

# Delayed Puberty in Boys: A Guide for Families

## How is delayed puberty in boys defined?

Boys can start puberty at a wide range of ages, with 95% starting between the ages of 9 and 14, so we consider puberty delayed when it has not started by age 14. The earliest sign of puberty in boys is enlargement of the testicles, followed by growth of the penis and pubic hair. Puberty happens when the pituitary starts making more of two hormones, luteinizing hormone (called LH) and follicle-stimulating hormone (called FSH), which cause the testicles to grow and produce the male hormone testosterone. The growth spurt usually starts a year or so after the genitals start to enlarge, generally by age 15.

## What causes delayed puberty in boys?

By far, the most common cause is constitutional delayed puberty. These boys are generally healthy and will eventually go through puberty if given enough time. In about two thirds of cases, it is inherited from one or both parents. The mother may have had delayed puberty if she started her periods after age 14, and the father may have had delayed puberty if he started his growth spurt late (after age 16) or if he continued to grow after he graduated from high school. Boys with chronic illnesses such as inflammatory bowel disease, sickle cell disease, or cystic fibrosis often mature late.

A smaller number of boys with delayed puberty have a life-long deficiency of the puberty hormones LH and FSH, a problem we call isolated gonadotropin deficiency (IGD). This is usually a condition present from birth, and many boys with IGD are born with a penis that is smaller than it should be. Other pituitary hormones in this condition are made normally, and usually growth is normal. Failure to start puberty by age 17 is one sign a boy might have IGD. Another clue is that some boys with IGD also have a poor sense of smell, a condition referred to as Kallmann syndrome. Finally, a few boys with delayed puberty have a problem with the testicles themselves. Because it is easy to determine the size of the testicles on a physical exam, having very small testicles or testicles that cannot be readily felt is a clue to the condition. There are several causes, including previous surgery for undescended testicles or cancer treatments, which can injure the testicles.

## What are the signs and symptoms of delayed puberty in boys?

The key finding is that the penis and testicles do not enlarge by age 14, which is easily noted on physical exam. Often, the testicles have just started to grow but the penis is still small, which suggests that other signs of puberty will appear in the next 6-12 months. Most boys with constitutional delayed puberty are short compared with their peers, but because they

have a delayed growth spurt, they usually catch up to other boys by the time they are 18 and have heights in the normal range as adults.

## How is delayed puberty diagnosed?

Sometimes just the physical exam is enough, but many doctors will order some tests to confirm what they suspect and to make sure that the problem is not in the testicles. The most common tests to order are testosterone, LH, and FSH first thing in the morning, when the levels in early puberty are usually higher. Adult testosterone levels vary from 250-800 ng/dL, and most boys with delayed puberty have testosterone levels of less than 40. An x-ray of the hand and wrist to determine the bone age is often ordered to help predict adult height, and is typically at least 2 years behind the chronological age, which means that there is more time remaining for growth.

## How is delayed puberty treated in boys?

For constitutional delayed puberty, the problem will resolve with waiting and reassurance. However, late-maturing boys are often impatient to start growing and do not want to wait another 6-18 months for the pubertal growth spurt to start naturally. Therefore, many pediatric endocrinologists may offer a brief course of testosterone to “jump-start” puberty. It is most often given in the form of a monthly injection for several months; different doctors use different doses and numbers of injections. When the boy is seen back after the injections, there is usually a very good gain in height and weight as well as growth of the penis and pubic hair, and puberty will, in most cases, progress without any further treatment. Studies show that a brief course of testosterone will have no effect on the adult height but will allow the boy to get there faster.

When the problem is either IGD or damage to the testicles, testosterone is still the treatment of choice, but the dose will need to be increased over time and it will need to be continued well into the adult years.

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