

2013 Wisconsin Track Coaches Association Clinic  
**A DIFFERENT TECHNICAL MODEL AND  
APPROACH TO TEACHING THE POLE VAULT**

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Most coaches employ a teaching methodology of developing and repeating motor patterns that emulate the correct technique used by top pole vaulters in the world. After years of experimentation, luck, biomechanical analysis and experience, this lecture and learn by doing session will demonstrate a new model and different teaching methodology that can greatly enhance the efficiency of the vaulter and decrease the learning curve of a top athlete.

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# A NEW MODEL AND APPROACH TO VIEWING POLE VAULT TECHNIQUE

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## INTRODUCTION

The Pole Vault World has often debated the value and technique of what a "free takeoff" is. The most commonly accepted free takeoff model is one in which the vaulters body, just prior to the pole tip contacting the back of the box, is fully extended, with a slightly outside step (see diagram 1.1). This article raises the question of whether this is a true "free takeoff".

When theorizing vault technique, is it possible for a vaulter to takeoff without any hindrance? In other words, is it possible for a vaulter at takeoff, to jump freely, without any counter/negative force while the pole moves to vertical (and beyond)? In the current model, the free takeoff is solely about position and/or taking off prior to the pole tip hitting the back of the box, not about using pole drop/timing technique to allow the pole to move freely to vertical, without hindrance to the vaulter.

To my knowledge no one has ever mentioned this type of truly free take-off. We often view and teach the vault in parts (run, plant, swing, flyaway). After witnessing a drill/technique in which a pole can be taken to vertical (and past) without the need to push the pole physically, this article proposes that we look at the vault at a different angle and change our teaching methodology.

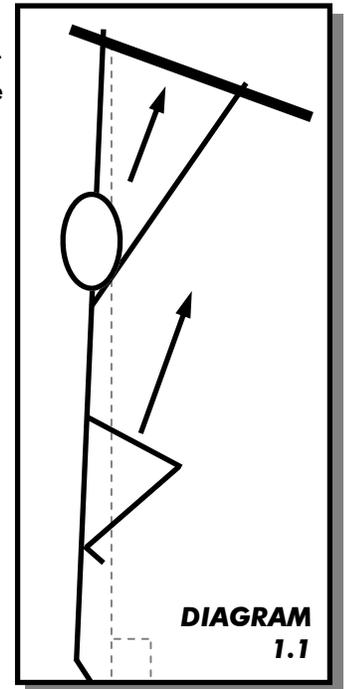
## THEORY

The theory is that by using this new model, **a truly "free take-off"**, which has no counter force exerted against a vaulter, can be accomplished. The result being that a vaulter will be able to:

- Maintain proper running posture
- Have a higher take-off angle
- Have a higher take-off velocity
- Use stiffer and longer poles
- Swing faster, rotate earlier and raise center gravity faster (catch ride)
- Clear high bars

The margin for error of a world class pole vaulter is extremely small compared to an average vaulter. The vaulter and the pole must become one unit/one system which depend on each other in order to produce successful vaults. Due to the size and weight of the poles used by elite athletes, the run, pole drop and plant/delivery are the most important components which must be executed precisely and consistently in order to vault successfully. Proper execution will reduce weight load on a vaulters run (pole should feel weightless if done correctly) while failure to do so will cause the vaulter to lose proper posture, use poor technique and decrease vault clearance heights.

**Vaulters must train consistently from their long run in order to be successful.** This technique requires precise and consistent timing which can only be developed by training/practicing with the competition run (long run). Vaulters who train primarily using short runs will have a very difficult time developing the precise timing and technique from a long run which is necessary to be successful at the world class level. It will be difficult to consistently accomplish this technique perfectly, however, the closer to perfecting this technique, the better.



# A NEW MODEL AND APPROACH TO VIEWING POLE VAULT TECHNIQUE

## TECHNIQUE

A vaulters run should begin with their pole at a 75 degree angle. This angle must be maintained until 4 lefts out (See Pole Vault Run, Triangle 1) when the vaulter initiates the pole drop. During the drop the vaulters speed must increase (accelerate) and only the weight of gravity should aid in the pole drop. At the last left/takeoff (See Pole Vault Run, Triangle 2), when the pole tip reaches around eye level, the vaulter should initiate the plant with his/her arms. This pole delivery is mandatory in order to accomplish the free take-off. There may be slight distance variations among different vaulters, however this is the basic model.

The need for a balanced take-off is important to allow the left arm to be in a position which places the body in an "elastic" position that allows the vaulter to swing, quickly and freely, to vertical. With this take-off model it is not necessary that the left arm be completely extended for a vaulter to be successful.

After witnessing drills and technique used by many former Soviet Republic Coaches, it can be assumed that they understand this concept, however their thoughts and ideas may have been lost, mistranslated or never stated (kept secret).

## DRILL

### POLE BOUNCE

[www.usapolevaulting.org/articles/videos/polebounce.mpg](http://www.usapolevaulting.org/articles/videos/polebounce.mpg)

Standing in place, with the pole held at an angle of around 75 degrees, the vaulter allows the pole to fall (be lowered) without aid, assistance or hindrance, allowing the weight of gravity to lower the weight of the pole. Once the pole tip reaches a height around eye level, the vaulter shall initiate the plant with his/her arms. If done correctly the pole will store energy and rebound out of the vaulters hand, traveling to vertical and beyond without additional physical aid (tip of the pole should remain solidly on the ground). This drill is a technical, timing and patience drill which must be practiced continually to achieve a consistent result. An improper or poor plant/pole drop (too early or too late) will result in the pole returning energy negatively towards (against) the vaulter, however a well executed plant will place energy in the pole and aid a vaulter to take-off upwards rather than inward.

### SAND PIT PENETRATION

[www.usapolevaulting.org/articles/videos/sandpitpenetration.mpg](http://www.usapolevaulting.org/articles/videos/sandpitpenetration.mpg)

The Sand Pit Penetration emphasizes the timing of the pole drop in order to use the pole as an aid in developing penetration and pole speed. From a short run about 4 to 5 lefts out into a sand pit, using a slightly narrower than normal grip, on a pole above the vaulters weight, have the vaulter try penetrate/move pole to vertical and beyond. The higher the grip, the better the mastery of the pole plant/delivery. This drill emphasizes the technical components of this new technique and the importance of the pole drop to the success of a vault, with the distance factor (step) isolated out of the drill.

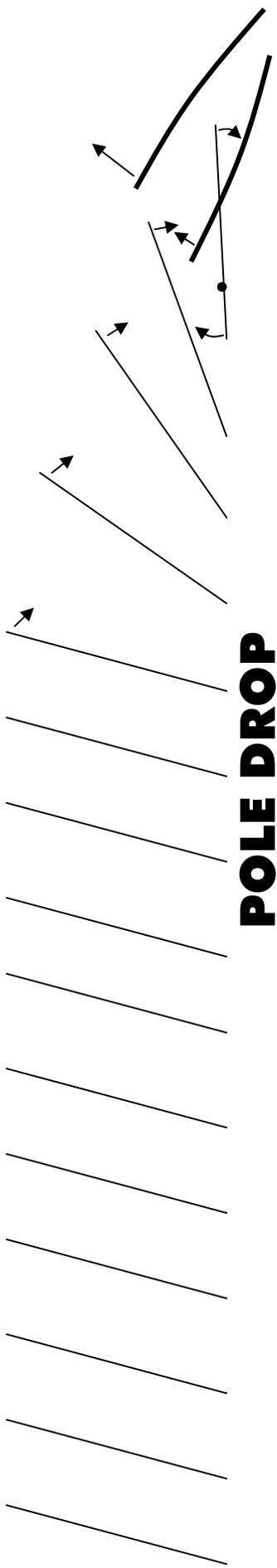
The sand penetration drill used by Petrov and Isinbayeva is a great example of how this technique is being applied.

## TEACHING METHODOLOGY

- Explanation of theory/technique
- Plant Mechanics (see The Takeoff Article)
- Pole Drop /Run System (see Pole Vault Run)
- Pole Drop Bounce
- Sand Pit Penetration
- Development of full vault run off of runway (develop running and pole drop rhythm/consistency)
- Implementation of full vault run on the runway

# POLE VAULT RUN

## triangle system

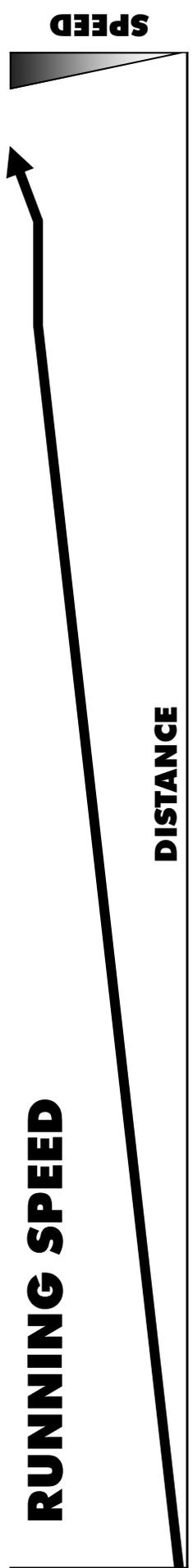


Approximate distance it takes for the pole tip to fall, with the weight of gravity, from 75 degrees to around eye level

### TRICK STEP



- ATHLETES**  
*Optional*
- COACHES**  
*Optional*
- TRIANGLE 1**  
*Fole drop begins*
- TRIANGLE 2**
- Fole Tip height is around eye level
  - Center of gravity must rise
  - Arms must initiate the plant.
- TAKEOFF**



# THE TAKEOFF

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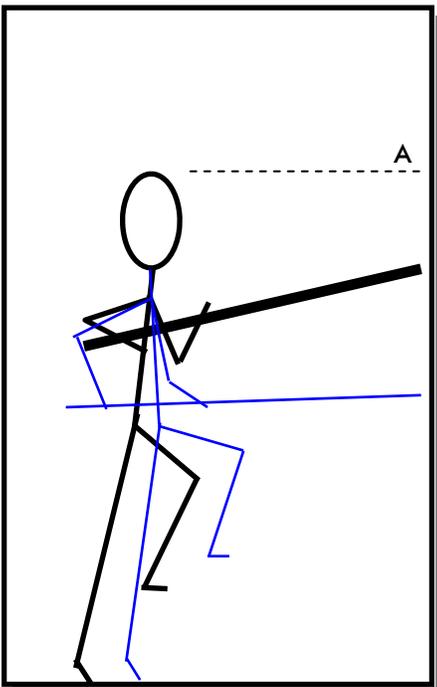


The takeoff (plant) is the most important technical aspect of the pole vault. It is responsible for transferring running energy( speed) into the pole and setting up the swing/rockback. As the efficiency of the plant increases, a greater amount of energy is transferred to the pole, allowing for the use of stiffer poles and increased clearances.

Previous biomechanical studies have shown many vaulters to be inefficient in the transfer of running energy into the pole (1991 Tokyo World Championship Biomechanical Study). Often, coaches have utilized set up techniques which produce inefficient takeoffs. This causes vaulters to be consistently under their top hand at takeoff. Adjusting the running distance (step) will not alleviate this problem. In order to increase efficiency at takeoff, maximize pole size, swing ability (rockback) and heights, coaches and athletes should consider converting to this European/Russian plant teaching system.

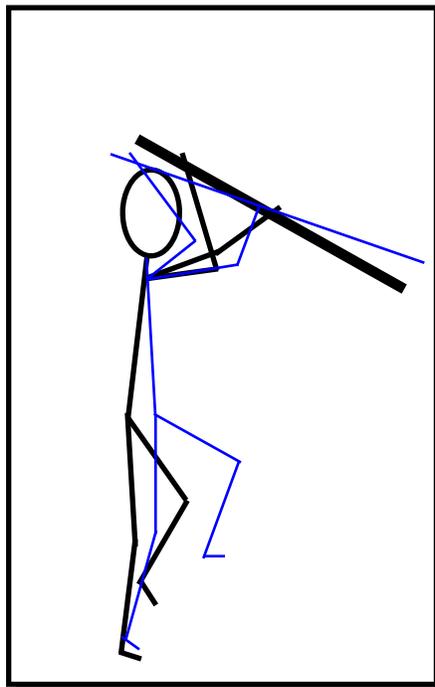
These methods utilize a takeoff placing the pole vaulter at a 90 degree angle, perpendicular to the pole. An example can be demonstrated by placing a pole horizontally supported at each end. Bending of the pole is most efficient when force is applied at a 90 degree angle (perpendicular to the pole). Any angle greater or lesser than 90 degrees would result in lost energy. The pole vault takeoff should emulate this concept (figure 3). Set up should prepare the vaulter to takeoff at this angle.

The following diagrams demonstrate a three phase model of this takeoff (the model is a right handed vaulter: left foot, right foot, takeoff). The light colored figures represent set up techniques resulting in inefficient energy transfer.



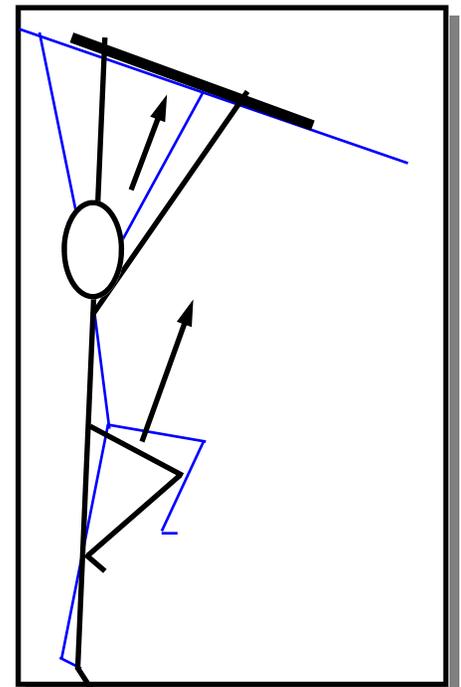
Left Support Phase (Fig. 1)

- A Right hand is parallel to the body, not behind it.
- B Both arms are tucked up high (forces the vaulter to plant forward).
- C Body is in a slightly forward sprinting (power) position.
- D Pole tip is at position at about the top of head level (A)



Right Support Phase (Fig. 2)

- A Both arms are in front of the head (the arms guide and the body follows behind).
- B Body is in a balanced position.
- C Left leg is cocked and ready for a explosive takeoff (penultimate step).
- D Arms are ready to help jump



Takeoff Phase (Fig. 3)

- A Arms and body are creating a 90 degree angle with the pole.
- B Both arms are extended and equally placing pressure into the pole.
- D Body and foot are fully extended prior to the pole impacting the back of box.

# NARROW GRIP DRILL

## A BETTER DRILL FOR A NEW GENERATION OF POLE VAULTERS?

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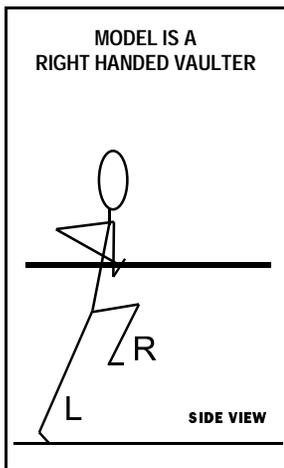
For many years, Americans have used the rockback drill (swinging to the upside down perpendicular position by straight poling) to help develop the swing. When comparing the current pole vaulting technique used by the Europeans, Japanese and Russians, it is apparent that this particular drill has outlasted its usefulness.

DRILLS ARE USED TO HELP DEVELOP DESIRED MOTOR PATTERNS IN AN ACTION. In developing motor patterns there are two major principles when using drills:

1. The closer a drill emulates the desired motor action, the better the transfer rate. Example = The closer a drill emulates the actual vault, the more effective the drill.
2. A drill which is repeated over and over, will eventually form a motor pattern. Example = A technique (good or bad) which is constantly repeated in a vaulting drill will be transferred to the actual vault.

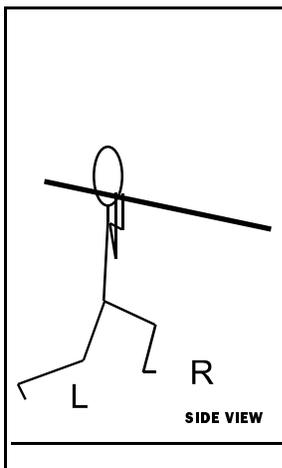
The rockback drill which is currently being used by most vaulters in the US develops few beneficial techniques, while fostering many harmful ones. The narrow grip drill is a better drill, which develops the benefits of the rockback drill without its harm.

**The narrow grip drill is essentially the same as the rockback drill except that the hands are placed as close together as possible.**



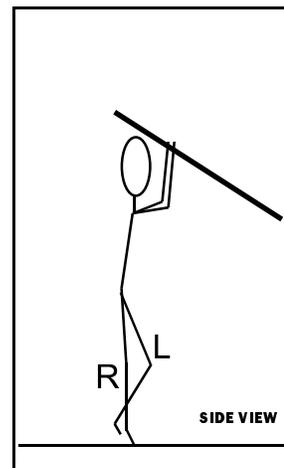
LEFT SUPPORT PHASE  
Figure 1

- \* Right hand is in front of the hip not behind it
- \* Both arms are tucked up high (forces the vaulter to plant forward)
- \* Body is in a sprint position with a high center of mass
- \* Pole is at a parallel position to the ground
- \* Arms initiate the plant (arms move before the leg)



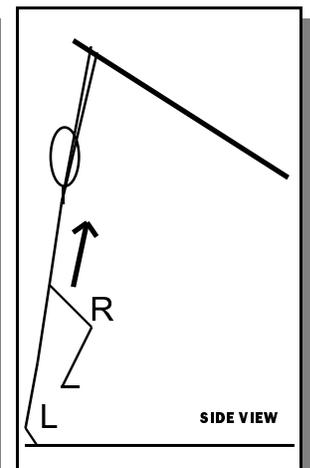
TRANSITION PHASE  
Figure 2

- \* Phase between Left Support Phase and Right Support Phase
- \* Both wrists flip pole up
- \* Arms leading legs
- \* Both arms are moving forward and up
- \* Both arms are in front of the head before right foot touches ground



RIGHT SUPPORT PHASE  
Figure 3

- \* Both arms are in front of the head moving forward and up
- \* Body is in a slightly forward sprinting (power) position
- \* Left leg is cocked and ready for a quick explosive takeoff (penultimate step)
- \* Center of mass is slightly lowered



TAKEOFF PHASE  
Figure 4

- \* Arms and body are creating a 90 degree angle with the pole
- \* Both arms are extended and equally placing pressure into the pole
- \* Body and foot are fully extended when the pole impacts the back of the box
- \* All force is placed upward into the pole (arrow)
- \* Shoulders are square with the pole and balanced

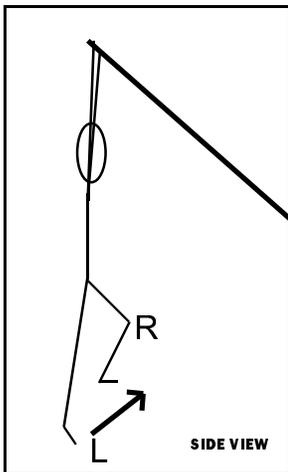
## ROCKBACK DRILL

Benefits	Harmful Effects
◆ Develops a long swing	• Teaches to collapse arms in order to swing
◆ Develops turning in front of the bar	• Allows vaulter to swing, even when under at takeoff
	• Allows vaulter to “muscle” the pole drop
	• Allows vaulter to set up the plant late
	• Allows the vaulter to carry the pole behind the hip

## NARROW GRIP DRILL

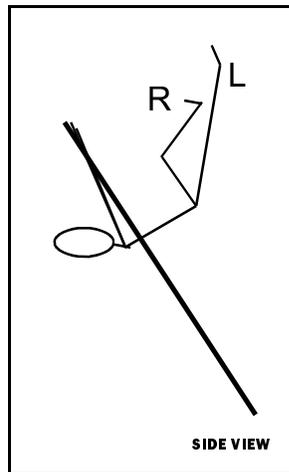
Benefits	Harmful Effects
◆ Develops a long swing	•
◆ Develops turning in front of the bar	•
◆ Develops keeping arms extended throughout the swing * Allows energy loaded in the pole to be conserved	•
◆ Develops a proper take off * Free takeoff / Unobstructed takeoff * Body must be tall and fully extended * All energy is focused upward into the pole * Does not allow the vaulter to swing when under at the plant	•
◆ Develops an early and proper set up * Arms initiating the plant * Arms continually driving upward	•
◆ Develops a proper pole carry * Vaulter must use proper pole carry mechanics/timing	•

### THE NARROW GRIP DRILL FORCES PROPER TECHNIQUE AND DEVELOPS CORRECT MOTOR PATTERNS



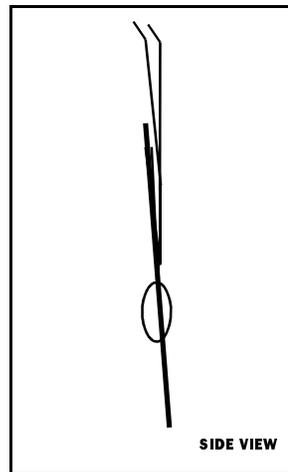
**HIGHBAR PHASE**  
Figure 5

- \* Both arms are extended directly overhead and rowing forward
- \* Both arms are placing equal pressure upward into the pole
- \* Trail leg is extended and swinging upward
- \* Right leg is in a well balanced position (flamingo position)



**SWING PHASE**  
Figure 6

- \* Both arms are extended and rowing forward, keeping energy in the pole
- \* Trail leg is straight (transferring horizontal energy into vertical energy)
- \* Rotation of the body occurs mostly at the shoulders



**VERTICAL PHASE**  
Figure 7

- \* Vaulter is in a rigid extended position
- \* Both arms are extended (keeping energy in the pole)
- \* Right arm is actively rowing toward the right hip and continuing on through
- \* Lead leg extends

### 10 KEYS TO SUCCESS

1. Maintain a high center of mass.
2. Takeoff should be smooth (no shock).
3. Balance, Balance, Balance (be balanced).
4. The higher the grip (with fast pole speed) the better.
5. On the left support phase (fig. 1), drive body upward to allow time/space to get the right support foot and takeoff foot get directly under center of gravity for maximum power (penultimate).
6. Beginner drill progression: A. Swing into a sand pit (no swinging to vertical phase). B. Swing to vertical. C. Spread hand grip and vault (bending pole).
7. Keep hands close together (touching).
8. Keep arms fully extended from takeoff on.
9. All energy must be driving upward at takeoff (arms, body, legs).
10. Mastery of this drill occurs when the vaulter can take a full vault, bending a pole above his/her body weight (on a pole 2 feet shorter than his/her biggest pole) from 3 lefts or 3 rights.

# THE POLE VAULT

## arm action during the swing

The arm action during the swing can be the difference between success and failure of a vault. During the swing phase the arms should constantly apply down force through the pole to create forward movement (Figure 1). This action “rolls” the pole forward and allows greater penetration into the pit.

Allowing the bottom arm (left arm for right handed vaulters) to collapse completely inward, stops the forward momentum and lifts the vaulter prematurely. By keeping energy in the pole, the athlete is lifted higher, faster and is able to create a wider window of opportunity to make the bar (Figure 4, Top).

With this technique in mind, it important that athletes are not taught to collapse their bottom arm completely to swing. Drills such as the standard rockback drill require athletes to break their bottom arm to swing. Inefficient drills will develop poor motor patterns and inhibit improvement. The “Narrow Grip Drill” (straight pole drill with hands touching together) forces the athlete to row/apply down force throughout the vault in order for success.

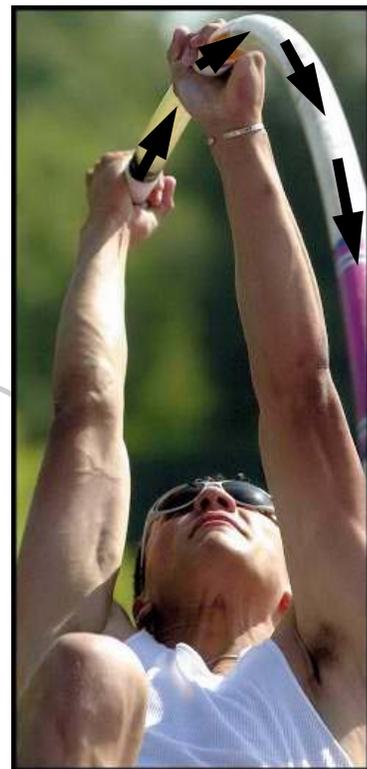


Figure 1

## TIPS

- Take the “ESCALATOR” (A) not the “ELEVATOR” (B) (Figure 4). Elevator goes straight up and straight down.
- Keep the arms moving forward in the “PLANE” of the runway (Figure 2). The arms should always move in the plane and not stray outside.
- Body should rotate around the axis (pole), not in the axis (Figure 3). Staying tight with the pole does not allow the athlete to keep energy moving forward.
- Keep arms locked out as much as possible throughout the swing (at least until the body is in vertical position).
- Mastery is when the athlete is able to flyaway with speed over the bar without stalling out on top of the bar. Athletes who “pike” over and “Volz” the bar may need to improve their technique with this arm action.



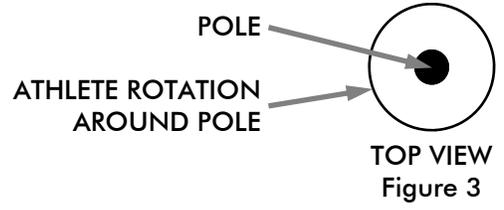
Figure 2

## MPEG

Check out an MPEG of this technique at

<http://events.mtsac.edu/usatfpv/pv1.mpg> or

<http://events.mtsac.edu/usatfpv/pv2.mpg>



WINDOW OF OPPORTUNITY

