

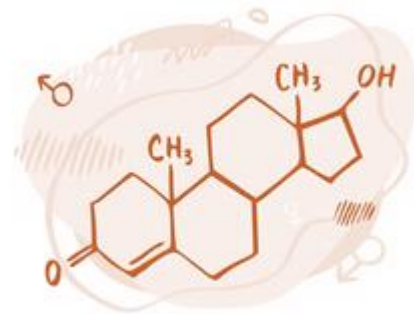
Testosterone replacement therapy: a general guide for patients and families

Please read **Puberty and the importance of sex hormones** before reading this factsheet.

Puberty

You have already heard about and discussed the changes of puberty with your doctor.

These changes usually begin around 12 years of age and continue for 2-3 years, turning us from children into young adults. Although many different hormones work together in puberty, testosterone from the testes is especially important.



Testosterone

The best hormone replacement therapy for boys who do not have their own testosterone is the type that is available and acceptable to him. If you have any questions, please speak to your care team, so we can best support you.

Testosterone causes the voice to deepen, the body to develop a 'male' shape with increased muscles, and the bones to become denser and stronger. It is also responsible for maturing the sexual reproductive system, including increase in size of penis, and keeping it healthy.

If your body does not make testosterone, your doctor will discuss replacing it. This is called **hormonal replacement therapy**.

It is important that you understand that testosterone treatment **replaces hormones that your body can't make but needs**. It is not only for puberty but life-long.

When to start?

Testosterone is usually started around the age of 11 to 12 years, when most children begin puberty, so that your development is similar to the young people around you, if you wish it to be. If late puberty is suspected, the age at which testosterone therapy is started will likely be older.

The starting dose is low and is slowly increased, usually every 6 to 12 months, to keep pace with what would happen naturally. You can find more detail in the example hormonal replacement therapy treatment plan on page 3.

How long will I need testosterone replacement?

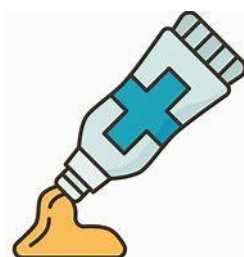
Testosterone therapy is life-long.

In some cases, a short course of testosterone therapy may be given to see if it can start your own puberty.

How is testosterone given?

Testosterone can be given in the form of injections into the bottom or thigh muscle once a month or gels that are applied daily.

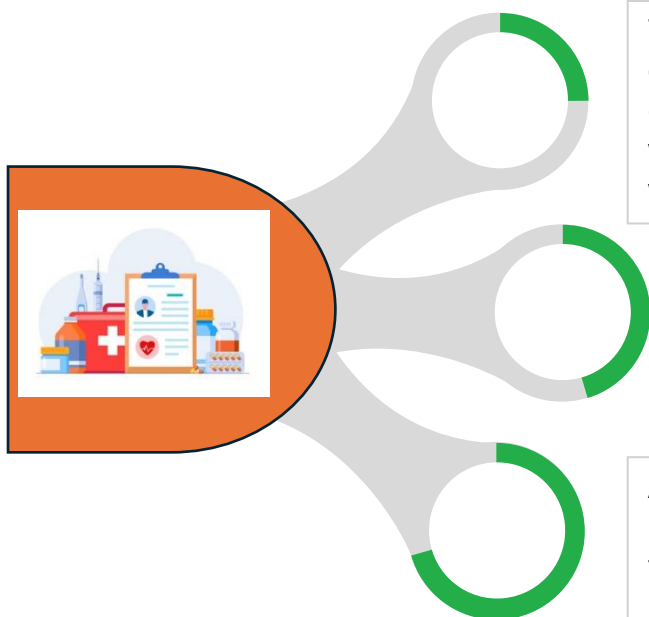
Injections are usually a better choice because a known dose is given, they need to be given less often, and don't risk rubbing off on other people. This is especially important when there's close contact with women and kids. However, if there are issues with injections, gels may be used.



What to expect from testosterone replacement?

Treatment is aimed at developing the changes of puberty at the rate at which other young people are developing – this is usually slowly, spread out over 2 to 3 years. Testosterone can't make the cells of the testes bigger or sperm develop in the testes to improve fertility. In some cases, this can happen with other hormones (e.g. FSH/hCG). Therefore, testes size doesn't increase on testosterone therapy.

How is the therapy monitored?



Testosterone affects body growth and muscle development amongst many things. Each time you come to clinic, usually every 6 months, your height, weight, blood pressure reading, and penile length will be checked to adjust your testosterone dose.

Blood tests for hormonal levels and other important body functions (liver function and full blood count) may be ordered. Bone age X-ray for bone maturity may also be requested.

A scan for bone density might be performed before beginning hormone replacement if risk factors for thinner bones are present. The scan will be repeated when you have reached adult doses of testosterone.

What are possible side-effects?

The more common side-effects of therapy are usually minor and the same as those that are experienced during natural puberty. Testosterone may cause acne, oily skin, some breast growth, weight gain and mood swings or aggression.

Testosterone injections can cause pain and redness at injection site.

If you do experience some of these side-effects, discuss them with your doctor.

Other issues include yellowing of skin and eyes due to liver issues (jaundice) and increased red blood cells, which will be checked with regular blood tests, and high blood pressure.

Testosterone can reduce sperm production. Depending on why your testosterone is low, there may be other options available as an adult if having children is something you want.

Sustanon has arachis oil, which comes from peanuts, so people with peanut or soya allergies should be careful. Since it doesn't have peanut protein, most people can use it unless their allergy is really severe. You should let your doctor know if you have a peanut allergy.

Example of testosterone replacement therapy treatment

	Preparation	Initial dose	Initial frequency	Titration	Adult dosing
Intramuscular testosterone (preferred)	Sustanon 250	50-100mg	Monthly	Increase by 50mg every 6 to 12 months Consider reducing frequency to 2-3 weekly once 250mg reached	200-250mg 2 to 4 weekly Can also consider switching to Reandron 1000mg every 3 months once at adult dose
Transdermal testosterone (gel)	Testogel (1%= 12.5mg testosterone per pump)	12.5-25mg (1 to 2 pumps)	Once daily	Increase by 12.5mg (1 pump) every 6 to 12 months	60-80mg once daily

Source: British Society for Paediatrics Endocrinology and Diabetes testosterone delivery for pubertal induction in boys with hypogonadism guidelines; adapted for local medication availability

- 50mg intramuscular testosterone monthly = 10mg topical testosterone daily
- This treatment will be adapted according to each young person's response
- Many testosterone preparations available to adult men are not readily available for adolescents.

More detail for those who want to know more

Testosterone replacement therapy aims to:

- Help the development of secondary sexual characteristics (facial hair, deeper voice, increased height, broader shoulders) and muscle growth
- Achieve a good adolescent growth spurt
- Ensure healthy bones
- Support emotional and mental maturation



Testosterone also influences many body systems besides the sexual reproductive system, as outlined below:

Bone mass: it is responsible for bone mass accumulation and therefore bone strength; and therefore, decreases the risk of osteopenia, osteoporosis, and later fracture.

Skeletal maturation: at low dose testosterone causes growth of bones but at high concentration. It also begins to close the area where bones grow (growth plate) and therefore can change final height. Testosterone also changes skeletal shape e.g. widened shoulders, and body proportions.

Body composition: testosterone increases muscle mass and decreases fat storage.

Cardiovascular system: testosterone deficiency increases the risk of cardiovascular disease in particular heart attacks and stroke.

Skin health: lack of testosterone is associated with accelerated skin aging with decreased skin collagen content, skin thickness, elasticity, and hydration.

Metabolic effects: when the body doesn't have enough testosterone, it can lead to health problems like a higher chance of getting diabetes. It can also affect the levels of fats in the blood, which may increase the risk of heart disease.

Cognition and psychosexual development: testosterone helps the brain grow and work well. It supports thinking, learning, memory, and emotional control. It also plays a role in developing sexual feelings and identity. Patients with low testosterone often report lower moods and energy, and with replacement may feel better in themselves. Some patients on replacement therapy, particularly if levels are higher, experience mood swings, irritability and aggression. These changes may also be seen in adolescents who undergo physiological puberty as testosterone levels increase.

Prostate cancer: physiological testosterone replacement therapy in people deficient in testosterone has not been shown to increase risk of prostate cancer.



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