Chapter 14

ADOLESCENCE: BIOSOCIAL DEVELOPMENT

I. Puberty begins

Key Points
- Time between first onset of hormones and full adulthood
- Takes 3 – 5 years
- Takes many more years to achieve psychosocial maturity
- Testosterone increases 18x in boys, estrogen increases 8x in girls
- Both levels increase in both sexes

1. Reproductive Changes
   - Primary sexual characteristics – directly involved in reproduction (vagina, penis, uterus, ovaries, testicles)
   - In girls the ovaries and uterus grow first and the vaginal wall thickens before the outward signs begin
   - In boys the testes begin to grow and about a year later the penis lengthens and the scrotum enlarges and becomes pendulous
   - Menarche is usually seen as the onset of fertility
   - First menstrual cycles are usually anovulatory

2. Sexual Appearance
   - Secondary sex characteristics – not directly involved in reproduction but indicate sexual maturity
   - Boys grow taller and develop broader shoulders than girls
   - Girls put on more fat all over and become wider in the hips
   - Breast bud growth is taken a the fist observable sign of puberty
   - Since breast size in our culture is seen as an indication of ‘womanhood’ many girls with small breast feel cheated
   - About 65% of boys experience some breast growth, this usually disappears by age 16
   - Voice becomes lower as the larynx grows—most noticeable in boys
   - The ‘Adam’s apple’ becomes noticeably bigger in boys
   - Existing hair on the body grows darker
   - Boys grow new hair grows on the arms, face and groin area
   - Visible facial hair is seen as a sign of manliness in American society
   - Girls develop light facial hair, more noticeable hair on legs and arms with the specifics of color being more genetic than hormonal
Menarche
- 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
- Boy's first ejaculation of sperm
- Erections can occur as early as infancy, but ejaculation signals sperm production.

The entire process of puberty begins with an invisible event—a marked increase in hormones.

Hormone
- Organic chemical substance that is produced by one body tissue and conveyed via the bloodstream to another to affect some physiological function

Pituitary
- 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

The pituitary produces hormones that stimulate the adrenal glands.

Adrenal glands
- Two glands, located above the kidneys, that produce hormones including the “stress hormones” epinephrine (adrenaline) and norepinephrine

Sex Hormones

Gonads
- Paired sex glands (ovaries in females, testicles in males).
- Gonads produce hormones and gametes.

GnRH (gonadotropin-releasing hormone)
Hormones that causes gonads to enlarge and increase production (estradiol in girls; testosterone in boys)

  - Estradiol
  - Testosterone

Sex hormone, considered the chief estrogen.
Females produce more estradiol than males do.
Sex hormone, the best known of the androgens (male hormones). Secreted in far greater amounts by males than by females.

**Body Rythmnes**

Hypothalamus and the pituitary regulate the hormones that affect the biorhythms of stress, appetite, sleep.

In puberty a phase delay in circadian sleep-wake cycles may occur.

**Eveningness** puts adolescents at risk for antisocial activities and sleep deprivation.

Blue spectrum lights from electronic devices may have strong effects on human circadian system by interfering with nighttime sleepiness

The phase delay at puberty makes many teens wide awake and hungry at midnight but half asleep, with no appetite or energy, all morning.

Teachers everywhere complain that students don’t remember what they were taught. Maybe schedules, not daydreaming, are to blame.

Three of every four high school seniors are sleep deprived.

Even if they go to sleep at midnight, as many do, they must get up before 8, as almost all do. Then all day they are tired.

Sleep-deprived teenagers nod off in class and sometimes use drugs to stay awake or go to sleep.

- In August 2014, the American Academy of Pediatrics concluded that high school should not begin until 8:30 or 9 a.m., because adolescent sleep deprivation causes a cascade of intellectual and behavioral problems.

*Do you agree? Disagree? Why?*

For many adolescents, early sleep and early rising are almost impossible.

Normally, pubertal hormones begin to increase between ages 8 and 14, and visible signs of puberty appear a year later.

That six-year range is too great for many parents, teachers, and children, who want to know when a given child will begin puberty.
If a child’s genes, gender, body fat, and stress level are known, some prediction is possible.

About two-thirds of the variation in age of puberty is genetic.

Genes on the sex chromosomes have a marked effect on age of puberty.

Girls generally develop ahead of boys.

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**Body fat**
- Children who have a relatively large proportion of body fat experience puberty sooner than do their thin contemporaries.
- Most girls must weigh at least 100 pounds before experiencing first period.
- Globally urban children are more often overfed and underexercised than rural children.

**Secular trend**
- Data on puberty over the centuries that reveals a dramatic example of a long-term statistical increase or decrease.
- Each generation has experienced puberty a few weeks earlier, and has grown a centimeter or so taller, than did the preceding one.
- Secular trend has stopped in developed nations.

*Do you know why?*

**Chemicals**
All the research on the effects on humans of hormones and other chemicals, whether natural or artificial, is complex.

The female system is especially sensitive to leptin and other factors in the environment

**Leptin**
- Affects appetite and is believed to be involved in the onset of puberty.
- Increases during childhood and peak at around age 12.
- Evokes uncertainty about its effects
Too Early Too Late

**Girls**
Early-maturing girls tend to have lower self-esteem, more depression, and poorer body image than later-maturing girls. Early-maturing girls may be attracted to older boyfriends and enter into abusive relationships more often than other girls.

**Boys**
Early-maturing boys are more aggressive, law-breaking, and alcohol-abusing than later-maturing boys. Slow developing boys tend to be more anxious, depressed, and afraid of sex. Size and maturation are important for many adolescents in every nation.

1. **Facets**
   - Developing a healthy body image is an important part of becoming an adult
   - Few adolescents are satisfied with their bodies
   - The opinions of self and peers are more important than parents
   - A teenager’s assessment of personal appearance is the most important determinant of self-esteem
   - Consequently they are preoccupied with their appearance

2. **Sex Differences in Body Image**
   - Concern with body image is more extreme for girls since the norms for attractiveness are punishing and narrow
   - Boys tend to be glad to have more body hair since it is seen as manly
   - Girls tend to be upset because of the cultural value to not have body hair
   - Feelings of depression correlate highly with a negative body image
   - Concern over body image should not be taken lightly.

3. **Too Early Too Late**
   - Girls have most difficulty with early maturation because of the added pressures that accompany it
   - Boys find late maturation most difficult because of correlation between peer status and maturity levels
   - Girls who date early suffer a lower self esteem, feel scrutinized by parents and girl friends, and pressured by dates to premature sex activity
   - Boys who are not athletic, or who appear weak, unattractive, and slow to become sexually involved tend to have lower self esteem regardless of timing

**Ethnic Differences**

- The effects of early puberty vary not only by sex, but also by ethnicity and culture.
• In contrast to European Americans, early-maturing African American girls were not depressed, but early-maturing African American boys were.
• European research finds that Swedish early-maturing girls were likely to encounter problems with boys and early drug abuse, but similar Slovak girls were not.
• Early maturing Mexican American boys were likely to experience trouble with the police and with other boys if they lived in neighborhoods with relatively few Mexican-Americans, but not if they lived in ethnic enclaves.

None of these trends is true for all children, of course, as ethnicity is only one influence on development. However, all three studies confirm that contextual factors interact with biological ones, and both have significant implications for individuals. Always, relationships with peers and parents make off-time puberty better or worse.

Growth spurt
• Spurt is a relatively sudden and rapid physical growth that occurs during puberty.
• Each body part increases in size on a schedule; growth is not always symmetrical.
• Weight usually precedes height, and growth of the limbs precedes growth of the torso.

• Sequence: Weight, Height, Muscles
  • Height spurt follows weight spurt, then a year or two later a muscle spurt occurs.
  • Arm muscles develop more in boys; other muscles are gender-neutral

Little difference
Both sexes develop longer and stronger legs during puberty.

• Organ growth
  • Lungs triple in weight; consequently, adolescents breathe more deeply and slowly.
  • Heart doubles in size and the heartbeat slows, decreasing the pulse rate while increasing blood pressure.
  • Only lymphoid system decreases in size
  • The lymphoid system decreases in size, resulting in fewer respiratory infections, disappearance of childhood asthma

• Skin and hair
  • Skin becomes oilier, sweeter, and more prone to acne.
  • Hair on the head and limbs becomes coarser and darker.
  • New hair grows under arms, on faces, and over sex organs.
In many ways, hair is more than a growth characteristic; it becomes a display of sexuality.

**Diet deficiencies**
Many adolescents are deficient in their intake of necessary vitamins or minerals. Deficiencies of iron, calcium, zinc, and other minerals, since these are needed for bone and muscle growth. Nutritional deficiencies result from the food choices that young adolescents are allowed, even enticed, to make.

- Deficiencies of iron, calcium, zinc, and other minerals may be even more problematic during adolescence than vitamin deficiencies, since minerals are needed for bone and muscle growth.

**Nutritional deficiencies result from the food choices that young adolescents are enticed to make.**

These choices are influenced by:
- Fast-food establishments
- Price of healthy versus unhealthy choices
- School-based vending machines

**Body Image**

**Anxiety about body image contributes to poor nutrition among teenagers.**
Focus on and exaggeration of imperfections

**Few adolescents are happy with their bodies.**
Discrepancy between teen body and bodies portrayed online and in teen-marketed media
Dissatisfaction with body image can be dangerous, even deadly

**Eating Disorders**

**Anorexia nervosa**
Eating disorder 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**
Eating disorder characterized by binge eating and subsequent purging, usually by induced vomiting and/or use of laxatives.

**Binge-eating disorder**
The DSM-5 introduced binge-eating disorder as a diagnostic category, in part to recognize that bingeing is sometimes associated with anorexia.
Origins of disordered eating
Cultural image
Stress
Puberty
Hormones
Childhood patterns

Family patterns and eating disorder reduction
Healthy eating in childhood
Eating together during childhood

A. Dieting as a Disease
1. Anorexia Nervosa – self starvation
   - 5-20% of the victims die
   - Social context disease – the culture supports it
   - Virtually unknown before 1950
   - On the rise in developing countries and in urban areas
   - At one time African Americans, Citizens of Asia and Africa, Latinas in South or North America did not have eating disorders
   - This is no longer true
   - 1% of women develop anorexia at some point in their lives with rates higher among athletes (particularly runners), gymnast, dancers, and among men wrestlers
   - High achieving girls in affluent families were the first diagnosed and at the most risk

2. Bulimia Nervosa -- binge eating followed by purging
   - 3x as common as anorexia
   - Some research finds that ½ of all college women have binged and purged
   - 1-3% of all women suffer form bulimia
   - Usually normal in weight
   - Experience serious health problems, such as damage to the digestive tract and cardiac arrest from electrolyte imbalance

3. Theories of eating disorders
   - Bulimia tends to emerge in early adulthood
   - 12 yr olds who eat till painfully stuffed at more likely to be bulimic by age 19
   - The stresses, weight gain and changing body shape, in a culture obsessed with thinness, make women more vulnerable
   - Most do not develop a disorder because they have already learned a habit of restraint, or because their mothers are not demanding and intrusive
   - Psychoanalytic – women develop eating disorders because of a conflict with their mothers
   - Behaviorism – some people with low self-esteem find binging, purging, and fasting effective since it has immediate release of tension and distress
   - Cognitive – One perspective is that women compete with men in the business world and want to project a strong, self-controlled, masculine image
• Sociocultural – cultural pressure to be slim and ‘model-like’
• Epigenetic systems – when girls stop eating they decrease their chance of reproduction (physically), and their appearance and obsession prevent young men from romantic interest. A powerful defense for girls frightened by the physical impulses of puberty

Brain Development

**Different parts of the brain grow at different rates.**

- Limbic system (fear, emotional impulses) matures before the prefrontal cortex (planning ahead, emotional regulation).
- Instinctual and emotional areas develop before the reflective ones do.

Brain scans confirm that emotional control, revealed by fMRI studies, is not fully developed until adulthood, because the prefrontal cortex is limited in connections and engagement.

- brain scans are part of a longitudinal study that repeatedly compares the proportion of gray matter from childhood through adolescence. Gray matter is reduced as white matter increases, in part because pruning during the teen years (the last two pairs of images here) allows intellectual connections to build. As the authors of one study that included this chart explain, teenagers may “look like an adult, but cognitively they are not there yet” (K. Powell, 2006, p. 865).

Cognitive development

**Risk and reward**

- Neurological research finds that the reward parts of adolescents’ brains are far stronger than inhibition parts.
- Slower-maturing prefrontal cortex makes powerful sensations desirable—loud music, speeding cars, strong drugs—compelling.

Benefits of Adolescent Brain Development

**There are benefits as well as hazards in the adolescent brain.**

Increased myelination and slower inhibition make reactions lightning fast. Brain’s reward areas activate positive neurotransmitters and teenagers become happier. **Questioning assumptions can raise important issues.**

Risk taking often facilitates learning.

Synaptic growth enhances moral development.
Sexual maturation

**Primary sex characteristics**
- 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

*Universal experience that produces another universal experience is influenced by cohort, gender, and culture.*

Boys are more influenced by hormones and girls by culture.
- Both are influenced by hormones, society, biology, and culture.

Research finds that the most powerful influence on adolescents' sexual activity is their close friends, not national or local norms for their gender or their ethnic group.

Sexual Problems in Adolescence

**Problems less than in earlier decades.**

*Positive trends*
- Decreased teen births in every nation
- Rise in use of protection
- Decrease in teen abortion rate

Sexual Maturity

**Hazards related to adolescent sexual activity**
- Correlation of early sex with depression and drug abuse
- Absence of husband
- Increased complexity and expense related to parenting
- More common and dangerous STIs.

**A. Reactions to Sexual Impulses**

1. Sexually Transmitted Diseases (STDs)
   - Sexually active teenagers have higher rates of gonorrhea, syphilis, and Chlamydia than any other age group
   - At risk for HIV infection, which increases if is already infected with another STD, has more than one partner a year, doesn’t use a condom
   - By senior year 22% of teenagers have already had 4 or more sexual partners
   - Only half of sexual active seniors had used a condom during their last act of sexual intercourse (This is higher than the younger groups)
   - The younger teens age when they contract an STD the less likely they are to seek treatment or tell their partners
• Teenagers are not more sexually active than adults, but they have more partners and poor or no medical care

2. Unwanted Pregnancies
• If a girl becomes pregnant within a year or two of menarche she at increased risk for every complication
• Woman who have their first baby by 16 tend to be shorter and sicker later on, and die younger
• Induced abortion rate is highest for girls under 15
• 80% of teenage mothers are unmarried
• The father is typically several years older but still not ready or willing to take on the responsibility
• Teenage motherhood slows educational and vocational achievement, restricts social and personal growth
• Teenage girls have a decreased chance of marriage and employment
• If the girl marries as a result of the pregnancy, it increase her chance of being abused, abandoned, or divorced
• Children of teenage mothers are more likely to become drug abusers, delinquents, dropouts, and parents themselves as teenagers

B. Sexual Abuse
2. Facets
• Sexual Abuse – use of an unconsenting person for one’s own sexual purpose (or if the person feels obligated)
• Child Sexual abuse – and erotic activity that excites or arouses an adult and excites, shames, or confuses a young person whether or not the child protests and whether or not their in genital contact
• Ongoing sexual abuse by a parent damages the victims ability as an adult to form a trusting and intimate relationship with another adult
• Fathers and step fathers are the typical abusers; mothers contribute by not recognizing the abuse and by not protecting the child
• Sexual victimization often begins in childhood with fondling, nudity, sexually suggestive comments
• Blatant sexual abuse begins in puberty
• The age at which sexual activity is considered abuse depends on the ‘age of consent’
• In the early 19th century in the US the age was 10
• Now in the US it is between 14 & 18 depending on local law
• Intercourse below the age of consent, even if consensual, is considered statutory rape
• One study in the US with 4 ethnic groups (African-, Native-, Mexican-, and European-) 1/3 reported sexual abuse and 1/5 reported having been rape
• Adolescents react to maltreatment with self destructive behaviors (suicide, drug abuse, or running away) or with counter attack (vandalism, or violence aimed at society or the perpetrator)
• In addition, a molested boy is likely to feel shame for being week and worry that he is gay
• 20% of sexual abusers are women
• An estimated 10 – 50% of child molesters are adolescent boys who had been abused themselves
• Every problem of adolescence is more common in victims of sexual abuse than in other teenagers
• Most abuse is committed by family or close family friends

Sexual Abuse

Child sexual abuse

Definition
Most common time
International and national rates

Characteristics
Family members most likely to abuse.
Victims often isolated and uninformed.
Impact of abuse often continues into adulthood.

• 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 made

Sexually transmitted Infections
• Worldwide, sexually active teenagers have higher rates of most common STIs: gonorrhea, genital herpes, and chlamydia.
• Human papillomavirus (HPV) has no immediate consequences but increases the risk of serious, life-threatening cancer in both sexes; rate reduced by immunization.
• Early age of first intercourse, failure to use condoms, hesitancy to report infection contribute to high U.S. infection rate.

1. Stress In families
• Abused children have either very high or very low levels of key stress hormones
• Those under extreme stress grow more slowly causing deprivation dwarfism
• Likely causes irregular period in young women
• Can cause production of hormones that cause puberty
• Ex. Girls in New Zealand whose parents are divorced experience early puberty than girls with married parents
• Girls from India raised by adoptive parents in Sweden experience earlier puberty than Swedish girls or girls in Indian raised by biological parents
• Polish children of both sexes in Urban areas experiences earlier puberty
• Another study found two factors that affect puberty: conflicted relationships with an unrelated man living in the house --- the longer a mother’s boyfriend lived in the house the earlier the onset of puberty

II. **Drug Use and Alcohol**

A. **Gateway Drugs** – a drug (marijuana, tobacco, alcohol) whose use increases the risk that a person will use harder drugs.
   1. Adolescents who use gateway drugs tend to be more violent
   2. The connection between gateway drugs and polydrug use, violence, sexual activity, and school failure is repeatedly shown in research
   3. Drug use is both a cause and a symptom
   4. Tobacco
      • Decreases food consumption and nutrient absorption
      • Only forbidden drug that girls use as much as boys
      • Girls who smoke are less developed and shorten women
      • Smoking reduces fertility
      • Nicotine is probably the most addictive drug
      • Research show that smoking reduces life span by 10 years because of cancer, stroke, heart disease
      • 40% of eighth grades believe there is ‘no great risk’

5. **Alcohol**
   • Drinking is more harmful in adolescents than in adulthood
   • It impairs judgments and loosens inhibitions
   • Correlates with abnormal brain development and impairs memory and self control by damaging the prefrontal cortex

6. **Marijuana**
   • Slows down thinking processes, particularly related to memory and abstract thinking
   • Children who become marijuana users experienced a developmental slowdown – later than their peers to graduate from college, obtain steady employment, and to marry

7. **Patterns of Drug Use**
   • Almost every teenager has tried a gateway drug
   • 80% have drank alcohol; 67% have smoked at least 1 cigarette; 54% have tried an illegal drug usually marijuana
• Adolescents tend not to listen to drug warnings from older people
• One longitudinal study in Calif. Found that teenagers who had never tried any drugs were troubled psychologically
• An in-depth East Coast study found that drinking and smoking marijuana helped adolescents bond with peers
• Whether a teenager uses or doesn’t use drugs depends largely on their peers
• Drug use among younger adolescents is increasing
• In a New Zealand study children that were allowed to drink early were alcoholics 10 years later

C. Storm and Stress
  1. Raging Hormones – ‘On One Hand’
     • Rapid hormones causes more rapid arousal of emotions
     • Hormones cause a quick shift from feeling great to feeling awful
     • For boys – hormonal increases lead to increased thoughts of sex, as well as more masturbation
     • For girls – the menstrual cycle can lead to mood swings form happy at mid-cycle to anger a day or two before
  2. Social Context – ‘On the Other Hand’
     • Detailed studies show that hormones make a relative small contribution to the emotional outburst of puberty
     • Adults and teenagers react to their biological changes trigger adolescent moods and reactions
     • Quantitative studies showed that among contemporary adolescents sexual activity levels are quite similar in boys and girls (about ¼ of both sexes have had sex by age 14; half by age 17; and 90% by age 20)
     • Sexual double standard is shifting