

# **Adolescent Medicine Online Handbook**

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\*\*These topics are intended for pediatric residents at University of Chicago Children's Hospital for use in their care of adolescent patients. Please note that these are general reviews and that all information regarding medical evaluation and treatment should be discussed with an attending physician. For further information, please refer to the websites and references listed.

## **The Adolescent History and Physical**

In the adolescent patient, a detailed medical history and physical exam are essential components of the well-adolescent visit. A history should include the same elements as a general pediatric H and P, with the addition of the following areas of questioning.

### **HEADSS**

#### **H- Home environment-**

**How are things going at home? How is the interaction between the teen and the parent/s? Does the teen feel safe at home?**

#### **E- Education-**

**How is school going? How are the teen's grades? What does the teen like/dislike about school? Is the teen involved in any extra-curricular activities or team sports?**

#### **A- Activity-**

**Does the teen get regular physical activity? How often does the teen exercise?**

#### **D- Diet/Drugs/Depression-**

**How is the teen's diet – is it well balanced or include a lot of junk food? Is the teen worried about his/her weight? Does the teen use drugs of any kind, like marijuana, crack, cocaine, or heroin? Does the teen or his friends smoke cigarettes or drink alcohol? If so, how often? Has the teen ever been drunk? Does the teen ever feel sad or overwhelmed by the events in his life? Does the teen feel any loss in interest in usual activities?**

#### **S- Sexuality-**

**Is the teen sexually active? If so, is the teen sexually active with men, women, or both? Does the teen use protection- if yes, what kind? Has the teen thought about becoming pregnant or getting a girl pregnant? What are the teen's feelings about his/her sexuality?**

#### **S- Suicidal ideation-**

**Does the teen have thoughts about ending his/her life or committing suicide? Has the teen ever thought of hurting someone else? Does the teen have a plan to do so?**

The adolescent physical exam is similar to a pediatric physical exam with a few additional points:

- It is important to note the height and weight of the teen at every visit, and to chart this on a growth chart. The teen's BMI should also be calculated to screen for obesity.
- If the patient is a female, you must always chart the date of her last menstrual period.
- Always assess the patient for scoliosis by examining their spine.
- On the physical exam, you must assess the Tanner Stage of every teen patient, in terms of both breast and pubic hair/genital development.
- If a female teen is sexually active or over the age of 18, she needs a yearly pelvic exam.

### **Pelvic Exam**

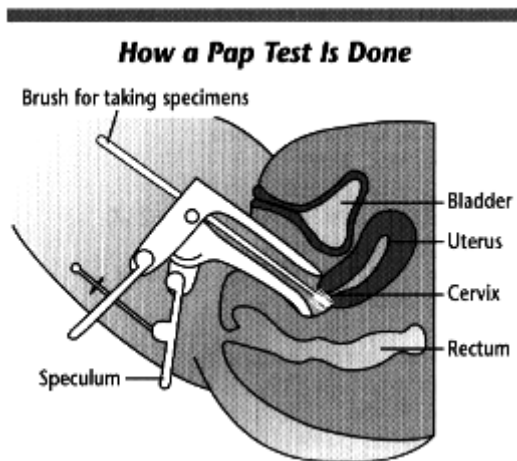
**Examination setup** — The basic equipment needed to perform a pelvic examination includes:

- An examining table with stirrups
- Light source
- Speculum of appropriate size
- Materials to obtain Pap smears
- Materials to test for common infections: chlamydia; gonorrhea; HSV
- Large cotton tipped swabs to absorb excess vaginal discharge or blood
- Q-tips for obtaining samples of vaginal discharge
- Dropper bottles of saline and potassium hydroxide for performing wet preps
- Water-soluble lubricant, disposable gloves, material to drape the patient.
- Microscope available for examining wet mount to look for BV or trichomonas

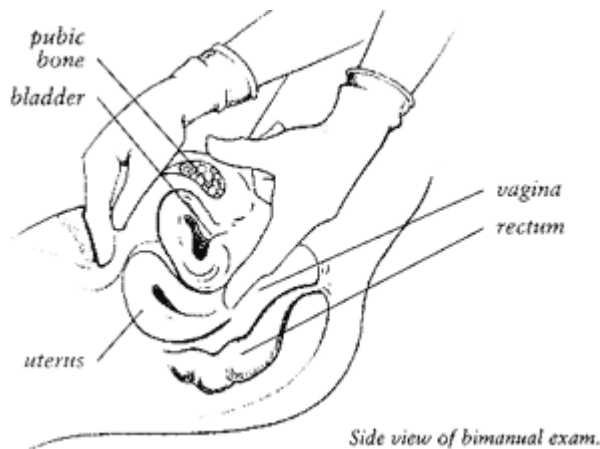
### **External Genital Exam**

**External genitalia** — The external genitalia are inspected and palpated. The hair distribution, skin, labia minora and majora, clitoris, introitus, perineal body, and urethral meatus are evaluated for developmental abnormalities, skin lesions (eg, discoloration, ulcers, plaques, verrucous changes, excoriation), masses, and evidence of trauma or infection.

**Internal Genitalia-** The vagina and cervix are examined next with the insertion of a water-lubricated appropriately sized speculum into the vagina. This is done carefully to avoid trauma and muscle spasm. The speculum is inserted downward and with pressure, and the speculum is then opened so that the cervix can be visualized. Cultures for GC and Chlamydia are obtained, and a pap smear is performed.



**Bimanual Exam-** After the speculum is removed, two fingers, lubricated with KY jelly, are inserted into the vagina to examine the vagina, cervix, uterus, adnexa, and cul-de-sac. The other hand of the examiner sweeps over the external abdominal wall to feel for masses or uterine abnormalities.



**References:**

<http://www.plannedparenthood.org/pp2/portal/medicalinfo/teensexualhealth/>

# PUBERTY

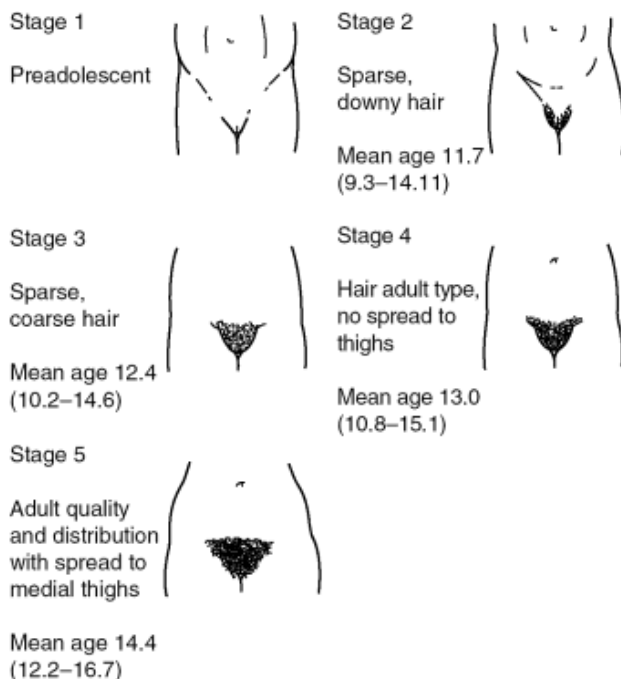
## General

- Growth in stature and development of secondary sexual characteristics. Occurs as a result of activity of the hypothalamic-pituitary-gonadal axis; pulsatile GnRH → FSH and LH → testosterone or estrogen.
- Onset, timing, and magnitude of pubertal changes are influenced by genetics, general health and nutrition, environmental, and psychosocial factors.

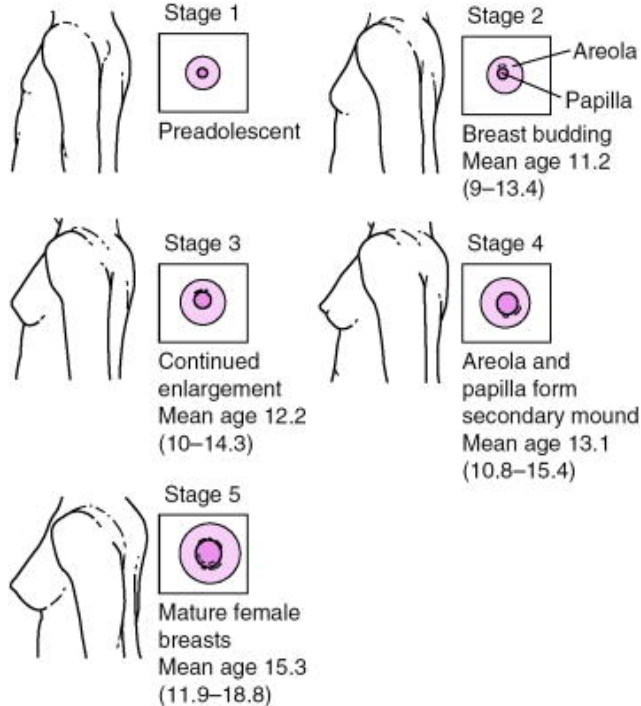
## Puberty Progression

- 1) Girls- thelarche (10.5 years in Caucasian, 9.5 in AA), adrenarche, growth spurt correlating with SMR 3 breasts, then menarche (12.88 years in Caucasian, 12.16 in AA).
  - 2) Boys- testicular enlargement, adrenarche, growth spurt correlating with SMR 4 testes, then facial hair/voice change/spermarche. Gynecomastia occurs in approximately 50% of males and is normal.
- Peak height velocity: During childhood, height growth averages 6 cm/yr. There is a slight deceleration in height immediately preceding puberty then peak height velocity is reached during mid-puberty, preceding menarche in girls and spermarche (appearance of sperm in seminal fluid) in boys. Average is 8 cm/yr at 11.5 years for girls and 9 cm/yr at 13.5 years for boys.

## Pubic Hair Development



## Breast Development



## Delayed Puberty

### *General*

- Puberty is considered clinically delayed if sexual maturation is not apparent in boys by age 14 or in girls by age 13. Using these clinical criteria, approximately 2.5% of healthy adolescents (mostly boys) will be identified as having pubertal delay. Most of these teens will be found to have no pathology after evaluation.

### *Differential*

- See table below

- Constitutional delay: Presumably due to slow development of pulsatile GnRH secretion. Family history may reveal family members with delayed puberty onset. Lab evaluation is normal and bone age will be delayed reflecting extent of pubertal maturation. Outcome is excellent for both adult height and final sexual maturity.

### *Evaluation*

- History: Screen for symptoms of chronic illness, thyroid disorders, or excessive exercise. Anosmia or galactorrhea may suggest a specific diagnosis. Evaluate for family members with delayed puberty

- Physical: Initial evaluation should focus on careful measurement of growth and early signs of sexual development, often unnoticed by the patient. A testicular volume of 4ml (using orchidometer) in boys and breast buds in girls are the earliest signs of pubertal development. Screen for signs of systemic illness or anomalies associated with congenital syndromes.

- Labs: General screening tests may include CBC, ESR, prolactin level, and TFT. Serum gonadotropins are useful to determine congenital or acquired gonadal failure (LH/FSH levels high) versus constitutional delay or GnRH deficiency (LH/FSH normal or low). Karyotype should be obtained if any stigmata of Klinefelter or Turner syndrome are present.
- Studies: Correlate bone age with chronological age and SMR. Further imaging with pelvic US to determine presence of uterus in girls and brain MRI can be useful based on clinical suspicion.

*Management*

- If pubertal delay is due to chronic illness, psychosocial stressors, or eating/exercise disorders, therapy should be aimed at optimizing health and nutrition through a multidisciplinary approach.
- For constitutional delay, reassurance is appropriate especially if there are signs of early pubertal development and careful follow-up is maintained.
- Use of hormonal therapy to “jump start” puberty and management of endocrinopathies should be referred to an endocrine specialist

**Table 1.** Differential Diagnosis of Delayed Puberty

<p><b>Increased Serum Gonadotropins</b></p> <ul style="list-style-type: none"> <li>• Turner syndrome (gonadal dysgenesis)</li> <li>• Klinefelter syndrome</li> <li>• Bilateral gonadal failure <ul style="list-style-type: none"> <li>—Primary testicular failure</li> <li>—Anorchia ("vanishing testes syndrome")</li> <li>—Premature ovarian failure</li> <li>—Resistant ovary syndromes</li> <li>—Irradiation</li> <li>—Cytotoxic therapy</li> <li>—Trauma</li> <li>—Infections</li> <li>—Castration</li> </ul> </li> </ul> <p><b>Normal or Low Serum Gonadotropins</b></p> <ul style="list-style-type: none"> <li>• Constitutional delay of puberty</li> <li>• Hypothalamic dysfunction <ul style="list-style-type: none"> <li>—Malnutrition</li> <li>—Strenuous exercise</li> <li>—Chronic illness</li> <li>—Eating disorders</li> <li>—Severe obesity</li> <li>—Central nervous system tumors</li> </ul> </li> <li>• Hypopituitarism <ul style="list-style-type: none"> <li>—Panhypopituitarism</li> <li>—Isolated gonadotropin deficiency</li> <li>—Kallman syndrome (with anosmia)</li> <li>—Isolated growth hormone deficiency</li> </ul> </li> <li>• Hypothyroidism</li> <li>• Hyperprolactinemia <ul style="list-style-type: none"> <li>—Pituitary adenoma</li> <li>—Drug-associated</li> </ul> </li> </ul> <p><b>Other Conditions</b></p>
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- Anatomic abnormalities
- Prader-Willi syndrome
- Lawrence-Moon syndrome
- Bardet-Biedl syndrome
- Bloom syndrome
- LEOPARD syndrome
- Ataxia-telangiectasia syndrome
- Cerebrohepato renal syndrome
- Noonan syndrome
- Androgen resistance
- Steroidogenic enzyme defects
  - Cholesterol desmolase complex deficiency
  - 3-beta-hydroxysteroid dehydrogenase deficiency
  - 17-alpha-hydroxylase deficiency
  - C17,20-desmolase deficiency
  - 17-beta-hydroxysteroid oxidoreductase deficiency

### References

- 1) Rosen DS. Physiologic Growth and Development During Adolescence. *Pediatrics in Review*. 2004; 25: 194-199.
- 2) Rosen DS, Foster C. Delayed Puberty. *Pediatrics in Review*. 2001; 22:309-315.

## ILLINOIS CONSENT AND CONFIDENTIALITY LAWS

\*\*For questions or further clarification of each law, please refer to the Illinois Consent and Confidentiality Laws Fact Sheet, January 2004, at [www.ica.org](http://www.ica.org)

Minor: A minor is a person under the age of 18. In general, all minors require consent of a parent or guardian for medical treatment. Exceptions include the mature minor and emancipation, both of which are determined by the court.

Emergency Care: Emergency care can be given without the consent of the parent or guardian if it is not feasible to obtain the consent without adversely affecting the patient's condition.

General Medical Treatment Including Abortion: Minors who are married, pregnant, or parents may consent to medical or surgical treatment. They have the same rights as people 18 years of age or older.

Birth Control: Physicians can provide birth control information and services to minors without consent if they are married, pregnant, or a parent, referred by a physician, clergyman, or planned parenthood, or when failure to provide services could result in a serious health hazard.

STD Treatment: In minors aged 12 or older, no consent is required for medical care (diagnosis and treatment) or counseling related to STDs. With the minor's consent, reasonable attempt should be made to involve the family in his or her treatment. However, there is no obligation to inform the parent or guardian as to the testing or treatment needed.

HIV Testing: Minors can consent to anonymous HIV testing. If there is a positive result, the physician must make a reasonable effort to notify the parent or guardian if in their professional opinion, notification is in the best interest of the child and they have tried unsuccessfully to have the minor make notification. There is no law, though, that obligates the physician to notify a parent or guardian of a positive result.

Substance Abuse Treatment: In minors aged 12 or older, no consent is required for medical care or counseling for substance abuse. With the minor's consent, reasonable attempt should be made to involve the family in his or her treatment. Without consent, no information should be given to the family unless in the provider's judgment, notification is necessary to protect the safety of the minor or another individual.

Mental Health Treatment- Outpatient: In minors aged 12 or older, outpatient counseling or psychotherapy can be provided without consent. This is limited to 5 outpatient sessions with each session lasting not more than 45 minutes.

Mental Health Treatment- Voluntary Inpatient: Minors aged 16 or older can admit themselves for inpatient mental health treatment but their parents or guardians must be informed immediately of the admission.

Mental Health Treatment- Involuntary Inpatient: Minors can be admitted upon request of their parent or guardian. Minors must be informed of their right to object the admission. If they object, discharge should be within 15 days (excluding weekends and holidays) unless there is a court filed petition for review of the admission.

Illinois Caucus for Adolescent Health. ICAH's 2004 Consent and Confidentiality Fact Sheet. January 2004.

## CONTRACEPTION

### General

- Adolescents typically wait  $\geq 1$  year after initiating sexual intercourse before seeking medical advice about contraception
- Approximately half of all adolescent pregnancies occur within the first six months of sexual activity. 85% of women will become pregnant within 1 year without use of contraception
- Always recommend the dual method approach to contraception, hormonal therapy to minimize pregnancy risk and condoms to minimize STD risk

### Abstinence

Abstinent adolescents should be counseled on what to do if they change their minds about sexual activity

Male Condoms (Failure rate: % of unintended pregnancies in adults with typical use and perfect use respectively, 15% and 2%)

- In 2003, 68% of adolescents reported the use of a condom during last intercourse
- Latex condoms are recommended, significantly reduce the transmission of STDs  
“Natural” lamb cecum condoms are less effective, polyurethane condoms can be used for latex allergy. New condom should be used each time with sexual intercourse
- Spermicides (nonoxynol 9 or octoxynol 9, gel/foam suppository/film, destroy sperm cell wall) used with condoms are an effective means of contraception for both STD and pregnancy prevention

Depo-Provera (Failure rate: 3% and 0.3%)

- Long acting progestin given Q12 weeks as 150mg IM dose with first dose given during first 5 days of menses. Do pregnancy test prior to each injection. Works by inhibiting ovulation by decreasing LH/FSH levels
- Side effects include weight gain (average increase 4.4 lbs in one study), headaches, mood changes, and menstrual cycle irregularities (60% have amenorrhea by 12 months). Counseling should be done regarding proper nutrition and exercise for weight management. Fertility can be delayed for up to 1 year after discontinuation
- May decrease bone mineral density, consider prescribing calcium supplements if inadequate intake by history. Should not be used in adolescents at risk for osteoporosis

Combination Oral Contraceptives (Failure rate: 8% and 0.3%)

- Contain synthetic estrogen and progestin. Monophasic has constant hormonal doses and multiphasics have varying amounts of progestin and sometimes estrogen. Work by inhibiting GnRH and ovulation along with causing thickening of cervical mucus, endometrial atrophy, and changes in tubal transport. 28-day cycle includes 21 days of hormonal pills and 7 days of placebo
- Failure rate is as high as 15% in teens because of inconsistent use, studies show teens miss approximately 3 pills/month
- Although sexually active teens should have annual screening for cervical cancer and STDs, pelvic exam is not mandated prior to starting OCP

- Refer to World Health Organization guidelines (see table below) to determine medical eligibility for OCP prescription. In particular, adolescent smoking is not a contraindication to use of OCP although recommend OCP with 20mcg of ethinyl estradiol for heavy smokers
- Start OCP immediately (quick start- need to verify negative pregnancy) or on first day or first Sunday of next menses. If miss one pill, take as soon as remembered. If miss two pills, take two pills for 2 days and use additional method of contraception for rest of the cycle
- Most common side effect is breakthrough bleeding which usually resolves in 3 months. Other side effects are nausea, headache, mood changes, and breast tenderness which improve with increased duration of OCP use
- Seasonale is an extended cycling OCP with 84 days of hormones followed by 7 placebo. Associated with increased breakthrough bleeding in first year
- Mini-pills are progestin only, have decreased efficacy compared to estrogen containing OCP

#### Transdermal Hormonal Contraceptive- Patch (Failure rate: 8% and 0.3%)

- Apply Q7 days for 3 weeks then off for 1 week. Better compliance than OCP with comparable efficacy
- FDA warning label regarding 60% more total exposure to estrogen compared to OCP, concern for increased risk for thrombosis
- Patch should not be used in women >90kg secondary to increased risk of pregnancy
- If off for >24 hours, need back-up contraception for 7 days

#### Vaginal Hormonal Ring Contraception- NuvaRing (Failure rate: 8% and 0.3%)

- Contains estrogen and progesterone. Inserted into vagina and left in place for 3 weeks, removed during 4<sup>th</sup> week for menses (comes with desktop timer). If ring is expelled, then wash and reinsert. If out for >3 hours, use back-up contraception until ring is back in place for 7 days
- Few studies to date, efficacy and adverse effects believed to be similar to OCP

#### IUD (Failure rate: Copper T 0.8% and 0.6%, Levonorgestrel 0.1% and 0.1%)

- Create a uterine environment that is spermicidal. Do not affect ovulation
- Not appropriate in adolescents at high risk for STDs by history, manufacturers do not recommend for nulliparous women

#### Vaginal Barrier Contraceptives (Failure rate: Female condom 21% and 5%, Cap in nulliparous 16% and 9%, Diaphragm 16% and 6%)

- Includes diaphragm, cervical cap, and female condom, use with spermicides to improve efficacy. Diaphragm and cervical cap require a prescription and fitting by a health care professional. Female condom is available without prescription, has two rings- one placed inside the vagina and one outside
- Offers some protection against STDs in the female whose partner will not use a condom
- Unpopular with adolescents because of discomfort with touching their vaginal area

Emergency Contraception

- A combined pill of estrogen and progestin or progestin-only pill, plan B, which has better efficacy and less associated N/V. Take within 72 hours of intercourse.
- Reduce pregnancy risk by approximately 75% (85% with plan B), most likely work by inhibiting or delaying ovulation
- Common side effect is nausea, may need anti-emetics. Less of an issue with plan B.
- Recommend pregnancy test (not required) before prescribing and 3 weeks after administration to detect treatment failure. ECP do not interrupt an implanted pregnancy, increase risk for ectopic pregnancy, or cause adverse effects to the fetus if given inadvertently to a pregnant woman.

\*\*For excellent patient handouts about contraceptives, visit [www.youngwomenshealth.org](http://www.youngwomenshealth.org), a Boston Children’s Hospital website

**WHO Guidelines for OCP Use**

<b>Category One</b> <i>* Do not restrict use of OCP</i>	<b>Category Two</b> <i>* Use caution, but OCP advantages usually outweigh risks</i>	<b>Category Three</b> <i>* OCPs usually not used unless there are no acceptable alternatives</i>	<b>Category Four</b> <i>* OCPs should not be used</i>
<ul style="list-style-type: none"> <li>- Epilepsy</li> <li>- Current use of antibiotics (except rifampin)</li> <li>- Cervical ectropian</li> <li>- Benign breast disease</li> <li>- Thyroid disorders</li> <li>- Pelvic inflammatory disease</li> <li>- Mild headache</li> <li>- Irregular menstrual bleeding</li> <li>- Sexually transmitted infections</li> <li>- Family history of breast cancer</li> </ul>	<ul style="list-style-type: none"> <li>- Sickle cell disease</li> <li>- Moderate hypertension (&lt;159/109 mm Hg)</li> <li>- Cervical cancer</li> <li>- Undiagnosed breast mass</li> <li>- Major surgery without prolonged immobilization</li> <li>- Uncomplicated diabetes mellitus</li> <li>- Severe headaches</li> <li>- Mental retardation</li> <li>- Severe psychiatric disorders</li> <li>- Drug or alcohol abuse</li> </ul>	<ul style="list-style-type: none"> <li>- Woman &lt;2 d postpartum</li> <li>- Gallbladder disease</li> <li>- Lactation (&gt;6 wk to &lt;6 mo postpartum)</li> <li>- Undiagnosed vaginal bleeding</li> <li>- Taking medications that decrease OCP efficacy: Griseofulvin Rifampin Barbiturates Hydantoins Carbamazepine Felbamate</li> </ul>	<ul style="list-style-type: none"> <li>- Deep vein thrombosis/pulmonary embolism</li> <li>- Hypercoagulability disorders</li> <li>- Lactation (&lt;6 wk postpartum)</li> <li>- Diabetes mellitus with complications</li> <li>- Severe hypertension (&gt;160/110 mm Hg)</li> <li>- Complicated congenital heart disease</li> <li>- Breast cancer</li> <li>- Surgery with prolonged immobilization</li> <li>- Migraine with focal neurologic deficits</li> <li>- Cerebrovascular disease</li> <li>- Coronary artery disease</li> <li>- Liver disease</li> </ul>

References

- 1) American Academy of Pediatrics, Committee on Adolescents. Contraception and Adolescents. *Pediatrics*. 1999; 104: 1161-1165.
- 2) Hillard, PJ. Overview of Contraception. *Adolescent Medicine Clinics*. 2005; 16: 485-493.
- 3) Rimsza, ME. Counseling the Adolescent About Contraception. *Pediatrics in Review*. 2003; 24: 162-169.

- 4) Mulchahey, KM. Practical Approaches to Prescribing Contraception in the Office Setting. *Adolescent Medicine Clinics*. 2005; 16: 665-674.
- 5) Neinstein, LS. *Adolescent Health Care*. Philadelphia: Lippincott, Williams and Wilkins, 2002.
- 6) Greydanus, DE. Contraception for College Students. *Pediatric Clinics of North America*. 2005; 52: 135-161

## STD's and Treatment

### *Chlamydia trachomatis*

#### **Background/Presentation:**

1. *Chlamydia trachomatis*- one of the most commonly reported sexually transmitted infectious diseases in the US.
2. Occurs 5-37% of the time in adolescents
3. Obligate intracellular parasite
4. Chlamydia is associated with a range of clinical presentations- patients can be asymptomatic, or can present with vaginal/penile discharge, dysuria, and or back/abdominal pain

#### **Diagnosis:**

1. Culture- definitive diagnosis can be made by isolating the organism in tissue culture, so sample must contain epithelial cells.
2. Antigen detection tests- Enzyme Immunoassays (EIA), DNA probe tests, Direct fluorescent antibody tests (DFA) and Nucleic Acid Amplification tests (NAATS) can be used to evaluate urethral swab specimens from males and endocervical swab specimens from females.

#### **Treatment:**

Treatment for uncomplicated genital tract infections in adolescents or adults, acceptable regimens include:

1. Azithromycin 1g PO x 1 dose
2. Doxycycline ( oral) 100 mg PO BID x 7 days

Alternative regimens include:

1. Erythromycin Base 500 mg PO QID x 7 days or
2. Erythromycin ethylsuccinate 800 mg PO QID x 7 days or
3. Ofloxacin 300mg PO BID x 7 days or
4. Levofloxacin 500mg PO QD x 7 days

Regimens for pregnant women:

1. Erythromycin base as above
2. Amoxicillin 500 mg PO TID x 7 days

All sexual contacts of patients with *C. trachomatis* infection should be evaluated and treated if the last sexual contact occurred within the past 60 days before onset of symptoms in the patient.

## *Neisseria gonorrhoeae*

### **Background/presentation:**

1. Gram negative diplococci
2. Incubation period is 1-14+ days
3. Clinical syndrome/presentation- patients can be asymptomatic or may present with urethritis, endocervicitis, or salpingitis
4. Complications can include epididymitis, Bartholinitis, PID and perihepatitis

### **Diagnosis:**

1. Culture with modified Thayer-Martin medium- the diagnostic standard- 80-90% sensitive and 100% specific
2. Non-amplified DNA probe- 89-97% sensitive and 99% specific
3. NAATs- very sensitive

### **Treatment:**

1. Ceftriaxone 125 mg IM x 1 dose
2. Ciprofloxacin 500mg Po x 1 dose
3. Ofloxacin 400mg PO x 1 dose

Additionally, when treating a patient for gonorrhea, you should also treat for presumed Chlamydia infection, and vice versa.

## **Herpes Simplex Virus**

### **Background/Presentation:**

1. Serotypes I and II- Serotype I often causes gingivostomatitis, but can cause genital lesions, and HSV-II most commonly causes genital herpes
2. Most primary HSV infections are asymptomatic, but can range in presentation. Secondary outbreaks are often accompanied by painful ulcers or vesicles, vulvar edema, perineal pain, vaginal or penile discharge, or systemic symptoms such as fever and malaise.

### **Diagnostic Tests for HSV:**

1. Cell culture- can be done if mucocutaneous lesions are present
2. Type specific serologic tests- specific, but less sensitive than culture- but can identify between HSV 1 and HSV 2 isolated

### **Treatment of primary HSV episode:**

1. Acyclovir 400 mg PO TID x 7-10 days, or
2. Acyclovir 300 mg PO 5x/day x 7-10 days, or
3. Famciclovir 250 mg PO TID x 7-10 days, or
4. Valacyclovir 1g PO BID x 7-10 days

It is important to note that one must counsel patients that treatment does not eradicate the latent virus, nor does it affect the frequency or severity of recurrences after the drug is stopped.

**Treatment of HSV recurrent episodes:**

Frequent genital HSV recurrences include more than 6 episodes per year. Triggers for recurrence can include stress, menses, fatigue. Prodrome can include itching, tingling, pain or burning at the site of eruption. Two management options:

**Episodic Treatment: during prodrome or within 1-2 days of lesions**

1. Acyclovir 400 mg PO TID x 5 days ( or 800 mg PO BID x 5 days) or
2. Famciclovir 125 mg PO BID x 5 days or
3. Valaciclovir 1g PO QD x 5 days

**Daily Suppressive Therapy:** for patients with greater than 6 recurrences per year

1. QD or Bid dosing of antiviral drug  
Can reduce transmission to uninfected patients

**HPV- Human Papilloma Virus:****Background/Presentation:**

1. Most HPV infections produce no lesions and are not clinically apparent.
2. Visible genital warts ( condyloma acuminata) are associated with anogenital dysplasia and cancer
3. Warts can be found on the penis, scrotum, anus, vulva, or perianal area
4. The incubation period is unknown but is estimated to range from 3 months to 3 years.
5. Warts can be papillomatous, pedunculated, or sessile growths, and may become confluent
6. May persist or recur, or regress spontaneously.

**Diagnosis:**

1. Most anogenital warts are diagnosed through clinical inspection
2. HPV cannot be easily cultured.

**Treatment:**

1. Treatment is directed towards eliminating the lesions that result from the infection, rather than HPV itself.
2. Treatment methods generally rely on chemical or physical destruction of the infected epithelium, as with salicylic acid or cryotherapy with liquid nitrogen.
3. Podofilox 0.5% solution or gel, applied BID x 3 days, then 4 days off for up to 4 cycles or Imiquimod 5% cream applied QHS 3x a week for 16 weeks, to help eliminate warts are patient applied treatments
4. MD treatments include cryotherapy, TCA ( trichloroacetic acid) or shave excision

***Trichomonas vaginalis*****Background/presentation:**

1. Trichomonas is caused by a flagellated protozoan, and it is an infection that often co-exists with gonorrhea or bacterial vaginitis.
2. Often asymptomatic or with a “frothy” vaginal discharge and mild vulvovaginal itching, mild dysuria can also occur.
3. Vaginal discharge is usually grey-green with a musty odor.
4. Vaginal mucosa is often deeply red and friable.

**Diagnosis:**

1. Diagnosis is usually made by examination of a wet-mount preparation of the vaginal discharge- the motion of the flagella are distinctive.
2. Organism culture is more sensitive than wet mount diagnosis, but are often not required.

**Treatment:**

1. Metronidazole ( flagyl) 500 mg PO BID x 7 days- remember to counsel patients to avoid alcohol for 48 hours after treatment to avoid the possible disulfiram –like reaction of the drug.
2. In pregnant patients, treatment with Metronidazole 2g PO x 1 is sufficient
3. The sexual partners of the affected person should be treated as well, even if they are asymptomatic.

**Bacterial Vaginosis**

**Background/Presentation:**

1. BV is a syndrome that occurs predominately in sexually active adolescent and adult females and is characterized by changes in the vaginal flora.
2. Symptoms include a white, adherent vaginal discharge with a characteristic “fishy” odor.
3. BV is often asymptomatic and is not associated with abdominal pain or significant pruritis.
4. The microbiologic cause may be an increase in concentration of *Gardnerella vaginalis* and a decrease in the concentration of *Lactobacillus species*.

**Diagnosis:**

The presence of three of the following symptoms is needed for the diagnosis:

1. Homogenous, white, noninflammatory vaginal discharge that smoothly coats the vaginal walls.
2. Vaginal fluid pH > 4.5
3. A Fishy odor of the discharge before or after adding 10% KOH ( whiff test)
4. “Clue cells”- squamous epithelial vaginal cells covered with bacteria

**Treatment:**

1. All non-pregnant patients who are symptomatic require treatment with Flagyl 500 mg PO BID x 7 days or
2. Metronidazole gel 0.75% 5g intravaginally QD x 5 days or
3. Clindamycin cream 2% 5g intravaginally QD x 7 days

**Sources:**

[www.cdc.gov](http://www.cdc.gov)

<http://aapredbook.aappublications.org>

## **Teen pregnancy**

### **Statistics:**

- Approximately 10% of all women aged 15 to 19 who are sexually active will become pregnant
- 78% of these pregnancies are unplanned.
- Approximately 10% of all live births in the US were to women 15 to 19 years of age in 2003.
- the US has one of the highest teen pregnancy rates in the Western world

### **Diagnosis:**

The diagnosis of pregnancy is made upon clinical suspicion (history of missed menstrual periods, breast tenderness and history of sexual activity) and assessment of hCG- human chorionic gonadotropin. Pediatricians should have a low index of suspicion for adolescents who may be pregnant. Important historical questions that must be asked of the suspected adolescent are:

1. What was the date of your last menstrual period (LMP)?
2. Are you sexually active?
3. Do you use protection? If so, do you use it every time? What kinds of protection do you or your partner use?
4. Is there a chance you might be pregnant?

When assessing a teen for possible pregnancy- it is important to ask the teen what her plans would be if her pregnancy test were to be positive. Some teens have a goal of becoming pregnant, and this should be determined.

### **Physical Exam:**

After a thorough history, a physical exam should be done, and a pelvic exam is essential when pregnancy is suspected. Possibly physical signs of pregnancy on pelvic exam may include:

- enlarged uterus ( uterus is a pelvic organ until 12 weeks of gestation, then it is palpable abdominally)
- Bluish cervix
- Engorged breasts with darkening of the alveolar area

### **Lab tests:**

In order to diagnose pregnancy, a urine pregnancy test is the most frequently used method for use in the clinic. The urine test is an immunologic assay that detects the beta subunit of human chorionic gonadotrophin ( hCG). Most tests are highly accurate qualitative tests. False negative tests are rare.

Adolescents who have irregular menstrual cycles, an uncertain LMP, or recent sexual activity should wait 14 days before obtaining a pregnancy test.

Home-based pregnancy tests should always be confirmed with an in-office test. Accuracy of home tests can be affected by user technique. The most common error with a home-based test is a negative test result done too early in the pregnancy. Most urine pregnancy tests can detect a pregnancy approx 7 to 10 days after the expected missed LMP.

**What to do with a teen that has a positive pregnancy test:**

This is a common scenario in the adolescent clinic. After a pregnancy is confirmed, the teen should be informed confidentially of the positive result. Then, her feelings about the pregnancy should be discussed. It is imperative to discuss with the teen how she plans on telling her parents and the father of the baby. She should be encouraged to tell her parents. A repeat office visit in 24 to 48 hours is often helpful- many adolescents will tell their parents or a responsible adult during that time.

Additionally, it is important to provide the teen with factual information regarding her pregnancy, including her estimated due date and the duration of the pregnancy. Her options for the pregnancy should be discussed with her in a non-judgmental manner. Her options include:

1. Parenthood
2. Adoption
3. Termination

Appropriate resources should be provided for the teen, including close follow up. It is important to note that in some states, parental consent is needed for a legal abortion- in these instances; it may be possible for the teen to obtain a judicial bypass and allow a judge to consent for the teen.

Teens who plan to continue their pregnancies should be directed toward appropriate prenatal care.

**Teen Pregnancies:**

- Teens are at increased risk of adverse pregnancy outcomes including low birth weight, and higher rates of infant deaths
- Mothers less likely to finish high school
- Mother and baby more likely to live in poverty and receive public aid
- Child is more likely to be neglected or abused

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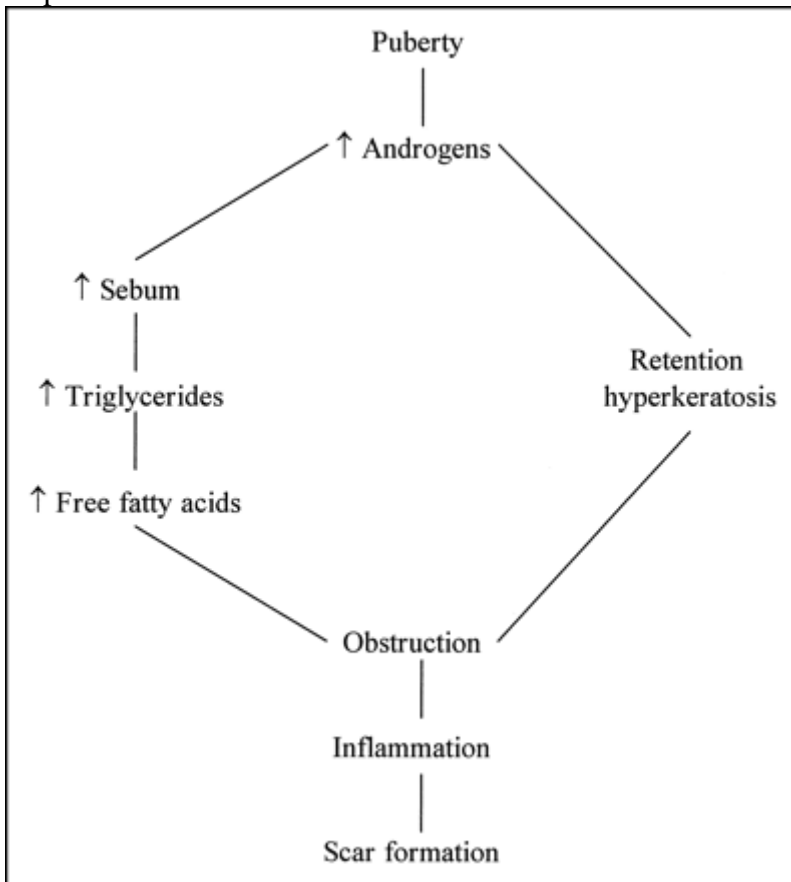
## ACNE

### Epidemiology

- Affects 80% of adolescents
- Estimated 14.5 million visits to physicians annually for acne treatment

### Pathophysiology

- Disorder of the pilosebaceous unit comprised of a follicle, sebaceous gland, and rudimentary or vellus hair
- Pilosebaceous units are concentrated in the face, chest, and back
- Pathogenesis multifactorial: Adrenarche causes increased production of DHEAS from adrenal gland with subsequent rise in testosterone and DHT. This leads to sebaceous gland enlargement and increased sebum production. Abnormal keratinization results in more cohesive epithelial cells with accumulation of cells and sebum in the follicle (comedogenesis). *P. acnes* colonizes the pilosebaceous unit and leads to an inflammatory response.



### Clinical Types

- Comedones: Caused by obstruction of cells and sebum within the follicle. Open comedones are blackheads, closed are whiteheads.
- Inflammatory lesions: Erythematous papules, pustules, or nodules. Occurs secondary to *p. acnes* colonization.

## Evaluation

- History: How long the patient has had acne, previous treatments, OCP and cosmetic use, other medical problems (eczema) or medications used (steroids).
- PE: Examine face, chest, and back to approximate the extent and severity of acne, evaluate for obesity and hirsutism (PCOS)
- Differential: Adenoma sebaceum, gram negative folliculitis, keratosis pilaris, pityrosporum folliculitis, acne rosacea
- Severity: Mild acne covers ¼ of face, few papules or pustules. Moderate covers ½ of face, several papules or pustules, few nodules and scars. Severe covers ¾ or more of face, many papules, pustules, and nodules, scarring often present.

## Treatment

### *General*

- Minimize trauma from picking and athletic gear which may lead to scar formation
- Use of noncomedogenic or nonacnegenic moisturizers, cosmetics, and sunscreens
- Remind patient that treatment is a long-term process, often requiring 3-6 months treatment to see improvement.

### *Benzoyl Peroxide*

- Use with mild comedonal or inflammatory acne, has some antibacterial properties
- 2.5-5% concentration (10% has no greater efficacy but does cause more side effects), gel formulation has best efficacy, wash can be used for large areas

### *Topical Antibiotics and Combinations*

- Topical antibiotics used for mild to moderate inflammatory acne, concern for resistance when used alone
- Suggest combination products such as benzamycin (covered by Medicaid) and benzaclin, both with 5% benzoyl peroxide gel

### *Retinoids*

- Useful in all types of acne. Main side effect is irritation, redness, and dryness. To minimize, apply to fully dry skin and can start with application of small amount QOD, then progress to QD.
- Normalize keratinization. BP inactivates tretinoin so do not apply simultaneously.
- Tretinoin: available in creams, gels, and liquid (order of increasing potency). Recommend starting with a low strength cream 0.025%
- Retin-A Micro: 0.1% gel, less side effects
- Adapalene: 0.1% gel, also available as cream, solution, and pledgets. Equal efficacy and less side effects than tretinoin.

### *Azelaic Acid*

- Antibacterial and anticomedonal, 20% cream
- Use in patients with mild to moderate acne who cannot tolerate tretinoin

### *Oral Antibiotics*

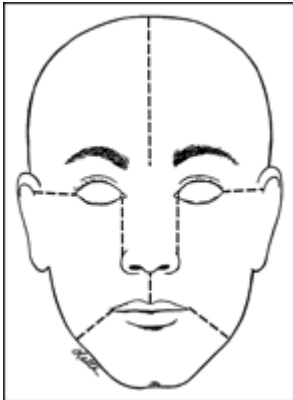
- Moderate to severe inflammatory acne, tetracycline, erythromycin (concern for emerging resistance), or doxycycline. Use oral antibiotics along with a topical therapy
- Tetracycline: 500mg BID, take on empty stomach (30min before or 2h after meal) with a large glass of water and avoid laying down after ingesting due to risk for esophageal ulceration. Do not take with milk or dairy products which decrease absorption. Rare side effects are photosensitivity, vulvovaginal candidiasis, and pseudotumor cerebri. Do not use in <10 years of age because of teeth discoloration.
- For failed treatment or GI side effects with tetracycline, can try doxycycline 100mg BID (risks are esophagitis, pseudotumor, or photosensitivity). Minocycline can be used but has been associated with rare but serious adverse effects (hepatitis, SLE-like reaction, hypersensitivity).
- Can take 3 months or longer to reduce number of new lesions, then can taper dose gradually

### *Isotretinoin- Accutane*

- Oral analog of vitamin A. Known teratogen, some reports to FDA that may predispose patients to suicide
- Refer to dermatology if Accutane considered.

### *Other*

- OCP have been shown to improve acne and is an very helpful adjunctive treatment for women
- Remember to follow-up with patients often, keep objective record of acne severity (draw face diagram)



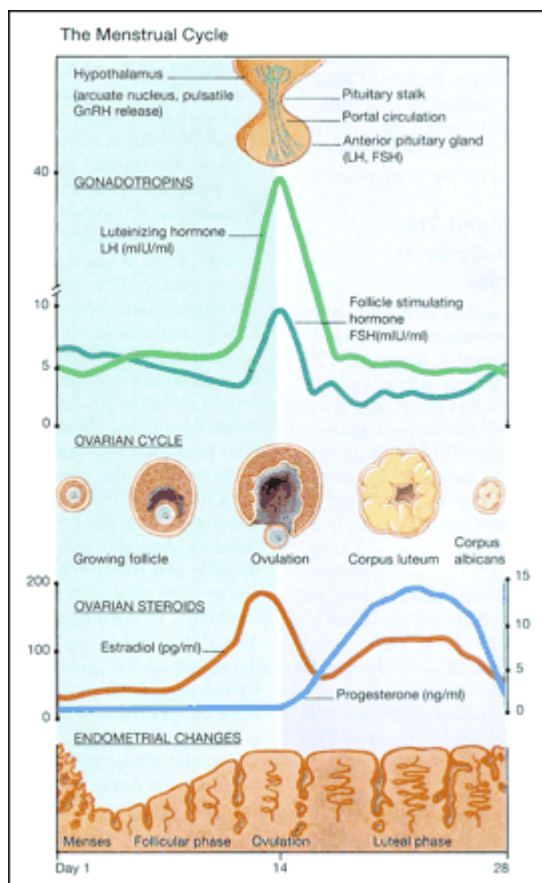
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## MENSTRUAL DISORDERS

### Normal menstruation

- Average age of menarche 12.88 for Caucasian girls, 12.16 for AA girls
- Irregular menses is normal up to two years after menarche due to anovulatory cycles (55- 82%).
- Most adolescent cycles lengths range from 21-42 days with 2-8 days of flow. Excessive bleeding is often difficult to quantify for the patient but is described as >80 ml/day.
- Follicular phase: last menses to ovulation. GnRH from hypothalamus → FSH from pituitary → estrogen from dominant ovarian follicle → builds up endometrial lining. Ovulation from LH surge around day 14.
- Luteal phase: ovulation to menses. LH from pituitary → progesterone from corpus luteum → counteracts estrogen, prepares endometrium for implantation. Without implantation, progesterone levels fall causing shedding of endometrial lining.
- In an anovulatory cycle, there is no corpus luteum producing progesterone. Unopposed estrogen secretion causes a negative feedback in the hypothalamic-pituitary axis. Subsequent decreased estrogen levels cause endometrial shedding.



### Abnormal Vaginal Bleeding

#### *Differential Diagnosis*

- Infection: STD's

- Pregnancy related bleeding: 40% of pregnancies will have some spotting or bleeding. Consider ectopic pregnancy, missed abortion.
- PCOS: Hyperandrogenism (acne, hirsutism), irregular menses, and obesity
- Coagulation defect: vWD, ITP, especially in those with menorrhagia at menarche or marked anemia
- Systemic illness: CF, IBD, SLE, anorexia. Poor nutritional status and emotional distress → anovulatory cycles. Typically need to maintain at least 85% of ideal body weight for regular menses.
- Endocrine disorders: Thyroid disorders, Cushing syndrome, Addison disease, late-onset CAH, hyperprolactinemia
- Reproductive tract pathology: Trauma/laceration, FB (retained tampon), vaginal or uterine cancers are rare in this age group

### *Evaluation*

- History: Menstrual history (menarche, frequency, duration, amount of flow), life changes (weight loss, illness, stress), easy bruising/bleeding, sexual history, general ROS. Ask about family history of bleeding disorders and thyroid disease.
- Physical: Should include vitals (orthostatics), fundoscopic exam and visual field testing, thyroid exam, evaluation for petechiae/bruises, Tanner staging, breast exam for galactorrhea, abdominal exam, and external genital exam. Pelvic exam should be done if patient is sexually active or has dysmenorrhea.
- Lab/Studies: Guided by H&P → CBC 3, BHCG, TSH/T4 in most patients. GC/chlamydia swabs and pap smear if doing a pelvic exam. If suspect bleeding disorder, send PT/PTT and vWD panel. If suspect PCOS, send FSH, LH, testosterone (total and free), DHEAS, and androstenedione. Late-onset CAH can be evaluated with a morning 17-hydroxyprogesterone level in the early follicular phase (level >200 ng/dl suggests the diagnosis). Depending on case, imaging can include abdomen/pelvic US or head CT/MRI.

### *Management*

- Mild: Hgb > 12, light-moderate flow. Menstrual calendar, reassurance, iron supplements, f/u in 1-3 months.
- Moderate: Hgb 10-12, moderate to heavy flow. 3-6 month therapy with OCP or medroxyprogesterone acetate 10mg PO QD X 10 days each month (if estrogen contraindicated). Add iron supplements and f/u in 1 month. If active bleeding, OCP 2-4 pills daily for 24-48h, taper to one pill daily by day 5, then complete 21 day pack.
- Severe: Hgb ≤ 9, heavy flow, hemodynamically unstable. Hospitalize, IV estrogen and OCP taper, iron supplements. Rarely, may require blood transfusion.
- All: NSAIDs shown to reduce blood loss by 30-50% if started at onset of menses.

## Amenorrhea

### *General*

- Primary amenorrhea is no menarche by age 14 without secondary sexual characteristics or no menarche by age 16 with secondary sexual characteristics
- Secondary amenorrhea is absence of menses for more than 3 cycles or 6 months in girls that previously had menses

- Always rule out pregnancy first

### *Primary Amenorrhea*

- Hypothalamic/Pituitary Disorders: Systemic illness (chronic disease, anorexia), stress, exercise, pituitary tumors, GnRH deficiency (idiopathic, Kallman syndrome)
- Ovarian Disorders: Gonadal dysgenesis, Turner's syndrome, PCOS
- Adrenal Disorders: 17-OH deficiency (CAH), adrenal tumors
- Genetic Disorders: Testicular feminization (46XY, androgen receptor defect), 5-alpha reductase deficiency (no conversion of testosterone → DHT), testicular regression (46XY)
- Anatomic Disorders: Imperforate hymen, mullerian agenesis
- Evaluation: Guided by H&P. In particular, depends on presence of uterus and breast development. Laboratory evaluation with FSH, LH, TSH/T4, prolactin level. Imaging with pelvic US, MRI if suspect pituitary adenoma. Additional w/u may include karyotype, testosterone level, and evaluation for 17-OH deficiency.

### *Secondary Amenorrhea*

- Differential: Hormonal contraception, hypothalamic dysfunction (systemic illness, stress, female athlete triad), drugs, pituitary tumor, thyroid disorder, PCOS, premature ovarian failure, Asherman syndrome (scarred endometrium)
- Evaluation: TSH/T4, prolactin, LH/FSH. Further testing based on clinical suspicion, includes brain MRI, pelvic US, PCOS evaluation, or karyotype.
- Progesterone challenge: 10mg medroxyprogesterone for 10 days. If withdrawal bleeding, problem with anovulation (stress, drugs, exercise, PCOS). If no bleeding, do estrogen/progesterone cycle.
- Estrogen/Progesterone cycle: If withdrawal bleeding and high LH/FSH, problem with ovarian failure. If withdrawal bleeding and low/normal LH/FSH, CNS lesion or hypothalamic dysfunction. If no withdrawal bleeding, evaluate for Asherman syndrome.

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- 2) Hillard PJ, Deitch HR. Menstrual Disorders in the College Age Female. *Pediatric Clinics of North America*. 2005; 52: 179-197.
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## Depression in Adolescents

- Depression is a not-uncommon complaint in the adolescent population, and it is often missed or under diagnosed.
- The risk for depression increases in adolescence.
- 4-8 % of adolescents show signs of depression.
- Teenage girls are at a greater risk of developing depression than are teenage boys.
- Factors that place adolescents at increased risk of depression include:
  1. Family history of depression in first degree relative
  2. Prior depressive episodes
  3. History of ADHA, anxiety disorder
  4. Family dysfunction
  5. Academic problems
  6. Chronic illness
- Depression in teens can manifest itself in many ways: disturbances in school functioning, changes in relationships with parents and friends, a change in involvement in activities, or somatic complaints.
- Teen with depression often have a comorbid diagnosis including substance abuse, anxiety disorders eating disorders, and disruptive behavior disorders (ADHD, conduct disorder)
- It is important to note that depression in teens may manifest ONLY as irritability and not as depressed mood.

### **Major Depressive Disorder** (DSM VI) criteria –

Characterized by a history of one or more depressive episodes in the absence of manic, hypomanic, or mixed episodes of mood disturbance. A teen must display at least five of the following:

- Depressed or irritable mood
- Diminished interest or pleasure in almost all activities
- Change in appetite or weight
- Insomnia or hypersomnia
- Psychomotor agitation or retardation
- Fatigue or energy loss
- Feelings of guilt or worthlessness
- Impaired concentration
- Recurring thoughts of death or suicide

One of the symptoms must be either depressed mood or loss of interest or pleasure that is present for most of the day, most days, for at least 2 weeks, with the remaining symptoms present as well for the same time. The symptoms must cause clinically significant distress, and must not be caused by substance abuse or another medical problem.

## **Dysthymic Disorder**

Symptoms of dysthymia are less intense but more persistent than symptoms of major depressive disorder. Dysthymia is characterized by chronically depressed or irritable mood for at least ONE year (two in adults) and two of the following:

- Appetite disturbance
- Sleep disturbance
- Fatigue
- Low self esteem
- Poor concentration
- Feelings of hopelessness

### **Differential Diagnosis:**

-Mood disorder related to a general medical condition:

- Endocrine- Addison's disease, hypothyroid
- Neurologic- post-concussive syndrome
- Infectious- HIV, mono
- Metabolic- Vitamin B12 deficiency

-Substance –induced mood disorder (alcohol, cocaine, amphetamines)

-Bereavement

-Adjustment disorder with depressed mood

-Bipolar disorder

### **Evaluation and treatment of Depressive Disorder:**

Evaluation of depression in adolescents can be difficult due to the variation in symptoms and potential for co-morbid disease.

- Diagnosis should be made by a formal clinical interview of the teen supplemented by information from parents and teachers.
- Must evaluate for potential co-morbid conditions
- Must evaluate for medical causes (hypothyroid)
- **RULE OUT SUICIDAL/HOMICIDAL IDEATION**
- Refer to psychiatry or mental health provider if high suspicion of depression.

### **Resources:**

The American Academy of Child and Adolescent Psychiatry

<http://www.aacap.org/Announcements/psychiatricmeds.htm>

The American Psychiatric Association

<http://www.psych.org/>

## **Treatment Recommendations:**

Three types of interventions:

- Psychosocial interventions (CBT, personal therapy, family or group therapy)
- Pharmacologic therapy (with SSRI's or TCA- somewhat controversial)
- Combination therapy (Psychosocial + Drugs)

If an adolescent requires treatment for depression, he or she should be referred to a child psychiatrist for management.

## **References:**

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Carlson, GA, Cantwell, DP. Unmasking masked depression in children and adolescents. Am J Psychiatry 1980; 137:445.

Reinherz, HZ, Giaconia, RM, Pakiz, B, et al. Psychosocial risks for major depression in late adolescence: a longitudinal community study. J Am Acad Child Adolesc Psychiatry 1993; 32:1155.

# Eating Disorders

## Diagnosis-

The diagnostic criteria for anorexia nervosa and bulimia nervosa have been established by the psychiatric community and are defined in the DSM-IV.

## Anorexia Nervosa:

1. Intense fear of becoming fat or gaining weight, even though underweight.
2. Refusal to maintain body weight at or above a minimally normal weight for age and height (weight loss leading to maintenance of body weight less than 85% of that expected, or failure to make expected weight gain in during period of growth leading to body weight less than 85% of that expected).
3. Disturbed body image, undue influence of shape or weight on self-evaluation, or denial of the seriousness of current low body weight.
4. Amenorrhea or absence of at least three consecutive menstrual cycles (those whose periods are inducible only after estrogen therapy are considered to be amenorrheic).

## Types of Anorexia Nervosa:

1. Restricting- no regular bingeing or purging (self induced vomiting or use of laxatives or diuretics).
2. Binge eating / purging- regular bingeing and purging by a patient who also meets the above criteria for anorexia nervosa.

## Bulimia Nervosa:

1. Recurrent episodes of binge eating, characterized by:
  - a. Eating substantially larger amounts of food in a discrete period of time (for example, 3 hours) than would be eaten by most people in similar circumstances in the same period.
  - b. A sense of lack of control over eating during the binge.
2. Recurrent inappropriate compensatory behavior to prevent weight gain (self induced vomiting, use of laxatives, diuretics, fasting or hyper exercising).
3. Binges or inappropriate compensatory behaviors occurring, on average, at least twice weekly for at least 3 months.
4. Self- evaluation unduly influenced by body shape or weight.
5. The disturbance does not occur exclusively during episodes of anorexia nervosa.

## Types of Bulimia Nervosa:

1. Purging: regularly engages in self-induced vomiting or use of laxatives or diuretics.
2. Non-purging: uses other inappropriate compensatory behaviors (fasting or hyper-exercising) without regular use of vomiting or medications to purge.

### **Eating Disorder Not Otherwise Specified**

This is a term defined by the DSM-IV to categorize patients who do not meet the full diagnostic criteria for anorexia nervosa or bulimia nervosa, but who present with eating disorders and psychological disturbances. Included in this category are:

1. Patients who have not yet missed three menstrual cycles or are not quite 15% below IBW.
2. Those who vomit or use laxatives regularly but who do not binge.
3. Children 8 to 12 years of age whose eating disorders are not driven by a specific fear of gaining weight. These disorders may be marked by a fear of choking, selective eating, or food avoidance.

### **Ideal Body Weight**

A good clinical estimate of ideal body weight is the following: for females, 100 lbs for 60 inches of height, then 5lbs per each additional inch, is a good estimate of IBW in adolescents and young adults. For males, 106 pounds for 60 inches, and 6 lbs for each additional inch is a good estimate. However, it is also necessary to look at the patients growth chart to see where the height and weight should be if no malnutrition existed.

### **Eating disorders**

Using official criteria, it is thought that 0.5 % of adolescent and young adult women have anorexia nervosa, and 1 to 3% have bulimia nervosa. Most cases occur in females, with a predicted ration of 10 to 20 to 1, female to male ratio. There is an increasing prevalence in males in recent years.

The pathogenesis of eating disorders is thought to be multifactorial. Cultural, genetic and environmental factors all play a contributing role.

The early recognition and decisive action of parents, schoolteachers and medical doctors is important in the detection and early treatment of eating disorders.

### **Medical Complications of Eating Disorders**

1. Metabolic Abnormalities:
  - a. Hyper or hyponatremia can occur with patients who consume too much or too little fluid.
  - b. Hypochloremic, hypoalkemic metabolic alkalosis can occur in the bulimic patient who abuses laxatives or diuretics.
  - c. Hypophosphatemia can occur in patients who are too rapidly re-fed.
2. Cardiac Abnormalities
  - a. Bradycardia and hypotension are common in the severely anorexic patient
  - b. Prolonged QT syndrome can occur in the anorexic patient
  - c. Sudden cardiac death due to severe hypokalemia in the bulimic patient
  - d. Cardiomyopathy from long term ipecac abuse
3. Gastrointestinal Abnormalities:
  - a. Abdominal pains and constipation in the anorexic patient are common complaints in the starvation or refeeding phase.
  - b. Frequent vomiting can result in esophageal irritation and chest pain.
  - c. Tooth enamel erosion can occur due to frequent vomiting.
4. Neurologic Abnormalities:
  - a. Peripheral neuropathy can occur in patients who lose large amounts of weight quickly
  - b. Seizures (uncommon) can occur with hyponatremia.
5. Endocrine Abnormalities:
  - a. Thyroid function is centrally decreased, resulting in a lowered pulse, temperature, and metabolic rate.
  - b. LH/FSH and estrogen levels are decreased, resulting in amenorrhea.
6. Hematologic Abnormalities
  - a. Mild anemia is common in patients with anorexia due to low levels of folate and iron.
  - b. ESR usually low in anorexia.

## **Treatment of Eating Disorders**

The AAP position on treatment of eating disorders discusses treatment levels based on severity of illness. The pediatrician along with a nutritionist or mental health worker can provide management for mildly affected patients. More severely affected patients will require outpatient management by an eating disorders team. Very severely affected patients will require intensive inpatient medical care on a medical or psychiatric unit. Medical, nutritional and psychological therapy should be provided in all instances.

### **Medical Therapy:**

Most medical complications will resolve with cessation of the disordered behaviors. However, electrolyte monitoring in patients with bulimia is essential, as the risk is

present for sudden cardiac death due to hypokalemia. Criteria for hospital admission for eating disordered patients is the following:

Anorexia Nervosa:

- less than 75% of ideal body weight or ongoing weight loss despite intensive treatment
- Refusal to eat
- Body fat less than 10%
- Heart Rate less than 50 beats/min (day) or less than 45 beats/min (night)
- Systolic BP less than 90
- Orthostatic changes in pulse more than 20 bpm, or blood pressure more than 10 mm Hg
- Temperature less than 35.6
- Arrhythmia

Bulimia Nervosa:

- Syncope
- Serum K less than 3.2
- Serum Chloride less than 88
- Esophageal tears
- Cardiac arrhythmia or prolonged QT
- Hypothermia
- Suicide risk
- Intractable vomiting
- Hematemesis
- Failure to respond to outside treatment

Medical therapy involves monitoring of electrolytes and of cardiac abnormalities, and monitoring for complications of refeeding syndrome. Refeeding of severely malnourished patients can lead to hypophosphatemia, which can result in cardiac failure, stupor and coma. Phosphorus levels should be closely monitored.

Nutritional therapy should involve counseling to establish weight gain in underweight patients. Generally 1 to 1.25 lbs per week is recommended. Initial daily diets in the 1,000 to 2,000 kcal range are used for initial weight gain, and diets in the range of 2,000 to 3,000 kcal for continued weight gain after a few weeks. A goal weight within 5 to 10% of IBW is often used because it is a weight where most patients can resume regular menses.

Psychological therapy is a crucial component of the treatment of eating disorders. Individual therapy is the mainstay of mental health care for these patients. Family therapy can be important for adolescents. Psychotropic medications are used frequently to help treat eating disorders, but the use is controversial.

## Outcome

The outcomes for eating disordered patients are variable. Short term, it is almost always possible to achieve weight gain in malnourished patients. Long term, anorexic patients have a 20% chance of continuing to do poorly. The mortality rate is 5 to 10% depending on medical complications or psychological issues, such as suicide. In bulimia, appropriate treatment can lead to an improved chance of controlling behaviors. Underlying all is the importance of early detection and aggressive treatment to positively impact prognosis.

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## SUBSTANCE ABUSE

AAP Policy Statement (1998): “Pediatricians should include discussion of substance abuse as part of routine health care, starting with the prenatal visit and as a part of ongoing anticipatory guidance.”

Epidemiology: Lifetime prevalence of adolescent substance abuse in 2003 was 80% for alcohol, 58% for cigarettes, 40% for marijuana, 12% for inhalants, 11% for ecstasy, 9% for cocaine, 8% for methamphetamines, and 3% for heroin.

Comorbidity: MVA, conduct disorder, antisocial personality, mood disorders (major depression, anxiety), physical and sexual abuse, suicide, delinquency

### Tobacco

- Evaluation: The 5 A’s → Ask about smoking at every visit, Assess if ready to quit, Advise to quit (physician delivered quit messages increase abstinence rates by 1.3!), Assist to quit, and Arrange follow-up.
- Pharmacotherapy: Studies on use of nicotine patch and bupropion in teens show low abstinence rates but a significant decrease in the number of cigarettes smoked per day.

### Alcohol

- Evaluation: CRAFFT → Driven in a Car when someone (including yourself) was under the influence?, use alcohol to Relax?, use alcohol when Alone?, ever Forget things while using alcohol?, family or Friends tell you to cut down drinking?, ever gotten into Trouble while using alcohol?. Two or more “yes” answers suggest a serious problem with alcohol.

DRUG	EFFECTS/ TOXICITY	WITHDRAWAL
Marijuana	Euphoria, relaxation, increased appetite	Within 24-48 hrs; flu-like symptoms, insomnia
Cocaine	Excitation, insomnia, dilated pupils, HTN, hyperthermia, tachypnea, bronchospasm, myocardial ischemia, seizures	Peak within 2-3 days; depression, irritability, somnolence, severe drug cravings
Amphetamines (methamphetamine, ecstasy)	Excitation, insomnia, dilated pupils, anorexia, HTN, hyperthermia, arrhythmias	Peak within 2-3 days; depression, irritability, somnolence, severe drug cravings
Inhalants (nail polish removers, gasoline, spray paints, glue)	Euphoria, ataxia, N/V, hypoxia, dysrhythmias, hallucinations, seizures	Not reported
Hallucinogens (PCP, LSD)	Hallucinations, delusions, psychosis, nystagmus, seizures, HTN, rhabdomyolysis	Not reported
Opiates (heroin, morphine)	Euphoria, nausea, constipation, drowsiness, pinpoint pupils, respiratory depression	Within 8-12 hrs; Sweating, tremors, cramps, diarrhea, rhinorrhea, lacrimation
Alcohol and Depressants (barbiturates, benzodiazepines)	Drowsiness, slurred speech, disorientation, sluggish papillary response	Up to 7-10 days; anxiety, tremors, hallucinations, seizures

### Stages of Adolescent Substance Abuse

Stage 1: Potential for abuse

Stage 2: Experimentation- learning the euphoria

Stage 3: Regular use- seeking the euphoria

Stage 4: Regular use- preoccupation with the 'high'

Stage 5: Burnout- use of drug to feel normal

According to AAP guidelines, if office management of substance abuse fails or if the adolescent meets the criteria for stage 3-5 (or DSM IV criteria for substance abuse or dependence), the patient must be referred or admitted to a treatment program.

### Referral Centers

Refer to the Directory of Licensed Substance Abuse Treatment Programs in Chicago, published by the Chicago Department of Public Health, for a listing of treatment centers. Includes details on population served, service area, and payment accepted at each center.

### References

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## Obesity in Adolescents

Obesity is a growing epidemic in the pediatric/adolescent population. Obesity has important medical consequences for teens, as it is a risk factor for the development of hypertension, diabetes, and heart disease.

### Definitions:

BMI has become the standard to define “overweight” in children and adolescents. The BMI, or body mass index, is the weight in kilograms divided by the height in meters squared.

**BMI= weight (kg)/ height (m)<sup>2</sup>**

The BMI is not a perfect measure of overweight, but it is considered an acceptable gross screening measurement. The CDC recently (2000) released growth curves for ages 2 to 20 that include BMI curves.

[www.cdc.gov/growthcharts](http://www.cdc.gov/growthcharts)

Overweight has been described as a BMI greater than the 95% for age on the 2000 CDC growth charts. A BMI between the 85<sup>th</sup> and 95<sup>th</sup> percentile indicates youth at risk of becoming overweight. Adults are considered overweight with a BMI greater than 30.

### Etiology:

The etiology/pathogenesis of overweight is likely a combination of genetic, environmental, and behavioral factors. Predictors include early childhood obesity, elevated parental BMI, and increased fasting blood insulin levels.

Decreases in the amount of physical activity in today’s children and teens, and an increased sedentary lifestyle have contributed to increased obesity. Increased TV watching and fast food choice and availability have been associated with increased BMI. A 2% increase in the prevalence of obesity has been documented for each extra hour of TV viewing by those 12 to 17 years of age. Parental levels of obesity and food preferences also affect children’s preferences.

Overweight and obesity appear to run in families, with parental obesity doubling the risk of adult obesity in children younger than 10.

### Assessment:

#### History:

Clinicians must learn to recognize and define the problem of obesity with a detailed history and physical exam, and with appropriate laboratory studies. Medical or secondary causes of obesity should be ruled out. In the history, a family history should be taken that includes asking about the presence of obesity in family members, hypertension, thyroid

disease, hyperlipidemia, diabetes, and cancer in siblings, parents, and grandparents. A social history should include asking about the patient's school attendance and grades, location and timing of meals and snacks, participation in sports, hours per week in physical education, history of depression. The clinician should also screen for presence of eating disorders.

### **Physical Exam:**

The clinician should determine the patient's BMI using an accurate assessment of height and weight. It is important to know that many obese patients are also tall for their age. Obese patients who are short for their age are more likely to have an endocrine or genetic syndrome causing obesity. Height, weight and BMI should be plotted for age at every visit. Blood pressure should be measured using an appropriately sized cuff. A fundoscopic exam should be done to evaluate for blurring of optic discs, which may indicate pseudotumor cerebri. The thyroid must be examined for signs of enlargement. Sexual maturity rating should be done on every patient to evaluate for pubertal stages. The skin should be examined for signs of acanthosis nigricans.

### **Laboratory testing:**

Laboratory testing should be done if clinically indicated by physical exam and by family history. Labs include fasting lipid levels and a complete metabolic panel, fasting glucose level, and thyroid screening. Some clinicians recommend sending HgA1C levels, or a 2 hour glucose tolerance test to assess for risk of glucose intolerance, though this is controversial.

### **Medical Causes of Obesity:**

Many medical problems can also cause obesity. Endocrine disorders, such as Cushing syndrome, hypothyroidism, and diabetes can lead to obesity. Genetic syndromes such as Prader-willi syndrome can lead to overweight. CNS disorders, such as hypothalamic tumors and trauma can cause obesity.

### **Complications of Obesity:**

Many medical problems are caused by or worsened by obesity. These include asthma, sleep apnea, snoring. Orthopedic complications include Blount disease and SCFE. GI complications include gallbladder disease and steatohepatitis. Cardiovascular complications include dyslipidemias and hypertension. Endocrine disorders worsened by diabetes include insulin resistance, impaired glucose tolerance, Type 2 diabetes, menstrual irregularities, and PCOS.

### **Management of Obesity:**

Obesity is best viewed as managing a chronic disease. As such, the clinician should set reasonable goals for the patient and family, and with frequent follow up. Dietary management is essential. It is also important to note that weight maintenance over time

with increasing linear height can significantly affect and lower a patient's BMI. Some weight loss can be achieved simply by eliminating high calorie foods like soda and excess snacks. However, consultation and close follow up with a nutritional expert is often needed. Exercise regimens are also essential to success in any weight loss program. The goals of exercise are to increase caloric expenditure, increase muscle mass, and assist in weight control. Behavioral intervention is another essential component of obesity treatment. Group or individual sessions with frequent monitoring are needed to help with the three components to lifestyle change: controlling the environment, self-monitoring, and contracting for reasonable goals. Goals MUST be realistic. Losing 1-3 pounds per month is an acceptable goal.

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