

10 *Training — what does it mean?*

The essence of training in sports is the ability of the human body to adapt to new situations — by which we mean demands of a higher level. So, in order to train a vaulter adequately, you must determine each vaulter's stage of development and technical ability.

Training should be concentrated equally on different parts of the body, especially since in vaulting we are often concerned with the growing child. The strength and endurance of a growing child must be taken into account, and sustained overloading of the muscles or joints must be avoided at all costs.

The ways of training mentioned hereafter may seem very specific and superfluous, especially if you only train a little show team with no ambitions for competition. Indeed, this is how the champions train, except that I am simplifying it for this book, sparing you detailed training schedules. But the basic principles are the same — and your ambition and wish to learn will grow with the successes you achieve on the way!

In order to understand why a certain way of preparing and training is better than another, one must have a basic understanding of how the body works and which parts are most affected by the sport.

The joints

tendons are the muscle to bone connections

ligament is the bone to bone connection

cartilage is the 'padding' between the bones, the shock absorber

The joints should never have to take on the major stresses. The

stress on the joints in high jump-off exercises (such as those the world champions perform) can be as high as five times the vaulter's body weight! Exercises in training should ensure that the muscles around and supporting the joints are built up and so strengthened that the stress on the joints is minimized.

The muscles

Muscles are organized in pairs and we use these pairs in two ways:

- preliminary movement, where one of the pairs is tensed while the other muscle relaxes (this is for example the *swing* before the push in the scissors, or the crouch before the salto off)
- and the 'payoff movement' (the jump or the height in the scissors we were aiming for), where the 'preliminary' partner relaxes

When we are *holding* a posture, both muscle partners are used at the same time, both contract to sustain the 'still movement'.

Basic understanding of energy and the body

Muscles are energy converters which transform chemical energy (food) into kinetic energy (movement). In sports we basically deal with three different kinds of energy, which are described by the following attributes: 'aerobic', if intake of oxygen is required to produce energy (anaerobic being the opposite); 'lactic', if the muscle produces lactic acid while active (alactic being the opposite).

<i>start-up energy</i>	<i>fast-twitch muscle energy</i>	<i>slow-twitch muscle energy</i>
	after 10 secs changes to	after 2 minutes changes to
basic prerequisite to any movement anaerobic alactic	high speed for short time needs carbohydrates & produces lactic acid anaerobic	lesser speed for longer time needs fats and carbohydrates produces carbon dioxide, aerobic, alactic

To guide and diagnose effective training you must understand how the muscles work, how to start, to increase and plan your overall training.

Muscles are only able to contract or to lengthen against loading. We call this concentric and eccentric movement. The energy needed for that comes from glucose (blood sugar), which splits into triphosphoric acid, for which process we need oxygen. Since in a healthy person there is always enough blood sugar present, the question is: is there enough oxygen for what we want the muscles to do? If there is *not* enough oxygen, lactic acid is formed. This we experienced as muscle soreness. One can have the level of lactic acid tested in a body, but for our purposes it is much easier to measure a different way (and I am simplifying the medical language on purpose!) You know that oxygen is transported from the lungs (where the fresh oxygen is taken into the blood stream) by the blood via the pumping of the heart. If the body realizes that for an activity there is not enough oxygen present, it tries to make up for the deficiency by making the heart pump faster. So if you measure the pulse (the heart rate), you are actually in a way measuring the oxygen deficiency in the muscles. And you are also measuring the training load on the body.

Endurance training load

Endurance training develops the muscles, but keeps them thin (the typical image of a marathon runner versus a weight lifter). Endurance is the most valuable attribute in a vaulter, because vaulting is not really a power sport.

Here you must ask yourself: what is the training load for, and when is it effective? Remember that we call training the adaptability of the human body to higher levels of performance. Therefore, if your heart rate (our way to measure if the body has enough oxygen or not) does not change, we are not trying to adapt the body to any higher level of performance — we are

missing the point, there will be no change, no progress. We are, in fact, not training.

- It follows that training with a heart rate of below 120 beats per minute is not effective.
- Any training, which elevates the heart rate above 120 beats per minute must be sustained for at least ten minutes – otherwise the body will not understand (in laymen's language) that we request it to get used to this new condition and actually improve its oxygen household. This means that pauses can be included, which we call effective pauses, as long as the heart rate stays above 120. (Because this still indicates a lack of oxygen in the muscle cells.)
- 'Aerobic' means in other words that there exists an oxygen debt, and aerobic exercises try to get the body used to making better use of the oxygen available. The body will adapt with correct training – the heart rate will sink below 120, and you will have to increase the training load to again stay effective and incite the body to get used to the next higher level of performance, by starving it of oxygen again.

Plan your endurance training so the heart rate stays above 120 for at least ten minutes per group of muscles. Training with low resistance means that the athlete will work at a level of plus-minus thirty per cent of the maximum power, with pauses, during which the heart rate may however not decline to under 120 beats per minute.

Cardiovascular workout is excellent for endurance and fitness. As it takes at least ten to fifteen minutes to raise the heart beat for a sustained period, often the allotted training times in the stables do not allow for these kinds of activities within the training program, so try to influence your vaulters to engage in these laudable undertakings on the side.

Excellent endurance training is jogging, swimming, rope skipping and the like. Train at least three times per week.

Periodicity

By this word we mean that we always have to catch the right moment to build new training on top of the new efficiency, which we just reached. Recreation periods will be included (and are necessary), but they may not be long enough for the body to forget that we now request this new level to be the normal one. This time span should not be longer than twenty-four hours. With always new training on top of the new efficiency we reach a build-up in terms of training results.

Muscle power training

In muscle power training, (strength) we want to ensure that we do *not* run into oxygen starvation. Muscle power training thickens the muscles (which means, it creates more muscle cells) and therefore adds weight (like in body building), which for vaulters is not necessarily desirable. In power training the heart rate should therefore stay below 120 beats per minute, that is, the load will be higher, but the pauses much longer (to keep the heart rate down). This we call ‘anaerobic training’ (no lack of oxygen in the muscle cells).

Pyramid training

An example of power training is weight lifting: determine the maximum power at the time (for example fifty pounds), then increase this by fifty per cent. This is your goal. Now lift weights corresponding to eighty per cent of this goal four times, then eighty-five per cent three times, then ninety per cent of that twice to peak to the new maximum power (your goal). Then measure the heart rate: if it is above 120 beats, pause. Don’t create a lack of oxygen! Do at least three sets per muscle.

Combination of both

It is *not effective* to combine power and endurance training in one session! (because in plain words then your body does not know what on earth it is supposed to get used to.) Rather counter-balance power training with endurance training (which will have a tendency to thin the muscle again).

In vaulting we do not only want thin bodies, but also stress the fact that optimum technique means that the vaulter will need a minimum of strength to perform the exercises, that is, achieve the optimum action efficiency. So train mainly for endurance: good vaulters should be able to perform all compulsory exercises five times in a row without pause, after which the pulse rate should decrease to normal within three minutes. (If this does not sound difficult to you, try it!) Endurance is needed in vaulting for being able to increase technique through repetition, whereas maximum power is not so important.

Muscle stiffness

Because of the make-up of the muscles — protein and water — they react to heat in a similar way to oil: cold temperatures make them stiff, warm ones fluid and easier to work. Hence the need for warm-up exercises before any training session. But anxiety or tension also influence the muscles' performance, as they hinder relaxation. So for best performance and safety we are striving for: a good warm-up, balanced muscle work, and a positive atmosphere. With adequate and well planned training muscle stiffness should not occur!

Stretching and warm-up sessions before vaulting

Other publications cover in depth how to stretch correctly to gain the necessary flexibility for good athletic performance. In-

creasing flexibility means being able to use a greater range of motion about a joint. It shall just be mentioned here that the prescribed warm-up *directly before* a vaulting session however should not be an endurance test, but consist of exercises to loosen and stretch the muscles. It should result in no more than a very light sweat on the forehead at the most. It is a wrong understanding of warm-up to exhaust the vaulters (especially the less fit beginners) by rigorous running and stretching for an hour before they get onto the horse. Developing the necessary stamina, flexibility and strength for vaulting competition is a daily routine, which must happen *in addition* and outside the vaulting sessions.

Let us assume you have determined the oxygen levels of your vaulters through a training test somewhat along the lines described above. You must now determine the training load of the vaulters according to their age and stage in development. Try to respect all conditions and cover all lack of endurance, power etc. In a team, for example, it should always be the weakest link who determines what we allow the vaulters to perform. So look at the underman's lifting power — see how much weight s/he can lift — *then* determine and check how long s/he can hold the flyer in such position. (Take into account, and re-check accordingly, that often flyers grow and get heavier at a faster rate than the lifting power of the underman increases.)

A good vaulter or vaulting team *must* be forced into training for endurance. Although you will encounter resistance (which is called laziness, and even vaulting trainers succumb to it sometimes...) nobody else can do this part of the home work for them. They can't expect you to turn them into good vaulters, if they don't take care of building up the necessary stamina.

Nutrition

It is no secret that a healthy diet greatly contributes to your fitness. So don't let your vaulters see you at the chocolate bar

dispenser! There are plenty of books to give you plans for well balanced nutrition. Here is just an outline of how it works:

energy	is gained from fat and carbohydrates
muscle build	from proteins
replacement for sweat	take in water and minerals
body chemistry	to regulate body chemical reactions, the athlete needs vitamins

A summary of the basic training principles

For flexibility, endurance and strength, which are necessary for good vaulting, the basic principles of training are as follows.

- *Training must be continuous:* the essence of training is the ability of the human body to adapt to new situations. By these changes we mean an improvement in terms of our sport. However, our body is not only adapting to new situations as we create them by asking for higher efforts or longer performances, but it also adapts to the pauses which we include. Therefore training must be continuous if higher levels of performance are to be reached.
- *Training load must increase:* Say our goal is to achieve the ability to do one hundred sit-ups in a row. Of course one must start slowly, because this load can't be reached in the beginning (otherwise the goal is set too low), so we start with ten. It is of no use to then stick with ten per day, but obviously the load must be increased in increments eventually to reach one hundred. The load must increase continuously.
- *The training must be effective:* for effective training the load of the training must be fixed according to the abilities as well as the goal to be reached.
- *The training goal must be set with each vaulter individually and*

must be attainable for him or her: if you set goals that under-challenge the vaulter's abilities, the training results in stalemate boredom. If you over-challenge, the vaulter can't experience any feeling of success and will stop training, discouraged.

- *Training must be periodized:* you need to set highlights and vary the training accents: one day you might emphasize strength of muscles, the next endurance, then flexibility etc.
- *Training must be planned correctly:* known medical facts must be taken into consideration, when planning how to train your vaulters:

up to 6 years in age: this phase is called the 'imprinting phase', which means a sensitive phase for imprinting things into the child's memory. This is why vaulters should have contact with horses early (not just barrel training), in any form possible. It is a bit like the 'bonding' that people talk about between parents and child.

7 to 12 years of age: here children have the best ability to learn technical things, so this is the age when you should include a lot of barrel training to explain and train the technical aspects of moves with them. It is not the age to train for optimal muscle strength, although strength can be increased significantly during this time. But building up strength now, means short-term success and a letdown later.

12 to 16 years of age: here the body is able to bear biological loading of training; it is the time to increase muscle strength. Meanwhile, of course, good technique has to improve further. During this phase endurance is built up.

from 17 years on: a good and effectively trained vaulter will reap his or her international successes...