

ROUND TABLE: POLE VAULT

By Gerald Baudouin, John Gormley, Serge Miroshnichenko, Alex Parnov, Steve Rippon and Mark Stewart

Mark Stewart convened this round table discussion on pole vault. Although all except one of the participants in this discussion is now Australian, from the background of the coaches it can be seen that as a group they have been exposed to ideas from all three of the great pole vault schools, American, French and Russian. Re-printed with permission from Modern Athlete and Coach.

Gerald Baudouin is the head pole vault coach at Institut National du Sport et de l'Education Physique (INSEP²) in France and is a former pole vaulter with a personal best of 5.80 metres in 1994.

John Gormley's professional background was as an academic specializing in the interpretation and practical application of biomechanics in physical education and coaching. He has been coaching pole vault for many years, and coached the women's gold medalist at the 2002 Commonwealth Games.

Serge Miroshnichenko was a professional athletics coach in the USSR/Russia from 1979 to 1998 and coached many international pole vaulters during this time. Since moving to Australia he has coached elite pole vaulters in South Australia and Queensland and again has produced a number of pole vaulters, including 2003 World Youth bronze medalist Charmaine Lucock.

Alex Parnov. Before moving to Australia in 1996 Alex was a pole vaulter (personal best 5.82 metres in 1985) and a coach in Russia. In Australia, Alex has worked in Adelaide and Perth coaching numerous international pole vaulters including the 2001 World Champion Dimitri Markov.

Steve Rippon is currently a professional athletics coach in the United Kingdom, but has previously coached in Australia and in the United States. He has produced many world class pole vaulters, including Paul Burgess whom he coached to the 1996 World Junior Championship gold medal.

Mark Stewart was Athletics Australia's national event coordinator (pole vault) from 1999 to 2002, and has coached many international pole vaulters, including Emma George. Mark coached Emma from the middle of 1994 (at which time she had never pole vaulted) until the end of 1997, by which time she had set 10 World Records.

Although there are a vast number of technical aspects to pole vaulting, most coaches have a few key points that they see as being critical. Please list some of the technical parts of pole vaulting that you see as being the most important.

Gerald:

The relationship between the run up, presentation and impulsion. This phase effectively determines how the athlete undertakes the vault. She / he must store the largest possible amount of energy in the pole, as this gives "life and joy to the pole".

The support phase of the pole. The vaulter must conserve the energy in the pole through a closure procedure (closing the angle between the arms and the trunk) coupled with an optimal final straightening up to benefit fully from the power in the pole.

John:

All the 'S's' need to be performed Strongly and explosively: Stretch upwards, Swing from hands, Swing body around shoulders, Shoulder swing, Stick the hips close to the hands, Spiral hips close to and along the line of the pole, Spring vigorously from the final push off hand.

Serge:

Pole vaulting consists of:

- the run up
- plant preparation and plant
- plant and take off
- pole penetration and upswing
- pull, turn and push
- bar clearance

Each element must be done efficiently, and as such I am concerned with all of them to the same extent.

Alex:

The transfer of the energy produced from horizontal velocity into the pole.

Steve:

The take off is the most critical part of the vault. Everything that happens before the take off must ensure that the take off is as efficient as possible. Everything that happens after the take off will be as a result of the take off. An effective plant and pole lower is crucial. If the take off does not allow for enough space between the vaulter and the box then the vaulter will not be able to turn the pole over effectively. The connection between trail leg swing (the tap) and bottom hand is also crucial.

A deep swing (tap) in connection with the bottom hand will roll the pole forward and keep the bend in the pole until the vaulter reaches a full rock back. This will allow for the vaulter to extend with the pole and increase the vaulter's push.

Mark:

All aspects of the vault are critical, but if I had to pick one it would be the plant and take off. One of my favorite sayings is, "no time spent on your plant is ever wasted"

Describe the main physical qualities to be developed in pole vaulters and in what priority.

Gerald:

Power: Power is the expression of strength with a high degree of speed. My priority is to make a vaulter powerful. I feel that the technical approach is more important to pole vaulting but through optimal physical ability. When an athlete finally vaults correctly from a technical point of view, it is then easier to exploit his/her strength, speed and power; "jump well if you want to jump higher and better".

Speed: A pole vaulter must be able to run as well as jump. These qualities are fundamental and complimentary. Again my athletes must be technically skilled when jumping (an important French aspect) by being strong and fast (this is the ideal, but it is difficult to obtain).

John:

An efficient musculo-skeletal and neuromuscular adaptability and responsiveness to developmental technical training.

Serge:

The physical qualities of pole vaulters are force generation, endurance, flexibility, speed, dexterity and coordination. In addition the vaulter should possess magnificent powers of concentration to be able to achieve good results, but this is not a physical quality, it is a mental skill. I do not give a priority to any of the set forth above qualities. I think that the excellent athlete should have this symbiosis.

Alex:

Speed and power.

Steve:

Pole vaulters are all round athletes. They must have a varied number of physical qualities to be successful at the highest level. Speed is the most important quality. It is not possible to be a world class vaulter and to be slow, even if extremely tall. Power, agility (gymnastic ability), strength and then flexibility would be the order I would place on the other physical qualities.

Mark:

I always look for athletes that are fast and are average height or taller. These two qualities are innate, while the other aspects of pole vaulting usually can be taught.

It could be said that the mental approach to pole vaulting is as important as the physical and technical aspects. Please explain why you agree or disagree with this. How do you train the mental facets of vaulting?

Gerald:

I totally agree with this as the psychological factor plays an important role. A vaulter can be technically good, run fast, be very strong, but not jump the highest if s/he does not have the mental qualities required. The physical and technical qualities can only help if the athlete is confident within himself/herself and the pole. Unfortunately, in France mental training is not advanced. Personally, I use a daily exchange method, using observations and advice to help with mental problems. If I do not find a rapid solution to a problem, I advise the athlete to work with the appropriate person. I would like to work more on the mental aspects but for the moment this is difficult in France.

John:

I agree, but it is only at the elite level that I believe the mental aspect is of equal importance to the physical and technical aspects. At the elite international level,

in the case where the individual has already achieved peak physical condition and mastery of the technical requirements of vaulting, the mental aspect of performance can be ranked as even more important than either physical or technical preparation.

Serge:

I agree that the intellectual approach to pole vaulting is as important as the physical and technical aspects. The sport requires athletes to be able to make instant decisions in complex situations. If it is the weather, an inconvenient wind or the terrible rule that does not allow the vaulter enough time to concentrate on the jump, an athlete must instantly be able to make decisions. For example, vaulters are required to make decisions about increasing their grip on a pole or to reduce it, increasing their speed at the start of the run or reducing it, and/or using a heavier pole or not. Therefore, the athlete needs to possess a high level of intellectual ability to be able to achieve high results. On the question of how I train this, I cannot answer briefly, but it involves using exercises that move from the simple to complex.

Alex:

The mental processes must be balanced with all aspects of pole vaulting.

Steve:

The mental facets are as important as the physical and technical ones. When I have coached athletes from early in their career I have had fewer problems with the mental facets of vaulting. If an athlete has good technical ability and is able to control the pole in all circumstances then it is easier for them to be mentally strong. Having a good set of poles that make the transition from one pole to the next easier also helps. I try to instill a tough approach in my vaulters by not allowing run-throughs.

Mark:

A super athlete with great pole vaulting technique will under-achieve if they are not mentally strong. I find this by far the most difficult aspect of pole vault coaching. My athletes have often sort help from sports psychologists when they are having mental problems; however the results of this have been mixed. I think it very difficult for some one who has never pole vaulted (even trained sports psychologists) to appreciate the sort of fear that goes through a vaulter's mind when they are having mental problems. I am still looking for answers to this question.

Do you train your pole vaulters on short run ups (4 steps, 6 steps, 8 steps etc...) progressing gradually back to a full run up? If so explain why, if not explain why not.

Gerald:

My pole vaulters jump using shorter run ups, from two strides to a complete run up over one training year. When starting back training, during the first two months, we do exercises on inflexible poles from 2-4-6-8 strides with many repetitions. This work is carried out according to the individual requirements of each vaulter and in accordance with my own technical convictions. Afterwards, we use sessions with 6-8-10-12 strides and a flexible pole. These sessions allow the jumpers to reproduce all of the previous two months work while executing complete jumps. During the pre-competition and competition periods, they vault using full run ups, or full run ups less two strides. This is used to correct and feel the new technical sensations brought about by the previous training.

John:

Yes. The 4-6-8 step run ups provide a progressive sequence that establishes an accurate and consistent take off foot placement, timing and rhythmic patterning of a 3-step plant action. A sequence progressing from 8-12-16 steps maintains the 4-step rhythmic unit structure and facilitates development of a positive acceleration during the final rhythmic unit that culminates in the take off. The process is logical.

Serge:

Yes, I use this system and it is the basis of my year long preparation of athletes. This system is the most flexible and effective and allows the coach to use the principle of graduation.

Alex:

Yes, this is the basis of my philosophy about pole vault.

Steve:

I use short runs a lot in the preparation phases, when the volume of training is high and the intensity is low. Being able to do 40 to 60 jumps in a session off a short run is beneficial in this phase. I very rarely use a hard cross bar off a short run, preferring to work on the shape of the vault rather than making athletes push hard off each step to achieve a result over the bar. I find that a vaulter will make the same mistakes off 8 and 12 steps that they make when using a full approach, so it makes sense to practice the movement patterns on a short run many times, rather than on a long run a few times.

Mark:

Yes, I use this method for all of my vaulters. It is an excellent way of teaching the event and of correcting mistakes in experienced vaulters. Early in an athlete's career the use of short approaches can lead to good results quickly. Once a pole vaulter has matured (having vaulted for a number of years) the emphasis needs to change toward teaching them how to vault well on a full approach.

Briefly describe your philosophy on running for the pole vault. List examples of the types of running drills and running sessions you use in the various phases of training.

Gerald:

My philosophy concerning the run up is for the athlete to obtain his/her optimal speed, meaning the fastest possible speed coupled with the greatest amount of efficiency at take off. For this, I do power work before speed work, with the latter being carried out leading up to competitions when training volume is reduced. Power work involves using short runs with small hurdles (15 to 30cm in height) with a gap of 2.10 to 2.30m, both with and without the pole. Longer sprints are also used over 100 to 200 metres at 80-90% of maximum sprinting speed. Running up hills also develops power. Either running up slight slopes over 80 to 200 metres, or steep slopes over 20 to 60 metres. The speed work involves flying start sprints over 10 to 30 metres or standing start sprints over 30 to 50 metres. Sprinting with the pole using the full run up is also used.

John:

Fast running in the pole vault has unique specific requirements in regard to the arm actions that normal sprint training practices and drills do not address. Since both arms act simultaneously and in concert with each other their action is quite unlike the alternating arm drive in normal sprinting. My view is that progressive practice drills (walk, jog, run, sprint, sprint down slight inclines etc.) whilst carrying a pole are essential to develop and train a fast and effective pole vault running action pattern.

Serge:

To discuss running for the pole vault it is necessary to talk about the year long preparation of an athlete. The year plan can be divided into three major phases, the preparatory and competitive periods and the stage of productive leisure. The duration of each stage depends on the individual athlete. Each phase has tempo and endurance running and fast/power running, but the ratios of each type of running change as we move through the phases.

Alex:

The pole is supposed to be like a part of the athlete's body.

Steve:

The running stride should have a short recovery side. The knee needs to move forwards and upwards so that the heel can move forward as it recovers from the ground strike. The foot needs to be dorsiflexed and 'grab back' into the track in an active movement. The shape of the running stride is oval like an egg. I prefer a high volume, low intensity running program in the preparation phase. As the volume drops the intensity increases. I normally use a 12 week program in this, starting with sessions of 3000 metres in total volume (3 x 1 kilometre runs) in week one, reducing this to 1000 metres (10 x 100m) in week 12. I use a wide variety of running drills. Some of these are intended to influence conditioning, some technique and some for warm up. All drills concentrate on the running model I described above.

Mark:

I often organize for my pole vaulters to work with specialist sprint coaches as they have more expertise in this area. I was also fortunate to have recently spent time in France and learnt a great deal about pole vault running technique from the excellent coaches there.

In a few words express your philosophy on weight training and its relative merits in the training process. List examples of the types of specific strength exercises you use in training.

Gerald:

My muscle conditioning philosophy is simple; gain strength while keeping the fastest possible execution speed. My strength training prioritizes quality and intensity rather than volume, and this is the same whatever the exercise. To summarize, muscle conditioning focuses on dynamic loading, progressive exercises, and intensity of loading, with light and heavy lifts.

John:

Weight training is useful, but can be even more important for addressing particular joint-muscle weakness in injury rehabilitation and individualizing resistance training to correct identified deficiencies in the physical strength/power/range of motion under load when performing particular actions for particular pole vaulters.

Serge:

A sample of some strength exercises used by my pole vaulters at various stages of their preparation are illustrated in Figure 1.

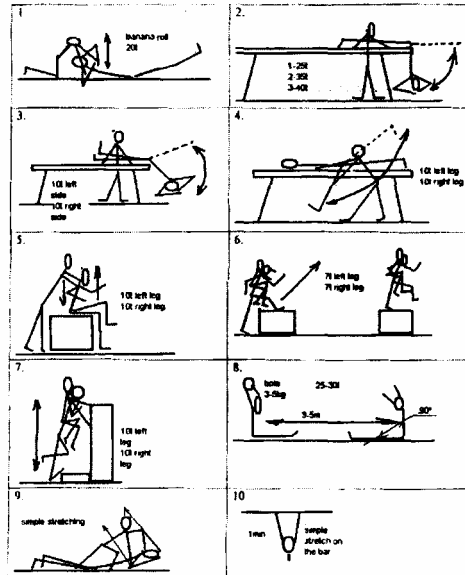


Figure 1. Sample strength exercises for pole vaulters.

Alex:

I'm still studying this subject, as there are many variations.

Steve:

My philosophy for weights is the same as for running and vaulting. High volume, low intensity in the early preparation phases with decreasing volume and increasing intensity as the athlete gets closer to the competition phase. Weight training provides the general conditioning to ensure that the athlete is able to take the high level of stress placed on their body during vaulting. Weight training also provides the strength base in which power can be developed. Some of my favorite strength exercises include:

- The use of a lat trolley: A machine that has a variable height and can have a rubber cord attached to it to increase resistance
- Janastics: A series of high bar exercises that mimic pole vault rock back and extension shown to me by American coach Jan Johnson
- An abdominal circuit, performed on wall bars with a quarter circle shoulder stretcher. This puts the shoulders on stretch while knee tucks, straight leg lifts and full rocks backs are performed.

Mark:

I use all the common exercises of bench press, squats, lunges and the Olympic lifts of cleans, jerks, and snatch. As athletes move from the preparation toward the competition phase the emphasis moves more toward the more dynamic Olympic lifts.

Do you employ gymnastics in your training programs? If so, please explain why, if not, please explain why not.

Gerald:

I use gymnastics for many reasons:

- It allows specific muscle training not possible in the weights room
- It allows vaulters to work on their spatial visual perceptions, by doing exercises that are similar to pole vaulting
- It provides a break and a change of scenery', and athletes are attentive and concentrate when working on specific aspects of vaulting at the same time as they develop their muscle strength.

John:

Gymnastics can be used to structure controlled and relatively safe learning situations. Pole vaulters can develop heightened 'body awareness' from selected tumbling activities. A wide variety of body inversion techniques can be learned using bars, ropes and rings. Rings, ropes and trapeze provide moving bases to learn swinging and circling movements. The list of useful exercises goes on. Gymnastics is important, but it should not usurp the place of actual specific pole vault technical preparation when time and financial support is limited.

Serge:

Gymnastics is vital to pole vault training. Gymnastic exercises are selected that are similar to the movements in a vault. The skills and conditioning obtained in gymnastics are then transformed into vaulting. Gymnastics is used in all training phases.

Alex:

Yes, because gymnastics is a large and important part of the pole vault preparation program.

Steve:

When I coached in Australia I used gymnastic training twice a week all year round. Since leaving Australia I have not had easy access to good gymnastic facilities. I now have this in the UK and plan to reintroduce gymnastic training into the program. The other problem is that gymnastic training is very coach intensive and trying to work with more than 3 or 4 athletes at a time is difficult, if they are inexperienced at the exercises you are working on.

Mark:

I use gymnastics as:

- I believe that the action of vaulting (once you have left the ground) is based on a giant swing on the horizontal bar, and it is easiest to learn this using gymnastics
- As vaulting is all about lifting your body, I think it is better to do as much of your strength training as possible by lifting your own body
- Gymnastics teaches aerial sense, which is very important for vaulting
- Gymnastics is fun and different and is done at a place away from the track, which I think makes training more varied and enjoyable.

Despite the physical differences between male and female pole vaulters, do you believe they can be trained the same way?

Gerald:

I feel that male and female pole vaulting is the same specialty. However, there are still differences due to female pole vaulting being a new event. Women are becoming better and better from a technical point of view but must still improve their skills. I often compare women's pole vaulting to a 13 or 14 year old male pole vaulter who is starting to vault and learning the subtleties of our wonderful event. However, there are certain rules to be respected. The physical approach to training must be adapted for females due to hormonal differences. The psychological approach, or rather the verbal instructions from the coach must be careful not to annoy' the susceptibility of the female athlete. Training women pole vaulters follows the same road but using different stops to achieve the same goal, "jump as high as possible"

John:

Anatomical structural differences can pose problems for beginners, but are not usually an issue at the elite level because competition has screened out those

individuals who are anatomical unsuited to the demands of the event. Managing actual behaviors and expressions of personal need during the physical training process does, at times, require differential treatment of males and females.

Serge:

Despite the physical differences between male and female pole vaulters, I believe they can generally be trained the same way; Although when working with women it may be necessary to pay attention to features of female physiology.

Alex:

I have not found any differences so far.

Steve:

I train males and females the same way, although there are some differences that need to be considered:

- Females tend to take longer to develop strength/power levels and lose it faster
- Females do not recover from training/competition as fast as men.

Mark:

As females have a lower centre of gravity than men their weight distribution may make them more susceptible to back injuries when vaulting. The take off always puts much stress on a pole vaulter's back, but a female physique may exaggerate this, therefore more attention needs to be paid to core stability exercises.

Women do appear to be more prone to body weight fluctuations than men. This means that girls probably need to be more vigilant with their diets. Body fat is the enemy of all athletes, but as far as the pole vault is concerned it is even more of a villain. Also, more endurance training in the preparation phases of the program may be needed to help control body weight.

Women are generally more emotional than men (this may not be a politically correct statement), so a degree of extra sensitivity on behalf of the coach appears warranted. In most other respects, I have not seen much of a difference. Their personalities differ just as men's do. As a general rule women are just as competitive and just as determined as men.