the bar, starting at a stop and taking only 4 steps to the bar can be used. With only 4 steps available to generate speed into the bar, the athlete must accelerate quickly and explosively.

**6-Step Approaches:** The MN and True varieties of the short approach can be expanded to 6 steps to more accurately represent the speeds and angles achieved from a full approach without the associated fatigue.

The other advantage to short approach jumps beyond the fatigue factor is that it allows a jumper to practice technique without being influenced by inconsistencies in the approach which may be caused by weather (e.g. head/tail-wind) or physical state (e.g. fatigue). Reducing an approach from 10 steps to 4 steps will proportionately reduce approach inconsistencies and allow the focus to remain on the technique.

## Full Approach Jumps

Full approach jumps in a practice session are necessary to prepare the athlete for competition. The confidence to execute the full approach in a meet situation will come from full approach jumps in practice. The focus on a full approach jump should be on the approach aspects of a slow to fast progression and an explosive last few steps. Bar clearance and takeoff technique queues are often forgotten by the time the athlete gets to the point in the jump where these queues are useful.

## Diagnosing Rotational Problems

Most high jumping technique problems arise from too much or too little of one or more of the rotations mentioned earlier. Insufficient twisting action will result in the lead hip (right hip for a left-footed jumper) being lower than the other over the bar. Insufficient somersaulting rotation results in the jumper appearing to "sit" over the bar, with his upper body higher than his hips. Too much rotation results in the bar being continually knocked off by the upper body on the way up (more commonly this is caused by taking off too close to the bar).

- **Not Enough Twist**

Typically a twisting problem comes from the knee and arms not being driven to the left of the direction of travel at takeoff (for a left-footed jumper). During the flight phase a dropping and straightening of the lead knee can also serve to counter-act twisting. The symptom can be that the body is not perpendicular to the bar at layout, but slanted, with the jumpers head closer to the bar, on the take-off side, than it should be. A weak knee drive can also cause the lead hip to be lower than the takeoff leg hip during layout. The jumper should be encouraged to keep the lead knee high and bent throughout the flight. At takeoff, the lead knee

and arms should be driven parallel to or slightly away from the bar, not in the direction of the bar.

- **Not Enough Somersault**

Athletes sometimes have a difficult time getting somersault rotation over the bar. This results in the appearance of them sitting over the bar as their head and shoulders are too slow to rotate around the bar so they are still quite high as the hips clear the bar. This is more common with taller athletes because 1) they tend to run slower thus lessening the leans away from the bar necessary to generate the rotation, and 2) they have such long moment arms that their rotation around the bar is slowed (spinning ice-skater example). Jumpers that lack this rotation can be encouraged to “lean into the curve,” “lean back at takeoff foot-plant,” or “attack the bar” (because it tends to generate more speed on the curve, thus more of a lean, thus higher rotation rates). This rotation is further slowed by any straightening of the legs during the flight phase or spreading of the arms far from the body during layout, and thus should be discouraged. Somersaulting rotation is also difficult to achieve if the approach angle of the athlete is too shallow (approaching parallel) with the bar. Increasing the approach angle almost always increases rotation. This can typically be achieved by moving the jumpers starting mark “in” (that is to the left for a left-footed jumper). If they are currently at 15 feet, move them in to 13 feet to increase somersaulting action.

## Summary of High Jumping Drills

Typical middle school and high school jumpers want to spend all their track and field practice days sitting around on the high jump pit, taking a few jumps when the coach asks them to. Unfortunately, that is a common perception of what high jump is all about. In reality, a full high jumping workout should only take place one or two times a week. By “full high jumping workout” I mean a workout where the jumping doesn’t stop until the athlete’s form begins to break down as they tire. There’s nothing wrong physically with going out and taking a jump or two every day (although I question the value and highly discourage it), but a full high jumping workout should only occur at most two times a week (besides competition day). These workouts should always start with full approaches without a jump, working on the approach rhythm and takeoff foot placement. The workout should then progress to more specifically focused drills depending on what the athlete needs to work on. Remember that when the athlete begins to show signs of fatigue, usually evident by the athlete digressing to bad jumping habits, it’s time to stop the high jumping portion of the workout. The following list of high jumping exercises can be used to form a workout. The parenthetical notes describe what the drill should be used for.

- **Full Approach Rhythm** (Every Jumping Practice)

This is simply executing the entire full approach, but bailing out of actually jumping in the last step and simply running under a bar that is placed at some goal height. EVERY high jump practice should start out with at least 10 of these. A successful high jump relies on a consistent approach, so approach practice is the base of all high jumping. By placing the bar at a goal height, the athlete can get

used to at least approaching a high bar. It's called "full approach rhythm" because this is the time that should be used to practice the slow to fast rhythm of the approach. These approaches should be critiqued just as you would a jump using the guidelines in *Practicing the Approach*.

- **Scissor Jumps** (approach problems, approach to takeoff transition problems)  
Taken from a 4, 6, or full approach, these are excellent for approach work with the added challenge of a takeoff. There is no layout in a scissor jump, but instead, the athlete "scissors" their feet over a low bar, finishing by standing on the mat.
- **Full Approach Jumps** (meet preparation)  
This is the actual high jump as would be executed in a competition. These should be used sparingly in practice because they can be tiring. I suggest not doing these more than 1 day per week in practice, plus a competition. A combination of full approach rhythm and 4 or 6 step jumps is a better choice for a practice situation.
- **Back-Overs** (arch/layout problems, kick-out problems)  
This is jumping off of two feet from a stance facing away from a fairly low bar. This is basically a back-flip over the bar. These are useful for layout practice. Things to work on here are a strong arch and explosive release from the layout, keeping the arms tight to the body and the head back.
- **Back-Overs with a Step** (arch/layout problems, kick-out problems)  
I prefer these to regular back-overs. This adds a step toward the bar to the normal back-overs. The athlete should start a few feet in front of their two-foot back-over takeoff spot with their back to the bar. They then take a step or a hop backward into their takeoff. This is easier and safer for an athlete because they have some momentum going toward the bar at takeoff.
- **Circle Drill** (rotation problems)  
This is running on the high jump curve without jumping and continuing on the curve until a complete circle has been run. Several circles can and should be run after the first. Sometimes jumpers have a tendency to stand up straight during the curve and not lean into it, or just lean with their lower body and not their upper (or visa versa). The circle drill is helpful for the athlete to experience the body leans that should be felt as they round their high jump curved approach without worrying about a takeoff.
- **4-Step Jumps** (acceleration problems, general jumping practice – useful for all takeoff and flight error correction)  
This is just a regular high jump with a shorter approach. The approach can either start from truly 4 steps out to work on explosively accelerating to the bar, or the approach can start 10 to 20 feet further back and the athlete can jog into the 4 step approach for more layout oriented work (described earlier as the "Minnesota 4-step"). Short approaches are very useful because they are not as tiring as full approaches. If you want the athlete to really work on a specific aspect of their layout or takeoff position, these are good because they can take more jumps in a single practice session. Also, with a shorter approach, the athlete is less likely to introduce approach errors into the jumps, which allows them to concentrate better on the takeoff and layout.
- **6-Step Jumps** (general jumping practice – full approach substitute)



Once again, you can have the athlete start from truly 6 steps out or take a short jog into the 6-step approach. These are a bit more tiring than 4-step jumps, but are more realistic from a speed and takeoff angle point of view because if the athlete takes a 20-foot run up into the 6-step approach they are essentially starting at their full approach mark. Six step jumps are a good substitute for full approaches if the athlete doesn't appear to be physically ready for full approach jumps (e.g. ill, tired).

### **“Paralysis of Analysis”**

There are likely hundreds of queues that can be given an athlete trying to execute a high jump. You must be able to direct your athlete to fix specific problems. I list a few of them here not as a list for a coach to choose from, but just as an example of how many instructions can be given to a high jumper on a single jump:

- Run tall – to emphasize good running technique
- Don't cut to the bar, run the curve.
- Lean into your curve
- Accelerate to the bar, attack the bar, explode to the bar
- Quicken up your last step.
- Actively put your takeoff foot down
- Lean back into your takeoff
- Take off vertically
- Keep your lead knee up – don't elongate.
- Don't jump into the bar
- Don't turn your back to the bar before you take off
- Put your head back over the bar
- Keep your arms in tight to your body
- Kick your legs up
- Hit whatever coaching mark

The problem of paralysis of analysis comes into play when a coach tries to give an athlete more than one instruction at any one time. An athlete responds best to just one instruction/queue. Giving two instructions (e.g. “Accelerate to the bar and then remember to put your head back when you're on top of the bar”) will likely result in one being accomplished and the other one being lost. Giving three or more instructions often results in a complete breakdown of technique resulting in a jump that is worse than when no instruction at all was given. This is paralysis of analysis and obviously should be avoided. One jump, one queue is a good rule to follow. Depending on the athlete and queues, two instructions may be successfully given for a single jump, but I have never seen three instructions given by a coach and successfully executed by the athlete in a single jump.

### **“The Classroom”**

Do not underestimate your athlete's willingness to learn about the event. Make a photocopy of a Jesus Dapena article or a chapter from a book on high jumping and give it to them. Just tell them it is interesting and you'd like to know what they think. Don't

make it seem like homework or they'll never read it. If they seemed to like it, give them more. An educated, independent athlete is priceless when you're coaching 10 different athletes at three different events simultaneously.

The two books that I recommend that are specific to jumps are:

1. "Complete Book of Jumps" by Ed Jacoby and Bob Fraley  
Recommended as a good starter.
2. "The High Jump Book" by David E. Martin, Dwight Stones, Greg Joy, and Jacek Wszola.

This is for the die-hard jumper or coach only. To make it through this book you have to truly love the sport, but you will be a better athlete or coach afterward.

## Chapter III. Non-Event-Specific Training for Jumpers

The non-technical abilities that make a good high jumper also make a good long and triple jumper. Therefore, the non-event-specific training for all of the jump events is mostly the same. The only difference is that the horizontal jumpers are often faster athletes and therefore get placed in short sprint events that force their training to include more running. The examples in this chapter are specific to the high jump, but all can be applied to the horizontal jumps as well.

### Training vs. Effective Training

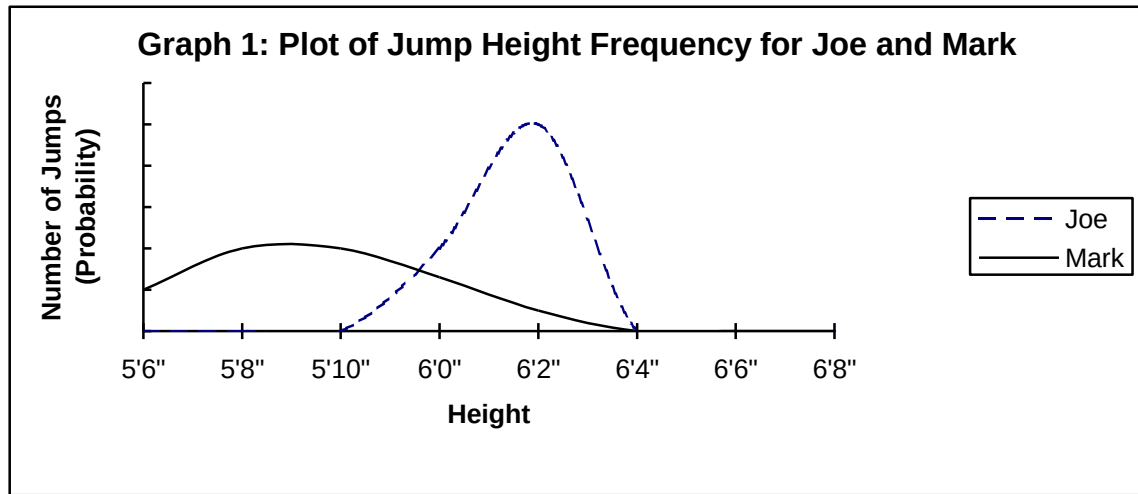
I call “training” showing up for practice and going through the motions of each particular training event for the day. Athletes can go through an entire season or career this way not knowing that they are cheating themselves out of better performances. Sending a jumper to the weight room with a list of lifts to perform is encouraging “training”. Sending a coach with them to ensure the exercises are actually performed, and performed at an intensity that will make the athlete stronger is “effective training”. Sending a young jumper to the high jump apron or long jump pit unattended is “training”. Sending a coach with them is imperative to making the training effective. When it comes to event-specific training, I do not recommend leaving young athletes unattended because an athlete with no feedback simply practices the same bad habits into his technique until it is nearly impossible to correct. Also, the high jump landing pit seems to be a magnet for people just to sit down on and talk. These people are distracting if not destructive to the high jumper’s practice.

**When I refer to training throughout this document, I assume effective training.**

### Importance of Balanced Training

How is a high jumper’s success measured? It is typically measured by the athlete’s personal best jump. When you talk about your high jumpers, you typically say something like “He’s a 6’2” jumper,” meaning his PR is 6’2”. That does not really tell the story of the athlete.

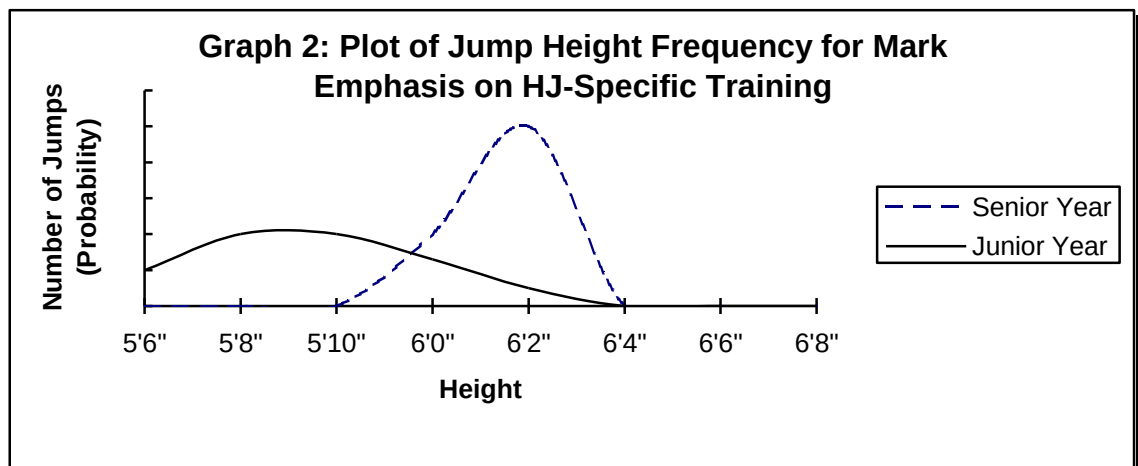
Graph 1, which follows, represents the jumping performances of two fictitious athletes, Joe and Mark. Mark usually jumps less than 6’0” but he snuck in a 6’2” once. Joe has jumped 6’2” several times and just has not gotten a 6’4” yet. Those are two very different jumpers; both described the same way in conversation as 6’2” jumpers. *The difference in the jumpers likely originates from the balance of training.*



By looking at Graph 1, you would conclude that Joe is more valuable to your team. He scores more points more often, even though they both have the same personal best. So, how do you train Mark to be more like Joe? Furthermore, is there a better graph (i.e. jump performances) for Mark to train towards than Joe's, or is Joe's the ideal? For the purpose of the following discussion "HJ-Specific Training" refers to anything done involving the high jump pit, apron, and/or crossbar. "General Training" refers to anything done on the track, on the infield, or in the weight room. Let's look at three different training plan balances and the likely outcome of each.

### Emphasis on HJ-Specific Training

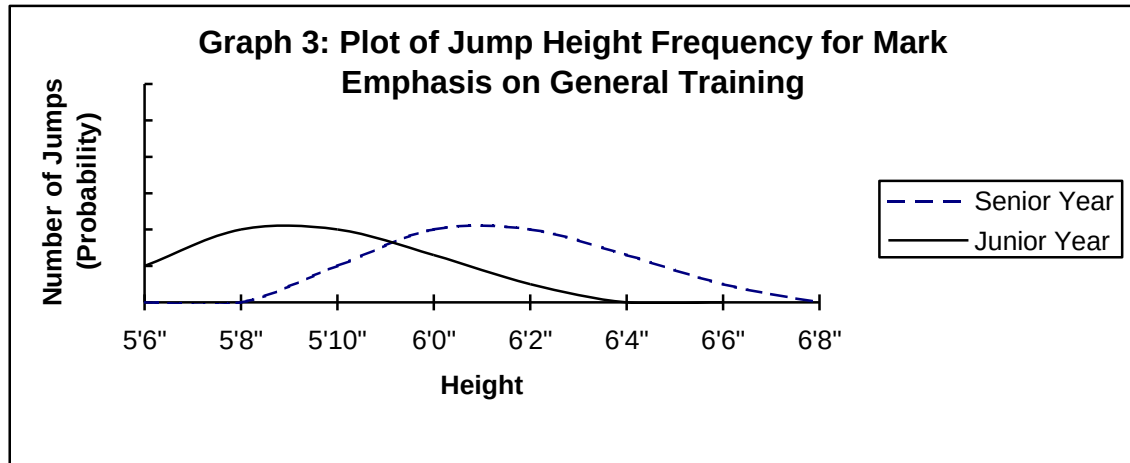
An athlete that spends all of his time at the high jump pit will likely become very familiar and comfortable there. His jumping will become more consistent, but because he is not doing anything that will increase his strength, there is a low probability of a new PR<sup>2</sup>.



<sup>2</sup> This excludes benefits that may be realized from the young athlete naturally growing stronger as he matures.

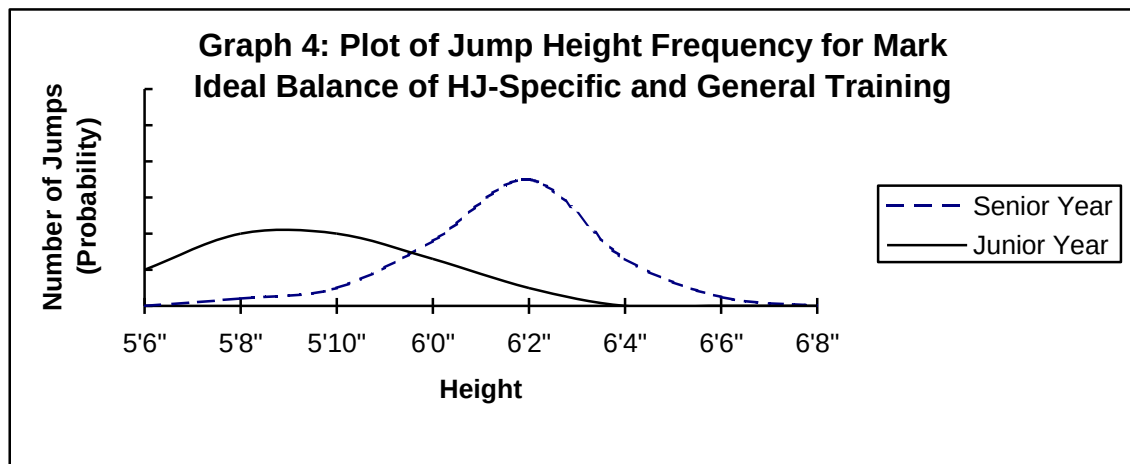
### Emphasis on General Training

An athlete that rarely high jumps, but spends a lot of time performing general training will become strong enough to jump higher, but inconsistencies around the crossbar in approach and technique will be the prevailing factor. Your jumper will have a good chance to jump high, but an equally good chance to jump very low.



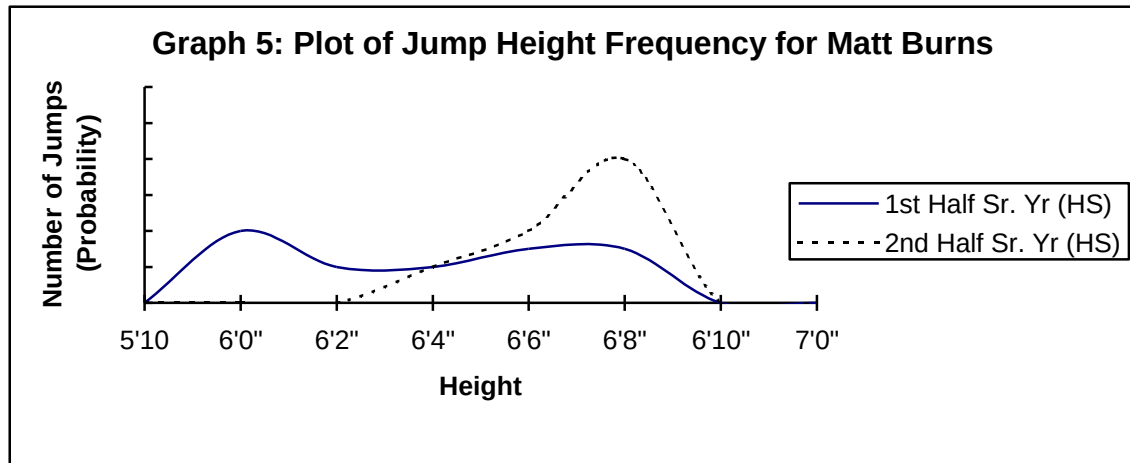
### Balance of HJ-Specific and General Training

By combining sessions in the weight room and on the track with time at the crossbar, a much better athlete is created. This athlete won't be the ideal in consistency, as Joe's graph portrayed, but he has a better chance to jump higher. The athlete may have some lower jumps at times when he is fatigued from a session on the track for example, but the payoff comes weeks later when a now stronger athlete can combine his strength with the HJ-specific work to perform a higher jump.



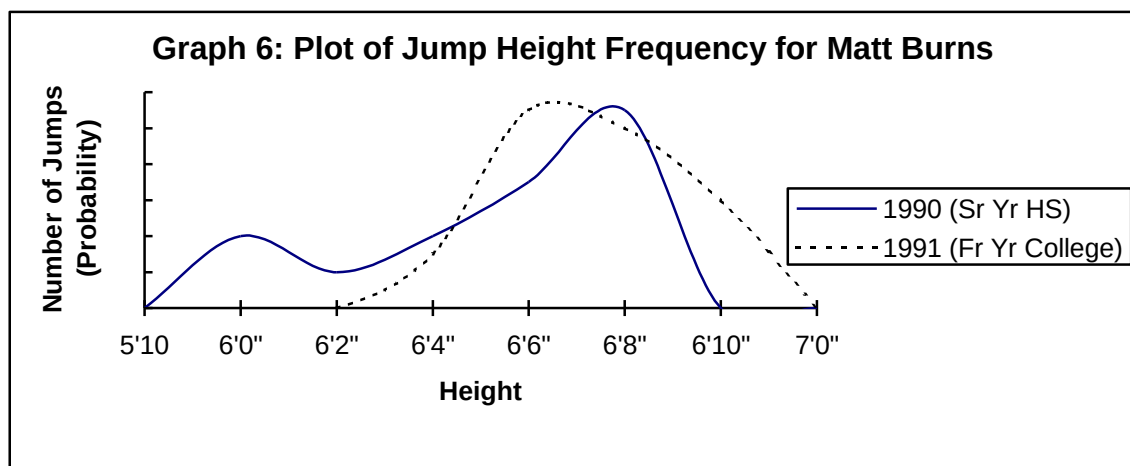
### Training Balance Summary and Real Data

While the preceding examples use a two-year comparison, the same philosophy applies to shorter time frames, such as an indoor and outdoor season. The following graph was created using actual results from my high school senior year.



From what we've learned previously, it looks like there was an emphasis on HJ-specific training during the second half of the season. That turns out to be exactly right. During that year we spent nearly every practice day at the high jump pit. During the entire season I had one significant training day of sprinting, and one day in the weight room. This was excellent for refining my technique to become consistent, but it was definitely too much event-specific training to expect the strength and quickness gains necessary to better my PR.

Now let's look at actual results over a two year period, comparing my senior year in high school to my freshman year in college. My college coach's training philosophy for me was that I needed to gain strength, so emphasis was put on weight training while maintaining enough HJ-specific work to retain some consistency. The balance was shifted toward general training. The results are in the following chart.



The actual high jump competition results do move to the right (strength gain), and the width of the plot narrowed, meaning I was more consistent when compared to my entire 1990 year. It is important to note though that the 1991 plot in Graph 6 actually demonstrates a decrease in consistency from what was achieved during the second half of

1990 (Graph 5). The training accomplished what it set out to do: Make me a stronger jumper at the sacrifice of consistency.

### **Training Balance Impact to Injury Prevention**

One important fact to be aware of is that anytime an athlete does the exact same thing repetitively for a long period of time, they have a higher risk of overuse injuries. The balance achieved by including training away from the event is paramount to injury prevention. A stronger athlete is less likely to be injured by jumping. I mentioned previously that my high school training consisted almost entirely of high jumping in practice. It is no wonder that both my teammate and I were plagued by injuries starting a month into our track season. I had shin splints and back pain, my teammate had a groin pull and back pain. Both of us went on to have successful college jumping careers, relatively injury free, while participating in a balanced college training program.

### **Non-Event Specific Training**

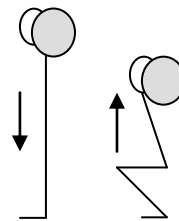
All jump event training can be divided into lifting weights, bounding exercises, sprinting/running, and event-specific jumping. Remember that the jump events are fast-twitch muscle fiber activities. Everything should be done with a goal of recruiting the maximum number of fast-twitch fibers possible.

### **Weightlifting**

The core of a jumper's ability to achieve high heights is quadriceps strength, and thus any weight workout should be focused on building that muscle group. Lifting also plays a role in injury prevention. Strong, well trained, muscles reduce workout fatigue and as a result the athlete will have higher quality practices and less overuse related injuries such as stress fractures and shin splints. Ideally a jumper will lift weights year around so that lifting during the season will not shock the muscles so much to negatively impact performances. An experienced lifter will also be able to move on to more advanced lifts that will contribute more to jumping ability. A jumper that is new to weightlifting or resistant to spending time in the weight room should be minimally started on a regimen of squats and hamstring curls. Once a base of strength is obtained (after about 6 weeks of lifting) the speed of the individual lift should move from slow and methodical (pre-season base strength work) to explosive as the season progresses. For example, a squat should not just be down and up, but down and UP! The athlete that is a jumper should explode out of the bottom of a squat and finish on their toes.

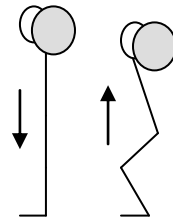
### **Full Squat**

My definition of a full squat is to go down to the point that the thigh is parallel to the ground or just beyond. Some people will do full squats where the butt actually goes all the way to their heels, but that puts a lot of unneeded stress on an athlete's knees. Full squats should be performed in the off-season or in the first few weeks of the season only.



## Half Squat

When you look at a jump takeoff, there is actually very little flexion in the takeoff knee, so training the muscles that give you great strength out of the bottom of a squat really do little good to the event itself. Not dropping down as far, but doing so with additional weight can gain more benefit. Much more weight can be lowered in a squat that only goes half way down. Remember that it is important to explode out the bottom of this exercise



## Jump Squat

In my opinion, this is the most important lift for any jumper. Jump squats are extremely beneficial in increasing speed and vertical. A jump squat is executed into about a  $\frac{1}{4}$  to  $\frac{1}{2}$  squat position, then as quickly as possible, the athlete should jump as high as possible, making sure to land with knees bent. The athlete should then return to the starting position in preparation for another repetition. The weight should be light enough that the athlete can execute the down-up action quickly, without getting bogged down by the lowering of the weight. Each repetition is an individual exercise performed at 100% effort (don't bounce). The athlete should try to jump as high as possible on each jump. Depending on the time you have, good progressions are:

### Normal Cycle (8-10 weeks)

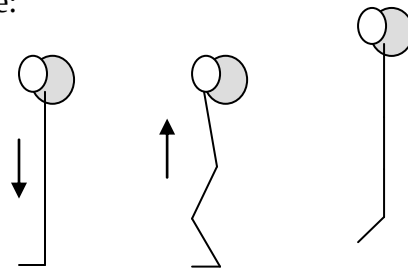
Week 1: 2x/week 3x6 @ 20% max squat

Week 2: 2x/week 3x6 @ 25% max squat

Week 3: 2x/week 4x6 @ 30% max squat

Week 4: 2x/week 5x6 @ 30% max squat

Week 5 to 8/9/10\*: 2x/week 6x6 @30-35% max squat, increasing weight slightly from 30% as weeks go on, but do not go above 35% of the week 1 measured max squat.



### Shortened Cycle (3-4 weeks)

Week 1: 2 days of 4x6 @ 20% max squat

Week 2: 2 days of 5x6 @ 25% max squat

Week 3-4: 2 days of 6x6 @30% max squat

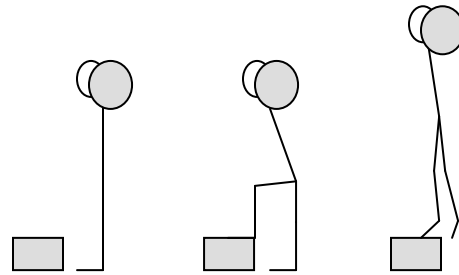
If the athlete is coming up slowly or having a tough time with the down/up transition, the weight should be lowered.

An experienced squatter should be able to progress to 6x6 at 30-35% of their maximum full squat weight. Inexperienced squatters should keep the weight down in the 20% range until they build confidence in the exercise. **Jump squats require great balance and abdominal, back, and leg strength. Make sure that the athlete new to jump squats starts out with lower weights and works their way up as they gain strength and confidence.** If safety is a concern, I've heard of these being done at the high school level in the confines of a squat rack.



### Step-Up

The athlete performs a step-up by stepping onto a raised surface (box) with a weight on their back. After stepping onto the box, the weight should be shifted forward so that the effort comes from the leg on the box and not the leg on the ground. The athlete should finish on top of the box, **not** back from the box, falling backward.



### Hamstring Curl

These are important to maintain muscular balance in the legs.

### Abdominals

All weightlifting programs should have abdominal exercises as an element. Strong abs will aide in stability when completing other weightlifting activities. It is also important for the finish of all of the jump events. For example, a high jumper needs to have strong abs to have an active kick-out to lift the legs up and over the bar following the high jump layout.

### Power Clean and Snatch (advanced athlete and coach)

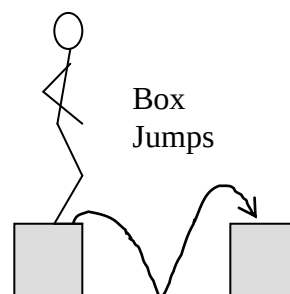
The olympic lifts are tremendously effective at generating explosive power in the legs and shoulders. They were the core of our lifting program at the university. These should not be taught by an inexperienced coach, as there is risk of injury if the lift is done incorrectly. If the coaching knowledge is present, I recommend making cleans and snatches, under close supervision, part of the weight-lifting plan of your jumpers.

### Bounding

Bounding can be split between horizontal and vertical exercises. All bounding should be done on a soft surface to reduce the likelihood of overuse injuries. Good options are outdoors on the grass or indoors on wrestling mats.

Horizontal bounding is good for developing leg strength and quickness when executed correctly. A variety of bounding patterns can be used to increase coordination and maintain interest, L (single leg bound), R (single leg bound), L-R (alternating leg bound), L-L-R-R are typical examples. The typical bound will cover 30 meters and have the concentration on actively cycling the leg and clawing the ground. Five or six repetitions of this distance make a good horizontal bounding workout.

Vertical bounding can be done using boxes, hurdles, or a combination of both. The emphasis should be on minimal contact time with the ground. The jumping motion should really start the instant before contact with the ground has been made to increase the speed of the “pop” off of the ground. Three sets of



ten box jumps or six sets of six hurdle hops are a good vertical bounding workout. As the season progresses, boxes and hurdles should be raised.

## Running

Short sprinting is valuable to a jumper in that it increases strength and power to directly improve jumping ability. Early in the season or in the off-season, longer sprints of 150 to 200 meters are good for increasing endurance to create a good training base. Once important competitions have started, speed work should be limited to 60 to 80 meter explosive sprints at 95-100% effort with a full recovery of 3 to 4 minutes between each sprint. Timing and recording performances is a great tool to show the athlete improvement as their training serves to decrease times.

- Off Season (80-85% effort)
  - 150M or 200M, 2 sets of 4 w/ 2.5 min rest between reps, 5 minutes rest between sets
  - 150-250-350-250-150 walk the distance just ran between reps.
- Early Season (90% effort)
  - 100M or 150M 2 sets of 4 w/ 2.5 min rest between reps, 5 minutes rest between sets
- Competitive Season (95-100% effort)
  - 60M or 80M 1 set of 6 w/ full recovery between reps.

All running should be performed with good sprinting form on the toes throughout the distance. A heel-toe run is of little use to a jumper.

### Workout Plan

A weekly workout plan should be an individualized program based on the needs of the athlete and competition schedule. During a collegiate season, the meets are almost always on Saturdays, so a typical week of training would consist of:

#### Monday:

- Full jumping workout with approaches and full approach jumps
- Speed/Endurance (150's)

#### Tuesday:

- Bounding
- Lifting

#### Wednesday

- Cross-train (swim?)
- Light jumping drills (e.g. back-overs)

#### Thursday

- Full jumping workout with full approach rhythm and short approach jumps
- Speed (60M) accelerations (or bounding if speed work is done on Wednesday)
- Explosive Lifting (lower weight, higher speed)

#### Friday

- Full warm-up only

#### Saturday

- Compete
- Lifting afterward (if home meet of lesser importance)

#### Sunday

- Rest

The order of training exercises during the workout is important. The fastest and most technical activities on any given day are done first. Always jump first. Always do speed/endurance last. The exercises planned for a workout should be performed in the order as follows:

1. High Jumping
2. Bounding
3. Speed (60-80M)
4. Lifting
5. Speed/Endurance (150s)

## Chapter IV. Competition Day

A lot of hard work in practice can be wasted by not preparing properly before and during the competition. The high jump athlete also needs to realize that he is not going to get the same attention from the coach as other event athletes might because of the duration of the event. A high jump competition with dozens of athletes can easily take over an hour to complete, and often over two hours. There should be no aspect of the warm-up and competition that relies on the coach. I've seen too many athletes apparently lost during a competition when they can't find their coach. The athlete needs to be prepared to compete without the coach available to them.

### General Warm-up

Before the athlete even steps foot on the high jump apron for the competition he should have undergone a warm up of at least 15 minutes. Typically the warm-up will be a half-mile jog, then dynamic drills and light bounding, and finally some accelerations. To complete these warm-up activities in time to get practice jumps in before competition, the athlete should on average begin the warm-up 45 minutes prior to event start time. The goal is to have a good sweat going before taking any warm-up jumps.

### Warm-up Jumps

Approximately 20-30 minutes before the competition starts, the athlete should measure out their starting mark. They should begin their jumping warm-up by taking several full approaches with no jump. When they are comfortable with the placement of their mark, they can progress to taking full approach jumps. They should take only enough to further their confidence in their starting mark and their ability to execute a jump. Usually 5-8 jumps are plenty in warm-ups. There are a few things I'd like to emphasize during the warm-up jumping period:

### The "jump-in-front-of-the-bar" Drill

Every high school high jump competition warm-up I've seen has several athletes doing this crazy stunt. They take an approach and jump up in front of the bar, peer over it, then land on the ground on their feet in front of the bar. I think I did this drill in high school and I don't know why, other than all of the other jumpers were doing it. In reality, this may be the single most destructive thing the athlete can do to their approach in the minutes before the actual jumping begins. The only way to *not* go into the mat (and thus land in front of the bar) after executing a full approach is to brake excessively over the final few steps of their approach. The only way to *not* rotate upon planting the takeoff leg (thus land *on their feet* in front of the bar) is to shallow out their approach so they are running nearly parallel to the bar at takeoff, combined with excessive braking. Instruct your athletes to not mimic this drill when others are warming up with it. They should always run onto the pit, under or through the bar.

### Aberration in Starting Mark Location

Many athletes will find themselves too close to the bar after measuring out their starting mark and taking a jump. The increased adrenaline associated with the competition will

often result in the jumper running a little faster causing them to be closer to the bar at takeoff. I got in the habit of just measuring my mark an extra 12 inches back for competitions than in practice. The opposite may also be true. If it is a particularly cold day, an athlete may be required to warm up with more layers of clothing on. The extra weight and constraining effects of the clothes causes the jumper to run more slowly and thus require a shorter run-up. Also, remind the athlete that a head-wind will force them to move their starting mark up and a tail-wind will force them to move their mark back to achieve the same takeoff spot. I've moved my mark back as far as 8 feet in a competition due to weather and physiological effects, although 1-3 feet is more common. The athlete must be prepared to and expect to update their approach starting location throughout the competition.

### **Warming up for Lower-Tier Athletes**

A jumper that is expected to finish in the lower group of athletes should be sure to arrive earlier than most at the mat for warm-ups. The bar will often start low in warm-ups and increase in height quickly as the better jumpers raise the bar for their warm-ups. The window for getting jumps in at lower heights is often very narrow but the athlete must take advantage of this opportunity. It does little good to warm-up at a height above their personal best.

### **Choosing a Starting Height**

Keep in mind that the best jumps are usually jumps 4-8 in a competition. Therefore, the starting height should be chosen such that those jumps occur at the goal height. Therefore, allowing for one miss early on, the athlete should start 3-4 heights below the goal.

### **Misses in Competition**

The quality of every jump should be stressed to the athlete. Just because they get three attempts at every height, the jumper should expect to use all three only once in the competition, that being their final height attempted. The first jump at every height is crucial to make for three reasons, 1) It sends a message to the other athletes, 2) Energy is conserved for the higher heights, and 3) Since a tie at a final height is decided by who made the jump with the fewest attempts, and a further tie is decided by total misses at earlier heights, athletes who generally make their first attempts will consistently place higher at meets.

### **Separating Fact from Fiction on What Constitutes a Miss**

While I do not want to get detailed about the rules of the high jump, there are two rules in particular I feel need clarifying, because of the frequency that I see them misunderstood. First is the rule about aborted attempts (i.e. running through your approach without jumping). Make sure your athlete is aware that he cannot touch anything (standard, mat, ground, etc) beyond the vertical plane of the bar while he is attempting a jump. The jumper can cross the plane of the bar (e.g. his hand can project beyond the plane) so long as nothing is touched. Second, I'd like to dispel a myth that has made its way even into the minds of high jump officials on occasion. It does not matter how fast your jumper

gets off the mat after jumping. If the crossbar falls down before it has steadied, it is a miss. I periodically hear coaches yelling at athletes to quickly get off the mat while the bar is threatening to fall. It is the discretion of the official that decides whether the bar was displaced due to the athlete or an outside influence (e.g. wind). If it is decided that it is due to the athlete, it doesn't matter if the athlete was 50 feet away when it fell. It is a miss.

## **Communication with the Athlete during Competition**

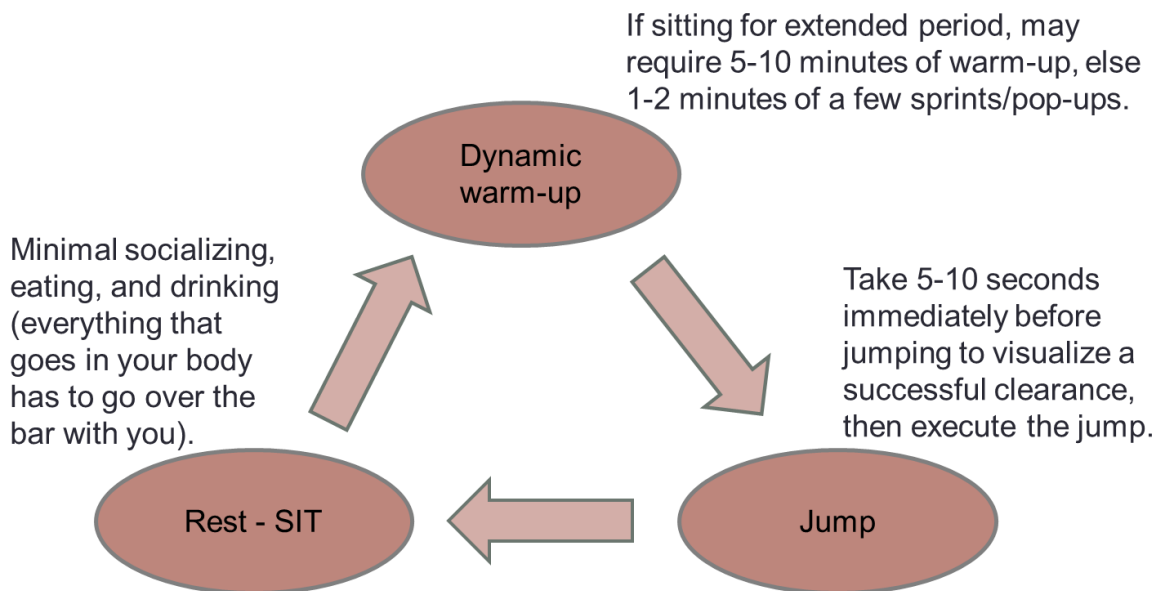
Athletes generally like to know that their coach is watching them during competition, but don't get them in the habit of only jumping when you're watching. In a big competition you may be elsewhere or may be hidden in a crowd. If a jumper takes all of their jumps during the year by first making eye contact with you, the first time he takes a jump without you he will not be concentrating on the jump, but on your absence.

Following a jump, always provide feedback if for no other reason than to reassure them that you saw their jump (this will also serve to lessen the athlete's "make sure coach is watching before jumping" attitude). If there is something they need to change, give them a queue that you've used before in practice, and only one queue. Paralysis of analysis is bad enough in practice. In a competition it will put a quick end to the athlete's day. If they cleared the bar with good technique, tell them that they cleared it by a mile and not to change a thing. Remember that a big competition is not a time to work on new stuff. The athlete should be thinking of nothing besides jumping – not all of the technical nuances that can be picked apart – save those comments for after the competition. Communicate a problem to the athlete only if you know the athlete can fix it.

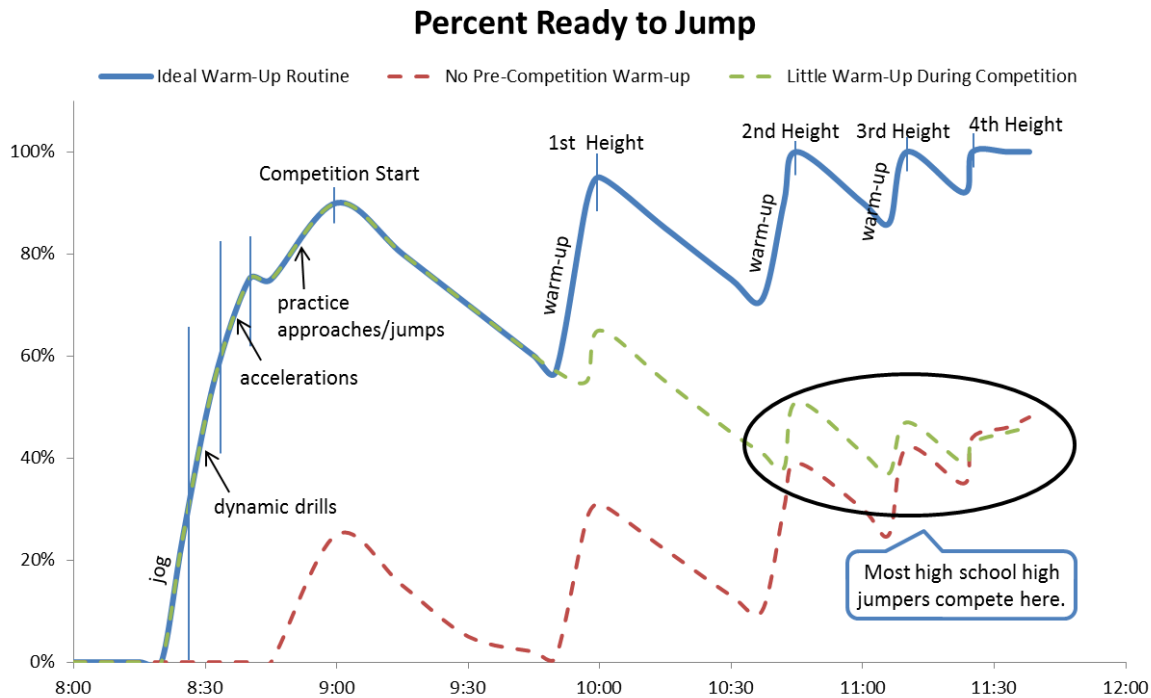
Be prepared to give "sign language" as queues if you will be watching from a great distance. You should always be able to communicate the simple things like "move your starting mark back/forward x inches" or whatever queue you consistently work on without spoken language. Communicating the queue in practice with signs as well as voice most easily does this. During my entire junior and senior years of college, I probably verbally communicated with my coach during competition only a handful of times.

## Athlete's Routine during Competition

Between jumps, unless an athlete is in the current flight of 3 or 5 jumpers, the athlete should sit down. I've seen jumpers spend the whole meet pacing, presumably to stay loose and warm. It is unreasonable to expect a high jumper to "stay warm" for the entire competition. Each time a jumper begins jumping at a height, it should be preceded by a 5-10 minute intense warm-up. This warm-up should not start until the jumper estimates they are 5-10 minutes from jumping. After warming up, the jumps at that height should be taken, and the athlete should immediately sit back down and allow their body to rest and even cool down before the next warm-up and jump. Too many athletes think that since they warmed up before the competition, they don't need to go through any further warm-up during the competition. They sit there and wait for their name to be called, then get up and jump and then sit back down. The problem is that pre-competition warm-up may have happened over an hour ago by the time they start jumping. It is hard to convince an athlete that they need to go through this warm-up, jump, rest cycle, but once they try it, they will not go back to their old routine.



At this point I'll introduce the concept of "Percent Ready to Jump". When the athlete first steps on to the track, they are 0% ready to jump and at the moment they are jumping in the competition, ideally they are 100% ready to jump. The graph below depicts three typical athlete competition routines. The example competition starts at 9:00AM and lasts until nearly noon due to the number of jumpers. The blue line represents the ideal competition routine consisting of a good pre-meet warm-up, followed by cycling through cool-down and warm-up phases throughout the competition. The green line depicts the athlete that does a good pre-competition warm-up, but then pretty much sits throughout the competition, only getting up a minute or two before each of their jumps to do a brief warm-up. The red line depicts the athlete that walks off the bus, onto the track, measures out their steps, does a good HJ warmup at the pit and does a good job of warming up before each of their jumps.



Recognize that a 50%-ready jumper may still jump pretty high and the difference between 50% and 100% may only be an inch or two. This is not shown in the graph, but in reality what will happen with the non-ideal warm-up jumpers above is that they will often miss their first attempts, then be forced to start warming up for jumps 2 and 3 and their readiness will actually get to closer to 80% as their missed competition jumps actually become part of their warm-up for the eventual make.

The following table is a good general guideline for how long an athlete should warm-up before each jump based on how long they've been sitting.

| Time Sitting | Warm-up Minutes |
|--------------|-----------------|
| 5            | 0.8             |
| 10           | 1.7             |
| 15           | 2.5             |
| 20           | 3.3             |
| 25           | 4.2             |
| 30           | 5.0             |
| 35           | 5.8             |
| 40           | 6.7             |
| 45           | 7.5             |
| 50           | 8.3             |
| 55           | 9.2             |
| 60           | 10.0            |
| 65           | 10.8            |
| 70           | 11.7            |
| 75           | 12.5            |
| 80           | 13.3            |
| 85           | 14.2            |
| 90           | 15.0            |

The warm-up should consist of 25% jog, 50% dynamic drills, 25% sprint/pop-ups/HJ simulation. So a 10-minute warm-up would start with 2.5 minutes of jogging, followed by 5 minutes of skips, fast-legs, high-knees, butt kicks, etc, followed by 2.5 minutes of sprints (probably just 2 30-meter accelerations) and a few 1-2-3-4 steps then HJ take-off. Note that of course there is recovery built in there. You're not spending 5 minutes constantly doing drills or 2.5 minutes of constant sprinting. Everything is broken up by 30-60 second recovery breaks.



To sprinkle a little reality on this, a jumper never knows when exactly 10 minutes before his next jump is, so if a 10 minute warm-up is desired, usually what happens is the jumper ends up a little on the high or low side of 10 minutes. In order to estimate their time until the next jump, it is extremely important that the athlete knows where their name is in the calling order and what method the officials are using to go through the names (3-alive, 5-alive, straight-through, etc).

The previously mentioned examples are for an “average good-weather day” a colder day will require more warm-up and a hot day will require less.

## **Wearing Spikes to High Jump**

If your jumper is not wearing some form of spikes, they are at a disadvantage to athletes that are. Long jump, pole vault, and even distance spikes are ok, but high jump spikes have the added advantage of heel spikes and should be worn. The heel spikes are crucial for a solid takeoff plant, especially in slick conditions. Sprint spikes should be avoided because they typically offer no heel cushion at all and try to encourage the wearer to stay on their toes, which is fine, until they need to plant their takeoff foot. Sprint spikes often result in bruised heels and sprained ankles if they are used for high jump. Definitely encourage your athletes to purchase and wear high jump spikes in practice and especially in competition.

## Appendix A: Top 10 Mistakes of the High School High Jumper

### 1. Decelerating Approach/Starting Too Fast

**Observation:** There are always jumpers that start out their approach as if they are in starting blocks, and then put on the brakes during the last three or four steps to decelerate to a reasonable takeoff speed.

**Evidence:** Loud footsteps coming into approach or simply observing a slowing-down as the athlete approaches the bar. Under-rotation observed during bar clearance.

**Why a Problem:** The takeoff is a very explosive action and should result from the most explosive part of the approach. It is difficult if not impossible to generate maximal vertical effort in the middle of a braking action. Braking during the approach robs the jumper of the necessary leans into the curve and away from the bar, which will result in under-rotation – either sitting over the bar or dragging it off with the lower body.

**Solution:** (Review “**The Approach**” on page 5 [HJT&T])

- a. Have athlete start out slower and slower until he/she is able to sustain acceleration through the final steps. This will likely involve shortening the approach since the athlete will be at a high speed for a shorter period of time.

### 2. Approach Angle Too Shallow

**Observation:** Some athletes are running nearly parallel to the bar at takeoff.

**Evidence:** It can be obvious by watching the approach. During the takeoff a parallel runner will also jump into the bar, frequently hitting it on the way up with their shoulder. In the flight phase, the jumper may appear to travel a great distance along the bar.

**Why a Problem:** All lean away from the bar is likely lost resulting in the jumper needing to artificially create the rotations to clear the bar. Takeoff will be a jump toward the bar thus lowering the height of the jump and increasing the chances of dislodging it with their upper body on the way up. Traveling a great distance along the bar increases the likelihood of dislodging it and forces the jumper to clear the bar where it is not at its lowest point.

**Solution:** (Review “**The Approach**” on page 5 [HJT&T])

- a. This is often caused by a jumper’s straight part of the approach being too far from the standard (i.e. too “wide” of an approach). Make sure the athlete’s approach falls within the measurement criteria in the diagram on page 5 [HJT&T].

- b. Make sure athlete begins curve with a lean in step 5, then each following step increases the lean and curve until a 35-45 degree angle of approach to bar is reached at takeoff.

### 3. Cutting the Curve

**Observation:** Some athletes initiate their turn into the 'J' with a cut instead of a gradual turn.

**Evidence:** Stepping outside of the curve to initiate the turn. Approach is the combination of two straight lines instead of a fluid 'J'.

**Why a Problem:** The 'J' curve has been proven to provide the proper body leans at foot-plant and takeoff that result in the necessary rotations to clear the bar. Under-rotation will likely be observed in a "cutter", and the jumper will displace the bar with their buttocks or hamstrings.

**Solution:** (Review "**The Approach**" on page 5 [HJT&T])

- a. Often the athlete is unaware he is not supposed to "cut". Simply educate the athlete of the proper curve. It may help to put pieces of tape down to show a curve, but I do not recommend trying to exactly draw out a perfect curve. That is very difficult to do and very distracting to the athlete if he knows he is supposed to run along this virtual tightrope that is drawn on the ground.
- b. Make sure the athlete begins curve with a lean in step 5, then each following step increases the lean and curve until a 35-45 degree angle of approach to bar is reached at takeoff.

### 4. Insufficient Approach Practice

**Observation:** Many high jump practice schedules have little or no time allotted strictly to approach work.

**Evidence:** Evidence of this can be seen when a jumper takes multiple approaches at a bar with no takeoff. This is also obvious when a jumper has an inconsistent takeoff location or adds/misses steps to his/her approach.

**Why a Problem:** When the jumper puts their takeoff foot down, they must have 100% confidence that they are hitting the same spot, with the same speed and the same leans on every jump. This can only be achieved through extreme repetition, and not always with a jump at the end.

**Solution:** (Review "**Training for Approach Consistency**" on page 9 [HJT&T])

- a. All jump practices should start with 10 approaches with no jump occurring at the conclusion of the approach. The athlete should simply pop up off the takeoff and go under the bar. The bar should be set at a goal height, or higher, so the athlete gets used to approaching a high bar. The key here is to tell the athlete to convince himself that for the first 9.5 steps (for a 10 step approach) they ARE going to go over the bar, then "bail-out" of the takeoff. Pre-approach routine should be as if they are jumping the bar.

- b. A practice does not need to proceed beyond approaches if the quality is inadequate (due to fatigue, injury, state of mind, skill level).
- c. Rest days can include approach work if needed.

## 5. Improper Takeoff Location

**Observation:** Jumpers clearing the bar to the right or left of center. Takeoff locations will vary between jumpers depending on each jumper's speed at takeoff and their flight path, but what should not be different between jumpers is where they clear the bar. Bar clearance should always occur at the very center of the bar (the lowest point).

**Evidence:** Obvious upon observation.

**Why a Problem:** A high jump bar, depending on age, brand, and cross-section shape will bend varying amounts when it is suspended from the standards. There can easily be a 1 inch difference in bar height between the center and the ends of bar. Safety also becomes a concern if a jumper is at risk at hitting either of the standards or missing the landing area.

**Solution:** (Review “**Executing the Jump – The Takeoff**” on page 7 [HJT&T])

- a. Educate the athlete that they **MUST** clear the bar at the center of the bar, and why.
- b. Find out where the spot on the ground is for that athlete to take off such that they clear the bar at the center (trial and error). After finding the ideal spot, when working on this in practice, put a **LINE** of tape down parallel to the bar - not a small piece (i.e. a point), not a box, not a line perpendicular to the approach. The line should be about 2 feet long and the center should be placed at the ideal takeoff spot.

## 6. Non-Vertical Takeoff (Trajectory)

**Observation:** Jumpers not taking off vertically, but jumping into the bar instead.

**Evidence:** The flight path will be lower and longer resulting in the jumper landing very deep in the landing pit (very far from the bar).

**Why a Problem:** Jumping into the bar increases the chances of dislodging the bar with the upper body. Most jumpers that takeoff into the bar do not lean back far enough at foot-plant so they under-rotate while in the air. If they are lucky enough to clear the bar with their upper body after jumping into the bar, their lower body will come into play as they under-rotate and drag the bar off with their hamstrings.

**Solution:** This is not easy to correct with a single cue for everybody. I've gone through a half dozen cues with several athletes before finding one that works for that athlete. (Review “**Executing the Jump – The Takeoff**” on page 7 [HJT&T])

- a. Oftentimes this is caused by too great of speed at takeoff, if this could be the case, experiment with having the athlete slow down.

- b. Make sure the athlete is leaning back and away from the bar when they plant their foot for takeoff.
- c. Place the takeoff spot (w/ mat and low bar) immediately beneath an item the athlete can reach for (e.g. basketball hoop) and try to get the athlete to take off, but try to touch the item and don't worry about clearing the bar. That should give the athlete the right feeling for takeoff, and then work without the prop.

## 7. Immediate Layout/Jumping into the Bar (Body Position)

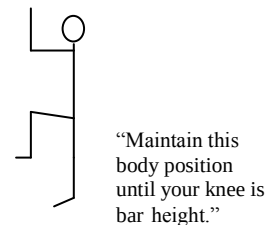
**Observation:** Many jumpers begin to layout immediately upon leaving the ground.

**Evidence:** A rapid shoulder drop into the bar.

**Why a Problem:** This is usually associated with a very “jerky” layout making timing more critical than it should be. Also, there is a high risk of dislodging the bar with the upper body.

**Solution:** (Review “**Executing the Jump – The Takeoff**” on page 7 [HJT&T])

- a. Encourage the athlete to maintain the takeoff body position for as long as they can.
- b. My favorite queue here is to tell the athlete not to even think about starting the layout out until they see their knee at bar height (“Knee to bar, then layout”). In actuality, the layout will begin before then, but the queue has proven to encourage athletes to retain verticality at takeoff.



## 8. Sitting Over the Bar

**Observation/Evidence:** There are always very good athletes at meets that don't jump to their potential because they are in a sitting position when they travel over the bar. It is very frustrating for both coach and athlete. This observation is really the evidence of underlying problems.

**Why a Problem:** The jumper that sits over the bar robs themselves of 6-10 inches (or more depending on severity) of height on each jump.

**Solution:** (Review “**Bar Clearance**” on page 8 and “**Not Enough Somersault**” on page 15 [HJT&T])

- a. Step one is understanding that this is not something that can be fixed after takeoff. You can tell the athlete to lay their head back, project their hips, and arch their back as much as you want, but they will still be sitting over the bar.
- b. Fundamentally, this is a rotation problem that can only be fixed on the ground, where all of the rotations are generated. Since all rotations

are created by a good approach, don't even start looking at the flight until all of the approach problems are fixed. If an athlete runs the proper curve with sufficient speed and the correct takeoff position they should automatically rotate and their hips will come up. Rarely have I seen a "sitter" that has a good approach. This cannot be fixed in one practice. I would typically spend 3+ practices just doing approach work and scissor jumps before letting the athlete layout over a bar.

- c. Sometimes you will come across an athlete that is completely resistant to getting their hips up. Even with a decent approach, somehow, subconsciously, they find a way to sit over the bar, most likely by altering something at the instant of takeoff to reduce rotation. This athlete must be taught how to land on their shoulders and the best way to do this is with back-overs (see "**Back-Overs**" on page 13 [HJT&T]). The "sitter" will most likely carry the sitting form into the back-over exercise. Until they can do a back-over and **land on their shoulders with enough rotational momentum that they roll over backwards on to their knees after landing**, there is no hope of breaking the sitting form. Keep lowering the bar until they can do the drill successfully, and then gradually raise it. Hundreds of repetitions of this may be necessary over the course of a couple months to completely rid the athlete of the "sit".

## 9. Spending Too Much Time in Practice Jumping

**Observation:** Many high jump practice schedules focus too much on jumping over a bar in practice.

**Evidence:** Evidence of this can be seen when a technically superior jumper is chronically injured or has low personal best marks.

**Why a Problem:** Full approach jumping is difficult in practice. It is hard on the lower legs, increasing the likelihood of injury. It is a tiring event resulting in shortened practices and less time to work on technical issues in the jump. It takes valuable time away from the weight room and track in many practice schedules.

**Solution:** (Review "**Importance of Balanced Training**" on page 19 and "**Workout Plan**" on page 27 [HJT&T])

- a. Rarely if ever should a week consist of three days of full approach jumps (two practices and a meet). One or two is sufficient. Other HJ practice days can be spent on approaches w/o a jump, or short approach jumps. Toward the end of a season, if the athlete is comfortable with their full approach, the athlete may only need to take a few full approach jumps in practice each week, simply to retain confidence for the meet.

## 10. Improper Competition Warm-up Strategy (Both Before and During Competition)

**Observation:** I am amazed at the quantity of jumpers that show up just minutes before competition is set to begin and thus start the competition with little or no warm-up jumps. Jumpers often just sit down the entire competition, getting up only to jump. Conversely, some jumpers will stand through the entire competition.

**Why a Problem:** Inconsistent or poor jumps early in the competition can result from not properly warming up or practicing the jump before competition begins. Most athletes should start doing some kind of acceleration or something to stimulate their legs approximately five minutes before each jump. Standing throughout an entire competition causes fatigue to accumulate.

**Solution:** (Review “**Competition Day**” on page 28 [HJT&T]) The athlete should....

- b. Warm up before going to HJ area.
- c. Show up at HJ area 20-30 minutes before start time and measure out the approach.
- d. Start out by taking 3-5 full approaches with no jump (go under or through the bar).
- e. Take as many full approach jumps as necessary to become comfortable with the approach mark (which may vary a foot or more from the practice mark).
- f. After the pre-competition warm-up, SIT DOWN (if athlete’s other events allow)!
- g. Before each jump in competition, spend a few minutes getting warm again. Run a couple 30-meter accelerations and do a few pop-ups away from the HJ pit.
- h. SIT DOWN during long breaks between jumps. The athlete that never sits will end up standing up for an hour or more in large competitions.

## Just Out of the Top 10....

**11. Not wearing spikes:** Spikes offer a tremendous advantage. HJ spikes are best, but any spikes are better than training flats.

**12. Wrong starting height:** Start 3 to 4 heights below the goal height.