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The erectile dysfunction revolution

The aim of this article is to provide some background information on the causes, treatments and impact of erectile dysfunction (ED). The intended learning outcomes are:

I To enable you to be aware of the major risk factors that are associated with ED.
I To give you a greater understanding of the rationale behind treatment options.
I To enable communication with patients.
I To stimulate interest, generate discussion and encourage further reading.
I To increase awareness of sexuality and sexual health as an integral part of patient care.

To understand ED, or impotence as it was formerly known, it is important to be aware of the background information. Impotence was never discussed, was little understood and was considered to be ‘all in the head’.

According to Webb (1988), nurses are poor communicators when it comes to discussions about sexuality. Many reasons have been given as to why nurses lack expertise in this area (Carr 1996, Rafferty 1995, Webb 1985, 1987, Webb and Askham 1987), but in the main, like our medical colleagues ED has simply not been covered in basic training (Green 1999).

Fortunately, attitudes are starting to change. The RCN published a document in March 2000 entitled Sexuality and Sexual Health in Nursing Practice. It states that: ‘...sexuality and sexual health is an appropriate and legitimate area of nursing activity, and that nurses have a professional and clinical responsibility to address it’.

The nurse at the face of the revolution For nurses working in this area of health care, the past two years have been high profile, dramatic and volatile; they have had to learn fast. The pace of change for these nurses has almost run ahead of practice.

The facts behind the myths Agreeing on a definition of ED is itself problematic, as confirmed by the literature (Dean 1999). No sooner has a definition been decided on, than it has been amended, reflecting the rapid pace of change within the field. The definition that is most widely used was agreed at the US National Institutes of Health Consensus Conference in 1993: ‘ED is the inability to obtain or maintain an erection sufficient for satisfactory sexual activity. It can be defined as the consequence of either organic or psychogenic disease. ED is a complex interaction of both.’
Which patients suffer from ED?

Do you think you have nursed a patient who might have suffered with ED? The chances are that you have, without realising it. ED is a lot more common than is often thought (Feldman et al 1994). The fact is that approximately one in ten men experience ED at some time (Impotence Association 1995). This means that approximately 2.5 million men in the UK and approximately 18 million men in the US are experiencing ED (Eardley et al 1998). Most patients do not like to talk about it, but given the opportunity would prefer to talk to a nurse about the condition than to anybody else (Baggs and Karch 1997).

If you have ever nursed a male patient with the disorders listed in Box 1, then you have possibly nursed a patient with ED.

Anatomy and physiology

The penis is a cylindrical organ, comprising the base, the body and the glans. The base is attached to the pelvis and consists of the bulb (containing the urethra) and the crura, which are attached to the ischial and pubic rami. The body contains the erectile tissue, the corpus spongiosum and the corpora cavernosa. The glans penis is made up of expanded corpus spongiosum, covered (in uncircumcised males) by the foreskin or prepuce.

The outer layer of the corpora cavernosa is called the tunica albuginea (or ‘white coat’) and is tough, fibrous and relatively indistensible; it comprises elastin and collagen. Inside the tunica lies the erectile tissue, which is a highly vascular structure called trabeculae. The formation of this is chiefly a framework of fibroelastic and smooth muscle tissue. The trabecular tissue contains cavernous spaces or sinusoids.

Circulation The sinusoids are lined by vascular endothelium and are fed by the helicine branches of the deep penile arteries, which originate from the internal pudendal artery. The terminal branches of these are the coiled helicine arteries that supply the sinusoidal spaces. During erection, these spaces expand with blood. Venous drainage begins in the sinusoidal spaces and forms the subtunical venous plexus. Here it exits obliquely through the tunica albuginea via the small emissary veins. Most of the venous drainage is into the deep dorsal and circumflex veins.

Physiology of penile erection Penile erection and detumescence are chiefly vascular events (Christ 1995), depending on the fine balance of arterial inflow and venous outflow. When arterial inflow is low and is balanced by venous outflow, the penis is flaccid; when inflow increases and outflow falls, tumescence occurs.

In the flaccid penis, the sympathetic nervous system is dominant and keeps arterioles constricted and smooth muscle contracted. Blood flow through the penis is low. Sexual stimulation results in increased parasympathetic nervous activity, which in turn causes arteriolar dilatation and trabecular smooth muscle relaxation. This produces increased penile blood flow and filling of the sinusoidal spaces. Increased blood volume and compression of the relaxed smooth muscle against the tunica albuginea result in reduced venous outflow. This is called the veno-occlusive mechanism and is the last stage in the production of a rigid erection.

Detumescence happens when the reversal of these events occurs, usually after removal of erotic stimuli or after ejaculation, when increased sympathetic activity causes the helicine arteries to constrict and the trabecular smooth muscle to contract.

Nerve pathways The nervous system can be activated centrally by erotic thoughts, locally by genital stimulation, or both. The parasympathetic innervation is the primary ‘pro erectile’ innervation of the penis, and it emanates from the sacral spinal cord and travels to the sacral plexus (Eardley et al 1998). The sacral plexus is located in the sacral S2 to S4 portion of the spinal cord. This receives messages from the central nervous system, as well as sensory information from the penis, which in turn initiates a reflex arc that causes or maintains an erection.

In the corpora, the nerve fibres travel within the trabeculae to innervate the smooth muscle and the endothelium directly. The sensory innervation of the penis has some interesting characteristics. The glans penis has many nerve endings and is more sensitive than most other parts of the body. Interruption in the nervous input from the lower thoracic (T10) and upper lumbar (L2) nerve roots is particularly significant in neurogenic impotence.

Chemical pathways in penile erection Although it is thought that a number of chemical pathways are involved in the erectile response, the most important of these is the nitric oxide-induced cyclic buanylic acid GMP (cGMP) (Andersson and Wagner 1995, Burnett 1997).

Nitric oxide is a neurotransmitter (neuronal relaxant) that is produced from intracellular L-arginine. It is released by the endothelial cells
Box 2. Psychogenic causes of erectile dysfunction

- Anxiety: Sexual performance
- Sexual identity
- Psychosis
- Depression
- Psychological trauma/abuse
- Stress disorders: Work related
- Financial
- Cultural/religious/social expectations
- Concomitant partner sexual difficulties
- Poor understanding of functioning/acknowledgment
- Education knowledge
- Relationship problems/guilt/fear of intimacy

Box 3. Taking a sexual history

- Ask straightforward, direct questions
- Provide the patient with a vocabulary with which he is comfortable and familiar
- Reassure the patient that you are not going to make judgements
- Clarify the exact nature of the problem
- Summarise what the patient said to you and offer him an opportunity to correct you if the details are complex
- Ensure the setting is comfortable and most importantly private, without distractions or interruptions

and the non-adrenergic, non-cholinergic neurones of the penis in response to sexual stimuli. Nitric oxide then diffuses into the smooth muscle cells of the corpora cavernosa and this causes a decrease in intracellular calcium and erection occurs. The enzyme responsible for this is phosphodiesterase type 5 (PDE5), an enzyme existing principally in the corpora cavernosa.

**Diagnosis** ED is one of the few areas of clinical practice where medical opinion has completely changed. Previously the diagnosis of ED was thought to be of a purely psychogenic origin. We now understand that this is not the case, although the psychological and emotional aspects can never be disassociated from the organic. No matter how obvious you might think the causes are, there will always be a psychogenic element to the problem. ED involves a complex interaction of both.

**Psychogenic erectile dysfunction** There are many reasons why men are unable to have an erection (experience ED) and it is something that most men and their partners experience at some time (Box 2). In most cases, this situation will spontaneously recover. When the problem persists, this is not normal and the cause of the sudden loss of erection needs to be identified.

**TIME OUT 2**

A patient might have tried to communicate with you previously on a sexuality issue, and you might not have answered the request for information as well as you would have liked. How, after reading this article, could you do things differently?

**Diabetes and erectile dysfunction** Diabetes mellitus accounts for approximately 40-50 per cent of all patients who are seen in specialist ED secondary care clinics or who present to the GP for treatment (Pickup and Williams 1997). On questioning, many of these patients do not realise that their diabetes is most likely to be the principal cause of failing erections.

In type 2 diabetes, vascular and neurological damage. ED usually occurs after the original diagnosis of diabetes, so it is not surprising that patients do not attribute ED to diabetes. In type 2 diabetes, vascular and neurological damage could have already occurred, and ED might be the initial presenting symptom, thus giving the patient some indication of the reason for the change in quality of erections.

Some diabetic patients feel angry that they have to deal with yet another complication of their diabetes. They need careful and considerate explanations as to why this has happened. To
help them come to terms with the progression of the disease, they will also need support and encouragement to continue with their medication for diabetes and any therapeutic regimen required for ED.

**Vascular disease** Patients with any form of vascular disease are likely to suffer an associated loss of erectile function. Cardiovascular disease can affect potency by a variety of mechanisms. ED can occur in up to 45 per cent of men following myocardial infarction (Eardley et al. 1998). Evidence suggests that there is a similarly high rate in men before myocardial infarction. ED occurs in approximately 17 per cent of men with untreated hypertension and 25 per cent with treated hypertension (Bulpitt et al. 1976, Jackson et al. 1999).

Sexual activity is no more stressful to the heart than a number of other natural daily activities, such as walking one mile on the level in 20 minutes (Jackson et al. 1999). ED and cardiovascular disease share many of the same risk factors and often co-exist. Assessing a patient’s physical abilities can be a useful guide to determining their ability to undertake sexual activity without triggering further cardiovascular events (Jackson et al. 1999). The message to the patient should be ‘get fit for sex’.

**Other organic causes: surgery and trauma**

Transurethral resection of prostate (TURP) is known to cause ED in approximately 13.6 per cent of men (Roehrborn et al. 1996). During the surgical procedure, diathermy damage can occur to the cavernous nerves that run laterally to the prostate. Retrograde ejaculation (ejaculation into the bladder) can also occur in up to 70 per cent of cases (Kirby et al. 1995). This is because of the loss of the bladder-neck sphincter. In bladder-neck incisions, ED can occur in up to 4.6 per cent of cases (Roehrborn et al. 1996). Abdomino-perineal excision of the rectum, anterior resection of the rectum and panproctocolectomy can also lead to post-operative ED because of the potential for surgical damage to the pelvic plexus, which lies anterolateral to the rectum. Radical radiotherapy to the pelvic organs can cause ED, possibly because of ischaemic damage to the cavernous nerves (Eardley and Sethia 1998).

Other causes of ED are associated with some prescription medicines and some ‘recreational’ drugs (Box 4).

**Management**

The management of ED can vary, depending on where practitioners work and whether they are in primary or secondary care. Reflection, learning and planning are essential if the practitioner is to provide an effective high-quality service.

The basic guidelines for good practice are as follows:

- Manage lifestyle/general well-man health check. This could include addressing issues such as exercise, diet, smoking, drinking and reinforcing the safe-sex message.
- Routine examinations: blood pressure, urinalysis and weight.

### Box 4. Drugs that might contribute to ED

<table>
<thead>
<tr>
<th>Antipsychotics/anxiolytics/hypnotics</th>
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<tbody>
<tr>
<td>Phenothiazines</td>
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<td>Butyrophenones</td>
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<td>Thioxanthenes</td>
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<th>Anticholinergics</th>
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<td>Atropine</td>
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<td>Propantheline</td>
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<td>Benztropine</td>
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<td>Dimenhydrinate</td>
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<td>Diphenhydramine</td>
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<th>Hormones</th>
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<td>Luteinising hormone-releasing hormone</td>
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<td>Corticosteroids</td>
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<td>Gonadotrophin-releasing hormone agonists</td>
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<td>Oestrogens</td>
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<td>Anabolic steroids (high doses)</td>
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<th>Antiandrogens</th>
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<td>Flutamide</td>
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<td>Cyproterone acetate</td>
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<td>Vasodilators</td>
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<td>Central sympatholytics</td>
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<td>ACE inhibitors</td>
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<td>Calcium channel blockers</td>
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<td>Tricyclics</td>
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<td>Monoamine oxidase inhibitors</td>
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<tr>
<td>Selective serotonin reuptake inhibitors (SSRIs) (might cause ejaculatory problems)</td>
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<th>Dopamine antagonists</th>
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<td>Metoclopramide</td>
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<th>H₂ antagonists</th>
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<th>Psychotropic drugs</th>
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<td>Alcohol, marijuana, amphetamines, barbiturates, nicotine, opiates</td>
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Men’s health

Advanced examinations depend on the experience of the practitioner, and might include the following:
- Observing secondary sexual characteristics.
- Palpation of the penis and testes.
- Digital rectal examination.
- Lower limb pulses.

It is important to be aware of any clinical features suggesting other systemic disease that might predispose the patient to ED. Signs of chronic illness, such as heart failure or respiratory failure, should be recorded.

**Investigations** Laboratory tests that might be considered will vary slightly depending on who is requesting them and for what reason. Serum glucose is recommended in all cases. Full blood count, thyroid function (if associated loss of libido), testosterone, prolactin and follicle-stimulating hormone (FSH)/luteinising hormone-releasing hormone (LH) are optional.

A thorough medical history should be obtained, noting any medication that the patient is taking. Skilled and careful questioning of the patient will reveal the origins and cause of ED. From the answers given the practitioners will be able to establish whether the patient is suffering from organic or psychogenic ED (Box 5).

**Treatment options/management choices ED**

Sildenafil is dependent for its action on the enzyme phosphodiesterase type 5 (PDE5), responsible for the breakdown of cGMP. Sildenafil inhibits the main enzyme, phosphodiesterase type 5 (PDE5), responsible for the breakdown of cGMP. Sildenafil is dependent for its action on the endogenous production of nitric oxide; it potentiates the effect of nitric oxide, and therefore helps restore natural erectile function in response to sexual stimulation. It does not cause erections in the absence of sexual stimulation, and it is not a libido-enhancing drug.
This oral preparation is simple and convenient to use, and the usual starting dose is 50mg. It is taken as required approximately one hour before anticipated sexual activity, although absorption can be delayed if a heavy fatty meal has been consumed. The dose may be titrated to 100mg or reduced to 25mg, depending on efficacy and tolerability. It is currently limited to one tablet per week on NHS prescriptions. The maximum recommended dose frequency is one tablet per day. Minor side effects are usually mild and transient and include headache (16 per cent of patients), facial flushing (10 per cent), and indigestion (7 per cent) (Morales 1998).

Concurrent use of sildenafil with nitrates, either episodic or continuous, is contraindicated. Sildenafil potentiates the effects of nitrates, resulting in a sudden fall in blood pressure. This contraindication also precludes the use of short-acting GTN sprays.

Depending on the aetiology of the ED, sildenafil has an overall response rate of between 40 and 80 per cent (Goldstein et al 1998).

**Intracavernosal injections** Patients for whom sildenafil is unsuitable might be offered intracavernosal injection therapy. This is an injection of the smooth muscle-relaxing drug alprostadil into one of the corpora cavernosa, which causes substances to pass across the permeable tunica, allowing both corpora to be affected. A suitably trained physician or nurse usually gives the initial injection, and thereafter the patient can be taught to inject himself at home. Alprostadil is a well tolerated, naturally occurring smooth muscle relaxant. Because it is given directly into the penis, there are few systemic effects; occasional light-headedness has been noted, but it is usually mild and transient. Other more specific contraindications to note are patients who have angulation or other abnormalities of the penis such as Peyronie's disease. This condition is characterised by fibrotic plaques that occur in the tunica albuginea and cause angulation of the penis on erection. Peyronie's disease is associated with 10-25 per cent of patients who have Dupuytren's contracture (Eardley and Sethia 1998).

They might experience some pain on erection, and caution is advised when giving the drug to this patient group. Patients taking anticoagulant therapy might experience bruising at the site of injection. If the prescribing physician has decided to continue with treatment, the patient's International Normalised Ratio (INR – normal value for patients on warfarin is between 2 and 3.5) should be assessed before continuation.

Intracavernosal injections are contraindicated in patients who might be predisposed to developing a priapism with use of these drugs, for example, patients who have sickle cell disease, myeloma, cerebrovascular disease, and haemodialysis. Priapism is a persistent painful erection unaccompanied by sexual desire and occurs in approximately 1 per cent of patients using intracavernosal injections (Chew et al 1997). Prolonged erection occurs in approximately 5 per cent of patients.

Depending on the aetiology, alprostadil can be given in doses from 2.5 to 40mcg. It can only be used a maximum of three times a week as repeated long-term use of injections in the same site can cause fibrosis in up to 6.5 per cent of patients (Brindley 1983).

**Efficacy of alprostadil** Patients suitable for intracavernosal injections should be made aware of the possibility of a prolonged erection and need to know what to do if this occurs. The patient must understand that he is responsible for his own welfare when he has left the hospital or surgery. Many conservative options have been given to patients on the best course of action, should they have a prolonged erection. Alternative solutions have ranged from running up and down stairs to putting a bag of frozen peas on the inside of the thigh. The best advice, however, is that if the erection has not subsided within three hours, the patient should go to the nearest A&E department with an accompanying letter explaining the treatment that has been administered. Aspiration of the penis and applying manual pressure to produce hypovolemia should help to bring the erection down. **Intraurethral alprostadil** Alprostadil can be administered via the urethra using a small plastic applicator. The patient has to pass urine before the insertion of a small pellet. The residual urine in the urethra acts as a diluent to the medicated pellet and helps lubrication for insertion. It is acknowledged that efficacy rates for this application are low and side effects tend to be frequent but mild, the most common being urethral pain after insertion (10 per cent) (Padma-Nathan et al 1997). Prolonged erection and fibrosis are rare. Barrier methods of contraception are recommended if the partner is of childbearing age or is pregnant.

**Vacuum-assisted devices** There are numerous types and styles of vacuum-assisted devices made by various companies. They all have similar basic principles to induce erection; they can either be pumped manually or a vacuum can be created using battery-driven devices. The penis is placed in a clear plastic cylinder, which is placed firmly against the symphysis pubis to create an

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**Box 5. Clinical history**

**Psychogenic origin**
- Onset sudden, or patient can remember exactly when it occurred
- Does not occur all the time (situational, eg, new partner)
- Morning and night time erections still occur
- Relationship difficulties
- Sexual development difficulties
- Poor/alter libido

**Organic origin**
- Occurs more gradually, patient can not pinpoint a particular time
- Occurs all the time (global)
- Poor or absent nocturnal/morning erections
- Stable, good relationship
- Normal sexual development
- Good libido

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**Men’s health**


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**Nursing update**

**BBC 2 Learning Zone schedule**

**Thursday November 30**

**094** Below the belt: men talking about testicular cancer 5-5.30am

**096** Men’s health: a cause for concern 5.30-6am

**Friday December 1**

**090** Nursing for a new era: promoting yourself 5-5.30am

**088** Steps in time: life with haemophilia 5.30-6am

**Thursday December 14**

**094** Below the belt: men talking about testicular cancer 5-5.30am

**096** Men’s health: a cause for concern 5.30-6am

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**Conservative treatment** Other methods of conservative management of ED are currently being assessed. The relationship between perineal muscle tone and penile rigidity seems to suggest that perineal contraction is significantly higher in potent men than in impotent men. Colpi et al (1999) observe that: ‘Reinforcement of the striated muscles of the penis achieved through physiotherapy directly or indirectly may improve penile erection.’

The idea that pelvic floor efficiency might be related to ED is a recent but interesting theory. Lavoiser et al (1998) conducted a small study of seven patients with psychogenic ED. They noted that during recordings of penile circumference and rigidity, contractions of the perineal muscles strongly coincided with changes within the penis during nocturnal erections. This suggested that the role of the perineal muscles caused increased intracavernosal pressure. This form of conservative therapy ought to be considered before initiation of alternative treatments.

**Surgical treatment** This is usually the last option available. The main type of surgery involves the insertion of a penile prosthesis. There are two types of prosthesis: semi-rigid or multi-part inflatable devices. These devices are expensive and technically difficult to implant and require destruction of the patient’s own cavernous tissue to place the cylinders down each corpora. It is vital that the patients are properly counselled and understand the implications of surgery including possible complications, the commonest being infection, which occurs in up to 10 per cent of patients (although the patients who tend to have infection more than others are those with diabetes).

**Peyronie’s disease**

Peyronie’s disease is poorly understood, but it is thought that trauma to the penis could be one of the predisposing factors to the condition. Treatment involves surgery to the affected plaque, either by incision of the plaque (Nesbit’s plication), which releases the tension but might also result in a degree of shortening, or by venous grafting to the plaque (Lue procedure). Another possible option is the use of shock-wave lithotripsy. It is given as a course of up to six treatments, which can take place as day case surgery. This procedure ‘dissolves’, or softens, the plaque and the degree of angulation is reduced. The most immediate improvement following this procedure is the relief of pain on erection. It is still in its early development, but indications are that it is promising as a form of treatment.

**Conclusion**

Nurses and nursing teach us to regard and respect the individual, care for their needs, support them in times of crisis and distress, and look after their whole body and mind. These principles form some of the cornerstones of nursing’s foundations. To ignore the patient’s sexuality is to ignore a large part of what it means to be human. ‘The thread of sexuality is woven densely into the fabric of human existence’ (Bancroft 1989)

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**TIME OUT 5**

What support systems would you like to see in place to help you tackle the issues of patient sexuality and its expression?

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**TIME OUT 6**

Now that you have completed the article, you might like to think about writing a practice profile. Guidelines to help you write and submit a profile are outlined on page 42.