Let's start from the beginning. With the boom of aerobics in the 70s, athletes new to the workout world needed a way to assess and monitor their activities for a safe, yet effective, intensity. A statistical analysis of the maximum heart rate (HRmax) achievable by people of different age groups showed that the formula — 220 minus age — correlated to the average value of the HRmax for that group. However, the standard deviation was around 12 beats per minute, meaning that around 68 percent of the subjects in the same age group were within 24 beats of each other when reaching their maximal heart rate. This leaves 32 percent of the population well off the predicted value by up to 72 beats.

Don't get me wrong. The statistical mean has a great deal of value for statistical applications. It could work well for the lucky Mr. John Doe, who represents the mean subject, but is not the number you want to use to prescribe exercise intensity to vastly different individuals. If we averaged the height, weight, inseam and waist of all the 45-year-old males and females in the United States, calculated the average values, made millions of same-size pants using these numbers, and then gave them to all the people we measured, telling...
them that they had to wear their custom-made pants. I am sure many of them wouldn't be too happy!

What's the solution? A variety of tests can provide more individualized information for assessing training zones. The most accurate are usually performed in a lab and require equipment. A VO₂ max, which looks at the ventilation as a means of prescribing training zones, is done in a lab on a treadmill or bike. The exhaled air is collected through a scuba-like mouthpiece and is analyzed by a computer. A lactate test, which uses lactic acid levels present in the blood to prescribe the training zones, can be performed in a variety of settings from on a rowing ergometer to a trail and even in a swimming pool. It is affected relatively quickly by training (four to eight weeks) and is an easy way to frequently re-evaluate training zones. If these tests are not easily accessible, a test based on heart rate and workload (watts, pace, etc.) can also be used to specify training zones and is also easily repeated for updating training information.

The goal of training is to optimize performance. In order to make training as precise as possible, statistical averages won't cut it. Take it one step further and test yourself to individualize your workout! It could make the difference between standing out or just being another athlete in the crowd.

CROSS COUNTRY:
Pass or be passed
By John Hansen

Running a cross-country race is challenging, but with hundreds of other runners on the same course, maneuvering and passing can become a daunting task, especially during sections that sometimes are no more than a foot wide. Passing strategies are still valid in narrow sections, including preventing others from passing you. One of the key elements to a passing strategy in narrow sections is to know your course and practice the strategies that will bring you success.

Knowing your course means reviewing course maps with your coach and running key sections prior to the race or running the course in its entirety during a tune-up race or in practice. This will tell you where the narrow sections begin and end, and how wide and how long they are. During a warm-up run, find significant landmarks that will indicate where the narrow sections are located. These landmarks should be within 200 meters of the section.

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BIOS

Dr. Massimo Testa is from Como, Italy, and has been involved in the highest level of athletics for many years. He has acted as the team physician for some of the top professional cycling teams in the world, including Motorola and 7-Eleven. He focuses his work on preventive medicine with an emphasis on health and wellness improvement through regular physical activity and proper nutrition. He believes that regular physical activity, good nutritional habits and emotional well-being are most important for good health. Before his time in cycling, he played for the Italian National Soccer Team.

Dr. Kim Cusimano is dedicated to the psychology of performance, health and well-being. She has consulted with athletes on the collegiate and national levels, assisting them in optimizing their performance potential. In addition, she has worked in hospitals and medical settings helping to successfully integrate a mind-body philosophy to further rehabilitative potential and needed lifestyle changes. She is a former collegiate and semi-professional soccer player who now focuses on distance triathlons.

John Hansen is an exercise physiologist at UC Davis. His background is in middle distance running and competed for Auburn University in the late 1980s. He currently participates in triathlons and has been ranked in the top 75 in the United States as an amateur athlete. Currently, he works with Team in Training (triathlon).
Developing a strong foundation for next season

By Dr. Kim Cusimano

When a new season is upon us, I often advise athletes that they need to recommit to their sport. Recommitting means understanding your motivation for continuing to compete and consciously choosing to do it another season.

Recommitment allows you to start anew and make the necessary changes to be your best. Choosing to compete includes both joy and fun but it also includes characteristics of sports, central to the definition of competition:

- Having the motivation and drive to endure pain.
- Making the necessary sacrifices to improve.
- Committing yourself to doing your best even as you know that your performance may not always be perfect.
- Being aware that other competitors will be trying just as hard to beat you.
- Recognizing that this takes dedication.

At the core of competition is motivation – the ability to initiate and commit to training and competition. It becomes the foundation upon which physical training and mental competitiveness build. It is self-directedness that allows you to persevere through the obstacles to fulfilling your potential. Several components comprise motivation. We will focus on a couple: commitment and goal setting.

1 COMMITMENT

The two questions you are looking to answer with commitment is: “How much do you really want this?” and “Is this concept of commitment realistic for me?” You need to have a solid understanding of your commitment level because it will dictate the behaviors that you engage in during the season. Knowing your level of commitment will help you to deal with obstacles that arise. Answering the following questions will help you gauge your commitment.

- What is your reason for doing this? (Look beyond the answer of: “Oh, I do this every year.” If it is to reach a certain goal, then the next question is “What makes this goal so important to you?”)
- What do you expect to gain?
  - Internal rewards (Feel good, health, look good, strong, sense of satisfaction)
  - External benefits (Medals, winning stages/races, money)
- What do you expect to sacrifice? What will your training cost? (Social/life, relationships, work etc)
- Identify obstacles to obtaining your endurance goals (Work, relationships etc.)
- What is the passion for your pursuit? (Internal value/meaning) What do I love about the sport?

2 GOAL SETTING

Goal setting is essential to good training and competing. It helps to create a positive vision of where you want to go and gives your action direction. Goal setting also helps you to focus on things within your control that help performance. The type of training that you do — quantity, quality, length, etc. — are all components within your control.

Goals should be:

- Specific – as detailed as possible
- Realistic – within your reach if you work hard
- Measurable – number of reps, time goals, amount of weight lifted, etc.

You want to develop both long-term goals and short-term goals. Long-term goals are seasonal goals and beyond and give you something to shoot for. Short-term goals are monthly, weekly and daily training or competition goals and help you to see the progress you are making.

Final Words for Goal Setting:

- Put your goals in writing. Make goals concrete by writing them down. You can then carry them with you or put them in places where you can

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**Christine Thorburn**

Christine is not only a strong time trialist and talented climber, she is also a medical doctor. After spending 2000 and 2001 as an internal medicine resident at Stanford Hospital and being sidelined by injury in 2002, Christine came back in 2003 with some impressive results, earning a spot on the 2003 World Championship Road Team.

**Background**

Christine graduated from Pleasant Valley Community High School in Davenport, Iowa, in 1988, and then attended Grinnell College, where she earned her bachelor's degree in 1992. Throughout high school and college, Christine competed in cross-country and track. She received her medical degree from Stanford in 1999, and became board certified in internal medicine in 2002. She is currently working on her postdoctoral fellowship in rheumatology at Stanford.

**How she got here**

Christine began cycling after a knee injury prevented her from running. She started competing while in medical school because a fellow classmate was on the Stanford Collegiate Road Cycling Team and encouraged her to join. In 1998, she qualified for the Collegiate National Championships as a member of the highly successful Stanford women's team, helping her teammate win the overall individual title, and helping Stanford secure second place in the team competition. After graduating in 1999, Christine took a break from competitive cycling and spent the next two years as an internal medicine resident at Stanford.

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**training TIP**

Rating your efforts on a scale of one to 10 during training sessions is a good way to keep track of your training intensity (zones) without having to use heart rate.

**travel TIP**

Eating within 30 minutes of the completion of a workout or competition increases the absorption and storage of carbohydrates, allowing for a better recovery and follow-up performance.

**foodBITE**

If you have to travel far to an event, be prepared. Packing healthy snacks is a great way to make sure you don’t get stuck eating junk. More importantly, bring your water bottle! Traveling can be a tiring and dehydrating experience.
Knowing the location of the narrow sections allows you to anticipate where to position yourself relative to other runners. Your strategy as you approach such a section should be to make a surge to pass other runners or to prevent other runners from passing you. This surge should be concerted and fully committed as other runners will have similar ideas. Although the energy to make such a surge will feel draining, it will prevent you from losing valuable time, if other runners begin slowing during these sections or if another runner falls causing you to slow or fall as well.

In addition, knowing how long the sections are will assist you in determining your strategy for passing other runners. If you find yourself out of position at the beginning of or during any stretch of a narrow, short section of the course — that is less than 15 seconds in duration— it may be better to pass when the trail opens up again to conserve energy and to reduce the risk of falling. If, however, you approach a competitor during such a section who is running very slowly or even walking, it is always better to pass to keep your rhythm and to keep yourself in a good position without losing time. Similarly, if the section lasts for more than 15 seconds, it is usually better to pass your competitors to keep your rhythm and to keep yourself in a good position without losing time. While passing, always be mindful of the terrain once you leave the course as it is typically very rough and often filled with rocks, ditches, etc.

Furthermore, planning your run can be ineffective if you have not conditioned yourself properly. Conditioning yourself for such a strategy means committing some practice time to surging, particularly during tempo and threshold runs. This type of conditioning will enable the body to adapt to race conditions where numerous surges may come into play.

To conclude, remember to know your course and practice the passing strategies that will bring you success. Your strategy as you approach such a section should be to make a surge to pass other runners or to prevent other runners from passing you. In addition, pass other runners if the section is longer than 15 seconds or if other runners are running slow enough that you lose your placing, rhythm and time.
see them (refrigerator, walls, mirrors, day planner) and use them as a driving force. Remember to review your accomplishments as well as your setbacks.

- Build flexibility into your goals. You will not always accomplish your goals the first time. The trick is to be able to learn from these setbacks and not use them to beat yourself up. Elite athletes will analyze the situation, figure out what went wrong, and make a plan to address the mistakes.

Good luck!!!

foodBITE

Eating breakfast, or at least a snack, before a morning workout helps to provide energy during the training session and spares the breakdown of muscle for fuel that occurs when there are not enough carbohydrates available.