

High-Tech Virtual Fitness and Training

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Traditional fitness and sport training programs are usually based on an estimate of achievable performance built on an estimate of sports background and baseline fitness. Obviously, this analysis and projection can be very complicated and includes interpretation of background, genetics, metabolism and nutritional efficiency, VO_2 max, equipment to date, past performance, and ideas for future training, both short- and long-term, treatment of intercurrent injuries, and introduction of new techniques of training, fitness, and equipment. With all of these factors combined and weighted, the solution and its implications can be estimated. Fortunately, the last ten years have brought forth multiple solutions to resolve this dilemma and allow, with reasonable expectation of success, the individual starting with minimal fitness or with many years of experience to improve performance and health.



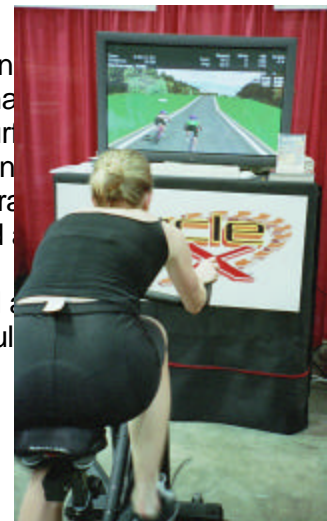
So where do you start? A search on the web or a trip to a local sporting goods store will usually yield a staggering array of equipment options. Most people, it seems, turn to web-based sports sites, sport-related magazines for product recommendations, and to friends, fellow competitors, trainers and coaches for a combination of equipment advice and training advice. What shoe should I buy, what frame size is best, should I use a heart rate monitor or not, should I use interactive software or stick with proposed plans from magazines? The answers may seem easy, but the implications of even the

simple choice of a running or fitness shoe may take a predisposition for an injury and turn it into a chronic problem plaguing an athlete for years.

So how do you train, improve my fitness, lose some weight, and improve my health? Probably the most important question that comes along with these questions is: What is your goal? Is it weight loss? Is it to complete a 5K run? Do you want to keep up with your friends when we go for a recreational bike ride on Sunday? Or, are my goals somewhat loftier - triathlon, marathon, the Ironman... The next question is: When do I want to complete your goal? Having answered these two questions you have one more - a tough one. How fit are you or where are you starting?

Let's take a few moments out to determine how you might determine fitness. There are some key factors that seem to be a common thread in the determination of fitness. These include: weight in proportion to height (a rough determination of body surface area), exercise background (what have you been doing?), resting or early morning heart rate. A resting heart rate of 60 is generally a sign of reasonable fitness while morning resting heart rate of 50 in a regularly training individual is usually a sign of good cardiac reserve and

To correlate all of the performance variables that occur in a recreational triathlete to complete and "feel good" at a 10K run following 6 weeks of training, would

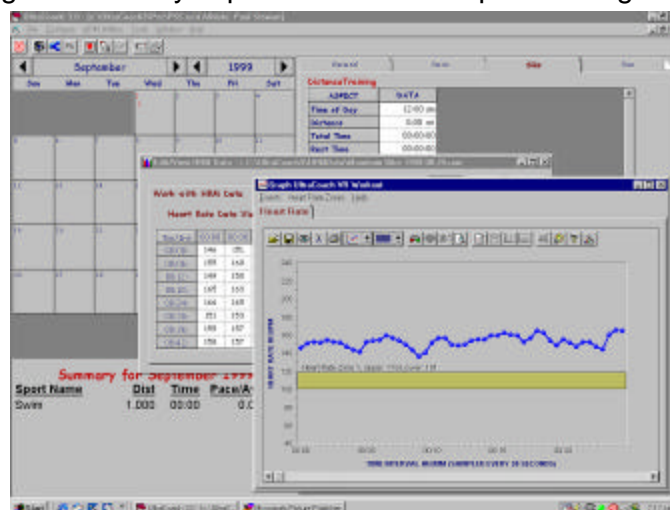


the hundreds. Since that is not practical, you make some pertinent decisions. For instance, 1) stick with a plan no matter what; 2) change some aspects of the plan such as distance or intensity based on a few performance variables suggesting overtraining; 3) use an interactive plan to evaluate your performance adhering to the goal while trying to minimize overtraining, avoid undertraining, and interactivity accommodate variables such as long days of work, illness, injury, or time off training for vacation, etc. There are advantages and disadvantages to each of these plan aspects and much of this depends on time available and the seriousness of the athlete. But, embarking on a training program involves a certain amount of commitment and the expectation that you will accomplish what you have set out to do. In that sense, the optimum should be an interactive program (#3) and the most potentially hazardous to accomplishing your goal is a simplistic “stick to this plan approach” (#1).

There are also variables created when you use fitness machines (simulator). For instance, if your goal is to complete a five mile mountain bike ride and all you train on is a simulator in front of your television, acquiring no positioning or other mountain bike skills, you may be in for a real surprise when you are looking down a 15% grade strewn with rocks and you have never been off the glassy smooth surface created by a simulator. On the other hand, simulators provide convenience and can provide valuable training and data acquisition when associated with a proper analysis package. Not everyone has time to do “real cycling” even when the goal is to do a mountain bike race. But certainly “cross training” and the extra cardiovascular stamina will certainly help you on your goal day. In addition, cross training that includes bodybuilding and strength training has worth regardless of what plan you are doing. By increasing muscle strength, you resist injury and increase performance by increasing “horsepower.” Heart rate monitoring is valuable in preventing overtraining and to make sure you are “in the right zone.” Heart zone training has been encouraged by Sally Edwards and others in order to create efficient training at all fitness levels. The use of a heart rate monitor regularly, both in training and in competition, allows you to ration out your cardiac reserve - particularly in endurance events. For more accomplished competitive athletes, knowing that perceived effort correlates with performance allows the coach, trainer, and athlete to be “honest” with themselves and almost assuredly will improve performance. The monitor delivers digital data - valuable in assessment.

Athletic training software offers a unique opportunity to gain motivation, log training data and evaluate performance using graphs and reports. Such interaction can be extended using artificial intelligence and other decision-making algorithms; computer software can help the athlete and provide workout suggestions incorporating fitness level, performance, and specific workouts oriented towards goal accomplishment. Various aspects of training including multiple sports, heart rate monitoring, and equipment usage can be interrelated so that preventive maintenance can help avoid a goal failure by something such as a bicycle part failure.

Where is athletic training going? As computer technology further pervades our lives, simulator training will become computerized offering virtual reality experiences in most sports. Imagine being on a climbing machine at home but climbing Mt. Everest or K2. Row a course in anticipation of a competition. There may be some aspects of the simulation that are difficult to create, such as the cold and bitter wind, but certainly the steepness, the terrain, and the scenery can be experienced in the virtual environment. Certain perilous aspects of the experience obviously



would be avoided. For more “regular” experiences, such as bicycle challenges, rowing events, and running/walking events, the virtual experience, using the Internet (Web Racing™), would allow for competition and remote training - the coach could be in Boston working online with the treadmill runner in Los Angeles. Dryland rowing events could be commonplace and interactive in a graphical experience; the user picks the competition including assigning pacers old workouts—compete against yourself! The sounds of the waves, the dipping of the oars, the effect of wind can all be incorporated into the interactive experience, heightening its enjoyment for those not privileged to be on the water. Virtual reality also offers a motivational experience and opportunity for users to be involved with terrain and experiences they might never ever get to experience, such as rowing the Nile, cycling on the Moon, cross-country skiing in Antarctica, or perhaps on the Alaska Iditarod course. To athletes aspiring to improve their performance on an actual course, the simulation experience would allow them to train on the course, noting the visual cues and improving their reaction to course variables. This would improve performance on race day.

And what will be the fitness center of the future? Perhaps the only part that will be familiar to the exercise enthusiast or individual starting a rehabilitation program will be the front door, lockers and showers! Beyond that, a computerized network environment will welcome and challenge the athlete with groups of interactive simulators training or competing together. Personal trainers and coaches will be able to monitor each athlete interactively viewing their LCD screen of the course and sending messages both visual and voice to help the athlete. The training session is recorded in the athlete’s computer diary and can be reviewed any time with the trainer or sent by e-mail home to be evaluated at the home computer. Events that cannot happen now will be commonplace in the future. The virtual Olympics, interactive rehabilitation (i.e., cardiac rehabilitation using home exercise interactive simulators), motivational training (allowing the individual to train against previous workouts on the same course), multi-sport competitions using Web servers and “usual athletic sponsors,” but in this new environment. The possibilities are endless once the simulator becomes more than what it is now.

Imagine it’s the end of the day, it’s dark and cold, but you want to go for a bicycle ride and are training for an event is coming up in a month or two - you need to “put in your time.” Your coaching program requires 15 miles on a hilly course and you know that is not going to happen outdoors, especially today and at night. But in our virtual environment, you get on your bike, turn on your computer in front of a display, VR glasses, or even a wide screen TV. At the last moment you decide you are going to call your friend Fred and go for a ride with him. Why? Because it is more fun and you know Fred is going to race as well. From the on-screen menu, you pick a 20 mile rolling terrain course, perhaps in Hawaii, or the actual course. With virtual reality glasses in place, Fred is interactively video conferencing and the two of you ride, talk, until you reach “The Monster.” Yes, that’s the hill that everyone talks about. As the resistance on your trainer slowly goes up to simulate the grade and the wind, conversation wanes and you become serious. You look to your right, Fred looks good. You wish you could check his file set and find out how many miles he is really putting in compared to the once or twice per week ride that he says he’s doing. You make your move...

What is fitness in this new millennium? Just wait and see.