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# Prevention in Practice

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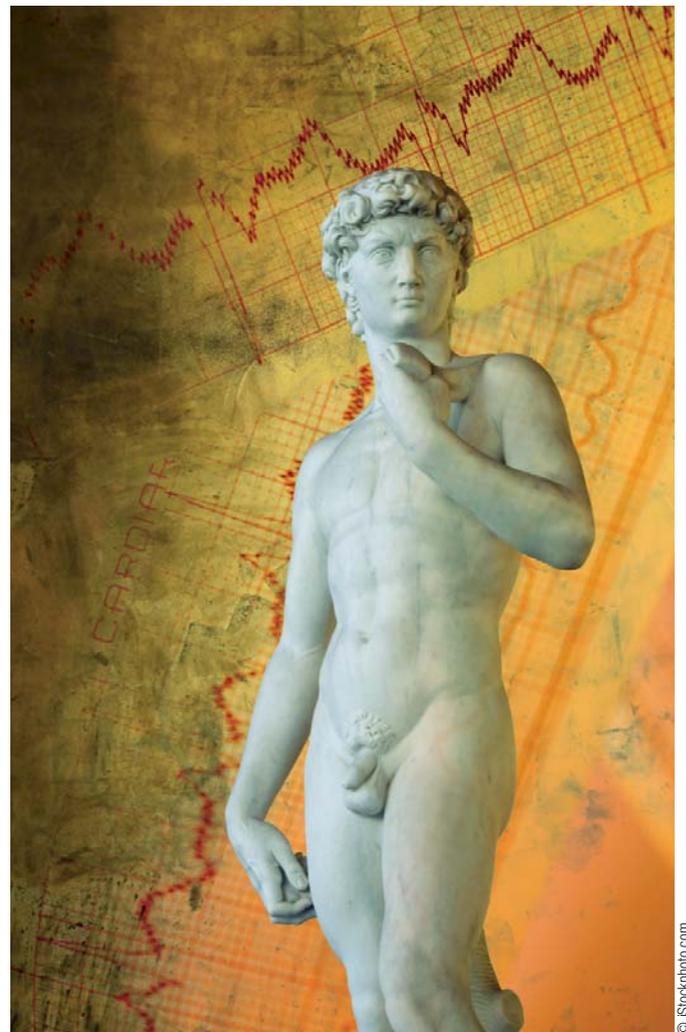
## THE PENIS AS A BAROMETER OF CARDIOVASCULAR RISK

**T**he arteries that supply the penis are very small and may be more prone to atherosclerosis than larger vessels. This means that the penis may be the first area in a man's body to suffer from a reduction in blood flow and so signal cardiovascular disease.

Cardiovascular disease (CVD) accounts for more than 235,000 deaths per year in the UK and the General Household Survey of 2005 showed that CVD was the second most commonly reported long-standing illness in Great Britain after musculoskeletal problems. CVD prevalence increases with age in both sexes but men have a higher prevalence than women.

Atherosclerosis is a major factor in the development of CVD. Atherosclerosis begins as microscopic damage to the lining of the arteries (the vascular endothelium). This damage causes inflammation and scarring of the artery walls and the development of fatty streaks and, subsequently, plaques.

Atherosclerosis increases over time causing narrowing and hardening of the arteries, increasing the work on the heart and contributing to high blood pressure. If plaques continue to grow they will eventually interfere with blood flow through the artery and result in symptoms such as intermittent claudication or angina. Damage to the artery walls predisposes to thrombosis and destabilised plaques may rupture, releasing fragments into the circulation that may result in a heart attack.



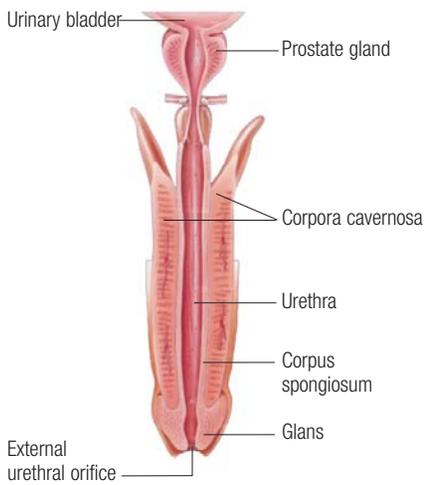
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**“The arteries that supply the penis are very small and may be more prone to atherosclerosis than the larger vessels. Increasing atherosclerosis in these vessels may result in the penis being the first area in the body to suffer from a reduction in blood flow”**



Atherosclerosis can affect any blood vessel in the body, including those that supply the penis in men. The body of the penis is composed of three cylindrical masses of tissue, each bound by fibrous tissue. The inner section contains the urethra and is known as the corpus spongiosum, while the two outer sections are called the corpora cavernosa. All three masses are enclosed by fascia and skin and consist of erectile tissue permeated by blood sinuses.

### Anatomy of the penis



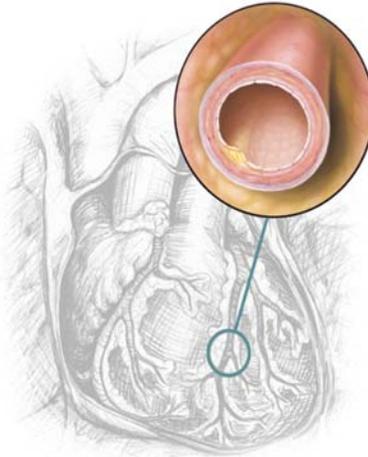
### BLOOD FLOW DURING AN ERECTION

Erection of the penis is a parasympathetic reflex. With sexual stimulation, which may be visual, tactile, auditory, olfactory or imaginative, the arteries of the penis dilate, allowing increased amounts of blood to enter the blood sinuses. Expansion of these spaces causes compression of the veins draining the penis so most of the blood is trapped, resulting in turgidity and erection. The penis returns to its flaccid state when the arteries of the penis constrict and the pressure on the draining veins is released.

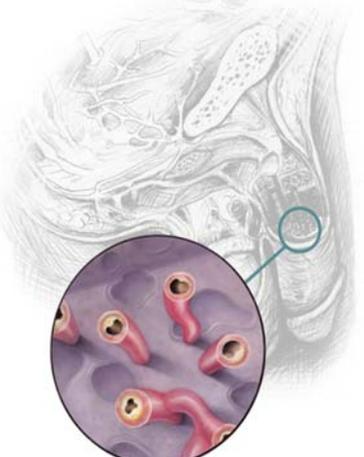
The arteries that supply the penis are very small and may be more prone to atherosclerosis than the larger vessels. Increasing atherosclerosis in these vessels may result in the penis being the first area in the body to suffer from a reduction in blood flow. An erection can only occur if there is sufficient blood flow to the penis and when blood flow is compromised through stiffening and narrowing of the arteries, men may be unable to achieve or maintain an erection. In addition to reduced blood flow, vascular disease is also associated with structural damage to the smooth muscle in the corpus cavernosa.

### Arteries affected by atherosclerosis

#### Atherosclerosis in coronary vessels



#### Atherosclerosis in penile arteries



### Artery size and atherothrombosis

Artery	Size (mm)	Clinical event
Penile	1-2	ED
Coronary	3-4	CAD
Carotid	5-7	TIA/stroke
Femoral	6-8	Claudication

Montorsi et al. Eur Urol 2003; 44: 352-354

Erectile dysfunction (ED) can be defined as the inability to achieve or maintain an erection sufficient for sexual intercourse. Most men will experience this happening at some point during their lives and occasional occurrences are normal. It may be considered abnormal when a man experiences ED on more than 25% of attempts. Although ED often has a physical cause, and atherosclerosis is thought to account for almost half of all ED in men over 50 years, it may also be precipitated by or maintained by psychological factors and the two causes need to be dealt with separately.

### THE IMPACT OF ERECTILE DYSFUNCTION

As with cardiovascular disease, the risk of ED increases with age, often mirroring the effect of ageing on the arteries (see graph). Men with ED may suffer from depression, low self-esteem and other signs of psychological distress, all of which may affect their work and relationships, and reduce their quality of life.

The partners of men with ED can also be affected significantly and may feel they are in some way to blame. Feelings of rejection, unattractiveness and

guilt may result in the partner withdrawing from sexual intimacy to avoid uncomfortable situations where an erection may fail. This in turn precipitates a vicious circle where the man feels even more anxious about failing to perform and the situation inevitably worsens. These factors can have devastating effects on relationships.

### BAROMETER OF VASCULAR HEALTH

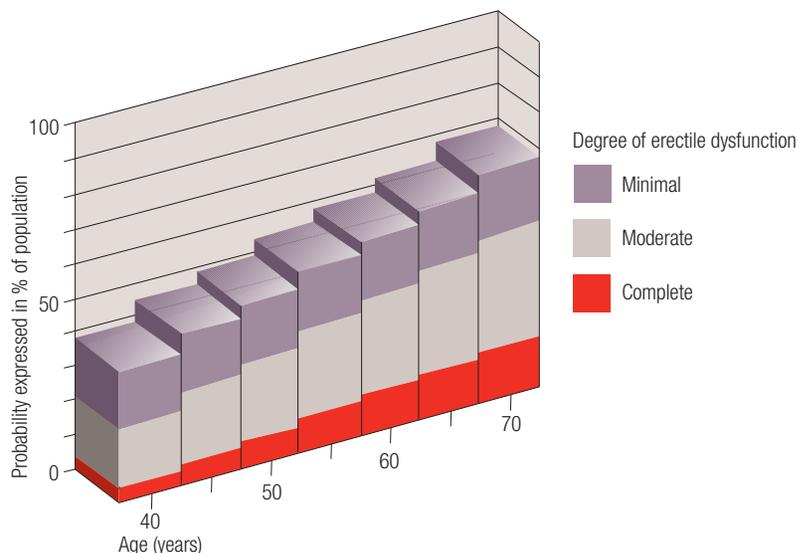
If arteries to the penis are affected by atherosclerosis, it is highly likely that other arteries in the body are affected too. For this reason the penis may be a barometer of vascular health as well as cardiovascular risk, and ED an early warning sign of more generalised cardiovascular disease.

Evidence suggests that the incidence of ED is higher in patients with CVD than in the healthy population. The Massachusetts Male Aging Study (MMAS) conducted in men aged 40-70 years, found that men with heart disease, diabetes or hypertension were up to four times more likely to develop complete ED than men without these conditions.

### USING ED AS A MARKER OF CV RISK

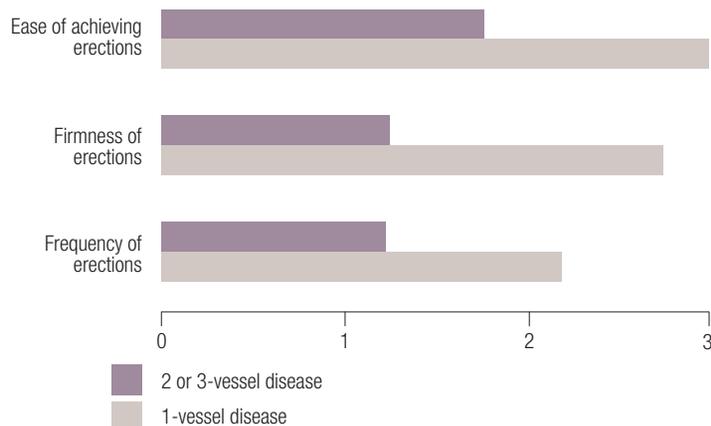
A man presenting with ED offers an opportunity to detect previously undiagnosed CVD and other concurrent conditions. This not only improves the patient's sexual and psychological well-being, but also offers an opportunity to improve the management of chronic diseases, such as hypertension and diabetes, earlier in the disease process.

**Graph: The risk of erectile dysfunction increases with age**



Adapted from Feldman HA et al. *J Urol* 1994; 151: 54-61

**Degree of ED and extent of coronary artery disease**



Adapted from Greenstein et al. *Int J Impot Res* 1997; 9: 125-36

particularly hard to reduce their risk factors.

Patients with high cholesterol may be able to reduce it with strict dietary control or they may require a statin to do so. Patients with hypertension should receive drug treatment and careful monitoring to control their blood pressure to target levels wherever possible, preferably using ARB drugs (sartans) which are less likely to cause ED, and patients with diabetes need to achieve and maintain good glucose control.

Simple lifestyle changes can equate to great benefits in terms of cardiovascular risk reduction. The most important thing any smoker can do is to quit and the necessary support should be available to help them with this. Obese patients should receive help to lose weight. Patients at risk of CVD should be advised to eat a healthy diet that is rich in a wide variety of fruit, vegetables and wholegrains and low in saturated fat, sugar and salt. And they should be encouraged to gradually increase their levels of physical activity, to a minimum of 30 minutes every day.

Perhaps one of the most important things to remember with ED is that erections are good for patients, both physically and psychologically. And sympathetic, understanding partners can make a big difference. If, however, men find it impossible to achieve and maintain an erection themselves, there are various options available to help.

### MANAGING ED

The primary goal in the management of ED is to enable the individual or couple to enjoy a satisfactory sexual experience. This involves:

- Identifying and treating any curable causes of ED
- Initiating lifestyle changes and risk factor modification
- Providing education and counselling to patients and their partners.

### First-line treatment

- Phosphodiesterase-5 (PDE-5) inhibitors (eg sildenafil, tadalafil, vardenafil)
- Vacuum erection devices.

### Second-line treatment

- Intraurethral alprostadil.

### Third-line treatment

- Penile prostheses.

ED can also provide important information on CVD progression and severity. Research has shown that in patients with a previously diagnosed cardiovascular condition, the degree of ED correlates with the severity of the cardiovascular disease. For example, patients with single-vessel ischaemic heart disease experience firmer erections and have less difficulty in obtaining an erection than patients with 2 or 3-vessel disease.

If men present early with ED, it offers a prime opportunity to evaluate the extent of any vascular disease, calculate their cardiovascular risk and instigate lifestyle changes and drug therapy to prevent disease progression.

### Factors that may contribute to CVD

- Advancing age
- Unhealthy diet
- Smoking
- Physical inactivity
- Obesity
- High blood pressure
- High blood cholesterol
- Diabetes
- Family history of heart disease

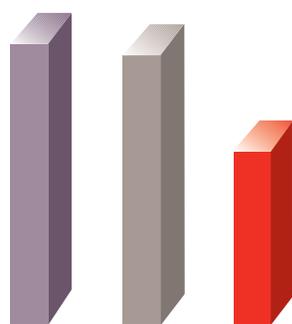
Apart from advancing age and family history, all of the risk factors for CVD are modifiable and older people with a family history of CVD should try



## ENCOURAGING MEN TO TALK ABOUT ED

Much cardiovascular disease is preventable through modification of risk factors, so men should be encouraged to be proactive in seeking help for ED. One of the main problems is that men remain notoriously reticent in seeking help for their health problems, particularly for those of a more sensitive nature.

### Why are patients reluctant to talk to healthcare professionals about ED?



- Patients believe ED would not be recognised as a medical problem
- Patients fear that discussing their sexuality may embarrass their doctors
- 44% of men attending urologists have ED but fail to mention it – most are too embarrassed

Manwick C. JAMA 1999; 281: 2175-2174

Education by posters and leaflets in the waiting room may be an indirect way of targeting men who attend the surgery for other reasons, as well as the partners of men who don't attend. And those considered at high risk of CVD could be flagged for being given educational materials or for opportunistic and tactful questioning about satisfaction with their sexual function when they attend the surgery for routine consultations, combined with a Sexual Health Inventory for Men (SHIM score).

Cardiovascular disease is the biggest cause of mortality in the UK and identifying the disease in its early stages provides the patient with the greatest chance of survival. Although the symptoms of cardiovascular disease are not always immediately obvious, ED may be the vital clue to its existence.

## Key points: CVD and erectile dysfunction (ED)

- ED is a highly prevalent condition, affecting many men.
- Although ED is significantly more prevalent in older patients, it is not an inevitable consequence of ageing. Its greater prevalence in the elderly is consistent with higher rates of cardiovascular disease, diabetes and other risk factors, which are all associated with an increased incidence of ED.
- Due to its association with many types of vascular disease and diabetes, ED is now thought to be an early warning sign of these types of co-morbid conditions.
- The early diagnosis of ED may provide an opportunity to detect previously undiagnosed CVD and other serious clinical co-morbidities, including diabetes.
- ED can often be helped by lifestyle modifications, medications and counselling.
- If nurses and doctors don't ask, patients don't tell!

## Diagnosing ED

### Initial assessment

- Sexual history – a detailed description of the problem should be obtained, including the duration of symptoms and original precipitants.
- Concurrent medical, psychiatric and surgical history should be recorded, as should current relationship status, history of previous sexual partners and relationships, issues of sexual orientation and gender identity.
- History of alcohol, smoking or illicit drug misuse.
- The validated version of the SHIM (Sexual Health Inventory for Men) may be helpful.

### Physical examination

- All patients should have a focused physical examination. A genital examination is recommended and this is essential if there is a history of:
  - Rapid onset of pain
  - Deviation of the penis during tumescence
  - Symptoms of hypogonadism
  - Other urological symptoms (past or present).
- A digital rectal examination (DRE) of the prostate is not mandatory in ED but should be conducted in the presence of genitourinary or protracted secondary ejaculatory problems.
- Blood pressure, heart rate, waist circumference and weight should be measured.

### Laboratory testing

- The choice of investigations depends on the individual circumstances of the patient. Serum lipids and fasting plasma glucose should be measured in all patients, and testosterone in most.

## more information

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- The SHIM score – [www.erectilefunction.org/tool\\_kit/Shim.pdf](http://www.erectilefunction.org/tool_kit/Shim.pdf)