Male Hypogonadism

Male hypogonadism is a condition in which the body doesn't produce enough testosterone — the hormone that plays a key role in masculine growth and development during puberty — or has an impaired ability to produce sperm or both.

You may be born with male hypogonadism, or it can develop later in life from injury or infection. The effects — and what you can do about them — depend on the cause and at what point in your life male hypogonadism occurs. Some types of male hypogonadism can be treated with testosterone replacement therapy.

Hypogonadism can begin during fetal development, before puberty or during adulthood. Signs and symptoms depend on when the condition develops.

Fetal development

If the body doesn't produce enough testosterone during fetal development, the result may be impaired growth of the external sex organs. Depending on when hypogonadism develops and how much testosterone is present, a child who is genetically male may be born with:

- Female genitals
- Ambiguous genitals — genitals that are neither clearly male nor clearly female
- Underdeveloped male genitals

Puberty

Male hypogonadism may delay puberty or cause incomplete or lack of normal development. It can cause:

- Decreased development of muscle mass
- Lack of deepening of the voice
- Impaired growth of body hair
- Impaired growth of the penis and testicles
- Excessive growth of the arms and legs in relation to the trunk of the body
- Development of breast tissue (gynecomastia)

Adulthood

In adult males, hypogonadism may alter certain masculine physical characteristics and impair normal reproductive function. Signs and symptoms may include:

- Erectile dysfunction
- Infertility

- Decrease in beard and body hair growth
- Decrease in muscle mass
- Development of breast tissue (gynecomastia)
- Loss of bone mass (osteoporosis)

Hypogonadism can also cause mental and emotional changes. As testosterone decreases, some men may experience symptoms similar to those of menopause in women. These may include:

- Fatigue
- Decreased sex drive
- Difficulty concentrating
- Hot flashes

When to see a doctor

See a doctor if you have any symptoms of male hypogonadism. Establishing the cause of hypogonadism is an important first step to getting appropriate treatment.

Male hypogonadism means the testicles don't produce enough of the male sex hormone testosterone. There are two basic types of hypogonadism:

- **Primary.** This type of hypogonadism — also known as primary testicular failure — originates from a problem in the testicles.
- **Secondary.** This type of hypogonadism indicates a problem in the hypothalamus or the pituitary gland — parts of the brain that signal the testicles to produce testosterone. The hypothalamus produces gonadotropin-releasing hormone, which signals the pituitary gland to make follicle-stimulating hormone (FSH) and luteinizing hormone (LH). Luteinizing hormone then signals the testes to produce testosterone.

Either type of hypogonadism may be caused by an inherited (congenital) trait or something that happens later in life (acquired), such as an injury or an infection. At times, primary and secondary hypogonadism can occur together.

Primary hypogonadism

Common causes of primary hypogonadism include:

- **Klinefelter syndrome.** This condition results from a congenital abnormality of the sex chromosomes, X and Y. A male normally has one X and one Y chromosome. In Klinefelter syndrome, two or more X chromosomes are present in addition to one Y chromosome. The Y chromosome contains the genetic material that determines the sex of a child and related development. The extra X chromosome that occurs in

Klinefelter syndrome causes abnormal development of the testicles, which in turn results in underproduction of testosterone.

- **Undescended testicles.** Before birth, the testicles develop inside the abdomen and normally move down into their permanent place in the scrotum. Sometimes one or both of the testicles may not be descended at birth. This condition often corrects itself within the first few years of life without treatment. If not corrected in early childhood, it may lead to malfunction of the testicles and reduced production of testosterone.
- **Mumps orchitis.** If a mumps infection involving the testicles in addition to the salivary glands (mumps orchitis) occurs during adolescence or adulthood, long-term testicular damage may occur. This may affect normal testicular function and testosterone production.
- **Hemochromatosis.** Too much iron in the blood can cause testicular failure or pituitary gland dysfunction affecting testosterone production.
- **Injury to the testicles.** Because they're situated outside the abdomen, the testicles are prone to injury. Damage to normally developed testicles can cause hypogonadism. Damage to one testicle may not impair total testosterone production.
- **Cancer treatment.** Chemotherapy or radiation therapy for the treatment of cancer can interfere with testosterone and sperm production. The effects of both treatments often are temporary, but permanent infertility may occur. Although many men regain their fertility within a few months after treatment ends, preserving sperm before starting cancer therapy is an option that many men consider.

Secondary hypogonadism

In secondary hypogonadism, the testicles are normal but function improperly due to a problem with the pituitary or hypothalamus. A number of conditions can cause secondary hypogonadism, including:

- **Kallmann syndrome.** Abnormal development of the hypothalamus — the area of the brain that controls the secretion of pituitary hormones — can cause hypogonadism. This abnormality is also associated with impaired development of the ability to smell (anosmia) and red-green color blindness.
- **Pituitary disorders.** An abnormality in the pituitary gland can impair the release of hormones from the pituitary gland to the testicles, affecting normal testosterone production. A pituitary tumor or other type of brain tumor located near the pituitary gland may cause testosterone or other hormone deficiencies. Also, the treatment for a brain tumor, such as surgery or radiation therapy, may impair pituitary function and cause hypogonadism.

- **Inflammatory disease.** Certain inflammatory diseases, such as sarcoidosis, histiocytosis and tuberculosis, involve the hypothalamus and pituitary gland and can affect testosterone production, causing hypogonadism.
- **HIV/AIDS.** HIV/AIDS can cause low levels of testosterone by affecting the hypothalamus, the pituitary and the testes.
- **Medications.** The use of certain drugs, such as opiate pain medications and some hormones, can affect testosterone production.
- **Obesity.** Being significantly overweight at any age may be linked to hypogonadism.
- **Normal aging.** Older men generally have lower testosterone levels than younger men do. As men age, there's a slow and continuous decrease in testosterone production.
- **Concurrent illness.** The reproductive system can temporarily shut down due to the physical stress of an illness or surgery, as well as during significant emotional stress. This is a result of diminished signals from the hypothalamus and usually resolves with successful treatment of the underlying condition.

  The rate at which testosterone declines varies greatly among men. As many as 30 percent of men older than 75 have a testosterone level that's below the normal range of testosterone in young men, according to the American Association of Clinical Endocrinologists. Whether treatment is necessary remains a matter of debate.

Risk factors for hypogonadism include:

- Kallmann syndrome
- Undescended testicles as an infant
- Mumps infection affecting your testicles
- Injury to your testicles
- Testicular or pituitary tumors
- HIV/AIDS
- Klinefelter syndrome
- Hemochromatosis
- Previous chemotherapy or radiation therapy
- Untreated sleep apnea

Hypogonadism can be inherited. If any of these risk factors are in your family health history, tell your doctor.

The complications of untreated hypogonadism differ depending on what age it first develops — during fetal development, puberty or adulthood.

Fetal development

A baby may be born with:

- Ambiguous genitalia
- Abnormal genitalia

Puberty

Pubertal development can be delayed or incomplete, resulting in:

- Diminished or lack of beard and body hair
- Impaired penis and testicle growth
- Unproportional growth, usually increased length, of arms and legs compared with the trunk
- Enlarged male breasts (gynecomastia)

Adulthood

Complications may include:

- Infertility
- Erectile dysfunction
- Decreased sex drive
- Fatigue
- Muscle loss or weakness
- Enlarged male breasts (gynecomastia)
- Decreased beard and body hair growth
- Osteoporosis

Your doctor will conduct a physical exam during which he or she will note whether your sexual development, such as your pubic hair, muscle mass and size of your testes, is consistent with your age. Your doctor may test your blood level of testosterone if you have any of the signs or symptoms of hypogonadism.

Early detection in boys can help prevent problems from delayed puberty. Early diagnosis and treatment in men offer better protection against osteoporosis and other related conditions.

Doctors base a diagnosis of hypogonadism on symptoms and results of blood tests that measure testosterone levels. Because testosterone levels vary and are generally highest in the morning, blood testing is usually done early in the day, near 8 a.m.

If tests confirm you have low testosterone, further testing can determine if a testicular disorder or a pituitary abnormality is the cause. Based on specific signs and symptoms, additional studies can pinpoint the cause. These studies may include:

- Hormone testing

- Semen analysis
- Pituitary imaging
- Genetic studies
- Testicular biopsy

Testosterone testing also plays an important role in managing hypogonadism. This helps your doctor determine the right dosage of medication, both initially and over time.

Treatment for adults

Treatment for male hypogonadism depends on the cause and whether you're concerned about fertility.

- **Hormone replacement.** For hypogonadism caused by testicular failure, doctors use male hormone replacement (testosterone replacement therapy, or TRT). TRT can restore sexual function and muscle strength and prevent bone loss. In addition, men receiving TRT often experience an increase in energy, sex drive and sense of well-being.

  If a pituitary problem is the cause, pituitary hormones may stimulate sperm production and restore fertility. Testosterone replacement therapy can be used if fertility isn't an issue. A pituitary tumor may require surgical removal, medication, radiation or the replacement of other hormones.

- **Assisted reproduction.** Although there's often no effective treatment to restore fertility in a man with primary hypogonadism, assisted reproductive technology may be helpful. This technology covers a variety of techniques designed to help couples who have been unsuccessful in achieving conception.

Treatment for boys

In boys, testosterone replacement therapy (TRT) can stimulate puberty and the development of secondary sex characteristics, such as increased muscle mass, beard and pubic hair growth, and growth of the penis. Pituitary hormones may be used to stimulate testicle growth. An initial low dose of testosterone with gradual increases may help to avoid adverse effects and more closely mimic the slow increase in testosterone that occurs during puberty.

Types of testosterone replacement therapy

Several testosterone delivery methods exist. Choosing a specific therapy depends on your preference of a particular delivery system, the side effects and the cost. Methods include:

- **Injection.** Testosterone injections are safe and effective. Injections are given in a muscle. Your symptoms might fluctuate between doses depending on the frequency of injections.

  You or a family member can learn to give TRT injections at home. If you're uncomfortable giving yourself injections, a nurse or doctor can give the injections.

  Testosterone undecanoate (Aveed), an injection recently approved by the Food and Drug Administration, is injected less frequently but must be administered by a health care provider and can have serious side effects.

- **Patch.** A patch containing testosterone (Androderm) is applied each night to your back, abdomen, upper arm or thigh. The site of the application is rotated to maintain seven-day intervals between applications to the same site, to lessen skin reactions.
- **Gel.** There are several gel preparations available with different ways of applying them. Depending on the brand, you either rub testosterone gel into your skin on your upper arm or shoulder (AndroGel, Testim), apply with an applicator under each armpit (Axiron) or pump on your inner thigh (Fortesta).

  As the gel dries, your body absorbs testosterone through your skin. Gel application of testosterone replacement therapy appears to cause fewer skin reactions than patches do. Don't shower or bathe for several hours after a gel application, to be sure it gets absorbed.

  A potential side effect of the gel is the possibility of transferring the medication to another person. Avoid skin-to-skin contact until the gel is completely dry or cover the area after an application.

- **Gum and cheek (buccal cavity).** A small putty-like substance, gum and cheek testosterone replacement (Striant) delivers testosterone through the natural depression above your top teeth where your gum meets your upper lip (buccal cavity). This product quickly sticks to your gumline and allows testosterone to be absorbed into your bloodstream.
- **Implantable pellets.** Testosterone containing pellets (Testopel) are surgically implanted under the skin and need to be placed every three to six months.

Taking testosterone orally isn't recommended for long-term hormone replacement because it might cause liver problems.

Keep in mind that testosterone therapy carries various risks, including contributing to sleep apnea, stimulating noncancerous growth of the prostate, enlarging breasts, limiting sperm production, stimulating growth of existing prostate cancer and blood clots

forming in the veins. Recent research also suggests testosterone therapy might increase your risk of a heart attack.