CONDITION

Delayed puberty in boys

Delayed puberty in boys means the expected physical changes of puberty have not started by age 14.

WHAT IT IS
Puberty starting later than the expected age

BODY SYSTEM
Hormones and reproductive system

MAIN SYMPTOMS
No testicular growth, limited genital growth, slower growth spurt

WHAT CAUSES IT
Usually inherited timing; sometimes illness or hormone disorders

HOW IT IS DIAGNOSED
Growth assessment, hormone blood tests, bone-age X-ray

MAIN TREATMENT
Observation, treating causes, or supervised testosterone therapy

CAN IT BE CURED?
Sometimes - the underlying cause may be treatable

IS IT AN EMERGENCY?
No, unless sudden severe testicular pain occurs

LONG-TERM OUTLOOK
Most boys complete puberty with appropriate care

Overview

Delayed puberty in boys means puberty has not begun by the expected age. Doctors usually define it as no clear testicular enlargement by age 14. Puberty that begins but then stops progressing also needs assessment.

Testicular enlargement is normally the first physical sign. Growth of the penis, a deeper voice, facial hair, increased muscle, and a height growth spurt follow over time.

Pubic or underarm hair alone does not prove puberty has started. These hairs can develop because of hormones from the adrenal glands even when the testes have not begun making more testosterone.

The most common cause is constitutional delay of growth and puberty. This describes a

healthy person who develops later than average, often following a family pattern.

Other causes include long-term illness, poor nutrition, problems involving the testes, or disruption of hormone signals from the brain. Finding the cause matters because some conditions need treatment. Delayed puberty can also affect confidence, bone development, and future fertility.

Symptoms

The main sign is a lack of testicular enlargement by age 14. Other changes may also be absent or limited.

Possible signs include:

Boys with constitutional delay are often shorter than classmates during adolescence. Their growth may be normal for their developmental stage, but their growth spurt occurs later.

Symptoms of an underlying condition can include weight loss, ongoing bowel symptoms, severe tiredness, headaches, vision problems, or a reduced sense of smell.

Delayed development may cause embarrassment, bullying, low mood, or withdrawal from sports and social activities. These effects matter even when there is no serious physical illness.

- Little or no growth of the penis and scrotum
- No clear adolescent height growth spurt
- A voice that has not deepened
- Limited facial or body hair
- Less muscle development than peers
- Puberty starting but making little progress

Causes and risk factors

Constitutional delay of growth and puberty is the most common cause. The hormone system can work normally, but puberty starts late. Bone development is often younger than the boy's calendar age, leaving more time for growth. A family history of late puberty makes this more likely.

The hypothalamus and pituitary gland in the brain signal the testes, which then make testosterone. Delayed puberty can occur when any part of this system is disrupted.

Temporary suppression of hormone signals may happen with:

A lasting shortage of signals from the brain is called hypogonadotropic hypogonadism. Causes include inherited conditions, problems involving the brain or pituitary gland, surgery, radiation, injury, or, less often, a tumour. In some inherited forms, reduced or absent sense of smell is an important clue.

Primary hypogonadism means the brain sends hormone signals, but the testes cannot respond normally. Causes include chromosome conditions, infection or injury, testicular torsion, chemotherapy, radiation, or testicular development problems.

Constitutional delay and lasting hormone deficiency can look similar at first, so follow-up over time may be needed.

- Undernutrition or significant weight loss
- Coeliac disease or inflammatory bowel disease
- Long-term kidney, lung, or heart disease
- Poorly controlled diabetes or thyroid disease
- Intensive exercise combined with inadequate nutrition
- Some medicines, including long-term opioid or glucocorticoid use

Diagnosis

There is no single test for every cause. Assessment usually combines medical history, growth pattern, physical examination, and selected tests.

A clinician will ask about growth, nutrition, exercise, medicines, previous illnesses, and family patterns of puberty. A history of undescended testes, testicular injury, surgery, or cancer treatment is also relevant.

Height and weight are plotted on a growth chart. Older measurements show whether growth has remained steady or slowed. The examination may include the testes and other signs of pubertal development.

A bone-age X-ray of the left hand and wrist estimates skeletal maturity. Delayed bone age is common in constitutional delay, but does not confirm the cause.

Blood tests may measure:

Hormone levels vary during the day and across puberty, so results must be considered with the examination and growth record. Repeat testing may be needed.

Depending on the findings, further assessment may include chromosome or genetic testing, ultrasound, or an MRI scan of the brain and pituitary gland. These tests are not needed for

every boy.

- Testosterone
- Luteinising hormone and follicle-stimulating hormone, which signal the testes
- Thyroid hormones
- Markers of anaemia, inflammation, kidney disease, or coeliac disease

Treatment and management

Treatment depends on the cause, age, developmental stage, growth pattern, and effect on daily life.

For constitutional delay, observation may be appropriate because puberty often starts on its own. Scheduled follow-up remains important to confirm that development is progressing.

A short, medically supervised course of testosterone may be offered when delayed puberty causes significant distress or development needs help getting started. It can support genital growth, voice deepening, and increased muscle. Treatment should be prescribed and monitored by a clinician experienced in adolescent hormone care.

If the testes cannot make enough testosterone because of a lasting condition, replacement may be increased gradually to imitate normal puberty. Some people need long-term treatment. Growth, physical development, symptoms, bone health, and blood tests guide adjustments.

When illness, inadequate nutrition, or a medicine is suppressing puberty, management focuses on that cause. Puberty may progress as health and nutrition improve, although this is not guaranteed.

Testosterone supports physical development but is not fertility treatment. Boys with certain brain or pituitary hormone deficiencies may later need specialist treatment to stimulate sperm production if they want biological children.

Hormones or bodybuilding steroids like prednisone or hydrocortisone bought without medical supervision are unsafe substitutes. Their contents may be unreliable, and they can affect growth, mood, liver health, and fertility.

Complications

Delayed puberty can lead to teasing, reduced confidence, anxiety, or low mood. Support from family, school, counselling services, or peer groups may help.

Sex hormones contribute to bone strength. Prolonged low testosterone can reduce the bone built during adolescence. Bone health may improve with adequate nutrition, normal hormone development, and treatment of the cause.

Fertility is usually normal in constitutional delay. It may be reduced by permanent testicular damage or a lasting deficiency of reproductive hormones. Specialist fertility treatment may be possible for some causes.

The underlying condition may cause separate complications. For example, untreated coeliac disease can impair nutrition, while a pituitary disorder may affect several hormones. Unexplained or stalled puberty should not simply be assumed to be late development.

Prevention

Constitutional delay and inherited hormone conditions cannot usually be prevented. A family pattern of late puberty does not mean anyone caused the delay.

Good nutrition and effective care for long-term conditions support growth and development but cannot prevent every case. Avoiding non-prescribed hormones and anabolic steroids reduces the risk of disrupting the hormone system.

Before chemotherapy, radiation, or surgery that may affect the testes or pituitary gland, the healthcare team may discuss future hormone and fertility effects. Protective or fertility-preservation options depend on the situation and are not always possible.

Living with it and what to expect

Boys with constitutional delay usually begin puberty later and then continue through the normal sequence of changes. Their growth spurt is also later. Many catch up substantially in height, although final height cannot be predicted from age alone.

Puberty takes years rather than weeks. Early changes can be subtle, so month-to-month comparisons may be misleading. Follow-up appointments allow growth and development to be reviewed over time.

A permanent hormone deficiency does not usually correct itself, but treatment can support pubertal development, bone health, sexual function, and adult well-being. Long-term monitoring may be needed, particularly if other pituitary hormones are affected.

Concerns about appearance, changing rooms, dating, or being treated as younger are common. Clear explanations and privacy during appointments can help. Boys should have

opportunities to discuss emotional, sexual, or fertility concerns confidentially when appropriate.

No test can guarantee exact adult height, the timing of each change, or future fertility. Growth records, bone age, family heights, diagnosis, and response over time provide more useful information than comparison with classmates.

When to get medical help

Arrange a routine medical appointment if:

Most delayed puberty is not an emergency. Assessment can usually take place through primary care or a paediatric hormone specialist.

Seek prompt medical advice for persistent headaches, changes in vision, repeated vomiting, excessive thirst and urination, or new weakness. These symptoms do not necessarily indicate a serious hormone problem, but need timely assessment.

Go to an emergency department for sudden, severe testicular pain or swelling, especially with nausea or vomiting. This may be testicular torsion, in which the testicle twists and loses its blood supply. It is not a typical symptom of delayed puberty, but requires emergency treatment.

Seek urgent mental health support if distress leads to thoughts of self-harm or suicide.

- There is no testicular enlargement by age 14
- Puberty started but has stopped progressing
- Growth has slowed noticeably or weight is falling
- Delayed development is causing bullying, anxiety, low mood, or withdrawal
- There is a history of undescended testes, cancer treatment, testicular injury, or pituitary disease
- Other symptoms suggest a long-term illness

Common questions

What age is considered delayed puberty in a boy?

Puberty is generally considered delayed if the testes have not clearly enlarged by age 14. Assessment may also be needed if puberty starts but makes little or no progress.

Does pubic hair mean puberty has started?

Not necessarily. Pubic and underarm hair can develop because of adrenal hormones. Testicular enlargement is the main sign that reproductive puberty has begun.

Will a late bloomer eventually catch up?

Many boys with constitutional delay progress through puberty and catch up substantially. However, assessment is important to exclude illness or permanent hormone deficiency.

Can testosterone start puberty?

Supervised testosterone treatment can begin or support physical changes. A short course does not identify every cause or guarantee that natural puberty will continue, so follow-up remains necessary.

Will delayed puberty affect adult height?

It can change the timing of the growth spurt. Boys with constitutional delay often have more time to grow because their bones are less mature. Adult height also depends on genetics, nutrition, health, and the cause of the delay.

Can delayed puberty cause infertility?

Constitutional delay usually does not cause infertility. Fertility may be affected if the testes are damaged or the brain does not produce the hormones needed for sperm production. Specialist assessment can clarify the likely risk and treatment options.

Sources

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