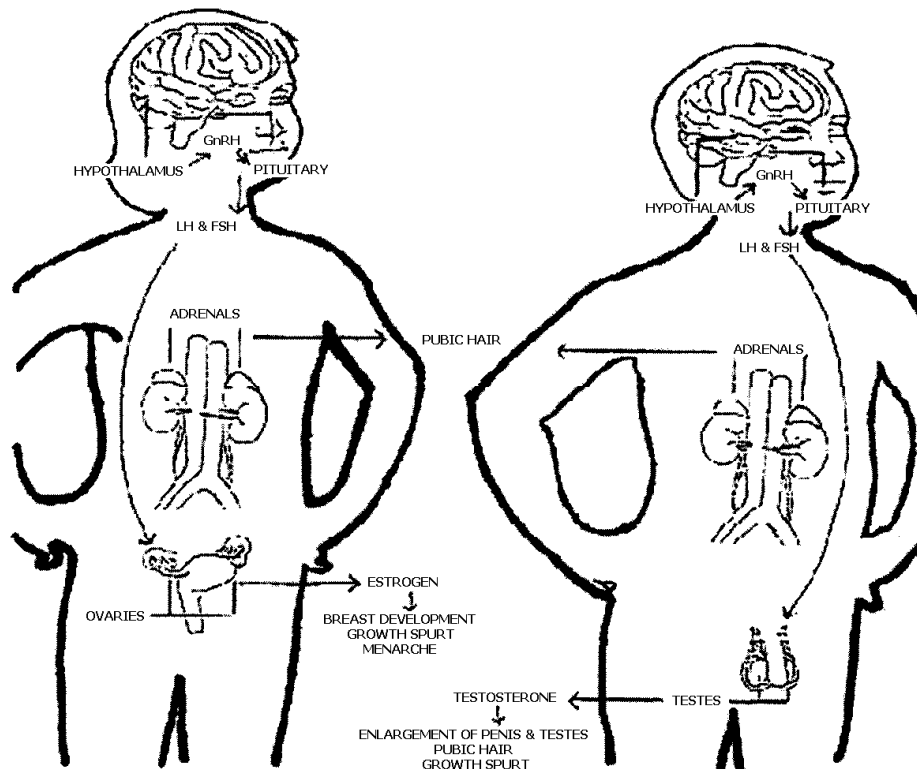


Precocious Puberty

How does puberty normally start?

Normal puberty begins when an area of the brain called the hypothalamus releases the hormone, GnRH (gonadotropin releasing hormone) to the pituitary gland. This signals the pituitary gland to release gonadotropic hormones called leutinizing hormone (LH) and follicular stimulating hormone (FSH). LH and FSH signal the ovaries in girls to make estrogen and the testes in boys to make testosterone. The estrogen and testosterone are the hormones that begin the process for children to develop secondary sex characteristics. The first sign of puberty in girls is usually breast development accompanied by a height spurt. In boys, testicular enlargement is the first sign followed by development of pubic hair. Most of the increase in height for boys occurs in the later stage of puberty.



What causes precocious puberty?

Precocious puberty occurs when the pituitary gland signals the ovaries and testes to mature too early. Precocious puberty or early puberty occurs when a girl under the age of 8 years begins breast development or when a boy less than 9 years of age begins testicular enlargement.

The cause of precocious puberty is unknown in 85% of children. This is especially the case with girls. When the problem begins in the brain, it is called central precocious puberty. Puberty is

actually normal except it starts too early. In boys, precocious puberty is rare and is often associated with a brain tumor. In rare cases, ovaries or testes function without stimulation from LH or FSH in the brain. This type of puberty is called peripheral and it starts in the ovaries or testes rather than in the brain. It is important to differentiate central precocious puberty from peripheral puberty with testing.

There are other conditions that resemble precocious puberty. Pubic hair development can occur, but if it happens without other signs it does not mean that your child is in puberty. Premature adrenarche is the gradual development of pubic hair and body odor in young children without any other changes. This is due to the early release of hormones by the adrenal gland and can be a common variation. Premature thelarche is breast development without any other signs of puberty. The reason for this may be that breast tissue has increased sensitivity to the amounts of normal estrogen levels present. This may also be caused by the presence of ovarian cysts or exposure to environmental sources of estrogen such as birth control pills, hormones in meat and poultry, creams and lotions.

What problems are associated with precocious puberty?

Precocious puberty can cause emotional, psychological and physical problems for children. Early puberty may be difficult for the following reasons:

- early closure of the growing portions of long bones may limit your child from reaching normal adult height;
- pubertal changes can cause your child to be viewed by others as different and not accepted socially;
- early puberty in a young child is difficult for the child to understand and can lead to unwanted social situations;
- early puberty can cause young children to have inappropriate sexual behavior including masturbating in public;
- early puberty can cause extreme moodiness that is difficult to manage and can lead to learning problems in school.

How is precocious puberty identified and treated?

Your child has been referred to the Endocrinology Clinic where various tests for the diagnosis of precocious puberty will be done. During the first visit to the Endocrinology Clinic, your child will have a thorough history, physical exam, and height and weight measurements. Other tests which probably will be ordered include: bone age evaluation which is an X-ray of the left wrist to measure skeletal growth, blood tests for hormone levels, possibly an X-ray of the head (MRI), and an ultrasound of your child's ovaries or testes. Another possible test which detects an LH surge or the start of puberty involves giving your child a medicine (gonadotropin releasing hormone) by injection under the skin or into the vein. A blood sample for LH is then drawn 40 minutes later.

Treatment is recommended if your child's predicted adult height is not consistent with predictions based on the parents' height, if signs of puberty are emotionally upsetting, or if puberty is progressing too rapidly. Treatment is a medication (leuprolide acetate) that tells the brain not to release the hormones that start the development of secondary sex characteristics (breast development or testicular enlargement). The medication is usually given by injection into the leg or buttock muscle once a month and is usually stopped by the age of 11 or 12. The medication returns hormone levels to normal, stops and may reverse puberty, and allows for growth rate to

become normal with a possible increase in final height. The medication's most common side effects are a reaction at the injection site and vaginal bleeding in girls. The vaginal bleeding occurs once after the shot is given and there is no need for concern. This medication is FDA-approved, but studies about the long-term effects are lacking.

Short-term studies have shown that children who stop the medication after a period of treatment go on to have normal puberty and fertility. Once treatment is started, your child will have another blood test done one to three months later to make sure the medication dose is correct.

Terms you may hear related to precocious puberty:

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| Adrenal Gland | produces sex hormones that influence sexual development in males and females |
| Adrenarche (ad"ren-ar'ke) | production of androgens resulting in the onset of observable characteristics such as pubic hair, acne, underarm hair and body odor |
| Endocrinology (en"do-krin-ol'o-je) | study of hormones |
| FSH (follicle stimulating hormone) | follicle stimulating hormone is a gonadotropin which in males stimulates sperm production |
| GnRH Analog | a substitute hormone that stops the release of gonadotropins (LH & FSH) and start the beginning process of puberty (leuprolide acetate) |
| Gonadotropins (gon"a-do-tro'pins) | LH- (uetinizing hormone) and FSH (follicle stimulating hormone) which are secreted by the anterior pituitary and stimulate the ovaries to release estrogen and the testes, testosterone |
| Hormone | chemical messengers |
| Hypothalamus (hi"po-thal'a-mus) | connected to the pituitary gland and is a part of the brain that links the nervous system with the endocrine system |
| LH (luetinizing hormone) | luetinizing hormone is a gonadotropin that promotes ovulation and secretion of estrogen in females. In males is responsible for the development and activity of cells in the testes |
| Menarche (men-ar'ke) | the onset of menstruation or periods |
| Pituitary Gland | often called the master gland, is a tiny organ located at the base of the brain |
| Pubarche (pu-bar'ke) | development of pubic hair |
| Thelarche (the-lar'ke) | breast development |

Call 720-777- 6061 if you have any questions or if you would like to contact a parent of a child with precocious puberty.