POLE VAULT CONDITIONING

by Andrzei Krzesinski

Poland's national coach, Andrzei Krzesinski, presents his views on the development of speed, strength, power, endurance and co-ordination for pole vaulters. The article is extracted from a lengthy contribution by the author, whose views on pole vaulting technique appeared in Modern Athlete and Coach Vol. 18, No. 2, 1980. Re-printed with permission from Modern Athlete and Coach.

SPEED

There is no doubt about the importance of speed in the pole vault. Sprinting speed and speed in running with the pole are decisive for outstanding performances. However, it should be kept in mind that, while speed is inherited, running with the pole differs from pure sprinting. To achieve good sprinting speed with the pole requires from a vaulter, power, mobility, an ability to relax and a correct movement technique.

Pure speed training is made up of runs at maximum speed with long recovery intervals. The athletes should be almost fully recovered before they begin with, the next repetition. Recoveries vary between five to 15 minutes, depending on the distance. In order to achieve high speed with the pole it is essential that running with the pole supplements sprint training. It is therefore advisable to alternate runs with and without a pole in order to reduce the difference in speed caused by the weight of the pole and its influence on the running posture.

Distances ranging from 40 to 60 meters are commonly used in pure sprint training with an average of six repetitions. However, shorter distances (20m) are employed during the competitive season. The world's best vaulters are capable of 20 m times between 2.00 to 2.05 seconds or better and cover 40 m between 4.00 to 4.05 seconds or faster. Speed training creates fatigue and should therefore not be followed by technique training, as the development of technique requires full physical and psychological readiness and concentration.

The following training methods are used to improve speed:

- Fast games, reaction exercises.
- Sprints over 40 to 60 m, accelerations over 80m.
- Various starts (individual, groups, commands and no commands).
- Uphill and downhill sprints (30^{o}).

- 20, 30 and 40 m time trials, 40, 50 and 60 m sprints from a standing start.
- Relay changeovers, hurdling.

STRENGTH

The recent changes in the approach to weight training have in a number of cases been responsible for over-developed muscles that have had negative influence on co-ordination in pole vaulting. Nevertheless, it is obvious that strength development is essential for a vaulter in order to handle his body weight. It is therefore advisable to adjust strength training to fit the developmental stage and experience of an athlete. Consequently, weight training, using the overload principle, should generally not begin before the age of about 16 years. It is integrated into the training program in the following sequence of strength development:

- gymnastics and various medicine ball exercises,
- sprints and starts,
- jumps over gymnastics apparatus,
- partner exercises,
- exercises on gymnastics apparatus and rope drills,
- weight training.

The simplest form of strength development in the beginning stages are slowly performed gymnastics exercises. These are combined with team games in the 12 to 13 age group for variety. The dynamic strength of the legs is developed by using various jumping exercises, as well as sprints and sudden direction changes in running. Throws help to develop upper body strength. Rope climbing and swinging on the rope assist to develop vault specific strength.

It is advisable, taking into consideration the biological age, to progress in strength training by first introducing exercises against the athlete's own body weight. These include jumps over and assisted by gymnastics apparatus, medicine ball exercises (4 to 7 kg) and exercises with dumbbells, before barbell exercises are introduced.

Weight Training

The specific strength training methods employed in pole vaulting are weight training, circuit training and gymnastics. Weight training, following the initial enthusiasm for this method, is treated carefully to avoid negative influences and injuries. It is based on the principles of finding the correct weights, number of

repetitions, number of series, time for each series and recoveries between the series. Both the volume of the work performed and its intensity are also taken into consideration.

The natural strength level of a vaulter is another factor that influences the preparation of training plans for strength development. Athletes with a high level of natural strength are therefore advised to have their weight training restricted to allow more time and energy for the improvement of other vaulting aspects.

Pole vaulters are recommended to choose weight training exercises that are suitable for all-round strength development. These include the single or double arm snatch, with a load of 50 to 100% of the athlete's own body weight, and the clean, using 75 to 150% of body weight. In the author's opinion it is sufficient to reach 180 to 200% of body weight in the squat and 140 to 160% in the bench press.

The basic principle of weight training for pole vaulters is to develop all-round strength with high loads and slow movements during the preparation phase (autumn, winter). This is changed during the competitive season to high intensity and fast movements. Three or four exercises performed in three or four series of three to six repetitions, are chosen for one training unit. The number of repetitions in exercises like the snatch can reach 10.

Weight training is incorporated into the total training plan twice a week during the preparation phase with a load around three to five tonnes a session. During the competitive season weight training continues once a week with emphasis on dynamic power development exercises.

Circuit Training

Circuit training employs restricted loads, or the athletes own body weight, in the performance of chosen exercises within a set time limit. The choice of exercises and the number of repetitions depends on the time of the year. Normally there are about 10 exercise stations and the time limit varies from 20 to 60 seconds. Recovery times are between two to three minutes and it is usual to perform two or three rounds of the circuit.

Circuit training is strongly recommended for beginners up to 16 years of age, employing a number of repetitions for each exercise that is around 50 to 60% of the maximum. It is advisable to begin slowly with long recoveries between the exercises. The exercises chosen for pole vaulters should be suitable for general and specific strength development, as well as improvement of co-ordination.

Gymnastics

Gymnastics exercises help to develop mobility and specific strength by imitation of certain phases of the vault. Horizontal bar, rings and rope exercises are well suited to improve strength and co-ordination for fiberglass vaulters. Rope exercises are particularly valuable in winter to replace actual vaulting.

Rope climbing and swinging exercises are introduced to beginners right from the start. Experienced vaulters are recommended to climb a five meter rope in five to six arm pulls with a load of 15 to 25 kg and perform swinging exercises, including swings over a crossbar. Up to 10 repetitions should be executed in rope climbing. Horizontal bar exercises begin with simple movements and finish with giant circles. Up to 30 repetitions of giant circles can be performed in a training unit.

POWER

Power, a combination of speed and strength is an important asset for the pole vaulter, who has to overcome the resistance of his own body weight and the pole. The basic exercises for the development of power are all variations of multiple jumps, jumps onto and over gymnastics apparatus, jumps over obstacles (hurdles) etc. Jumping exercises begin during the preparation phase, for example, with series of 10 to 15 repetitions of multiple jumps. This is shortened to five repetitions series during the competitive season. The total number of jumps performed in one training unit varies between 90 to 150.

ENDURANCE

The development of general endurance should receive a high priority in the first stages of a training program as well as in the preparation phase in each year's training schedule. The common methods used are cross country runs and team games.

Speed endurance development begins in the second part of the preparation phase, using 120 to 200 m distances. The recovery intervals are reduced and the intensity is increased prior to the competitive season. The number of repetitions ranges between 8 to 10 in one training unit. This is reduced during the competitive season when the distances are covered in maximum speed.

Event specific endurance is helpful to perform specific training, when emphasis is placed on vaulting for height or the finer points in technique. It is also useful in long, drawn-out competitions when the athlete is forced to perform 10 to 15 vaults, sometimes within five to seven hours.

Event specific endurance is closely related in the development of pole vault technique. This normally takes place in two or three training units in a week. Around 25 to 30 vaults, depending on the length of the run-up, are performed in

one session in the winter. The same number of vaults in a single session should be executed from a full run-up at the beginning of the summer. This is reduced to 15 to 20 vaults during the competitive season.

CO-ORDINATION

The basis of good pole vault performances is the so-called “motor intelligence.” The most important part here is spatial awareness, allowing the athlete to correct faults during the vault. A high level of this ability depends largely on the reactions of the nervous system, making it important to select pole vaulters from athletes with good co-ordination and mobility.

Specific programs to develop co-ordination and mobility are made up from team games, hurdling, acrobatic exercises, and even cross country running, often requiring complicated movement patterns to overcome obstacles. It must be kept in mind in the design of such programs that mobility can not be separated from co-ordination in the development of spatial awareness in pole vaulting.

The following activities can be recommended to assist with the development of co-ordination and mobility:

- Cross country running, incorporating all types of obstacles (climbing, jumping, hurdling etc.).
- Climbing of trees, rock climbing.
- Combat type partner exercises.
- Acrobatics, tumbling, apparatus gymnastics.
- Team games, downhill skiing, ice skating.
- Trampolining, hurdling.