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## **Exercise Getting Started Part III – The Exercise Prescription By James L. Holly, MD**

Now that you know some of the principles of exercising (See *The Examiner*, February 5, 2004) and the goals of exercising (see the explanation of V.O<sub>2</sub>max and anaerobic threshold in *The Examiner*, February 12, 2004), lets design an exercise prescription.

The prescription involves four basic factors:

1. Type
2. Frequency
3. Duration
4. Intensity MODE

### OF EXERCISE

Traditionally, the activities prescribed most frequently are: walking, jogging, running, hiking, cycling, rowing, swimming. Alternative activities have been identified that should promote similar cardiovascular benefits. Aerobic dance, box or bench stepping, most racquet sports or any type of activity that is steady, nonstop and uses large muscles (arms and legs) have also been shown to improve aerobic capacity.

Aerobic exercise may be the center piece of the exercise program but it is still only a piece of the total program. The exercise program should also include flexibility training (stretching) and resistance training (weight lifting).

### FREQUENCY OF EXERCISE

The frequency of exercise participation is probably less critical than either exercise duration or intensity. Research studies conducted on aerobic exercise frequency show that 3 to 5 days per week is an optimal frequency. This does not mean that 6 or 7 days per week won't give additional benefits, but simply for the health-related benefits, the optimal gain is achieved with a time investment of 3 to 5 days per week of aerobic

Exercise should initially be limited to 3 or 4 days per week and increased up to 5 or more days per week only if the aerobic activity is enjoyed and physically tolerated. All too often, a person starts out with great intentions, is highly motivated, and exercises every day for the first few weeks, only to stop from utter fatigue or injury. Obviously, additional days above the 3 to 4 day frequency are beneficial for weight loss, but this level should not be encouraged until the exercise habit is firmly established and the injury risk is reduced.

Resistance training (weight lifting) should be done two or three days per week and never two days in a row. Resistance training can be done on the same day as aerobic exercise or you can

work with the weights on the days you are not doing aerobic activities.

Flexibility training (stretching) should be done every day if you like. Stretching should be done after a brief 3-5 minute warm-up and after exercise as part of the cool-down.

## DURATION OF EXERCISE

Several studies have demonstrated improvement in cardiovascular conditioning with endurance exercise periods as brief as 5 to 10 minutes per day. More recent research has indicated that 20 to 30 minutes per day is an optimal amount. Again, optimal is used here to reflect the greatest return for time invested, and the specified time refers to the time during which you are at your appropriate exercise intensity. Exercise duration cannot be discussed appropriately without also discussing exercise intensity.

Similar improvements in aerobic capacity are gained with a short-duration, high intensity program or a long-duration, low intensity program if the minimal threshold is exceeded for both duration and intensity. Similar benefits are also gained whether the daily endurance training session is conducted in multiple shorter bouts (e.g., three 10-minute bouts) or a single long one (e.g., a single 30-minute bout).

Resistance training should take no more than 30 to 60 minutes to complete (this is a full body workout).

Flexibility exercises can take as little as a few minutes or up to a half hour depending on your preference and time.

## INTENSITY OF EXERCISE

The intensity of the exercise bout appears to be the most important factor. How hard must you push yourself to gain benefits? This depends on your current state of fitness. The more fit you are the harder you will have to push yourself to improve your fitness. When you are just beginning a fitness program don't worry about trying to push yourself hard, it is important to exercise at a relatively easy pace during the first few months of an exercise program. Over a period of time you can gradually increase the intensity of There are several methods used to determine your aerobic exercise intensity. Monitoring your exercise heart rate is probably the most popular method. The American College of Sports Medicine recommends that most healthy people exercise somewhere between 60% to 90% of their maximum heart rates. The problem with this method is determining your maximum heart rate. You can estimate your maximum heart rate (220-age), but this is really not much more than a guess, just because two people are the same age does not mean they have the same maximum heart rate.

A better method to determine aerobic exercise intensity is what is called "The Rate of Perceived Exertion". With this method, individuals subjectively rate how hard they feel that they are working. This system for monitoring exercise intensity has proven to be very accurate. To be working at the correct level of intensity of aerobic exercise you should feel that you are working hard enough to demand deep breathing, but not so hard that you have to

gasp for air. In fact you should be able to carry on a conversation during aerobic exercise. You should also be able to maintain your pace of exercise for at least 20 to 30 minutes.

The best way to determine aerobic exercise intensity is to have your anaerobic threshold measured with a cardiopulmonary exercise test.

Flexibility exercises should be performed slowly and gently. Quick, forced stretching movements are potentially dangerous and can lead to pulls or spasms.

Resistance training does require a rather intense momentary effort to build strength, but when you first begin to lift weights it is very important to start out easy. You have to give your body time to adapt to the stress of resistance training; if you push too hard you will be sorry the next day. Over time your body will adapt and you can begin to push harder and lift heavier weights.

## THE EXERCISE PROGRAM

Once the exercise prescription has been determined, it is integrated into a total exercise program. The total exercise program consists of the following activities:

1. Warm-up
2. Endurance training (aerobic exercise)
3. Cool-down
4. Flexibility training (stretching)
5. Resistance training (weight lifting)

Generally, the first three activities are performed three to five days a week. Flexibility training can be included in the cool-down, or it can be done at a separate time during the week. Resistance training is usually done on alternate days when endurance training is not; however, the two can be combined into the same workout. Now, let's examine each of these activities.

### Warm-up

The warm-up should last about 5 to 10 minutes. Easy stretching and low intensity exercise, (the same mode of exercise you will be doing during the endurance training phase of the session). For example, if you train by running, you might start with easy stretching and follow it with 5 to 10 minutes of light jogging. Such a warm-up period increases both heart rate and breathing, preparing you for the efficient and safe functioning of your heart, blood vessels, lungs, and muscles during the more vigorous exercise that follows. A good warm-up also reduces the amount of muscle and joint soreness that you experience during the early stages of the exercise program and can decrease your risk of injury.

### Endurance training (aerobic exercise)

Physical activities that develop cardiovascular endurance are the heart of the exercise program. They are designed to improve both the capacity and efficiency of your cardiovascular, respiratory, and metabolic systems. These activities also help you control or

reduce your body weight. Activities such as walking, jogging, running, cycling, swimming, rowing, aerobic dancing, box stepping, and vigorous hiking are good endurance (aerobic) activities. Sports such as handball, racquetball, tennis, and basketball also have aerobic potential if they are pursued vigorously.

### Cool-down

Every endurance training session should end with a cool-down period. Cool-down is best accomplished by slowly reducing the intensity of the endurance activity during the last several minutes of your workout. After running, for example, a slow, restful walk for several minutes helps prevent blood from pooling in your extremities. Stopping abruptly following an endurance exercise bout causes blood to pool in your legs and can result in dizziness or fainting. After cooling-down for 5 to 10 minutes you can perform stretching exercises to facilitate increased flexibility. Stretching after vigorous exercise is safer, easier and feels better than stretching before exercise.

### Flexibility training (stretching)

Flexibility training (stretching) can be performed as part of your cool-down. Stretching exercises are quite useful for those who have poor flexibility or muscle and joint problems, such as low-back pain. These exercises should be performed slowly. Quick stretching movements are potentially dangerous and can lead to muscle pulls and spasms. At one time it was recommended that these exercises be performed before aerobic exercise, but more recent research has shown that muscles, tendons, ligaments and joints are more adaptable and responsive to flexibility exercises when they are done after the endurance training phase.

### Resistance training (weight lifting)

Increased interest surrounds the use of resistance training as part of a general health and fitness program. Indeed, many health-related benefits can be obtained from resistance training. The American College of Sports Medicine has recently included resistance training in its recommendation for a general health and fitness program. When you start a resistance training program for the first time it is very important to take it easy, don't try to lift heavy weights or push yourself too hard, let your muscles, tendons and joints adapt to the new type of stress they are experiencing. If you push too hard you are likely to experience extremely sore muscles the next day and won't be able to lift weights again for a week! Take it easy during your first couple of weeks of resistance training. Let the first two weeks be used to learn how to perform the various types of resistance training exercises.

After the first couple of weeks you can start to get serious. There are many different formulas used when prescribing a resistance training program. Start out by using a weight that you can lift ten consecutive times maximum. If you can lift that weight more than ten consecutive times then you need to use a heavier weight, and if you can't lift the weight ten consecutive times on your first attempt then you need to use a lighter weight. Just make sure the weight you are using allows you to lift it just eight to ten consecutive times before you give out, this will be your appropriate starting weight. You should try to achieve as many repetitions as possible during the second and third sets, but the number of repetitions you can perform in

these last sets will probably decrease as your muscles become fatigued.

You can perform two or three sets of each exercise per day, 2 to 3 days per week. Make sure you never lift weights two days in a row, it is important to give your muscles 48 hours or more to rest and adapt after resistance exercise. As your strength increases, the number of repetitions you can complete per set will increase. When you reach 15 repetitions on the first set, you are ready to progress to the next higher weight. This training technique is referred to as progressive resistance training.

The specific resistance training exercises and their proper performance can be learned from various books on resistance training but probably the best way to learn how to properly perform these exercises is to hire a good fitness trainer. After a few sessions with a certified fitness trainer you will be ready to tackle a resistance training program safely and efficiently.

If you don't exercise, start! If you do exercise, continue! Remember, it is your life and it is your health.