

# “EXERCISE ON PRESCRIPTION FOR PRIMARY CARE PHYSICIANS”

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*Better to hunt in fields for Health unbought  
Than fee the Doctor for a nauseous draught.  
The wise, for cure on exercise depend;  
God never made his work for man to mend.*

John Driden (sic) John Dryden (1631-1700)

## INTRODUCTION

Lack of exercise is a causative factor, either directly or indirectly, for a number of diseases, especially coronary artery disease, dyslipidemia, hypertension, diabetes and obesity. Recent research shows that medical advice from general practitioners (GPs) could motivate patients to exercise. (British Heart Foundation, 1996) Therefore a substantial knowledge in this field is of paramount importance for primary health care providers.

As Doctors, when prescribing, various factors are taken into consideration. Apart from the particular needs dictated by the illness, the age and weight of the patient may be important. Can the patient be relied upon to take the medication frequently, or is a slow release formulation more suitable? Which route is appropriate- orally, local injection or skin absorption? We are unlikely to tell the patient just to take medication and leave the choice to him. We specify the type, the dose, the frequency and the means by which it is taken.

Similarly, it would be equally illogical to advise patients that they take exercise or train without offering advice about how much, how often and what kind. In Sports and Exercise Medicine, an easy to remember mnemonic is being used worldwide known as FITT formula when prescribing exercise programmes to patients or normal healthy people.

***F- Frequency*** – how frequently

***I- Intensity***- how hard

***T- Time*** -duration

***T- Type*** – Walking, jogging, swimming etc (resistance training, cardiovascular training or flexibility)

General physical activity guidelines provide a solid foundation for activity counseling within the context of an office consultation. An exercise prescription is analogous to any other medical prescription.

Before prescribing exercise we need to consider three corner stones, namely a comprehensive medical history, physical examination and clinical testing if indicated.

### First the **History**

It is important to ask about and document a prior history of coronary artery disease, hypertension, diabetes, hyperlipidemia, peripheral vascular disease, asthma, chronic

obstructive pulmonary disease, cancer, or musculoskeletal diseases. If any suspicious history is documented, further evaluation is indicated prior to initiating a new program of regular physical activity.

In addition inquire about patient's current activities such as

- Any present or past, sport or recreational activities
- Occupation and the lifestyle (smoking , alcohol consumption )
- Number of hours watching television and working at computer

## Next comes the **Physical examination**

This is the second corner stone upon which formal exercise prescriptions are based. Blood pressure, height and weight, are recorded in a standard way.

## Then the **Clinical Investigations**

The following chart shows how we can easily identify our patients for any clinical testing before the programme.

<b>Low risk</b>	Men <45 and women < 55 years who are asymptomatic and have only one risk factor	Do not need a clinical testing
<b>Moderate risk</b>	Men > 45& women > 55 or people who have two or more risk factors	Need clinical testing only if they want to do vigorous exercises
<b>High risk</b>	People who are symptomatic or have known cardio pulmonary disease	Clinical testing is compulsory ie ECG

The exercise programme can be tailor-made to the individual patient after getting an idea about the fitness of the patient with the above criteria.

The basic recommendations by American College of Sports Medicine, the world largest sports Medicine body (2008) are mentioned below.

# **FREQUENCY**

## **Cardiorespiratory exercise**

Adults should get at least 150 minutes of moderate-intensity exercise per week. This can be met through 30-60 minutes of moderate-intensity exercise (five days per week) or 20-60 minutes of vigorous-intensity exercise (three days per week). One continuous session and multiple shorter sessions (of at least 10 minutes) are both acceptable to accumulate desired amount of daily exercise. Gradual progression of exercise time, frequency and intensity is recommended for best adherence and least injury risk. Individuals unable to meet these schedules can still benefit from some activity.

## **Resistance Exercise**

Adults should train each major muscle group two or three days each week using a variety of exercises and equipment. Very light or light intensity is best for older persons or previously sedentary adults starting exercise. Two to four sets of each exercise will help adults improve strength and power. Strength exercise is beneficial for everyone, even people in their 90s. It is the only form of exercise that can slow and even reverse the decline in muscle mass, bone density, and strength that occur with aging.

## **Strength-Training Regimens**

Strength training involves intense and short-duration activities. For beginners, adding 10 - 20 minutes of modest strength training two to three times a week may be appropriate. The following are some guidelines for starting a strength regimen: Strength training involves moving specific muscles in the same pattern against a resisting force (such as a weight) for a preset number of times. This is called a repetition. People should first choose a weight that is about half of what would require a maximum effort in one repetition. In other words, if it would take maximum effort to do a single repetition with a 10-pound dumbbell, the person would start with a five-pound dumbbell. In the beginning, most people can start with one set of 8 - 15 repetitions per muscle group with low weights. As individuals are able to perform one or two repetitions over their routine, weights can be increased by 2 - 10%. Breathe slowly and rhythmically. Exhale as the movement begins. Inhale when returning to the starting point. Joints should be moved rhythmically through their full range of motion during a repetition. Do not lock up the joint while exercising it. For maximum benefit, one should allow 48 hours between workouts for full muscle recovery.

For each exercise, 8-12 repetitions improve strength and power, 10-15 repetitions improve strength in middle-age and older persons starting exercise and 15-20 repetitions improve muscular endurance.

Adults should wait at least 48 hours between resistance training sessions.

For the purpose of understanding the terms reps and sets for those who are not familiar the following example is provided:

*Let's take pull-ups for an example. Each time you pull your neck up to the bar that is one rep. You do a bunch of reps in a row to make one set. If you can do ten pull-ups you just did a set of ten reps. you then take a rest. Then you do another set.*

## INTENSITY

This represents the central component of the exercise prescription. In general, benefits of physical activity follow a typical dose-response curve. Previously sedentary patients and others who are interested in health related physical fitness should always begin at low intensities. To determine the intensity there are mainly 2 methods. One is the target heart rate and the second is rating of perceived exertion (RPE).

### **Target heart rate:**

The patient must be comfortable taking the pulse. If the person has any difficulty in doing this there are commercial heart rate monitors available.

***How to calculate the target heart rate:***  $Maximum\ heart\ rate\ (MHR) = 220 - age\ in\ years$

**Target heart rate.** The most common target rate is 40 - 80% of your maximum heart rate. You should measure your pulse off and on while you exercise to make sure you stay within this range. After about 6 months of regular exercise, you may be able to increase your target heart rate to 80% (but only if you can comfortably do so).

Certain heart medications may lower your maximum and target heart rates. Always check with your doctor before starting an exercise program.

### **Rating of perceived exertion (RPE):**

For patients who are not interested in using target heart rate or are uncomfortable taking their pulse, self- ratings perceived exertion is another useful tool for prescribing activity intensity. To measure this there is a scale called Borg's perceived exertion and pain scale. The modified Borg RPE scale is given below.

0 - Nothing

0.5 – Extremely weak

1 – Very weak

2 – Weak

3 – Moderate 4.

5 – Strong 6.

7- Very strong 8. 9. 11.

12 – Absolute maximum

The use of this scale is especially useful for patients on medications that slow the heart rate.(eg. Beta blockers, certain calcium channel blockers).

## **Talk Test**

Using this tool, patients should be instructed to exercise to a level where they are able to carry out a conversation without undue breathlessness. For example, patients who are exercising at a moderate intensity should be able to engage in a conversation with an exercise partner without stopping or slowing down to catch their breath.

A useful variation of the talk test is the talk-sing test. Using this variant, patients are instructed to exercise at an intensity where they can comfortably talk but would be unable to sing.

## **Type of activity**

This should be based on each individual's interests as well as his or her current level of fitness. It is also important to recommend a variety of activities to maintain patient interest and discourage boredom. Activities should employ large-muscle groups that are used in continuous and rhythmic motion.

## **Types of Aerobic Exercise**

Aerobic exercise is usually categorized as high, moderate, or low intensity.

### **Low- to moderate-impact exercises:**

Walking, swimming, stair climbing, step classes, rowing, and cross-country skiing. Nearly anyone in reasonable health can engage in some low- to moderate-impact exercise. Brisk walking burns as many calories as jogging for the same distance and poses less risk for injury to muscle and bone.

Note: Swimmers should use a heart rate target of 75% of the maximum and then subtract 12 beats per minute. The reason for this is that swimming will not raise the heart rate quite as much as other sports because of the so-called "diving reflex," which causes the heart to slow down automatically when the body is immersed in water.

### **High-impact exercises:**

Running, dance exercise, tennis, racquetball, squash. Perform high-impact exercises no more often than every other day, and less often for those who are overweight, elderly, out of condition, or have an injury or other medical problem that would rule out high-impact.

#### **A few simple rules are helpful as you develop your own routine.**

- Don't eat for 2 hours before vigorous exercise.
- Drink plenty of fluids before, during, and after a workout.
- Adjust your activity level according to the weather, and reduce it when you are fatigued or ill.
- When exercising, listen to the body's warning symptoms, and consult a doctor if exercise causes chest pain, irregular heartbeat, unusual fatigue, nausea, unexpected breathlessness, or light-headedness.
- Shoes - All that's really necessary for a workout is a good pair of shoes that are made well and fit well. They should be broken in, but not worn down. They should support the ankle and provide cushioning for walking as well as for impact sports such as running or aerobic dancing. Airing out the shoes and feet after exercising reduces chances for skin conditions such as athlete's foot.
- Clothing Comfort and safety are the key words for workout clothing. For outdoor nighttime exercise, a reflective vest and light-colored clothing must be worn. Bikers, inline skaters, and equestrians should always wear safety devices such as helmets, wrist guards, and knee and elbow pads. Goggles are mandatory for indoor racquet sports. For vigorous athletic activities, such as football, ankle braces may be more effective than tape in preventing ankle injuries.

## **Warm up and cool down**

Warming up and cooling down are important parts of every exercise routine. They help the body make the transition from rest to activity and back again, and can help prevent soreness or injury, especially in older people. Practice warm-up exercises for 5 - 10 minutes at the beginning of an exercise session. Older people need a longer period to warm up their muscles. Strengthening exercises, quiet calisthenics, and walking are ideal.

To cool down, you should walk slowly until the heart rate is 10 - 15 beats above your resting heart rate. Stopping too suddenly can sharply reduce blood pressure, and cause syncope. It may also cause muscle cramping. Stretching may be appropriate for the cooling down period, but it must be done carefully for warming up because it can injure cold muscles.

Warming up before exercise and cooling down after is just as important as the exercise itself. By properly warming up the muscles and joints with low-level aerobic movement for 5 - 10 minutes one may avoid injury. Cooling down after exercise by walking slowly, then stretching muscles, may also prevent strains and blood pressure fluctuation.

### **FOR MOST PEOPLE, EXERCISE MAY BE DIVIDED INTO TWO GENERAL CATEGORIES:**

#### **1. Aerobic or endurance**

People who are out of shape or the elderly should start aerobic training gradually. For example, they may start with 5 - 10 minutes of low-impact aerobic activity every other day and build toward a goal of 30 minutes per day, three to seven times a week. (For heart protection, weekly total is the key.)

Swimming is an ideal exercise for many elderly people, and for certain people with physical limitations. People with physical limitations include pregnant women, individuals with muscle, joint, or bone problems, and those who suffer from exercise-induced asthma.

People who seek to lose weight should concentrate on calories burnt each week, not the number of workout sessions. One way of gauging the aerobic intensity of exercise is to aim for a "talking pace," which is enough to work up a sweat and still be able to converse with a friend without gasping for breath. As fitness increases, the "talking pace" will become faster and faster.

**Aerobic-exercise equipment** Home aerobic exercise machines can be adapted to any fitness level and used day or night. Before investing in any exercise machine, however, it



is wise to first test it at a gym. In addition, initial supervised training when using these machines can reduce the risk of injury that might occur with self-instruction.

The following are a few observations on specific equipment:

A good floor mat is important to provide cushioning for all home exercises.

For burning calories, the treadmill has been ranked best, followed by stair climbers, the rowing machine, cross-country ski machine, and stationary bicycle. (Elliptical trainers, however, may be even better than treadmills for increasing heart rate, calorie expenditure, and oxygen consumption.)

Stationary bikes condition leg muscles and are fairly economical and easy to use safely. The pedals should turn smoothly, the seat height should adjust easily, and the bike's computer should be able to adjust intensity. Stair machines also condition leg muscles. They offer very intense, low-impact workouts and may be as effective as running with less chance of injury.

## **2. Strength or resistance**

### **Strength-training equipment**

Unlike aerobic exercise, strength training almost always requires some equipment. Strength-training equipment does not, however, have to cost anything. Any heavy object that can be held in the hand, such as a plastic bottle filled with sand or water, can serve as a weight.

Dumbbells (1 - 10 pounds) and resistance bands are inexpensive, portable, and effective. Wearable weights help strengthen and tone the upper body. Ankle weights strengthen and tone muscles in the lower body. They should not be worn during high-impact aerobics or jumping. Hand grips strengthen arms and are good for relieving tension. A pull-up bar can be mounted in a doorway for chin-ups and pull-ups.

### **Flexibility training (Stretching)**

#### **Benefits of Flexibility Training**

Flexibility training uses stretching exercises. Many stretching exercises are particularly beneficial for the back. In general, flexibility training provides the following benefits: Prevents cramps, stiffness, and injuries and improves joint and muscle movement (improved range of motion). Certain flexibility practices, such as yoga and tai chi, also involve meditation and breathing techniques that reduce stress. Such practices appear to have many health and mental benefits. They may be very suitable and highly beneficial for older people, and for patients with certain chronic diseases.

#### **Flexibility Training Regimens**

Doctors recommend performing stretching exercises for 10 - 12 minutes at least three times a week. When stretching, exhale and extend the muscles to the point of tension,

not pain, and hold for 20 - 60 seconds. (Beginners may need to start with a 5- to 10-second stretch.) Breathe evenly and constantly while holding the stretch.

Inhale when returning to a relaxed position. Holding your breath defeats the purpose; it causes muscle contraction and raises blood pressure. When doing stretches that involve the back, relax the spine to keep the lower back flush with the mat, and to work only the muscles required for changing position (often these are only the abdominal muscles).

## **SPECIFIC EXERCISE TIPS FOR OLDER PEOPLE**

Studies continue to show that it is never too late to start exercising. Elderly adults who exercise twice a week can significantly increase their body strength, flexibility, balance, and agility. Any older person should have a complete physical and medical examination, as well as professional instruction, before starting an exercise program. The following tips for exercising may be helpful:

### **Start low and go slow**

For sedentary, older people, one or more of the following programs may be helpful and safe: Low-impact aerobics, gait (step) training, balance exercises, tai chi, self-paced walking, and lower legs resistance training, using elastic tubing or ankle weights. Even in the nursing home, programs aimed at improving strength, balance, gait, and flexibility have significant benefits.

Strength training assumes even more importance as one ages, because after age 30 everyone undergoes a slow process of muscular weakening (atrophy). This process can be reduced or even reversed by adding resistance training to an exercise program. As little as one day a week of resistance training improves overall strength and agility. Strength training also improves heart and blood vessel health.

## **GUIDELINES FOR PATIENTS WITH CHRONIC ILLNESSES**

There are patients with chronic illnesses such as hypertension, diabetes and bronchial asthma who can improve their condition, sometimes enabling them to reduce the number of tablets they are taking. However this has to be done with proper advice from a Doctor.

### **Bronchial asthma:**

- Intensity-low moderate aerobic activity, 4 to 5 days a week, 20 to 30 minutes per session
- Strengthening exercises- 9light weight with high repetition – can increase gradually. -2 to 3 days a week and 15 to 20 minutes per session.
- Recommended RPE 6-8 or 60to 80% of MHR

## **Exercise Induced Asthma (EIA)**

- Administer a single dose of a short acting beta agonist 15 -30 minutes before the event.
- Need a good warm up about 15 -20 minutes. Warm humid environment if preferred as cold and windy weather can induce an attack.
- RPE 6 – 8.

## **Angina**

- Aerobic activity 4-5 times a week- 30 minutes per session.
- Be careful when doing strengthening exercises as lower limb exercise may trigger an attack.
- RPE 3-5.
- Longer warm up about 15 minutes.

### **Avoid**

- High intensity exercises (fast rowing, and any other high intensity work outs)
- Valsalva maneuver-by holding breath
- Strengthening exercises as it can increase blood pressure
- Dehydration as excessive fluid loss may result in increased blood viscosity and increase cardiac demand.

## **Congestive heart failure**

- Warm up and cool down for more than 15 minutes.
- RPE 2-4.
- Strengthening exercises should be with high repetition and low resistance
- Aerobic activity 3-4 times a week with 20-40 minutes a session
- Exercise sets should be done with a 1-2 minutes rest

### **Avoid**

- High intensity work outs
- Valsalva maneuver
- Dehydration

## **Diabetes Mellitus**

- Make sure you do not inject your insulin shot into any of the primary muscle groups you are going to exercise because it will be used quickly, resulting in hypoglycaemia.
- Advise to exercise at the same time each day for better control
- Take good care of feet, which should be regularly checked for any accidental cuts, blisters or signs of infection.
- Exercise 3 to 5 days a week.

- The target heart rate 50-60% of MHR
- Type- walking, swimming, and cycling.
- Time recommended: 20 -40 minutes per session for IDDM(Type 1) and 40-60 minutes for patients with NIDDM(Type 2)

## Hypertension

- **Frequency** - exercise 3-5 times a week, 20-30 minutes per session.
- **Intensity** - Aerobic exercise should be at least at moderate intensity (e.g. brisk Walking), corresponding approximately to 40-60% of maximal aerobic capacity (VO<sub>2</sub> max. Relatively, moderate-intensity activity could be expressed as a level of effort of 5 or 6 on a scale of 10 or 50–70% of maximum heart rate.
- **Type** - Emphasis on aerobic exercises such as walking, jogging, cycling and swimming
- Rope skipping is also a very good option that can be performed every day, requires little equipment and learning, and involves a lot of muscle groups. However, any activity that uses large muscle groups, can be maintained continuously, and is rhythmical and aerobic in nature is recommended as the primary modality for those with hypertension
- Resistance exercise should involve the major muscle groups (legs, hips, chest, back, abdomen, shoulders, and arms). Either machine weights or free weights might be used while the former is likely the safest approach. Resistance exercise performed should be alternating between upper- body and lower-body works to allow for adequate rest between exercises. Some examples of resistance exercise include chest press, shoulder press, triceps extension, biceps curl, pull-down (upper back), lower-back extension, abdominal crunch/curl-up, quadriceps extension or leg press, leg curls (hamstrings), and calf raise

## References

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