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## Androgen deficiency in men

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### Summary

- Androgens (including testosterone) are the hormones that give men their 'male' characteristics.
  - Androgen deficiency means the body has lower levels of male sex hormones, particularly testosterone, than is needed for health.
  - Causes of androgen deficiency include problems and conditions of the testes, pituitary gland and hypothalamus.
  - Androgen deficiency is treated with testosterone replacement therapy.
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Androgen deficiency is when the body has lower levels of male sex hormones, particularly testosterone, than is needed for health. This deficiency may be caused by problems in the areas of the brain that control the function of the testes (the pituitary gland and the hypothalamus), or by problems in the testes themselves. Treatment involves testosterone replacement therapy.

The term 'male menopause' is meaningless as it doesn't exist: there is no sudden, severe or inevitable drop in sex hormone production in men as experienced by women. A modest and gradual drop in sex hormone levels is seen across male populations from the age of about 30 but this fall is not seen in all men. In some men the drop in testosterone appears to be caused by them developing other illnesses along the way.

### Androgens are sex hormones

Hormones can be thought of as chemical messengers. They communicate with tissues in the body to bring about many different changes. Hormones are needed for growth, reproduction and well-being.

Androgens are the group of sex hormones that give men their 'male' characteristics. The major sex hormone in men is testosterone, which is produced mainly in the testes. The testes are controlled by a small gland in the brain called the pituitary gland, which in turn is controlled by an area of the brain called the hypothalamus.

Androgens are crucial for male sexual and reproductive function. They are also responsible for the development of secondary sexual characteristics in men, including facial and body hair growth and voice change. Androgens also affect bone and muscle development and metabolism. The term androgen deficiency means your body is not making adequate amount of androgens, particularly testosterone, for full health. The effects of this depend on how severe the deficiency is, its cause and the age at which the deficiency begins.

### Testosterone

The major sex hormone in men is testosterone. Some of the functions of testosterone in the male body include:

- starting and completing the process of puberty
- bone and muscle development
- growth of body hair, including facial hair
- change of vocal cords to produce the adult male voice
- sex drive (libido) and sexual function
- prostate gland growth and function
- sperm production.

### Symptoms of androgen deficiency

When there is not enough testosterone circulating in the body, it can cause a wide range of symptoms. However, a number of these symptoms may be non-specific and can mimic the symptoms of other diseases and conditions.

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Some of the symptoms of androgen deficiency include:

- reduced sexual desire
- hot flushes and sweating
- breast development (gynaecomastia)
- lethargy and fatigue
- depression
- reduced muscle mass and strength
- increased body fat, particularly around the abdomen
- weaker erections and orgasms
- reduced amount of ejaculate
- loss of body hair
- reduced bone mass, therefore increased risk of osteoporosis.

### **Androgen deficiency in older men**

If testosterone levels decline with age, a number of factors may be contributing. In particular, any cause of poor general health, including obesity, will lower testosterone. Recent research suggests that testosterone levels do not drop significantly in healthy older men.

The impact of the fall in testosterone levels in older men is still not completely understood. There has been much media coverage of 'andropause' or 'male menopause', suggesting that many older men would benefit from testosterone treatment (testosterone replacement therapy). However, there is limited evidence to suggest benefit and the risks are not clear. A recent study (Snyder et al, 2016) has shown a modest increase in sexual function with testosterone treatment, although this may not have been sustained beyond 12 months, and was not accompanied by a significant improvement in mood, vitality or physical function.

It is essential that careful diagnosis of androgen deficiency is undertaken before starting any testosterone treatment. A full health assessment should be performed and testosterone levels should clearly have been shown to be consistently low. Often, there are other health problems (such as obesity and diabetes) that should be treated first, which may render testosterone replacement therapy unnecessary.

The effect of lower testosterone levels with increasing age and the effects of testosterone replacement therapy in men are currently being studied. Of concern are some studies suggesting a rise in cardiovascular disease after commencement of testosterone therapy in older men, but this remains controversial.

### **Androgen deficiency in boys**

Boys who have not completed puberty should only be treated by paediatric hormone specialists (paediatric endocrinologists).

### **Causes of androgen deficiency**

Some of the causes of androgen deficiency include:

- Testes – medical problems that affect the testes can prevent sufficient testosterone production. Some of these conditions are present from birth (for example, Klinefelter's syndrome – a genetic disorder where there is an extra sex chromosome in the body's cells). Other conditions may occur at various stages of a boy's or a man's life, such as undescended testes, loss of testes due to trauma or 'twisting off' of the blood supply (torsion), complications following mumps, and the side effects of chemotherapy or radiotherapy.
- Pituitary gland – the most common condition that affects the pituitary gland and leads to low testosterone levels is the presence of a benign tumour (adenoma). The tumour may interfere with the function of the pituitary gland, or it may produce the hormone prolactin, which stops the production of the gonadotrophins, which are the hormones needed to signal the testes to produce testosterone.
- Hypothalamus – particular conditions, such as tumours or congenital abnormalities, can prevent the hypothalamus from prompting the pituitary gland to release hormones. This will inhibit testosterone production

by the testes. This is a rare cause of androgen deficiency.

## Diagnosis of androgen deficiency

Androgen deficiency is diagnosed using a number of assessments, including:

- medical history – a full history is taken, including details about fertility, sexual function, symptoms of androgen deficiency, other medical problems, occupation, medication and drug use (prescribed and non-prescribed)
- physical examination – a thorough general examination is performed, including measuring the size of the testicles and checking for breast development
- blood tests – are taken to determine the level of testosterone in the blood. Ideally, a fasting blood test should be taken in the morning to detect the body's peak release of testosterone. Testosterone levels should be measured on two separate mornings. The pituitary hormone levels should also be measured
- other tests – may be required to determine if testosterone deficiency is due to another underlying medical condition. These may include blood tests to check for iron levels, genetic tests (to diagnose, for example, Klinefelter's syndrome), or MRI scans of the brain (to examine the pituitary gland). Semen analysis will help to determine the potential fertility of men with androgen deficiency.

## Treatment of androgen deficiency

Treatment for proven androgen deficiency is based on testosterone replacement therapy. Testosterone can be administered by capsule or tablet, skin patch, gel, lotion or cream, or injection (short- or long-acting).

If the cause of testosterone deficiency is located in the pituitary gland, and the man is also wishing to father a child, then gonadotrophin injections, several times a week for many months, are used to stimulate both testosterone and sperm production.

Men who receive testosterone replacement therapy will have regular reviews with their doctor. Prostate examinations are performed according to a man's age and other risk factors for prostate cancer.

Older men need to be checked for prostate cancer before testosterone replacement therapy can be started, because increased levels of testosterone could make unrecognised prostate cancer grow. However, testosterone replacement therapy is not thought to increase the risk of a new prostate cancer above that of the general population.

## Side effects of treatment of androgen deficiency

Once testosterone levels are restored to the normal range, side effects of testosterone replacement therapy are not common. Some of the possible side effects include:

- weight gain
- mild acne
- mood changes and increased aggression
- male pattern baldness
- breast development
- problems with urine flow (older men).

## Where to get help

- Your doctor
- Andrology Australia Tel. 1300 303 878

## Things to remember

- Androgens (including testosterone) are the hormones that give men their 'male' characteristics.
- Androgen deficiency means the body has lower levels of male sex hormones, particularly testosterone, than is needed for health.
- Causes of androgen deficiency include problems and conditions of the testes, pituitary gland and hypothalamus.

- Androgen deficiency is treated with testosterone replacement therapy.

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Andrology Australia

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