



X-Plain **Low Testosterone Reference Summary**

Introduction

Testosterone is the most important male sex hormone. It helps the body produce and maintain adult male features.

Low levels of testosterone affect a man's sex drive, physical features and mood. About 5 million American men have low testosterone. Low testosterone can be treated with hormone replacement therapy.

This patient education summary explains what testosterone does for the body. It also describes what happens if a man does not have enough testosterone. Included are diagnosis, treatment options and associated risks of low testosterone.

Testosterone

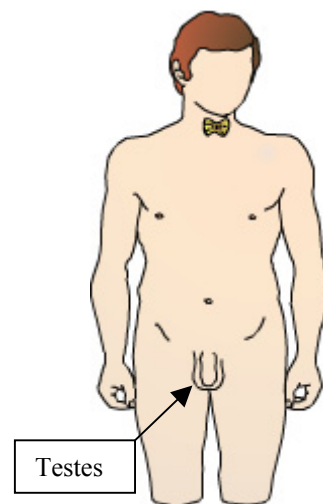
Hormones are chemicals made by glands in the body. Hormones travel in the blood stream and regulate body functions.

Testosterone is the most important male sex hormone. It causes the changes in boys, as they become men during puberty.

The testes produce most testosterone. The adrenal glands make a little bit, also. In women, the ovaries make a small amount of testosterone.

Testosterone is active throughout life. While a male fetus develops inside his mother, testosterone causes his genital organs to develop.

At puberty, testosterone causes the penis and testes to grow larger. It also causes facial and pubic hair to grow. A teenage boy's voice becomes deeper, he grows taller and his muscles get bigger and stronger. This is all because of testosterone.



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In men, testosterone helps produce sperm cells and keeps men interested in sex. It also keeps muscles and bones big and strong. Testosterone even has something to do with the way a man's hair grows.

The body carefully controls the level of testosterone. The hypothalamus tells the pituitary gland how much testosterone to produce. The pituitary gland passes the message on to the testes. The glands communicate this message by releasing hormones and chemicals into the blood stream.

Not all testosterone in the body is available to tissues for action. About 40% is bound tightly to a protein called "sex hormone binding globulin" and is not available for action. About 58% is bound to albumin and is available to most tissue. The remaining 2% circulates freely in the blood.

The level of testosterone in a male's body changes throughout the day. It is highest in the morning.

There are a number of medical conditions that can cause low testosterone. The next sections discuss the symptoms, causes and treatment of low testosterone in adult males.

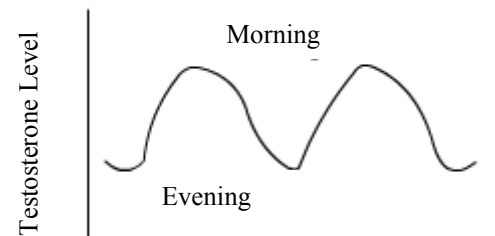
Symptoms

Signs of low testosterone in adult men may include:

- Decreased sex drive or libido
- No or poor erections of the penis (called impotence or erectile dysfunction).
- Lowered sperm count
- Increased breast size

Some men with low testosterone have hot flashes, increased irritability, inability to concentrate and depression.

Men with severely low testosterone may lose body hair and muscle mass. Their bones may be more prone to fracture. Their testes may become smaller and softer.



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Low testosterone can cause erectile dysfunction. However, diseases of the nerves and blood vessels can also affect the penis and cause erectile dysfunction.

Causes

Low levels of testosterone are linked with aging. Diseases of the glands that produce and control testosterone also cause low levels.

As a man ages, his body makes less testosterone. A lower level of testosterone in older men is sometimes called “andropause.”

As men age it is normal for them to have less interest in sex. However, it is abnormal for a man to have absolutely no interest in sex. This could be caused by significantly low levels of testosterone.

Damage to the cells of the testes can cause low testosterone. This kind of damage can be a result of

- Accidents
- Inflammation of the testicles
- Testicular cancer
- Radiation therapy or chemotherapy used to treat testicular cancer

Diseases that affect the hypothalamus and the pituitary glands can cause low testosterone. These include cancer, inflammation and autoimmune diseases of either gland.

Certain drugs can affect the way the pituitary gland works and cause low testosterone. Morphine and anabolic steroids are two examples.

Certain genetic diseases cause low testosterone. Abnormalities in chromosomes, the genetic materials of the body, cause genetic diseases. For example, myotonic dystrophy causes testicular failure between the ages of 30 and 40.

It is normal for men to have less interest in sex, as they get older. It is also normal for older men to have less spontaneous erections.



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Diagnosis

Men with less sex drive, erectile dysfunction, reduced sperm count, decrease in muscle size or other signs of low testosterone should have a blood test to find out their testosterone level.

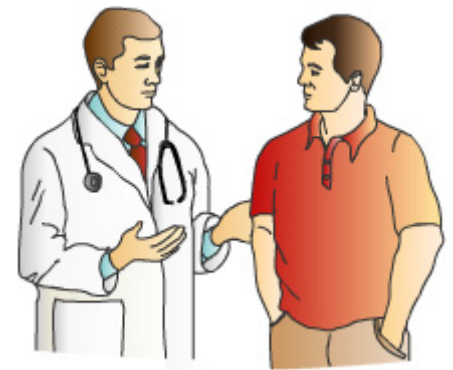
Normal testosterone levels are 300 to 1,200 nanograms per deciliter (ng/dl). Testosterone levels are usually highest early in the morning. Doctors often measure it at that time.

The doctor's main concern is to find out if there is a disease causing low testosterone. If not, it may be an extreme case of low testosterone due to aging.

It is not always easy to diagnose the cause of low testosterone. You can help your doctor by providing a detailed and accurate medical history.

To get your medical history, the doctor will ask about:

- Your past or present illnesses
- All prescription and nonprescription drugs you are taking
- Any sexual problems you are having
- Recent events that may have caused you stress
- Any genetic disease in your family

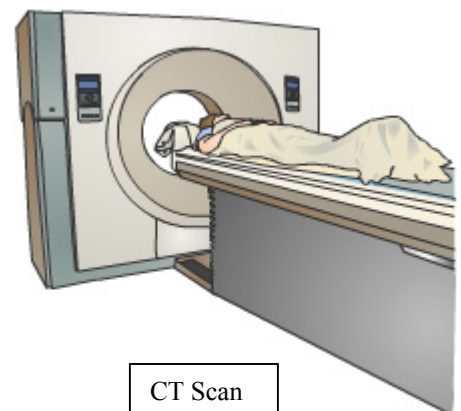


Next, your doctor will examine you and look at:

- How much body hair you have and where it is at
- The size of your breasts, testes and penis
- Your testes and scrotum to check for lumps
- Your ability to see in all directions

Your doctor may request a bone density test. Low testosterone levels can make the bones more brittle.

If the doctor thinks there may be a tumor in the pituitary or hypothalamus, he or she may need to take a picture of your brain. This is done with a CT scan or MRI. CTs and MRIs are painless. CT scans use x-rays and MRI



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uses a strong magnetic field. MRI is usually better at showing pituitary or hypothalamic tumors.

If the doctor suspects a genetic cause of low testosterone, he or she may request a genetic test. This is a process to examine a person's DNA. It shows whether the person is at risk of passing a genetic condition to his or her descendants.

If the doctor diagnoses a tumor, inflammation, or genetic disease that is causing low testosterone, it is best to get treatment. Sometimes a specialist is needed for treatment.

Hormone replacement therapy may be recommended to make up for low levels of testosterone. This therapy is discussed in the next section.

Hormone Replacement Therapy

Hormone replacement therapy gives the body more testosterone to replace what is lost. This therapy can take care of many symptoms of low testosterone.

Testosterone replacement therapy may:

- Increase interest in sex
- Produce more frequent erections
- Reduce depression, anger and fatigue
- Maintain male traits, such as a beard
- Increase muscle mass and bone density
- Strengthen the hand and leg muscles



Hormone replacement therapy can be in the form of

- Pills
- Injections
- Gel and patches
- Gum tablets

Testosterone pills or capsules are not recommended as hormone replacement for men. In weak concentrations, these pills are not as effective as injections, gels, patches or gum tablets. In high concentrations, they can cause serious, adverse effects on the liver.

Deep muscle injections are the least expensive. They are taken every 7 to 22 days. Testosterone levels are highest 2 to 3 days after an injection and slowly go back down

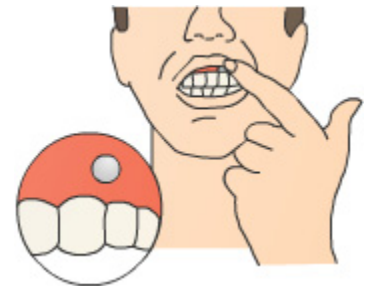
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until the next injection. Injections are painful and testosterone levels fluctuate between injections.

Gel and patches are applied daily to the skin. They can be placed on the back, abdomen, upper arm, thigh or scrotum. They are easy to apply and do not cause testosterone levels to fluctuate like injections do. The skin absorbs the testosterone quickly, stores it and releases it slowly into the blood.

There are some disadvantages of gel or patches. They can cause skin irritation, itching or blisters. The patch could fall off if the person sweats. Also, women and children should not touch the skin where the gel or patch is applied.

Gum tablets, or buccal medications, are the newest form of testosterone replacement therapy. A tablet is placed between the gums and upper lip every 12 hours. It is absorbed into the blood and is released slowly, like with the gel or patch. It is okay to kiss women and children while using gum tablets.



Side effects of gum tablets include gum or mouth irritation, bitter taste, pain or tenderness in the gums, headache and a distorted sense of taste. However, these usually go away within 14 days.

If you take testosterone supplements, you should tell your doctor if you have trouble breathing, especially when sleeping. You should also tell your doctor if you have frequent or persistent erections. Your dose of testosterone may need to be adjusted.

Risks & Counter-indications

Men who have or may have breast or prostate cancer should not take testosterone replacement therapy.

Men with heart, kidney or liver disease may experience heart failure while on testosterone therapy.

Use of testosterone supplements over a long period of time can result in breast or prostate enlargement or prostate cancer in older men.

Men receiving testosterone replacement therapy should be checked often for prostate cancer. A doctor can screen for prostate cancer with a rectal examination and a blood test called PSA.

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Conclusion

Testosterone is the most important sex hormone in men. It produces and maintains adult male features.

Low testosterone can be due to aging. It may also be caused by a disease of the glands that produce and control testosterone levels. Low testosterone affects sex drive, physical features and mood.

Low testosterone is treated using hormone replacement therapy. Gel, skin patches and gum tablets are effective ways to give the body extra testosterone.

Testosterone replacement therapy can:

- Increase interest in sex
- Produce erections more frequently
- Reduce depression, anger and fatigue
- Maintain masculine traits such as beard growth
- Increase muscle mass and bone density

Testosterone replacement is not for every man. It is normal to lose interest in sex and have fewer spontaneous erections with age. A doctor can determine if testosterone replacement therapy is right for you. It will depend on how low your testosterone is, why it is low, and your medical condition.



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