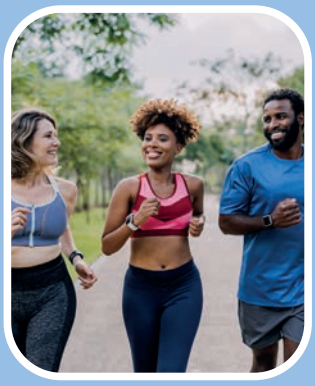
INDEPENDENT DIABETES TRUST








Diabetes and Physical Activity

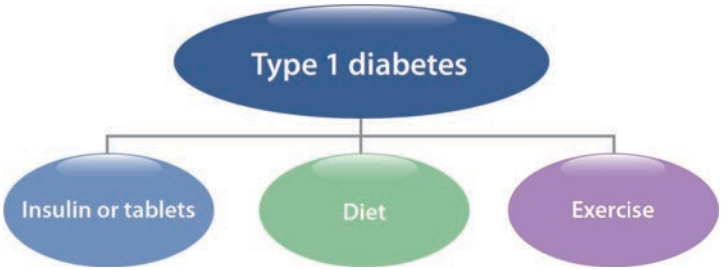
A charity supporting and listening to people who live with diabetes

HELPLINE: 01604 622837
www.iddt.org

- The Trust offers support, understanding and information to people with diabetes and to those who care for them.
- We listen to the needs of people who live with diabetes and do our utmost to offer help and support.
- We raise awareness of important issues for people living with diabetes and lobby governments on issues that affect people's lives.
- We fund research into ways of improving the lives of people with diabetes.

Introduction

Three important factors in the treatment of Type 1 and Type 2 diabetes



Although Type 1 and Type 2 diabetes are very different conditions, the treatment of both types of diabetes has three factors in common – medication (insulin or tablets), diet and exercise. All three are important, they all affect blood sugar levels and they all affect each other. So in both Type 1 and Type 2 diabetes there is an important relationship between medication (insulin or tablets), diet and exercise and to achieve good diabetic control we have to try to balance all three.

So exercise or physical activity is an essential part of the treatment of diabetes. In addition, it is good for your heart. This message is one that must have reached almost everyone but is it a message that many of us choose to ignore? Maybe we hear it so often that it just washes over us and we ignore it. It may simply be that for those of us that are couch potatoes, the very thought of 'physical activity' is quite off-putting! Or for many of us with busy lives, just the thought of trying to fit in time for 'exercise' is exhausting!

Maybe the words 'exercise' and 'physical activity' put us off because they conjure up visions of fit, lithe people visiting a rather expensive gym three times a week! Perhaps the messages would be more effective if they excluded the words 'physical activity' and 'exercise' and simply encouraged us to introduce more activity into our existing lives so we actually achieve greater activity and the health benefits almost without realising it!

There are estimates that although 7 out of 10 adults in the UK do not take enough regular exercise to achieve health benefits to protect their heart, 8 out of 10 adults actually think that they are fit.

Facts

- Physical activity reduces the risk of having a stroke and helps to lower blood pressure.
- It reduces the risk of Type 2 diabetes and osteoporosis.
- It helps to reduce weight in people that are overweight or obese.
- It helps to improve cholesterol levels, decreases triglycerides and increases 'good' cholesterol (HDL).
- Exercise decreases insulin resistance and in people with diabetes this may mean less medication.
- It can help to relieve stress, make you feel better and it can be enjoyable.
- There is no level of activity that has to be achieved to gain health benefits.
- The largest gain in health benefits from increasing physical activity levels is in people who are inactive and who start to take regular exercise such as walking, cycling, dancing or swimming.

Physical activity halves the risk of developing coronary heart disease

In people that have already had heart attacks, those who have been physically active are twice as likely to survive the heart attack compared to those people who have not been active.

The major risk factors for coronary heart disease are:

- Smoking
- High blood pressure
- High cholesterol levels
- Lack of exercise

Other factors that may affect your risks of having a heart attack:

- Too much alcohol
- Excessive salt intake
- Obesity

The scientific evidence

A review of 54 clinical trials involving 2,419 previously sedentary adults, published as long ago as 2002 in the Annals of Internal Medicine, concluded that regular exercise reduced the systolic blood pressure [the top number] by an average of 4 and diastolic blood pressure [the lower number] by an average of 2.6mmHg. The results add to the evidence that exercise is important for treating high blood pressure and for preventing it occurring in healthy people.

While the study did not show what level of activity was ideal for lowering blood pressure, results of various types of aerobic exercise at all frequencies were beneficial to people who were previously sedentary – in other words any activity is better than none. The present recommendations are that people should have at least 30 minutes of moderate exercise on 5 or more days of the week.

The cause of coronary heart disease

It is caused when the arteries that supply blood to the heart become narrowed due to a gradual build up of fatty tissue [atheroma] within the

walls of these arteries – this condition is called atherosclerosis. A heart attack is caused if a blood clot forms over the artheroma.

The development of this fatty tissue, or atheroma, is caused by the cells in the coronary artery walls taking up cholesterol and this is the beginning of the narrowing of the arteries. As we all know, some cholesterol is formed from the fats in the food we eat but it is important to remember that there are two types of cholesterol – the good and the bad!

LDL cholesterol [bad] forms the atheroma

HDL cholesterol [good] removes cholesterol from the circulation and appears to have a protective effect on the heart.

So ideally we should have a lower levels of LDL cholesterol and higher levels of HDL.

Why is physical activity important for your heart?

Research indicates the following:

- Physical activity appears to raise HDL [good] cholesterol levels but does not affect LDL cholesterol levels.
- It helps to prevent blood clotting and so reduces the risk of a heart attack.
- It helps to lower blood pressure and also to prevent high blood pressure from developing.
- It helps to reach and maintain a healthy weight.

Physical activity and diabetes

Facts:

- Men with diabetes are 2 to 3 times more likely to develop coronary heart disease than men without diabetes.
- Women with diabetes are 4 to 5 times more likely to develop it than women without diabetes.
- In people that already have diabetes, physical activity can reduce the amount of medications needed or reduce the insulin dose.
- Moderate, rhythmic exercise seems to reduce the risk of people developing Type 2 diabetes in middle age.

Blood pressure

High blood pressure is a key concern for the general population but especially for people with diabetes. High blood pressure [hypertension] often causes no symptoms and no immediate problems. If you have high blood pressure your heart has to work harder to pump blood around your body and over time this can weaken it. It can also damage the walls of the arteries or cause a blockage and both of these situations can cause a stroke.

High blood pressure is a major risk factor for serious cardiovascular diseases such as:

- **Coronary heart disease** where the main arteries supplying blood to the heart become clogged with fatty deposits [plaques].
- **Heart attacks** where the blood supply to the heart is blocked.
- **Strokes** where the blood supply to the brain is interrupted.
- **Thrombosis** caused by blood clots in the blood vessels.
- **Aneurysm** where there is a weakness in the blood vessel wall which forms a bulge in the blood vessel.

According to information from the NHS, in 90 – 95% of cases in the general population there is no single identifiable reason for a rise in blood pressure but all the evidence suggests that lifestyle plays a significant role. The main factors influencing high blood pressure are:

- age – half of people over 75 have high blood pressure
- lack of exercise
- overweight
- poor diet
- excessive alcohol consumption.

How is blood pressure measured?

Blood pressure is measured in millimeters of mercury (mmHg). Two measurements are used:

- **Systolic pressure** – the blood pressure exerted when the heart beats to force blood around the body.
- **Diastolic pressure** – the blood pressure when the heart is resting between beats.

The measurement of the systolic pressure is given first, for instance 130 over 80 or 130/80mmHg and this means the systolic pressure is 130mmHg and the diastolic pressure is 80mmHg.

High blood pressure and diabetes

About 25% of people with Type 1 diabetes and about 80% of people with Type 2 diabetes have high blood pressure. Unfortunately, as we are aware, having diabetes already raises the risk of heart disease, stroke, kidney disease and other complications, so having high blood pressure raises these risks even more.

- NICE recommends blood pressure management at 135/85mmHg for adults with Type 1 diabetes. If they have albuminuria (kidney problems) or 2 or more features of metabolic syndrome, then NICE recommend blood pressure is at 130/80mmHg.
- NICE guidance for Type 2 diabetes is that if lifestyle advice does not lower blood pressure to below 140/80mmHg or below 130/80mmHg if there is kidney, eye or cardiovascular damage, then medications should be added.

Blood pressure targets can vary with many factors such as ethnicity and age eg if you are 80 and above, then the target is usually 150/90

NOTE: A Cochrane Review found that evidence from randomised trials does not support blood pressure targets any lower than 130/85 for people with diabetes.

Treatment

High blood pressure can be treated or prevented in some cases by making lifestyle changes, such as eating a healthy diet, taking regular

physical activity and reducing alcohol intake. Often medication is necessary to lower blood pressure and people with diabetes may be given drugs known as ACE inhibitors [angiotensin receptor blockers] because they are thought to also have a protective effect on the kidneys. However, other blood pressure-lowering drugs may be used. ACE inhibitors may also be given to protect the kidneys even when blood pressure is not high.

Blood pressure research

Taking blood pressure pills at night

The findings of a 5-year study have shown that the timing of blood pressure medication with the person's body clock makes it more effective and offers greater protection against heart attacks, strokes and other cardiovascular diseases. This could well change the way blood pressure medication is given and have a significant impact on the type of treatment people with high blood pressure receive. The results were quite amazing:

- The group of patients who took at least one of their medications at night had a third of the number of cardiovascular disease episodes compared to those taking all their blood pressure medications in the morning.
- Taking at least one blood pressure medication at bedtime was the best way to achieve normal sleep-time blood pressure but also the best way to control day-time blood pressure.

Historically, medical professionals have worked on the assumption that sleep-time blood pressure levels will drop by 10-20% from daytime levels. However, for many patients this doesn't happen and therefore sleep-time becomes a high risk period. If you are taking blood pressure tablets, then do discuss this with your doctor before making any changes.

Types of activity

There are three main types of exercise:

Aerobic physical activity – this type of exercise benefits your heart. It is any activity that is rhythmic and repetitive, such as walking, swimming, cycling and dancing. These activities increase the body's demand for oxygen so making the heart and lungs work harder and more efficiently.

Isometric exercise - this increases muscle tension without moving a joint, such as pushing against a wall. Isometric exercise does not help the heart and circulation. It should be avoided by people with heart disease or high blood pressure because it can increase blood pressure so putting the heart under stress.

High intensity endurance exercise – as the name suggests, this type of exercise includes activities such as marathon running.

Is it safe to start exercising?

- If you already have had a heart attack or any other heart condition such as angina or you have high blood pressure, you should always discuss with your doctor how much and what sort of exercise you should do. There are certain heart conditions where exercise may not be advisable.
- Always stop exercising if you get any pain or feel dizzy, sick or unwell. If the symptoms don't go away or come back later, see your doctor.
- It is unsafe to exercise when you have a viral infection such as a sore throat.
- It is always sensible to gradually build up your physical activity in terms of both the time spent and the intensity. A sudden increase in exercise, especially vigorous exercise can be dangerous, especially in middle aged people.

Tips for exercising

- Discuss the best type of exercise for you with your doctor or diabetes healthcare team.
- If you are not used to exercising, start slowly and build up gradually.
- Don't give up easily. If you get into the habit of taking physical activity several times a week for 3 months, you are likely to continue and still be taking some exercise a year later.
- Walking or exercising with a spouse, partner or friend is more likely to be continued than doing it alone. Fitness can be part of a weight loss programme and just walking a few miles over a week can help.
- Exercise makes you feel better, breathe more easily and generally feel better about yourself.
- Moderate intensity physical activity like brisk walking, cycling or swimming is better at lowering fat levels in the blood and increasing insulin sensitivity than low intensity exercise like walking, housework or gardening.
- Moderate to high intensity exercise four times a week has the most beneficial effect on the heart.
- Wear comfortable, well-fitting shoes or trainers.

Don't set yourself unachievable goals!

One of the pieces of advice that nearly everyone is given when they are first diagnosed with Type 2 diabetes is to do more exercise. No one would dispute that this is good advice but there are many different things to consider and decisions to make and although many of us set out with the best of intentions, many of us also set ourselves up to fail without realising it. Making the right decisions about our fitness goals at the outset can dramatically improve our chances of succeeding in following the advice we were so readily given at diagnosis.

Picking the right activity to meet your fitness goals

For many of us the thought of setting foot in a gym full of super-fit people may fill us with dread. In reality there are plenty of exercises we can do without necessarily going to a gym or fitness club. There are lots of different exercises that we can do that are suitable for people with different levels of ability. To start with there are a few things that we can do that will help us prepare to take up exercise and make us feel physically ready to start exercising.

Improve your balance

To improve your balance try standing on one foot while standing near the kitchen counter, so that you can hold on if you feel unstable. Build up to holding this pose for 10–20 seconds on each foot, it can help to focus your eyes on an object in the distance while you try to balance. You can also try walking across a room as if you were on a tightrope, putting one foot directly in front of the other. If you need to, extend your arms out like a tightrope-walker to help keep your balance.

Reducing stiffness

Stiffness can hamper both regular daily activities and attempts at physical activity. The best way to decrease stiffness is to stretch properly. Many people believe that stretching should precede exercise, but it should be done when your muscles are warm, so a few minutes walking with your arms pumping will warm them up.

While stretching, don't bounce, bob or jerk, just slowly and gently move into a position to put gentle pressure on the muscle and hold

the position for 20 seconds then relax and repeat. You may be able to stretch a little further the second time, but don't force it. Stretch each muscle group or whatever body parts feel like they need to be stretched.

Increasing flexibility

If you lose flexibility, you lose some of the range of movement in your joints. To increase your flexibility incorporate stretching and strengthening exercises that mimic activities you find difficult. For example, if bending at the waist is hard, try exercises that work the hamstrings, such as slowly reaching for your toes while seated, ideally on the ground, with your legs extended. Hold for several seconds, relax and then repeat. Be patient - increasing your flexibility won't happen overnight but it will happen.

Building strength

Ageing will steal strength from us. If you can get stronger it will help with your exercise regime. You could try calisthenics - those old gym-class standards that include squats, calf raises and push-ups can help you build strength. However, remember to go "low and slow" at first as you may only be able to do knee-assisted push-ups but in a few months, maybe you can build this up to 10 push-ups from your toes. Remember to be careful and don't hurt yourself.

Physical activity for people taking insulin or tablets which can cause low blood glucose levels (hypoglycaemia)

Keeping fit is recommended for people with diabetes, including those being treated with insulin. However, injected insulin cannot mimic the response of a healthy pancreas to physical activity and initially, a fitness programme may worsen glucose control until the insulin user learns how their body responds to exercise and the amount of carbohydrate and insulin that are needed. Regular moderate intensity exercise, such as brisk walking or swimming, is easier to manage than high intensity endurance exercise such as marathon running.

If you have diabetes which is treated with insulin or one of the drugs for Type 2 diabetes that can cause low blood glucose levels (hypoglycaemia), it is important to eat sufficient carbohydrates before, during and after exercise to avoid hypoglycaemia.

- Eating a meal of slow-acting carbohydrates about an hour before exercising will keep your blood sugars steady during exercise. Examples: porridge, cereal or multi-grain bread.
- Eating fast-acting carbohydrate immediately after exercise will help to prevent hypoglycaemia and will help to re-stock the liver stores of glycogen which the body turns into glucose when needed. Examples: a piece of fruit, fruit juice or biscuits.
- Regular blood glucose monitoring is important when exercising to avoid both high and low blood sugars.

Hypoglycaemia can occur 12 – 14 hours, or even longer, after exercise /physical activity. This is because the body uses up any circulating glucose to try to replace the glycogen stores in the liver. In addition, exercise increases the sensitivity of the body tissues to insulin, especially the muscles.

Vigorous exercise can raise blood glucose levels

Hypoglycaemia is seen as the main risks when taking insulin and it is often not recognised that vigorous exercise can raise blood glucose levels but this effect has been shown in several studies. Here are some examples:

- Exercising at a constant speed for several minutes or longer, such as swimming, running or cycling. A good way to judge if the exercise may raise your blood glucose levels, is if your breathing is deep and you cannot talk to the person next to you.
- Playing a vigorous sport which includes short bursts of speed alternating with periods of moderate intensity, such as football or tennis.

This level of exertion activates the sympathetic nervous system which in turn produces the 'fight or flight' response which helps the body meet emergency needs. Stress hormones, such as adrenalin and others, are released into the blood and they stimulate the liver to release glucose at a faster rate than normal. When this happens, the rate glucose is absorbed by the active muscle tissue, blood glucose levels rise. This process is similar to what can happen during a severe hypo – the body goes into a defense mechanism as a protection and the liver releases glucose to raise blood glucose levels.

With moderate intensity exercise, the stress hormones are not significantly produced and so blood glucose levels do not go up and will tend to drop, so a snack before the activity is advisable (or a lowering of the insulin dose).

Know how different types of exercise affect you

The intensity of the activity or exercise strongly influences the blood glucose responses. Knowing how various types of activity affect your blood glucose (if it is likely to raise or lower them) is important in trying to manage blood glucose levels. It also helps to avoid giving carbohydrate snacks when a particular type of exercise will raise glucose levels anyway as this could lead to hyperglycaemia.

The message here really is to know what happens to you and your blood glucose levels with different types of activity - light gardening or taking a walk can cause a hypo but a game of tennis may have just the opposite effect. This is what makes Type 1 diabetes such a difficult condition to manage!

Get active - from the comfort of your chair

If you have difficulty standing or walking it doesn't mean physical activity is out of the question. If you want to remain physically active then chair exercises could be just the thing for you. These gentle exercises will help improve your mobility and can help prevent falls. Choose a solid, stable chair without arms, that allows you to sit with your feet flat on the floor and your knees at right angles.

Wear some loose, comfortable clothing and keep some water handy. Build up slowly and aim to gradually increase the number of repetitions of each exercise over time. Try to do the exercises at least twice a week.

Chest stretch

This stretch is good for posture.

A. Sit upright and away from the back of the chair. Pull your shoulders back and down. Extend your arms out to the side.

B. Gently push your chest forward and up until you feel a stretch across your chest.

Hold for 5 to 10 seconds and repeat 5 times.

Upper body twist

This stretch will develop and maintain flexibility in the upper back.

A. Sit upright with your feet flat on the floor, cross your arms and reach for your shoulders.

B. Without moving your hips, turn your upper body to the left as far as is comfortable. Hold for 5 seconds.

Repeat for 5 times on each side.

Hip marching

This exercise will strengthen hips and thighs, and improve flexibility.

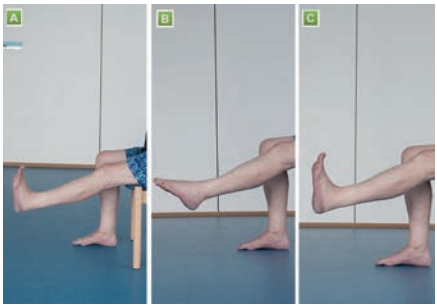
A. Sit upright with your feet flat on the floor, cross your arms and reach for your shoulders.

B. Without moving your hips, turn your upper body to the left as far as is comfortable. Hold for 5 seconds.

Repeat for 5 times on each side.

Ankle stretch

This stretch will improve flexibility and lower the risk of developing a blood clot.



A. Sit upright, hold on to the side of the chair and straighten your left leg with your foot off the floor.

B. With your leg straight and raised, point your toes away from you.

C. Point your toes back towards you.

Try 2 sets of 5 stretches with each foot.

Arm raises

This stretch will improve flexibility and lower the risk of developing a blood clot.

A. Sit upright, hold on to the side of the chair and straighten your left leg with your foot off the floor.

B. With your leg straight and raised, point your toes away from you.

C. Point your toes back towards you.

Try 2 sets of 5 stretches with each foot.

Neck stretch

This stretch is good for improving neck mobility and flexibility.

A. Sit upright with your shoulders down. Look straight ahead.

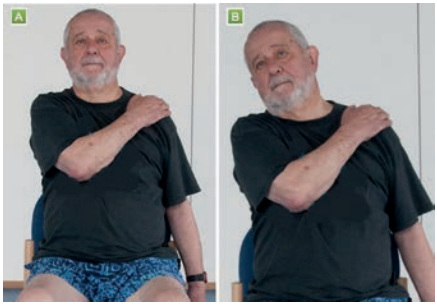
B. Slowly turn your head towards your left shoulder as far as is comfortable. Hold for 5 seconds and return to the starting position.

C. Repeat on the right.

Do 3 rotations on each side.

Neck rotation

This stretch is good for loosening tight neck muscles.



A. Sitting upright, look straight ahead and hold your left shoulder down with your right hand.

B. Slowly tilt your head to the right while holding your shoulder down.

C. Repeat on the opposite side.

Hold each stretch for 5 seconds and repeat 3 times on each side.

IDDT publishes a range of leaflets some of which may be of particular interest in relation to exercise.

To obtain any of our leaflets or for a copy of IDDT's publication list contact:

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