

Erectile Dysfunction (ED; Impotence) — Symptoms and Diagnosis

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Erectile dysfunction is defined as the inability to achieve or maintain a penile erection that would result in the inability to perform vaginal sexual intercourse. Systemic, neurologic and local diseases can cause erectile dysfunction which includes but are not limited to diabetes, multiple sclerosis, and Peyronie's disease respectively. History and physical examination are important for the diagnosis of erectile dysfunction. Treatment can be medical with testosterone, sildenafil, or specific medical treatment according to the etiology. Surgical correction might include a penile prosthesis.



Definition of Erectile Dysfunction and Peyronie's Disease

Erectile dysfunction can be defined as the **inability to get a penile erection or to maintain an erection** that would adversely affect vaginal sexual intercourse. Erectile dysfunction is one of the problems encountered in men with **Peyronie's disease**.

Peyronie's disease is a penile condition that presents with a **palpable plaque** and an **abnormally increased curvature** of the penis when erect. This is associated with **painful erections** and/or erectile dysfunction.

Epidemiology of Erectile Dysfunction and Peyronie's Disease

The prevalence of erectile dysfunction is **age-dependent**. Prevalence is estimated to be less than 10% in men younger than 4 years of age, approximately 10% in men aged 40 to 49 years, up to 40% in men aged 60 to 69 years and virtually all men aged older than 70 years complain of some form of erectile dysfunction.

The incidence of erectile dysfunction is high and ranges from 26 to 46 per 1,000 men. **Coronary artery disease, stroke, smoking, obesity, sleep disorders, diabetes,** and **cardiovascular disease** are all linked to an increased risk of erectile dysfunction.

On the other hand, **Peyronie's disease** seems to be less common than nonspecific erectile dysfunction and is estimated to have a prevalence of 0.4%. The average age of patients with Peyronie's disease is approximately 53 years. Approximately, 30% of men with Peyronie's disease have erectile dysfunction.

Etiology and Pathophysiology of Erectile Dysfunction and Peyronie's Disease

Etiologies of erectile dysfunction are diverse and first, we need to understand the most common causes of Peyronie's disease before talking about other etiologies of erectile dysfunction in general.

Peyronie's disease's most common and well-established etiology is **sexual trauma to the erect penis**. A dorsal or ventral sheer stress can be elicited in the past medical history of most patients with Peyronie's disease. It is believed that **impaired healing along with fibrosis** are the main causes of the formation of the penile plaque which is responsible for the increased curvature of the penis and the painful erections in Peyronie's disease.

Other less common etiologies of Peyronie's disease include a **family history of the disease**, history of **Paget's disease of the bone** and **Dupuytren's contracture**.

On the other hand, **erectile dysfunction without Peyronie's disease** can be a complication of a diverse myriad of conditions. **Central nervous system injury, multiple sclerosis, diabetes polyneuropathy** and **autonomic neuropathy** of any cause can result in erectile dysfunction.

Male hypogonadism regardless of the etiology and **hyperprolactinemia** have also been linked to an increased risk of erectile dysfunction. Additionally, men with a **cardiovascular atherosclerotic disease** can develop erectile dysfunction.

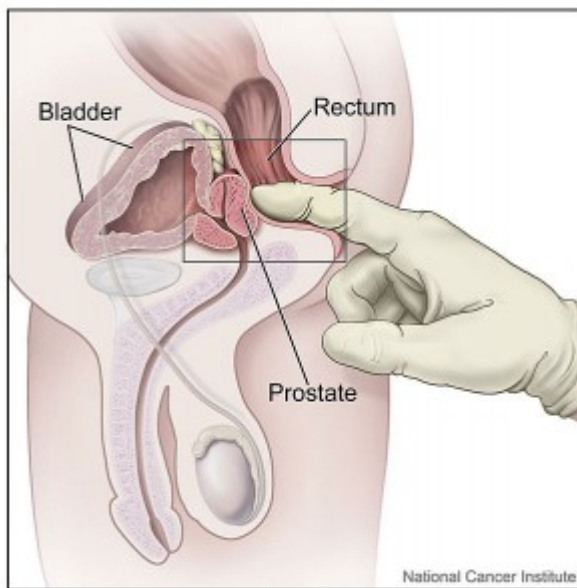
Beta-blockers, antidepressants, antiandrogens, tobacco smoking, and **alcoholism** are also linked to erectile dysfunction. Patients with systemic diseases such as **liver, renal or respiratory failure** can have erectile dysfunction.

While the mechanism of erectile dysfunction in **atherosclerosis** and **peripheral neuropathy** is understood, the pathogenesis of other etiologies and how they cause erectile dysfunction still needs to be elicited.

Clinical Presentation of Erectile Dysfunction and Peyronie's Disease

Patients with erectile dysfunction usually present to the clinic with **indirect questions about weak erections** and whether they are normal in their age or not. Once the subject is opened, it is important to understand whether the patient has erectile dysfunction or **premature ejaculation** which can be mixed up by most patients.

Additionally, it is important to ask about the **normal and physiological morning erections**, and whether the patient can have an erection due to sexual thoughts. If the patient can attain an erection in these circumstances but not with his partner, the possibility of **psychogenic erectile dysfunction** is high.



[Image:](#) "Digital rectal exam of the prostate." by Unknown - This image was released by the National Cancer Institute, an agency part of the National Institutes of Health, with the ID 7136.
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Risk factors for erectile dysfunction such as a **relevant drug history, alcohol intake** and **tobacco smoking** should be excluded. It is also important to ask about **painful erections, increased curvature of the erect penis** and history of previous **sexual trauma** to the penis which can point towards Peyronie's disease.

Systemic conditions known to be associated with erectile dysfunction such as diabetes, hypertension, multiple sclerosis, and polyneuropathy should be excluded. **Physical examination** should include a **genital examination** to exclude any penile structural abnormalities such as plaques, to assess the prostate via **rectal examination**, and to exclude **male hypogonadism**.

Diagnostic Work-up for Erectile Dysfunction and Peyronie's Disease

Laboratory investigations for erectile dysfunction

It is important to exclude **diabetes** or **hyperglycemia** as many patients with type 2 **diabetes** can present with symptoms and signs of peripheral vascular disease or neuropathy before the establishment of the diagnosis of diabetes. A **fasting blood glucose level** is therefore indicated.

Testosterone levels should also be checked to exclude **male hypogonadism** as the cause of erectile dysfunction. Other tests to exclude systemic diseases include **liver function tests, kidney function tests** and **BNP levels** to exclude **heart failure**/cardiovascular disease.

Imaging and more advanced evaluation for erectile dysfunction

Erectile dysfunction is a very subjective symptom and **specific sexual questionnaires** should be used to objectively evaluate sexual performance and to confirm the diagnosis of erectile dysfunction. These questionnaires exist to confirm the diagnosis of erectile dysfunction but cannot identify the cause of the problem.

The next step would be to **exclude vascular causes** by performing either an **intracavernosal injection** of vasodilators that cause tumescence within 10-15 minutes or a **color Doppler ultrasound scan**. Achieving an erection with injections is indicative of the severity of the erectile dysfunction. Color Doppler ultrasound scans help to diagnose **arteriogenic erectile dysfunction**.

Patients who are at risk of **neurogenic erectile dysfunction** due to **central nervous system disease** or **peripheral neuropathy** should undergo specific neurologic testing which might include a **brain magnetic resonance image, spinal magnetic resonance imaging** and/or **electromyography studies**.

Treatment of Erectile Dysfunction and Peyronie's Disease

Treatment of erectile dysfunction depends on whether a cause can be identified or not. When the cause is **hypogonadism**, **testosterone** can be used. Patients with **psychogenic erectile dysfunction** benefit from **psychotherapy** and **oral sildenafil therapy, a phosphodiesterase type 5 inhibitor (PDE5 inhibitor)**, that blocks the degradative action of cGMP-specific phosphodiesterase type 5 (PDE5) on cyclic GMP in the smooth muscle cells lining the blood vessels supplying the corpus cavernosum of the penis.

Obese patients and those who have **sleep disturbances** benefit from **weight reduction** and **physical exercise**. **Smokers** and **alcoholics** should be advised to quit or abstain respectively.

If these treatments fail, **sildenafil therapy** should be tried for most patients who complain of erectile dysfunction. Additionally, **adequate glycemic control** should be achieved in patients with diabetes.

If sildenafil therapy or **another phosphodiesterase type 5 inhibitors** fail, **intracavernosal injections, intraurethral injections** and **vacuum constrictive**

devices should be tried. These treatments of erectile dysfunction carry certain risks such as **painful and prolonged erections**, hence should be used only as second-line therapies.

When all of the above fail, a **penile prosthesis** can be implanted to achieve adequate penile erections.

Several medical options exist for **Peyronie's disease** that can be tried before going for surgical correction. Systemic treatment with **vitamin E supplementation, colchicine, tamoxifen, and Acetyl-L-carnitine** have been all used with variable success in improving sexual performance in men with Peyronie's disease.

Additionally, intralesional treatments where an injection of a **calcium channel blocker** such as **verapamil, collagenases** or **interferons** can be used in this group of patients. Intralesional treatments are known to decrease and/or reverse fibrosis in the penile plaques and can perhaps alleviate the symptoms of the disease.

When local and systemic therapies fail, **surgical treatment** is usually indicated in patients with Peyronie's disease. The goal of surgery in Peyronie's disease is to achieve asymmetric penis. The penis is usually curved to one side or the other and the procedure involves lengthening the shorter side of the penis or shortening the longer side.

Another option would be a **penile prosthesis** especially in men with erectile dysfunction due to Peyronie's disease.

References

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