

Taking a principled approach: concepts to guide your training

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In each issue of *Ohio Sports and Fitness* throughout the coming year, staff fitness writers will relate some aspect of training periodization to their particular sport, but first, it is necessary to discuss periodization itself, and to review other concepts that underlie the training prescription in any program, no matter for whom it is prepared.

1. *Periodization.* Training programs are organized by periods of time, each with a specific purpose and emphasis, the aim being to make performance consistent and predictable while preventing overtraining and injury by applying the appropriate training stress, in the proper amount, at the proper time, thus avoiding excessive and rapid changes in training load and its three variables (frequency, duration, and intensity).

This process is often likened to the structure of a pyramid, perhaps Aztec or Mayan rather than Egyptian, since the targeted event or period of competition is more accurately represented by a plateau rather than a classic peak. Another analogy might be to higher education, where introductory courses that are broad in scope provide the basis for advanced courses where knowledge is applied more narrowly, as related to a particular area.

Similarly, physical training proceeds from general (i.e., aerobic) to specific conditioning, while overall training stress must be increased gradually, consistently, and incrementally (see “Progression” below). Typical designations for the pre-season preparation period are “Base” (or “Foundation”), “Build,” and “Specialization,” followed by periods of competition and recuperation/rebuilding, then finally off-season phases of “Stabilization” and “Maintenance.”

2. *Individualization.* Training prescriptions must be shaped by the fact that different individuals may respond in significantly varying degrees, and have varying recovery needs, for a given workout or training load. Other factors to be taken into account are age, training status/history, individual characteristics (e.g., strengths and weaknesses), weather, training opportunities (e.g., local availability of roads/trails, terrain, traffic), work schedule and other responsibilities, competitive priorities and preferences (which races you want to do well in, which you want to use for training, and which you *enjoy* the most, since motivation will determine how diligently you train), role within a team, etc.
3. *Progressive overload.* The story of Milo of Croton from the 6th century B.C. illustrates this principle perfectly. Every morning, according to legend, this greatest of ancient Greek athletes would lift a young calf overhead and carry it across a pasture. As it grew, Milo lifted a little more each day, until he could carry the full-grown bull.

Similarly, training adaptation, and hence improved performance, is induced by consistently-applied stress loads that “challenge” the body (exceed existing fitness levels) and fatigue it to an appropriate degree (see Seth Hosmer’s fine summary of the [workout/recovery cycle](#) for more). As an old and fundamentally useful maxim runs, “Train where you are, or slightly beyond, not where you want to be.” In response, and after adequate rest/recuperation, the body’s plasticity allows it to “defend” itself, and “supercompensate” or rebound to reach a higher level of fitness. It is in quantifying the imposed stress load, especially at higher/variable intensities, that power-measuring devices and analysis software are most useful.

4. *Balance.* “Variety” is often cited as a training principle, but it is often desirable for training composition to vary little for weeks on end (such as a period of aerobic conditioning), and while it is important to avoid boredom and remain motivated, variety simply for its own sake can produce sub-optimal training.

Instead, it is better to strive for optimal *balance* in a training program, which depends on the event being prepared for as well as rider characteristics. For instance, if preparing simply for a long, flat, relatively “isopower” time trial, an appropriate training balance will include little anaerobic capacity training, if any at all. At the other extreme, competitors in the 4,000 meter team pursuit must strive for the most nearly “perfect” combination, or comprehensive balance, of anaerobic, maximal aerobic, and threshold capacities, plus adequate neuromuscular power – after a period of rather unvarying aerobic conditioning which is identical to that needed by road competitors.

More generally, periods of competition must be balanced with structured training. Racing (especially criteriums) and group rides impose specific neuromuscular demands as well as wide, rapid variations of intensity that structured training does not normally replicate, leading some to place excessive emphasis on the notion that ‘the best training is racing,’ however, it is not as effective as 2-3 hour steady-state tempo rides or long (40-60 minute) intervals at lactate threshold in creating consistent aerobic demand and increasing muscle respiratory capacity. After a period of competition, aerobic endurance and lactate threshold need rebuilding in this manner.

5. *Specificity* exists in varying degrees; stated in the most general terms, to get better at a particular activity, you must do that activity, e.g., riding a bike is more specific to cycling than running, even though both have similar training effects. Thus, “supplemental” training activities (e.g., cross-country skiing, speed skating, running, etc.) should be limited to periods of injury and “active recuperation” during the off-season.

Aerobic conditioning (base training) consisting of prolonged (90 minutes – 4 hours), moderately intense, relatively steady-state rides is specific to all road competition, but to optimize performance in any one particular event, you must train (stress) the systems that underlie it in a way that mimics event demands.

Thus, after a sufficient period of base conditioning, training becomes more specific, i.e., narrowly focused or specialized in reference to the task (event) being prepared for as it draws near: to get ready for a longer (30+ minute) time trial, do long (~20 minute) repeats at threshold intensity on a course like the race route (the actual course is best, if possible); to be able to bridge gaps or prepare for prologue TTs, shorter (1 minute) intervals at ~150% threshold power are indicated; to improve at climbing, climb hills of similar grade and length to those you will encounter, etc.

A broader concept is *simulation*, which includes specificity but goes beyond it in attempting to replicate race conditions, as well as physiological demands, as closely as possible. What is the general lay of the course, and what are the particular characteristics? What are the road conditions? Where does the road narrow? What is the range of elevation? What is the weather forecast? Is it likely to be rainy, hot, cold, sunny, cloudy? What are the prevailing winds, and where are they most likely to be a factor? What time of day do you normally train, and when does the race take place? Have you prepared in these conditions?

6. *Reversibility*. Just as fitness gains (adaptations) occur at a certain rate in response to a given training load, so too does the loss of fitness follow a predictable time course in response to inactivity. This must be accounted for upon a return to training after injury or illness, during the transition to the off-season, and when tapering/peaking, which is defined as strategic manipulation of training variables to enhance or accentuate supercompensation and produce peak performance for selected events.
7. *Maintenance*. Once a given level of performance in a particular aspect of fitness has been achieved and consolidated, less training will be required to maintain it than was required to reach it. This comes into play at two junctures during the training year: 1) when transitioning to another phase of training, it allows you to keep the fitness level built up in one area while working on another, and 2) during a period of competition, maintenance workouts and a reduced training load let you stay fresh and rested, so that peak form can be held for an extended period.
8. *Evaluation*. Periodic testing, careful record keeping of relevant workout/race data, and meaningful analysis are essential to assessing progress and the effectiveness of any training program.
9. *Rest, recuperation, and diet*. Fitness gains are maximized when training stress and recuperation, as well as energy production and intake, are kept in approximate equilibrium, i.e., there is sufficient time and rest between long/intense workouts, plus adequate intake of proper nutrients both during and after each workout.

From a broader perspective, training and competition need to be balanced with some time off altogether (complete rest), as well as periods of “active recuperation” where fitness is stabilized and maintained. Just as large increases in training load are to be avoided, neither should you let yourself fall too far out of condition. A friend recently remarked to me, “but I thought the off-season was the time to drink beer and smoke cigars.” **NOT!** Once again, consistency is truly the key.