



ACTIVITY FOR PHYSICAL FITNESS

This information is brought to you by many of the Australian nutrition professionals who regularly contribute to the Nutritionists Network ('Nut-Net'), a nutrition email discussion group.

Date of last Revision: 1999

The following questions and answers address the types and intensities of training recommended for general physical fitness. This FAQ is applicable to the non-specialist sports person, or to those interested in fitness as an end in itself. It does not discuss the benefits to health of being physically active, or how increased activity can assist in weight control; these subjects are discussed in other FAQs in this series.

If I want to maintain a fairly high level of 'all-round' physical fitness, what is an appropriate training program?

A training program that includes five or six days of exercise per week, with 20-30 minutes of vigorous activity on each training day, and with one or two days of rest and recovery, is ideal for the non-specialist sportsperson. It is also worth emphasising that to be of value, fitness training must be conducted on a regular basis. Fitness that takes weeks or months to acquire will be largely lost after just three weeks of inactivity. Fortunately however, fitness can be regained just as quickly as it is lost, if the break from exercise is not prolonged.

A big problem with today's busy lifestyle is finding the time to train. Many people find that a fitness program is easier to maintain if fitness training is involved in the daily routine – for example, setting aside an appropriate amount of time for training at much the same time each day. This way, training becomes as much a 'habit' as putting on makeup or shaving. Some people also find that keeping a diary of fitness training (noting such things as when intensity or duration of activity is increased, how many kilometres they have run, etc) helps them to stay motivated.

What are the types and intensities of training I should be doing for all round fitness?

Physical fitness has many components. For general fitness, the most important types of activities are aerobic training, strength training (also called 'resistance training') and flexibility exercises. A good exercise program will include all of these aspects of training and will also help to improve (or maintain) fitness levels, balance and good posture.

The frequency, intensity and type of training, and amount of time to be spent on each fitness component is outlined below. One factor common to each component is 'progression' - a program needs to be commenced at an appropriate level (usually quite low) and increased gradually as fitness improves. The body will not respond to a program that stays the same for many weeks.

It is also important to remember that we are individuals and that different people respond differently to any particular exercise intensity. Programs therefore need to be adjusted to suit each individual. If you are unsure of the best way to approach your fitness after reading the guidelines below, consult a qualified fitness leader or exercise physiologist at your local fitness gym or health club. The reference books acknowledged below provide additional information on how the individual training components can be conducted safely and effectively.

Aerobic Activity

This is probably the most important component for general fitness and health. 'Aerobic fitness' can be defined as the ability to continue to do fairly hard physical work (where the work may be any vigorous activity) over a prolonged period (e.g., for 30 minutes or more). A good predictor of a person's aerobic fitness is their 'maximal oxygen uptake'. (See [Appendix 1](#) if you would like detailed technical information on maximal oxygen uptake).

Aerobic exercise includes walking, jogging, cycling, swimming, rowing and machine-based stair climbing (among many other activities). To improve aerobic fitness it is appropriate to exercise vigorously for 20-30 minutes continuously, three to five times per week.

When commencing an aerobic program, 20 minutes of aerobic activity -- conducted three times a week -- will improve fitness significantly. To obtain a training effect, you will need to exercise at a rate that requires you to breathe fairly heavily and that causes your heart to beat much faster than usual. For guidance on how you can measure your heart rate, see [Appendix 2](#).

It is important to start at a low intensity and increase this over the following weeks as the exercise becomes easier. For example, 20 minutes of walking, jogging or a combination of walking/jogging may be sufficient to leave you rather breathless and fairly tired at the start of your program, but as the weeks go by, you may need to increase the pace or introduce jogging up some shallow hills to achieve a further increase in fitness. In order to continue to increase your fitness level, you will need to increase the time spent exercising aerobically to ~30 minutes per session for up to five sessions per week. (See [Appendix 3](#) if you would like more detailed information on how to check if you are training aerobically).

Using a variety of exercise types, intensities and durations is important; that is, do not get 'bogged down' into doing the same exercise each time you train. This would quickly become boring and would not lead to all-round fitness.

Although a warm up is not necessary before gentle jogging, cycling or similar aerobic activity, the 'cool down' period following the activity is the most appropriate time for stretching to improve flexibility (see below).

Strength Exercise

The aim of strength exercises is to improve muscular strength and muscular endurance. These two components are closely related. See [Appendix 4](#) for technical definitions of these two terms.

Many of the tasks that we carry out as part of daily living require a certain amount of muscular strength and endurance. Lifting the shopping bags into the car, walking up a set of stairs, pruning the hedge and so on all require some strength and muscular endurance. Even maintaining good posture while sitting requires muscular endurance. A strength program can also target muscles that are not used very often, and therefore become weak, causing muscle imbalances that can lead to injury or pain.

Increasing strength and muscular endurance can be achieved at any age, from childhood to well past retirement age. The 'overload principle' is used to develop muscular strength and endurance. This means gradually increasing the work the muscle has to do, leading to a slow but steady improvement. Similar to aerobic fitness, it is important to start slowly and build up strength and muscular endurance over several months.

Strength and muscular endurance can be improved through weight training, or by using your body weight as the source of resistance (exercises such as push ups, dips, squats and crunches are appropriate) or, better still, with a combination of these. Initially, a program of 6-8 different exercises, targeting the major muscle groups of the body, is appropriate. Each exercise needs to be conducted a total of two or three times ('2-3 sets').

A suitable load is one that can be lifted between 10 and 15 times ('10-15 repetitions') within each set. The intensity of the strength workout can be varied by altering the load lifted and the number of repetitions conducted (e.g. occasionally use higher weights/lower repetitions and occasionally use lower weights/higher repetitions), the length of rest intervals between exercises and the number of sets performed. For best effect, resistance training should be conducted two or three days per week. Always allow at least one 'rest and recovery' day between resistance training sessions. This is necessary because the actual strengthening process occurs during the recovery phase.

It is advisable to warm up before commencing resistance training by conducting some 'range of motion' activities (such as arm swinging) and lifting the bar without weights, using the same actions that you are about to use with weights attached to the bar. The cool down period (following resistance training) is a good time to stretch for improving flexibility (see next section).

Appropriate reference books for strength training include:

- Title: The Ultimate Training System: Periodisation Breakthrough
Authors: Steven J Fleck and William J Kraemer
Publisher: Advanced Research Press, New York, 1996
- Title: Strong Women Stay Young
Author: Nelson ME, Wernick S
Publisher: Lothian Aurum Press, Melbourne, 1997

- Title: The Men's Health Guide to Peak Conditioning
Authors: Richard Laliberte, Stephen C. George
Publisher: Rodale Press, Inc Emmaus, Pennsylvania

How can I improve my level of flexibility?

In addition to the potential for muscle wasting, inactivity results in a tendency for muscles to become less flexible, thus decreasing the 'range of motion' of joints as we age (i.e. the joints stiffen). Regular stretching exercises and full 'range of motion' activities (such as gently swinging the arms and 'high kicking') will reduce or delay the onset of inflexibility.

Stretching for flexibility is best done after completing your endurance or resistance training because the muscles are warm; as a result they will be able to be fully stretched. Long, slow stretches are recommended (hold for 20-30 seconds), with each stretch taken to the point where a slight discomfort is experienced. Each stretch should be followed by a short rest, and then repeated several times. All the major muscle/tendon groups (legs, abdomen, arms, shoulders, wrists and so on) should be stretched. Stretching should be conducted several times per week, preferably after conducting and/or resistance training.

Suitable books about flexibility training include:

- Title: Stretching
Author: Bob Anderson
Publisher: Random House, Canada
- Title: Stretching for Flexibility and Health
Author: Francine St.George
Publisher: The Crossing Press, Freedom, California.

Are there any dangers associated with taking up a training program such as the one recommended here?

Provided that you are in reasonable physical shape, there is no reason not to take up exercise aimed at improving physical fitness. Your physical condition should be taken into account when determining the level of fitness you are aiming for as well as the time period in which you wish to 'get in top shape'. For example, you shouldn't expect to be able to run at the same pace at age 55 that you could at age 25 if you have been physically inactive for some time. Moreover, if you have not been physically active for a number of years, it is a good idea to have your doctor check for underlying health problems that might flare up with unaccustomed vigorous exercise. For mature aged people (over ~60), walking, weight training and stretching are still entirely suitable, but must be conducted at a level of intensity appropriate for each individual's health and fitness level.

There are dangers involved in engaging in weight training and some forms of flexibility training that are conducted inappropriately. A real potential for injury exists from incorrect technique when conducting these forms of exercise. It is recommended that you obtain a suitable guide (such as one of the books recommended above) on how to do these exercises correctly. Alternatively, you might join one of the many fitness clubs that are now available in every city and even

in many country towns, to obtain expert advice on safe resistance and flexibility training.

Training hard in the heat of the day can lead to heat illness. It is better to avoid training in very hot weather, if you can. It is also essential to drink plenty of fluids such as water or sports drinks.

There are some risks associated with particular activities. For example, road cycling greatly increases the danger of being involved in a road accident, and a cyclist has no protection compared to the occupant of a motor vehicle. For this reason, stationary bikes in your own home or the local gymnasium may offer a safer form of cycling. There is an increased risk of 'orthopaedic' injury (such as sprains and strains) from activities that involve running; but studies have shown that the overall health benefits of regular running outweigh this risk, particularly if the running is conducted on soft surfaces (such as grass) rather than hard surfaces (such as bitumen or concrete). You should ensure that your footwear provides good support and protection against the impact forces caused by running.

For some people, there is also the risk of 'overtraining'. This is mainly a problem for elite sports people or others who are required to be extremely active for long periods. However, overtraining can also affect very enthusiastic 'social' runners' or tri-athletes, as well as those who exercise for weight control. Physical training is a double-edged sword: just enough will promote fitness and health, whilst too much can significantly reduce the effectiveness of your immune system. Many elite athletes find that they suffer from colds and other infectious illnesses when they are in full training. The solution to the overtraining syndrome is simple: reduce the intensity and/or duration of training and do not attempt to train again at the level that caused the problems.

OK, so I should run, swim or ride a bike for 20-30 minutes three to five times a week, do up to three sets of 10-15 repetitions of about eight types of weight training two or three times a week, and stretch after most sessions of vigorous exercise. What is the best time of day for this training?

There is no universally agreed 'best time' to train. If you are simply training for general fitness, the time of day available for exercise may be dictated by factors other than personal preference. For example, in summer it may be too hot to train at any time other than early morning. Time available for training may be dictated by other constraints – e.g. shift workers may not be able to consistently train at the same time of day. As mentioned in the introduction, making training a part of your daily routine will encourage and motivate you to keep exercising.

If you have the luxury of being able to choose your training time, you can choose the time that most suits you. It is appropriate to train before eating a meal (rather than soon after), but otherwise there is no inherent advantage to training early in the morning as opposed to later in the afternoon or in the evening. Some athletes find that training hard late at night tends to keep them awake. There is a theoretical basis for this: hard training leads to production of adrenaline and other hormones that have a stimulating effect, making sleep difficult. However, the scientific evidence suggests that many people can train late in the evening and still sleep well.

Do I need to join a gym or fitness club?

All of the above forms of training can be done at, or from home. Simple weight lifting equipment (such as a barbell, dumbbells and weights) is relatively inexpensive. Stationary bikes (or similar equipment for aerobic fitness) do not take up much room, and running only requires shorts, a tee-shirt and running shoes (and perhaps a tracksuit in winter).

However, as mentioned above, you should ensure that you have shoes that provide appropriate cushioning, and try to run on grass or other soft surface, rather than on concrete or bitumen. Callisthenics such as push ups, sit ups, dips, squats and crunches can be done without any equipment, as can stretching.

However, there is a burgeoning fitness industry, with people who are qualified to give individually-tailored advice on safe and effective ways of improving fitness. It is also true that many people do not exercise (or quickly abandon an exercise program shortly after commencing one) because they suffer from a lack of motivation. Gyms and fitness clubs exist that provide expertise, motivation and personalised programs appropriate to the individual. So if you are lacking in motivation, or don't have time to read up on how to safely perform weight training exercises, callisthenics and stretches, you may be better off joining a reputable fitness club and getting expert advice.

What sort of diet should I be eating for peak fitness?

The 'fitness diet' is similar to that for good health generally, but with increased quantities of grain foods such as bread, rice, pasta and breakfast cereals (mainly for energy and B group vitamins). Eating plenty of fruits and vegetables will give you many of the remaining additional vitamins and minerals your body needs while you are staying or becoming fit. Lean meat, eggs and/or fish are valuable for protein, B group vitamins and minerals such as iron and magnesium (and vegetarians should have plenty of 'meat alternatives' such as beans, soy products, lentils and nuts). Finally, low- or reduced-fat milk and milk products will provide extra calcium and phosphorus for improving bone strength.

Appendix 1: Maximal Oxygen Uptake

Maximal oxygen uptake (abbreviated to VO₂max) is considered to be the best all-round predictor of a person's ability to perform sustained physical work. It is a measure of how well your body can take in and use oxygen to release energy from the 'fuels' protein, fat and carbohydrate. VO₂max is best measured in a physiology laboratory, with the subject gradually increasing work output on a treadmill or bicycle ergometer, while his/her oxygen consumption is measured. Unless you are extremely keen on knowing your aerobic fitness level, it is not necessary to have this test conducted (it is also quite expensive). The most appropriate method of expressing VO₂max takes the subject's body weight into account. Typical VO₂max results for sedentary young Australian men are around 40 millilitres of oxygen per kilogram of body weight per minute (mL/kg/min). Taking part in vigorous exercise such as

jogging or walking/jogging for 20-30 minutes three to five times a week can improve VO₂max by 10-20%.

Appendix 2: Measuring heart rate

Heart rate can be determined by using a commercially-available heart rate monitor that straps to your chest and sends a radio signal to a wrist-mounted monitor (that also doubles as a wrist watch). Alternatively, you can measure your own heart rate by stopping for a few seconds, and conducting any of the following:

1. Measure your heart rate directly by placing the fingers of your right hand over your heart;
2. Measure your carotid pulse by pressing fairly firmly with index and middle finger just to the side (either side) of the midline of the front of your neck - at the position of the 'Adam's Apple' in men; or
3. Measure your wrist pulse by placing index and middle fingers of the opposite hand on the underside of the wrist (either wrist) about 3-4 cm towards the elbow from the point where the thumb bone attaches to the wrist. Feel around this point until you detect the pulse.
4. Wait until a heart or pulse beat coincides with the appearance of a second on your watch (any second will do, providing that it 'appears' at the same time as a beat occurs). Count this as 'zero', then count how many beats occur in the next six seconds. Include a beat if it occurs exactly at the six-second mark, but do not include beats that occur later. Add a zero to the number of beats that occurred in six seconds to determine approximate heart rate in beats per minute (e.g., 14 beats in six seconds = ~140 beats per minute). With practice, you can estimate your heart rate accurately enough to know if you are in the 'training zone', while breaking from your training for less than half a minute.

Appendix 3: Determining a Target Heart Rate for Aerobic Fitness Training

For aerobic training, your heart rate should be about 70% or more of your estimated 'heart rate reserve'. The heart rate reserve is calculated from the predicted maximal heart and the resting heart rate as follows:

- First estimate your maximal heart rate as approximately 220 minus your age in years. For example, a person who is 50 years old will have an estimated maximal heart rate of $220 - 50 = 170$ beats per minute.
- Then determine your minimum heart rate. This is your heart rate or pulse on awakening from a good night's sleep (provided that you are in good health). The 50 year old person might detect a resting heart rate as 60 beats per minute for example.
- Next determine the difference between your maximal and resting heart rates. For our 50 year old subject, this is $170 - 60 = 110$
- Now calculate (70% of 110) = 77

- Finally, add 77 to the resting heart rate to determine the minimal training rate:
 $77 + 60 = 137$ beats per minute
- Therefore, a minimal aerobic training heart rate for the 50 year old would be about 130 - 140 beats per minute (or 13-14 beats in six seconds)

For someone starting a training program after a long period without training, 60% of the predicted heart rate reserve may be a reasonable target to begin with. Therefore, the 50 year old person who has been sedentary for many years might aim for an initial training heart rate of: $[60\% \text{ of } (170 - 60)] + 60 = \sim 125$; and then gradually build up to 130-140 beats per minute. There is little point in training at much more than about 80% of heart rate reserve. This is a high level of power output that will tire most non-athletes quickly, possibly leading to demotivation.

Appendix 4: Definitions of 'Strength' and 'Muscular Endurance'

'Strength' of a muscle is defined as the maximum force that the muscle can develop during one maximal contraction. It is usually tested by determining the heaviest weight that a subject can lift once, using a lifting action based on that muscle (the 'one repetition maximum', abbreviated to 1 RM). 'Muscular endurance' is defined as the number of times that a muscle can continue to contract submaximally. A good test of muscular endurance is the maximum number of times that the subject can lift a fairly heavy weight.

Disclaimer: This material is provided on the basis that it constitutes advice of a general nature only. It is not intended to replace the advice of a physician or a dietitian.

A periodization model typically begins by laying a fitness foundation first. The foundation involves basic exercises and movements to strengthen tendons and ligaments and preparing the body for the training stress ahead while reversing the effects of disuse in your beginning clients. This phase usually employs a relatively higher number of reps (10-15) and moderate/high volume (2-4 sets, 8-12 exercises). Start by marking "Periodization Breakthrough!: The Ultimate Training System" as a must-read. "Periodization Breakthrough!" describes essential, but often overlooked principles of successful strength training such as, the process of dividing training into smaller, more manageable intervals, and the need to vary workout intensity and exercises to allow athletes to reach maximum strength and muscular development. Fleck and Kraemer describe a scientifically based training model. "Periodization Breakthrough!" describes essential, but often overlooked principles of successful strength training.

Although many training variables contribute to the performance, cellular and molecular adaptations to resistance exercise, relative intensity (% 1 repetition maximum [%1RM]) appears to be an...^Â The ultimate training system: periodization breakthrough! New York: Advanced Research Press, 1996Google Scholar. 13. Stone MH, Oâ€™Bryant H. Weight training: a scientific approach. Minneapolis (MN): Bellwether, 1987Google Scholar. 14. Karvonen MJ, Kentala E, Mustala O. The effects of training on heart rate: a longitudinal study.

Block periodization, linear periodization and daily undulating periodization. Linear periodization: As simple as it gets, we do not have to use too many words to describe it. You take your training program and divide it into macro- (9-12 months), meso- (3-4 months) and microcycles (1-4 weeks). Over the course of time, you gradually decrease the training volume and increase the training intensity within and between cycles (15). It could look somewhat like this (microcycle): • Week 1: 4 sets of 10 reps 60 kg. In other words, despite training, your Bench performance is going down. The block structure of the periodization allows introducing whole phases that can be used to "recover". As a short example approach. It can look somewhat like this.