

Understanding the Physical Changes of Puberty

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Understanding the Physical Changes of Puberty explains what puberty is and why it occurs, how a young body changes and strategies to help youth through puberty.

Physical changes during the adolescent years are dramatic — with teens seemingly growing inches overnight, their bodies re-shaping and voices changing all at once. This transformation is complex, sometimes confusing, and even anxiety provoking. Understanding this process of change, and knowing what to expect can help prepare youth and their parents for the transitions ahead. This NebGuide provides readers with basic facts about the changes that teens go through during puberty. It also provides parents with suggestions on how to help their developing adolescent through this period of physical transitions.

What Is Puberty? Why Does it Happen?

Puberty is the period when a person develops into sexual maturity. This means that a boy or girl undergoes the physical changes that make them capable of sexual reproduction. While puberty is known to be a teenage event, in actuality the internal changes begin much earlier — at about age 8 for girls and age 11 for boys.

Hormones, which are specialized substances in our bodies released by glands, signal our bodies to develop in certain ways. Puberty occurs when hormones signal the development of organs related to sexual reproduction. For girls, this includes the development of ovaries and the fallopian tube. For boys, hormones signal the development of gonads and other organs related to semen production.

While many of the pubertal changes occur internally, outside indications signal the onset of sexual maturity. For girls, sexual maturity is marked by “menarche” or the first menstrual period (on average, between 10 to 15 years of age). For boys, sexual maturity is marked by “spermarche” or the production of viable sperm and first ejaculation (on average, around the ages of 11 to 16). For boys, spermarche is often signaled by nocturnal emissions, otherwise known as “wet dreams” (See *Table 1*).

How Will the Body Change?

In addition to sexual maturation, adolescents also experience physical changes in the following ways:

- 1) *Maturation of secondary sex characteristics.* Secondary sex characteristics are those that are related to, but not directly involved in reproduction. For instance,
 - As early as age 8, girls experience “breast budding” or the emergence of breasts. Hair growth under the arms and pubic areas also begin.
 - As early as age 11, boys experience growth in the testicular area, and start facial, underarm and pubic hair growth.
- 2) *The growth spurt.* During puberty, hormones signal the body to grow faster. This hastened growth is called “the growth spurt.” Some things to note:
 - The growth spurt starts at around age 11 for girls and 13 for boys. Thus, girls become generally taller than boys during these years, though boys often catch up and generally end up taller.
 - At the peak of the spurt, boys can increase their height to an amazing 4 inches in a year, and girls can grow 3.5 inches per year.
 - The growth spurt does not happen evenly throughout the body. The head, hands and feet go through the growth spurt first. This is followed by the legs and arms, and lastly by the torso and shoulders. Teenagers thus appear disproportionate in their appearance, at least for a short period of time.
- 3) *Change in body proportions.* Another change during puberty happens in how the body is proportioned. Before puberty, the bodies of girls and boys are very similar. During puberty, muscle and fat tissue increase and are redistributed in ways that give girls and boys more adult-like appearances.
 - Both boys and girls have increased fat/muscle growth.
 - Boys have a faster increase in muscle tissue, and girls have a faster increase in fat tissue.
 - For girls, fat moves from the middle to the upper and lower body, giving them a curvier appearance.
 - By the end of puberty, boys have about 1.5 times as much muscle as girls. The muscle-to-fat ratio at the end of puberty is 3:1 for boys and 5:4 for girls.
- 4) *Increase in strength and endurance.* Partly because of the increase in muscles, puberty is a time of increased strength and endurance.
 - In addition to increased muscle mass, there is maturation of circulatory and respiratory organs. This results in increased lung and heart capacity.
 - Changes are greater for boys and by the end of puberty, they have overall higher endurance/strength.

In addition to the four main transitions outlined above, adolescents also experience a range of changes that are often related to the hormonal activity in puberty. These transitions include the deepening of voice for males, the emergence of acne, emergence of body odor and mood changes. These all are related to the maturing body, particularly to hormones and sexual development.

Strategies to Help Youth Through Puberty

Several things can help both youth and their parents successfully deal with the physical transitions of puberty. First, youth and parents should **learn** about the changes. When parents and youth are educated about the process of puberty, particularly when they know what to expect, they are much better prepared for the changes ahead. Knowing what to expect and how to deal with those physical changes alleviates the anxiety and confusion that can sometimes result from the rapid changes during this period.

Second, parents and youth should **understand** that the changes are *normal*, and that there is no shame in what is going on. For instance, girls' first periods and boys' nocturnal emissions ("wet dreams") are both normal. While not often discussed, this is all a part of the normal process of develop-

ment. Furthermore, chances are that that when a teen goes through these events, their peers are undergoing them, too.

Third, parents and youth should learn how youth can **adapt** to the changes. Many of the experiences are new and teens need to learn how to properly address the new experiences. While some information might be available from school, friends and even the Internet, some things might not be addressed. In particular, parents and teens should address the practical concerns that puberty brings, for instance, new hygiene needs (e.g., how to deal with hair growth, menstrual periods, nocturnal emissions, body odors), as well as clothing (e.g., undergarments) and product needs (e.g., deodorant).

Finally, parents and youth should continue to **communicate** in an open and honest manner. Questions and concerns might arise both from the parents and the youth, and it is important that both sides understand that the other is ready and available for communication. At the same time, parents should be willing to give their teen some room if they are not ready to talk. They should continue to let them know, however, that they are present and supportive, and willing to discuss issues and questions when their teen is ready. Parents also should communicate that they are willing to seek for more information on their behalf if their children have questions that they do not have the answers to.

Table I. This table shows summaries of changes during puberty and when they occur. Note that these are averages and individuals will vary somewhat on their age of onset.

	Age											Age												
Boys	8	9	10	11	12	13	14	15	16	17	18	Girls	6	7	8	9	10	11	12	13	14	15	16	
Hormone change	[Red]											Hormone change	[Red]											
Spermarche			[Red]	[Red]	[Red]	[Red]	[Red]	[Red]	[Red]	[Red]		Menarche						[Red]	[Red]	[Red]	[Red]	[Red]		
Penis/Genital growth		[Red]	[Red]	[Red]	[Red]	[Red]	[Red]	[Red]	[Red]	[Red]		Breast development			[Red]	[Red]	[Red]	[Red]	[Red]	[Red]	[Red]	[Red]		
Pubic hair growth		[Red]	[Red]	[Red]	[Red]	[Red]	[Red]	[Red]	[Red]	[Red]		Pubic hair growth						[Red]	[Red]	[Red]	[Red]	[Red]		
Underarm/Face hair				[Red]	[Red]	[Red]	[Red]	[Red]	[Red]	[Red]		Underarm hair growth								[Red]	[Red]	[Red]	[Red]	
Height spurt				[Red]	[Red]	[Red]	[Red]	[Red]	[Red]			Height spurt				[Red]	[Red]	[Red]	[Red]	[Red]	[Red]			
Acne						[Red]	[Red]	[Red]	[Red]			Acne								[Red]	[Red]	[Red]		

Sources

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