


# *PENILE IMPLANT ERECTION*

*M A R I B E T H M I L L S*

The recent popularity of the drug sildenafil citrate, known as Viagra®, has helped publicize the problem of erectile dysfunction (ED). Because of Viagra, the existence of erectile dysfunction is no longer hidden under the guise of embarrassment and sexual disharmony. Former US Senator Robert Dole has also increased awareness of erectile dysfunction by talking about the problems he experienced following treatment for prostate cancer.

Although men with ED may hope for improved sexual functioning while on the drug, Viagra is not a cure all. Implantation of a penile prosthesis may be necessary. A typical patient is a 50-year-old who has diabetes and cannot achieve erection. Conservative treatments and oral medications, such as Viagra and testosterone, have not proven effective. After consulting with a urologist, the patient becomes a candidate for a penile prosthesis.

# *NTS FOR DYSFUNCTION*



rectile dysfunction is defined as a consistent inability to achieve or maintain an erection of the penis necessary to have sexual intercourse. ED usually has a physical cause, such as disease, injury, or drug side effects. Any disorder that impairs blood flow in the penis has the potential to cause impotence. Incidence rises with age: about 5 percent of men at age 40 and between 15 and 25 percent of men at age 65 experience impotence. Yet, it is not an inevitable part of aging. Although one in four men experience the problem, only 5 percent have talked to their doctor about it.<sup>6</sup> The patient must acknowledge that a problem exists to take the first step toward successful treatment.

### History

In 1952, Goodwin and Scott tried to use a rib graft to reconstruct a penis that had been amputated because of a malignant growth. Use of an acrylic splint was also attempted, but neither of these methods was very successful. In 1960, Loeffler and Sayegh described the use of a perforated acrylic penile implant. In 1966, Beheri reported good results using two polyethylene rods placed in the center of each corpus cavernosum. In the early 1970s, silastic implants began to be used.

Today, three types of penile implants exist: semirigid rods, which are made of meshed silver or steel and covered by a thick layer of silicone; inflatable rods with an additional pump, and inflatable rods with an internal pump. Both types of inflatable rods are implanted into the cavernous bodies.<sup>2</sup>

### Anatomy and physiology

The penis contains two chambers, called the corpus cavernosum, which run the length of the organ. The corpora cavernosa are filled with spongy tissue, which contains smooth muscles, fibrous tissues, spaces, veins, and arteries. The urethra, which is the channel for urine and ejaculation, runs along the underside of the corpora cavernosa (Figures 1 and 2). Erection begins with sensory and mental stimulation. Impulses from the brain and local nerves cause the muscles to relax, allowing blood to fill the open

spaces and create pressure in the corpora cavernosa, making the penis expand. The fibrous tissue that surrounds the corpora cavernosa helps to retain the blood, keeping the penis erect. Erection is reversed when muscles in the penis contract, stopping the inflow of blood and opening outflow channels.

The most common cause of impotence is diminished arterial blood flow, smooth muscles and fibrous tissues, often as a result of disease. About 70 percent of cases of impotence result from diseases—diabetes, kidney disease, chronic alcoholism, multiple sclerosis, atherosclerosis, and aortoiliac vascular disease. Between 35 and 50 percent of men with diabetes experience impotence. Impotence is also a side effect of common medications, such as high blood pressure drugs, antihistamines, antidepressants, tranquilizers, appetite suppressants, and cimetidine. Smoking is another possible cause because it affects blood flow in veins and arteries and causes hormonal abnormalities, such as insufficient testosterone.<sup>3</sup>

### Diagnosis

Symptoms of ED include the inability to achieve an erection and the inability to maintain an erection for the normal duration of intercourse (erection may be too weak, too brief or too painful). Diagnosis begins with the patient's medical history, which reveals diseases or medications that would lead to impotence. The patient may be asked to recount sexual activities to distinguish between problems with erection, ejaculation, orgasm, or sexual desire. A physical examination provides clues for systemic problems, such as aortoiliac occlusive disease, which leads to impotence.

The physician may order laboratory tests for systemic diseases, including blood counts, urinalysis, lipid profile, and measurements of creatinine and liver enzymes. In cases of low sexual desire, measuring testosterone in the blood can yield information about problems with the endocrine system.

Monitoring nocturnal penile tumescence (erections that occur during sleep) can help rule

out certain psychological causes of impotence. If nocturnal erections do not occur, the cause of impotence is likely to be physical rather than psychological. However, tests of nocturnal erections are not completely reliable.<sup>4</sup>

### Treatment options

A variety of options are available for treatment for ED. Drug therapy is often considered the first. Initially, drugs for treating impotence were injected directly into the penis or inserted into the urethra. In March 1998, the Food and Drug Administration approved Viagra, the first oral pill to treat impotence. The pill is taken one hour before sexual activity, and works by enhancing the effects of nitric oxide, a chemical that relaxes smooth muscles in the penis during sexual stimulation, allowing increased blood flow. The recommended dose of Viagra is 50 mg; however, doses may be adjusted, depending on the patient's needs. The drug should not be taken more than once a day.<sup>4</sup>

When more conservative means have not produced erection, surgery is another form of treatment. Surgery has three goals: to implant a device that can cause the penis to become erect; to reconstruct arteries to increase blood flow to the penis; and to block off veins that allow blood to leak from the penile tissues. Implanted devices, known as penile prostheses, can restore erection in many men suffering from impotence.

### Inflatable prosthesis

An inflatable penile prosthesis is a hydraulic system intended to be surgically implanted into the penis for the management of erectile impotence. The prosthesis consists of a pump, a reservoir, and two penile cylinders, which fit into the corpora cavernosa of the penis (Figure 3). The fluid reservoir is implanted underneath the abdominal muscles and is connected to the cylinders through a pump in the patient's scrotum. Reservoirs are available in 40 ml, 50 ml, 60 ml, 75 ml, 100 ml, and 125 ml fluid capacities. Repetitive squeezing of the pump bulb transfers fluid from the reservoir to

the cylinders in the penis. As the penile cylinders inflate, the penis enlarges and becomes erect facilitating intercourse. Fluid pressure is released when the patient activates the release mechanism on the pump in the scrotum, returning the penis to a flaccid state.

An implant is not advisable if infection is present in the body, especially a urinary tract or genital infection. Also, careful consideration should be given before implanting prostheses in diabetic patients who are susceptible to infection.<sup>5</sup>

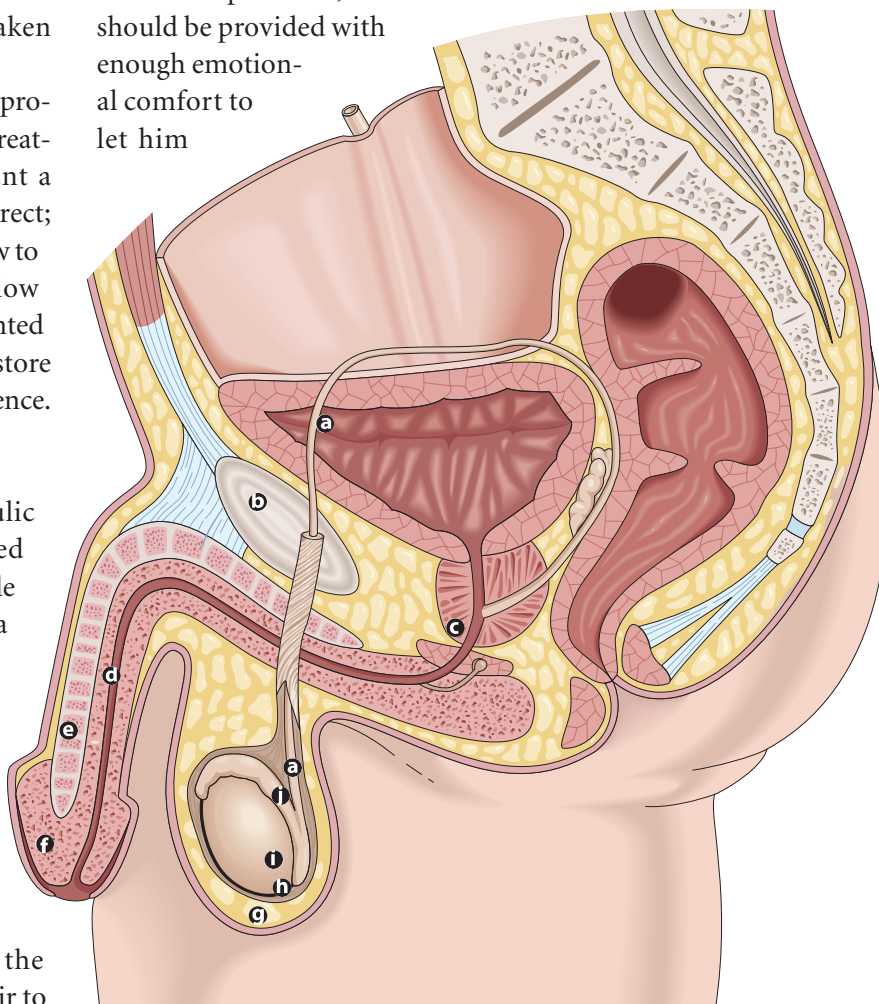
### Preoperative Preparation

The decision for a prosthesis is the patient's choice, making this an elective procedure. The patient should be counseled prior to surgery regarding the benefits and possible risk factors associated with implantation of an inflatable penile prosthesis. Once the patient has been hospitalized, he should be provided with enough emotional comfort to let him

**FIGURE 1**

### Male reproductive anatomy

- Ⓐ Vas deferens
- Ⓑ Symphysis pubis (pubic bone)
- Ⓒ Prostate gland
- Ⓓ Urethra
- Ⓔ Corpus cavernosum
- Ⓕ Penis
- Ⓖ Scrotum
- Ⓗ Tunica albuginea
- Ⓘ Testis
- Ⓚ Epididymis



## FIGURE 2

### A cross-section of the penis

- a Corpus cavernosum
- b Urethra
- c Central artery
- d Dorsal veins
- e Dorsal artery
- f Dorsal nerve
- g Corpus spongiosum

know his problem is not unique. The staff must provide support and answer questions honestly. Direct questions to the urologic surgeon.

The patient should take a cleansing antiseptic shower the evening before and the morning of surgery. Vancomycin (1 g) and Gentamycin (80 mg) are administered preoperatively as prophylaxis against infection. The patient is instructed to void immediately prior to transfer to the operating room.

The surgical team should know whether the patient is right-hand or left-hand dominant, as the pump is placed on the dominant side. Sequential compression stockings or TED hose are applied to prevent venostasis, which is the pooling of or stagnation of blood in the lower extremities predisposing the patient to clot formation (thrombus) and the risk of pulmonary emboli as a result of the thrombus. To be preventative, these stockings must be applied before anesthesia is given. Epidural or general anesthesia is required.<sup>2</sup>

The patient is then placed in supine position, caring for all the nerves involved in positioning. He is then carefully shaved at the penis and scrotum to avoid skin breaks that may be portals for infection. An electro-surgery grounding pad is applied to the patient's thigh followed by a 10-minute Beta-dine skin prep.

Because of the high risk for infection with any implantation, the sterile team is required to wear paper hoods and should be double gloved. Only the surgical team should be allowed in the OR

during the procedure. Careful sterile technique and draping are essential.<sup>1</sup>

The team should be careful not to allow the implant to come in contact with paper or cloth, which may shed fiber particles. The surgical team should clean their gloves with sterile normal saline to prevent powder from entering the sterile field. The circulator should open the prosthesis only when the surgeon is ready to use it, not before. Some suggest using two Mayo stands or two back tables—one for preparing the prosthetic components and one for the regular setup.<sup>1</sup>

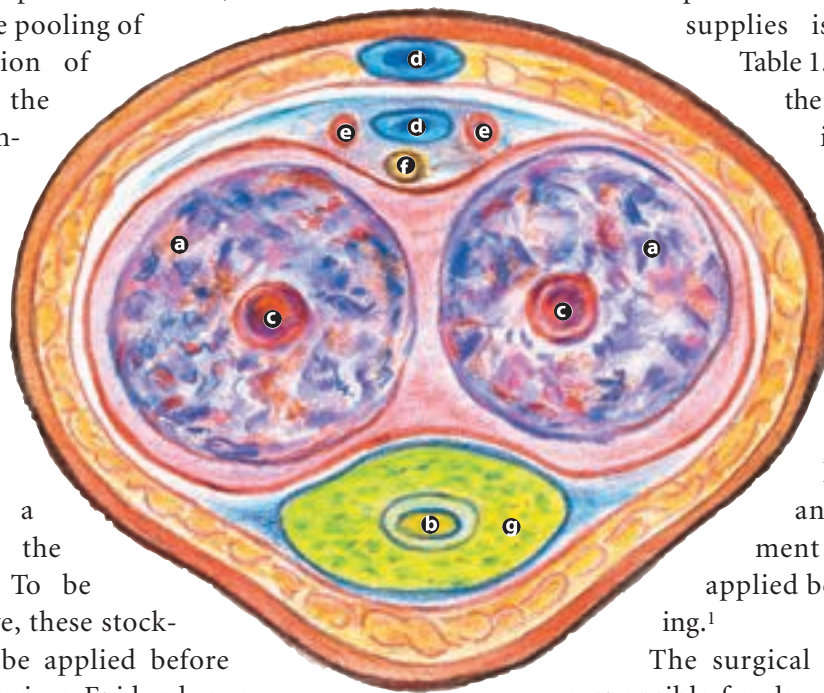
### Instrumentation, medications and supplies

A complete list of instruments and supplies is provided in Table 1. Medications on the back sterile field include Lidocaine 1%, and Vancomycin 2 g in 1000 cc sodium chloride (physiological saline) to soak the implant. A triple antibiotic ointment should be applied before the dressing.<sup>1</sup>

The surgical technologist is responsible for drugs on the sterile field. He or she should label all medications on the sterile field for patient safety and professional accountability. The surgical technologist should then report which medications were used to the circulator.

### Procedure

The procedure begins with the insertion of a 16 Fr Foley catheter with a 5 ml balloon to identify the urethra and retract the penis. A 3 cm incision is then made from the base of the penis into the scrotum. The most proximal portion of each corpus is incised, and 2-0 absorbable stay sutures



are placed. These sutures are left uncut with the needle attached and tagged.<sup>1</sup> The team should maintain awareness of the sharps on the surgical field.

Next, 7 to 11 mm Hegar dilators are used to enlarge the corpora distally and proximally. The length of the corpus is measured with a Furlow inserter. Traction sutures, which are attached at the distal end of the cylinders, are threaded through the eye of the Keith needle. The needle is placed into the groove of the Furlow inserter, which is guided along the corporal tunnel. The plunger is then pushed to release the Keith needle and puncture the glans penis. A heavy hemostat is used to grasp the Keith needle and pull it through the glans. This causes the cylinders to enter the channel. The Furlow inserter is removed, and the cylinder is inserted and positioned beneath the glans penis. The surgeon then repeats the procedure on the other side.<sup>1</sup>

The surgeon palpates the external inguinal ring and uses finger dissection to create a path lateral to the testicle. Small Metzenbaum scissors are used to separate the transversalis fascia on the inguinal floor. Perivesical space is distended and Cooper's ligament is palpitated. The reservoir, primed with the appropriate amount of solution for its capacity, is positioned into the enlarged space and pulled against the floor of Hesselbach's triangle. The pump is then placed into the most dependent portion of the scrotum. The rods and reservoir tubes are connected to the pump using connectors and the assembly tool. The system is then tested for inflation and deflation. The prosthetic device should remain partially inflated to lessen bleeding. A Jackson-Pratt drain is placed, and the tunica of the scrotum sutured with a running stitch of 3-0 absorbable suture.<sup>1</sup>

The Foley catheter is left in place for the immediate postoperative period. A 4-0 absorbable suture is used to close the incision in a subcuticular fashion, then a dressing is applied. The patient may be more comfortable with the penis secured upright to the suprapubic area. Mesh pants may be helpful as a nonadherent support dressing.<sup>1</sup>

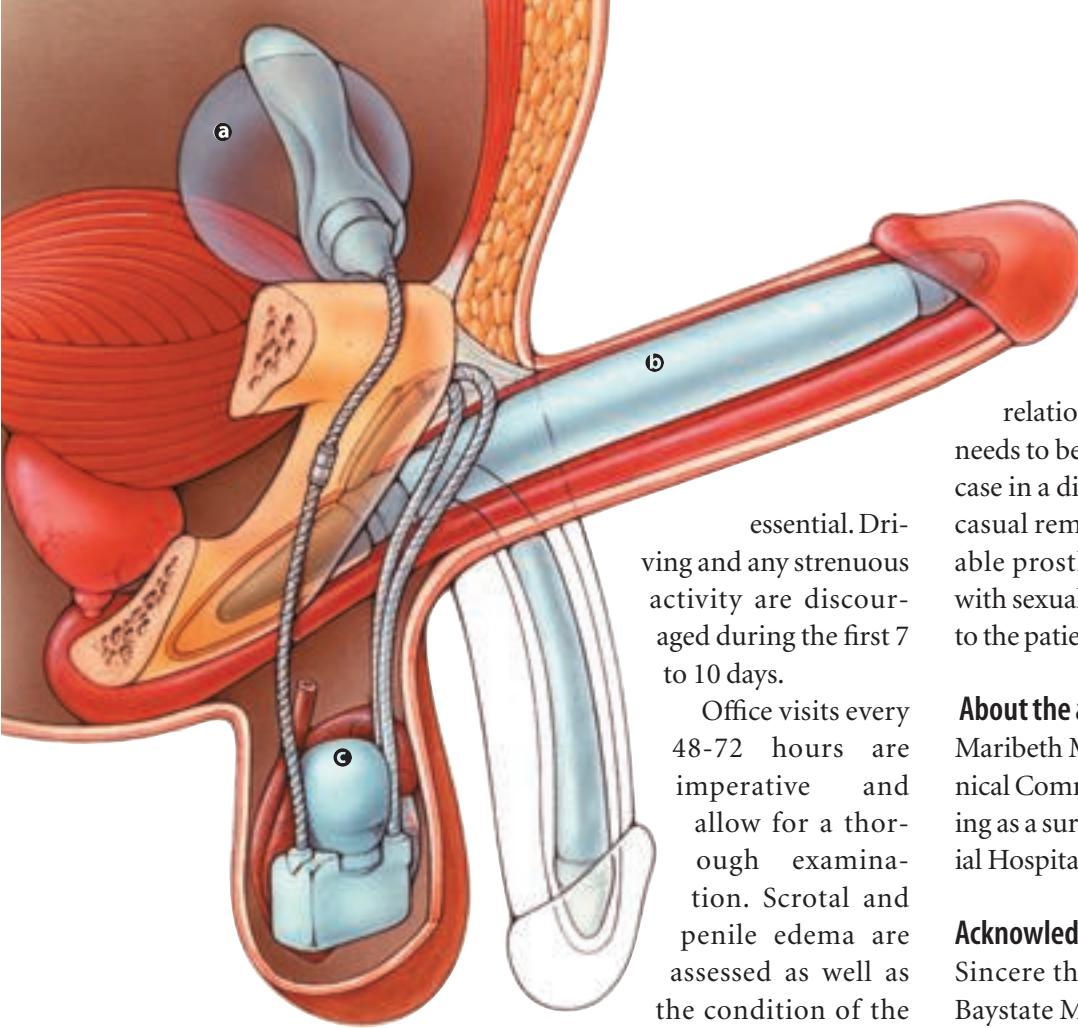
## Postoperative care

Ice packs to the suprapubic perivesical area should be applied for the first 24 hours following surgery. A Jackson-Pratt drain exiting from a small suprapubic wound will remain in place for 24-48 hours, depending on the amount of fluid that accumulates. Care must be taken to ensure proper drainage. Analgesics should be administered as directed, as well as intravenous or oral antibiotics.

When the patient is ready for discharge (24-48 hours postoperatively), specific instructions are vital. Preventing infection is one of the primary considerations, so antibiotics, antiseptic showers, and a daily routine of wound care are

### Table 1: Instrumentation

- #15 Scalpel blade
- Syringes: 10 ml, 20 ml, 60 ml
- Sterile Normal Saline Solution
- Foley Catheter 16 Fr, 5 ml balloon
- Hegar dilators (sizes 7 to 11 mm)
- Minor set with fine instruments (Adson and Debaquey forceps, needle holder, small Metzenbaum scissors)
- Yankauer suction tip
- Neuro suction tip
- Kitners or Peanuts
- Sutures: 2-0, 3-0 and 4-0 absorbable
- Keith needle
- Penile prosthesis: pump, reservoir, and cylinders
- Furlow inserter
- Closing tool
- Assembly tool for clamping connectors
- Tegaderm dressing
- Mesh pants
- Elastoplast
- Sequential compression stockings
- Electrocautery pad
- Betadine scrub
- Lidocaine 1%
- Vanomycin 2g
- 1000 cc sodium chloride
- Triple antibiotic ointment
- Jackson-Pratt drain
- Electrocautery



**FIGURE 3**

Components of  
the penile  
prosthesis

- Ⓐ Fluid reservoir
- Ⓑ Penile cylinders
- Ⓒ Pump

essential. Driving and any strenuous activity are discouraged during the first 7 to 10 days.

Office visits every 48-72 hours are imperative and allow for a thorough examination. Scrotal and penile edema are assessed as well as the condition of the wound. Approximately 10 days postoperatively, the patient is taught the correct method of pump inflation and deflation. The device should be pumped twice daily as soon as the patient can tolerate the associated pain. The patient is also taught to properly apply pressure and pull the pump downward in the scrotum to prevent the possibility of the tubing coiling or kinking between the pump and the cylinders. This also insures that the pump heals in the lower, dependent portion of the scrotum.

Walking and loose clothing is encouraged, but patients should avoid strenuous activity. Sexual activity is allowed in 4 to 8 weeks with ample lubrication.<sup>2</sup>

### Conclusion

Although this surgery is not a common procedure, more men are now addressing the problem of erectile dysfunction. Like every procedure, a penile prosthesis has benefits and risks. It can add to the patient's personal life, improving quality of life and his relationship with a partner.

However, the risk of infection is always present.

Surgery for sexual dysfunction is sensitive, touching a very personal side of the life of a couple.

Erectile dysfunction may threaten that relationship. In the operating room the staff needs to be sensitive to the patients and treat this case in a dignified professional manner. Jokes or casual remarks about the surgery, or the inflatable prosthesis, may demonstrate discomfort with sexually related body parts and insensitivity to the patient, who is the reason for our existence.

### About the author

Maribeth Mills is a graduate of Springfield Technical Community College. She is currently working as a surgical technologist at Johnson Memorial Hospital in Stafford Springs, Connecticut.

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