Chapter 14 - Adolescence: Biosocial Development

The Developing Person Through the Life Span 8e
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Puberty Begins

Puberty

• The time between the first onrush of hormones and full adult physical development.

• Usually lasts three to five years.
  – Many more years are required to achieve psychosocial maturity.
Puberty Begins

**Menarche**- A girl’s first menstrual period, signaling that she has begun ovulation.
- Pregnancy is biologically possible, but ovulation and menstruation are often irregular for years after menarche.

**Spermarche**- A boy’s first ejaculation of sperm.
- Erections can occur as early as infancy, but ejaculation signals sperm production.
Puberty Begins

Hormone

• An organic chemical substance that is produced by one body tissue and conveyed via the bloodstream to another to affect some physiological function.

• Various hormones influence thoughts, urges, emotions, and behavior.
Puberty Begins

Pituitary

• A gland in the brain that responds to a signal from the hypothalamus by producing many hormones, including those that regulate growth and control other glands, among them the adrenal and sex glands.
Puberty Begins

• **Adrenal glands** - Two glands, located above the kidneys
  – produce hormones, including the “stress hormones” epinephrine (adrenaline) & norepinephrine

• **HPA (hypothalamus–pituitary–adrenal) axis** - A sequence of hormone production
  – originates in the hypothalamus, moving to the pituitary and then to the adrenal glands.
Puberty Begins

Sex Hormones

• **Gonads**- The paired sex glands (ovaries in females, testicles in males)
  – produce hormones and gametes

• **HPG (hypothalamus-pituitary-gonad) axis**- A sequence of hormone production
  – originates in the hypothalamus, moves to the pituitary gland and then to the gonads
Puberty Begins

Sex Hormones

- **Estradiol** - A sex hormone, considered the chief estrogen.
  - Females produce more estradiol than males do.

- **Testosterone** - A sex hormone, the best known of the androgens (male hormones).
  - Secreted in far greater amounts by males than by females.
### Puberty Begins

#### The Sequence of Puberty

<table>
<thead>
<tr>
<th>Girls</th>
<th>Approximate Average Age*</th>
<th>Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ovaries increase production of estrogen and progesterone†</td>
<td>9</td>
<td>Testes increase production of testosterone†</td>
</tr>
<tr>
<td>Uterus and vagina begin to grow larger</td>
<td>9½</td>
<td>Testes and scrotum grow larger</td>
</tr>
<tr>
<td>Breast “bud” stage</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Pubic hair begins to appear; weight spurt begins</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Peak height spurt</td>
<td>11½</td>
<td>Pubic hair begins to appear</td>
</tr>
<tr>
<td>Peak muscle and organ growth (also, hips become noticeably wider)</td>
<td>12</td>
<td>Penis growth begins</td>
</tr>
<tr>
<td>Menarche (first menstrual period)</td>
<td>12½</td>
<td>Spermarche (first ejaculation); weight spurt begins</td>
</tr>
<tr>
<td>First ovulation</td>
<td>13</td>
<td>Peak height spurt</td>
</tr>
<tr>
<td>Voice lowers</td>
<td>14</td>
<td>Peak muscle and organ growth (also, shoulders become noticeably broader)</td>
</tr>
<tr>
<td>Final pubic-hair pattern</td>
<td>15</td>
<td>Voice lowers; visible facial hair</td>
</tr>
<tr>
<td>Full breast growth</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Final pubic-hair pattern</td>
</tr>
</tbody>
</table>

*Average ages are rough approximations, with many perfectly normal, healthy adolescents as much as three years ahead of or behind these ages.

†Estrogens and testosterone influence sexual characteristics, including reproduction. Charted here are the increases produced by the gonads (sex glands). The ovaries produce estrogens and the testes produce androgens, especially testosterone. Adrenal glands produce some of both kinds of hormones (not shown).
Age and Puberty

- The rise in hormone levels that signals puberty is still considered normal in those as young as age 8 or as old as age 14.
- About 2/3 of the variation in age of puberty is genetic.
Body Fat

• Data on puberty over the centuries reveals a dramatic example of a long-term statistical increase or decrease called a **secular trend**.

• The secular trend has stopped in developed nations, possibly due to nutrition.
Body Fat

Leptin

• A hormone that affects appetite and is believed to affect the onset of puberty.

• Levels increase during adulthood and peak at around age 12
Stress

• Affects fertility and puberty by making reproduction more difficult

• Puberty arrives earlier if:
  – a child’s parents are sick, addicted or divorced
  – the neighborhood is violent and impoverished

• Not all scientists agree that stress causes early puberty.
Too Early, Too Late

Early-maturing girls tend to have lower self-esteem, more depression, and poorer body image than later-maturing girls.

• Early-maturing boys are more aggressive, lawbreaking, and alcohol-abusing than later-maturing boys.

• Slow developing boys tend to be more anxious, depressed, and afraid of sex.
• Many adolescents are deficient in their intake of necessary vitamins or minerals.

• Deficiencies of iron, calcium, zinc, and other minerals affect bone and muscle growth.

• Nutritional deficiencies result from the food choices that young adolescents are allowed, even enticed, to make.
Body Image

A person’s idea of how his or her body looks.

• One reason for poor nutrition is anxiety about body image.
• Girls diet partly because boys tend to prefer to date thin girls.
• Boys want to look taller and stronger, a concern that increases from ages 12 to 17, partly because girls value well-developed muscles in males.
Eating Disorders

• **Anorexia nervosa** - Characterized by self-starvation, affected individuals voluntarily under eat and often over exercise, depriving their vital organs of nutrition. Anorexia can be fatal.

• **Bulimia nervosa** - Characterized by binge eating and subsequent purging, usually by induced vomiting and/or use of laxatives.
The Transformations of Puberty

Growth spurt

• The relatively sudden and rapid physical growth that occurs during puberty.
• Each body part increases in size on a schedule: A weight increase usually precedes a height increase, and growth of the limbs precedes growth of the torso.
• A height spurt follows the increase in body fat, and then a muscle spurt occurs.
The Transformations of Puberty

Sexual Maturation

• **Primary sex characteristics** - The parts of the body that are directly involved in reproduction, including the vagina, uterus, ovaries, testicles, and penis.

• **Secondary sex characteristics** - Physical traits that are not directly involved in reproduction but that indicate sexual maturity, such as a man’s beard and a woman’s breasts.
Sexual Activity

• Fantasizing, flirting, handholding, staring, displaying, and touching all reflect gender, availability, and culture.

• Hormones trigger thoughts and emotions, and the social context shapes thoughts.

• Sex-related impulses are more hormonal for boys and more cultural for girls.
The Transformations of Puberty

Compared to 100 years ago, adolescent sexual development is more hazardous, for five reasons:

1. Earlier puberty and weaker social taboos mean teens have sexual experiences at younger ages. Early sex correlates with depression and drug abuse.

2. Most contemporary teenage mothers have no husbands to help them, whereas many teenage mothers a century ago were married.
The Transformations of Puberty

3. Raising a child has become more complex and expensive.
4. Mothers of teenagers are often employed and therefore less available as caregivers for their teenager’s child.
5. Sexually transmitted infections are more widespread and dangerous.
The Transformations of Puberty

• **Child sexual abuse**
  – Any erotic activity that arouses an adult and excites, shames, or confuses a child, whether or not the victim protests and whether or not genital contact is involved.

• **Sexually transmitted infection (STI)**
  – A disease spread by sexual contact, including syphilis, gonorrhea, genital herpes, chlamydia, and HIV.
# Sexual Abuse

<table>
<thead>
<tr>
<th>Age</th>
<th>Number of Sex-Abuse Victims</th>
<th>Percent of Maltreatment That Is Sex Abuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td>315</td>
<td>0.3%</td>
</tr>
<tr>
<td>1–3</td>
<td>3,249</td>
<td>2.2</td>
</tr>
<tr>
<td>4–7</td>
<td>13,137</td>
<td>7.4</td>
</tr>
<tr>
<td>8–11</td>
<td>13,459</td>
<td>9.5</td>
</tr>
<tr>
<td>12–15</td>
<td>19,848</td>
<td>14.5</td>
</tr>
<tr>
<td>16–17</td>
<td>6,084</td>
<td>13.5</td>
</tr>
</tbody>
</table>

*Source: U.S. Department of Health and Human Services, 2010.*
Neurological Development

Different parts of the brain grow at different rates:

• The limbic system (fear, emotional impulses) matures before the prefrontal cortex (planning ahead, emotional regulation).

• That means the instinctual and emotional areas develop before the reflective ones do.
Neurological Development

• When emotions are intense, especially when one is with peers, the logical part of the brain shuts down.

• When stress, arousal, passion, sensory bombardment, drug intoxication, or deprivation is extreme, the adolescent brain is overtaken by impulses that might shame adults.
Benefits of Adolescent Brain Development

Several aspects of adolescent brain development are positive:

• increased mylenation, which decreases reaction time
• enhanced dopamine activity, promoting pleasurable experiences
• synaptic growth enhances moral development and openness to new experiences and ideas