



British Society for Paediatric Endocrinology and Diabetes

DELAYED PUBERTY

Puberty is the process of body changes from the first signs of adolescence to full adult development. It is brought about by a series of chemical signals (hormones), sent from the brain to the pituitary gland in the head, then from the pituitary to the sex glands, the ovaries in girls and the testes (testicles) in boys. These in turn make the sex hormones, oestrogen in girls and testosterone in boys, which cause the physical changes of puberty. Normal puberty takes from 4 to 5 years in both sexes but it starts earlier in girls than in boys.

The first sign of puberty in girls is breast buds, which can start anywhere between age 8-14 but typically start about age 11. Pubic hair follows a few months later, with periods usually starting about 2 years after breast buds are first noticed. Girls have their growth spurt fairly early in puberty and by the time they start their periods, a lot of their growing will have been done. Most girls will have started their periods by the time they are 13 and finish growing by about the age of 15. Because girls usually start their puberty earlier than boys and have their growth spurt around the age of 12, they will often be taller than boys at the start of secondary school, with the boys overtaking them a couple of years later.

In boys, the first sign of puberty is the testicles getting bigger, which is often not very obvious to start with. After a few months, the penis starts to enlarge and pubic hair develops. This can happen anywhere between the ages of 9-15, with most boys noticing the first changes around the age of 12. The growth spurt happens later in boys compared to girls, usually at about age 14, and final height is not reached until 17 or later.

It is normal for there to be some variation in the age at which puberty starts and most children will start theirs two years before or after the average. Thus 95% of girls start their periods between the ages of 11 and 15. Problems most commonly arise through "mistiming" of puberty which is either early ("precocious") or delayed. Delayed puberty is a frequent problem but affects boys more often than girls. It can cause more distress in boys since at this age, physical development is so important for the male sex. However, both boys and girls can be very upset by the difference in their body shapes compared to their friends of the same age and, since sex hormones work on the brain as well as the body, the physical immaturity of delayed puberty can also mean that they are more immature in how they think and feel. If a girl shows no signs of breast development by the age of 13 or no periods by the age of 16 and a boy shows no sign of puberty by the age of 15, then they should be assessed by a paediatrician with experience in this area.

Simple delay, a more or less extreme delay in the normal process of puberty, is usually the cause in most children who present with delayed puberty. There is often a family history of one or both parents also being late developers. When this is the case the problem will go away on its own with time, with no tests or treatment needed. However, delay in puberty can sometimes happen when the brain, the pituitary or the ovaries or testes are not working properly.

Tests may be needed to see if these organs have developed properly or are working correctly. This may mean blood tests, X-rays and/or scans. These investigations are often normal and then it may be necessary to wait and see whether the problem is simply a matter of delay and so will settle on its own.

Treatment.

Treatment for the delay may be appropriate, whatever the cause, if the lack of development is causing a lot of upset or underachievement. It is fortunately a simple matter to accelerate the changes of puberty by treatment. The simplest option is to give testosterone or a related compound in boys and oestrogen in girls.



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Boys.

Testosterone is usually given by mouth (Restandol capsules) or by depot injections (Sustanon or similar). The capsules have to be taken every day, whereas the injections are usually given every 4-6 weeks. A course of treatment for from three to six months can be given and then the situation reassessed. There is usually a very quick response with a good acceleration in growth and in physical and emotional development. Spontaneous development often starts during such a course of treatment although it is not clear whether it is truly precipitated or whether it would have happened without the treatment.

Girls.

Oestrogen preparations are also available as tablets or patches. Ethinyloestradiol is the most commonly used tablet, taken daily. Patches are changed every 3-4 days and need to be cut into quarters initially to give low enough doses of oestrogen. As in boys, a relatively short course of treatment, from three to six months, is often associated with the onset of spontaneous puberty.

Outlook.

Permanent problems are relatively unusual and in general also respond well to replacement treatment. If puberty does not start after a course of treatment further investigation is likely to be needed and it may then be necessary to restart replacement of sex hormones long-term, in boys using continuous testosterone and in girls cyclical oestrogen and progesterone (another hormone) in order to have monthly periods which are required to shed the lining of the womb. Even if permanent treatment is needed, with appropriate management the prospects for future development, sexual function and fertility are good for the great majority of children.