

can make pregnancy difficult. Testosterone therapy should not be considered however, as a reliable form of birth control. If fertility is a concern, other treatment options exist for hypogonadal males. Make sure to address this issue with your doctor if you are contemplating testosterone therapy.

Testosterone therapy should be used with caution in men with enlarged prostate glands, or BPH. Testosterone therapy can accelerate the growth of benign prostate tissue and aggravate urinary difficulties. If you experience slowing of the urinary stream, frequent urination, increased nighttime urination, or straining to urinate, make sure to discuss this with your doctor.

Testosterone therapy should not be used in males with breast cancer. Although breast cancer is very rare in males, testosterone may affect the progression of the cancer and should be avoided.

Testosterone replacement therapy may cause a variety of side effects.

- » Fluid retention in body tissues, commonly noticed as swelling ankles. (Testosterone is a steroid, and all steroids can cause fluid retention)

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- » Breast Enlargement or Tenderness (males, like females, have glands within the breast tissue, although to a much smaller extent than females. Testosterone may stimulate minor development.)

- » Sleep Apnea
- » Mood Swings
- » Prostate Enlargement (Testosterone can stimulate prostate growth)
- » Changes in Cholesterol levels
- » Changes in blood counts (hematocrit)
- » Acne

If your female partner experiences changes in hair distribution, acne or signs of masculinity, then transfer of the testosterone may be occurring from skin-to-skin contact.

Monitoring Results

For patients on testosterone replacement therapy, several issues deserve particular attention. While testosterone does not cause prostate cancer, testosterone can accelerate prostate cancer growth. Because of this, patients on testosterone need to be screened for prostate cancer every six months rather than just annually. For screening, patients need both a digital rectal exam and PSA level.

To judge the effectiveness of testosterone replacement therapy, a review of the patient's symptoms is most telling. Replacement levels can be checked with a simple blood test to see if dosages need to be adjusted.

Low testosterone levels can be associated with the development of osteoporosis. Once diagnosed, men are generally screened to see if the bones have any decrease in density. A DEXA scan can identify those developing any degree of osteoporosis.

Hematocrit levels (blood count) need to be monitored while on testosterone. Hematocrit levels can rise, and too high of a rise will actually "thicken" the blood. If a significant rise is noted, therapy may require adjustment.

In general, testosterone therapy will be continued indefinitely, as ongoing testosterone is needed to maintain levels.

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Hypogonadism *By Robert S. Hollabaugh, Jr. MD*

Information

Low testosterone levels can cause a variety of symptoms including less interest in sex (low libido), easy fatigue, lethargy, and depression. The onset is usually very subtle, often going unnoticed by the affected individual for many years. In fact, for many cases, the individual never notices the subtle changes in behavior and it is only noticed and brought to their attention by spouses or close friends.

The condition of low testosterone is also known as Hypogonadism. It occurs when your body no longer makes enough testosterone to satisfy the body's needs. This leads to feeling fatigued, depressed, as well as having increased body fat, less muscle, diminished sex drive and difficulty with erections. Unlike women, males do not routinely go through menopause. In females, when the ovary expends all of the available eggs, a female will cease

producing estrogen (the female hormone) and menopause begins. Everyone is familiar with the constellation of symptoms associated with menopause, which include hot flashes, moodiness, irritability, and diminished sex drive, to name a few. These symptoms are due to the lack of hormone. In a normal male, sperm production never runs out and testosterone production continues lifelong. The level of hormone production will diminish, however, and the individual may notice signs consistent with a "male menopause."

While hormone production rarely stops completely, the lower levels can definitely cause problems. In addition to these symptoms, untreated low testosterone levels can lead to a reduction in bone density (osteoporosis).

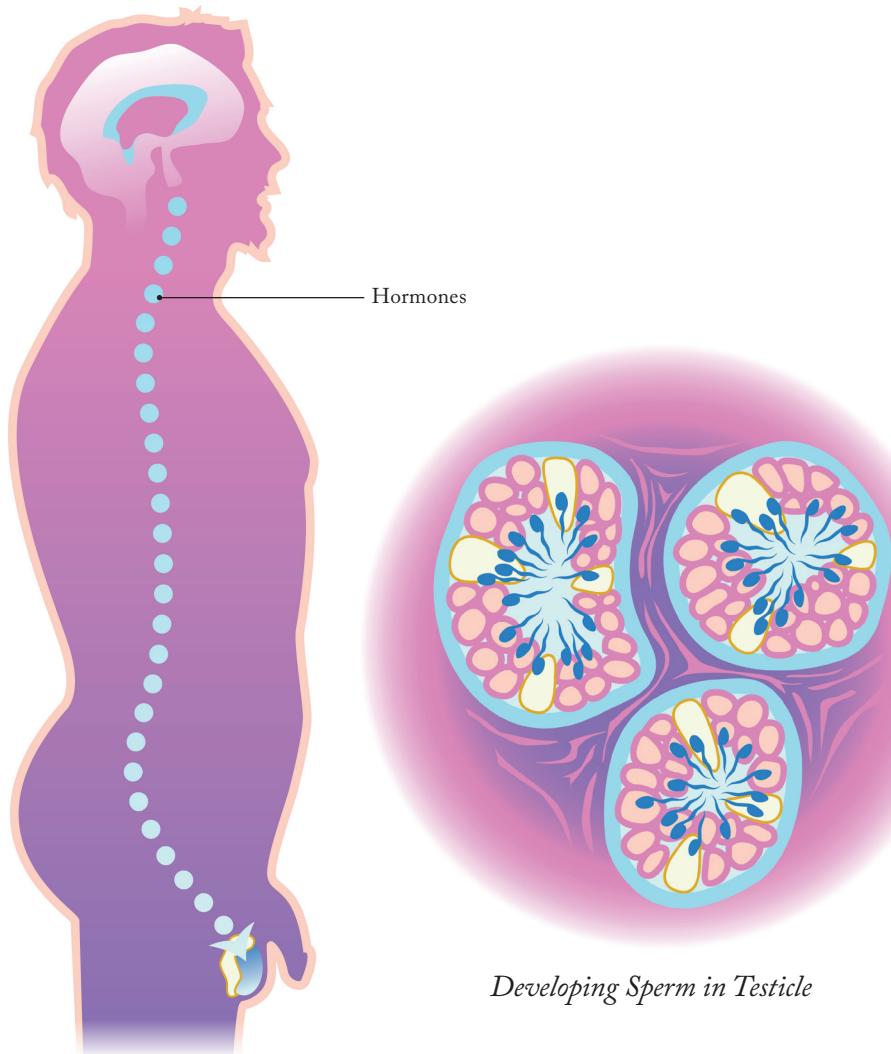
While the symptoms of hypogonadism are similar to a variety of other medical conditions, it is easy to test and see if low testosterone may be

Physiology

The release of testosterone by the testicle is controlled by a hormone called luteinizing hormone, or LH, which is produced by the pituitary gland in the brain. When the testosterone level is low, the pituitary gland releases LH, which increases the amount of testosterone produced by the testicles.

Before puberty, the testosterone level in boys is low. An increase in testosterone during puberty

SPERM DEVELOP IN THE MALE



causes sex organs to mature, sperm to be produced, sexual features to develop (including facial and body hair), enlarged muscles, and a deep voice. The level of testosterone continues to rise during adulthood until it peaks around age 40, then gradually decreases.

Most of the testosterone in the blood is tightly attached to a protein

called sex hormone binding globulin (SHBG). A smaller amount is weakly attached to albumin. The tightly bound portion of the hormone is unavailable and inactive; the bioavailable portion (the total of unattached and "weakly bound" testosterone) is the active portion and represents the most important consideration in evaluation. Certain conditions can increase SHBG

(such as obesity, hyperthyroidism, pulmonary disease, and certain chronic illnesses). By binding more testosterone, these conditions effectively lower the available "free" testosterone in the system. Simple blood tests can tell if a man's testosterone is abnormal, and can quantify the different fractions of testosterone (total, free, and bioavailable).

Replacement Therapy

If testosterone levels are low, your physician may recommend replacement therapy. There is no safe pill version of testosterone, however, shots, patches, and gels are commonly used. In the natural system, testosterone is released by the testicles in pulses at various intervals throughout the day and night. As such, the levels will vary even during the same day, but they usually will remain within the standard range of 300 - 800 ng/dl. Current testosterone therapies seek to replace testosterone in a steady, daily fashion. Testosterone injection is usually the initial route of therapy to increase levels. A single injection in the hip muscle can deliver testosterone that will last for two weeks. Injection will sharply increase bioavailable testosterone, and patients will often experience improved symptoms within a few days. The injection does not allow steady daily levels however, and the levels decrease from the initial high

APPLICATION SITES



over time. Dosing over the standard levels provides no extra benefit or relief. The body only will utilize testosterone at appropriate levels, and discards the remainder. As an example, your car does not run any better on 7 quarts of oil if 4 will fill it. Current testosterone formulations require an injection every 2 weeks. A longer acting (3-month duration) injection is being developed that aims to provide more stable daily levels and a more convenience injection routine.

Testosterone patches and gels give a more reliable and steady daily dosing of testosterone. Applied each day, the levels of testosterone can be measured and the doses adjusted to reach target levels. Androderm patches are applied daily to a hairless area. They can withstand sweating, bathing, and swimming to some

degree. The most common side effects are related to a slight allergic skin reaction to the adhesive.

Testosterone Gels (Testim and Androgel) are clear, colorless gels. They are applied like a lotion to a hairless area of the body, preferably the flanks or shoulders. After application, the user should allow the gel to dry for a few minutes before getting dressed. You should also wait 2 hours before showering, swimming, or exercising (sweating). Make sure to wash your hands after application of the gel, as it could be transferred to others.

Transfer usually requires vigorous skin-to-skin contact with fresh gel application. Once the gel has dried, transfer is unlikely. Skin to skin contact with the treated area should be avoided for 3 hours after application. Because testosterone

can harm fetus, extra care needs to be taken to avoid transfer to pregnant or nursing females.

Contraindications and Side-Effects

Testosterone Replacement therapy is contraindicated in men with prostate cancer because testosterone is the "fuel" for prostate cancer. While testosterone does not cause the cancer, it will accelerate its growth; therefore, testosterone is not used in patients with a history of prostate cancer. If prostate cancer has been cured, physicians may allow a trial of testosterone with close, careful monitoring. Testosterone therapy is not indicated for females.

Testosterone therapy should not be used in males wanting to maintain fertility. Testosterone use will suppress sperm production, and