

Impotence (Erectile Dysfunction)

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WHAT IS IMPOTENCE (ERECTILE DYSFUNCTION)?

Impotence is the inability to achieve or maintain an erection sufficiently rigid for sexual intercourse, ejaculation, or both. Sexual drive and the ability to have an orgasm are not necessarily affected. Because all men experience erection problems from time to time, doctors consider impotence to be present if attempts at intercourse fail on at least 25% of attempts.

Impotence is not new in medicine or human experience, but it is not easily or openly discussed. Cultural expectations of male sexuality inhibit many men from seeking help for a disorder that can, in most cases, benefit from medical treatment. The term "impotence" comes from Latin and means loss of power; a more accurate term is "erectile dysfunction." The condition is normal and usually temporary, so it is highly unfortunate that the common term for it implies a sweeping diminution in a man's overall capabilities.

The Penis and Erectile Function

The Structure of the Penis. The penis is composed of the following structures:

- Two parallel columns of spongy tissue called the *corpus cavernosa* , or erectile bodies.
- A central spongy chamber called the *corpus spongiosum* , which contains the urethra, the tube that carries urine from the bladder through the penis.

These structures are made up of *erectile tissue* . Erectile tissue is rich in tiny pools of blood vessels called *cavernous sinuses* . Each of these vessels are surrounded by smooth muscles and supported by elastic fibrous tissue composed of a protein called *collagen*.

Erectile Function. The penis is either flaccid or erect depending on the state of arousal. In the flaccid, or unerect, penis, the following normally occurs:

- Small arteries leading to the cavernous sinuses contract, reducing the inflow of blood.
- The smooth muscles regulating the many tiny blood vessels also stay contracted, limiting the amount of blood that can collect in the penis.

During arousal the following occurs:

- The man's central nervous system stimulates the release of a number of chemicals, including nitric oxide.
- Nitric oxide stimulates production of cyclic GMP, a chemical that relaxes the smooth muscles in the penis. This allows blood to flow into the tiny pool-like cavernous sinuses, flooding the penis.

- This increased blood flow nearly doubles the diameter of the spongy chambers.
- The veins surrounding the chambers are squeezed almost completely shut by this pressure.
- The veins are unable to drain blood out of the penis and so the penis becomes rigid and erect.
- After ejaculation or arousal, cyclic GMP is broken down by an enzyme called phosphodiesterase-5 (PDE5), and other compounds are released that cause the penis to become flaccid (unerect) again.

Important Substances for Erectile Health

A proper balance of certain chemicals, gases, and other substances is critical for erectile health:

Collagen. The protein collagen is the major component in structural tissue in the body, including in the penis. Excessive amounts, however, form scar tissue, which can impair erectile function.

Oxygen. Oxygen-rich blood is one of the most important components for erectile health. Oxygen affects two substances that are important in achieving erection:

- Oxygen suppresses transforming growth factor beta 1 (TGF-B1). TGF-B1 is a component of the immune system called a cytokine and is produced by smooth muscle cells. It appears to stimulate collagen production in the corpus cavernosum, which can lead to erectile dysfunction.
- Oxygen enhances the activity of prostaglandin E1. Prostaglandin E1 is produced during erection by the muscle cells in the penis. It activates an enzyme that initiates calcium release by the smooth muscle cells, which relaxes them and allows blood flow. Prostaglandin E1 also suppresses production of collagen.

Oxygen levels vary widely from reduced levels in the flaccid state to very high in the erect state. During sleep, oxygen levels are high and a man can normally have three to five erections per night, each one lasting from 20 to 40 minutes.

Testosterone and Other Hormones. Normal levels of hormones, especially testosterone, are essential for erectile function, though their exact role is not clear.

Erectile Dysfunction and Oxygen Deprivation

Erectile dysfunction most commonly occurs when the penis is deprived of oxygen-rich blood. When oxygen levels to the penis are low, an imbalance occurs in two important substances, TGF-B1 and prostaglandin E1:

- TGF-B1 levels increase, which trigger production of collagen, a tough protein that forms all types of connective tissue, including scar tissue.
- In addition, there is a reduction in prostaglandin E1, a chemical that suppresses collagen production and relaxes the smooth muscles to allow blood flow resulting in an erection.

When TGF-B1 levels increase and prostaglandin E1 levels decrease, smooth muscles waste

away and collagen is overproduced, causing scarring, loss of elasticity, and reduced blood flow to the penis. A number of conditions can deprive the penis of oxygen-rich blood.

Blockage of Blood Vessels (Ischemia). The primary cause of oxygen deprivation is ischemia, the blockage of blood vessels. The same conditions that cause blockage in the blood vessels leading to heart problems may also contribute to erectile dysfunction. For example, when cholesterol and other factors are imbalanced, a fatty substance called plaque forms on artery walls. As the plaque builds up, the arterial walls gradually narrow, reducing blood flow. This process, known as atherosclerosis, is the major contributor to the development of coronary heart disease. It may also play a role in the development of erectile dysfunction.

WHO BECOMES IMPOTENT?

A large survey in 2000 suggested that nearly 620,000 American men between ages 40 and 70 experience erectile dysfunction of any degree each year, and an estimated 20 million and 30 million men in the US have erectile dysfunction at some point during their lives.

Being older is primarily associated with impotence in most men. At a major professional meeting in 2000, experts reported survey results finding that 44% of men over age 50 experienced some degree of erectile dysfunction, but less than a quarter of them discussed their problems with a physician. Many felt this was simply an aging problem. Nevertheless, impotence is not inevitable with age. In another survey of men over 60 years old, 61% reported being sexually active, and nearly half derived as much if not more emotional benefit from their sex lives as they did in their 40s.

Severe erectile dysfunction in elderly men often has more to do with disease than age itself. For example heart disease, diabetes, and hypertension can cause sexual dysfunction and are more likely to occur in older than younger men.

So many physical and psychological situations can cause erectile dysfunction, in fact, that a man should consider brief periods of impotence to be as normal as having a cold. In fact, a cold is one common condition that can cause temporary impotence. It is safe to say, then, that every man experiences erectile dysfunction from time to time. [See *What Are Lifestyle and Psychological Factors Contributing to Erectile Dysfunction?* and *What are the Physical Causes of Impotence?*.]

WHAT ARE LIFESTYLE AND PSYCHOLOGICAL FACTORS CONTRIBUTING TO ERECTILE DYSFUNCTION?

Differentiating between Physical and Psychological Causes of Erectile Dysfunction

Over the past decades, the medical perspective on the causes of impotence has shifted. Common wisdom used to attribute almost all cases of impotence to psychological factors. Now investigators estimate that up to 85% of impotence cases are caused by medical or physical problems. Only 15% are psychologically based.

It is often difficult to determine if the cause of erectile dysfunction is a physical or psychological one, or even some combination. The following may be helpful:

- Physical impotence can be caused by internal medical causes (e.g., diabetes, high blood pressure) or by external causes (e.g., surgery, injury, medications). Erectile dysfunction due to medical conditions usually develops gradually but continuously over a period of time. If impotence persists over a three-month period and is not due to a stressful event, drug use, alcohol, or known medical conditions, then the patient needs medical attention by a urologist specializing in impotence.
- Psychological impotence tends to develop rapidly and be related to a recent situation or event. The patient may be able to have an erection in some circumstances but not in others. Being able to experience or maintain an erection upon waking up in the morning suggests that the problem is psychological rather than physical.

It should be strongly noted that in virtually every case of impotence there are emotional issues that can seriously affect the man's self-esteem and relationships. Negative emotions may even perpetuate erectile dysfunction that has been caused by a medical condition that has been successfully treated. Many men tend to fault themselves for their impotence even if it is clearly caused by physical problems over which they have little or no control.

Emotional Disorders Associated with Erectile Dysfunction

Anxiety. Anxiety has both emotional and physical consequences that can affect erectile function. It is among the most frequently cited contributors to psychological impotence. Excessive concern about sexual performance is often referred to as performance or "honeymoon" anxiety and may provoke an intense fear of failure and self-doubt. It can sometimes set off a cycle of chronic impotence. In response to anxiety, the brain releases chemicals known as neurotransmitters that constrict the smooth muscles of the penis and its arteries. This constriction reduces the blood flow into and increases the blood flow out of the penis. Even simple stress may promote the release of brain chemicals that disrupt potency in a similar way.

Depression. Depression is strongly associated with erectile dysfunction. In one study, 82% of men who reported moderate to severe erectile dysfunction also had symptoms of depression. Depression can certainly reduce sexual desire, but it is often not clear which condition came first.

Problems in Relationships

Troubles in relationships often have a direct impact on sexual functioning. Partners of men with erectile dysfunction may feel rejected and resentful, particularly if the affected man does not confide his own anxieties or depression. Both partners commonly experience guilt for what they each perceive as a personal failure. Tension and anger frequently arise between people who are unable to discuss sexual or emotional issues with each other. It can be very difficult for the man to perform sexually when both partners harbor negative feelings.

Socioeconomic Issues

Losing a job or having lower income or education increases the risk for impotence.

Smoking

Smoking contributes to the development of impotence, mainly because it compounds the effects of other disorders of the blood vessels, including high blood pressure and atherosclerosis. For example, a 2001 study concluded that among men with high blood pressure, smoking causes a 26-fold increase in erectile dysfunction.

Alcohol

Alcohol has also been implicated in causing impotence. A small amount releases inhibitions, but having more than one drink can depress the central nervous system and impair sexual function.

Lack of Frequent Erections

Infrequent erections deprive the penis of oxygen-rich blood. Without daily erections, collagen production increases and eventually may form a tough tissue that interferes with blood flow. The spontaneous erections men have while sleeping or awake may be a natural protection against this process.

WHAT ARE THE PHYSICAL CAUSES OF ERECTILE DYSFUNCTION?

Common Medical Conditions That Contribute to Erectile Dysfunction

Diabetes. Diabetes may contribute to as many as 40% of impotence cases. Between one-third and one-half of all diabetic men report some form of sexual difficulty. Atherosclerosis and nerve damage are both common complications of diabetes; when the blood vessels or nerves of the penis are involved, erectile dysfunction can result.

High Blood Pressure. Erectile dysfunction is more common and more severe in men with hypertension than it is in the general population. Many of the drugs used to treat hypertension are thought to cause impotence as a side effect; in these cases, it is reversible when the drugs are stopped. More recent evidence is suggesting, however, that the disease process that causes hypertension itself is the major cause of erectile dysfunction in these men. Newer anti-hypertensive agents, including angiotensin-converting enzyme (ACE) inhibitors and angiotensin-receptor blockers (ARBs) are less likely to cause erectile dysfunction. In fact, ARBs may be particularly effective in restoring erectile function in men with high blood pressure who suffer from impotence.

Parkinson's Disease. As a risk factor for impotence, Parkinson's disease (PD) is an under-appreciated problem. It is estimated that about one-third of men with PD experience impotence. The physical cause of PD-related impotence is most likely an impaired nervous system. Depression and lowered self-esteem also contribute to erectile dysfunction in these patients.

Multiple Sclerosis. Multiple sclerosis (MS), which affects the central nervous system, also precipitates sexual dysfunction in as many as 78% of male patients. (Corticosteroids, which are common treatments for MS, may improve sexual function.)

Diseases that Affect the Arteries. Because erectile dysfunction is often due to blockage of oxygen in the arteries that effect the penis, other diseases that are caused by arterial blockage are associated with erectile dysfunction. They include coronary artery, peripheral artery disease,

and stroke.

Other Common Medical Conditions. Other medical conditions that have been associated with erectile dysfunction in some cases include allergies, thyroid problems, lung disease, and epilepsy.

Prostate Cancer and Its Treatments

Advanced prostate cancer can damage nerves needed for erectile function. Prostate surgery and surgical and radiation treatments for prostate cancer can also cause impotence. [See Well-Connected Report #33, Prostate Cancer.]

Prostate Cancer Surgery (Radical Prostatectomy). The first nationally representative study to evaluate long-term outcomes after radical prostatectomy concluded that impotence occurs far more frequently than previously reported. The study included more African American, Hispanic, and young men than previously studied, although there was little difference among ethnic groups. About 40% of the study subjects considered sexual impairment a moderate to big problem, but over 70% still said they would have the surgery again. Patients reported postoperative impotence at the following rates depending on procedure:

Type of Prostate Surgery	Sexual Impairment Rate
Bilateral nerve-sparing procedure	56%
Unilateral nerve-sparing procedure	59%
Non-nerve-sparing procedure	66%

A number of treatments for sexual dysfunction are available that may help some men. [See treatment sections.]

Radiation. The side effects of radiation therapy include most of those of surgery, but the risks for impotence and incontinence are considerably lower. A 2000 study concluded that adjuvant external-beam radiation therapy (given right after surgery) in moderate doses does not increase the risk for long-term urinary incontinence or sexual dysfunction beyond that of surgery alone (60% to 70%). An alternative radiation technique called brachytherapy, which involves the implantation of radioactive "seeds," carries a lower impotence rate (roughly 40%). A 2000 study suggested that the dose of radiation received by the bulb of the penis correlates with risk of impotence. If this is confirmed by further study, carefully designed radiation may improve current rates.

Drug Treatments. Prostate cancer medical treatments commonly employ androgen-suppressive

treatments, which cause erectile dysfunction.

Surgical Treatments that Affect Intestinal Tracts

Surgery for Colon and Rectal Cancers. Surgical and radiation treatments for colorectal cancers can cause impotence in some patients. For example, a 2001 study of rectal cancer patients treated with high-dose preoperative radiation followed by surgery and intraoperative radiotherapy reported that sexual function was impaired in about half of the patients. [See Well-Connected Report #55, Colon and Rectal Cancers.]

Surgical Treatment of Inflammatory Bowel Disease. Rectal excision for inflammatory bowel disease can cause impotence, but rates are low (2% to 4%).

Operations for Fistulas. Surgery to repair anal fistulas can effect the muscles that control the rectum (external anal sphincter muscles), sometimes causing impotence. (Repair of these muscles may restore erectile function.)

Treatments for Benign Prostatic Hyperplasia (BPH)

Surgery and drug treatments for benign prostatic hyperplasia (BPH) can also increase the risk for impotence, although to a much lesser degree than surgery for prostate cancer.

- Between 4% and 10% of patients who have transurethral resection of the prostate (TURP) and open prostatectomy for BPH report impotence afterward. The risk is very low, however, in men who were functioning normally before surgery.
- Finasteride (Proscar) has been associated with impotence in between 6% and 19% of patients. Anti-androgen agents used to treat BPH can also cause erectile dysfunction.

Medications

About a quarter of all cases of impotence can be attributed to medications. Many drugs pose a risk for erectile dysfunction. Some authorities go so far as to say that nearly every drug, prescription or nonprescription, can be a cause of temporary erectile dysfunction.

Among the drugs that are common causes of impotence are the following:

- Drugs used in chemotherapy.
- Many drugs taken for high blood pressure, particularly diuretics and beta-blockers.
- Most drugs used for psychological disorders, including anti-anxiety drugs, anti-psychotic drugs, and antidepressants, especially selective serotonin reuptake inhibitors (SSRIs). Newer antidepressants pose fewer problems.

Drugs that sometimes cause impotence include:

- Older anti-ulcer medications (cimetidine).
- Anticholinergic drugs (including some antihistamines).
- Antinausea agents, particularly metoclopramide (Reglan).

- Antifungal drugs (especially ketoconazole).

Physical Trauma, Stress, or Injury

Injury to the Spine. Spinal cord injury and pelvic trauma, such as a pelvic fracture, can cause nerve damage that results in impotence. Other conditions that can injure the spine and effect impotence include spinal cord tumors, spina bifida, and a history of polio.

Bicycling. Studies have indicated that frequent bicycling may pose a risk for erectile dysfunction by reducing blood flow to the penis. The greatest risk is in cyclers who sit upright while cycling.

Note: Vasectomy does *not* cause erectile dysfunction. When impotence occurs after this procedure, it is often in men whose female partners were unable to accept the operation.

Hormonal Abnormalities

Hypogonadism (Testicular Failure). Hypogonadism in men is a deficiency in male hormones, usually due to an abnormality in the testicles, which secrete these hormones. It affects four to five million men in the United States. In addition to impotence, hypogonadism causes reductions in energy, sex drive, lean body mass, and bone density. Hypogonadism can be caused by a number of different conditions. Among them are the following:

- Disorders in the pituitary or hypothalamus glands.
- Malnutrition.
- Genetic factors.
- Myotonic dystrophy.
- Orchitis (inflammation of the testicles).
- Physical injury.
- Mumps.
- Radiation treatments.
- Exercise-induced hypogonadism. Only a few cases of exercise-induced hypogonadism have been identified in men, but some researchers believe certain athletes may be at risk, including those who began endurance training before full sexual maturity, have very low body weight, and have a history of stress fractures.

Low Testosterone Levels. Only about 5% of men who see a physician about erectile dysfunction have low levels of testosterone, the primary male hormone. In general, lower testosterone levels appear to reduce sexual interest, not cause impotence. A 1999 study, however, suggests that testosterone levels are not an accurate reflection of sexual drive.

Other Hormonal Abnormalities. Other hormonal abnormalities that can lead to erectile dysfunction include:

- High levels of the female hormone estrogen (which may occur in men with liver disease).
- Abnormalities of the pituitary gland that cause high levels of the hormone prolactin are particularly likely to cause impotence.
- Other, uncommon hormonal causes of impotence include an underactive or overactive thyroid or adrenal gland abnormalities.

Varicoceles

A varicocele is an enlarged (varicose) vein in the cord that connects to the testicle. Varicoceles are found in 15% to 20% of all men and in 25% to 40% of infertile men. When varicoceles occur in both testicles, they may contribute to hormone imbalances that cause erectile dysfunction.

Other Erectile Abnormalities

Peyronie's Disease

Peyronie's disease is an accumulation of scar tissue within the penis shaft. This inflammation may be associated with an injury to the penis, but no clear information exists on its origin. The scar tissue within the shaft often causes the penis to curve and can make erection and intercourse difficult and painful. The disease often goes into a type of spontaneous remission, and some individuals are able to resume sexual activity, although scarring may result in erection problems.

Treatment for Peyronie's Disease. If Peyronie's disease is treated early, ultrasound, heat application, and anti-inflammatory drugs may help reduce scar formation. There have been reports that potassium para-aminobenzoate (POTABA) may be helpful. Vitamin E has also been tried but does not seem to be very useful. Studies are suggesting that the calcium channel blocker verapamil may be helpful. One study used verapamil and the steroid dexamethasone administered through a special skin patch. More than 80% of patients reported a definite improvement in penile rigidity. Extracorporeal shock wave therapy, which uses sound waves to break up scar tissue, has also been used with some success, particularly when it is used with verapamil. In severe cases of scarring, the only treatment is surgery to straighten the penis and reduce the curve. Penile implants may also be beneficial.

Priapism

Priapism is a sustained, painful, and unwanted erection that persists despite a lack of sexual stimulation. Generally, priapism results when the smooth muscle tissue remains relaxed so that a

constant flow of blood into the vessels of the penis occurs with no leakage back out. The development of priapism has been associated with urinary stones, certain medications, neurologic disorders, and, more recently, with self-injection therapy used for impotence.

Treatment of Priapism. If priapism occurs, applying ice for 10-minute periods to the inner thigh may help reduce blood flow. Erections that last four hours or longer require emergency care.

HOW SERIOUS IS ERECTILE DYSFUNCTION?

Impotence can be a symptom of serious medical conditions, such as atherosclerosis, diabetes, and hypertension. It can also indicate injury, age-related changes in tissue, or long-term effects of smoking, heavy drinking, or unhealthy diet.

Psychological effects can be significant. Erectile dysfunction can have a devastating impact on a relationship and can cause extreme depression, which may become chronic if not treated. When a consistent pattern of sexual dysfunction extends over a prolonged period of time, a serious physical or emotional disorder may be present.

HOW IS ERECTILE DYSFUNCTION DIAGNOSED?

Physician Interview

The physician typically interviews the patient about many physical and psychological factors. The patient must be as frank as possible for his physician to make a diagnosis. He should not interpret these questions as intrusive or too personal if he expects to obtain help. These questions are very relevant and important for determining the proper approach. Even when erectile dysfunction has a clear physical cause, relationships and psychological factors can also have an effect.

Medical and Personal History. The physician should take a medical and personal history and may ask about the following:

- Past and present medical problems.
- Medications or drugs being used.
- Any history of psychological problems, including stress, anxiety, or depression.

Sexual History. In addition the physician will ask about the patient's sexually history, which may include the following:

- The nature of the onset of the dysfunction.
- The frequency, quality, and duration of any erections, and whether they occur at night or

in the morning.

- The specific circumstances when erectile dysfunction occurred.
- Details of technique.
- The patient's motivation for and expectations of treatment.
- Whether problems exist in the current relationship.

Interviewing the Sexual Partner. If appropriate, the physician might also interview the sexual partner. In fact, including the partner in the interview process may help the physician to better decipher underlying causes and in turn better recommend treatment choices.

Physical Examination

The physician should perform a careful physical exam, including examination of the genital area and a digital rectal examination (the doctor inserts a gloved and lubricated finger into the patient's rectum) to check for prostate abnormalities.

Trials Using Treatments for Erectile Function

A useful approach is to administer a treatment for erectile dysfunction and then observe the response: Physicians now usually recommend a trial of sildenafil (Viagra) to test for an erection response after 30 to 60 minutes. This drug is replacing more invasive and expensive tests, such as an injection of papaverine or prostaglandin E1, medications that dilate blood vessels in the penis. They produce an erection in about 15 minutes.

After administering the treatment and waiting the appropriate amount of time, the physician then observes the erectile response, curvature of the penis, and response after erection, sometimes using an ultrasound scanner to assess blood flow.

Laboratory Tests

Blood Tests for Hormonal Abnormalities. Blood tests may be used to measure testosterone levels and, if necessary, prolactin levels to determine if there are hormone problems. The physician may also screen for thyroid and adrenal gland dysfunction. In addition, various specific tests for erectile dysfunction can be performed.

Tests for Medical Conditions that may be Causing Erectile Dysfunction. Evidence of other medical conditions should be sought, particularly hypertension, diabetes, atherosclerosis, and nerve damage.

Monitoring Nighttime Erections

Tests that monitor nighttime erections may be used to determine if the causes of erectile dysfunction are more likely to be psychological. Neither of the following methods is helpful in determining a physical cause for erectile dysfunction.

Snap-Gauge Test. The snap-gauge test monitors the man's ability to achieve an erection during sleep. It is a very simple test.

- When the man goes to bed, he places bands around the shaft of his penis.
- If one or more breaks during the course of the night, it provides evidence of an erection. In this case, a psychological basis for the erectile dysfunction is likely.

RigiScan Monitor. A more sophisticated and more expensive device is the RigiScan monitor, which makes repetitive measurements of rigidity around the base and tip of the penis. This test is quite accurate but may fail to detect mild cases of erectile dysfunction.

Penile Brachial Index

The penile brachial index is a measurement that compares blood pressure in the penis with the blood pressure taken in the arm. Problems with the arterial flow to the penis can be detected using this method.

Imaging Techniques

Imaging tests may be used in certain cases, but they are expensive and often limited to younger men. Anyone considering these tests should have them done in a specialized setting by professionals experienced in their use.

Dynamic Infusion Cavernosometry and Cavernosography. Dynamic infusion cavernosometry and cavernosography (DICC) is usually only given to young men in whom some blockage of the penis or physical injury of the pelvic area is suspected. After an erection is induced with drugs, the following four steps are taken:

- The penile brachial index is taken.
- The storage ability of the penis is gauged.
- An ultrasound of the penile arteries is performed.
- An x-ray of the erect penis is taken.

Unfortunately, this test and other similar imaging techniques used to determine blood flow in the penis are currently not very effective or accurate in diagnosing and determining treatment.

Duplex Doppler Ultrasound. An ultrasound technique called duplex Doppler ultrasound may be useful alone or with sildenafil (Viagra) in detecting some causes of erectile dysfunction, such as leakage from blood vessels.

WHAT ARE THE GENERAL GUIDELINES FOR TREATING ERECTILE DYSFUNCTION?

Approach to Treatment

The cause of impotence dictates the mode of treatment. The first step is to define the cause, if possible, and then try the simplest and least-risky solution.

Before a certain treatment is prescribed, the following factors should be considered:

- Any pre-existing illnesses and medications.
- The degree of comfort with the treatment method.
- Partner satisfaction and safety profiles need to be considered. Experts strongly recommend that the patient's partner be involved to help with any necessary sexual adjustment.

No matter what the treatment, embarking on a healthy lifestyle is the first and critical step for maintaining and restoring erectile function.

Treatment Choices

Psychotherapies. Some form of psychological, behavioral, sexual, or combination therapy is often recommended for individuals suffering from impotence, regardless of cause.

Medical and Surgical Treatments. Sildenafil (Viagra), the first effective oral agent for erectile dysfunction, is currently the treatment of choice for many men.

Those who cannot or choose not to take the drug still have many other options, including the following:

- Medications inserted or injected into the penis.
- Vacuum devices.
- Intracavernosal injection therapy.
- Invasive procedures, such as penile implants or surgery (limited to those for whom other treatments haven't worked and who have been carefully screened).

Ultimately, how successful the medical treatment is and how well it is accepted depends, in large part, on the man's expectations and how he and his partner both adapt to the procedure.

WHAT LIFESTYLE CHANGES OR PSYCHOTHERAPIES MAY HELP PREVENT ERECTILE DYSFUNCTION?

Maintain General Health

Because many cases of impotence are due to reduced blood flow from blocked arteries, it is important to maintain the same lifestyle habits as those who face an increased risk for heart disease.

Diet. Everyone should eat a diet rich in fresh fruits and vegetables, whole grains, and fiber and low in saturated fats and sodium. Because erectile dysfunction is often related to circulation problems, diets that benefit the heart are especially important. [For more information, see the

Exercise. A regular exercise program is extremely important. One study reported that older men who ran 40 miles a week boosted their testosterone levels by 25% compared to their inactive peers. Another study found that men who burned 200 calories or more a day in physical activity (which can be achieved by two miles of brisk walking) cut their risk of erectile dysfunction by half compared to men who did not exercise.

Limit Alcohol and Quit Smoking. Men who drink alcohol should do so in moderation. Quitting smoking is essential.

Stay Sexually Active

Staying sexually active can help prevent impotence. Frequent erections stimulate blood flow to the penis. It may be helpful to note that erections are firmest during deep sleep right before waking up. Autumn is the time of the year when male hormone levels are highest and sexual activity is most frequent.

Kegel Exercises

The Kegel exercise is a simple exercise commonly used by people who have urinary incontinence and by pregnant women. It may also be helpful for men whose erectile dysfunction is caused by impaired blood circulation. The exercises consist of tightening and releasing the pelvic muscle that controls urination:

- Since the muscle is internal and is sometimes difficult to isolate, practice first while urinating. (Once learned, however, Kegel exercises should not be regularly performed while urinating because doing them at that time may eventually weaken the muscles.)
- Try to contract the muscle until the flow of urine is slowed or stopped. Attempt to hold each contraction for 10 seconds.
- Then release the muscle.
- Perform about 5 to 15 contractions three to five times daily.

It may be several months before the patient sees significant improvement.

Changing or Reducing Medications

If medications are causing impotence, the patient and physician should discuss alternatives or reduced dosages.

Psychotherapy and Behavioral Therapy

Even if erectile dysfunction is caused by a physical problem, interpersonal, supportive, or behavioral therapy can be of help to a patient during all phases of the decision-making process regarding possible methods of treatment. Therapy may also ease the adjustment period after the initiation or completion of treatment. It is beneficial to have the partner involved in this process. The value of sex therapy is questionable. In one study, 12 out of 20 men whose dysfunction had a psychological basis and who were advised to enter a sex clinic resisted sex

therapy out of embarrassment or because they felt it wouldn't help. Of the eight who entered therapy, only one actually achieved satisfactory sex.

WHAT ARE THE ORAL TREATMENTS FOR ERECTILE DYSFUNCTION?

Sildenafil (Viagra)

Sildenafil (Viagra) was originally developed for heart disease but was found to have a unique mechanism of action that targeted factors specific to the penis. The drug blocks the enzyme phosphodiesterase-5 (PDE5). This action maintains persistent levels of cyclic GMP, a chemical that is produced in the penis during sexual arousal and which is the primary chemical that relaxes smooth muscles and increases blood flow.

Good Candidates for Sildenafil. Sildenafil (Viagra) is now prescribed in over 90% of erectile dysfunction cases. It is a good choice for any man in good health who does not have conditions that preclude taking it. Studies indicate that overall, it may help more than 70% of patients achieve sexual function, with results depending, however, on individual conditions. It should be noted that other good options are still available for many men who do not respond to sildenafil.

Studies are indicating that sildenafil is safe and effective for many men whose erectile dysfunction is related to the following conditions:

- Hormonal problems or psychologically induced impotence. These men achieve the highest success rates (80% to 100%). Furthermore, in one study, among men with mild to moderate depression who responded to the drug, symptoms of depression eased in 76% of them.
- Stable heart disease, with symptoms responsive to drug therapy, but who are not taking nitrates.
- Controlled diabetes (type 1 or 2). Success rates in one study were 69%.
- Controlled hypertension.
- Kidney conditions, including those that require chronic dialysis and kidney transplantation.
- Parkinson's disease. There is even some evidence that Sildenafil may have properties that help brain functions (attention, memory).

Sildenafil may also help restore erectile dysfunction in some men who have had the following conditions or treatments:

- Spina bifida, a congenital defect of the spinal cord.
- Spinal cord injury with some erectile response.
- Radiation therapy for local prostate cancer. Advanced radiation techniques, such as 3D

conformal therapy, along with sildenafil offer the best chances for success (70% in one study).

- Nerve-sparing radical prostatectomy. Sildenafil restores potency in an average of 30% of patients who have had this surgery for prostate cancer. It may be considerably more effective in younger men who were potent before surgery and who had bilateral nerve-sparing procedures. It is unlikely to be effective for men over 55 who had unilateral or non-nerve-sparing procedures. When it works, it may take nine months or longer, so men might benefit from alprostadil injections starting right after surgery. They help prevent scarring and preserve elasticity.

Higher-Risk Candidates. Men with the following conditions should not take sildenafil without the recommendation of their physicians and even then should use it with caution:

- Severe heart disease, such as unstable angina, a history of heart attack, or arrhythmias. Sildenafil increases nerve activity associated with cardiovascular function, especially during physical and mental stress. Men with heart disease may benefit from an exercise test to determine whether resuming sexual activity increases their risk of a heart attack. [See also Effects on the Heart, below.]
- Recent history of stroke.
- Hypotension (very low blood pressure).
- Uncontrolled diabetes.
- Uncontrolled hypertension.
- Taking anticoagulant therapy.
- Heart failure.

Retinitis pigmentosa. (With this genetic disease, people do not produce phosphodiesterase-5 and do not respond to sildenafil.)

Administration and Effect. Sildenafil is effective within 20 to 40 minutes; its effects may last for several hours. The drug works only when the man experiences some sexual arousal. Patients usually take 50 mg, although lower doses (e.g., 25 mg) may be appropriate in some groups, such as elderly patients. Sildenafil should not be used more than once a day and the dose should not exceed 100 mg. It may help men who did not respond to initial therapy with penile injections. and can also be used together with injections, though side effects can be quite intense when the combination is used.

Side Effects and Other Limitations. Common side effects include flushing, gastrointestinal distress, headache, nasal congestion, and dizziness.

Effects on the Heart. There were early reports of fatal heart attacks in a small percentage of men taking the drug. While more recent studies are not finding a higher risk for heart attack so far in men who take Viagra, its effects on the heart and circulation are mixed. On the one hand, a small 2001 study reported that it may improve blood flow to the heart. However, another 2001 study reported that the drug may excite the nerves associated with heart function. And it is known to cause small drops in blood pressure. Of specific concern in this regard are sudden and possibly dangerous drops in blood pressure when Viagra is taken with nitrates, such as

nitroglycerine, which are used for angina. The effects have been fatal in some men. No one taking nitrates, including the recreational drug amyl nitrate, should take sildenafil. The bottom line is that caution is still warranted for men with severe heart disease until more research has been conducted.

Visual Effects. About 2.5% of men experience abnormal visual effects that include seeing a blue haze, temporary increased brightness, and even temporary vision loss in a few cases. Experts believe that visual disturbances are related to the inhibition of phosphodiesterase enzymes in the retina, but the effect appears to be temporary and insignificant, lasting a few minutes to several hours. Men at risk for eye problems who take sildenafil regularly should have frequent eye examinations with an ophthalmologist. Men should also see an eye doctor if visual problems last more than a few hours.

Risk of Priapism. The drug poses a very low risk for priapism in most men. (Priapism is sustained, painful, and unwanted erection.) Exceptions are young men with normal erectile function who take sildenafil.

Interactions with Other Drugs. In addition to serious interactions with nitrates, it also may interact with certain antibiotics, such as erythromycin, and acid blockers, such as cimetidine (Tagamet). Patients should tell their physician about any medications they are taking.

Decrease in Effectiveness. Over time, sildenafil may lose effectiveness. A 2001 study found that after two years, 20% of patients had increased their dose to achieve the same effect, and 17% had discontinued sildenafil due to loss of efficacy. It is possible that these men were suffering from heart disease or other problems that was making their impotence worse. An earlier study found that 96% of men who had been taking sildenafil for two to three years remained satisfied with the treatment.

New Generation PDE5 Inhibitors

Researchers are investigating a newer version of drugs that inhibit the enzyme targeted by sildenafil, phosphodiesterase-5 (PDE5).

IC351 (Cialis). Cialis is a potent and highly selective PDE5 inhibitor and may not affect other parts of the body, including the brain, heart, kidney and eyes. Clinical trials are reporting significant success rates in up to 88% of patients. It appears to take effect in 15 minutes and the effects last up to 24 hours. Improved results were reported in men suffering from erectile dysfunction of varying severity and causes. Common side effects include headache, muscle pain, stomach upset following meals, and back pain. Additional trials of the drug are under way.

Vardenafil. Vardenafil is another PDE5 inhibitor currently being investigated. One small study concluded that it increased penile rigidity and tumescence. Another found that it may aid men who have impotence because of prostate cancer surgery. Further evaluation is warranted.

Angiotensin-Receptor Blockers for Men with Hypertension

Recent drugs known as angiotensin-receptor blockers (ARBs), also known as angiotensin II receptor antagonists are being used to lower blood pressure in men with hypertension. In one study after 12 weeks of treatment with an ARB called losartan (Cozaar), 88% of hypertensive males with sexual dysfunction reported improvement in at least one area of sexuality. The number of men reporting impotence declined from 75.3% to 11.8%. Other ARBs include

candesartan (Atacand), telmisartan (Micardis), and valsartan (Diovan).

Testosterone Replacement Therapy

Replacement Therapy for Hypogonadism. Testosterone replacement therapy may be effective in inducing puberty in adolescent boys with hypogonadism and may also be helpful for some adult patients with the condition. Some experts believe testosterone replacement therapy also may be helpful for older men whose testosterone levels are deficient. Over the course of about three months, it may gradually heighten sexual interest. It can also improve bone density, boost energy and mood, and increase muscle mass and weight.

Forms of testosterone therapy include the following:

- Muscle injections using testosterone enanthate (Andryl, Delatestryl) or cypionate (Andro-Cyp, Depo-Testosterone, Virion). This has been the standard administration.
- Skin patch (Testoderm, Testoderm TTS, Androderm). Depending on the brand, patches may be applied to the skin of the scrotum every 24 hours or to the abdomen, back, thighs, or upper arm. In the latter case, two patches are required every 24 hours. Testoderm and Testoderm TTS may cause less skin irritation than Androderm. The skin patch achieves normal testosterone levels in between 67% and 90% of men.
- Skin gel (Androgel). At this time, the gel is applied only to the same parts of the body as the patch. In one study the gel produced normal testosterone levels in 87% of men. A gel applied to the penile skin is being investigated for men with hypogonadism and erectile dysfunction. Pregnant women must avoid contact with the gel because theoretically the testosterone could harm the fetus.

Oral forms of testosterone are not recommended because of the risk for liver damage when taken for long periods of time.

Testosterone in Men with Normal Levels. Testosterone therapy is not recommended for men with testosterone levels that are normal for their age group. In such men, replacement therapy does not appear to have any benefits for increased bone mass or muscle strength. There is also some concern that replacement therapy in men with normal testosterone levels may increase the risk for the following adverse effects:

- Lower HDL (the so-called good cholesterol).
- Rapid growth of prostate tumors in men with existing prostate cancers. (Although some studies indicate that taking testosterone does not increase the risk for prostate cancer, some experts remain concerned.)
- Lower sperm count.
- Possible cause of sleep apnea.
- Possible increased risk for polycythemia, an abnormal increase in red blood cells.
- Possible increased risk for benign prostatic hyperplasia.

DHEAS. Dehydroepiandrosterone sulfate (DHEAS) is a male hormone involved in the

production of testosterone. Levels of this hormone decrease as a man ages. In a 2000 study, men under 60 years old with erectile dysfunction tended to have lower DHEAS levels than their peers. In one small study, those who took DHEAS for 16 weeks experienced some improvement in erectile dysfunction. It is available as a supplement but should not be taken without the recommendation of a physician. The long-term effects of this potent hormone are unknown but may be similar to those of testosterone replacement.

Yohimbine

Yohimbine (Yocon, Yohimex) is derived from an herbal remedy. It appears to boost erectile function by improving blood flow. Studies have been inconclusive about its benefits, but a recent analysis of seven trials reported that between 34% and 75% of men achieved favorable results when taking 5 mg to 10 mg. Side effects include nausea, insomnia, nervousness, and dizziness. Large doses of yohimbine can increase blood pressure and heart rate. One death has been reported from taking tablets of the standard dosage (5.4 mg). More rigorous studies are needed to confirm its effectiveness, and men suffering from anxiety or hypertension are cautioned against its use. To boost success rates, some doctors suggest combining it with the antidepressant drug trazodone if a patient is also depressed.

The American Urologic Association does not recommend yohimbine for treating impotence, although some experts believe it is an inexpensive and reasonable option for some men. It should be noted, that Yohimbine is available over the counter as an herbal remedies. It is not government regulated and brands vary in effectiveness and quality. [See What Are the Alternative Treatments for Impotence?]

Experimental Agents

Oral Phentolamine. Phentolamine is an agent that has been used in injections for achieving erection. The drug blocks adrenaline (epinephrine), which dilates blood vessels. An oral form of phentolamine (Vasomax) has been developed that may be of some benefit for men with mild impotence. The drug is not as effective as sildenafil (Viagra), but it does not interact with nitrates. In some studies, it was effective in producing erections within 20 to 40 minutes in 40% to 50% of men with mild to moderate erectile dysfunction. Side effects include nasal congestion, headache, light-headedness, low blood pressure, tachycardia (increased heart rate), and nausea.

Apomorphine. Apomorphine (Uprima), which is taken as a tablet under the tongue, causes a sexual signal in the brain to trigger an erection, although it is not an aphrodisiac. Studies report improved erectile function in 40% to 60% of men, with the better results occurring at the higher doses. High doses, however, also cause severe side effects, including nausea (in between 15% to a third of patients), yawning, fatigue, dizziness, sweating, excitability, and aggression. Apomorphine appears to be safe for men with diabetes or stable heart disease, and is well tolerated by men with high blood pressure. It is available in Europe but the manufacturer withdrew the drug application in the US.

Alpha-MSH Agents. Researchers are investigating drugs that are derived from a natural substance released in the brain called alpha-MSH, which increases sexual behavior. One agent called Melanotan II is showing promise in investigative studies. In one study, 60% of men achieved erections after injections of Melanotan II, but up to 20% of men experience severe nausea. It appears to increase sexual desire and takes over an hour to take effect. Another promising agents is a nasal spray called PT-141 that may enhance erectile function by stimulating receptors in the hypothalamus section of the brain. This area of the brain is

associated with emotions and sexual arousal.

WHAT ARE INJECTION AND TOPICAL TREATMENTS FOR ERECTILE DYSFUNCTION?

Penile injections have now largely been replaced by oral medications, specifically sildenafil. Nevertheless, injection and topical (skin) therapies employ various agents that have properties that help achieve erection, even in many men who do not succeed with sildenafil. The standard agents used in injections or topical administration include the following:

- Alprostadil.
- Phentolamine.
- Papaverine.

Although any or all of these agents are very effective, injections or other invasive methods of administration are awkward and uncomfortable. Topical forms of some of these agents are showing promise.

Treatments Using Alprostadil

Alprostadil is derived from a natural substance, prostaglandin E1, and acts by opening blood vessels. It is an effective treatment for some men. It can be administered in three ways:

- By injection into the erectile tissue of the penis (Caverject, Edex).
- By a device that administers the drug through the urethra (MUSE system).
- In a topical cream (Topiglan, Alprox-TD).

Candidates. Regardless of how it is administered, alprostadil works in many men with a wide range of medical disorders related to erectile dysfunctions, including the following:

- Diabetes.
- Surgery.
- Injury.

Alprostadil is not an appropriate choice for the following individuals:

- Men with severe circulatory or nerve damage.
- Men with bleeding abnormalities or men who are taking medications that thin the blood, such as heparin or warfarin.
- Men with penile implants.

Side Effects of Most Alprostadil Methods. Certain side effects are common to all methods of

administration, although they may differ in severity depending on how the drug is given:

- Pain and burning at the application site. In one study half of the men who injected alprostadil experienced some burning and pain at the injection site.
- Scarring of the penis (Peyronie's disease), which is most likely to occur with injections.
- Sudden, low blood pressure. Symptoms include dizziness, lightheadedness, and fainting. If these symptoms occur, the man should lie down immediately with his legs raised.
- Priapism (prolonged erection). Possible with any method, but less chance with the MUSE system than with injections. If priapism occurs, applying ice for ten-minute periods to the inner thigh may help reduce blood flow. Erections that last four hours or longer require emergency care.
- Women partners may experience vaginal burning or itching. The drug may have toxic effects if it reaches the fetus in pregnant women, so men should not use alprostadil for intercourse with pregnant women without the use of a condom or other barrier contraceptive device.

In addition, each method has other specific side effects. [See discussions of individual methods below].

Injected Alprostadil. Injected alprostadil (Caverject, Edex) employs a very small needle that the man injects into the erectile tissue of his penis. About 80% of men describe the pain of administering the injection as being very mild. Edex is a newer and less expensive form of injected alprostadil. In one 12-month study of 894 patients, Edex injections achieved erections in 95% of attempts. There is some evidence that the agent may have long-term benefits on smooth muscles. Some men have even reported return to spontaneous erections after long-term use, although objective evidence has not confirmed these findings.

The drug should not be injected more than three times a week or more than once within a 24-hour period.

Specific reports of the severity of side effects using injections include the following:

- Pain and burning at the injection site. Half of men reported this side effect in one study. To help prevent this side effect, experts in one study recommended a lower starting dose of 2.5 micrograms with subsequent doses increasing by increments of 2.5 until an erection is achieved. In this study there were only two episodes of pain out of 138 injections. (Usually, patients start with a dose of 20 micrograms.)
- Priapism. Studies report that up to 4% of men using injection therapy experienced erections lasting more than four hours, but most cases resolve without treatment.
- Scarring (Peyronie's disease). This occurs in almost 8% of men who use injection therapy for more than a year. Treatment can be resumed when the condition resolves.

In spite of its general success, self-injection therapy has a high dropout rate and is less likely to be used now that oral treatments are available. The primary reasons for dropping out are the following:

- Loss of interest in the procedure.

- Partner objection or relationship breakup.
- Cost.
- Spontaneous improvement in erections.
- Side effects (reported as being severe enough to withdraw by 10% of men in one study).
- Lack of effectiveness (14% in one study).

MUSE System. The MUSE system delivers alprostadil through the urethra. It works in the following way:

- The device is a thin plastic tube with a button at the top.
- The man inserts the tube into his urethral opening right after urination. (Urinating or urine leakage right after administration may reduce the amount of medication.)
- He presses the button, which releases a pellet containing alprostadil.
- The man rolls his penis between his hands for 10 to 30 seconds to evenly distribute the drug. To avoid discomfort, the man should keep the penis as straight as possible during administration.
- The man should be upright, either sitting, standing or walking for about 10 minutes after administration. By that time, he should have achieved an erection that lasts between 30 to 60 minutes. (If a man lies on his back too soon after administration, blood flow to the penis may decrease and the erection may be lost.)
- The erection may continue after orgasm.

Reported success rates have been around 50% but range widely. A 2001 study reported higher success rates with sildenafil (Viagra), and in another study, only 18% of men requested additional refills. Some experts believe that these less than optimal results may be due to the physician's failure to educate patients and their partners adequately about the procedure.

Specific reports of side effects using the MUSE system include the following:

- Burning in the urethra. Up to 31% of MUSE administrations result in a burning sensation in the urethra that can last five to 15 minutes. This pain is generally mild to moderate, however, and is not a primary reason for discontinuing.
- Penile pain. Some pain in the penis occurs in about a quarter to a third of cases; it is usually mild.
- Low blood pressure. About 3% of patients experience low blood pressure, which can cause dizziness or fainting.
- Drug interactions. Taking certain cold and allergy remedies may offset the effects of the MUSE-administered drug.
- Other side effects. Other side effects include minor bleeding or spotting, redness in the

penis, and aching in the testicles, legs, and area around the anus.

The MUSE system should not be used more than twice a day and is not appropriate for men with abnormal penis anatomy.

Topical Cream. Alprostadil is being developed as a topical cream or gel (Topiglan, Alprox-TD). The cream is applied to the tip of the penis 15 minutes before intercourse. Studies are reporting an efficacy rate of 40% to 75% and no significant side effects, although some men report a temporary burning sensation at the application site. The consequences to the female partner are not known.

Injections Using Papaverine and Phentolamine

Until the introduction of alprostadil, the two drugs used for injection therapy had been papaverine (Pavabid, Cerespan) and phentolamine (Regitine). Adverse reactions are usually minor but include pain, ulcers, and prolonged erections (priapism), which sometimes require a needle to withdraw blood or another drug to reverse the process. In a 2000 study, a combination of these two drugs produced a much higher drop out than alprostadil alone or a triple combination of all three.

WHAT PROCEDURES OR DEVICES ARE USED FOR ERECTILE DYSFUNCTION?

Vacuum Devices

Vacuum devices, or external management systems, are effective, safe, and simple to use for all forms of impotence except when severe scarring has occurred from Peyronie's disease. Devices include Erecaid, Catalyt, and the VED pump and are available over the counter.

Using the Device. Patients must receive thorough instructions in the proper use of such devices. They typically work as follows:

- The man places the penis inside a plastic cylinder.
- A vacuum is created, which causes blood to flow into the penis, thereby creating an erection.
- A band is tightly secured around the base of the penis, which retains the erection, and the cylinder is removed.
- It takes about three to five minutes to produce an erection.

Lack of spontaneity is this method's only major drawback. The erection involves only part of the penis shaft, and the process will certainly seem peculiar in the beginning. When these psychological obstacles are overcome, many couples find the result highly satisfactory.

Success Rates. Studies have found that success with the vacuum device is equal to other methods. Between 56% and 67% of men using it reported the device to be effective. In one study of men who had used the vacuum device for many years, almost 79% reported improvement in their relationships with their sexual partners, and 83.5% said they had

intercourse whenever they chose. Nevertheless, drop-out rates are high. In one 1999 study, for example, the overall drop out rate was 65%. Even in a high-success group, over half stopped using it.

Side Effects. Side effects include blocked ejaculation and some discomfort during pumping and from use of the band. Minor bruising may occur, although infrequently. It is very important to use a medically approved pump. There have been reports of injury from vacuum devices bought through catalogues that do not have a pressure-release valve or other safety elements.

Venous Flow Controllers

Vacuumless devices that trap blood within the penis are also available. They are called venous flow controllers or simple constricting devices. These devices are typically rubber or silicone rings or tubes (e.g., Actis) that are placed at the base of the erect penis to trap the erection. They can be used by men who can achieve erections but lose them easily. These devices should not be used for longer than 30 minutes or lack of oxygen can damage the penis, and they should not be used by patients who have bleeding problems or are taking anticoagulants ("blood thinners").

Penile Implants

Three types of surgical implants are currently being used for the treatment of erectile dysfunction:

- A hydraulic implant consists of two cylinders placed within the erection chambers of the penis and a pump. The pump releases a saline solution into the chambers to cause an erection, and removes the solution to deflate the erection.
- A penile prosthesis is composed of two semi-rigid but bendable rods that are placed inside the erection chambers of the penis. The penis can then be manipulated to an erect or non-erect position.
- A third implant uses interlocking soft plastic blocks that can be inflated or deflated using a cable that passes through them.

Implant surgery is irreversible. Erectile tissue is permanently damaged when these devices are implanted. Although uncommon, mechanical breakdown can occur, or the device can slip or bulge, especially if the patient coughs or vomits vigorously after the operation. In addition, a less than optimal quality of erection may result. (Using the MUSE system may restore or improve the function of a penile prosthesis in patients with a failed device.) There appear to be no long-term immune problems related to the silicon or other materials in the devices. Nevertheless, although there are more than 200,000 implant procedures were performed between 1982 and 1989, this is now the least popular therapy for erectile dysfunction.

Complications and Failure. Infection may be the major cause of penile implant failure. Redness and fever often accompany a full-blown infection. Any intermittent pain that continues to occur after an implant may be an indicator of a low-grade infections. If the infection can be caught early enough, implant failure can be prevented. Most infections are treated with antibiotics for at least 10 to 12 weeks. If antibiotics fail, a surgical exchange, in which the infected implant is simultaneously replaced with a new one, should be considered. This is a complex procedure, but some surgeons have reported a 90% success rate.

Vascular Surgery

For men whose impotence is caused by damage to the arteries or blood vessels, vascular surgery might be an option. Two types of operations are available: revascularization (or bypass) surgery, and venous ligation. The American Urologic Association stresses that vascular surgery is still investigative.

Revascularization. The revascularization procedure usually involves taking an artery from a leg and then surgically connecting it to the arteries at the back of the penis, bypassing the blockages and restoring blood flow. In a related procedure called deep dorsal vein arterialization, a penile vein is used for the bypass. Young men with local sites of arterial blockage or those with pelvic injuries generally achieve the best results. In studies of selected patients there was improvement in erectile dysfunction in 50% to 75% of men after five years.

Venous Ligation. Venous ligation is performed when the penis is unable to store a sufficient amount of blood to maintain an erection. This operation ties off or removes veins that are causing an excessive amount of blood to drain from the erection chambers. The success rate is estimated at between 40% and 50% initially, but drops to 15% over the long term. It is important to find a surgeon experienced in this surgery. In a variation of this technique called venous ablation, ethanol is injected into the deep dorsal vein, the main vein that drains blood from the penis. The ethanol causes scarring that closes off smaller veins and prevents blood leakage, thereby bolstering erectile function. In a small trial in 10 men with severe impotence, half maintained erectile function two to three years after the procedure.

WHAT ARE THE ALTERNATIVE TREATMENTS FOR IMPOTENCE?

Many alternative agents are marketed for impotence. Very few have been studied and some can be harmful. Some, but not all, are discussed in this report. [See Warning Box.]

Aphrodisiacs

Aphrodisiacs are substances that are supposed to increase sexual drive, performance, or desire. Some examples include the following:

- Viramax is a well-marketed product that contains yohimbine and three herbal aphrodisiacs: catuaba, muira puama, and maca. It has not been proven to be either effective or safe, and interactions with medications are unknown.
- Foods that some people claim have aphrodisiacal qualities include chilies, chocolate, licorice, lard, scallops, oysters, olives, and anchovies. No evidence exists for these claims, and eating large amounts of some of these foods, such as licorice and lard, can be dangerous.

Spanish fly, or cantharides, which is made from dried beetles, is the most widely-touted aphrodisiac but can be particularly harmful. It irritates the urinary and genital tract and can cause infection, scarring, and burning of the mouth and throat. In some cases, it can be life threatening. No one should try any aphrodisiac without consulting a physician.

Other Alternative Remedies

- In one small study, 78% of men who had impotence caused by impaired blood flow regained erections after taking ginkgo. More research is needed.
- Ginseng root is a traditional Asian remedy for stimulating sexual function, although no studies have been conducted on its efficacy.
- A dietary liquid supplement called ArginMax is being hailed as a natural sildenafil (Viagra). The preparation contains a number of vitamins, ginkgo, ginseng, and arginine, an amino acid that increases production of nitric oxide, a substance that relaxes blood vessels and promotes erections. As with most alternative remedies, however, rigorous studies are lacking.
- An herbal supplement sold as Vaegra has no association with the prescription drug sildenafil (Viagra).

None of these substances are regulated and their quality is not controlled. Any substance that can affect the body's chemistry can, like any drug, produce side effects that may be harmful.

Warnings on Alternative and So-Called Natural Remedies

It should be strongly noted that alternative or natural remedies are not regulated and their quality is not publicly controlled. In addition, any substance that can affect the body's chemistry can, like any drug, produce side effects that may be harmful. There have been a number of reported cases of serious and even lethal side effects from so-called natural products.

For example, some products marketed for improving sexual function (Verve, Jolt) contain gamma-butyrolactone (GBL). This substance can convert to a chemical that can cause toxic and life-threatening effects, including seizures and even coma.

In addition, some so-called natural remedies have been found to contain standard prescription medication. Most problems reported occur in herbal remedies imported from Asia, with one study reporting a significant percentage of such remedies containing toxic metals. Even if studies report positive benefits, most, to date, are very small. In addition, the substances used in such studies are, in most cases, not what are being marketed to the public.

The following website is building a database of natural remedy brands that it tests and rates. Not all are available yet.
<http://www.ConsumerLab.com/>

The Food and Drug Administration has a program called

MEDWATCH for people to report adverse reactions to untested substances, such as herbal remedies and vitamins (call 800-332-1088).

WHERE ELSE CAN SOMEONE GET HELP FOR IMPOTENCE?

National Kidney and Urologic Diseases Information Clearinghouse, Office of Communications and Public Liaison, NIDDK, NIH, 31 Center Drive, MSC 2560, Bethesda, MD 20892-25603. (<http://www.niddk.nih.gov>)

The American Association of Sex Educators Counselors and Therapists (AASECT), PO Box 5488, Richmond, VA 23220-0488. (<http://www.aasect.org/>)

Offers referrals for counselors and therapists in local areas.

American Foundation for Urologic Disease, 1128 North Charles Street, Baltimore, MD 21201
Call (410-468-1800) or (800-473-0616) for specific information on erectile dysfunction or on the Internet (<http://www.afud.org/>)

Offers information on erectile dysfunction and other urologic problems.

The Endocrine Society, 4350 East West Highway, Suite 500, Bethesda, Maryland 20814-4426.

Call (301-941-0200) or on the Internet (<http://www.endo-society.org/>)

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