

## Puberty Hormones

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Puberty has such a bad reputation and hormones are blamed for the challenging behaviors we see in adolescence. Some typical teen issues, like poor impulse control and bad choices, are the product of prefrontal cortex (brain) development, and not because of hormones at all.

“Hormones” in puberty refers to testosterone (male) or estrogen (female). Both genders make both hormones, but in different proportions. Testosterone has many positive effects, such as a growth spurt, increased muscle size and strength, bone strength, a sense of well-being, genital growth, increased energy - but also acne, body hair, and perhaps aggression. Estrogen also prompts a growth spurt, breast development and is very important for bone quality, but also prompts some moodiness, and eventually menstrual periods.

Without puberty hormones, bone strength and bone quality will not be normal. Complete lack of estrogen will create bones that may fracture easily and vertebrae that may compress. For boys, testosterone is naturally converted to estrogen – leading to stronger bones. Estrogen is the strong bone sex hormone.

To produce sex hormones, the preteen pituitary gland begins sending signals to the gonad (ovaries or testes). Gonads have two jobs, both under the control of this system. The easier job is to make hormones. The harder job is to make sperm cells or to mature an egg – which helps explain why people with PWS are almost never fertile, and yet many of them will have some natural puberty. To make the situation a bit more confusing, the early underarm or pubic hair often seen in PWS isn't from true (pituitary-gonad) puberty. It comes from adrenal gland hormones. This is a different system, sometimes called “adrenarche” and it is not real puberty.

For boys with PWS, puberty and fertility are complicated. Undescended testes don't work optimally even if a great surgeon moves them into the right spot. There are no such issues for girls with PWS, so they are more likely to have ovaries that will make hormones. But for both boys and girls, the main problem isn't typically the gonad (testis or ovary). The hormones are low because of dysfunction of the hypothalamus, which in turn controls the function of the pituitary gland – and the pituitary gland controls the gonads.

Few women will claim to enjoy the experience of menstrual periods, and many parents want to spare their daughters this burden. Estrogen causes growth of the uterus and the lining of the uterus, but in 2018, periods can be controlled or eliminated. When doctors

prescribe estrogen supplements, it is often as a “birth control pill” or OCP (Oral Contraceptive Pills). OCPs today come in very low doses. There are also estradiol patches, but these could tempt picking behavior.

Estrogen or an OCP does not increase fertility or help an ovum mature – that is under the control of pituitary pulses. Having periods because of taking estrogen pills does not increase the possibility of pregnancy – remember, these are also called “birth control pills.” Taking estrogen will not make the hypothalamus and pituitary work which is how eggs get developed.

For boys with communication or developmental challenges, the worry about puberty is related to fears of aggression and worse behavior in puberty. In the past, the only way to give testosterone supplements was by monthly intramuscular injections – which meant 28 days of worry and no opportunity to take away the medication if problems began. Now there are many options, with much lower doses and methods which shorten the action of the hormone. Testosterone shots can be given subcutaneously at home, once per week, in much lower doses. Patches can be worn on the skin, with some younger teens wearing these only overnight, reducing the amount of absorption and avoiding daytime picking at the patch. A topical gel could be applied but with great caution to avoid transferring the invisible gel to other family members. Gel comes in a pump or foil packets, with a range of strengths and doses available. These treatments do not treat infertility or allow the body to develop sperm. They can allow normal adult development and function.

Adding sex hormones is a complicated decision to discuss with your endocrinology provider. While few parents celebrate puberty – all parents want good health for their children, and sex hormones are part of the recipe of a balanced body, especially strong bones.

More great information about puberty and these hormones is at [hormones.org](http://hormones.org). Look at our website under Medical A-Z – Puberty - for sex education materials for teens with developmental delays, in English and Spanish.

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