

The Fit Racehorse

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[I include this article both as some history of thinking and in recognition of its chief source as one of the best training presentations I ever encountered. There's something about a million dollar horse that makes trainers pay attention to science and detail....much more so, ironically, than we often do with our young human athletes. Some of the details of training have evolved since then, of course, but the basics seem to have remained essentially the same.]

By this time of year a new training cycle has begun. Last year's preparation should have been evaluated by now, scheme balanced against results, and a detailed plan committed to, all the way through next spring.

At the base of both informed evaluation and new commitment rest the simple principles of effective training. They are worth reviewing, for they assure any coach or athlete that "the horses" will remain fit and happy throughout every phase of next year's efforts. And a fit horse, we assume, will be best persuaded if he hears it straight from the horse's mouth, or at least from someone who knows a lot about horses' mouths.

Building base, foundation mileage.

"Every mile of LSD [long, slow distance] is money in the bank. The mild stresses cause.... bones to remodel, expanding in diameter and becoming denser. Tendons and ligaments thicken and become more stretch resistant. Joint capsules and tendon and ligament bursas become more stable while cartilage pads between bone thicken like calluses on a working man's hands.... Perhaps most important, the horse gradually build a daily workload which will form the foundation for him to perform the stressful stages of conditioning with quicker recovery and more safety. Later, he can do more speed work, more cardiovascular work, setting up speed and endurance on the racetrack...

Warning: All the structural changes we're taking about here take place far more slowly than specific muscle conditioning for speed. Without background mileage, the quick-prepped Thoroughbred [so many high school athletes whose seasons start right off with competitions] quickly leaves the structural remodeling of his body behind and his muscles quickly adapt for speed, setting up the possibilities for a multitude of injuries due to lack of structural development. He gets fast, but the wheels fall off. And he won't get near his peak racing fitness because he can't do enough speed work to bring him to that level of fitness." (1)

All of this stage is aerobic, with no oxygen debt or lactic acid buildup. Heart rate of 140 need seldom be exceeded. On the other hand, work below 120 is not helpful: add mileage/time or *a little* speed, but never both at once. The purpose of this stage is critical to keep in mind when skier consider summer and fall competitions. Races are great fun, particularly as social events, and good training as well, but I advise none until July, then one every three weeks only, at level of fitness effort. Off-season record setting, if it has to be, should wait at least until fall.

Speed is what we're after. Of course, but it is a tricky, fascinating exercise, and dangerous if not in the correct place in the calendar. Be patient. Too much speed and racing too early in any season invite stress levels of fatigue, and with it injury. The rugged Calvinist, preaching "no pain, no gain" or "race into shape," may add to his moral credit by mortifying the flesh, but he'll have a short, frustrating winter. The notion of "bone tired" can in fact be taken quite literally, for inordinant levels of concussion due to speed, too fast, too soon, can cause of the very bone density, among other things, which base

training aimed to achieve. In case of this type of loss, recovery from all workouts will become unusually slow. Quality time is lost overall.

“One of the golden rules of athletic conditioning is: build distance, then speed. It is far easier to sharpen a fit athlete to speed than it is to go back for endurance once he's racing sprints and can't handle longer routines. In fact, the workouts that will enhance endurance....will coincidentally take the edge right off his speed, and he'll end up being mediocre in both for a long time.”(2)

“The transition from distance to racing speed is made through *interval training*. Interval training is a workout consisting of a series of heats, shorter than racing distances, near, at, or [slightly] faster than racing rates, separated by short, precise rest periods. The shorter heats allow for more speed per heat without the risk of high levels of fatigue. The shorter heats allow the trainer more opportunity to make decisions about stopping or going on. The multiple heats, separated by short rest periods allowing only partial recovery....produce a conditioning effect of anaerobic/aerobic endurance, as well as speed... You get speed and endurance with far lower risk, and at a far more rapid pace of development.”(3)

This process is a tightrope act of sorts, and the necessity for *control* and *monitoring* to prevent excessive stress is foremost. Accelerations, or *fartlek*, mark the first stage of interval work, floats, swells, releases, whatever you wish to call them. The rhythm of the accelerations and rests is natural and for the most part unplanned at this point. But something significant happens: “After a few workouts like this, the horse begins thinking ahead. He'll move fast because he loves to, but when asked to go slow, he realizes that very soon he'll be asked for speed again. So he tends not to go all out the way back to the limited gait of slow work, but instead keeps his stride open and smooth, backs off the muscle power and waits for the next call for speed. When it comes he simply pours on the fuel to an already effective and efficient stride, and accelerates without stumbling all over himself trying to gather his legs together for another burst.... Once he learns his efficient and rather relaxing 'cruising' stride, it carries over to his slow workouts on his day off. Pretty soon, no matter how fast he's going, his motion is that of a race horse.”(4)

“Just as LSD mileage was money in the bank in terms of structural strength, so [acceleration sections/intervals], at or near the anaerobic threshold of the horse, produce the maximum development of oxygen efficiency in the shortest period of time.”(5) The informal, fartlek-type intervals are followed by formal, timed intervals and rests in later fall and early winter.

Speed

“Pure speed.... is derived from muscle power, neuromuscular coordination, and gait efficiency... All of these are enhanced through sprinting exercises which emphasize speed and power over either aerobic or anaerobic endurance. Thus the type of work we have previously described as interval training, designed for the development of speed and anaerobic endurance, is not as effective.... as are sprints and repetitions. The principal difference between sprint and interval workouts is faster speed for the heats, more of them over shorter distances, and FULL recovery periods between heats. Repetition workouts fall somewhere between sprints and intervals.”(6) The key to repetitions is the longer distance, 1 kilometer and longer, level of fitness speed, or a touch over, and FULL recovery. Sprints are fast floats, not tight or driving; not as hard as you can go but as fast as you can go comfortably.

The Gains

With these sprints so short, energy stores are not depleted. High quality effects are achieved at

low cost. They also have a positive affect on the neuromuscular system: power is improved, as well as the comfort at progressively higher rates of speed. This comfort derives from the release of tension between agonist and antagonist muscle groups. “When the sensory receptor in a muscle feels it particular area becoming overstretched, it sends out a 'help' message, and action is taken both to limit the power of the agonist group and increase the power of the antagonists. The result is less athletic power for the task at hand. Multiple heats translate into more experience at speed for all the muscle groups involved... To put it crudely, the antagonists and their controlling mechanisms begin to 'trust' the agonists more and tend to allow more power to be delivered in a given contraction of the agonists.”(7) The sensation of release into comfort at speed is experienced ultimately and the true efficiency of relatively effortless movement.

Finally, *individuality*. Though the essential physiology of all athletes [equine or human] is similar, we all know that each skier is a different complex of personality, motivation, personal physique, history and culture. There will of necessity be variations in the training of individuals. That is where monitoring and communication become critical, between coach and athlete, between athlete and him- or herself. Coach and athlete must seek out and define that individuality and treat it with fascination, precision, and patience. Likewise, individuals must care for other individuals. One athlete, in the flush of well-being and success, however, must not believe his “medicine” is going to be the best prescription for another. The pleasure and goodwill of well-intended advice notwithstanding, the caution remains that being fast in the pasture does not necessarily mean one is an expert in the field.

So much for horses. As Jack Foster, one of New Zealand's great distance runners, once said as he hosed down his legs with cold water after a run, “If it's good enough for horses, it's good enough for me.”(8)

1. Tom Ivers, *The Fit Racehorse*, Esprit Racing Team, Ltd. Cincinnati (1983), p. 62.
2. Ibid., p. 83.
3. Ibid., p.97.
4. Ibid., p.74.
5. Ibid., p.75.
6. Ibid., p.122.
7. Ibid., p. 123f.
8. In *On the Run*, a film by Arthur Lydiard and Pyramid Productions