

Low testosterone

A plain-English guide for you and your family

WHAT IS HAPPENING

Your body makes testosterone in a three-step chain: the hypothalamus (a tiny control room deep in the brain) sends a signal called GnRH, which tells the pituitary gland (a pea-sized gland hanging below the brain) to release LH and FSH, and those hormones travel through the blood to your testicles and tell them to make testosterone. That testosterone then flows all over your body to power your sex drive, build muscle, keep bones strong, lift your mood, and fuel your energy. When testosterone drops, it is usually because one piece of that chain broke—either the testicles themselves are damaged (from Klinefelter syndrome, an injury, infection, chemotherapy, or getting older), or the pituitary stopped sending the signal (because of a tumor, being very overweight, taking opioid pain pills long-term, or high prolactin). The result is the same: not enough testosterone reaches your muscles, bones, brain, and blood vessels. You feel tired all the time, your interest in sex fades, your muscles shrink, your mood sinks, and over the years your bones can become fragile and break easily. None of those problems is random—they all trace back to one missing hormone. The good news is that once you confirm low testosterone with two early-morning blood tests and figure out whether the testis or the brain is the broken part by checking LH and FSH, you can replace the hormone safely if you have real symptoms and no warning signs like untreated prostate cancer or a very high red-blood-cell count.

What you might feel

- Low sex drive (reduced interest in sex)
- Trouble getting or keeping erections
- Fatigue and low energy all day
- Loss of muscle mass and strength
- Increase in body fat, especially around the belly
- Mood changes: feeling down, irritable, or less motivated
- Hot flashes or sweating episodes
- Thinning bones (osteoporosis) over time
- Smaller or softer testicles

- Breast tissue growth (gynecomastia)

Call the doctor right away if...

- Severe, sudden-onset headaches or vision changes—may signal a pituitary tumor pressing on the optic nerves.
- Very high red blood cell count (hematocrit above 54%) on testosterone therapy—raises the risk of dangerous blood clots in the heart, lungs, or brain.
- Rapid breast growth or a hard lump in the breast—could be breast cancer, which is rare in men but more common when hormone balance is off.
- Testicular lump, pain, or one testicle much smaller than the other—may indicate testicular cancer or severe damage to testosterone-making cells.

What the care team will do

- Schedule two separate morning fasting blood draws before 10 AM for total testosterone, LH (luteinizing hormone), and FSH (follicle-stimulating hormone) at least one week apart
- Screen for reversible causes by asking about opioid use, measuring BMI (body mass index), and referring for sleep study if the patient snores or has daytime sleepiness
- Check baseline hematocrit (percentage of red blood cells), prostate-specific antigen (PSA, a protein made by the prostate), blood pressure, and lipid panel before starting testosterone therapy
- Teach the patient that testosterone will not work immediately and symptoms improve slowly over 3 to 6 months
- Recheck hematocrit and hemoglobin (the oxygen-carrying protein in red cells) every 3 to 6 months during testosterone treatment
- Measure testosterone level 3 to 6 months after starting therapy to confirm the dose brings levels into the normal range of 300 to 1000 nanograms per deciliter
- Remind patients using testosterone gel to apply it to shoulders or upper arms and wash hands immediately, keeping the area covered for 6 hours
- Monitor for worsening urinary symptoms like weak stream, nighttime urination, or trouble starting to pee, and check PSA yearly

Medicines you may be given — and why

Testosterone cypionate (injection)

This is a lab-made copy of testosterone (the main male sex hormone made by the testicles). It replaces the missing hormone when the body cannot make enough on its own. Once in the

bloodstream, it travels to cells all over the body and tells them to do the jobs testosterone normally does—build muscle, grow facial hair, keep bones strong, support red blood cell production, and help with sex drive and energy.

Testosterone gel (topical)

A clear gel rubbed onto the shoulders, upper arms, or abdomen once daily. The testosterone soaks through the skin into the bloodstream and replaces the hormone the testicles are not making. It works the same way as injected testosterone once it reaches the blood—telling muscle, bone, brain, and other cells to do the jobs testosterone normally does.

Testosterone patch (transdermal)

A stick-on patch worn on the skin, usually the back, abdomen, upper arm, or thigh. The patch slowly releases testosterone through the skin into the bloodstream over 24 hours. Once in the blood, it works the same as other forms of testosterone replacement—telling cells to do the jobs the missing hormone normally does.

Testosterone pellets (subcutaneous implant)

Tiny pellets (about the size of a grain of rice) made of pure testosterone are placed under the skin of the buttock or abdomen during a quick in-office procedure. The pellets slowly dissolve over three to six months, releasing a steady stream of testosterone into the bloodstream. Once in the blood, it works like other testosterone forms—replacing the hormone and telling cells to build muscle, strengthen bone, and support energy and mood.

Clomiphene citrate (oral pill)

Clomiphene tricks the brain into thinking testosterone and estrogen levels are low. It blocks estrogen receptors (docking sites for the hormone estrogen) in the hypothalamus and pituitary gland (the control centers at the base of the brain). The brain responds by releasing more GnRH (gonadotropin-releasing hormone), which then tells the pituitary to pour out more LH and FSH (the two hormones that signal the testicles to make testosterone and sperm). This wakes up the testicles to do their own work instead of replacing the hormone from outside. It is used mainly in younger men who want to preserve fertility or in men with secondary hypogonadism (when the testicles can still work but the brain is not sending the right signals).

Human chorionic gonadotropin (hCG, injection)

hCG is a hormone that acts just like LH (luteinizing hormone), the signal from the pituitary gland that tells the testicles to make testosterone. It is injected under the skin or into a muscle, usually two to three times per week. By directly stimulating the testicles, it keeps them active and producing their own testosterone and sperm. This is the preferred choice for men with low testosterone who want to preserve or restore fertility, because it does not shut down the testicles the way testosterone replacement does.

Where this information comes from

- Endocrine Society Clinical Practice Guideline 2018
- American Urological Association Guideline on Testosterone Deficiency 2018
- UpToDate Clinical Decision Support
- Journal of Clinical Endocrinology & Metabolism

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