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ADDITIONAL RESOURCES

ADDITIONAL READING

- Exercise Quiz for Special populations
- Cancer and Exercise
- Chronic Fatigue and exercise
- Depression and Exercise
- Pregnancy Factsheet
- Asthma and exercise
- Asthma medications
- Obesity factsheet
- Obesity and exercise
- Diabetes Factsheet
- Osteoporosis
- GP Exercise referral
- Breathing problems and exercise
- Heart Disease and risk factors
- How heart smart are you
- NSW Department of Education – contraindicated exercises
- Total Body Strength for Seniors

WEB SITES

Better Health Channel Victoria Betterhealth.vic.gov.au

WEB PAGES

Undertake a combined search like “specific condition and exercise”
  e.g. Google “osteoporosis and exercise”
Search “Exercise program and older adults”
Search “Exercise program and pregnancy”

PLEASE NOTE: Handouts can be found at the back of the module following page 26.
COURSE OVERVIEW

This module is an introduction into training special population clients. It identifies which clients may fall into the special population category and how to address these clients. Specific types of conditions are also contained within this module to give the student an understanding of how these may affect training and exercise.

SECTION 1 - SPECIFIC POPULATION CLIENTS & EXERCISE

WHAT IS A SPECIFIC POPULATION CLIENT?

In your role as a fitness professional you need to be able to identify and provide appropriate advice to specific population clients.

*So what is a “specific population” client?*

Here are some client groups falling into this category:

- individuals diagnosed with a selection of disease states or conditions
- clients with specific physiological needs
- asthmatic
- diabetic
- arthritic
- osteoporotic
- pregnant
- older adult
- obese
- hypertensive
- children
- injured
- specific disability or impairment

Clients falling into these categories or with these conditions are by no means precluded from exercise. Exercise can have great benefits for specific populations. These benefits can include:

- improved functional capacity
- improved quality of life
- independence
- decreased mortality
- decreased morbidity
CONTRAINDICATIONS TO EXERCISE

As stated, clients falling into these categories or with these conditions are by no means precluded from exercise. However extra care and consideration during client screening should be done to ensure there are no contraindications to exercise.

Note a “contraindication” is a condition or factor that increases the risks involved in engaging in a particular activity.

The following list is not a definitive list of contraindications to exercise, but it does cover many of the important ones.

If in doubt, always stop your client exercising and refer to their medical practitioner for further advice.

CONTRAINDICATIONS FOR EXERCISE TESTING

When commencing a screening session for symptoms or conditions, stay away from testing if your client has:

- shortness of breath
- chest pain
- chest tightness
- any painful area

ABSOLUTE CONTRAINDICATIONS TO EXERCISE

Absolute means that under no conditions should you undergo exercise until professional medication clearance is requested. Absolute contraindications include:

- A history of recent Heart Attack, also called Myocardial Infarction
- Any heart related disease including, but not limited to Aortic Stenosis, Unstable Angina, Pericarditis or any thromboembolic disease
- Severe infections and fever
- Severe illness of any kind
- Severe emotional distress

RELATIVE CONTRAINDICATIONS

These are less threatening conditions but still dangerous enough to warrant a clearance from a suitable medical practitioner:

- Previous history of heart illness
- Any skeletal or neuromuscular disorders, back problems etc.
- High blood pressure
Liver diseases
Advanced pregnancy

ASSESSING THE RISK OF EXERCISE

Before commencing exercise with a special population client you must first test and then process the client’s fitness screening information to determine the risk status of the client.

Next you need to determine what level of risk your client is associated with before they participate in exercise. Decide whether they are low risk, moderate risk or high risk.

Actions resulting from your evaluation of the client risk status may include referral to a medical or allied health professional for further medical evaluation and clearance or more advanced testing prior to starting an exercise program.

WARNING SIGNS TO STOP A CLIENT EXERCISING

If a client exhibits signs of poor exercise tolerance to any fitness activity STOP the exercise immediately and make an appointment to see a medical or allied health professional.

These signs can include:

- shortness of breath
- pallor
- dizziness or light–headedness
- swelling of ankles
- nausea or vomiting
- fatigue
- leg cramps
- claudication
- redness
- unusual heart rate response
- loss of coordination

THE FITNESS PROFESSIONAL’S ROLE WITH SPECIAL POPULATION CLIENTS

As a fitness professional you need to be able to:

- Identify specific population clients
- Provide advice to specific population clients regarding exercise
- Modify exercise for specific populations
- Liaise and work with other medical and allied health professionals
IDENTIFY SPECIFIC POPULATION CLIENTS

Before a client even starts training you will need to be able to identify if they are in any category of special populations.

In particular you need to look out for clients who may have medical conditions or possible injuries that may exclude an individual from undertaking pre–exercise screening or participating in exercise without a medical clearance.

LEGAL AND ETHICAL LIMITATIONS

You also need to explain to the client, the legal and ethical limitations that you, as a fitness instructor, have in prescribing and delivering exercise to them.

Explain where the boundaries of advice are and what you can and cannot do.

Where necessary ensure that the need is acknowledged for a suitably qualified exercise, medical or allied health professional to design the client's exercise program.

PROVIDE ADVICE TO SPECIFIC POPULATION CLIENTS REGARDING EXERCISE

If the risk evaluation determines your client can continue with exercise you will need to design and then explain a suitable exercise program to this special population client.

This task will enable you to recommend suitable fitness activities to your client and to identify unsuitable or contraindicated activities.

When designing a suitable exercise program you will need to know how to apply an understanding of your client’s condition and injuries to the task of program planning.

You will also need to be aware of how any diseases or injuries may limit the prescribed exercise.

You are also required to know how to modify exercise for specific populations clients.

When your special population clients do start training you will need to know how to modify:

- fitness activities
- exercise techniques
- fitness equipment
- fitness facilities

You may also need to modify typical goals of special population clients. You will need to set realistic and attainable goals for clients and outline strategies to overcome emotional and psychological factors that may hinder exercise adherence.

WORK WITH OTHER MEDICAL AND ALLIED HEALTH PROFESSIONALS

Having special population clients will mean you will need to work with their other health professionals.
All exercise programming and modification should be done in consultation with a medical professional and suitably qualified allied health professional.

For example you may need to contact a client’s GP to get approval for a certain exercise program.

People you may deal with include:

- Physiotherapists
- Chiropractors
- Exercise Physiologists
- Occupational Therapists
- Osteopaths
- Therapeutic recreation professional
- Massage Therapists
- Sports Physicians
- Medical Practitioners
- Podiatrists
- Dieticians

CARDIOVASCULAR DISEASE

Cardiovascular Disease refers to conditions or diseases of the heart and blood vessels in general. The following section discusses some of the major conditions.

CORONARY HEART DISEASE

Coronary disease (or coronary heart disease) refers to the failure of coronary circulation to supply adequate circulation to cardiac muscle and surrounding tissue. It is already the most common form of disease affecting the heart.

HYPERTENSION

Hypertension is persistently high blood pressure in the arteries. Chronic hypertension is considered a risk factor for the development of heart disease, peripheral vascular disease, stroke and kidney disease

PERIPHERAL VASCULAR DISEASE

Peripheral Vascular Disease is the narrowing of the blood vessels that carry blood to the extremities such as the arms and legs

CEREBROVASCULAR DISEASE

Cerebrovascular Disease results in damage to blood vessels in the brain. Vessels can burst and bleed or become clogged with fatty deposits. When blood flow is interrupted, brain cells die or are damaged, resulting in a stroke.
CONGESTIVE HEART FAILURE

This is a condition in which the heart can't pump enough blood to the body's organs. This can result from narrowed arteries that supply blood to the heart muscle (coronary artery disease), past myocardial infarction (heart attack) with scar tissue that interferes with the heart muscle's normal work etc.

PULMONARY DISEASE

Pulmonary Disease includes all the diseases and disorders of the lung. Two common ones are:

ASTHMA

This is a common respiratory condition marked by spasms in the bronchi of the lungs. It causes difficulty in breathing. It usually results from an allergic reaction or other forms of hypersensitivity.

CHRONIC OBSTRUCTIVE PULMONARY DISEASE

This disease causes a pathological limitation of airflow in the airway that is not fully reversible. It may be caused by reactive airways, chronic infection, congenital defects, or, most commonly, cigarette smoking.

The key issue with pulmonary disease and exercises is the restriction of the client's capacity to breathe.

During exercise, especially aerobic activity, the body needs more oxygen than normal. Clients with this sort of condition will find it more difficult to breathe and get this required oxygen intake.

METABOLIC DISEASES

Metabolic disease is a disorder caused by the accumulation of chemicals produced naturally in the body.

These diseases can often be serious, some are even life-threatening. (Note pregnancy is also included in this classification).

Metabolic Diseases and conditions to be aware of as a fitness professional include:

- Diabetes
- Obesity
- Thyroid Disorder
- Pregnancy

DIABETES

Diabetes is a condition in which a person has a high blood sugar (glucose) level as a result of the body either not producing enough insulin, or because body cells do not properly respond to the insulin that is produced.

Put simply, diabetes is a chronic condition where the levels of glucose (sugar) in the blood are too high.
Our body relies on blood glucose for energy. Blood glucose levels are normally regulated by the hormone insulin, which is made by the pancreas.

Diabetes occurs when there is a problem with this hormone and how it works in the body. When a person has diabetes, the pancreas doesn’t make enough insulin or the body’s cells don’t respond adequately to the hormone.

The two main types of diabetes are type I (insulin dependent) and type II (non-insulin dependent).

**Type I diabetes** is caused by an autoimmune destruction of insulin-making cells in the pancreas, which means insulin is no longer made. It is most common in people under the age of 30, but can occur at any age.

**Type II diabetes** is caused by either inadequate levels of insulin or a failure of the body’s cells to respond properly to insulin – most people have both of these problems. It is mostly associated with being overweight, particularly when the excess weight is carried around the waist – it is also common in people with high blood pressure or heart disease.

All forms of diabetes have been treatable since insulin became available in 1921, and type II diabetes may be controlled with medications. Both type I and II are chronic conditions that usually cannot be cured.

As a fitness instructor be aware that sensible lifestyle decision can assist with diabetes management.

Sensible exercise and good nutrition can be programmed with the goal of keeping both short-term and long-term blood glucose levels within acceptable bounds.

In addition, given the associated higher risks of cardiovascular disease, exercise and nutrition improvements are recommended to control blood pressure.

**OBESITY**

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems.

At an individual level, a combination of excessive food energy intake and a lack of physical activity is thought to explain most cases of obesity.

A limited number of cases are due primarily to genetics, medical reasons, or psychiatric illness.

Obesity is difficult to tackle because of the many contributing factors. The International Obesity Taskforce suggests the following measures:

- Help families to understand how to provide a healthy environment for themselves and their children. This would include decisions about activity and eating habits
- Identify high risk groups in the community
- Change city planning to include venues for safe, accessible and affordable physical activities
- Improve the nutritional value of processed foods
- Reduce food marketing to children
- Reduce the price of healthy foods such as fruits, vegetables and wholegrain products
o Improve the nutrition and variety of food available at school canteens and in workplaces
o Improve opportunities for physical activity in schools and workplaces
o Increase education for health professionals on how to recognise and manage weight problems in patients
o Invest in community education programs on weight management

These measures show that exercise and nutritional advice are considered to be key factors in preventing obesity.

**THYROID DISORDER**

The thyroid gland is an Endocrine (meaning ductless) gland, which secretes its hormones directly into the bloodstream. It is located in the lower part of your neck. It wraps around your windpipe (trachea) like a bow tie, with two connecting lobes, and is well supplied with blood vessels.

When the thyroid gland produces too much thyroid hormone (becoming overactive), the condition is called Hyperthyroidism. When the thyroid gland produces too little thyroid hormone (becoming underactive), the condition is called Hypothyroidism.

When you're hypothyroid, your metabolism usually does not work at the same speed as someone else of your height, weight, and level of physical activity, meaning that it becomes easier for you to gain weight, and harder to lose weight.

Some of the symptoms of this disease that can affect exercise include sluggishness, muscle weakness and shortness of breath.

Unfortunately Hypothyroidism has been called the "unsuspected illness" and one that is frequently misdiagnosed, so many of your clients may not be aware they have this condition.

**PREGNANCY**

Regular physical activity can provide health and social benefits for many pregnant women.

Suggestions for exercise during pregnancy include walking, swimming and supervised classes such as yoga or Tai Chi.

Pelvic floor exercises are also important before, during and after pregnancy.

Unless your client has complications, it should be possible to enjoy some level of physical activity throughout most of their pregnancy.

The first step is to have your client consult their doctor or healthcare professional to make sure exercise won’t harm them or their unborn baby.

You will have to consider modifying the exercise programs you propose to your client.
MUSCULOSKELETAL CONDITIONS

Some key musculoskeletal conditions to be aware of include:

- Rheumatoid Arthritis
- Osteoarthritis
- Osteoporosis
- Lower Back Pain

RHEUMATOID ARTHRITIS

Rheumatoid Arthritis (RA) is an autoimmune disease that causes pain and inflammation of the joints. Other parts of the body can also be affected. Inflammation causes the joints to become painful and swollen and movement may be restricted. Stiffness in the joints is common, especially in the morning. The inflammation caused by Rheumatoid Arthritis can result in damage to the joints.

Rheumatoid Arthritis usually starts in middle life, with onset generally occurring between the ages of 35 to 64, and affects 2.5 per cent of Australia’s population. An estimated 57 per cent of people with Rheumatoid Arthritis are women.

The most common symptoms of Rheumatoid Arthritis include:

- Swelling, pain and heat in the joints
- Stiffness in the joints, especially in the morning
- Persistent fatigue
- Sleeping difficulties because of the pain
- Weak muscles

How can exercise help?

Relaxation techniques and muscle relaxation techniques can help your client to manage pain and difficult emotions such as anxiety.

Some physical activity will help to maintain muscle strength and joint flexibility and assist your client in managing pain. Appropriate activities include exercising in warm water, strength training and Tai Chi. You may need to seek advice from a physiotherapist or exercise physiologist before you begin an exercise program for affected clients.
OSTEOARTHRITIS

Osteoarthritis is one of the most common forms of arthritis. Osteoarthritis commonly develops from the age of 45, although it can occur in younger people. Many of us will develop symptoms as we age.

A breakdown of the cartilage

A joint is the meeting point of two bones to allow movement. Cartilage is the firm cushion found covering the ends on the two bones that stops them from grating against each other.

The joint is wrapped inside a tough capsule that is filled with synovial fluid. This fluid lubricates the joint and keeps it moving smoothly. In Osteoarthritis, the cartilage becomes brittle and breaks down. Some pieces of cartilage may even break away and float around inside the synovial fluid. This can lead to inflammation. Eventually, the cartilage can break down so much that it no longer cushions the two bones. The symptoms of Osteoarthritis can vary from one person to the next. Some of the more common symptoms include:

- Stiffness
- Joint pain
- Muscle weakness

There is no cure for Osteoarthritis, but the condition can be managed. Exercising an osteoarthritic joint is important to:

- Maximise the health of the cartilage
- Maintain joint movement
- Improve muscle strength

As cartilage does not have a blood supply it relies on the synovial fluid moving in and out of the joint to nourish it and take away its wastes. Keeping the joint mobile with physical activity is one way of improving cartilage health.

Exercises that involve moving the joints through their range of movement will also help maintain flexibility that is otherwise lost as a result of the arthritis.

Pain associated with the arthritis has a weakening effect on the surrounding muscles. However, by undertaking strengthening exercises, muscle weakness can be reversed. Strong muscles will support sore joints.

OSTEOPOROSIS

Osteoporosis is characterised by the loss of calcium and other minerals from the bones, which makes them susceptible to fracturing (breaking). In Australia, around half of all women and one third of men over 60 years have osteoporosis. Women are more susceptible because the hormonal changes of menopause worsen bone loss.

A nutritional diet including calcium-rich foods and regular exercise throughout life (including during childhood and adolescence) are known to reduce the risk of osteoporosis in later years. People with existing osteoporosis can also benefit from exercise. This is because a sedentary lifestyle
encourages the loss of bone mass. Exercising regularly can reduce the rate of bone loss. Most fractures occur due to a fall. Exercise can build muscle strength and improve balance, which reduces the likelihood of falling. It can also reduce the risk of fractures resulting from osteoporosis by slowing the rate of bone loss.

There are other benefits of exercise for people who have osteoporosis or want to prevent osteoporosis. These include reduced need for some medications that can contribute to falls risk, and better management of other health problems.

**Benefits of exercise for people with osteoporosis**

A sedentary lifestyle, poor posture, poor balance and weak muscles increase the risk of fractures. A person with osteoporosis can improve their health with exercise in valuable ways, including:

- Reduction of bone loss
- Conservation of remaining bone tissue
- Improved physical fitness
- Improved muscle strength
- Improved reaction time
- Increased mobility
- Better sense of balance and coordination
- Reduced risk of bone fractures caused by falls
- Reduced pain
- Better mood and vitality

Always consult with your client’s doctor, physiotherapist or health care professional before you decide on an exercise program for your client. Factors that need to be considered include:

- Age
- The severity of the osteoporosis
- Current medications
- Fitness and ability
- Other medical conditions such as cardiovascular or pulmonary disease, arthritis, or neurological problems
- Whether bone density or falls prevention are the main aims of the exercise program
- A combination of weight-bearing aerobic and muscle-building (resistance) exercises is best, together with specific balance exercises.

Exercises that are beneficial for people with osteoporosis include:

- Weight-bearing aerobics exercise including dancing
- Resistance training using free weights such as dumbbells and barbells, elastic band resistance, body-weight resistance or weight-training machines
Exercises to improve posture, balance and body strength including Tai Chi

Ideally, weekly physical activity should include something from all three groups.

LOWER BACK PAIN

Low back pain (or lumbago) is a common musculoskeletal disorder affecting 80% of people at some point in their lives.

It is the most common cause of job-related disability and a leading contributor to missed work.

Exercise has proven to be effective for lower back pain.

Engaging in physical activity within the limits of pain aids recovery. Even with cases of severe pain, some activity is preferred to prolonged sitting or lying down - excluding movements that would further strain the back.

However advice from the client's medical practitioner or physical therapist should always be sort first.

IMMUNOLOGICAL DISORDERS

Immunological disorders are disorders of the immune system.

ACQUIRED IMMUNE DEFICIENCY SYNDROME

Acquired Immune Deficiency Syndrome (AIDS) is a disease caused by a retrovirus, the human immunodeficiency virus (HIV).

There is a growing body of evidence suggesting that exercise training can improve mood state and quality of life for HIV+ individuals. There is also a belief among the HIV community that exercise training will make them stronger, improve their endurance and protect them from infection.

Sport also provides an arena for social inclusion and support. So there are many good psychological benefits from health and fitness for HIV clients.

HEPATITIS

Hepatitis means inflammation (swelling and pain) of the liver.

The liver is important for a range of functions in the body. These include regulating metabolism, making proteins, storing vitamins and iron, removing toxins and producing bile.

If the liver doesn’t work properly, it can cause serious illness or sometimes even death.

Hepatitis may be caused by infection, viruses, chemicals, alcohol, drug use and other factors. ‘Chronic Hepatitis’ means ongoing inflammation of the liver, irrespective of the underlying cause.

The various forms of viral Hepatitis are named after different letters of the alphabet. These include Hepatitis A, B, C, D and E. They are also sometimes called ‘hep A’, ‘hep B’, ‘hep C’ and so on. While all these viruses...
affect the liver, they are spread in different ways and have different treatments. The most common types of viral Hepatitis in Australia are A, B and C.

Symptoms may include:

- Fever
- Nausea
- Abdominal discomfort
- Dark urine
- Lethargy (tiredness)
- Painful joints
- Oedema (swelling)
- Easy bruising
- Jaundice (yellow skin and eyes).

**Hepatitis A** - Anyone can be infected if they come in direct contact with the Hepatitis A virus through food, drinks or objects contaminated by the faeces of an infected person. Symptoms may last several weeks but the person usually recovers completely. Infection with Hepatitis A will give lifelong immunity. However, this doesn’t offer immunity against the other types of Hepatitis. A vaccine is available to protect against Hepatitis A.

**Hepatitis B** - Hepatitis B virus is found in the blood and, to a lesser degree, in body fluids such as semen and vaginal secretions. You can get Hepatitis B through unsafe sex, sharing contaminated injecting drug equipment and other activities where the blood of an infected person enters your bloodstream. A vaccine is available to prevent Hepatitis B infection. It is included in the standard immunisation schedule, beginning in infancy. Screening the mother before birth can prevent infection of newborn infants. If a mother tests positive, Hepatitis B immunoglobulin is given to the baby when they are born, as well as Hepatitis B vaccination.

**Hepatitis C** - Hepatitis C is a blood-borne virus that is spread when blood from an infected person enters another person’s bloodstream. In Australia, the most common way it is transmitted is through sharing unsterile injecting drug equipment. Around 20 to 30 per cent of people who have been infected with hepatitis C may clear the virus from their blood with no treatment. These people no longer have hepatitis C and are not infectious.

**GLANDULAR FEVER**

Glandular fever’s correct name is infectious mononucleosis.

The symptoms of someone with glandular fever are:

- fatigue not satisfied by sleep
- recurrent tonsillitis
- chronic sore throat and swollen lymph glands in the neck
- aches and pains in the limbs
- brain fog - not being able to find the right words
- lack of concentration
- depression (feeling very low)
- deep lethargy
- not being able to stand lots of noise, people or strong smells (perfume, cleaning materials etc.)
- pins and needles
- not feeling all there

Any client with glandular fever or recovering from this virus should only do mild to light exercise until full recovery and their body can cope with more strenuous activity.

### CHRONIC FATIGUE

**Chronic Fatigue Syndrome (ME/CFS)** is an illness characterised by exhaustion and many other symptoms. It can strike at any age and can affect children as well as adults.

The symptoms for which ME/CFS is best known are persistent weakness and exhaustion.

The distinguishing feature of the condition is a type of exhaustion known as post-exertional malaise or ‘payback’. This includes abnormal exhaustion after any form of exertion and a worsening of other symptoms. The response may be delayed, perhaps beginning after 24 hours.

It can take an unusually long time to recover from this type of exhaustion. Activities that were once taken for granted now take an enormous toll on a person’s health. For example, your normal walk, which caused no fatigue before, is followed by unusual tiredness that takes longer than usual to go away.

You should be aware of any client with these symptoms and ensure you do not ignore these signs or allow them to over train. The best advice is to refer them to a medical professional.

| READ | Chronic fatigue syndrome and exercise |

### NEUROLOGICAL DISEASE

Neurological disease is a disorder of the nervous system. The following are common examples of this disease:

#### SPINAL CORD INJURY

Spinal cord injury results in impairment or loss of motor and sensory function in the cervical, thoracic, lumbar, or sacral neurologic segments secondary to damage of neural elements within the spinal canal.

Care should be taken when exercising clients with a spinal cord injury that may be recent. However, once a client has been cleared by their medical practitioner or specialist there is no reason a full level of training cannot resume, based on what movement the client is capable of.

#### CEREBRAL PALSY

Cerebral palsy is a loss or deficiency of motor control with involuntary spasms caused by permanent brain damage present at birth.
The benefits of exercises for people with cerebral palsy include the psychological benefits of stress release, energy release and all round wellbeing.

One strategy in an exercise program for people with cerebral palsy should become a part of their daily activities such as dressing and feeding. Consulting with your client’s occupational and physical therapists is a good way to do this.

MUSCULAR DYSTROPHY

Muscle weakness is a major symptom in people with all different forms of muscular dystrophy. This can make it difficult to exercise.

There have been some reports that certain types of exercise may, in fact, cause damage to already weak muscles in people with muscular dystrophy. However, other studies show that exercise can be safe and beneficial for people with the condition.

PARKINSON’S DISEASE

Parkinson’s disease is a neurological disorder caused by degeneration of or damage to nerve cells in the brain. Parkinson’s disease is incurable.

The symptoms include tremor, rigidity, slowness and impaired movement.

Evidence suggests that regular exercise can improve some of these symptoms and enhance quality of life.

CANCER

Cancer and cancer treatments such as chemotherapy can cause persistent fatigue (tiredness) leaving the client too tired to exercise.

Exercising can help people cope with cancer treatment.

In the past, people being treated for a chronic illness were often told by their doctor to rest and reduce their physical activity. This may still be true if movement causes severe pain, rapid heart rate, or shortness of breath. Newer research has shown that exercise is not only safe and possible during cancer treatment, but it can improve physical functioning and quality of life. It can help to combat fatigue, depression and muscle weakening.

So a cancer patient can exercise if they are able to, and if their doctor says it is safe.

Exercise helps in several ways. It can:

- Increase strength, flexibility and heart and lung function
- Increase your energy and reduce fatigue
- For some people on chemotherapy, exercise can reduce nausea and vomiting
- Increase appetite
- Encourage deeper and more refreshing sleep
- Reduce pain – exercise stimulates the brain to release endorphins, which are opiate-like pain-killing chemicals
- Help you to feel in charge of your life
- Help digestion and reduce constipation
- Improve your mood

Some studies show that regular exercise can:
- Encourage the body to produce more white blood cells
- Boost functioning of the immune system
- Reduce the time spent in hospital in some cases
- Increase survival rates in some cases.

**COGNITIVE / EMOTIONAL / SENSORY DISORDERS**

**DEPRESSION & ANXIETY DISORDERS**

Everyone feels sad from time to time, but depression is characterised by prolonged feelings of sadness, dejection and hopelessness.

One in four women and one in six men will suffer from depression at some point in their lives.

Depression is a complicated illness, which can involve a number of contributing factors such as genes, environment, lifestyle, brain chemicals, psychology and personality.

Often the very nature of depression means that exercise is the last thing a client wants to do. So motivation and having the client start with exercise is generally the greatest challenge.

**VISUAL AND HEARING IMPAIRMENT**

A visual or hearing impairment does not directly stop a client from exercising. However the nature of the disability will restrict what the client can and cannot do in terms of exercise choices.

As a fitness professional you will need to work through modifications you may need to make to your exercise classes to ensure clients with a visual or hearing impairment can participate.

For example, if your exercise class relies on strong visual cues, this may limit the ability for a visually impaired student to participate. However, you may be able to modify the class to include more verbal instructions so the client can participate.

**INTELLECTUAL IMPAIRMENT**
Intellectual impairment clients will have restricted capacity in issues such as learning, mobility, language and self-care.

For example, clients with severe communication difficulties find it difficult to articulate their health needs, and without adequate support and education might not recognise ill health.

This does not preclude them from exercise. However in most cases you will need to work with the client’s primary care givers who will take the responsibility to motivate the intellectually impaired client to undertake exercise.

ALZHEIMER’S

Alzheimer’s disease is a progressive and eventually fatal disease of the brain. It impairs higher brain functions such as memory, thinking and personality.

A person with Alzheimer’s disease gains the same kind of benefits from regular exercise as anyone else, including improved cardiovascular fitness, strength and endurance. Research suggests that exercise can also address some of the symptoms associated with the disease.

Exercise helps to reduce depression rates among people with Alzheimer’s and helps protect against the side effects of physical deterioration such as falls and fractures. People with Alzheimer’s disease who regularly exercise are also less likely to be institutionalised because of behavioural problems.

UNDERSTANDING EFFECTS OF MEDICATIONS

VASODILATORS

A vasodilator is a drug that causes dilation of blood vessels.

Vasodilators are used for heart failure treatment and to control high blood pressure by relaxing the blood vessels so blood can flow more easily through the body.

Vasodilators are prescribed for people who cannot take ACE inhibitors or angiotensin receptor blockers, or for patients who need an extra medication to control symptoms of heart failure.

Side effects of vasodilators include:

- Dizziness
- Headache
- Upset stomach, flushing of face or neck
- Fever, joint or chest pain

Vasodilation with exercise will result in an increased heart rate.

INSULIN

Insulin is a hormone that is needed to convert sugar, starches, and other food into glucose (blood sugar).
When we eat, insulin is released into the bloodstream where it helps to move glucose from the food we have eaten into cells to be used as energy. Insulin also helps store excess glucose in the liver.

Insulin injections are needed when the body doesn’t produce insulin, as with type 1 diabetes.

There are several differing types of commercial insulin available for diabetes patients. These types of insulin’s vary according to (1) how long they take to reach the bloodstream and start reducing blood glucose levels; (2) how long the insulin operates at maximum strength; and (3) how long the insulin continues to have an effect on blood sugar.

**DIURETICS**

Diuretics are medicines that remove water from the body by increasing the amount of urine the kidneys produce. They are often known as 'water tablets' because they remove excess water.

Diuretics are prescribed if you have:

- high blood pressure
- too much fluid in the tissues of your body (this is known as oedema) as a result of heart failure, which is when your heart loses its ability to pump blood efficiently throughout the body

Side effects can be an upset stomach, fainting, dizziness, muscle cramps. Sometimes a skin rash may occur.

**ACE INHIBITORS**

Ace inhibitors are drugs that are used to treat hypertension and other cardiovascular diseases. They work by blocking the production of a hormone called angiotensin II.

These medications may be administered in the form of a tablet, capsule, liquid or intravenous (IV) injection. They generally begin to affect the body within one to two hours after being taken by mouth (i.e. tablet, capsule or liquid) and almost instantly after injection.

People taking ACE inhibitors are encouraged to drink sufficient liquids during exercise or while outside in hot weather.

The most common side effect of ACE inhibitors is coughing, which is usually not serious but may occur in up to 20 percent of patients. In some cases, this side effect will cause the physician to prescribe a different antihypertensive.

Clients taking ace inhibitors should always check with their doctor to discuss suitable exercises to undertake.

**CALCIUM CHANNEL BLOCKERS**

The muscle cells in your heart are driven by electrical activity. By changing this activity, calcium channel blockers can:

- Make your heart beat more slowly
- Make your heart pump less hard.
They can also:

- Relax your arteries and make them wider
- Lower your blood pressure.

Doctors generally agree that these drugs can help you have fewer angina attacks. They can also help you stay active and live a normal life.

Some common side effects of these medicines are flushing, swelling of ankles, dizziness when standing up quickly and low blood pressure. These effects (except for ankle swelling) generally get milder as you go on with the treatment.
CERTIFICATE III
MODULE 3
ASSIGNMENT

Please note that assignment questions may alter slightly, these changes will be action on the downloadable version. This can be accessed via www.acsf.com.au/fitnesscourse.
CERTIFICATE III IN FITNESS

MODULE 3 – SPECIFIC POPULATIONS

ASSIGNMENT TASK

GENERAL INSTRUCTIONS

The assignment is in one section with one parts. Please ensure that you submit complete assignments including all parts.

You may use your Cert IV Module 1 course notes and any other resources available to you. We advise you to use as many research strategies as possible to acquire a good understanding of the subject matter. Although you may use various sources, you must always ensure that your work is in your own words, plagiarism is strictly not allowed. You may use references, as long as you identify the source.

Please submit your assignment based on the submission instructions in the course overview information.

If you have any questions how to complete assignment question please email or contact your tutor.

COMPETENCIES BEING ASSESSED

Within this assessment task you will be assessed on your ability to demonstrate competency in the following:

Section 1 – Fitness Orientation and Health Screening

<table>
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<th>Identify Specific populations</th>
<th>Recognise medical condition, injuries, medications that exclude participation without clearance</th>
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<td>Evaluate clients risk status and level of risk with exercise</td>
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<td>Implement actions resulting from risk evaluation</td>
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<td>Identify specific populations requiring modifications</td>
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<td>Provide Advice</td>
<td>Explain limitations of fitness instructor</td>
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<td>Apply understanding of specific requirements and limitations of clients</td>
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<td>Understand how the pathology of the disease or injury affects client’s ability to exercise</td>
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<td>Investigate the effects of medications used to manage disease or condition</td>
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<td>Promote the benefits of exercise and recommend suitable exercise activities</td>
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<td>Deliver exercise programs</td>
<td>Apply exercise considerations and exercise prescription guidelines</td>
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<td>Identify modifications to programs, equipment, facilities</td>
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<td>Identify poor exercise tolerance in clients and respond</td>
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<tr>
<td>Work with medical and allied</td>
<td>Refer clients with contraindications to AHPs or MPs</td>
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<tr>
<td>health professionals</td>
<td>Use appropriate documentation and terminology</td>
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SECTION 1 – FITNESS ORIENTATION AND HEALTH SCREENING

There are a large number of specific conditions which will require modifications to a exercise programming. Some of these include:

- Coronary Heart Disease
- Hypertension
- Asthma
- Diabetes
- Pregnancy
- Obesity
- Rheumatoid Arthritis
- Osteoporosis
- Lower Back Pain
- Depression
- Visual and Hearing Impairment
- Intellectual Impairment
- Acquired Immune Deficiency Syndrome
- Hepatitis
- Chronic Fatigue
- Cerebral palsy
- Muscular Dystrophy
- Parkinson’s Disease
- Cancer
- Liver Disease
- Renal Disease
- Acquired Immune Deficiency Syndrome
- Hepatitis
- High cholesterol

1. Choose five (5) of these conditions to research. For EACH condition:
   - Provide an explanation of the condition including it’s pathology (1 paragraph each)
   - Identify 3 risks associated with exercising with this condition
   - Outline 3 benefits of exercise for clients with the condition
   - Outline 3 specific requirements or limitations for clients with each condition
   - Outline modifications you would make for a client with each condition and recommend suitable activities (include exercises, facilities and program considerations)
   - Identify unsuitable or contraindicated activities and exercises

2. The level of risk for a client with a special condition can be low, moderate or high. For each of the following, describe the level of risk, giving reasons. Then describe what actions you would take:
   - A pregnant woman in her 3rd trimester wants to join your bootcamp session
   - An over 55’s man with a hearing impairment wishes to join a circuit class
   - A person with osteoporosis asks you to develop a resistance program
- A person with depression would like a program to help him run a marathon in 6 months time

3. Explain 3 limitations of a fitness instructor when prescribing and delivering exercise advice to special populations.

4. Many clients from special populations will rely on medication to manage their condition. Choose 5 medications from the list below and describe the effects of these medications on your client and their ability to exercise:
   - Lipid lowering agents
   - Bronchodilators
   - Anti Hypertensive agents
   - Insulin
   - Oral Hypoglycaemic
   - Anti inflammatory
   - Analgesic (painkiller)
   - Anti-depressants
   - Non prescribed medications
   - Multiple medicine interactions

5. Your client is exhibiting signs of poor exercise tolerance to your exercise program. You are concerned that they are displaying contraindications to exercise.
   a. Outline the advice/action that you should give/take with your client immediately.
   b. Identify 5 signs of poor exercise tolerance or contraindications to exercise.
   c. Identify 5 medical or allied health professionals you could refer a client to.

6. Why must you consult the client before sharing any information of their with a medical or health professional?

7. Chose 3 conditions for question 1 and identify the medical or allied health professional that would be suitable to refer to.
ADDITIONAL READING ARTICLES

The following articles and additional reading will support your learning for this module.
Total Body Strength for Seniors
By Paige Waehner, About.com Guide

- See your doctor before you begin any exercise program
- Begin with a 5-10 minute warm up of light cardio (walking in place, etc.)
- Perform each exercise for 12 repetitions, resting when you need to, and start with no weights or light weights
- Stretch after each exercise
- Do this workout 1-2 non-consecutive days a week, taking at least one day of rest between workouts.
For best results, combine this workout with regular cardio and a healthy, low-calorie diet.

Chair Squat
Stand in front of a chair with feet about shoulder-width apart. Sit down and, as soon as you make contact with the chair, stand back up and try to do so without rocking back or using momentum. You can place your hands on your thighs if you need to. Hold weights for added intensity.

Ball Taps
Sit in a chair and place a ball front of both feet (a mid-sized ball works best). Sit straight up and try not to rest against the back of the chair, keeping your back straight and your abs contracted. Lift your right foot and tap the top of the ball and take it back down to the floor. Switch sides and do the same with your left foot, alternating each foot for all repetitions. For added intensity, sit on an exercise ball to challenge your balance or try the exercise while standing.

Step Ups
You can do this exercise on a staircase or on a step if you have one. If you're on a staircase, stand at the bottom step and step up with your right foot. Bring your left foot up onto the stair next to your right and then step back down on the floor (hold onto a rail if you need to). Perform all reps by stepping up and down with the right foot. Then switch sides and start with your left foot. You can use a resistance band (as shown) or hold weights for added intensity.

Hamstring Curls
Stand in front of a chair and hold onto it for balance if you need to. Bend your right knee, bringing your foot up behind you (like you're kicking your own butt) and keeping the right knee pointing towards the floor and right next to your left knee. Slowly lower back down and repeat all repetitions before switching to the other leg. For challenge, do it without holding onto the chair or add light ankle weights.

Knee Lifts with a Med Ball
Hold a light weight or medicine ball (e.g., 2-5 lbs) straight up over your head in both hands. Lift the right knee up to waist level while bringing the arms down, touching the weight to the knee. Return to start and repeat on the left side. You can add intensity by speeding the movement up (while still maintaining control of the weight and your body) and lifting the knees as high as you can. Alternate each side for 30-60 seconds (or more). If you have back or knee problems, you may want to avoid the upper body portion of the move and just do the knee lifts.
Side Leg Lifts
Stand sideways to a chair or wall for support and lift one leg out to the side, foot flexed and hips, knees and feet in alignment. Try to lift the leg without tilting at the torso—hold the torso upright as you lift the leg a few inches off the ground. Lower back down and repeat all reps on the same leg before switching sides. Add ankle weights for added challenge.

Wall Push Up
Stand a few feet away from a wall or stair rail (as shown) and place hands on wall at shoulder level, a few inches wider than shoulders. Pull the abs in and, keeping back straight, bend elbows and lower body towards the wall until elbows are at 90 degree angles. Push back to start and repeat. The further away from the wall you are, the harder the exercise. Make sure you don't sag in the middle—keep the abs tight and the back flat.

Lat Pulls With Bands
Stand or sit holding a resistance band in both hands up over your head. Hands are wider than shoulder-width apart and back is flat, abs engaged. Keep the left hand in place and contract the lat muscles (at the sides of your upper back) to pull the right elbow down towards the ribcage. Press back up and switch sides, alternating right and left for all repetitions.

Bicep Curls
Sit or stand holding dumbbells in both hands, palms facing out. Contract the bicep (front of the arm) and curl the weight up towards your shoulder (without touching the shoulder). Lower back down, but keep a slight bend in the elbow at the bottom—don't swing the weight and keep the elbows in place as you curl the weights.

Chest Squeeze with Med Ball
Sit on ball or chair, back straight and abs in. Hold a medicine ball at chest level and squeeze the ball with the palms of hands to contract the chest. While continuing to squeeze the ball, slowly push the ball out in front of you at chest level until elbows are almost straight. Continuing the pressure with your hands, bend the elbows and pull the ball back to chest.

Lateral Raises
Stand or sit holding light dumbbells in both hands at the sides. Keeping the elbows slightly bent and wrists straight, lift the arms up to the sides only to shoulder level (palms face the floor). Lower back down and repeat for all reps. You can use full water bottles or soup cans for weights if you don't have dumbbells.

Tricep Extension
Sit or stand and hold a dumbbell in the right hand straight up overhead and directly over your shoulder. Your palm should face the front and you can use your other hand to support the right arm. Bend the elbow and lower the weight down a bit behind your head (the elbow should be facing the right side of the room) to about 90 degrees. Contract the back of the arm to pull the weight back up and repeat.
**Bird Dog**

Begin on hands and knees with the back straight and the abs pulled in. Lift the right arm up until it is level with the body and, at the same time, lift the left leg up and straighten it until it is parallel to the floor. Hold for several seconds, lower and repeat on the other side, this time lifting the left arm and right leg. Continue alternating sides for 12 reps. Modify by lifting the arm and leg a few inches off the ground until you're able to balance.

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What are contraindicated exercises and movements?

A contraindicated exercise is a movement that is not recommended because it is potentially dangerous. It may involve:

- extreme movements that cause extension or flexion of a joint beyond its normal range e.g. full circle neck rotations, back arches, toe touches, deep knee bends and frog jump repetitions
- movements that involve excessive, rapid or repetitive twisting around a fixed base e.g. wall slaps, trunk rotations
- sustained or held movements, e.g. held sit-up
- repetitive movements e.g. arm circling through a small range of movement.

It is important that students use safe stretching techniques when warming-up for any physical activity. This link demonstrates a range of safe stretching exercises.

Other movements that should be avoided include:

- running backwards - this should be avoided due to the potential for tripping over or running into an obstacle
- weight bearing on the head – this should be avoided as children’s neck strength is not sufficiently developed
- hanging by knees from apparatus - when using fixed apparatus, students need a firm grip to avoid falling
- dive rolls - incorrect technique can result in excessive strain on wrists or neck
- crossing feet over each other when using hanging apparatus - if the student falls and the feet are twisted together, injury to the feet is more likely than if the feet were side by side.
Heart health - quiz

How heart smart are you? Test your knowledge about heart health with our quick health quiz. Find out how diet, exercise, smoking and other factors can affect your risk of heart disease.

1. Too much cholesterol affects your heart by
   A. Increasing the rate of your heartbeat
   B. Slowing blood flow to the heart
   C. Decreasing your energy levels and making you lethargic

2. Which of these will help you control your cholesterol levels?
   A. Regular exercise
   B. Modifying your diet
   C. Regular exercise and modifying your diet

3. To get any health benefit from exercise you need to:
   A. Exercise vigorously for two hours once a week
   B. Exercise until you’re exhausted
   C. Exercise moderately for 30 minutes most days

4. All cholesterol is bad for your heart.
   A. True
   B. False
   C. Not sure

5. Adults should aim for a daily fibre intake of:
   A. 5 –10g
   B. 10 – 20g
   C. 30 – 35g

6. Smokers have a 70 per cent greater risk of death from coronary heart disease than non-smokers.
   A. True
   B. False
   C. Don’t know

7. Fifteen years after giving up smoking, a smoker’s risk of heart disease is:
   A. The same as when you gave up smoking
   B. Halved
   C. The same as if you had never smoked

See over...
Heart health – quiz answers

Correct answers

1. B
A person gets coronary heart disease when cholesterol is deposited in the inner lining of the coronary arteries. These arteries provide the heart with blood. The higher the cholesterol levels in the blood, the greater the chance that deposits will form at these sites, reducing blood flow to the heart.

2. C
You can keep your cholesterol at safe levels by having regular exercise (a half hour a day is good), eating a healthy diet low in fat and rich in fresh fruit and vegetables and drinking alcohol in moderate amounts – and don’t smoke.

3. C
You should aim to do 30 minutes or more of moderate intensity physical activity (such as brisk walking) on most, if not all, days of the week. Just 30 minutes of moderate intensity physical activity each day can improve health and reduce the risk of developing certain conditions or diseases. Vigorous exercise can be dangerous so talk to your doctor first if you haven’t exercised for a long time.

4. False
There are two types of blood cholesterol. Low density lipoprotein (LDL) silts up the arteries, while high density lipoprotein (HDL) helps to reduce this silting up process. Saturated fats and trans fatty acids (that is, an unsaturated fat) generally tend to increase LDL cholesterol in the blood. Common sources of these fats include animal products (such as meat fat, beef, lamb, chicken skin and full-cream dairy foods) and processed foods like pastries and biscuits. Mono-unsaturated fats (such as, margarines, avocado, olives, nuts) and polyunsaturated fats (such as, salmon and tuna) help to reduce LDL and increase HDL.

5. C
Adults should aim for a diet that contains 30 to 35g of fibre per day. Most Australians don’t consume enough fibre. Fibre keeps the digestive system healthy. It also contributes to other processes, such as stabilising glucose and cholesterol levels. In countries with traditionally high fibre diets, diseases such as bowel cancer, diabetes and coronary heart disease are much less common.
6. A
Smoking adds to the artery-clogging process that can lead to heart attack, stroke and peripheral vascular disease. It also overworks the heart and reduces its oxygen supply, makes clots more likely to form in blood vessels, and increases the risk of potentially fatal changes in the heartbeat.

7. C
The human body has great abilities to repair itself – if given the chance. But smoking does a lot of damage, so it takes time. The sooner you give up, the quicker you’ll be able to give your heart a new start.
Heart disease - risk factors explained

Coronary heart disease - disease of the coronary arteries around the heart - leads to heart attacks. Together with the same disease in other arteries, it ultimately leads to the death of nearly half of us.

Most people who develop heart disease have recognised risk factors which contribute to the cause of the disease. The so-called 'major risk factors' include:

- Raised cholesterol level in the blood
- Raised blood pressure
- Smoking.

**Cholesterol**
A person gets coronary heart disease when cholesterol is deposited in the inner lining of the coronary arteries. These arteries provide the heart with blood. They lie on the surface of the heart and form a crown (corona) around it. As the heart beats, they twist and bend. Cholesterol is deposited where the arteries bend and divide. The higher the cholesterol levels in the blood, the greater the chance that deposits will form at these sites.

**High blood pressure**
If a person has 'high blood pressure, there is more stress in the places where the arteries bend and divide. This added pressure increases the speed at which cholesterol is deposited along the walls of the arteries.

**Smoking**
Cigarette smoke contains many chemicals, including nicotine and carbon monoxide. Some of these chemicals, along with the carbon monoxide, damage the inner layer of the arteries. Damage to arteries from smoking causes:

- Cholesterol to enter the artery walls more rapidly
- Blood clots in the arteries which lead to heart attacks.

**Diabetes**
Diabetes is another risk factor for heart disease. Many diabetics have a high cholesterol level and may also have raised blood pressure. Other biochemical changes in diabetics may also accelerate the development of coronary heart disease.

**Obesity and excess weight**
A person's weight generally has an impact on their cholesterol level. People who are overweight often have high cholesterol and raised blood pressure. Further, their blood is more likely to clot.

**Inactivity**
People who are inactive (the 'couch potatoes') are more likely to have heart attacks, heart disease and early death than those who are generally active (moderately active seems to be enough). Inactive people are more likely to:

- Have high cholesterol
- Have raised blood pressure
- Be overweight
- Be smokers.
Even without risk factors like smoking and high blood pressure, people who are not active still have a higher chance of heart disease. The reasons for this are not clear. It might have something to do with blood clotting and the way clots are removed from the body, but there are many other possibilities.

**Family history**
A person's genetic inheritance forms the background for most diseases. Each person's genetic makeup is different (except in identical twins). We tend to inherit things like:

- Blood pressure levels
- Cholesterol
- Blood glucose
- Clotting tendencies
- Body build
- Response to stress (internal and external).

While a family history of heart disease is a strong marker of risk, you should remember we usually inherit tendencies rather than diseases. You can overcome some inherited tendencies if you have a healthy diet and an active lifestyle. For example, if you have a family history of heart disease, you can gain enormous advantages if you limit your fat intake, don’t smoke and have an active, healthy lifestyle.

**Gender and age**
If you’re male, you have a disadvantage when it comes to cholesterol levels and blood pressure. Men are more likely to develop coronary heart disease in middle age. The risk then progressively rises as they get older. The risk for women is much less, until after the menopause. Then hormonal changes, combined with higher blood pressure, cholesterol and increased weight progressively increase the risk of heart disease.

Despite our gender and age, we can reduce our risk levels if we follow a healthy lifestyle.

**Where to get help**
- Your doctor
- Your local community health centre

**Things to remember**
- Deposits of cholesterol in your arteries may reduce blood flow to parts of your heart
- Smoking increases your risk of heart disease
- You can reduce your risk of heart disease by having a healthy diet and active lifestyle.

**This page has been produced in consultation with, and approved by:**

Heart Research Centre

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- This Better Health Channel fact sheet has passed through a rigorous approval process. For the latest updates and more information visit www.betterhealth.vic.gov.au.
Breathing problems and exercise

A little physical activity and some breathing exercises can help a person with lung disease. Be guided by your doctor or health practitioner. Always plan your exercise routine under their supervision.

How the lungs work
Your lungs absorb oxygen from the air. You breathe with the muscles in your ribcage and a sheet of muscle called the diaphragm, which sits beneath your lungs and above your abdomen. The lungs contain tubes and small air sacs. Each air sac is covered with a mesh of blood vessels called capillaries and oxygen enters the blood via these capillaries. When oxygen levels are too low, the brain sends a signal to the lungs, telling them to work harder.

Lung diseases
There are many diseases that stop the lungs from working as well as they could. Some of these diseases include:

- Asthma
- Emphysema
- Bronchiectasis
- Chronic bronchitis.

Breathing is difficult
A person with lung disease has to work harder to get enough oxygen. They often use extra muscles to breathe, such as the muscles of the neck and shoulders. If the lungs are stiff and inflexible, the diaphragm has to work harder too. This is very tiring. Feeling short of breath is one of the most common symptoms of lung disease.

Breathing exercises

- Improve the strength of the diaphragm
- Get more air into the lungs
- Help bring up deep-seated mucous
- Keep the lungs and chest wall mobile.

Some examples of breathing exercises
You should consult your doctor or health practitioner before starting any new exercise program.

Relaxed deep breathing
Sit down, relax your shoulders, and breathe in through your nose and out through your mouth. Your abdomen should move in and out while you're breathing. This shows you are using your diaphragm.

Prolonged breathing out
Breathe in for two counts and breathe out for three or four counts. This helps to expel any trapped air.

Physical exercise
You may be avoiding activities that make you feel short of breath. This can reduce your lung function even more. Make sure you talk over the possibilities of an exercise program with your doctor or health practitioner before you start. Some examples of physical activity include:

- Walking - perhaps start off with a few minutes each week and build up slowly.
- Stretching - to keep your muscles supple.
• **Weight training** - using small hand-held dumbbells.
• **Tai Chi** - Tai Chi relies on breathing techniques and slow graceful movements which relax and rejuvenate the body, help to boost energy, calm the mind, and improve posture and balance.
• **Hydrotherapy** - exercise done in water.

Don’t push yourself. If you start feeling short of breath - stop, sit down and practice your breathing exercises.

**Hospitals provide ‘training’**
Hospitals with respiratory units often run pulmonary (lungs and airways) rehabilitation courses. The courses may be twice a week for six weeks and they use a holistic approach which may include:

• Monitored use of a treadmill
• Exercise bike
• Tailored exercise routine
• Lectures by a respiratory physician
• Physiotherapy
• Occupational therapy.

You may also be offered advice from a:

• Social worker
• Pharmacist
• An accredited practising dietitian, contact the Dietitians Association of Australia

**Where to get help**

• Your doctor
• Your respiratory professional
• Hospitals with respiratory units.

**Things to remember**

• Breathing can be much harder for someone with lung disease.
• Breathing exercises and light physical activity can help.
• Always consult your doctor or health practitioner before starting any type of exercise program.

**This page has been produced in consultation with, and approved by:**

Buteyko Institute of Breathing and Health

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• This Better Health Channel fact sheet has passed through a rigorous approval process. For the latest updates and more information visit www.betterhealth.vic.gov.au.
A) REFERRAL REASONS: I refer this patient to:

**Get Moving! Stay Well!**

- YES, this participant meets the following eligibility criteria for the Get Moving! Stay Well! Program where this patient has the following: (please tick all that apply)
  - Pre-diabetes (IFG / IGT)
  - Diabetes
    - Type 1
    - Type 2
    - Diet controlled
    - Oral medication
    - Insulin
  - Other:
    - Back pain: non-acute
    - Hypertension
    - Inactive / Sedentary
    - Raised cholesterol
    - Osteoarthritis: mild-moderate
    - Osteoporosis: asymptomatic and no history of fracture
    - Polycystic ovarian syndrome
    - Clinically obese
    - Smoking: not COPD
    - Stress/Axiety mild-moderate

**Community Maintenance Group**

- YES, this participant meets the following eligibility criteria for the Community Maintenance Group where this patient has completed The Sutherland Hospital Cardiac Rehabilitation or Heart and Lung Team Exercise Rehabilitation Programs, or Patient with previous cardiac history with little or no rehabilitation with any of the following:
  - Stable heart disease or other stable chronic disease
    - Including at least 3 months following hospital discharge for an acute coronary syndrome
    - At least 3 months following coronary bypass surgery, heart valve surgery or other cardiac surgery
    - At least 3 months following coronary angioplasty/stenting for stable CAD
    - With 2 or more major risk factors for heart disease who were previously inactive or sedentary
    - Heart failure or cardiomyopathy with NYHA Class I or II (no symptoms during exercise or reduced physical capacity during moderate activity)
    - Body Mass Index >30
  - Assessed as medically stable and suitable to exercise by GP
  - Able to walk 300-400 metres in 6 minutes.

*PLEASE READ CONTRAINDICATIONS TO EXERCISE PRIOR TO REFERRAL.*

B) PATIENT HEALTH STATUS

**PATIENT DETAILS**

- Name:
- Address:
- Phone: (w) (h) (Mob)
- Weight: Height: BMI: BP:

**DETAILS OF PATIENT’S USUAL GP**

- Referring Doctor
- GP Name:
- Practice Address:
- Phone: Fax:

**MEDICATIONS**

**ALLERGIES**

**STAGES OF CHANGE** (please tick current activity status)

- Pre Contemplation (not considering exercise)
- Contemplation (not exercising but considering)
- Preparation (beginning to exercise but not enough)
- Action (regularly active, but only recently)
- Maintenance (regularly active)

**COMMENTS (MEDICAL / FAMILY / SOCIAL HISTORY / OTHER)**

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Contraindications to Exercise – Excluded Conditions

- Complicated acute myocardial infarction (within 3 months)
- Unstable angina
- Untreated heart failure or cardiomyopathy
- Acute myocarditis or pericarditis
- Suspected or known dissecting aneurysm
- Shortness of breath on low exertion
- Uncontrolled cardiac arrhythmias
- Uncontrolled symptomatic heart failure
- Severe and symptomatic valvular stenosis or regurgitation
- Acute thrombophlebitis or intracardiac thrombi
- Acute pulmonary embolus or pulmonary infarction
- AICD (Automatic implantable cardioverter defibrillator)
- Acute infections/fever
- Uncontrolled high-risk proliferative retinopathy
- Uncontrolled diabetes (BGL’s above 15mmol/L / unstable BGL’s)
- Uncontrolled hypertension
- Chest discomfort
- Severe aortic stenosis
- Resting heart rate >100 bpm
- Acute infections/fever

Informed Consent

Program participants are also informed that there is some increased risk associated with participation in physical activity. All activity will be prescribed and supervised by appropriately qualified staff. If you feel any chest pains, nausea, dizziness or feel faint whilst exercising, please STOP all activity and inform a staff member immediately.

Contraindications to Exercise – Excluded Conditions

Please be aware that the list below details conditions that are contraindicated in exercise and are not suitable for referral into the GP Exercise Referral Scheme (GPERS) program.

Referral information to the Sutherland Shire Leisure Centre

Phone: 8536 9706 or 8536 9718   Located at: Sutherland Leisure Centre Rawson Avenue, Sutherland-in Waratah Park

The patient needs to contact the GP Exercise Referral Scheme (GPERS) Coordinator at the Sutherland Leisure Centre to arrange an appointment as soon as possible. Please inform your patient to take a copy of the referral form with them to their appointment with the Exercise Physiologist for an assessment before the program starts. Please note fee schedule may change with each new financial year so please ask your patient to contact the Sutherland Leisure Centre for current prices or refer to the program brochure for further information. You will also be notified of your patient’s results following the completion of the program.

Please provide duplicate copy to the patient to take to the Sutherland Shire Leisure Centre and keep original copy on file

GP Exercise Referral Scheme is a joint initiative between the Sutherland Division of General Practice Inc and Sutherland Shire Leisure Centres

The Scheme is supported by the Australian Association for Exercise and Sports Science.
Pregnancy and exercise

Regular physical activity can provide health and social benefits for many pregnant women. Suggestions for exercise during pregnancy include walking, swimming and supervised classes such as yoga or tai chi. Pelvic floor exercises are also important before, during and after pregnancy. Unless you have complications, it should be possible to enjoy some level of physical activity throughout most of your pregnancy.

The first step is to consult your doctor, physiotherapist or health care professional to make sure your exercise routine won’t harm you or your unborn baby. You may need to modify your existing exercise program or choose a suitable new one if you were sedentary before conceiving.

While exercise during pregnancy is usually encouraged, under some circumstances exercise can be detrimental to both the expecting mother and the growing foetus.

Benefits of physical activity during pregnancy

Exercise during pregnancy offers many physical and emotional benefits. Physical activity may also help manage some symptoms of pregnancy and you’ll feel better knowing you’re doing something good for yourself and your baby.

Some of the benefits of exercising regularly throughout your pregnancy include:

- Resistance to fatigue
- Stronger back muscles, which can help manage back pain and strain as your belly grows
- Improved posture
- Weight control
- Stress relief
- Improved sleep and management of insomnia
- Preparation for the physical demands of labour
- Faster recuperation after labour
- Faster return to pre-pregnancy fitness and healthy weight
- Increased ability to cope with the physical demands of motherhood.

Bodily changes associated with pregnancy

There are many anatomical and physiological changes that take place during pregnancy. When exercising, take into account the changes you’re experiencing.

- Hormones such as relaxin loosen ligaments, which could increase your risk of joint injuries (for example, sprains).
- As pregnancy progresses, weight increases combine with changes in weight distribution and body shape. This results in the body’s centre of gravity moving forward, which can alter balance and coordination.
- Pregnancy increases your resting heart rate, so it is not recommended to use target heart rate to work out the intensity of your exercise. In healthy pregnant women, exercise intensity can be monitored using a method known as Borg’s Rating of Perceived Exertion Scale (RPE). This measures how hard you feel (perceive) your body is working.
- Your blood pressure drops in the second trimester, so it is important to avoid rapid changes of position – from lying to standing and vice versa – so as not to experience dizzy spells.

Suggested activities

Activities that are generally safe during pregnancy, even for beginners, include:

- Walking
- Swimming
- Cycling – outdoors or on a stationary bicycle
- Exercise in water (aquarobics)
- Yoga
• Stretching
• Dancing
• Pilates
• Pregnancy exercise classes.

Some activities are safe when done in moderation by pregnant women who had already been participating in these activities prior to pregnancy. These include:

• Running
• Strength training.

**General exercise suggestions**
It is important to discuss your exercise plan with your doctor, as each pregnancy is different. In general, healthy women who have uncomplicated pregnancies can continue their previous exercise program after consultation with a doctor. It is also now considered safe to start a new exercise program during pregnancy if given the all-clear by your doctor.

If you have been cleared to exercise, it is recommended that you:

• Engage in at least 30 minutes of **moderate-intensity** physical activity (according to the perceived exertion scale) on most, if not all, days of the week.
• Do no more than three sessions per week of **vigorous** exercise by the third trimester.
• Let your body be your guide. You know you're at a good intensity when you can talk normally and not become exhausted too quickly. Be guided by your doctor, physiotherapist or health care professional.

**Exercises to avoid**
During pregnancy, avoid sports and activities with increased risk of trauma or falling such as rollerblading, soccer, basketball, gymnastics, horse riding, downhill skiing and scuba diving. These include:

• Contact sports or activities that carry a risk of falling (such as trampolining)
• Competition sports – depending on the stage of pregnancy, the level of competition and your level of fitness
• After about the fourth month of pregnancy, exercises that involve lying on your back – the weight of the baby can slow the return of blood to the heart. Try to modify these exercises lying on the side
• In the later stages of pregnancy, activities that involve jumping, frequent changes of direction and excessive stretching.

**General cautions**
Be guided by your doctor or physiotherapist, but general cautions include:

• Avoid raising your body temperature too high – for example, don’t soak in hot spas or exercise to the point of heavy sweating.
• Reduce your level of exercise on hot or humid days.
• If weight training, choose low weights and medium to high repetitions – avoid lifting heavy weights altogether.
• Don’t exercise if you are ill or feverish.
• If you don’t feel like exercising on a particular day – then don’t! It is important to listen to your body to avoid unnecessarily depleting your energy reserves.

**Pelvic floor exercises**
The pelvic floor muscles are weakened during pregnancy and during birth (vaginal delivery), so it is extremely important to begin conditioning the pelvic floor muscles from the start of the pregnancy. Appropriate exercises can be prescribed by a physiotherapist. It is important to continue with these throughout the pregnancy and recommence as soon as is comfortable after the birth.

**Abdominal exercises**
Strong abdominal muscles support your spine. The internal core and pelvic floor abdominal muscles act as a natural ‘corset’ to protect the pelvis and lumbar spine. Traditional sit-ups or crunches can be ineffective during pregnancy and may make worse the condition known as diastasis recti abdominis (a painless splitting of the abdominal muscle at the midline).
Appropriate core stability exercises are recommended during pregnancy to strengthen the muscles of the abdomen:

- Concentrate on drawing your belly button towards your spine.
- Breathe out while pulling in your belly.
- Hold the position and count to 10. Relax and breathe in.
- Repeat 10 times, as many times a day as you are able.
- You can perform this exercise sitting, standing or on your hands and knees.

**Warning signs**
If you experience any of the following during or after physical activity, stop exercising immediately and see your doctor:

- Headache
- Dizziness or feeling faint
- Heart palpitations
- Chest pain
- Swelling of the face, hands or feet
- Calf pain or swelling
- Vaginal bleeding
- Contractions
- Deep back or pubic pain
- Cramping in the lower abdomen
- Walking difficulties
- An unusual change in your baby’s movements
- Amniotic fluid leakage.

**Where to get help**

- Your doctor
- Physiotherapist
- National Continence Helpline Tel. 1800 33 00 66
- ‘Go for your life’ Infoline service Tel. 1300 73 98 99
- Bicycle Victoria – for further information on cycling and pregnancy

**Things to remember**

- Exercise during pregnancy offers many physical and emotional benefits. While exercise during pregnancy is usually encouraged, you may feel it’s not right for you.
- Talk to your doctor, physiotherapist or health care professional to make sure your exercise routine won’t cause harm to you or your unborn baby.
- Exercise during pregnancy is not advised in a number of conditions including heart disease, high blood pressure, risk of premature labour or pre-eclampsia.
- Any illness or complication of the pregnancy should be fully assessed and discussed with your doctor before commencing or continuing an exercise program.

**This page has been produced in consultation with, and approved by:**

Kinect Australia (inc VICFIT in Victoria)
This guide is based on two articles by Professor Maria A. Fiatarone Singh that were first published in Medicine Today in December 2006 (Medicine Today 2006; 7(12): 30-39) and in January 2007 (Medicine Today 2007; 8(1): 31-41).

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KEY POINTS

- Osteoporotic fracture is a multifactorial problem requiring a holistic approach to prevention for optimal efficacy and safety.
- Targeted exercise addresses many of the risk factors for osteoporotic fracture, including osteopenia, muscle wasting and weakness, falls, poor balance, depression, use of medications for depression and insomnia, sedentariness, fear of falling, mobility impairment and disability.
- Concurrent management of fracture risk with a physical activity prescription, adequate nutrition and pharmacotherapy for osteoporosis when required offers the best approach to optimal bone health.
- The important elements of the exercise prescription for bone health include high intensity progressive resistance exercise (weight lifting), progressive balance training, moderate to high intensity weight-bearing aerobic exercise and, when feasible, high impact exercise.

This guide outlines the role and rationale for exercise and implementing and prescribing evidence-based exercise regimes for people with osteoporosis.
1. THE ROLE OF EXERCISE

A combination of exercise, adequate nutrition and, when required, pharmacotherapy offers the best approach to optimal bone health and osteoporotic fracture prevention.

The clinical manifestations of osteoporosis (pain, fracture and subsequent mobility impairment) affect about 2 million Australians currently, and some 20,000 people each year suffer a hip fracture. General Practitioners (GPs) and Health Professionals (HPs) have a critical role to play in preventing such fractures. Current evidence suggests exercise is an important strategy to address the major primary risk factors for such fractures. Physical activity is complementary and additive to the nutritional and pharmacological management of osteoporosis but is a vastly underutilised preventive and therapeutic modality.

SCOPE OF THE PROBLEM

The prevalence of osteoporosis-related conditions in Australia is predicted to increase over the next two decades, from 10% of the population currently to 13.2% by 2021. Also predicted to increase is the incidence of osteoporotic fractures, from one every 5.6 minutes in 2006 to one every 3.7 minutes in 2021.

The total direct costs relating to osteoporosis are currently estimated at $1.9 billion annually. These costs, however, greatly underestimate the suffering caused by osteoporosis-related conditions, such as mobility impairment and activity restriction, pain, fear of falling, need for informal care and support, and loss of self-esteem and emotional wellbeing associated with recurrent injurious falls and fractures. There is, therefore, a great need to better understand osteoporosis and to implement ways to prevent and recover from these morbid events.

PHYSICAL ACTIVITY REDUCES FRACTURE RISK

Epidemiological studies suggest that regular exercise is associated with a reduction in osteoporotic fracture risk of up to 50% in men and women over 65 years of age.

Currently, there is evidence only for the efficacy of exercise in preventing vertebral fractures; no randomised controlled trials investigating exercise and fracture prevention have been carried out at other specific sites. However, optimal physical activity participation clearly maximises the attainment of peak

Figure 1. Resistance training, balance training, weight-bearing aerobic exercise and, when feasible, high impact exercise can improve bone and muscle strength and many other modifiable risk factors for osteoporotic fracture.
bone mass and bone strength, and attenuates age- and menopause-related bone loss. It also improves the overall risk factor profile associated with osteoporotic fracture in older adults (such as low muscle mass and strength, poor gait and balance, and depressive symptoms).

Choosing the right kind of exercise for patients with various health profiles requires an understanding of the effects of specific kinds of exercise on bone formation and remodelling at different stages of life.

TYPICAL PATTERNS OF BONE LOSS

In women, bone mass begins to decrease well before the menopause (as early as during their 20s in the femur of sedentary women) and accelerates in the perimenopausal years, with continued decline into late old age. Similar patterns of bone loss are seen in men, although without the acceleration related to loss of ovarian function seen in women.

As with losses of muscle tissue (sarcopenia), many genetic, lifestyle, nutritional and disease and medication-related factors affect the prediction of bone health at a given age. However, a wealth of animal and human data provides evidence for a strong relation between physical activity and bone health/fracture risk at all ages. Mechanical loading of the skeleton generally leads to favourable site-specific changes in bone mineral density (BMD), morphology and strength. In contrast, unloading (in the form of bed rest, immobilisation, casting or spinal cord injury) leads to resorption of bone and increased susceptibility to fracture within a few weeks of unloading. This rapid resorption mimics many years of ‘ageing’. Space travel is the most dramatic example of unloading, and much information on the effect of mechanical stresses on bone has been gained from studies of astronauts.

Less extreme variations in mechanical loading patterns seen within normal populations are also associated with differences in bone morphology and strength. Comparative studies of athletic and nonathletic populations usually demonstrate significantly higher BMD in the active cohorts, ranging from 5 to 30% higher, depending on the type, intensity and duration of exercise training undertaken and the characteristics of the athletes studied. Exceptions occur with nonweight-bearing activities, such as swimming, and in amenorrhoeic athletes or elite distance runners with very low body fat, who often appear similar or worse than controls. Measurable differences in BMD are also observed between habitually active (but non-athletic) and sedentary individuals.

Overall, cross-sectional and prospective cohort data support a strong relation for both men and women between lifetime physical activity patterns and preservation of BMD into old age, as well as a protective effect for hip, humerus and vertebral fracture. These reduced risks for fracture remain after adjustment for most major known risk factors for osteoporosis, and are not completely accounted for by differences in BMD, muscle strength or fall rates. It is thought that other changes in bone structure and geometry (such as greater diameter and stronger trabecular architecture) favourably influence skeletal integrity after exposure to exercise. Also, the positive effects of physical activity on gait mechanics, balance, psychological health and nutritional status may help protect against fractures.
EXERCISE & OSTEOPOROTIC FRACTURE PREVENTION

EXERCISE AND OPTIMAL BONE HEALTH

The goals of a physical activity prescription for bone health are to enhance bone strength and also address other potentially modifiable risk factors for osteoporotic fracture relevant to exercise, including muscle wasting, poor gait and balance, visual impairment, poor nutritional intake, depression, postural hypotension, polypharmacy, podiatric problems and environmental hazards (see Table 1 on page 7). This holistic approach to the promotion of physical activity is much broader than the simplistic goal of attenuating osteopenia through exercise. Thus exercise is likely to impact favourably not only on bone health but also on the control of many major chronic diseases, mobility impairment and disability, mental health, and quality of life in older patients. Some terms used in association with exercise are defined in the box on page 10.

Principles of exercise prescription

There are many unanswered questions regarding the optimal prescription of exercise for bone health, and in particular its ultimate efficacy for fracture prevention. There is, however, evidence that bone responds positively to novel mechanical forces, and that rapid, short bursts of high intensity loading of bones are more effective than sustained, low intensity loading of bones. Characteristics of exercise that maximise bone adaptation are listed in the box below.

PRINCIPLES OF EXERCISE THAT MAXIMISE BONE ADAPTATION

- Rapid, short bursts of high intensity and/or high impact activities such as jogging, jumping and rope skipping are more stimulating to bone cells than sustained, low impact activity such as walking.
- Effective activity does not have to be weight-bearing. Resistance training is an effective nonweight-bearing activity.
- Aerobic activity that is nonweight-bearing (such as swimming or cycling) does not enhance bone density.
- Lifting heavy weights is more effective than lifting light weights.
- Lifting heavy weights rapidly (power training) seems to be more effective than lifting heavy weights slowly (traditional resistance training).
- Exercising in short bouts with rest periods between has been shown in animal models to be more effective than continuous, long periods of exercise.
- Rapid movements are more stimulating than slow movements.
- Novel forces, such as changing directions and different heights of jumps, are more stimulating than repetitive force patterns.
- As the response of bone to muscle contraction is a local phenomenon, muscles connected to clinically important bones susceptible to osteoporotic fracture (hip, wrist, thoracic spine) need to be targeted specifically to achieve protection at those skeletal sites.
Appropriate types of exercise

Moderate to high intensity weight-bearing aerobic exercise (such as brisk walking, hiking, stair climbing or jogging), high intensity progressive resistance training (weight lifting) and high impact exercise (such as jumping or rope skipping) increase BMD by 1 to 4% per year in pre- and postmenopausal women.

More vigorous exercise interventions seem to produce greater effects. The widest range of benefits relevant to fracture protection seems to be provided by weight lifting and balance training exercises. Whether these benefits translate into fracture risk reduction is not yet known, but it is reasonable to use exercise for risk factor modification pending completion of studies.

The types of exercise appropriate for specific risk factors are listed in Table 1 (opposite), placed in context with other preventive or therapeutic options. It should be noted that prescribing low intensity aerobic exercise alone (such as casual walking) has not been shown to improve gait, balance, muscle mass, muscle strength, bone density, fall risk, clinical depression or fracture rates in older adults.

Although this is the most common exercise advice given by GPs & HPs (such as ‘You should take a walk every day’ or ‘You should be a little more active’), there is no evidence that giving such advice to older patients will prevent osteoporotic fracture. In fact, advising osteoporotic patients with poor balance to walk more without first improving their balance and strength has been shown to increase the risk of fracture.
### TABLE 1  OSTEOPOROTIC FRACTURE RISK FACTOR MODIFICATION: ROLE OF EXERCISE

<table>
<thead>
<tr>
<th>RISK FACTOR FOR OSTEOPOROTIC FRACTURE</th>
<th>PREVENTIVE OR THERAPEUTIC OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exercise</strong></td>
<td><strong>Other Options</strong></td>
</tr>
<tr>
<td>Osteopenia</td>
<td>Resistance training, power training, weight-bearing aerobic training, high impact training</td>
</tr>
<tr>
<td>Sedentary behaviour</td>
<td>Exercise counselling/prescription</td>
</tr>
<tr>
<td>Falls</td>
<td>Resistance training, balance training</td>
</tr>
<tr>
<td>Muscle weakness/sarcopenia</td>
<td>Resistance training, power training</td>
</tr>
<tr>
<td>Impaired balance</td>
<td>Balance training, tai chi, yoga, resistance training, power training</td>
</tr>
<tr>
<td>Depression, antidepressant medications</td>
<td>Substitute moderate to high intensity aerobic or high intensity resistance training for antidepressant medication</td>
</tr>
<tr>
<td>Protein &amp; calorie undernutrition, weight loss</td>
<td>Resistance training to increase appetite &amp; protein uptake from diet</td>
</tr>
<tr>
<td>Polypharmacy</td>
<td>Substitute aerobic or resistance training for medications for depression, insomnia and anxiety</td>
</tr>
<tr>
<td>Visual impairment</td>
<td>Physical activity may reduce adiposity/insulin resistance/diabetes, all risk factors for cataracts</td>
</tr>
<tr>
<td>Smoking and excessive alcohol intake</td>
<td>Exercise has been shown to support positive behavioural change in other domains (such as dietary change and smoking cessation)</td>
</tr>
</tbody>
</table>

*Abbreviation: SERMs = selective oestrogen receptor modulators*
Types of exercise to be avoided

Patients at risk for osteoporotic fracture should avoid activities that involve forward flexion of the spine, particularly while carrying an object (for example, lawn bowls, sit ups with straight legs or simply bending over to pick up something from the floor), as this movement in the presence of osteopenia increases the risk of anterior compression fractures of the thoracic vertebrae. Similarly, unsupervised exercise in those with poor balance or a history of osteoporotic fracture is best avoided, as are high risk activities or hazardous environments that may lead to falls.

PRESCRIBING EXERCISE

It is part of the GP’s and HP’s role in fracture prevention to provide a detailed exercise prescription for bone health, including written instructions and other educational support materials (see the box below). For some patients, such as those with cognitive impairment, frailty, balance impairment or severe osteoporosis, the exercise should be performed in a supervised venue at least until the patient is considered safe; the GP or HP should refer the patient to one. When referring patients to a fitness centre or other physical activity program, GPs should specify the nature of the exercises required to ensure that the most appropriate program is provided.

FRACTURE PREVENTION USING EXERCISE: THE ROLE OF THE GP & HP

- Assess the risk factors for osteoporotic fracture that are present in each individual (including osteopenia, muscle wasting, poor gait and balance, visual impairment, depression, poor nutritional intake, postural hypotension, polypharmacy, podiatric problems, environmental hazards, smoking, alcohol intake).
- Record historical and current physical activity patterns, and discuss with the patient how these patterns compare with the optimal physical activity recommendations for bone health.
- Identify any contraindications to exercise participation or need to modify exercise recommendations to enhance feasibility or prevent injury.
- Determine the patient’s preferences for specific types of exercise within the range of possible choices relevant to fracture risk.
- Provide a detailed exercise prescription for bone health, in terms of exercise type, volume, frequency and intensity, including written instructions and other educational support materials. (GPs can refer patients to a physiotherapist or exercise physiologist for a detailed exercise plan.)
- When referring patients for physical activity programs, specify the nature of the exercises required (e.g. weight lifting, stair climbing, balance training).
- Recommend a supervised venue for training until independent and safe. Note that for some frail patients, withdrawal of supervision will not be realistic at any time point.
- Establish a strong behavioural change program to accompany the exercise prescription, including recording of adherence, provision of feedback, monitoring and periodic revision of the prescription as the patient’s risk profile or health status changes.
EXERCISE & OSTEOPOROTIC FRACTURE PREVENTION

2. PRESCRIBING EXERCISE

Rapid, short bursts of progressive high impact or high intensity resistance exercise have been shown to improve the major primary risk factors for osteoporotic fracture in middle-aged and older adults more effectively than other forms of exercise. High impact exercise and balance training can readily be incorporated into daily activities.

DEVELOPING AN EXERCISE PRESCRIPTION

Exercise can be considered like a drug in terms of:

- the type prescribed (modality)
- the dosage (volume, frequency, intensity)
- how to take it (type of equipment, supervision)
- interactions (nutritional or pharmacological treatments for osteoporosis, exercise–drug interactions)
- compliance (behavioural change program accompanying the exercise prescription, practical implementation needs)
- side effects (adverse events, risks of exercise).

Some terms used in association with exercise are defined in the box on the next page. The flowchart on page 13 provides an approach to choosing the appropriate exercise types for individuals with and without osteoporosis or risk factors for it and/or at risk of falls. Depending on a patient’s health status, modifications to standard exercise prescriptions may be required.

KEY POINTS

- The most important elements of the exercise prescription for bone health are high intensity progressive weight lifting exercise and progressively more difficult balance training, with the addition of high impact exercise (such as jumping) when feasible.
- The most economical prescription with the broadest benefits for body composition and bone health as well as neuromuscular function is progressive resistance training as the primary exercise modality.
- Continuous progression in the amount of weight moved, balance exercise difficulty and height of jump is the most critical element of the exercise prescription for bone health; if progression stops, so does adaptation in the bone and muscle.
- Given the short time (several minutes per day) that is necessary for effective high impact exercise or balance training, incorporating such episodes into daily activities may be more successful than planning structured exercise classes away from home.
EXERCISE TERMS DEFINED

- **Weight-bearing aerobic exercise**
  Use of large muscle groups in a rhythmic pattern in a standing position, at a rate that increases heart rate, blood pressure and breathing to at least a ‘moderately hard’ level. Examples are brisk walking, hiking, stair climbing, jogging and aerobic dance. (Swimming, cycling, seated steppers and arm exercises are examples of nonweight-bearing aerobic exercises.)

- **Resistance training (weight lifting exercise)**
  Use of targeted muscle groups to lift and lower moderate to heavy weights slowly.

- **Power training**
  Weight lifting exercise performed so that the lifting phase is done as fast as possible, and the lowering is done slowly.

- **High impact exercise**
  Exercises in which the bones of the spine and lower extremities are loaded forcefully and rapidly as the feet hit the ground. Examples include jumping, rope skipping, hopping up or down stairs, jumping off boxes and sports involving jumping, such as basketball.

- **Balance exercises**
  Exercises that stress the equilibrium by narrowing the base of support, removing vision, decreasing foot contact with the ground and changing the centre of mass. Examples include standing on one leg with eyes closed, sitting on an exercise ball, heel-to-toe walking, leaning as far as possible in all directions while standing without bending at the waist, tai chi and balancing while placing a pillow or rocker board under the feet.
MODALITY

Resistance training

Although weight-bearing aerobic exercise, high impact exercise and resistance training have all been shown to maintain or augment bone density in older adults, resistance training has the added benefits of increasing muscle mass and strength, as well as balance to some extent.

This combination of effects on body composition and muscle function is a direct antidote to age-associated changes in these domains, and offers potential benefit for many health conditions in addition to osteoporosis. Therefore, the most economical prescription with the broadest benefits for body composition and bone health, as well as neuromuscular function, is resistance training as the primary exercise modality.

Adding high velocity forces/movements may further enhance bone strength benefits for the femoral neck or trochanter, improve lower extremity muscle power and augment balance. Thus, traditional weight lifting exercise (slow lifting and lowering) or power training (rapid lifting and slow lowering of the weight), either on machines or using free weights, are the key exercise modalities.

The effects of muscle contraction on bone appear to be primarily regional (stimulation of osteoblast function) rather than systemic. Therefore, muscle groups connected to bones of relevance to osteoporotic fracture should be emphasised in a resistance training program (e.g. spinal extensor muscles, hip abductors and extensors, knee extensors and flexors) as well as those related to gait and balance (such as ankle plantar flexors and dorsiflexors and hip abductors). Typical exercises would include the machine-based leg press, seated rowing, lat (latissimus dorsi) pull down and knee extension and flexion, the free weight versions of these exercises, and standing calf raises (Figures 2a to 2c).

Figures 2a to 2c. Resistance training exercises using machines or free weights increase both bone density and muscle strength. Figure 2a (left): Leg press. Figure 2b (centre): Knee extension. Figure 2c (right): Hip extension (note the weight bands around the ankles).
High impact exercise

In middle-aged and older adults, high impact exercise is typically prescribed as some form of jumping, including jumping in one place or up and down boxes and stairs, and rope skipping, also known as jump rope (Figure 3).

Fast heel drops (fast drop with sudden stop, then slow raise) are more suitable, although not as effective, for patients with previous injuries or osteoarthritis of the knees and hips. Jumps and heel drops should be performed with hips and knees fully extended (straight) when landing so that the forces are transmitted to the bones, rather than dissipated by the muscles.

Doing high impact exercise between sets of weight lifting exercise incorporates resistance training and high impact exercise in one session without extending the time required, an economical prescription for busy adults.

Figure 3. High impact activities such as rope skipping, jumping and hopping increase bone density. Jumping up and down stairs can be incorporated into everyday life.

Balance training

Balance training will not have any impact on muscle strength, sarcopenia or osteopenia, but will improve balance, mobility and fear of falling, and is thus an additional modality of exercise important for prevention of osteoporotic fractures.

There are many ways to improve balance, from yoga and tai chi postures and exercise ball and rocker board exercises, to navigating obstacle courses and integrating one-legged standing postures into daily activities (Figure 4).

It is possible to do some weight lifting exercises in the standing position on one leg with reduced hand support, thus completing both resistance training and balance training at the same time.

Figure 4. Balance enhancing exercises such as tandem or heel-to-toe walking improve balance, mobility and fear of falling.
FLOWCHART 1 AN APPROACH TO EXERCISE PRESCRIPTION FOR MIDDLE-AGED AND OLDER INDIVIDUALS

SCREEN PATIENT FOR BONE HEALTH STATUS

Patient has osteoporosis and/or a risk of falls

Advise patient to participate in:
- weight lifting exercise with
  - high loading forces
  - progressive increases in loading
  - rapid lifting of load
- balance training

Does patient have any of the following:
- arthritis
- balance impairment
- frailty
- cognitive impairment

Appropriate training types are:
- resistance training: traditional (slow velocity lifting and lowering) and power training (high velocity lifting and slow velocity lowering)
- balance training
Supervision is required

Patient does not have osteoporosis or risk factors for it and has not had a fall

Advise patient to continue with an active lifestyle and to participate in:
- weight-bearing aerobic exercise
- weight lifting exercise
- high impact activities

Appropriate training types are:
- high impact activities (plyometrics, jumping sports)*
- resistance training: traditional (slow velocity lifting and lowering) and power training (high velocity lifting and slow velocity lowering)
- high intensity/loading aerobic exercise (stair climbing, hiking)

* Plyometrics = any exercise where the muscle is stretched (i.e. loaded) before it is contracted, e.g. jumping up a step or off a box.
Aerobic exercise

Aerobic exercise has many health benefits for older patients, but it should be remembered that nonweight-bearing aerobic exercise (cycling, swimming, seated rowing or stepping machines) has little effect on bone health, balance or muscle strength, and should, therefore, not be the primary prescription for these health-related outcomes. Even though walking is a weight-bearing aerobic exercise, it does not increase muscle mass and strength nor improve balance, and it only augments bone density when moderate to high intensities, such as brisk walking, hiking, stairclimbing and jogging, are used.

Aerobic exercise is, therefore, much less potent and comprehensive in its effects on the multiple risk factors for osteoporotic fracture. The type of weight-bearing aerobic exercise used will vary with the health status of the patient.

For example, obesity and osteoarthritis often contraindicate jogging and stairclimbing as appropriate or feasible exercise.

DOSE

Intensity

The physiological responses in bone and muscle are proportional to the magnitude and rate of strain imposed, and successful exercise programs generally use intensities at the higher ranges. Therefore, moderate to high intensity progressive resistance training and/or high impact exercise is recommended as the primary intensity of planned exercise. High intensity progressive resistance training means that the weight feels hard to lift, or is rated about 15 to 18 on the Borg Scale for ratings of perceived exertion when first picked up or pushed at each training session (see Figure 5). As soon as the weight used no longer feels hard, the next higher weight increment (machine setting or free weight) should be used. Such continuous progression keeps the intensity at the intended level over time. If progression stops, so does adaptation in the bone and muscle. This is the most critical element of the exercise prescription for bone health.

Jumping programs incorporating 10 to 50 jumps of approximately 8 cm height each day have successfully increased trochanteric BMD by 3 to 4% in women. This kind of jump is high impact (producing ground-reaction forces that are three to four times bodyweight) but feasible for nonathletic women and infrequently associated with injuries.
Also, programs incorporating these jumps take only about two minutes per day to perform. Such prescriptions may need to be modified in the presence of osteoarthritis of the knee, hip and ankles or balance impairments (see Table 2 on pages 16 & 17).

However, it is possible to jump while holding on to a railing or another person, enabling safe prescribing of this training modality without sacrificing the intensity of the impact on bone and muscle.

**Volume and frequency**

The optimal volume of exercise (i.e. the product of the number of sets completed of each exercise, the number of repetitions completed in each set and the number of exercises, or the total minutes of aerobic exercise) for reduced fracture risk has not yet been determined.

However, programs involving resistance training, weight-bearing aerobic exercise and/or high impact exercise on about three days each week have been shown to augment BMD significantly compared with sedentary controls if continued for at least one to two years.

In the case of resistance training, this amount of training is also sufficient for the other body composition changes (increased muscle mass, decreased fat mass) and improvements in muscle strength, power and balance as well as depression. Animal studies do not show benefits of very high numbers of repetitions compared with low numbers for aerobic, weight lifting or jumping exercises.

Each of the following recommendations for exercise volume and frequency is supported by clinical trials evidence as being effective for increasing BMD:

- about 50 jumps three to six days per week
- two or three sets of eight to 10 repetitions of each of six to eight weight lifting exercises three days per week
- 45 to 60 minutes of weight-bearing aerobic exercise three days per week.

Animal models strongly suggest that, for bone strength adaptation, optimal recovery periods are 10 to 14 seconds between loading cycles (repetitions) and at least eight hours between bouts of loading (training sessions). These rest intervals between repetitions are longer than currently prescribed by most practitioners, who wait only one to two seconds.

However, long intervals are not detrimental to muscle function outcomes, and are likely to enhance adherence to technique and therefore minimise injury. It has also been shown in animal models that doses of exercise may be broken down into three or more mini sessions, which can be easier to incorporate into a busy day.

Therefore, recommending exercise no more frequently than every other day (about three days per week) satisfies both muscle and bone health requirements, and is not overly burdensome to most individuals.
**TABLE 2  PRESCRIBING EXERCISES FOR BONE HEALTH & MODIFICATIONS REQUIRED**

<table>
<thead>
<tr>
<th>EXERCISE MODALITY</th>
<th>STANDARD OR OPTIMAL MODE</th>
<th>MODIFICATIONS FOR PATIENTS WITH ARTHRITIS</th>
</tr>
</thead>
</table>
| **Progressive resistance training** | • Prescribe 6 to 10 exercises for major muscle groups, including muscles attaching to greater trochanter and vertebral bodies, as well as those involved in gait and balance. The most important exercises are the machine-based leg press or hip extension, squats, knee extension, knee flexion, hip abduction, hip flexion, dorsiflexion, lat* pull down, back extension, upright seated rowing, abdominal crunch, the free weight versions of these exercises, and standing calf raises  
• Include novel planes of movement, free weights and standing postures if possible  
• High intensity (about 80% of peak capacity, progressed continuously)  
• Use high velocity for concentric (lifting) portion of movement for optimal power development, and slow velocity for lowering weight (i.e. lift rapidly and lower slowly) | • Ensure technique is good to prevent injuries  
• May need to limit range to pain-free motion, provide good back support, adjust machines or free weights to accommodate joint deformities or restrictions  
• Intensity may need to be individualised for some exercises  
• May need to medicate for pain prior to exercise |
| **Aerobic training** | • Moderate to high intensity stair climbing, hiking, brisk walking, walking up hills  
• Weight-bearing  
• High ground-reaction forces (jogging, running, step aerobics) | • May need to reduce or eliminate weight-bearing or high impact component: substitute brisk walking or walking up hills for stair climbing, step aerobics, jogging, running |
| **High impact exercise** | • Jumping, hopping, rope skipping (jump rope)  
• Progressively increase height of jumps or step boxes, hop on one leg, jump or hop up and down stairs | • May need to reduce or eliminate high ground reaction forces (heel drops instead of jumps)  
• Substitute power training (rapid concentric muscle contraction against moderate to high load on weight lifting machine) to produce rapid onset of high muscle contraction forces as in take off of jump, but with no impact |
| **Balance training** | • Combine progressively more difficult static and dynamic postures (e.g. one-legged standing, tandem walking,†, crossover walking,‡, turning, stepping over objects, leaning to limits of sway)  
• Improve lateral stability (side stepping over objects & leaning)  
• Reduce base of support (e.g. tandem or one leg standing)†  
• Perturb centre of mass (lean to limits of sway in all directions, or balance while seated on exercise ball or standing on rocker board)  
• Withdraw vision (close eyes during exercises)  
• Decrease proprioception by increasing compliance of standing surface (stand on pads, mattress or pillows)  
• Add cognitive distractor (e.g. animal naming, mental calculations out loud) to increase difficulty  
• Incorporate postures from yoga and tai chi or other exercise forms that emphasise the above principles | • May not be able to place full body weight on osteoarthritic joints: use less painful leg to perform one-legged postures, assist weight bearing with use of walking stick  
• Keep sessions short to avoid pain from prolonged weight bearing  
• Reduce angle of flexion at knee during tai chi movements |

* *lat* = latissimus dorsi muscles. † † † † Tandem walking and standing = walking and standing with one foot placed directly in front of the other, also
## FOR SPECIFIC PATIENT GROUPS

### MODIFICATIONS FOR PATIENTS WITH FRAILTY AND/OR NEUROMUSCULAR IMPAIRMENT

- Usually little modification needed
- May need to alter certain exercises for neurological impairment
- May need to perform exercises in seated rather than standing positions due to fatigue or poor balance
- Supervision usually needs to be more intensive for safety and when progressing the amount of weight lifted

### MODIFICATIONS FOR PATIENTS WITH CARDIOVASCULAR AND/OR PULMONARY DISEASE

- Usually no modification needed
- If angina or ischaemia is provoked by exercise, keep intensity below the level at which this occurs
- Avoid breath holding, Valsalva manoeuvre, sustained isometric contractions or tight handgrip during weight lifting

### MODIFICATIONS FOR PATIENTS_called heel-to-toe walking and standing

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>Call heel-to-toe walking and standing.</td>
</tr>
<tr>
<td>Walking</td>
<td>Crossover walking = walking with one foot placed to the other side of the other foot.</td>
</tr>
</tbody>
</table>

- May need to substitute seated exercises if weakness or poor balance prevents standing postures; however, this limits bony adaptation
- May need to begin with low to moderate intensity level and short sessions until improved
- Start with heel drops instead of jumps
- Perform exercises under supervision and while holding on to a support rail initially
- Gradually reduce hand support as tolerated

- Keep training intensity below the level that causes ischaemia or severe dyspnoea
- Walk or exercise beyond the onset of claudication if possible (1 to 2 minutes), then rest and repeat
- Avoid breath holding, Valsalva manoeuvre, sustained isometric contractions or tight handgrip during activity

- Perform exercises under supervision and while holding on to a support rail initially
- Gradually reduce hand support as tolerated

- Usually none

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1 Crossover walking = walking with one foot placed to the other side of the other foot.
EXERCISE PRESCRIPTIONS FOR SPECIFIC PATIENT GROUPS

Certain patient groups require specific exercise prescriptions. For example, high impact activities are not suitable, and probably not feasible, for very frail older adults with osteoarthritis of the hips and knees as well as risk of osteoporotic fracture and falling because of the likelihood of exacerbation of arthritis as well as fall-related injuries. In such cases, therefore, a low impact but high loading form of exercise (such as seated and standing weight lifting) would be both effective and tolerable.

A guide to exercises for bone health and the modifications necessary for patients with arthritis, neuromuscular disease/frailty, and cardiopulmonary disease are presented in Table 2 (see pages 16 and 17).

RISKS OF EXERCISE

As already mentioned, people at risk for osteoporotic fracture should avoid physical activities involving forward flexion of the spine, particularly while carrying an object, because of the risk of anterior compression fractures of thoracic vertebrae in the presence of osteopenia. Such activities include sit-ups with straight legs, lawn bowls and bending over to pick up something from the floor.

Unsupervised exercise in individuals with poor balance or a history of osteoporotic fracture is also best avoided, as is participation in activities that are at high risk of falls themselves or involve hazardous environments that may lead to falls.

The potential risks of exercise in patients with osteoporosis and suggested means to avoid such complications are summarised in Table 3 opposite.

SAFETY OF EXERCISE PROGRAMS

There are many studies suggesting that weight lifting exercise is safe when prescribed as described above in middle-aged and older adults.

Although very little information on high impact exercise is available, studies to date in postmenopausal women exercising unsupervised in their own homes have not reported injuries.

Screening for potential contraindications (hernias, aneurysms, acute joint injuries, unstable cardiovascular disease) and supervision in the initial stages is critical for the safety and efficacy of the exercise prescription.
# Table 3: Risks of Exercise in Patients at Risk for Osteoporotic Fractures

<table>
<thead>
<tr>
<th>Potential Risk</th>
<th>Preventive Strategy</th>
</tr>
</thead>
</table>
| Injurious fall                                      | - Prescribe balance training prior to aerobic training if gait and balance are impaired
|                                                     | - Prescribe progressive resistance training for sarcopenia and muscle weakness                         |
|                                                     | - Optimise lighting, visual aids, safety of exercise environment, climate conditions, footwear          |
|                                                     | - Tell patients not to exercise when their judgement is impaired due to use of drugs or alcohol, or when their health status changes |
|                                                     | - Review medications for agents that may increase risk of falls, postural hypotension or altered central nervous system function |
| Spinal compression fractures                        | - Avoid prescribing exercises involving forward flexion with loading of the spine                      |
|                                                     | - Avoid prescribing exercises involving twisting movements of the spine                                |
|                                                     | - Emphasise good sitting and standing postures                                                       |
|                                                     | - Tell patients to avoid activities involving spinal flexion (e.g. bowling, cycling, golf, gardening, vacuuming) or provide modifications to these activities |
|                                                     | - Tell patients to bend their knees rather than their back when picking up or reaching low objects    |
| Dislocation of total hip prosthesis                 | - Avoid prescribing exercises involving internal rotation and flexion of the hip                      |
| Pain from osteoarthritis                            | - Prescribe low impact, high intensity exercises (e.g. weight lifting) rather than high impact exercises (such as jumping, stepping, jogging) |
|                                                     | - Emphasise brief, novel loading of bones with adequate rest periods rather than prolonged, repetitive loading bouts |
| Pain from hip fracture, spinal osteoporosis or old compression fractures | - Rule out new fractures or dislocation of surgical prostheses                                          |
|                                                     | - Brace or support spine during exercise if needed                                                     |
|                                                     | - Use analgesia or local pain relieving techniques (e.g. heating, massage)                             |
ENHANCING COMPLIANCE

It is common for novice exercisers to lose motivation within the first six months of developing this new behaviour. Ways to enhance long term adherence to this or any health promoting behaviour include the following:

- provide the patient with simple educational materials
- provide a place to carry out the program under supervision
- ask the patient about the behaviour at each health encounter
- encourage the patient to keep a log of his or her physical activity and regularly review and provide feedback on this
- periodically measure outcomes likely to show change in response to the behaviour (walking speed, balance, muscle strength, depressive symptoms)
- anticipate and provide strategies to overcome common barriers and risks for relapse (such as illness in patient or partner, travel, family commitments, inclement weather, transportation difficulties)
- consider setting up a corner in the waiting room with a demonstration video of bone health-enhancing exercise, brochures to take home and sample exercise equipment or routines that patients can try out in the safety of the office.

Evidence available indicates that although the volume of exercise required for bony adaptation is small (only 12 minutes per week of jumping in one study), the critical factor is the need for progressive high impact or high intensity loading, which is difficult to achieve without good supervision and feedback.

There is a great need to reinforce behavioural strategies that will assist with compliance with any exercise program.

Given the very short time (several minutes per day) that is needed for high impact or balance training exercises, finding ways to incorporate such episodes into daily activities may be more successful than planning structured exercise classes away from home. For example, inserting a few jumps during television commercials, jumping or hopping rather than walking up a flight of stairs, or standing on one leg while washing the dishes, may provide an effective stimulus if such habits can be effectively behaviourally reinforced.

Aerobic exercise can be incorporated into lifestyle by always using stairs instead of elevators/escalators, or walking briskly for 10 minutes or more several times a day.
EXERCISE & OSTEOPOROTIC FRACTURE PREVENTION

THE ROLE OF THE GP & HP – SUMMARY

The role of the GP/HP in fracture prevention using exercise is to fully integrate an exercise prescription into the rest of the health care of patients at risk. Patients who sense that exercise is considered just as essential to their health care as the rest of the prescriptions offered to them will be far more likely to adopt and adhere to recommendations for exercise.

To enhance compliance the GP/HP should always:

- assess the risk factors
- compare current physical activity with optimal recommendations
- identify contraindications to exercise participation or exercise modifications needed
- prescribe exercise
- establish an accompanying behavioural program.

Rural GPs/HPs, however, are likely to need to develop home exercise programs because of the lack of suitable training facilities and specialised equipment.

Suggestions for incorporating balance training, high impact and strengthening activities into patients’ daily routines rather than using exercise equipment are given in the box below.

INCORPORATING FRACTURE PREVENTION EXERCISES INTO DAILY ROUTINES

Exercise prescriptions can be developed for patients who do not have access to weight lifting and other equipment. The following exercises can be carried out without any specialised equipment:

- Stand on one leg whenever standing at a sink or counter or in a queue (where feasible).
- Walk heel-to-toe between rooms (heel of one foot directly in front of the toes of the other foot, so that they touch or almost touch).
- Stand up and sit down slowly without using arms.
- Squat to pick up items or reach into low shelf or drawer, rather than bending over.
- Jump up and down steps using both feet to land, advance to one leg. Arthritis or balance impairment may preclude this exercise in some patients. Patients may start by holding on to a railing and advance to no hand support.
- Lift items with one hand instead of both.

Avoid having poor posture, particularly forward flexion of the spine (use a Swiss ball or a backless chair when sitting).
EXERCISE AND OTHER TREATMENTS

Exercise does not take the place of nutritional and pharmacological management of osteoporosis, and these treatments should, therefore, be continued when exercise is initiated. In most trials studying the benefits of exercise, women have received calcium, and in some cases vitamin D, supplementation, and there is evidence that nutritional adequacy in terms of energy, protein, calcium, vitamin D and other micronutrients is necessary for optimal skeletal adaptations. In addition, oestrogen has been shown to be additive to the benefits of exercise on bone in some studies.

More information is needed on the potentially additive effects of exercise and bisphosphonates on bone density and fracture risk. In the meantime, as the effects of bisphosphonates on bone are greater than other currently available treatments, the most rational approach would seem to be to continue these agents and add exercise. Exercise has the added benefits of improving fitness, mental health, neuromuscular function, muscle and fat mass, and general health status in ways that osteoporotic pharmacotherapy alone cannot.

CONCLUSIONS AND SUMMARY

Many epidemiological studies suggest that physical activity substantially lowers the risk of osteoporotic fracture in older men and women. In addition, there is a wealth of experimental evidence that exercise can improve the major risk factors for osteoporotic fracture in older adults (that is, bone density, muscle strength, balance and falls). Thus, the incorporation of evidence-based physical activity counselling and implementation strategies into the care of such patients is critical if the personal and societal burden of fragility fractures in Australia are to be reduced.

There is evidence that a stabilisation or increase (by 1 to 2% per year) in bone mass is achievable by resistive, weight-bearing aerobic exercise or high impact exercise. Such effects on bone density may be important for both prevention and treatment of osteoporosis and related fractures and disability. Even if exercise alone is an insufficient stimulus to maintain bone density at youthful levels, the effects of exercise on bone strength, muscle mass, muscle strength, balance, mobility, disability and mental health should, in combination, lower the risk of injurious falls substantially in physically active individuals.

However, large, long term, randomised controlled trials of any exercise modality with osteoporotic fracture as a primary outcome have yet to be conducted, and are a priority for advances in this field.

Further information on exercise and osteoporotic fracture prevention is available from Osteoporosis Australia (www.osteoporosis.org.au) and the Fit For Your Life Foundation (www.fitforyourlife.org).
EXERCISE & OSTEOPOROTIC FRACTURE PREVENTION

HEALTH PROFESSIONAL GUIDES

CONSUMER GUIDES

5 FACT SHEETS IN 5 LANGUAGES (PLUS ENGLISH): CHINESE, VIETNAMESE, ARABIC, GREEK AND ITALIAN
The Australian Government has provided funding to support this publication; however, the views in this document are those of the authors and do not necessarily represent the views of the Australian Government.
Management of overweight and obesity in adults

The proportion of Australians who are overweight or obese has increased markedly over the past 20 years. An estimated 2.5 million Australian adults (about 1 in 5 men and 1 in 6 women) are obese and a further 4.9 million are overweight but not obese, based on 2004–2005 data. A greater proportion of premature death and illness in Australia is now caused by excess body fat than by tobacco smoking or high blood pressure.\(^1\)

Unhealthy weight gain occurs when energy intake from food is greater than energy expended through physical activity. Environmental, cultural, genetic and lifestyle factors all contribute to overweight and obesity. Physical inactivity and overeating are the major modifiable contributors to the problem of obesity.

GPs, practice nurses, exercise physiologists, dietitians and other health professionals can help people correct the imbalance between energy intake and expenditure by giving reliable, individually tailored advice about physical activity, sedentary behaviours and long-term patterns of healthy eating.

Obesity is itself a disease state, and is also a risk factor for many chronic disease conditions. Obesity:\(^2,3\)
- reduces life expectancy
- increases the risk of coronary heart disease, stroke and gout
- strongly predicts increased risk of type 2 diabetes, insulin resistance, hypertension, dyslipidaemia, gall bladder disease and non-alcoholic fatty liver disease (abdominal obesity carries particularly high risks)
- is associated with obstructive sleep apnoea and reduced quality of life
- has been linked with increased risk of some surgical and post-surgical complications.

Overweight or obese people can achieve clinically significant improvements in comorbid and related conditions by losing weight. The degree of benefit correlates with amount of weight lost, but even modest losses of 5–10% bodyweight can be medically important:\(^3\)
- Each 1% reduction in bodyweight can reduce diastolic blood pressure (BP) by 2 mmHg and systolic BP by 1 mmHg.
- Each kilogram of weight lost is estimated to reduce low-density-lipoprotein cholesterol by 1%.
- In people with newly diagnosed type 2 diabetes, weight loss of 15–20% in the first year after diagnosis reverses the elevated risk of premature death.
- Weight loss is associated with improved quality of life, self esteem and sometimes also economic benefits (e.g. reduced medication costs).

Weight loss is not easy, but is achievable – even in people with weight-related medical conditions. High failure rates are partly due to unrealistic goal setting and inappropriate approaches to physical activity and dietary changes.\(^3,7\)

It is important to note that BMI cut-points provide a benchmark for individual assessment, but there is evidence that risk of chronic disease in populations increases progressively from a BMI of 21.\(^4\) There is a continuous relationship between weight and cardiovascular risk. Therefore, definitions of abnormality based on BMI or waist circumference values are somewhat arbitrary.\(^5\)

Useful measures

Both Body Mass Index (BMI) and waist circumference are useful measures in monitoring overweight and obesity.\(^3\)

**Classification by BMI**\(^2\)

<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
</tr>
<tr>
<td>Normal</td>
<td>18.5–24.9</td>
</tr>
<tr>
<td>Overweight</td>
<td>25.0–29.9</td>
</tr>
<tr>
<td>Obese</td>
<td>≥30.0</td>
</tr>
</tbody>
</table>

**Classification by waist circumference**\(^2\)

<table>
<thead>
<tr>
<th>Classification</th>
<th>Abdominal overweight</th>
<th>Abdominal obesity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>≥94 cm</td>
<td>≥102 cm</td>
</tr>
<tr>
<td>Women</td>
<td>≥80 cm</td>
<td>≥88 cm</td>
</tr>
</tbody>
</table>

*Classification systems based on data for Caucasian adults. The International Diabetes Federation has proposed cut-points for other ethnic groups.*\(^6\)
through diet, physical activity and behavioural interventions.9

Successful long term weight loss programs usually involve individually tailored lifestyle changes to increase energy expenditure through physical activity and/or reduce energy intake from food and drinks, but preferably both. Medication or surgery may be necessary for some patients. Steps for managing clinical management of overweight or obesity are summarised in Table 1.

**Physical activity and weight loss**

Physical activity is well established as a key component of any weight loss program. Sufficient regular physical activity is crucial to prevent weight gain and successfully maintain weight loss.11

It is important for people to understand that the amount of physical activity needed to lose weight is usually higher than the recommended levels for health benefits.

<table>
<thead>
<tr>
<th>Duration</th>
<th>Weight loss</th>
<th>Waist circumference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short term</td>
<td>1–4 kg/month</td>
<td>1–4 cm/month</td>
</tr>
<tr>
<td>Medium term</td>
<td>10% of initial weight</td>
<td>5% after 6 weeks</td>
</tr>
<tr>
<td>Long term</td>
<td>10–20% of initial weight</td>
<td>88 cm (women) 102 cm (men)</td>
</tr>
</tbody>
</table>

For health benefits, everyone should do at least 30 minutes of moderate-intensity** physical activity on most, if not all, days of the week. This amount can be accumulated in shorter bouts, such as three 10-minute walks. About half of Australian adults do not do enough leisure-time physical activity for health benefits.1

For weight loss and to prevent regaining weight, at least 60 minutes’ moderate-intensity physical activity every day is usually needed.12 In practice, it is more realistic to work with the patient towards achieving the target of at least 30 minutes, and then gradually increase the duration to 60 minutes on most, if not all, days of the week.

It is important that patients understand that physical activity is beneficial, independent of whether weight loss is achieved. Encourage any effort to become more active. Exercise interventions (pre-planned programs of physical activity intended to increase energy expenditure) significantly improve glycaemic control and reduce visceral adipose tissue and plasma triglycerides in people with type 2 diabetes.12

### Table 1. Clinical management of overweight in general practice

1. **Discuss** the patient’s weight and health implications non-judgementally. Agree together on whether to take measurements (the results may be counter-productive for some people). It is best to use both weight and waist circumference to assess relative changes in body fatness over time.

2. **Identify and manage weight-related medical conditions.**

3. **Ascertain motivation** to lose weight, expectations, confidence of success and readiness to change. Information about health risks of overweight may benefit those not yet ready to change.

4. **Explore reasons for energy imbalance** – consider genetic influences, history of failed attempts, life changes (e.g. menopause, recent pregnancy), life events (e.g. marriage, divorce, quitting smoking, stress), other medical conditions or treatments (e.g. benzodiazepines, corticosteroids, antipsychotic agents, anti-epileptic agents, sulphonylureas, insulin).

5. **Identify the source of energy imbalance** – consider meal patterns, types of food eaten, amount of physical activity and sedentary behaviours.

6. **Determine clinical intervention needed** – identify need for individual education and skills training (anyone who is overweight/obese or steadily gaining weight), behavioural therapy (patients with disordered eating patterns or food-related beliefs), drug therapy or surgery (those at highest risk).

7. **Agree on goals and strategies** to achieve weight loss needed for health benefits, set realistic interim targets and explore best personal strategies.

8. **Provide advice** – consider writing a prescription for physical activity, giving written information on healthy eating or referral for dietary or physical activity advice (e.g. dietitian, physiotherapist, exercise physiologist, psychologist or Heartmoves exercise leader).

9. **Prescribe or refer** – patients with BMI >30 or BMI >27 and comorbidities may benefit from drug treatment in combination with dietary and physical activity advice. Behavioural modification can help with adherence and long-term weight management. Surgery is the most effective weight loss treatment for severely obese patients.

10. **Provide regular review and assistance** – fortnightly review may be needed initially, followed by monthly reassessment until goals have been reached. Review periodically to prevent regain of weight.

Adapted from Reference 10

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**Physical activity sufficient to produce a noticeable increase in breathing depth and rate but still allows person to talk comfortably.**

**§ Realistic targets are higher than upper limit of healthy range.**
diabetes, even without weight loss. Emerging data from observational studies suggest that recreational physical activity after the diagnosis of breast cancer or colorectal cancer may confer significant protective effects, including reducing the risk of recurrence or death. Therapeutic physical activity regimens (e.g. walking and muscle-strengthening exercises) also reduce pain and improve physical function in people with osteoarthritis of the knee.

**Healthy eating and weight loss**

Successful weight loss depends on correction of energy imbalance through increased energy expenditure from physical activity, and changes in food habits to reduce overall energy intake. It is important to understand that a reduction in energy intake can be achieved through multiple strategies – not simply by reducing dietary fat. To reduce energy intake, the key is to reduce consumption of energy dense (e.g. high fat, high sugar and high starch) foods and drinks (e.g. high sugar drinks) and consume mainly low energy dense foods (e.g. fruits and vegetables). Further detail is provided in the healthy eating tips section. Reduction of energy intake is a key factor in weight loss, whereas the particular macronutrient composition of diets for weight loss is still being identified. While much emphasis has been placed on very low carbohydrate diets for weight loss, their long term safety and effects on weight are in doubt.

**Maintaining weight loss**

Approximately 20% of previously overweight people who succeed in losing a significant amount of weight for a year or more are able to maintain the weight loss long term. Preventing regain appears to become easier over time. Factors associated with successful long-term weight control include regular physical activity (approximately 60 minutes per day), low energy eating habits, regular breakfast, self-monitoring weight, and maintaining a consistent eating pattern across weekdays and weekends.

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**Healthy eating tips for achieving a healthy weight**

1. **Choose foods and drinks lower in energy**
   Choose these options:
   - Foods that are packed with vitamins, minerals and fibre as well as providing some energy: vegetables, fruit and legumes (e.g. split peas, kidney beans, baked beans, lentils, chick peas). These foods help you feel full without giving you too much energy.
   - Low fat or reduced fat milk and yoghurt
   - Lean meat (e.g. meat trimmed of fat before cooking, chicken without the skin) and fish
   - Wholegrain or wholemeal bread and breakfast cereals
   - Plain pasta (preferably wholemeal), plain rice (preferably brown), plain noodles or grains
   - Plain water as your first-choice drink. Other suitable choices include plain mineral water or soda water.

2. **Limit high energy foods and drinks**
   Have these foods and drinks only occasionally or as a treat:
   - Chocolate, confectionery
   - Potato crisps, corn chips, other savoury snack foods
   - Cakes, sweet biscuits
   - Pastries (including sweet and savoury)
   - Take-away foods such as deep-fried foods, creamy pasta dishes, cheesy dishes, hamburgers
   - Soft drinks, fruit juices, fruit drinks and alcohol. When drinking alcohol, use low energy mixers e.g. diet tonic.

3. **Watch your overall amount of food and drink**
   - Eat when you feel hungry – not just because it’s meal time or food is there. (If you’re always hungry, see your doctor for advice on possible reasons.)
   - Be careful not to order too much when you’re eating out or buying take-away. (If you only need a small serve or individual item from the menu, resist the urge to buy the meal pack or larger serve – even though it may be good value for money.)
   - Limit the amount of high energy drinks like alcohol, soft drinks and fruit juices.

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**Successful weight management programs involve cooperation between a health professional and a motivated patient, and include these key components:**
- personal support by trained experts (and the person’s family, if possible)
- dietary assessment and individualised advice
- assessment of physical activity levels and help to achieve more
- behavioural advice that takes into account an individual’s environment and psychosocial factors to help achieve dietary and physical activity goals
- medical treatments, where indicated (e.g. extreme obesity, comorbid conditions).
Heart Foundation programs and services

♥ Just Walk It program – refer your patient to a community walking group (NSW): call 1300 36 27 87 (local call cost)

♥ Heartline – information for you and your patients on healthy eating, physical activity, blood pressure, blood cholesterol, smoking cessation, etc: call 1300 36 27 87

♥ www.heartfoundation.com.au

♥ Heartmoves – refer your patient to the safe, low- to moderate-intensity exercise class suitable for every fitness level (especially suitable for patients with existing chronic conditions such as diabetes, cardiovascular disease or arthritis). Delivered by trained and accredited fitness leaders, exercise physiologists and physiotherapists: call Heartline 1300 36 27 87

♥ Losing weight the healthy way booklet – call Heartline.

♥ Heart Foundation Pedometer – www.heartfoundation.com.au

Other resources and support services

♥ Lifescripts tools – general practice tools for managing chronic disease risk factors (available from your division of general practice or www.agpn.com.au)

♥ Accredited practising dietitians – contact the Dietitians Association of Australia (www.daa.asn.au).


References


Low Back Pain Exercises

Exercises that stretch and strengthen the muscles of your abdomen and spine can help prevent back problems. If your back and abdominal muscles are strong, it will help you to maintain good posture and keep your spine in its correct position.

Warm up your muscles with light aerobic activity like brisk walking before doing any strengthening or stretching. Wear loose clothing to make it easier to do the exercises. Stop doing any exercise that causes pain until you have talked with your health care provider.

The exercises are intended only as suggestions. Ask your health care provider or physical therapist to help you develop an exercise program.

Caution: If you have a herniated disk or other disk problem, check with your health care provider before doing these exercises.

Exercises

- **Lying supine hamstring stretch:** Lie on your back with a small rolled towel under your waist (lower back). Place your left leg down with knee straight. Bend your right hip so your knee is pointing to the ceiling. Hold your right thigh by interlocking your fingers. Keep your elbows straight while holding and straighten your right knee and move the foot toward the ceiling. You should feel a stretch on backside of your thigh. Hold for 30 seconds and repeat 2 times. Repeat the same stretch on your other leg.

- **Cat Stretch:** In a hands and knee position, place your hands under the shoulders and the knees under your hips. Let your head drop down while at the same time tuck your hips under and raise the middle of your back as high as you can. You should try to create a gradual curve of your back towards the ceiling. Hold the position for 5 seconds and repeat 10 times.

- **Camel Stretch:** In a hands and knee position, place your hands under the shoulders and the knees under your hips. Raise your head up while at the same time raise your hips up and allow your stomach to fall to the floor. Hold the position for 5 seconds and repeat 10 times.
• **Pelvic tilt:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your abdominal muscles and push your lower back into the floor. Hold this position for 5 seconds, and then relax. Do 2 sets of 10.

![Pelvic tilt diagram](image)

• **Partial curl:** Lie on your back with your knees bent and your feet flat on the floor. Tighten your stomach muscles and flatten your back against the floor. Tuck your chin to your chest. With your hands stretched out in front of you, curl your upper body forward until your shoulders clear the floor. Breathe out as you come up. Hold this position for 3 seconds. Relax. Repeat 10 times. Build to 3 sets of 10. To challenge yourself, clasp your hands behind your head and keep your elbows out to the side.

![Partial curl diagram](image)

• **Prone hip extension:** Lie on your stomach with your legs straight out behind you. Tighten up your buttocks muscles first and then lift one leg off the floor about 4-8 inches. Keep your knee straight. Hold for 5 seconds. Then lower your leg and relax. Repeat with the opposite leg. Do 3 sets of 10.

![Prone hip extension diagram](image)
Exercises to avoid

It is best to avoid the following exercises because they strain the lower back:

- Lying on your stomach with legs extended and lifting together
- sit-ups with legs straight
- hip twists
- hurdlers stretch
- Any stretching that requires quick and bouncy movements.

Sports and other activities

In addition to conditioning your back, you need to condition your whole body. Physical activities such as walking or swimming can help strengthen your back. It is always best to check with your health care provider before you start any rigorous exercise program. Remember to begin slowly.

Good activities for people with back problems include:

- walking
- bicycling
- swimming
- strength training on machines
- aerobic exercise on machines

Sports that may be dangerous to your back because of rough contact, twisting, sudden impact, or direct stress on your back include:

- football
- soccer
- volleyball
- handball
- high intensity weight lifting
- trampoline
- tobogganing
- sledding
- snowmobiling
- ice hockey.

December 2007

Information maintained by the UMHS Clinical Care Guidelines Committee
1. Diabetes and Exercise

1.1. Diabetes and Exercise

Everybody benefits from regular exercise. In diabetes it plays an important role in keeping you healthy.

How can exercise help

- It helps insulin to work better which will improve your diabetes control
- It can help you control your weight
- It can help lower your blood pressure
- It can reduce your risk of heart disease
- It can help reduce stress

What type of exercise should I do?

This depends on what you enjoy and your level of fitness. Here are some suggestions:

- Walking
- Swimming
- Dancing
- Water aerobics
- Gardening
- Golf
- Cycling
- Exercise bike
- Walking machine
Increasing your general physical activity is also helpful. e.g. taking the stairs instead of the lift, getting up to change the TV station instead of using the remote control, housework.

**How much exercise do I need to do?**

Ideally, about 30 minutes every day. If this is not possible, then this time can be divided in 3x10 minutes sessions.

**How intense does the exercise need to be?**

You do not need to puff to gain the benefits of exercise. Aim for moderate intensity. This means you should still be able to talk as you exercise without becoming breathless.

**Getting started**

Before commencing a regular exercise program, see your doctor for a full medical examination. This is especially important if you have any complication of diabetes. Commence exercising gradually. Start with 5-10 minutes and slowly build up to 30 minutes.

### 1.2. Exercise Tips

- Drink extra fluid before, during (only if prolonged exercise) and after exercise to avoid dehydration.

The fluid may be water, or a sweetened drink if extra carbohydrate is required. 250 ml every 15 minutes or one litre of fluid per hour is recommended.

- Take care of your feet

Wear comfortable and well-fitting shoes.

Always inspect your feet before and after exercise.

Ulcers or other lesions on the feet are a serious danger for people with diabetes. It is important to avoid foot damage especially for middle-aged and elderly people. It is wise for them to avoid exercise that causes stress to the feet (e.g. running).

Exercise which poses minimal weight or stress on the feet is ideal such as riding an exercise bike or brisk walking in good footwear.

- Take extra carbohydrate before and during exercise to prevent hypoglycaemia.

Extra carbohydrate is often needed after exercise.

Monitor your blood glucose levels before, if possible during (at least initially), and after exercise to assess your requirements for extra food.
Discuss adjusting carbohydrate intake with your dietitian.

- Adjust insulin and medication.

It may be necessary to reduce your insulin dose prior to exercise. Insulin adjustment varies with each individual. Discuss appropriate adjustments to suit your exercise schedule with your doctor or diabetes educator.

- Wear sun block when exercising outdoors

**Advice for people with type 1 diabetes**

- If your diabetes is poorly controlled (i.e. fasting blood glucose levels greater than 14 mmol/L and urinary ketones) then it is best to avoid exercise until your blood glucose has settled.

- Exercise in these circumstances can actually elevate a high blood glucose and increase ketone production.

**Advice for people with type 2 diabetes**

- Regular exercise is an important part of your management.

- It will help your insulin to work more efficiently and assist with your blood glucose control.
What this fact sheet covers:

- Evidence for the benefits of exercise in managing depression
- How does exercise help depression?
- Role of exercise in treating depression
- Other benefits of exercise
- Exercise recommendations
- Getting started and where to get help

Evidence for the benefits of exercise in managing depression

Regular exercise can be an effective way to relieve some forms of depression and is often a neglected strategy for treatment of depression.

- Numerous studies have shown that people who exercise regularly experience fewer symptoms of depression and anxiety than those who do not exercise regularly.
- Several trials have shown that regular exercise of moderate intensity can be an effective treatment by itself for mild to moderate depression.
- Two trials have found that 16 weeks of regular exercise is equally effective as an SSRI antidepressant medication in the treatment of mild to moderate depression in older adults who have been inactive.
- Research also suggests that exercise can further assist depression in individuals with depression who have responded only partially to an antidepressant medication.
- Both aerobic exercise (e.g. brisk walking, cycling or jogging) and resistance or strength training (e.g. weight-lifting) have been found to be beneficial for depression.

How does exercise help depression?

Research suggests that regular exercise may increase levels of serotonin in the brain. Serotonin is a neurotransmitter involved in mood, sleep, libido, appetite and other functions, and has been linked to depression. Exercise may also increase endorphins, which are chemicals in the brain with ‘mood-lifting’ properties.

Regular exercise may also help depression by:

- Increasing energy levels
- Helping to get a good night’s sleep
- Providing distraction from worries and rumination
- Providing social support and reducing loneliness if exercise is done with other people
- Increasing a sense of control and self-esteem, by taking an active role in the individual’s own recovery.
Exercise and depression

Key points about the role of exercise in treating depression

- Regular exercise can be an effective treatment by itself for non-melancholic depressions (particularly for people who were previously ‘sedentary’ or inactive).
- For more severe melancholic depressions, exercise may be a helpful adjunctive strategy alongside other treatments (e.g. medication or psychological therapies).
- Exercise does not need to be extremely vigorous to be helpful for depression – simply briskly walking each day can be beneficial.
- For those with a melancholic depression and experiencing a distinct lack of energy in the morning, immediate exercise on getting out of bed can be beneficial.

Other benefits of exercise

In addition to being helpful for depression, there are numerous physical health benefits of regular exercise that are well-established by research. These benefits include prevention of numerous (including life-threatening) medical conditions such as heart disease, type 2 diabetes, osteoporosis, strokes and certain types of cancer. At a population level, physical inactivity is ranked just behind cigarette smoking as a cause of ill health. Therefore, regular exercise as a treatment for depression has the added benefit of improving general health and preventing serious diseases.

Exercise recommendations

The National Physical Activity Guidelines for Australians recommend:
- a minimum of 30 minutes of moderate intensity exercise on most, preferably all, days of the week (an example of ‘moderate intensity’ exercise is brisk walking where you notice a slight increase in breathing and heart rate).
- exercising for at least 10 minutes at a time - the 30-minutes total does not need to be continuous – you can combine short sessions of different activities to a total of 30 minutes or more each day.
- being active in as many ways you can each day (e.g. use the stairs).

At least one study has shown that exercising at around the above level for 12 weeks can significantly reduce symptoms of depression amongst people who are inactive and experiencing mild to moderate depression. For people who are very inactive, health benefits can be gained by becoming even slightly more active. A little activity is better than none, and more is better than a little.

For extra health and fitness, it is recommended that adults (who are able) should also do vigorous activity that makes them ‘huff and puff’ (e.g. jogging, squash, rowing). For best results, vigorous exercise should be done for 30 minutes or more on 3-4 days per week (on top of moderate exercise).
**Exercise and depression**

Feeling tired and being less motivated in general are two very common symptoms of depression. This means that exercise is often the last thing that people feel like doing when they are experiencing depression. Therefore, it can be useful to use some of the strategies below to help with motivation to gradually become more active:

### Getting started

- **Make a plan**
  - Start slowly and build up gradually. For example, if you have not been exercising at all, start with a 10-15 minute walk each morning, and gradually increase this to 30 minutes per day.
  - Set short-term realistic goals for exercising each week (e.g., 3 x 20 minute walks per week). Plan to exercise at specific times of the day that fit in with your lifestyle and write your plan down.
  - A range of health professionals can assist with increasing activity (see "Where to get help").

- **Keep motivated**
  - Reward yourself when you achieve your short-term exercise plan.
  - Remember that it is common to not feel like exercising when experiencing depression, it can be helpful to include others in exercise, to gain support and help with motivation.
  - Write down the specific benefits that you would like to gain from exercise and refer back to these to help with motivation (e.g., reduce stress, improve mood).
  - Keep a food and mood diary which can help to identify when you feel less motivated to exercise and help to identify opportunities to build in exercise.
  - A pedometer can be helpful in keeping track of your activity levels.
  - Although it is common to not feel like exercising when experiencing depression, it can be helpful to include others in exercise, to gain support and help with motivation.

### Fact Sheet

**Keeping active: medication and symptoms**

- **Seeking Medical Advice:**
  - If you are new to exercise, are pregnant, a smoker, overweight, have heart disease or major health problems, it is recommended that you see your doctor for medical advice before commencing vigorous exercise.

- **Keep motivated:**
  - Reward yourself when you achieve your short-term exercise plan.
  - Remember that it is common to not feel like exercising when experiencing depression, it can be helpful to include others in exercise, to gain support and help with motivation.

- **Keep physical activity in your life:**
  - Reward yourself when you achieve your short-term exercise plan.
  - Remember that it is common to not feel like exercising when experiencing depression, it can be helpful to include others in exercise, to gain support and help with motivation.

- **Join a group:**
  - Reward yourself when you achieve your short-term exercise plan.
  - Remember that it is common to not feel like exercising when experiencing depression, it can be helpful to include others in exercise, to gain support and help with motivation.

- **Find a Plan:**
  - Reward yourself when you achieve your short-term exercise plan.
  - Remember that it is common to not feel like exercising when experiencing depression, it can be helpful to include others in exercise, to gain support and help with motivation.

- **Get Help:**
  - Reward yourself when you achieve your short-term exercise plan.
  - Remember that it is common to not feel like exercising when experiencing depression, it can be helpful to include others in exercise, to gain support and help with motivation.
Where to get help

Exercise Physiologists
Exercise physiologists are university qualified allied health professionals who specialise in the delivery of exercise, lifestyle and behavioural programs for the prevention and management of chronic conditions (including depression) and injuries. People who have ongoing health conditions (e.g. depression) are now able to receive Medicare rebates for up to five sessions with an exercise physiologist. For more information on exercise physiologists (and to find an exercise physiologist in your area), see www.aaess.com.au, and for more information on Medicare rebates see www.medicareaustralia.gov.au.

General Practitioners (GPs)
A doctor who is a general practitioner may well be able to provide advice and information about depression and exercise, and can provide referrals to a qualified exercise physiologist, under Medicare.

Psychologists/Clinical Psychologists
Psychologists can assist with increasing motivation to exercise, activity scheduling, and problem solving to overcome barriers to exercise.

Organisations that provide facilities and services for exercise include:
- Council recreation centres
- Gymnasiums/sports clubs
- Community health centres

Further information
- “Get Active” information and online directory for NSW
- “Live Life Well” information and resources for NSW
  www.livelifewell.nsw.gov.au
- “Just Walk It” information about walking groups
  www.heartfoundation.org.au/Healthy_Living/Physical_Activity/Walking.htm

Australian Association of Exercise Sports Science
- www.aaess.com.au for information on exercise physiologists

Australian physical activity guidelines
- Department of Health and Ageing (1999) National Physical Activity Guidelines for Australians, Canberra. Available at:
Chronic fatigue syndrome and exercise

Chronic fatigue syndrome (CFS) or myalgic encephalomyelitis (ME) is an illness characterised by extreme exhaustion. Other common symptoms include aching muscles, joint pains, headache, sore throat and flu-like feelings. The cause is unknown and recovery can take years. In some cases, people don’t recover and suffer relapses throughout their lives.

Exercise is often a problem for people with CFS because physical activity can worsen their symptoms. Medical opinion has been divided on whether people with CFS should attempt regular exercise or not – some believe that gentle exercise is helpful, while others caution against any form of aerobic activity.

Research has found that patient education on CFS and a graded exercise program can improve symptoms in many cases and, on average, is not likely to worsen outcomes.

**Exercise may not be possible for everyone**
Some people with CFS, especially in the weeks or months following onset, are unable to perform the most basic activities such as showering or walking from one room to another. In such cases of extreme exhaustion and pain, the person may be confined to their bed.

As time passes, the person may feel a little better and attempt regular exercise. However, aerobic activity can cause a relapse of symptoms. The added problem for people with CFS is that a sedentary lifestyle causes a range of other health problems including muscle wastage, loss of bone mass, and increased risk of obesity and cardiovascular disease.

**The potassium connection**
Medical problems that cause low levels of the electrolyte potassium often include chronic fatigue as a symptom. The bulk of the body’s potassium supply is found in muscle tissue, with the rest in the brain, blood and internal organs. A 2004 study by researchers at Adelaide University found that people with CFS have less total body potassium (TBP) than healthy people of similar age and weight.

**Exercise suggestions**
A person with CFS needs a gentle approach to physical activity and should only make tiny increases in the frequency, duration and intensity of their exercise program.

Be guided by your doctor or physiotherapist, but general suggestions include:

- Aim for no more than three exercise sessions per week.
- Experiment to find the type of exercise that works best for you. Choose from a range of gentle activities such as stretching, yoga, Tai Chi, walking and light weight training.
- Stretching seems to be well tolerated by people with CFS. You may prefer to perform your stretching program while lying down in bed.
- Aerobic exercise seems to cause relapses for many people with CFS. If this is true for you, try non-aerobic forms of exercise like weight training with light weights.
- Keep an activity diary so you have a long-term picture of your performance levels and factors that might impact on fatigue.
- Learn from past relapses. For example, if walking for 20 minutes worsened your symptoms, try walking for five minutes and see how that goes. Use your activity diary to keep track of what works for you and what doesn’t.
- Stop the physical activity well before you feel tired. Pacing yourself is very important.
- Remember that your exercise tolerance will differ from one day to the next.
- If possible, monitor your heart rate during exercise with a heart rate monitor or by manually taking your pulse.
- Listen to your body – if you don’t feel up to exercising on a particular day, don’t.
- Slowly increase the intensity, time spent or frequency of exercise, but only when you know you can cope with it. For example, if you can exercise for five minutes without suffering a relapse, try for six minutes.
Educate yourself
People who have a thorough knowledge of CFS tend to manage their condition better and have a more positive outlook. Suggestions include:

- Find out as much as you can about CFS. You could consult with your doctor, physiotherapist or CFS association, read books on the subject or browse through reputable CFS sites on the Internet.
- Talk to other people with CFS who can give you more ideas on exercise. Consider joining a support group. Many CFS websites offer online chat rooms.
- Set realistic exercise goals and congratulate yourself for any gains that you make, no matter how small.
- Be patient – it may take months or years to slowly build up the intensity, duration or frequency of your exercise program.

Where to get help

- Your doctor
- Physiotherapist
- AAESS accredited exercise physiologist – search the AAESS website to find a practitioner
- ME/Chronic Fatigue Syndrome Society of Victoria, Information and Support Line Tel. (03) 9888 8798
- ‘Go for your life’ Infoline Tel. 1300 739 899

Things to remember

- A person with chronic fatigue syndrome (CFS) should only make very small increases in the frequency, duration and intensity of their exercise program.
- Set realistic exercise goals and congratulate yourself for any gains that you make, no matter how small.
- Stretching seems to be well tolerated by people with CFS.
- Listen to your body – if you don’t feel up to exercising on a particular day, don’t.

This page has been produced in consultation with, and approved by:

Kinect Australia (inc VICFIT in Victoria)
Cancer - exercise to help you cope

Cancer and cancer treatments can make a person feel too tired to exercise. However, studies show that regular, moderate physical activity can help a person who has cancer to cope with the disease and the side effects of treatment. Your doctor can help you devise an appropriate exercise program. Do not exercise without your doctor’s knowledge and support because inappropriate exercise may be harmful.

Causes of fatigue
Cancer and cancer treatments such as chemotherapy can cause persistent fatigue (tiredness). Some of the reasons include:

- All types of cancer interfere with the body’s normal functioning. For example, cancer may disrupt the hormone balance.
- Cancers that involve the bone marrow can impair the body’s ability to make red blood cells. This results in anaemia, which is a known cause of fatigue.
- Some treatments may destroy non-cancerous cells such as red blood cells.

The benefits of exercise
Physical activity can boost the energy levels of a person who has cancer. Moderate regular exercise can:

- Prompt the body to make more red blood cells, which increases the oxygen-carrying capacity of the blood
- Strengthen the cardiovascular system and improve blood supply to every cell of the body
- Increase muscle tone and strength
- Improve stamina, which makes daily activities less tiring to perform
- Reduce nausea and vomiting associated with chemotherapy
- Increase appetite
- Encourage deeper and more refreshing sleep
- Reduce the pain of cancer – exercise stimulates the brain to release endorphins, which are opiate-like pain-killing chemicals
- Stabilise mood – depression and anxiety are known to cause fatigue
- Reduce the need for drugs used in the treatment of depression and anxiety – some of these drugs may cause fatigue.

The cancer-fighting benefits of exercise
Some studies show that regular exercise can:

- Encourage the body to produce more white blood cells
- Boost functioning of the immune system
- Reduce the time spent in hospital in some cases
- Increase survival rates in some cases.

Other health benefits
For the person who has cancer, regular exercise can:

- Increase the amount of platelets and reduce the risk of bleeding
- Prevent or help to treat constipation
- Help to manage other medical conditions such as shortness of breath or heart problems
- Reduce the risk of infection such as upper respiratory tract infections (URTIs)
- Allow the person to feel more in control
- Boost self-confidence
- Give the person enough energy to participate more fully in daily activities
• Improve quality of life.

**Appropriate forms of exercise**

It is important to be guided by your doctor. The exercise program you choose in consultation with your doctor depends on your lifestyle, treatment program (including the type of surgery you may have had) and your doctor's opinion on which forms of exercise are safe or best for you. Almost any type of exercise may be appropriate, including:

• Walking, jogging, running
• Dancing
• Tai Chi
• Cycling
• Weight training
• Team sports
• Gardening
• Yoga
• Swimming.

**General exercise guidelines**

Be guided by your doctor, but general suggestions include:

• If you were physically active before your diagnosis and treatment, continue the same program. You may need to reduce the intensity, duration and frequency of the exercise.
• Aim for five to 20 minutes of exercise per session.
• Aim for moderate intensity. Don’t push your heart rate too high.
• Regularity is the key. Short periods of physical activity on most days of the week are far more beneficial than the occasional gruelling work-out.
• Do not force yourself to exercise when you feel exhausted. Instead, take a short stroll around the garden or do some stretches.
• Avoid exercise for the first 24 hours after chemotherapy.
• Do not exercise if you are ill: for example, if you have a fever. Consult with your doctor.
• Avoid high-impact activities (such as running or any sport that involves jumping) if you have bone cancer.
• Some cancer medications may affect your balance. Be advised by your doctor.
• If you are bedridden, perform regular stretches to help keep up your stamina. Even small amounts of exercise can be beneficial.
• Your doctor may recommend that you avoid exercise altogether. This is because exercise may be harmful in some cases. It is important to follow your doctor’s advice.

**Where to get help**

• Your doctor
• Oncologist
• Hospital physiotherapist
• Hospital occupational therapist
• Cancer Council Victoria, Information and Support Service Tel. 131 120
• Peter McCallum Cancer Institute Tel. (03) 9656 1111 or (03) 9656 1918
• ‘Go for your life’ Infoline service Tel. 1300 739 899

**Things to remember**

• Physical activity can boost the energy levels of a person who has cancer.
• Regular exercise improves functioning of the immune system and may increase survival rates in some cases.
• Aim for five to 20 minutes of moderate intensity exercise on most days of the week.

**This page has been produced in consultation with, and approved by:**

Kinect Australia (inc VICFIT in Victoria)
Asthma medications

There are three main groups of asthma medications:
1. Relievers
2. Preventers
3. Symptom controllers

1. Relievers

*Inhaled medications* - (blue) Airomir, Asmol, Bricanyl, Ventolin

Relievers provide relief from asthma symptoms within minutes by relaxing the muscles around the airways for up to four hours. Important Points

- Always carry your blue reliever medication in case you need to use it, particularly for an asthma emergency.
- If you are using your reliever medication more than three times per week to ease asthma symptoms it may be a sign that your asthma is not well controlled. Check with your doctor.

2. Preventers

*Inhaled medications* – Alvesco (rust), Flixotide (orange), Intal Forte (white), Pulmicort, Qvar (brown), Tilade (yellow)

*Oral medications* – Singulair

Preventers make the airways less sensitive, reduce the redness and swelling inside the airways and dry up the mucus. It may take a few weeks for preventers to reach their full effect.

Preventers must be taken daily to keep you well, reduce the risk of asthma attacks and to prevent lung damage. A number of these medications are corticosteroids (sometimes referred to as steroids). They are similar to the steroids that we produce naturally in our bodies. They are not the same as the anabolic steroids misused by some athletes.

**Important points**

- Some people may only need preventers for a set period (eg. seasonal) while other people need to take preventers all year round
- Preventers need to be taken at the same time each day at the dosage prescribed by your doctor
- Preventers take time to work, so an improvement in your symptoms may not be noticed for a couple of weeks. Do not stop taking your preventer medication after only a few days
- Preventers are safe to use every day and they can reduce the risk of life threatening asthma attacks
- Most adults can successfully control their asthma on low to moderate doses of corticosteroids. Discuss with your doctor whether your corticosteroid dose is appropriate
- Most children can successfully control their asthma with a non-steroid preventer or low dose of corticosteroids. Discuss with your doctor whether your child's corticosteroid dose is appropriate

3. Symptom Controllers

*Foradile (pale blue), Oxis, Serevent (green)*

Symptom controllers (also called long acting relievers) help to relax the muscles around the airways for up to 12 hours. They are taken daily, usually at morning and night, and can only be prescribed for people who are taking regular inhaled corticosteroid preventers and are still experiencing asthma symptoms.

Symptom controllers (or long acting relievers) may actually make asthma worse if they are used without corticosteroids. They should never be used without preventer therapy.
Asthma and exercise

Being active is great for your health and wellbeing. Sometimes, however, the physical exertion of exercising or playing sport can trigger a bout of asthma. This is called ‘exercise-induced asthma’ (EIA). This kind of asthma is usually easily managed and should be part of any asthma management plan.

As well as being good for you, regular physical activity can help you manage your condition. Take time to learn how to manage your asthma so you can have a healthy, active lifestyle.

People with asthma should be able to participate in almost any sport or exercise. Scuba diving is the only sport not recommended. Most individuals with EIA can exercise to their full potential if the condition is properly treated. Many top athletes competing at national and international level have asthma.

**Exercise-induced asthma**

Most people with asthma have asthma symptoms if they exercise in dry or cold air. When at rest, you breathe through your nose and the air is warmed, moistened and filtered as it enters your body. When you exercise, you need more oxygen and so you breathe faster through your mouth. Your airways react to this cold, dry air and the muscles around them tighten.

Some of the symptoms of exercise-induced asthma include:

- Wheezing
- Coughing
- A feeling of tightness in the chest
- Breathlessness.

These symptoms can occur during or, more commonly, after exercise.

It is the type of exercise, the amount of time spent exercising and the intensity of exercise that is important. Typically, vigorous activity for six minutes or more in cold, dry air is more likely to trigger asthma.

**Preparing for exercise**

You can reduce the risk or prevent exercise-induced asthma by preparing for physical activity in a few simple ways:

- Make sure your day-to-day asthma is well managed.
- Use your asthma reliever medication around five to ten minutes before you warm up. Speak to your doctor for advice.
- Always warm up with light exercise and stretching for 10 to 15 minutes before you play sport or exercise.
- Always cool down.

**If you get exercise-induced asthma during activity**

If you feel the symptoms of exercise-induced asthma:

- Stop what you’re doing.
- Follow your Asthma Action Plan. If you do not have an Asthma Action Plan, take four separate puffs of your blue reliever medication (Airomir, Asmol, Bricanyl, Epaq or Ventolin). The medication is generally best taken one puff at a time via a spacer. Take four breaths from the spacer after each puff of medication.
- Wait four minutes.
- Only return to exercise or activity if you are free of symptoms.
• If the symptoms don’t go away, or if they return while you’re exercising, use your blue reliever as before. Do not return to any exercise or activity for the rest of the day and see your doctor.

A ‘spacer’ is a special device shaped like a clear plastic football or tube through which aerosol inhaler medications are inhaled. Bricanyl is the only reliever medication available in a dry powder inhaler and cannot be used with a spacer.

**When to avoid exercise**

You should avoid exercise if:

• Your asthma is not under control.
• You have a cold or the flu.
• Your peak flow meter reading is less than 80 per cent of your usual best.

**Where to get help**

• Your doctor
• Your local pharmacy
• The Asthma Foundation of Victoria Tel. 1800 645 130 or (03) 9326 7088
• Australian Sports Drug Agency – for guidelines for athletes on medication and sport Tel. 1800 020 506 or (02) 6206 0200 www.asda.org.au
• ‘Go for your life’ Infoline service Tel. 1300 73 98 99

**Things to remember**

• Regular activity is an important part of life. Don’t let asthma stop you from being active.
• Vigorous exercise can sometimes trigger exercise-induced asthma.
• Exercise-induced asthma can be prevented with medication and by preparing for exercise.

This page has been produced in consultation with, and approved by:

Asthma Foundation of Victoria

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This Better Health Channel fact sheet has passed through a rigorous approval process. For the latest updates and more information visit www.betterhealth.vic.gov.au.
Pregnancy and exercise

Regular physical activity can provide health and social benefits for many pregnant women. Suggestions for exercise during pregnancy include walking, swimming and supervised classes such as yoga or tai chi. Pelvic floor exercises are also important before, during and after pregnancy. Unless you have complications, it should be possible to enjoy some level of physical activity throughout most of your pregnancy.

The first step is to consult your doctor, physiotherapist or health care professional to make sure your exercise routine won’t harm you or your unborn baby. You may need to modify your existing exercise program or choose a suitable new one if you were sedentary before conceiving.

While exercise during pregnancy is usually encouraged, under some circumstances exercise can be detrimental to both the expecting mother and the growing foetus.

Benefits of physical activity during pregnancy
Exercise during pregnancy offers many physical and emotional benefits. Physical activity may also help manage some symptoms of pregnancy and you’ll feel better knowing you’re doing something good for yourself and your baby.

Some of the benefits of exercising regularly throughout your pregnancy include:

- Resistance to fatigue
- Stronger back muscles, which can help manage back pain and strain as your belly grows
- Improved posture
- Weight control
- Stress relief
- Improved sleep and management of insomnia
- Preparation for the physical demands of labour
- Faster recuperation after labour
- Faster return to pre-pregnancy fitness and healthy weight
- Increased ability to cope with the physical demands of motherhood.

Bodily changes associated with pregnancy
There are many anatomical and physiological changes that take place during pregnancy. When exercising, take into account the changes you’re experiencing.

- Hormones such as relaxin loosen ligaments, which could increase your risk of joint injuries (for example, sprains).
- As pregnancy progresses, weight increases combine with changes in weight distribution and body shape. This results in the body’s centre of gravity moving forward, which can alter balance and coordination.
- Pregnancy increases your resting heart rate, so it is not recommended to use target heart rate to work out the intensity of your exercise. In healthy pregnant women, exercise intensity can be monitored using a method known as Borg’s Rating of Perceived Exertion Scale (RPE). This measures how hard you feel (perceive) your body is working.
- Your blood pressure drops in the second trimester, so it is important to avoid rapid changes of position – from lying to standing and vice versa – so as not to experience dizzy spells.

Suggested activities
Activities that are generally safe during pregnancy, even for beginners, include:

- Walking
- Swimming
- Cycling – outdoors or on a stationary bicycle
- Exercise in water (aquarobics)
- Yoga
• Stretching
• Dancing
• Pilates
• Pregnancy exercise classes.

Some activities are safe when done in moderation by pregnant women who had already been participating in these activities prior to pregnancy. These include:

• Running
• Strength training.

**General exercise suggestions**
It is important to discuss your exercise plan with your doctor, as each pregnancy is different. In general, healthy women who have uncomplicated pregnancies can continue their previous exercise program after consultation with a doctor. It is also now considered safe to start a new exercise program during pregnancy if given the all-clear by your doctor.

If you have been cleared to exercise, it is recommended that you:

• Engage in at least 30 minutes of **moderate-intensity** physical activity (according to the perceived exertion scale) on most, if not all, days of the week.
• Do no more than three sessions per week of **vigorous** exercise by the third trimester.
• Let your body be your guide. You know you’re at a good intensity when you can talk normally and not become exhausted too quickly. Be guided by your doctor, physiotherapist or health care professional.

**Exercises to avoid**
During pregnancy, avoid sports and activities with increased risk of trauma or falling such as rollerblading, soccer, basketball, gymnastics, horse riding, downhill skiing and scuba diving. These include:

• Contact sports or activities that carry a risk of falling (such as trampolining)
• Competition sports – depending on the stage of pregnancy, the level of competition and your level of fitness
• After about the fourth month of pregnancy, exercises that involve lying on your back – the weight of the baby can slow the return of blood to the heart. Try to modify these exercises lying on the side
• In the later stages of pregnancy, activities that involve jumping, frequent changes of direction and excessive stretching.

**General cautions**
Be guided by your doctor or physiotherapist, but general cautions include:

• Avoid raising your body temperature too high – for example, don’t soak in hot spas or exercise to the point of heavy sweating.
• Reduce your level of exercise on hot or humid days.
• If weight training, choose low weights and medium to high repetitions – avoid lifting heavy weights altogether.
• Don’t exercise if you are ill or feverish.
• If you don’t feel like exercising on a particular day – then don’t! It is important to listen to your body to avoid unnecessarily depleting your energy reserves.

**Pelvic floor exercises**
The pelvic floor muscles are weakened during pregnancy and during birth (vaginal delivery), so it is extremely important to begin conditioning the pelvic floor muscles from the start of the pregnancy. Appropriate exercises can be prescribed by a physiotherapist. It is important to continue with these throughout the pregnancy and recommence as soon as is comfortable after the birth.

**Abdominal exercises**
Strong abdominal muscles support your spine. The internal core and pelvic floor abdominal muscles act as a natural ‘corset’ to protect the pelvis and lumbar spine. Traditional sit-ups or crunches can be ineffective during pregnancy and may make worse the condition known as diastasis recti abdominis (a painless splitting of the abdominal muscle at the midline).
Appropriate core stability exercises are recommended during pregnancy to strengthen the muscles of the abdomen:

- Concentrate on drawing your belly button towards your spine.
- Breathe out while pulling in your belly.
- Hold the position and count to 10. Relax and breathe in.
- Repeat 10 times, as many times a day as you are able.
- You can perform this exercise sitting, standing or on your hands and knees.

**Warning signs**
If you experience any of the following during or after physical activity, stop exercising immediately and see your doctor:

- Headache
- Dizziness or feeling faint
- Heart palpitations
- Chest pain
- Swelling of the face, hands or feet
- Calf pain or swelling
- Vaginal bleeding
- Contractions
- Deep back or pubic pain
- Cramping in the lower abdomen
- Walking difficulties
- An unusual change in your baby’s movements
- Amniotic fluid leakage.

**Where to get help**

- Your doctor
- Physiotherapist
- National Continence Helpline Tel. 1800 33 00 66
- ‘Go for your life’ Infoline service Tel. 1300 73 98 99
- Bicycle Victoria – for further information on cycling and pregnancy

**Things to remember**

- Exercise during pregnancy offers many physical and emotional benefits. While exercise during pregnancy is usually encouraged, you may feel it’s not right for you.
- Talk to your doctor, physiotherapist or health care professional to make sure your exercise routine won’t cause harm to you or your unborn baby.
- Exercise during pregnancy is not advised in a number of conditions including heart disease, high blood pressure, risk of premature labour or pre-eclampsia.
- Any illness or complication of the pregnancy should be fully assessed and discussed with your doctor before commencing or continuing an exercise program.

**This page has been produced in consultation with, and approved by:**

Kinect Australia (inc VICFIT in Victoria)
Obesity

Obesity increases the risk of many diseases. Fat is deposited on our bodies when the energy (kilojoules) we consume from food and drink is greater than the energy used in activities and at rest. Small imbalances over long periods of time can cause you to become overweight or obese.

Obesity rates in Australia have more than doubled over the past 20 years. Around seven million Australians are now overweight or obese. Estimates taken in the year 2000 suggest that, while more men are overweight than women (67 per cent compared to 52 per cent), obesity is more common among women (22 per cent) than men (18 per cent).

**Body mass index**
Overweight and obesity are defined by the World Health Organization using the body mass index (BMI). This is calculated by dividing a person’s weight in kilograms by their height in metres squared. For example, a person who is 1.65m tall and weighs 64kg would have a BMI of 24.

People with a BMI of 25 or more are classified as overweight. People with a BMI of 30 or greater are classified as obese.

BMI calculations used for adults are not a suitable measure of weight for children or adolescents. A dietitian or GP can assess a child’s weight using a special BMI chart, together with weight and height growth charts.

**Increased risk of chronic disease**
Obesity increases the risk of many chronic and potentially lethal diseases. Most of these diseases can be prevented with lifestyle changes including proper nutrition and regular exercise.

Generally speaking, the more body fat you’re carrying, the higher the health risk. However, the amount of weight gained throughout the adult years also contributes to the risk. For example, a middle-aged person who weighs 10kg more than they did in their early 20s has an increased risk of high blood pressure, stroke, diabetes and coronary heart disease.

**A range of diseases**
Some of the many chronic conditions and diseases associated with obesity include:

- Insulin resistance
- High blood pressure
- Atherosclerosis
- Cardiovascular disease
- Stroke
- Some cancers including breast, endometrial and colon cancer
- Type 2 diabetes (non-insulin dependent diabetes mellitus)
- Gall bladder disease
- Polycystic ovarian syndrome
- Musculoskeletal problems such as osteoarthritis and back pain
- Gout
- Cataracts
- Stress incontinence
- Sleep apnoea.

**A range of causes**
A range of factors can cause obesity. Factors in childhood and adolescence are particularly influential, since a high proportion of obese children and adolescents grow up to be obese adults.

Factors known to increase the risk of obesity include:
• **Genes** – researchers have found that genetics play a part in regulating body weight. However, these genes explain only a small part of the variation in body weight.

• **Birth factors** – some studies suggest that a person is more likely to become obese later in life if they experienced poor nutrition in utero, had a low birth weight and weren’t breast fed. However, other studies show that high birth weight is a stronger risk for becoming overweight.

• **Eating more kilojoules than you use** – whatever your genetic background, you will deposit fat on your body if you eat more energy (kilojoules) than you use.

• **Inactivity** – for most of us, physical activity is no longer a natural part of our daily schedule. Obese people tend to live sedentary lifestyles.

• **Modern living** – most modern conveniences, such as cars, computers and home appliances, reduce the need to be physically active.

• **Socioeconomic factors** – people with lower levels of education and lower incomes are more likely to be overweight or obese. This may be because they have less opportunity to eat healthy foods and take part in physical activities.

### Obesity – the costs

Obesity costs Australian taxpayers an estimated $1.5 billion every year in direct health costs. Indirect health costs are harder to estimate. They include work absenteeism, production lost to premature death, and the hundreds of millions of dollars that Australians spend each year on weight management programs.

### What the experts recommend

Experts predict that Australia’s obesity rate will keep rising, which will put even greater strain on our health system.

Obesity is difficult to tackle because of the many contributing factors. The International Obesity Taskforce suggests the following measures:

• Help families to understand how to provide a healthy environment for themselves and their children. This would include decisions about activity and eating habits.

• Identify high risk groups in the community.

• Change city planning to include venues for safe, accessible and affordable physical activities.

• Improve the nutritional value of processed foods.

• Reduce food marketing to children.

• Reduce the price of healthy foods such as fruits, vegetables and wholegrain products.

• Improve the nutrition and variety of food available at school canteens and in workplaces.

• Improve opportunities for physical activity in schools and workplaces.

• Increase education for health professionals on how to recognise and manage weight problems in patients.

• Invest in community education programs on weight management.

### Where to get help

• Your doctor

• An accredited practising dietitian, contact the Dietitians Association of Australia

### Things to remember

• Overweight and obesity are preventable diseases. To prevent them we need to choose lower energy foods and be more physically active.

• Rates of overweight and obesity are rising rapidly. This has a major impact on health and health care costs.

• Everyone can and should seek changes to their lifestyle to help them stay a healthy weight.

**This page has been produced in consultation with, and approved by:**

Deakin University - School of Exercise and Nutrition Sciences
Diabetes is a disease in which the body does not produce or properly use insulin, a hormone that your body needs to convert sugar, starches and other foods into energy. When you have diabetes your blood glucose, or blood sugar, level is elevated. If left untreated, diabetes can lead to serious, long-term complications including kidney failure, blindness, heart disease and other life-threatening conditions.

Currently, 20.8 million Americans have diabetes, and close to one-third of them do not know it. More than 90 percent of people diagnosed with diabetes have Type 2 diabetes, which is usually associated with older age, obesity, lack of physical activity and a family history of the disease.

**SYMPTOMS OF DIABETES**

While Type 2 diabetes usually occurs in people over 40, more young people are developing the disease, often because of poor diet, lack of physical activity and obesity. Symptoms of diabetes include increased urination, thirst, extreme fatigue, blurred vision and dehydration. If you suspect that you may have diabetes, see your physician immediately.

While diabetes has no cure, people with the disease can live healthier lives by managing their disease. Important components of diabetes management include regular exercise, a healthy diet and medication.

**PREVENTING AND MANAGING YOUR DIABETES**

The good news is that Type 2 diabetes can be prevented. Research has found that lifestyle changes, such as a 5 to 10 percent weight loss and increased physical activity, can prevent or delay the development of Type 2 diabetes. In fact, when many people are first diagnosed with Type 2 diabetes, their physicians recommend managing the disease through a well-balanced diet, like the one recommended by Curves, and exercise.

**DIABETES AND EXERCISE**

Everyone should exercise, but for people with diabetes exercise has extra health benefits: it helps to control weight and to keep blood glucose, or sugar, levels within a healthy range. In fact, 30 minutes of moderate-intensity exercise can lower blood glucose levels for 24 to 72 hours. Moderate intensity exercise is any exercise that increases body temperature and elevates the rate of breathing.

The American Diabetes Association (ADA) recommends that people with Type 2 diabetes engage in physical activity at least three days a week. The ADA also recommends:

- At least 150 minutes of moderate-intensity physical activity each week (this might include your three weekly Curves workouts accompanied by a vigorous 30-minute walk twice a week) or 90 minutes of more vigorous activity a week (which might mean pumping up your Curves workouts a notch)
- Resistance exercise, such as weight training, three times a week (your three weekly Curves workouts meet this recommendation)

While exercise is good, it can lower your blood glucose level too much. It is important to monitor your blood glucose before and after any physical activity.

Of course, before you start any exercise program, talk to your doctor.

"Curves International, Inc. is a corporate member of the International Health, Racquet & Sportsclub Association, a not-for-profit trade association representing over 7,000 health and fitness facilities in 74 countries."

FOR MORE INFORMATION, CALL 1-800-CURVES30 OR VISIT WWW.CURVES.COM
Dynamic changes in the health of the country are leading more people to the services and knowledge of a certified personal trainer. Personal trainers are finding greater responsibilities related to providing the appropriate exercise prescription for each of a wide variety of special populations. Most personal trainers are very comfortable training a client who is apparently healthy, between 18-40 years of age without any major medical conditions. When presented with the additional challenges of programming for what are collectively referred to as special populations, some trainers may fall short in their programming due to a lack of knowledge about a certain niche group, in particular the programming considerations necessary for safe and effective exercise prescription for children, older adults, and those individuals with pre-existing medical conditions such as diabetes. This article will provide an overview of the key points to keep in mind when considering program objectives for these populations.

Children

Children can be a difficult, yet very rewarding, population to work with as a personal trainer. Depending on the specific type of training, children may experience different responses to the activity when compared to the adult population. In addition, due to developmental concerns, a personal trainer will want to adhere to accepted practices specific to working with this population. There are four primary goals each trainer should focus on when working with children: 1) improve overall health and fitness; 2) initiate an active lifestyle habit that will hopefully continue throughout life; 3) decrease disease risk; and 4) make it fun. Specific programming recommendations for children include an accumulation of at least 60 minutes and up to several hours of age-appropriate physical activity most days of the week. In addition, 15 minutes of vigorous activity, done on an intermittent basis, should be included during each day of activity. Trainers should also offer a variety of activities to make sure that their young clients stay interested in the program and are exposed to a wide array of activities. This will increase the likelihood of a child staying active on a regular basis, and will also assist in motor skill acquisition.

Children exhibit a few acute and chronic adaptations to exercise that are worth noting. Compared with an adult population, children are similar in their acute response to exercise in VO\textsubscript{2}(max) and the utilization of their creatine phosphate and ATP stores. This means that endurance activities, as well as short duration, intense exercises can be handled well by children. However, it is important to note that when compared to an adult population, children have a reduced capacity to utilize ATP via glycolysis, translating into a reduced ability to perform intense activity lasting between 10-120 seconds. In addition, children often have a reduced ability to dissipate heat and regulate internal body temperature. Trainers need to be aware of this when programming activity to prevent heat-related illnesses. An interesting characteristic of children is their collective ability to reach steady-state levels of oxygen uptake quicker than adults. This corresponds with a lower oxygen deficit at the onset of exercise and a correspondingly low oxygen debt, thereby reducing recovery time back to baseline.

Chronic exposure to exercise will result in a variety of adaptation responses in children, which for the most part, are very similar to those seen in an adult population. Over 60% of studies examining children’s response to exercise have found that chronic adaptations include improved musculoskeletal and cardiovascular health, improvement in levels of adiposity in those who are overweight, and decreases in blood pressure for those who were mildly hypertensive at the start of a program. Additional long-term effects include improved self-confidence and academic performance, reduced levels of anxiety and depression, and
improved blood pressure and lipid profiles. In broad perspective, children are one of the most important niche markets for personal trainers, especially as activity levels in schools continue to decrease, while levels of childhood obesity and the early onset of Type II diabetes rises. Trainers who can program exercise effectively can be very successful working with this population, and many find the work to be extremely rewarding, particularly when looking at the long-term adaptations that can occur.

**Older Adults**

On the other end of the age spectrum, one of the largest developing markets for personal trainers may be working with the older adult (classified as >65 years of age). As with any special population, the older adult has a number of characteristics specific to exercise programming that are important to note for safe and effective exercise participation. Each and every client you work with will present different abilities or limitations. However, there are some statistics that can provide a general overview of this population. Nearly 55% of individuals over the age of 65 report having at least one disability, with just over a third (37%) reporting a severe disability. Disabilities are classified as conditions that limit an individual’s ability to perform activities of daily living (ADLs) such as cooking and shopping. In addition to the likelihood of working with a client who has a disability, the probability is also high that they will have at least one chronic medical condition such as hypertension (49%), arthritis (36%), heart disease (31%), or diabetes (15%). Exercise programming that accounts for these conditions may require additional considerations, but should be fairly manageable with a little effort.

Specific programming goals for the older adult population should include the prevention or reduction of progress of any chronic disease state or physical limitation and reducing age-limiting factors. In addition, increasing or maintaining the level of physical fitness will improve the likelihood that a client will be able to maintain or improve their level of independence, a common goal of all older adults. Many adaptations to exercise are similar in older adults as are observed in younger adults. Improved blood lipid profiles, decreased level of body fatness, lower blood pressure, and improved glucose tolerance and insulin sensitivity will result from regular exercise participation.

Two key components of physical fitness a trainer should focus on specific to this population are aerobic capacity and bone density. Aerobic capacity (VO$_2$ max) decreases approximately 1% per year in both men and women due primarily to reduced cardiac output in conjunction with reduced oxygen extraction capabilities. Regular aerobic conditioning can maintain current levels of aerobic capacity, and over time has been shown to actually improve VO$_2$ by 10%-30% if the level of training is of high enough intensity to foster adaptation responses. Accelerated decreases in bone mineral density are also a concern for the older adult, mostly due to reduced levels of activity and decreased amounts of calcium in the diet. Exercise prescription should include weight-bearing activities and resistance training. This will increase bone stress, positively affecting bone density. Prescribing exercise that will increase the strength of all muscle groups will also increase bone density, due to the stress placed on the attachment points of the bone during force production. If osteoporosis is a concern, be cautious of the wrist, vertebrae, and hip as they are often most affected by the disease. Likewise, if osteoarthritis is a factor, use longer warm-ups and lower volumes and intensities.

Due to general functional decline with age, exercise programs focusing on improving balance and coordination can have excellent results related to a reduction in falls and the consequent injuries. It is important to evaluate individual clients for adequate baseline levels of muscular strength and endurance, as well as aerobic capacity. Strength training for the older adult should utilize a repetition range of 10 to 15, with an associated rate of perceived exertion (RPE) of 12-13. The exercise routine should be completed at least twice a week, with 48 hours of rest between training sessions. As with any population, proper lifting technique should be stressed as well as moving through a pain-free range of motion. Activities centering on balance training, resistance training, walking, and weight transfer, when completed consistently will result in an older adult less likely to fall. Independent factors such as vision, medications, and environmental factors may also need to be addressed prior to programming. A personal trainer has many tools in his/her repertoire to pull from when working with this population. Ideally, a combination of strength training utilizing total body movements and a selection of
the most functional activities possible will result in positive adaptations for older adults.

**Diabetes**

The probability of a trainer encountering a client with either type I or type II diabetes is increasing everyday. It has recently been estimated that more than 20 million Americans have diabetes, with nearly 90% of those cases being type II diabetes. Although the development of type II diabetes can be related to genetics, a large portion of those individuals with type II diabetes can trace their development of the disease to low levels of activity, being overweight or obese, and having poor nutritional habits. It should not be surprising that personal trainers can play a large role in the prevention and reduction in risk of individual development of type II diabetes by programming for increased levels of activity and recommending a decreased caloric intake along with healthier food choices. However, once an individual has been diagnosed with diabetes, there are a few guidelines personal trainers must follow to ensure safe and effective exercise programming.

Although exercise cannot prevent or cure type I diabetes, regular exercise participation should be encouraged to reduce the consequences of the disease and improve health status. Exercise will lead to improvements related to insulin sensitivity and an overall reduction in the risk of disease development, a similar occurrence to what is observed in a healthy population with exercise. Prior to exercising a client with type I diabetes, certain precautions should be taken to avoid exercise-induced hypoglycemia: measure blood glucose immediately before and 15 minutes after exercise, avoid exercise during times of peak insulin action, reduce insulin dose on days of planned exercise, avoid exercise late at night due to the possibility of hypoglycemia occurring at night, and extend the warm-up and cool-down periods.

Exercise can be beneficial in both the prevention and treatment of type II diabetes. Two of the more common traits of individuals with type II diabetes are obesity and physical inactivity. Research shows that individuals who exercise regularly are 30% to 50% less likely to develop type II diabetes compared to their less active counterparts. Among the list of benefits of regular physical activity for those with type II diabetes are: lower fasting blood glucose concentrations, improved glucose tolerance and insulin sensitivity, increase in lean mass and a reduction in fat mass, improved lipid profile and blood pressure, and lower risk of cardiovascular disease. Ideal programming for an individual with type II diabetes should require the individual to expend at least 1,000 kcals/week from aerobic activity. At least 3 nonconsecutive days are recommended, although individuals looking to maximize caloric expenditure and glucose control may exercise daily. A typical exercise session should last at least 15 minutes, with an ultimate goal of total accumulated time between 30 to 60 minutes. While walking or jogging are great methods to increase caloric expenditure, swimming and other non-impact exercise may be necessary for those with peripheral nerve damage.

Resistance training is also a suggested mode of exercise for individuals with type II diabetes. Weight training will result in the maintenance or even increase of muscle mass, thereby resulting in an increased resting metabolic rate and positively affecting caloric balance and weight management. In addition, weight training will improve an individual's glucose tolerance and insulin sensitivity. Resistance training programs for individuals with type II diabetes should focus on 8-10 major muscle groups and utilize repetition ranges of 10 to 15 at least 2 days/week. Oftentimes these individuals have a history of poor levels of physical activity and nutrition. Goals should be realistic, exercise prescription should progress at a slow pace, and the client's needs and preferred activities should be included in a well-designed exercise program.

Personal trainers need to be aware of programming considerations for all populations they may come in contact with in a gym or fitness facility. Understanding the training adaptations and any special exercise considerations is necessary in order for safe and effective programming. If individual considerations are ignored when dealing with a special population adverse effects may result. Children, older adults, and individuals with diabetes represent only a few of the special populations one may encounter in personal training. Given the current trends within the fitness industry such as childhood obesity, an ever expanding baby boomer generation (older adults), and increasing levels of diabetes in our society, these three populations will continue to require the services of qualified personal trainers in their fight to stay healthy.
1. One of the primary programming recommendations for a trainer working with children is the accumulation of at least _____ minutes of physical activity.
   A. 15  B. 30  C. 60  D. 120

2. Due to children’s ______________, they may have difficulty performing intense exercise lasting between 10-120 seconds.
   A. decreased VO\textsubscript{2}\text{max}  
   B. decreased utilization of ATP via glycolysis  
   C. increased utilization of ATP via glycolysis  
   D. increased VO\textsubscript{2}\text{max}

3. Children more readily reach __________ when compared to an adult population.
   A. VO\textsubscript{2}\text{max}  
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   C. repetition maximums  
   D. all of the above are correct

4. Nearly ____ of individuals over the age of _____ report having at least one disability.
   A. 35%; 65  
   B. 45%; 55  
   C. 55%; 65  
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5. A 1% reduction, per year, in aerobic capacity occurs in both sedentary men and women as a result of
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6. To appropriately combat functional decline with age, personal trainers should incorporate __________ into their training matrix for older adults.
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7. The development of type II diabetes can be linked with all of the following except:
   A. poor nutritional habits  
   B. low levels of physical activity  
   C. being overweight  
   D. regular exercise participation

8. __________ is(are) a result of regular exercise participation for individuals with type I diabetes.
   A. Improved insulin sensitivity  
   B. Better nutrition  
   C. Decreases in flexibility and strength  
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9. All of the following are positive adaptations that result from regular exercise participation for individuals with type II diabetes, except:
   A. decreased blood glucose control  
   B. improved lipid profile  
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10. Which of the following correctly portrays a resistance training program for an individual with type II diabetes?
    A. focus on lower body, 6-8 exercises; complete 10-15 repetitions, everyday  
    B. focus on upper body, 8-10 exercises; complete 3-5 repetitions, at least twice/week  
    C. focus on total body, 10-12 exercises; complete 6-8 repetitions, once a week  
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Dynamic changes in the health of the country are leading more people to the services and knowledge of a certified personal trainer. Personal trainers are finding greater responsibilities related to providing the appropriate exercise prescription for each of a wide variety of special populations. Most personal trainers are very comfortable training a client who is apparently healthy, between 18-40 years of age without any major medical conditions. When presented with the additional challenges of programming for what are collectively referred to as special populations, some trainers may fall short in their programming due to a lack of knowledge about a certain niche group, in particular the programming considerations necessary for safe and effective exercise prescription for children, older adults, and those individuals with pre-existing medical conditions such as diabetes. This article will provide an overview of the key points to keep in mind when considering program objectives for these populations.

**Children**

Children can be a difficult, yet very rewarding, population to work with as a personal trainer. Depending on the specific type of training, children may experience different responses to the activity when compared to the adult population. In addition, due to developmental concerns, a personal trainer will want to adhere to accepted practices specific to working with this population. There are four primary goals each trainer should focus on when working with children: 1) improve overall health and fitness; 2) initiate an active lifestyle habit that will hopefully continue throughout life; 3) decrease disease risk; and 4) make it fun. Specific programming recommendations for children include an accumulation of at least 60 minutes and up to several hours of age-appropriate physical activity most days of the week. In addition, 15 minutes of vigorous activity, done on an intermittent basis, should be included during each day of activity. Trainers should also offer a variety of activities to make sure that their young clients stay interested in the program and are exposed to a wide array of activities. This will increase the likelihood of a child staying active on a regular basis, and will also assist in motor skill acquisition.

Children exhibit a few acute and chronic adaptations to exercise that are worth noting. Compared with an adult population, children are similar in their acute response to exercise in \( \text{VO}_2 \text{(max)} \) and the utilization of their creatine phosphate and ATP stores. This means that endurance activities, as well as short duration, intense exercises can be handled well by children. However, it is important to note that when compared to an adult population, children have a reduced capacity to utilize ATP via glycolysis, translating into a reduced ability to perform intense activity lasting between 10-120 seconds. In addition, children often have a reduced ability to dissipate heat and regulate internal body temperature. Trainers need to be aware of this when programming activity to prevent heat-related illnesses. An interesting characteristic of children is their collective ability to reach steady-state levels of oxygen uptake quicker than adults. This corresponds with a lower oxygen deficit at the onset of exercise and a correspondingly low oxygen debt, thereby reducing recovery time back to baseline.

Chronic exposure to exercise will result in a variety of adaptation responses in children, which for the most part, are very similar to those seen in an adult population. Over 60% of studies examining children’s response to exercise have found that chronic adaptations include improved musculoskeletal and cardiovascular health, improvement in levels of adiposity in those who are overweight, and decreases in blood pressure for those who were mildly hypertensive at the start of a program. Additional long-term effects include improved self-confidence and academic performance, reduced levels of anxiety and depression, and
improved blood pressure and lipid profiles. In broad perspective, children are one of the most important niche markets for personal trainers, especially as activity levels in schools continue to decrease, while levels of childhood obesity and the early onset of Type II diabetes rise. Trainers who can program exercise effectively can be very successful working with this population, and many find the work to be extremely rewarding, particularly when looking at the long-term adaptations that can occur.

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