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Erectile Dysfunction (Impotence)

Erectile dysfunction (ED) means that you cannot get a proper erection. Most cases are due to narrowing of the arteries that take blood to the penis. This is due to a build-up of fatty deposits (atheroma) in these arteries in the same way that heart arteries are affected in people with heart disease. ED is usually treatable, most commonly by a tablet taken before sex. You may also receive lifestyle advice and treatments to minimise your risk of heart disease.

What is erectile dysfunction (ED)?

Having ED means that you cannot get and/or maintain an erection. In some cases the penis becomes partly erect but not hard enough to have sex properly. In some cases, there is no swelling or fullness of the penis at all. ED is sometimes called impotence.

How common is erectile dysfunction (ED)?

Most men have occasional times when they cannot get an erection. For example, you may not get an erection so easily if you are tired, stressed, distracted, or have drunk too much alcohol. For most men it is only temporary and an erection occurs most times when you are sexually aroused.

However, some men have persistent, or recurring, ED. It can occur at any age but becomes more common with increasing age. About half of men between the ages of 40 and 70 have ED. About 7 in 10 men aged 70 and above have ED.

How does an erection normally occur?

When you are sexually aroused, messages from your brain travel down nerves to your penis. Chemicals called neurotransmitters are then released from the ends of the nerves in the penis. Stimulation of the penis can also cause local nerve endings to release neurotransmitter chemicals.

The neurotransmitters which are released in the penis cause another chemical to be made, called cyclic guanosine monophosphate (cGMP). This chemical causes the arteries in the penis to widen (dilate). This allows extra blood to flood into the penis. The rapid inflow of blood causes the penis to swell into an erection. The swollen inner part of the penis also presses on the veins nearer to the skin surface of the penis. These veins normally drain the penis of blood. So, the flow of blood out of the penis is also restricted, which enhances the erection.

Once you stop having sex, the level of cGMP falls, the blood flow to the penis returns to normal and the penis gradually returns to the non-erect state.

What causes erectile dysfunction (ED)?

There are several causes which tend to be grouped into those that are mainly physical and those that are mainly due to mental health (psychological).

Physical causes

About 8 in 10 cases of ED are due to a physical cause. Causes include:

- **Reduced blood flow to the penis.** This is, by far, the most common cause of ED in men over the age of 40. Like in other parts of the body, the arteries which take blood to the penis can become narrowed. The blood flow may then not be enough to cause an erection. Risk factors can increase your chance of narrowing of the arteries. These include getting older, **high blood pressure, high cholesterol** and **smoking**.
- **Diseases which affect the nerves going to the penis.** For example, **multiple sclerosis, a stroke, Parkinson's disease, etc.**
- **Diabetes.** This is one of the most common causes of ED. Diabetes can affect blood vessels and nerves.
- **Hormonal causes.** For example, a lack of a hormone called testosterone which is made in the testicles (testes). This is uncommon. However, one cause of a lack of testosterone that is worth highlighting is a previous head injury. A head injury can sometimes affect the function of the pituitary gland in the brain. The pituitary gland makes a hormone that stimulates the testicle (testis) to make testosterone. So, although it may not at first seem connected, a previous head injury can in fact lead to ED. Other symptoms of a low testosterone level include a reduced sex drive (libido) and changes in mood.
- **Injury to the nerves going to the penis.** For example, spinal injury, following surgery to nearby structures, fractured pelvis, radiotherapy to the genital area, etc.
- **Side-effect of certain medicines.** The most common are some antidepressants; beta-blockers such as propranolol, atenolol, etc; some 'water tablets' (diuretics); cimetidine. Many other less commonly used tablets sometimes cause ED.
- **Alcohol and drug abuse.**
- **Cycling.** ED after long-distance cycling is thought to be common. It is probably due to pressure on the nerves going to the penis, from sitting on the saddle for long periods. This may affect the function of the nerve after the ride.
- **Excessive outflow of blood from the penis through the veins (venous leak).** This is rare but can be caused by various conditions of the penis.

In most cases due to physical causes (apart from injury or after surgery), the ED tends to develop slowly. So, you may have intermittent or partial ED for a while, which may gradually become worse. If the ED is due to a physical cause, you are likely still to have a normal sex drive apart from if the cause is due to a hormonal problem. In some cases, ED causes poor self-esteem, anxiety and even depression. These reactions to ED can make the problem worse.

Mental health (psychological) causes

Various mental health conditions may cause you to develop ED. They include:

- Stress - for example, due to a difficult work or home situation.
- Anxiety.
- Relationship difficulties.
- Depression.

Typically, the ED develops quite suddenly if it is a symptom of a mental health problem. The ED may resolve when your mental state improves - for example, if your anxiety or depression eases. However, some people become even more anxious or depressed when they develop ED. They do not realise it is a reaction to their mental health problem. This can make matters worse and lead to a vicious circle of worsening anxiety and persisting ED.

As a rule, a psychological cause for the ED is more likely than a physical cause if there are times when you can get a good erection, even though most of the time you cannot. (For example, if you can get an erection by masturbating, or wake up in the morning with an erection.)

Erectile dysfunction (ED), heart disease and other vascular diseases

Although ED can be caused by various conditions, about 7 in 10 cases are due to narrowing of the small arteries in the penis. This causes reduced blood flow to the penis. This is the same problem that can occur in other blood vessels. For example, narrowing of the blood vessels in the heart (the coronary arteries) is a **cause of angina** and other heart problems. Narrowing of blood vessels to the brain is a risk factor for having a stroke. Narrowing of blood vessels in the legs can **cause peripheral arterial disease**.

Atheroma is the root cause of the narrowing of the arteries. Atheroma is like fatty patches or plaques that develop within the inside lining of arteries. (This is similar to water pipes that get furred up with scale.) Plaques of atheroma may gradually form over a number of years in one or more places in the body, commonly in arteries going to the heart, brain, legs and penis. In time, these can become bigger and cause enough narrowing of one or more of the arteries to result in symptoms and problems.

Certain risk factors increase the risk of more atheroma forming, which can make atheroma-related conditions worse. **See separate leaflet called Preventing Cardiovascular Diseases**. Briefly, risk factors that can be modified and may help to prevent atheroma-related conditions from getting worse are:

- **Smoking.** Smoking is one of the biggest risk factors for developing an atheroma-related condition. Smoking roughly doubles your chance of developing ED. Young smokers may not be aware that they have a much greater risk of developing ED by middle age compared with non-smokers. If you smoke, **make every effort to stop**.
- **High blood pressure.** Make sure your blood pressure is checked at least once a year. If it is high, it can be treated.
- **If you are overweight,** **losing some weight is advised.**
- **A high cholesterol.** This can be treated if it is high.
- **Inactivity.** We should all aim to do **some moderate physical activity** on most days of the week for at least 30 minutes. For example, brisk walking, swimming, cycling, dancing, gardening, etc.
- **Diet.** **Aim to eat a healthy diet.**
- **Alcohol excess.** For information about sensible drinking **see the separate leaflet called Alcohol and Sensible Drinking.**
- **Diabetes.** If you have diabetes, good control of the blood sugar level and blood pressure can help to minimise the impact of diabetes on the blood vessels.

Note: ED caused by narrowed arteries commonly develops several years before any symptoms or problems develop due to narrowing of the heart (coronary) arteries (or other arteries). Therefore, ED is thought of as an 'early warning signal' that heart disease (or other cardiovascular diseases) may develop. A large international study found that men with ED are twice as likely to have a heart attack, 10% more likely to have a stroke and 20% more likely to be admitted to hospital with heart failure. This is why some of the tests listed below may be advised if you develop ED. Also, you are likely to be advised by your doctor on how to modify any risk factors listed above. The aim is to prevent heart disease and other cardiovascular disease from developing.

What should I do if I develop persistent erectile dysfunction (ED)?

It is best to see your GP. He or she is likely to discuss the problem, go over any medication you may be taking and do a physical examination. This can help to identify or rule out possible underlying causes. Before treatment, your GP may suggest some tests.

What tests may be done?

Depending on your symptoms, likely cause of the erectile dysfunction (ED), age, etc, your doctor may suggest that you have some tests. These are mainly to check up on any risk factors listed above which increase the risk of developing narrowing of the arteries. Tests may include:

- A blood test to check the level of cholesterol and other fats (lipids).
- **Blood sugar level.**
- Blood tests to rule out **kidney** and **liver** disease.
- A **urine test**.
- A check of your blood pressure.
- A **'heart tracing' (electrocardiogram, or ECG)**.
- Other heart tests which are sometimes done, where appropriate, if heart disease is suspected.

If you have a low sex drive, or if you have had a previous head injury, ED may be due to a hormonal problem. In this situation a blood test to check the level of the hormone testosterone (and sometimes prolactin) may be advised.

In a small number of cases, tests to check the way the blood circulates through the penis, using scans or drug injections, may be done in hospital clinics.

What are the treatment options?

A referral to a specialist is sometimes needed for assessment and treatment of erectile dysfunction (ED). However, GPs are now treating more cases of ED than previously, as the treatment options have improved in recent years. Your GP is more likely to suggest referral if you have been found to have a hormonal problem, if the cause is related to another condition like circulatory problems, or if you are young and the condition started after an injury.

The following gives a brief summary of treatment options. There is a good chance of success with treatment.

Have you considered your other medication?

As mentioned, some medicines can cause ED. Check the leaflet that comes with any medication that you take to see if ED is a possible side-effect. Do not stop any prescribed medication but see your doctor if you suspect this to be the cause. A switch to a different medicine may be possible, depending on what the medicine is for.

Medication (tablets taken by mouth)

In 1998, the first tablet to treat ED was launched. This made a huge impact on the treatment of ED. For treating ED, there are now four different tablets licensed in the UK:

- They work by increasing the blood flow to your penis. They do this by affecting cGMP, the chemical involved in widening (dilating) the blood vessels when you are sexually aroused (described above). They are **sildenafil (Viagra®)**, **tadalafil (Cialis®)**, **ildenafil (Levitra®)** and **avanafil (Spedra®)**. You take a dose before you plan to have sex. Because of the way they work, these medicines are called phosphodiesterase type 5 (PDE5) inhibitors.

So, even if the nerves or blood vessels going to your penis are not working so well, a tablet can cause the blood flow to increase in your penis and cause an erection. Tablets can treat ED caused by various underlying conditions.

Note: none of these tablets will cause an erection unless you are sexually aroused.

There is a good chance that a medicine will work (about an 8 in 10 chance of it working well). However, they do not work in every case. There are pros and cons for each of the above and your doctor will advise. For example, you may not be able to take certain tablets for ED if you have certain other medical conditions or take certain other medicines. For example, you should not take a PDE5 inhibitor if you take nitrate medicines (including glyceryl trinitrate (GTN)) which are often used to treat angina. Also, if you have high blood pressure for which you take a certain type of medication, called **alpha-blockers (doxazosin, indoramin, terazosin or prazosin)**, you need to wait until you are on a stable dose. This is because combining alpha-blocking medication with a PDE5 inhibitor can cause a sudden blood pressure drop.

Cream applied to the penis

Topical alprostadil may be prescribed. The cream comes with a plunger. It is applied to the tip of the penis and the surrounding skin. It should be used 5 to 30 minutes before you have sex.

Injection treatment

This was the most common treatment before tablets became available. It usually works very well. You are taught how to inject a medicine into the base of the penis. This causes increased blood flow, following which an erection usually develops within 15 minutes. (Unlike with tablets, the erection occurs whether or not you are sexually aroused.)

Urethral medication

You can place a small pellet into the end of the tube which passes urine and opens at the end of the penis (the urethra). The pellet contains a similar medicine to that used for the injection treatment. The medicine is quickly absorbed into the penis to cause an erection, usually within 10-15 minutes.

Vacuum devices

There are several different devices. Basically, you put your penis into a plastic container. A pump then sucks out the air from the container to create a vacuum. This causes blood to be drawn into the penis and cause an erection. When erect, a rubber band is placed at the base of the penis to maintain the erection. The plastic container is then taken off the penis and the penis remains erect until the rubber band is removed (which must be removed within 30 minutes).

Penile prosthesis

A surgeon can insert a rod permanently into the penis. The most sophisticated (expensive) type can be inflated with an inbuilt pump to cause an erection. The more basic type has to be straightened by hand.

Other treatments for erectile dysfunction (ED)

Treating an underlying cause

For example, treating depression, anxiety, changing medication, cutting back on drinking lots of alcohol, or treating certain hormonal conditions may cure the associated ED.

Lifestyle and other advice

As mentioned above, ED is often a marker that heart disease or other cardiovascular diseases may soon develop. Therefore, you should review your lifestyle to see if any changes can be made to minimise the risk of developing these problems.

Also, your doctor may prescribe a [statin medicine](#) to lower your blood cholesterol level if your risk of developing cardiovascular disease is high.

Counselling

Sometimes couple counselling, or sex therapy is useful. These are most useful if certain mental health (psychological) problems are the cause of, or the result of, ED.

In some cases, sex therapy is used in addition to another treatment option.

Treatment for erectile dysfunction (ED) on the NHS

In England, Scotland and Wales sildenafil is available on NHS prescription from GPs as well as specialists for all men who have ED. In Northern Ireland, a specialist has to assume responsibility for prescribing it.

Tadalafil, vardenafil and avanafil are only available to those patients who have one of the specified medical conditions listed below. Other men can receive a private prescription from their own GP.

The specified medical conditions are:

- Diabetes.
- Multiple sclerosis.
- Parkinson's disease.
- Poliomyelitis.
- Prostate cancer.
- Following an operation to remove the prostate gland (prostatectomy).
- Having had radical pelvic surgery.
- Chronic kidney disease treated by dialysis or transplant.
- Following severe pelvic injury.
- Single gene neurological disease.
- Spinal cord injury.
- Spina bifida.

A specialist can also prescribe treatments using medication on the NHS if your condition causes severe distress in your life. Examples would be relationship breakdown, social problems or effects on mood or behaviour.

Further reading & references

- [Guidelines on Male Sexual Dysfunction: Erectile dysfunction and premature ejaculation](#); European Association of Urology (2015)
- [Nehra A, Jackson G, Miner M, et al; Diagnosis and Treatment of Erectile Dysfunction for Reduction of Cardiovascular Risk. J Urol. 2013 Jan 9. pii: S0022-5347\(13\)00009-8. doi: 10.1016/j.juro.2012.12.107.](#)
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