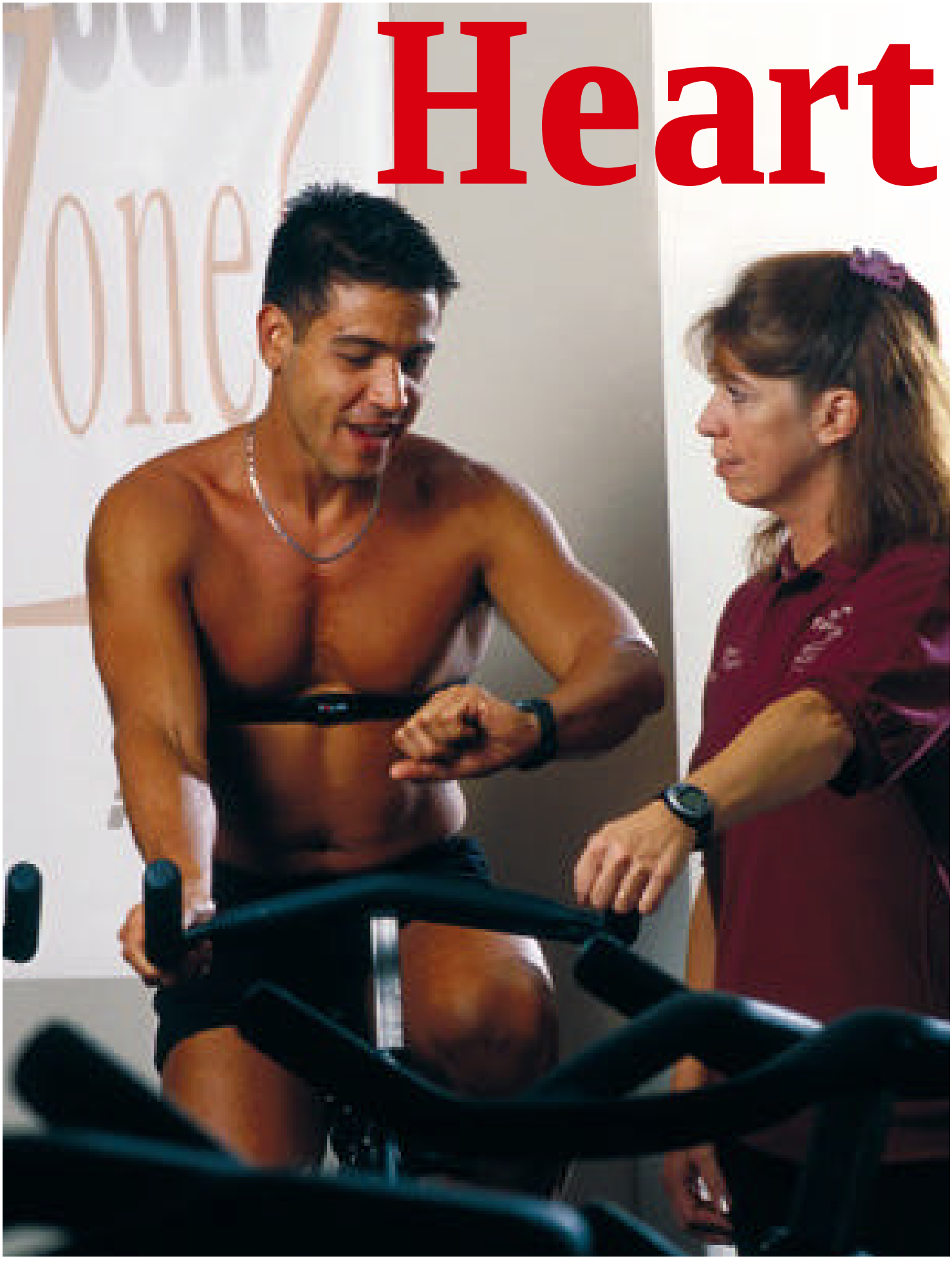
# Heart



# Rate Training:

## A Valuable Exercise Barometer

A heart rate monitor can help your members to monitor their exercise progress, which will motivate them to keep working out.

***By Stephen A. Black, M.Ed., P.T., A.T.C., C.P.T.***

Wearing a heart rate monitor has become as commonplace as putting on a wristwatch for both competitive athletes and weekend warriors. Now, thanks to booming heart-monitoring technology and a drop in price for these units, average people are finding that using a heart rate monitor can help them lose weight, feel better, decrease stress and reduce the risk of exercise-related injuries.

A heart rate monitor can motivate, educate and monitor your clients and members. It can increase the safety and effectiveness of exercise and provide a workout incentive: Heart rate measurements provide proof that the exercise program is making a person more fit.

**Just as lifting weights can make the biceps bigger and stronger, exercising the heart will make it more powerful.**

### A gauge for workouts

Think of a heart rate monitor as a non-invasive window into what's going on within the body physiologically, metabolically and emotionally. Regardless of fitness goals, a heart rate monitor can let exercisers know if they're exercising appropriately.

One of the most frequently asked questions about monitors is, "Why can't I just take my pulse on my neck or wrist?" According to studies performed by Dr. James Rippe and published in *The New England Journal of Medicine*, taking a pulse during exercise is intermittent, and maybe inaccurate by as many as plus or minus 15 beats per minute. Consider the potential consequences of this discrepancy with a deconditioned or diseased population. Also, other muscle movements and heavy breathing can make a pulse difficult to find and count. And if exercisers stop or slow their activities to count, it's not really an accurate measure of exercising heart rate.

### Methods of measurement

Intermittent versus continuous heart rate monitoring is something to consider. Intermittent monitoring usually means taking the pulse at the wrist or neck. Another example of this is the contact method used on cardiovascular equipment, which requires participants to grasp the appropriate handles on the device to get a heart rate reading. Cardio machine monitoring can be affected by variables such as sweat, hand lotion and contact pressure. Some heart rate monitor manufacturers also employ the contact/intermittent method. They either pick up the radial pulse at the wrist or require the participant to apply digital pressure on the monitor to take a pulse.

Heart rate monitors that provide continuous heart rate readings incorporate the same technology used in ECG machines found in hospitals, physician's offices and physiology laboratories. The monitor has two components: the transmitter worn around the chest that picks up electrical signals from the heart, and the receiver, which picks up the signal (radio telemetry) from the transmitter and displays it in watch-like fashion.

### Heart rate basics

The heart responds to exercise like any other muscle in the body. Working the heart on a regular basis will make it stronger. As your clients' fitness levels increase, their hearts can pump more oxygenated blood with each beat. When this happens, the heart does not have to beat as often to get needed oxygen and nutrients to the muscles. Therefore, a fit individual will have a lower heart rate at rest and during exercise. Although heart rate measurement is most useful during exercise, it is also relevant for other situations, such as gauging the cardiac demands of occupational and leisure-time activities and for stress management.

Individuals respond to exercise in different ways. This is one of the reasons for using a monitor to determine heart rate (rather than using tables and charts). Under a constant workload, the heart rate of a fit person increases more slowly than that of an unfit person. Differ-
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Photos courtesy of Polar Electro

A simple method to figure out yourclient's maximum heart rate is as follows:

For males, take 220 (theoretical maximal heart rate) – age = age-adjusted maximum heart rate.

For females, take 226 – age. (The higher theoretical maximal heart rate for women is to accommodate for the smaller female heart, decreased stroke volume and smaller blood volume.)

People experienced with using heart rates may use a different formula, which accounts for resting or morning heart rate. This allows for training adjustments to be made on a daily or weekly basis. With this formula, you need to know your client's actual maximal heart rate.

## Designing programs

Once the maximal heart rate of your client has been determined, an appropriate cardiovascular program can be developed. Consider the following factors when developing and implementing a heart rate monitor program:

**Intensity.** During aerobic exercise, intensity level is determined by the speed and type of movements, as well as the muscle mass involved. A fast tempo makes the exercise more strenuous. Adding active muscle mass (for example, adding arm movements or hand weights) during exercise increases the intensity.

**Mode.** The mode, or type of exercise, should be determined by the current condition of the individual, goals and equipment available.

**Duration/frequency.** Studies show that more frequent, shorter bouts of cardiovascular activity can be more beneficial and less dangerous than less frequent, longer bouts of exercise. Minimal levels might include 30 to 40 minutes of aerobic activity five to six times a week.

**Body position.** Heart rate is lowest when lying down, and highest when standing, because of the work required to return

### Table 1. Sample Walking Program

| | Sun | Mon | Tues | Wed | Thurs | Fri | Sat |
|---|---|---|---|---|---|---|---|
| **Time (minutes):** | 60+ | 30 | 45 | 60+ | 30 | off | 45 |
| | RW | LTIW | TW | RW | LTIW | | TW |

Key: RW = Recovery Walk TW = Tempo Walk
LTIW = Lactate Threshold Interval Walk

### Table 2. Sample Group Cycling Workout

- 10 minute warm-up at 55 to 60 percent max heart rate, or 30 beats below anaerobic threshold
- Six times for 30 seconds at 10 beats below anaerobic threshold, with 30 seconds between each interval
- Three minutes at 20 beats below anaerobic threshold
- Six times for 15 seconds at anaerobic threshold, recover with 10 beats before next interval
- Three minutes at 20 beats below anaerobic threshold
- Two minutes at anaerobic threshold
- Six times for 10 seconds at 90 percent max heart rate, or 10 beats above anaerobic threshold
- Five minutes at anaerobic threshold
- Six times for 10 seconds at 90 percent max heart rate, or 10 beats above anaerobic threshold
- Three minutes at anaerobic threshold
- Five minutes at 10 beats below anaerobic threshold
- Two minutes at 20 beats below anaerobic threshold
- Three minutes at 30 beats below anaerobic threshold

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the blood through the veins to the heart. Keep this in mind during cool-down, when programs typically involve floor work.

**Environmental factors.** High temperatures and/or humidity increase heart rate; low temperatures may also alter the heart rate. A 1-percent decrease in hydration may vary the heart rate by as many as five beats per minute.

**Stress.** The heart rate, both at rest and during exercise, is generally elevated in the overworked body. Excessive exercise may cause excess fatigue and stress. Lack of sleep and the demands of family, study and job may also influence heart rate.

**Medication.** A number of drugs used to treat heart disease, hypertension, asthma, coughs, and stress or anxiety can accelerate or decelerate heart rate. Refer to ACSM's drug guide for specifics.

**Upper-body exercise.** Typically, heart rates for upper-body activitiesare 10 to 15 beats lower than for lower-extremity activities.

### Heart rate training zones

Based on a percentage of maximal heart rate, have your clients aim for the following heart rate percentages for each type of exercise mode:

- Anaerobic or interval work: 85 to 95 percent of max heart rate
- Lactate threshold or anaerobic threshold work: 75 to 85 percent of max heart rate
- Tempo work: 65 to 75 percent of max heart rate
- Recovery work: 55 to 65 percent of max heart rate

Weekly activities using a heart rate monitor can be based on heart rate zones. For example, 75 percent of activities can be performed in the recovery heart rate zone; 15 percent in the tempo heart rate zone; 5 percent in the lactate/anaerobic threshold heart rate zone; and 5 percent in the anaerobic heart rate zone.

For a high-performance walking program using heart rate zones, exercisers should work hard enough to get their heart rates into the 80 to 90 percent of maximum zone, one to three times per week. The idea is to force their bodies into taking in and circulating a large volume of oxygen, and to teach their muscles to use that oxygen efficiently.

### Sample walking workouts

Following are some sample workouts used by recreational walkers. Have your clients and members try them as is, or modify them to meet their schedules and fitness levels. (Also see Tables 1 and 2.)

**Tempo walks.** After a 10-minute warm-up at 60 to 70 percent max heart rate, have them walk for 20 to 30 minutes at approximately 85 percent of max heart rate, or 10 beats below their anaerobic threshold. Have them cool down for 10 minutes.

**Lactate threshold intervals.** After a sufficient warm-up, have clients walk three times for eightminutes, or three timesfor twominutes at 90 percent max heart rate. Have them repeat this routine four to 10 times, allowing their heart rate to drop 20 beats between intervals.

**Recovery walks.** Have clients walk 60 minutes or longer at 55 to 60 percent max

heart rate, or 20 to 30 beats below their anaerobic threshold. Remember, this is a recovery and walkers should not exceed the recommended heart rate.

### Use in classes

To make group exercise safer and more effective, and to avoid driving participants to intensities beyond their capabilities, incorporate heart rate monitoring into your group programs. Providing monitors for your members to use during a class can encourage heart-rate appropriate conditioning. Instructors can encourage participants to purchase a monitor for use during their outside activities.

### Guiding members

Once your clients and members are introduced to heart rate training, theirexercise sessions can bemore productive, more motivatingandcancarry more meaningas farasmonitoringimprovements. If you are looking for another way to motivate and retain yourmembers, heart ratetraining just maybe the answer. FM

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## High-Intensity Concerns

**Exercise provides people with multiple cardiovascular benefits, but it also carries risks. Sudden cardiac death, which kills an estimated 225,000 Americans each year, and acute myocardial infarction are the most important cardiovascular complications of exercise based on both frequency and seriousness. To avoid working out at intensities that are too high, exercisers can wear a heart rate monitor and stay within a safe exercise zone.**

## Graded Exercise Testing

**Beginning exercisers, those increasing the intensities of their programs, or those with exercise risk factors may need a graded exercise test (GXT) given under the supervision of a cardiologist. This determines appropriate maximal heart rate, and gives valuable information regarding cardiovascular response to increased workload.**

**The test determines the electrical response of the heart under stress, blood pressure response to increased demand and heart rate response to increased demand. These factors are critical for determining the appropriateness of an exercise and exercise intensities. (A resting electro cardiogram [EKG] will not give the appropriate information relative to exercise readiness and appropriateness.)**

**Do not confuse this evaluation with a sub-maximal test or a $VO_2$ assessment. These tests may not be appropriate for the average exercise enthusiast. Health and fitness professionals should search the literature for a review of testing methods and draw their own conclusions.**