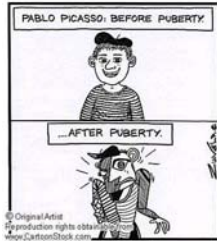


Biological Transitions: Puberty



Puberty: An Introduction

- From Latin word *pubertas* (adult)
- Period of lifespan in which an individual becomes capable of sexual reproduction
- Hormones regulated by the endocrine system lead to physical changes
- No new hormones are produced and no new bodily systems develop at puberty

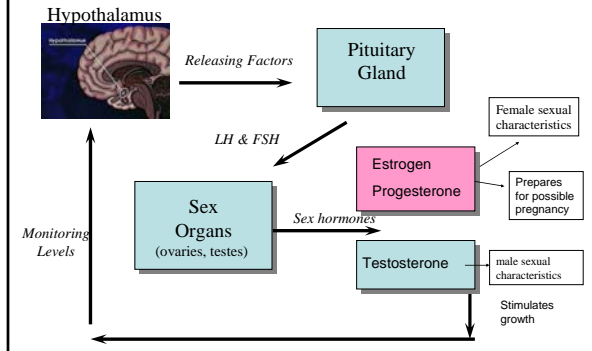
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The Endocrine System

- Produces, circulates, and regulates hormone levels in the body
- Hormones
 - Substances secreted by endocrine glands
- Glands
 - Organs that stimulate particular parts of the body to respond in specific ways
- Feedback loop (HPG axis)
 - Set point (Example: thermostat)

3

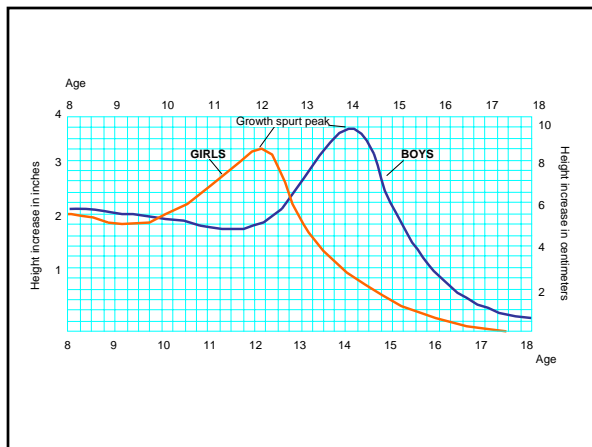
Endocrine system produces, circulates, and regulates the level of sex hormones



What Are The 5 Major Physical Changes of Puberty?

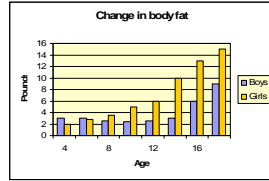
- Adolescent growth spurt
- Development of primary sex characteristics (gonads)
- Development of secondary sex characteristics (breasts, pubic hair)
- Changes in body composition
- Changes in circulation and respiration

5



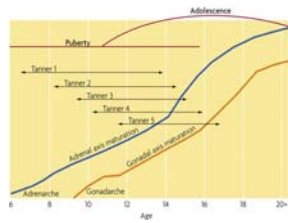
Sex Differences: Changes in Muscle and Fat

- Before puberty, boys = girls on levels of muscle and fat
- Both boys and girls develop muscle and increase fat during puberty
- Muscle grows faster in boys, fat increases faster in girls
- End of puberty muscle/fat ratio: 3:1 for boys, 5:4 for girls



Sexual Maturation: Overview

- Development of secondary sex characteristics
 - Measured in boys and girls by Tanner Stages
 - Changes include
 - growth of pubic hair
 - changes in appearance of sex organs
 - breast development



Sexual Maturation

Breast

Stage 1: No breast development.

Stage 2: The first sign of breast development has appeared. This stage is sometimes referred to as the breast budding stage. Some people begin to notice under the areola the fat pads of the nipple (areola) may be somewhat enlarged.

Stage 3: The breast is more distinctly although, there is no separation between contour of the two breasts.

Stage 4: The breast is further enlarged and more glandular development. The areola including the areola forms a noticeable mound on the breast.

Stage 5: Full maturity in the breast stage. The breast is fully developed. The areola are distinct and the areola has merged into the general contour of the breast.

Pubic Hair

Stage 1: No pubic hair.

Stage 2: There is a small amount of long pubic hair (initially the lightest and coarsest) growing from the area around the genital area.

Stage 3: The hair is now adult in type, but the areola are distinct and the areola has merged into the general contour of the breast.

Stage 4: The hair is adult in type, abundant in amount and spread.

Stage 5: The hair is adult in type, abundant in amount and spread. There may be hair on the inside of the thigh.

Penis and Scrotum

Stage 1: The infantile state that persists from birth until puberty begins. During this time the genitalia increase slightly in overall size but there is little change in general appearance.

Stage 2: The scrotum has begun to enlarge, and there is some reddening and change in texture of the scrotal skin.

Stage 3: The penis has increased in length and there is a smaller increase in breadth. There has been further growth of the urethra.

Stage 4: The length and breadth of the penis have increased further and the glans has developed. The scrotum is further enlarged and the scrotal skin has become darker.

Stage 5: The genitalia are adult in size and shape. The appearance of the genitalia may vary the criteria for one of these stages for a considerable time before the penis and scrotum are sufficiently developed to be classified as belonging to the next stage.

Pubic Hair

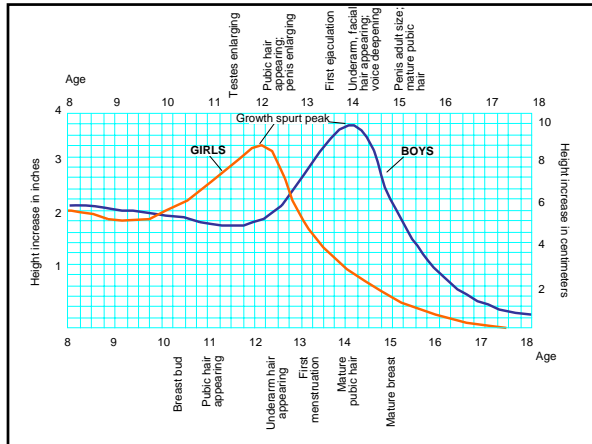
Stage 1: There is no pubic hair, although there may be fine vellus over the pubes similar to that over other parts of the abdomen.

Stage 2: Sparse growth of lightly pigmented hair, which is usually straight or only slightly curved. This growth begins at the side of the base of the penis.

Stage 3: The hair spreads over the pubic symphysis and is considerably darker and coarser and usually more wavy.

Stage 4: The hair is now adult in character but covers an area considerably smaller than in most adults. There is no spread to the medial surface of the thigh.

Stage 5: The hair is distributed in an inverted triangle as in the female. It has spread to the medial surface of the thigh but not elsewhere above the base of the triangle.



Phases of Puberty

- Prepubescent Phase
- Pubescent Phase
- Postpubescent

Prepubescence

- Two years earlier for girls
- Females experience changes in primary and secondary characteristics (e.g., the enlargement of the ovary, rounding of the hips, and visible breast development)
- Males experience mostly changes in primary characteristics (e.g., enlargement of testicle and penis, and reddening of the scrotal sac).

Pubescence

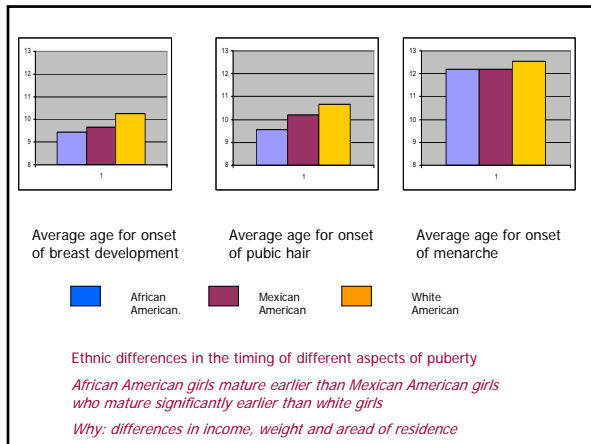
- Onset occurs with appearance of pubic hair
- Growth spurt occurs-2 yrs earlier in females
- Continued development of primary and secondary sex characteristics
- Menarche in females; appearance of facial hair and armpits in males

Postpubescence

- Starts with completion of pubic hair growth, decrease in the rate of growth in height, and onset of fertility
- Males start to grow beard and females experience further growth of axillary hair (arm pit) and breast development

Influences on Pubertal Timing

- Largely genetic
- Influenced by nutrition and medical health
- Stress



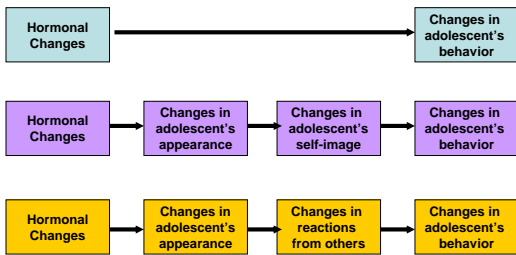
Median age of Menarche in Several populations

Cuba		Uganda (wealthy Kampala)	13.2
Negro	12.4	Oslo, Norway	13.5
White	12.4		
Mulatto	12.6		
Hong Kong (wealthy Chinese)	12.5	France	13.5
Florence, Italy	12.5	Nigeria, (wealthy Ibo)	14.1
Budapest, Hungary	12.8	U.S.S.R. (rural Buriats)	15.0
California, U.S.	12.8	South Africa (Transkei Banfu)	15.0
Moscow,	13.0	Rwanda	
		Tutsi	16.5
		Hutu	17.1
Tel Aviv, Israel	13.0	New Guinea (Bundi)	18.8
Assam, Indian (city dwellers)	13.2		



Reactions to Sexual Development

- Girls are often ambivalent about menarche
 - Prior expectations affect girls' experience of menarche
- Boys do not tend to feel anxious or embarrassed about first ejaculation
 - However, boys do not talk about it with anyone



The biological changes of puberty can affect the adolescent's behavior in at least three ways

Changes associated with Puberty

- Changes in patterns of sleep
- Self-esteem
 - Girls: Puberty associated with small decrease in self-esteem
 - Greatest impact is on girls experiencing multiple transitions at once (e.g., menarche, dating, school change)

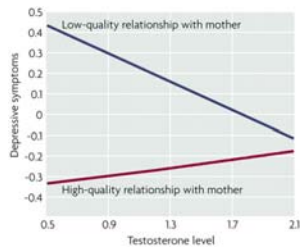
Changes associated with Puberty

- Mood
 - Adolescents are moodier (more variation in mood, but does not increase with age 9 to 15).
 - Moodiness not random, but changes with type of activity
 - Direct connection not very strong- effects are strongest in early adolescence when the "process" is turned on and hormones are more variable. (rapid increase in hormones is associated with increased irritability, impulsivity, aggression (in boys) and depression (in girls). Once hormones have stabilized, effects wane.
 - The relationship between puberty and mood is further influenced by environment- we don't see it as much in families with good relationships.

Changes associated with Puberty

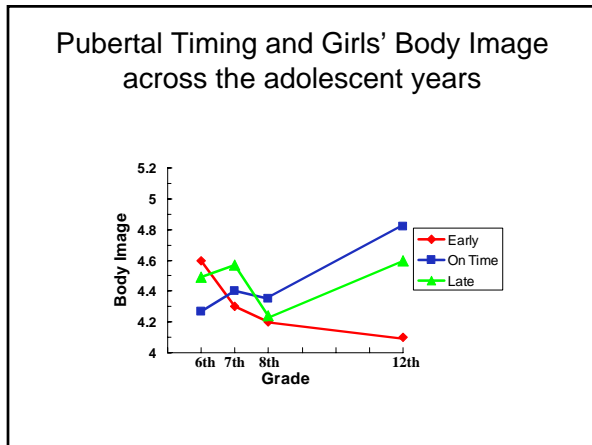
- Family Relationships
 - Increased distance and conflict, especially conflict with mother
 - Conflict gradually diminishes after the growth spurt
 - Possible explanations:
 - Evolutionary process to achieve separation
 - Change in established childhood relationship patterns, a transition for all family members

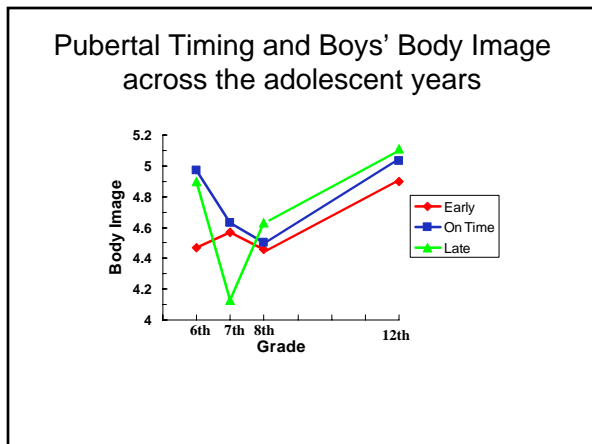
Hormones & Mothers



Early and Late Maturation

	Female	Male
Early	<ul style="list-style-type: none"> Is more popular (esp. boys), dates earlier and more often Is more vulnerable to peer pressure Is more likely to get in trouble in school, use drugs, and engage in early sex Has lower grades Experiences more emotional distress Has a less positive body image, more food intake problems, More anxiety, depression and panic attacks 	<ul style="list-style-type: none"> Is considered more masculine and attractive Is more popular and self-confident Is somewhat more likely to show behavior problems in school Becomes more conventional, less curious, and more conforming with age At greater risk for antisocial behavior and substance use
Late	<ul style="list-style-type: none"> Experiences less pressure to engage in antisocial conduct Is more poised and assertive Has a body image that is more consistent with current trends (taller and thinner) Has fewer problems with parents Has more time to adjust to changes and challenges 	<ul style="list-style-type: none"> Is considered tenser, more childish, and more attention seeking Is considered more rebellious, yet dependent Is more assertive, flexible, and insightful in adulthood





Early Maturation and Girls' Problem Behavior

