Adolescent Menstrual Concerns

A Developmental Approach

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Mount Sinai

Learning Objectives

- Understand normal menstruation
- Describe the developmental approach to adolescent menstrual concerns
- Identify common menstrual disorders in teens
- Recognize and address the difficulties of teens related to menstruation
  - "Difficult patients"
  - Impact of trauma

I will discuss off-label use of medications

I have no conflicts

Case 1

- 13-year-old brought to pediatrician because she has irregular periods.

Case 2

- 14 year old misses school 2 days every month for her period

Case 3

- 15-year-old presenting for annual CPE reports two periods last month

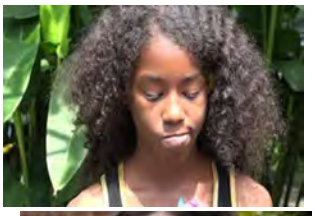
Case 4

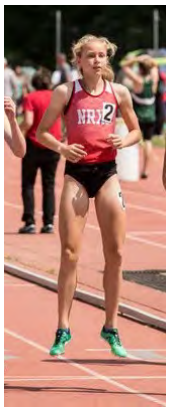
- 16yo brought to pediatrician because mom is concerned about weight gain and mood. ROS reveals no period in 3 months

Case 5

- 17-year-old athlete presents for sports preparticipation exam. ROS reveals no menses in 6 months.

What do these cases have in common?





Typical

Common

Annoying

Real Learning Objectives

- Understand why teens are different from children and adults
- Develop an appreciation for those differences
- Come to enjoy taking care of adolescents, even when they
  - Don't understand your instructions
  - Roll their eyes at you
  - Resist being examined

Adolescence

- The process of transition from childhood to adulthood
  - Physical
  - Cognitive
  - Social/Emotional
- Overarching theme is **change**
  - Teens are a moving target, physically, cognitively, and emotionally
  - *And that affects how we approach these patients*

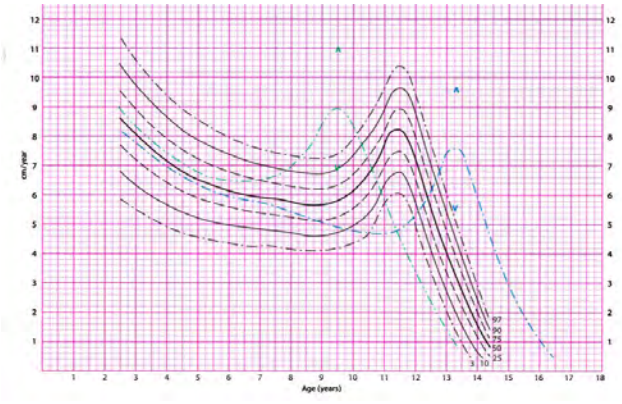
Adolescence is Tough

Puberty: the physical transition childhood to adulthood

- Physical maturation *(imagine growing 4" in a year!)*
  - Tripping over big feet, bumping into things, "growing pains"
- Sexual maturation
  - Breasts & periods
  - Body hair, acne, body odor
- Differences in Timing
  - Early vs. Late, fitting in
- Blossoming sexuality
  - Strange feelings
  - Attention from older kids

Physical Growth

- Median 9.5" in height, 45# in weight
- Changes in face, proportions, wider hips
- Body feels foreign & strange – it's confusing

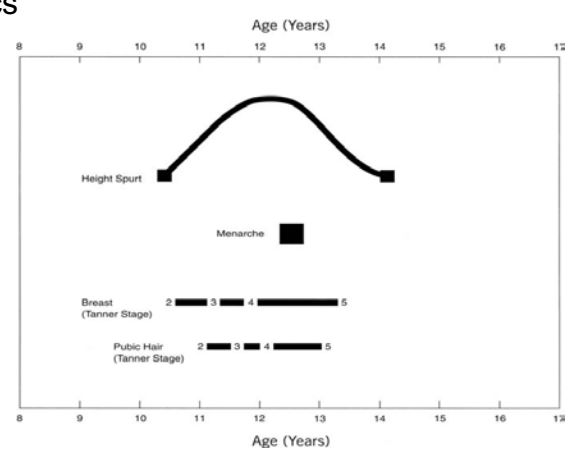


Sexual Development

Secondary Sex Characteristics

Sexual maturation staging

- Detect deviation from norm
- Anticipatory guidance

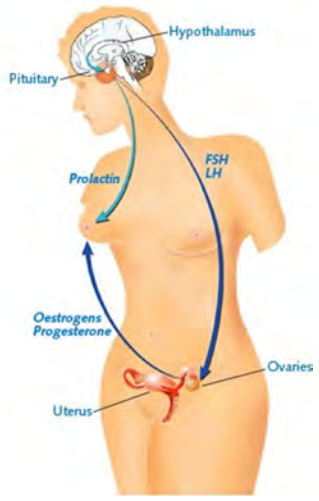


Tanner JM: Growth and endocrinology of the adolescent. In Gardner LI [ed]: Endocrine and Genetic Diseases of Childhood and Adolescents, p 14. 2nd ed. Philadelphia, WB Saunders, 1975.

Sexual Development

Primary Sex Characteristics

- Present at birth
- Change in puberty
  - Hypothalamus
  - Pituitary
  - Breasts
  - Ovaries
  - Uterus
  - Cervix
  - Vagina/vulva

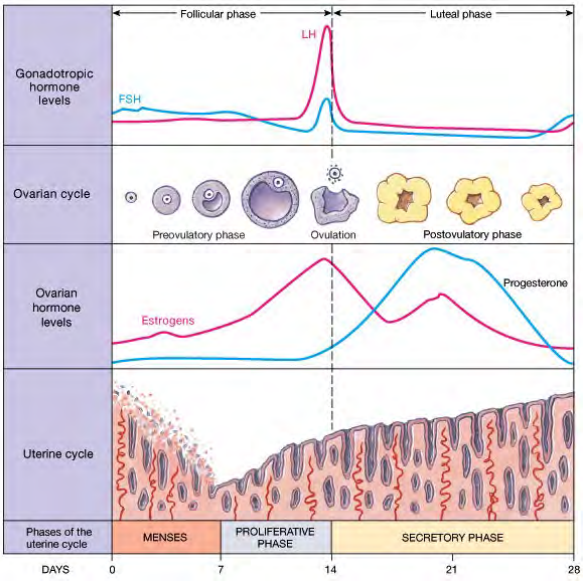


Drawing from: Antipuesto: https://nusingcrib.com/news-blog/physiology-of-menstruation Accessed 12/2/18

Case 1

- 13-year-old brought to mom's gyn because she has irregular periods.

Menstrual Cycle



- FSH
- Estradiol
- LH surge
- Ovulation
- Corpus Luteum
- Progesterone
- Menses

Normal Menses

Menarche NHANES 3 median 12.4yo

- <10% before age 11y; >90% by age 13.75y
- Earlier in non-Hispanic Black median 12.1y, <10% before 10.5y

Variable cycles first 5-7 years after menarche

- Frequent anovulatory cycles first 2 years → irregularity
- 95% of cycles “normal” after 2 years

Interval: 21-45 days

- Average adult 28-35

Duration: 2-7 days

- Average adult 4-6

Blood loss: medial 30ml, upper limit normal 80ml

- Up to one package of pads/tampons is normal
- BUT, study demonstrates women are terrible at estimating, teens worse, and they found no correlation with pad counts

Fraser IS, McCarron G, Markham R. A preliminary study of factors influencing perception of menstrual blood loss volume. Am J Obstet Gynecol. 1984;149(7):788.

Irregular Periods in Teens

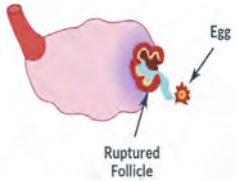
- HPO axis immaturity
  - Anovulatory bleeding
- HPO dysfunction
  - Stress
  - Chronic disease
  - Obesity (PCOS)
  - Exercise (female athlete triad)
  - Underweight/acute weight loss (eating disorder)
- Others
  - Sexually experienced: pregnancy, infection, contraception
  - Inexperienced: thyroid, prolactin, structural, bleeding d/o

Anovulatory Bleeding

On average first year: 50% anovulatory

BUT, time to establish regular ovulatory cycle increases with menarche

- Menarche<12: half ovulatory by one year
- Menarche 12-13: half by 3 years
- Menarche >13: half by 4.5 years



Why does menstrual flow occur?

Progesterone withdrawal OR Instability of the endomentrium

Anovulatory Bleeding

Girls w occasional anovulation can have regular periods

- Estrogen levels cycling
- Progesterone from ovulatory cycles keeps endometrium more stable

Irregular bleeding from anovulation

- HPO axis immaturity
- Delayed maturation of negative feedback
- Increasing E levels do not suppress the FSH (as they should)
- Estrogen secretion continues past LH peak
- FSH is increased relative to the LH level
- Endometrium proliferates beyond ability to sustain it

Evaluation of Irregular Bleeding

- History
  - HPI: Details: menarche, amount, timing, pain
  - PMH & ROS: meds
  - Social history
    - Effect on life
    - Sexual activity
- Physical Exam
  - Hemodynamic stability
  - Signs of anemia, endo
- Labs: CBC, UCG, STI screen, ?endo, ?bleeding eval

Management of Anovulatory Bleeding

Depends on the patient!

- Hemodynamically unstable
  - ED, hormones, transfusion
  - Test for bleeding d/o
- Stable
  - Not sexually active
    - Watchful waiting
    - Provera 10mg/d x 7d
    - Hormonal contraception 3-6m
  - Sexually active
    - Hormonal contraception

Case 2

- 14-year-old misses school 2 days every month for her period

Adolescence is Tough

Puberty: the physical transition childhood to adulthood

- Menstrual periods are difficult
- School isn't set up to accommodate
  - Pain
  - Flow

Dysmenorrhea

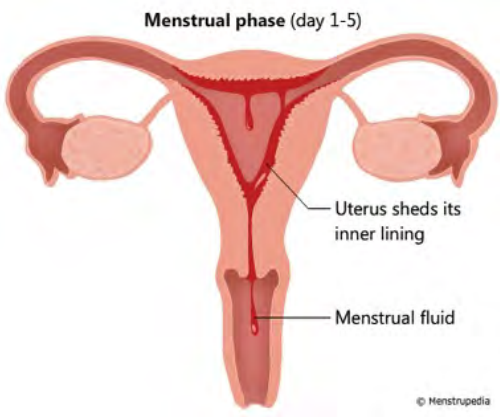
- Incidence: studies vary 16-93%
- Impact
  - Severe pain in 2-29%
    - Nausea in 55%, vomiting in 24%
  - One third to one-half miss school once/cycle
    - More often in 5-14%
- Increased risk
  - Earlier menarche
  - Long and/or heavy periods
  - Smoking
  - Family history

DeSanctis et al. Pediatr Endocrinol Rev. 2015 Dec;13(2):512-20

O'Connell et al. JPAG 2006 Aug; 19 (4): 285-289

Pathophysiology of 1°Dysmenorrhea

- Prostaglandins
  - Endometrial levels↑3x from follicular to luteal phase, increase further w flow
  - PG F2α: potent vasoconstrictor & myometrial stimulant
  - Levels correlate w pain
- Leukotrienes
  - Heighten sensitivity to pain
- Type C pain neurons
  - Stimulated by anaerobic metabolites in ischemic endometrium



Calis. Medscape. https://emedicine.medscape.com/article/253812-overview#a4. Accessed 12/2/18

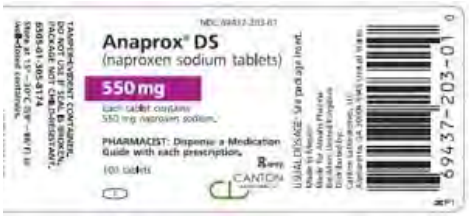
Dysmenorrhea Treatment

- 70% of teens self-treat
  - Wrong dose
  - Wrong med

Dysmenorrhea Treatment

- Cramps are the #1 cause of school absence,

  but only 6% of teen girls get medical advice
- NSAIDS
  - Start before menses
  - Use correct dose
- Hormonal contraception
  - Innate improvement *plus* makes period predictable for NSAID use
- Evidence for heat, complementary medicine



Durain D. *J Midwifery Womens Health*. 2004 Nov-Dec. 49(6):520-8.
DeSanctis et al. Pediatr Endocrinol Rev. 2015 Dec;13(2):512-20

Adolescence is Tough

Puberty: the physical transition from childhood to adulthood

Cognitive maturation: change in thinking from child to adult

Piaget 1936

- 7-11yo: Concrete operational
  - Logic, objective, rational, inflexible, black and white
  - Solve problems by trial and error
- 12-adult: Formal operational
  - Abstract, more nuanced,
  - Solve problems by deductive reasoning

NYC Reality 2024:

much more variability

Cognition in Teens

Increasing capacity for abstract thought

They just think a lot more – *but not very well*

- About themselves: adolescent angst
- About others
- About "issues"

They care very deeply

- About the present
- Not far into the future
- Who cares what happens when I'm 50? (or 30!)

But, they regress under stress – *back to concrete thinking*

Imperfect Abstract Thinking

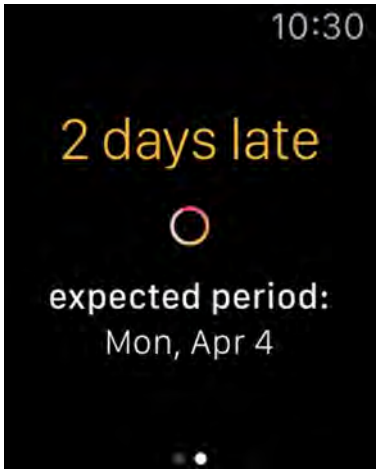
- Inconsistent thinking about self vs others
  - Personal fable
  - “It won't happen to me”
  - My experience is the norm
- Poor understanding of risk
  - Effectiveness of contraceptives
  - Overconcern about adverse effects
- Regression under stress
  - Return to concrete thinking

Case 3

- 15-year-old presenting for annual CPE reports two periods last month

Imperfect Abstract Thinking in Teen Care

- Period is “irregular” because it came twice in a month
  - On the first and the 30th
- Period is “irregular” because app says it should have come 2 days ago
- Even more difficult and worrisome when sexually active



Imperfect Abstract Thinking in Teen Care

Poor understanding of risk, especially to self

- Request Plan B when on OCP
- Believe infertile because didn’t get pregnant before
- Engage in sexual activity under influence of substances
- Fear rare contraceptive adverse effects

Repeated requests for pregnancy & STI tests =

Concrete thinking under stress

Imperfect Abstract Thinking in Teen Care

Misunderstanding of contraceptive instructions

- Stopping OCP if breakthrough bleeding
- Stopping OCP if amenorrhea
- Stopping OCP if leg cramp or headache
- Using 9 patches in 5 weeks
- Inadvertently removing IUD when checking strings

Dealing with Imperfect Thinking

- Be aware
- Ask questions
  - *What have you heard?*
- Be approachable
- "Teach back"
- Written instructions, patient portal
- Web references: they believe the web more
- Quickstart
- Recheck visits

“Irregular Periods” in Sexually Active Teen

Longer differential

- Track dates and flow
- Confidential history!
- Consider:
  - Infection
  - Pregnancy
  - Contraceptive effects
  - Sexual trauma

- As well as issues discussed earlier: endocrinopathy, bleeding disorder, anovulatory bleeding, etc – much less common

History is the key!

Physical exam is less helpful

Screening labs: UCG, STI, ? CBC

Adolescence is Tough

Puberty: the physical transition from childhood to adulthood

Cognitive maturation: change in thinking from child to adult

Emotional maturation: “growing up” is the task of adolescence

- Striving for independence
  - Separation from parents: deciding what to do
  - Importance of peer group for support
- Striving for identity
  - Separation from parents:
    deciding who they are
  - Importance of peer group for ideas

Social-Emotional Development

Stages of Adolescence

- Early
  - Independence: Rule & limit testing, attachment to non-parent adults
  - Identity: Am I normal?: feeling awkward, wanting privacy, regressing
- Middle
  - Independence: intensely self-involved, striving, distancing from parents
  - Identity: grooming, fitting in, with peers playing major role
- Late
  - Independence: increased self-reliance, more serious relationships
  - Identity: firmer sense, social & cultural traditions regain importance

Social-emotional Development and Patient Care

- Early adolescents
  - Reassurance re: normal
  - Serve as trusted adult
    - To teen and mom
- Mid adolescents
  - Risk-taking: harm-reduction
  - Positive peer influence
- Late adolescents
  - Long-term thinking
  - Partner in care

Toughest of All: Peer Pressure

Especially for mid-adolescents.

The peer group is most important at this age

- But they're also the most judgmental

"Fitting In" is very helpful for the process of

- Independence from parents
- Identity establishment separate from parents

Teens who don't fit in have a very hard time

And unfortunately those who do fit in have a hard time too

Which Teens Need Us?

They all do -- but in particular -- those who

- Lack family support
- Lack support from other adults
  - Those who don't excel in school or activities where they would make a connection with other adults = the average kid
- Don't fit in, so lack peer support
  - Disability
  - Chronic disease
  - LGBT
  - Late bloomer
  - Mental illness
  - New to this area
  - Different culture
  - Economic challenges
  - Are ***unattractive***

Unattractive Teens Really Need Us!

Acne

- Even “back-ne”

Facial hair

- Even abdomen, chest & back

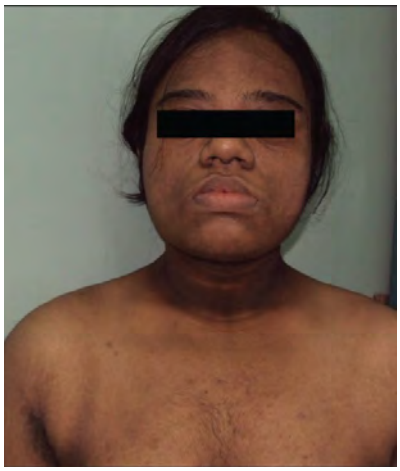
Sweaty

Obese

Masculine build

Unpredictable periods

- Accidents



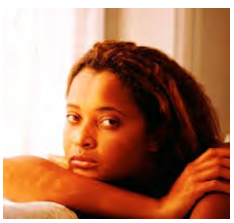
Polycystic Ovary Syndrome

Common: *5-10+% of US women*

- “Most common cause of infertility in women”

Frequently presents in adolescence

- “Really common cause of misery in teen girls”



Great *exemplar* for the paradigms of adolescent medicine

PCOS Can Be Much More Subtle

Classic: Stein-Leventhal 1935

- Obese
- Severe hirsutism
- Amenorrhea and sterility
- Treated with ovarian wedge resections
  - So ovaries assumed to be the problem

Current: more complicated and heterogeneous

- 1990 NIH Consensus: irregular menses due to oligo/amenorrhea, clinical or chemical hyperandrogen, exclusion of others
- 2003 Rotterdam: (2 of 3) oligo/anovulation, clinical or chemical hyperandrogenism, USG polycystic ovaries
- 2008 Androgen Excess Soc: hyperandrogen, ovarian dysfunction = oligo/anovulation or USG polycystic, exclusion of others
- 2013 Endo Soc: reaffirm Rotterdam: 2/3: oligo/amen, ↑andro, cyst

Consensus of the Experts

- Hyperandrogenism
  - Clinical
  - Laboratory
- Ovarian dysfunction
  - Oligo/amenorrhea
  - Oligo/anovulation
  - Polycystic appearance
  - Enlarged ovarian volume

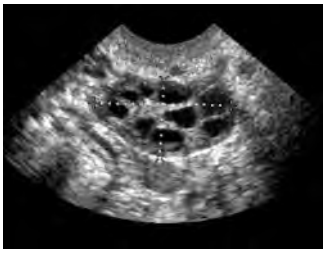
So What's Going On Here?

Cause unknown

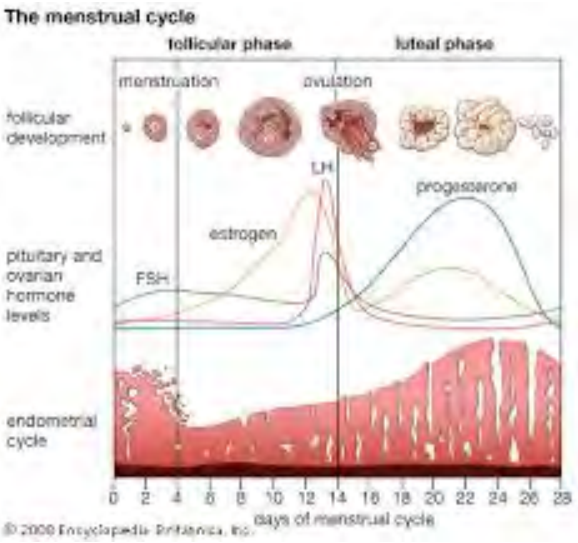
Very complicated

- Basic Explanation
  - Intraovarian androgen excess
    - Growth of many follicles without establishment of dominant
    - Anovulation so irregular periods
  - Systemic androgen excess
    - Acne, hirsutism, etc.

Why?



Normal Menstrual Cycle



FSH

Estradiol

LH surge

Ovulation

Corpus luteum

Progesterone

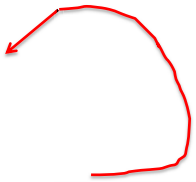
Menses

PCOS Pathophysiology:Thecal Dysregulation

Abnormal Steroidogenesis

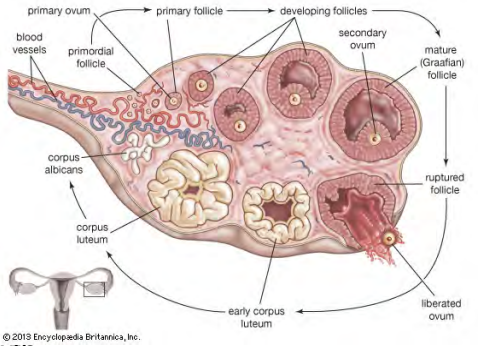
Normal: Increased LH levels →
- Increased steroidogenesis →
  - Downregulation Theca Cells →
    - Decreased steroidogenesis

PCOS: Increased LH levels →
- Increased steroidogenesis →
  - Inadequate Theca Regulation →
    - Hyperresponsiveness to LH →
      - Increased steroids



Granulosa Cell & Ovulatory Dysfunction

Ovarian hyperandrogenism affects granulosa cells



Disrupted estradiol
- Too early, too high

Increased folliculogenesis
- Increased percentage recruited for growth
- Prolonged lifespan of follicles with maturational arrest
- But no dominant follicle, so no ovulation

Obesity further complicates matters

Hyperinsulinemia in 50-70% of adult PCOS patients

Insulin upregulates thecal androgen production

- Increases serine phosphorylation of insulin receptors
- Increases cytochrome P450c17
- Upregulates LH binding sites
- Increases (w IGF's & TNFα) steroidogenic enzymes in the ovary and adrenal → ↑ testosterone & DHEAS

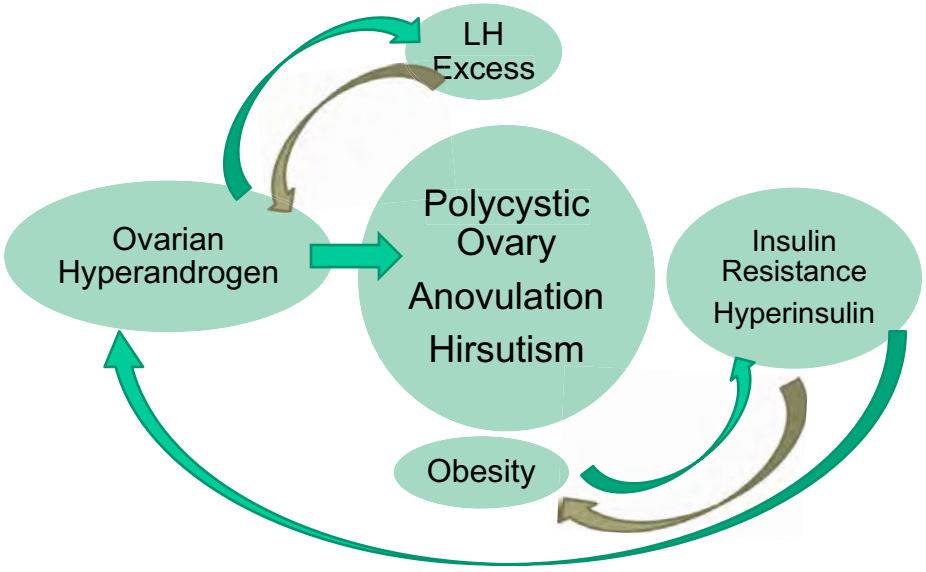
Insulin inhibition of hepatic production of SHBG

- Leads to higher levels of free (= bioactive) testosterone

Insulin disrupts pituitary LH pulses

Metabolism of estrone in fat further contributes

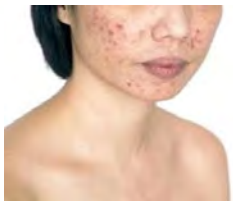
Simplified Pathophysiology: Vicious Circle



When to Suspect PCOS

Any adolescent girl with

- Irregular periods
- Hirsutism
- Persistent acne
- Obesity



You Need to Have a High Index of Suspicion

Because the signs of PCOS are embarrassing!

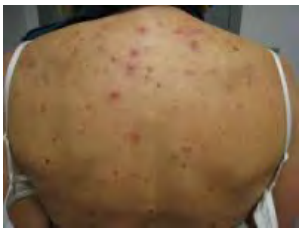
And the presentation is very variable

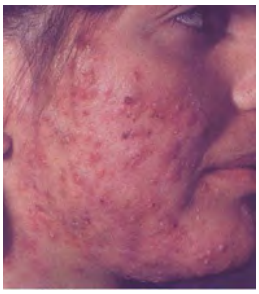
Acne in PCOS

At least 70% of teen girls have acne

Think PCOS with

- Moderate/+ in early puberty
- Inflammatory perimenarchal
- Nonresponsive to usual tx
- Back and chest





Hirsutism in PCOS

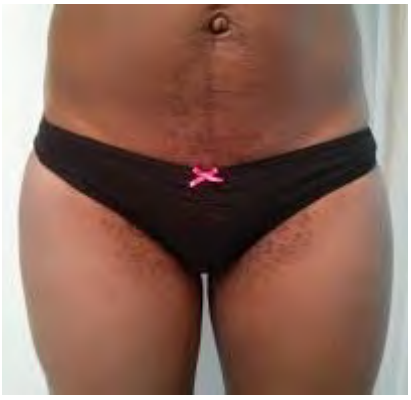
Increased sexual hair in male pattern

- ~2/3 of PCOS patients
- Also occurs in absence of hyperandrogenism

Different from hypertrichosis

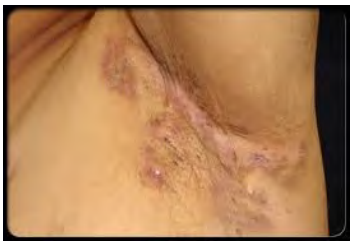
Ethnic differences

Ask about removal!



Other Cutaneous Manifestations of Hyperandrogenism

- Balding
  - Male or female pattern
- Hyperhidrosis
- Seborrhea
- Hidradenitis suppurativa



Associated Metabolic Features

- Central obesity
  - 30-75%
  - Waist circumf >88cm (34.5”)
- Insulin resistance (45%)
  - Acanthosis nigricans
  - Metabolic syndrome
    - Abd obesity, ↑glucose, ↑triglycerides, ↓HDL, hypertension (56% v 8%)
  - Sleep-disordered breathing (71% v 41%)

Treatment for Teen PCOS

To determine the treatment, first we need to identify our goal

Patient, mom and doctor can have different goals

We have to address all three

Goals of Treatment: Patient

Acne

Hirsutism

Irregular periods

Weight

Goals of Treatment: Mom

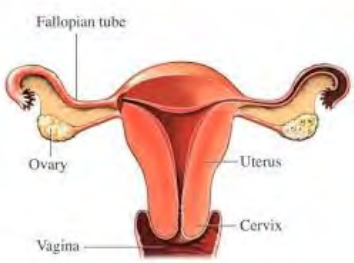
- Feel better about herself
- Be “healthy”
  - Code for thinner with better skin or weight
- Eventual fertility

Medical Goals of Treatment

- Regulation of menses
  - Prevent anemia
- Improve weight
- Improve cutaneous signs of hyperandrogenism
- Prevent sequelae

Prevention of Gyn Sequelae

- Effects of unopposed estrogen
  - Dysfunctional (anovulatory) bleeding and anemia
  - Endometrial hyperplasia
  - Endometrial cancer
- Anovulatory infertility
- Pregnancy complications
  - Gestational DM
  - Pregnancy-induced hypertension & pre-ecclampsia
  - Preterm birth



Treatment

- Obesity & Insulin Resistance: treatment & prevention
  - Healthy diet and exercise are good for everybody!
  - Diet
    - Half of obese PCOS adults normalized menses with 10% weight loss
    - Acne and hirsutism can show a little improvement
    - Whatever diet works for the patient is best
      - Success reported with low-carb and low-glycemic index
  - Exercise
    - Goal an hour a day for best results
    - Whatever a patient can manage is best

Options for Menses

Birth Control Pills *(off-label)*

- "Override" abnormal pituitary activity
- Decrease elevated LH levels, increase SHBG
- Result: regular monthly periods
  - Just like everyone else!
  - Bonus: ↑SHBG helps acne and slows hirsutism!
  - Bonus: Drospirenone reverses hirsutism!
- Remember cultural issues
- Remember contraindications & SE's

Periodic Provera

- Induce menses to prevent endometrial hyperplasia
- Not "birth control"
- Doesn't help acne or hirsutism

Social-Emotional Development

Stages of Adolescence

- Early
  - Independence: Rule & limit testing, attachment to non-parent adults
  - Identity: Am I normal?: feeling awkward, wanting privacy, regressing
- Middle
  - Independence: intensely self-involved, striving, distancing from parents
  - Identity: grooming, fitting in, with peers playing major role
- Late
  - Independence: increased self-reliance, more serious relationships
  - Identity: firmer sense, social & cultural traditions regain importance

The LateTeen's World Can Be Very Tough

Developing identity and independence

School Pressure

- Increased intellectual and workload demands
- Sleep deprivation, no lunch period

Activity Pressure

- Sports specialization
- "Overscheduled" kids
- No time for family dinner

Planning for the Future: "college process"

Increased risks of mental health dx and trauma

Emotional Development

Increased incidence of mental health diagnoses

- Depression
- Anxiety
- OCD
- Eating disorders
- Schizophrenia
- Substance use

Trauma is Common

US Agency for Healthcare Research & Quality

- Physical assault by partner: nearly 1 in 3 adult

National Survey of Family Growth

- Forced intercourse by male:
  1 in 5 women 18-44yo

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- 20% of our patients report trauma

1. www.ahrq.gov/ahrq.gove/professionals/prevention-chronic-care/healthier-pregnancy/preventive/trauma.html

2. Hall KS et al J Sex Med 2012; 9: 1382

How do traumatized patients react?

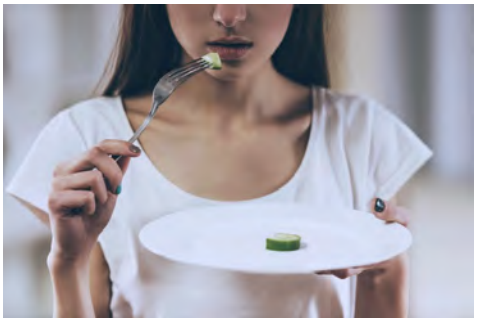
- Fear
- Avoidance
- Passivity
- Resistance
- Rudeness
- Combativeness

Case 5

- 17-year-old athlete presents for sports preparticipation exam. ROS reveals no menses in 6 months.

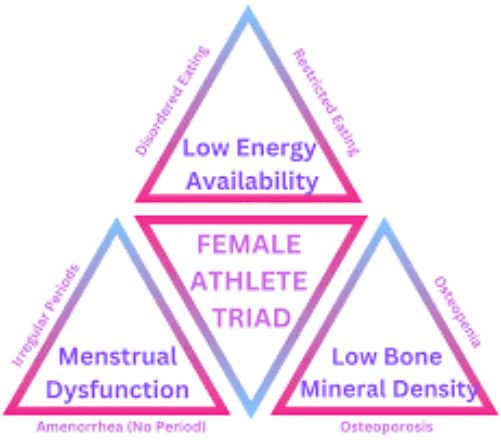
Functional Hypothalamic Amenorrhea

- 25-35% of secondary amenorrhea
- Anorexia nervosa, other causes of low weight, excessive exercise, stress
- Decreased hypothalamic GnRH secretion
- Decreased Gn pulses
  - Amplitude/frequency
  - Relatively low LH vs FSH
- Anovulation
- Low serum estradiol



Female Athlete Triad

- Relative caloric deficiency
  - Output exceeds intake
- HPO axis inhibition
  - Oligo/amenorrhea
- Low bone density
- May also have HPA dysfunction, with higher cortisol levels to maintain glucose levels
- Higher ghrelin and PYY
- Lower leptin and T3



www.mangiarellirehabilitation.com/blog/female-athlete-triad-physical-therapy

Clinical Presentation

- Low bone density, fractures, abnl DEXA
- Anorexia nervosa
- Exercise-induced amenorrhea
- Dyspareunia (decreased estrogen)
- Cognition and anxiety

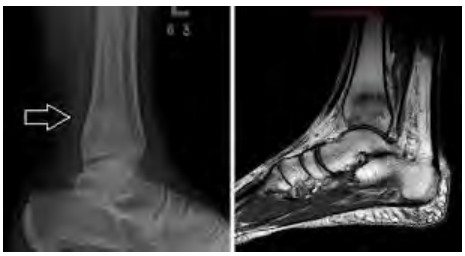


Image from www.orthopaedia.com/stress-fractures-female-athletic-triad

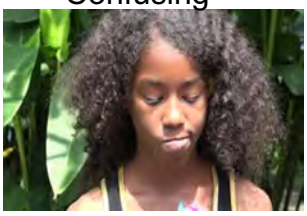
Treatment of Female Athlete Triad

- Restoration of positive calorie balance
- Specialty team
  - Nutrition
  - Mental health
  - Medical
  - Sports medicine/physiatry
- Calcium and vitamin D
- OCP and bisphosphonates not recommended

What do these teens have in common?

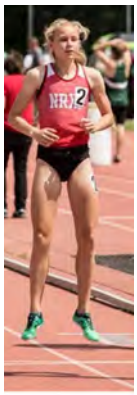
Having periods is hard

Confusing



Embarrassing

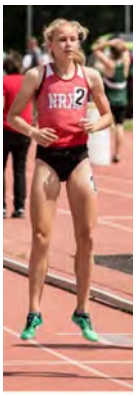
Inconvenient



Worrisome

Painful

What do these cases have in common?



Typical

Common

Rewarding

Learning Objectives

- Understand normal menstruation
- Describe the developmental approach to adolescent menstrual concerns
- Identify common menstrual disorders in teens
- Recognize and address the difficulties of teens related to menstruation
  - "Difficult patients"
  - Impact of trauma

Real Learning Objectives

- Understand why teens are different from children and adults
- Develop an appreciation for those differences
- Come to enjoy taking care of adolescents, even when they
  - Don't understand your instructions
  - Roll their eyes at you
  - Resist being examined

Take Home Messages

Adolescence is tough –

and taking care of adolescents is tough

- Physical change
  - Immature HPO axis, new medical problems
- Cognitive change
  - Inconsistent skills in thinking
- Social-emotional change
  - Increased rates of psychiatric conditions
  - Exacerbated by trauma

Contact Information

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Martha.arden@mountsinai.org

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Suggested References

1. Up-To-Date
    1. NK DeSilva: Abnormal uterine bleeding in adolescents: Evaluation and approach to diagnosis
    2. NK DeSilva: Abnormal uterine bleeding in adolescents: Management
    3. C Banikarim: Primary dysmenorrhea in adolescents
    4. KE Ackerman and M Misra: Functional hypothalamic amenorrhea: Evaluation and management

2. Journal Reviews
    1. ACOG Committee Opinion No. 760: Dysmenorrhea and Endometriosis in the Adolescent. Obstetrics & Gynecology 132(6):p e249-e258, December 2018. | DOI: 10.1097/AOG.0000000000002978
    2. Catherine M. Gordon, Kathryn E. Ackerman, et al, Functional Hypothalamic Amenorrhea: An Endocrine Society Clinical Practice Guideline, The Journal of Clinical Endocrinology & Metabolism, Volume 102, Issue 5, 1 May 2017, Pages 1413–1439, https://doi.org/10.1210/jc.2017-00131

Teen Pregnancy

Wendy Neal, MD, MPHTM
Medical Director
Mount Sinai Adolescent Health Center
June 13, 2024

Mount Sinai Adolescent Health Center

Purpose and Objectives

PURPOSE	*Update on Teen Pregnancy and Best Practices in Counseling The Pregnant Adolescent*

OBJECTIVES

- Objective 1: Review the epidemiology of teen pregnancy
- Objective 2: Discuss the assessment and diagnosis of pregnancy in the adolescent
- Objective 3: Learn key components of non-directive option counseling in the pregnant teen

FINANCIAL DISCLOSURE	*None*

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Agenda/ Presentation Overview

- Overview of teen pregnancy rates and outcomes
- Key clinical history questions to diagnosis pregnancy in adolescents
- Non-directive options counseling

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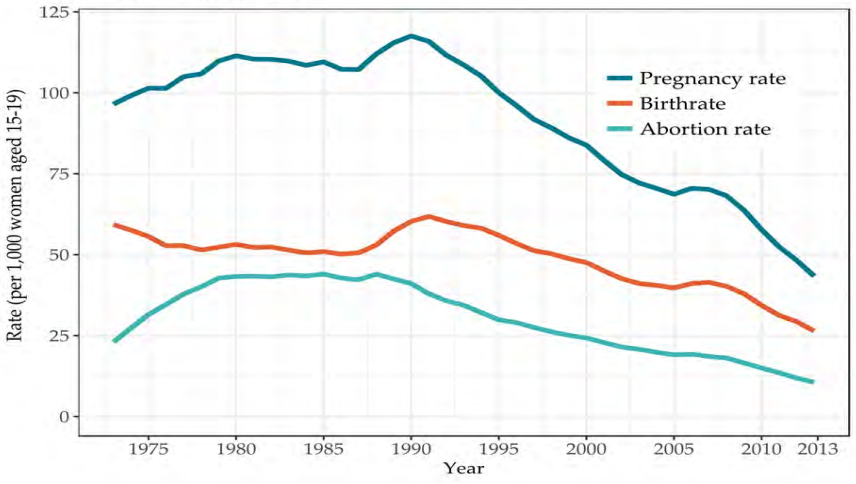
Figure 1. Trends in rates of pregnancy, birth and abortion per 1,000 women aged 15–19, 1973–2013



www.guttmacher.org

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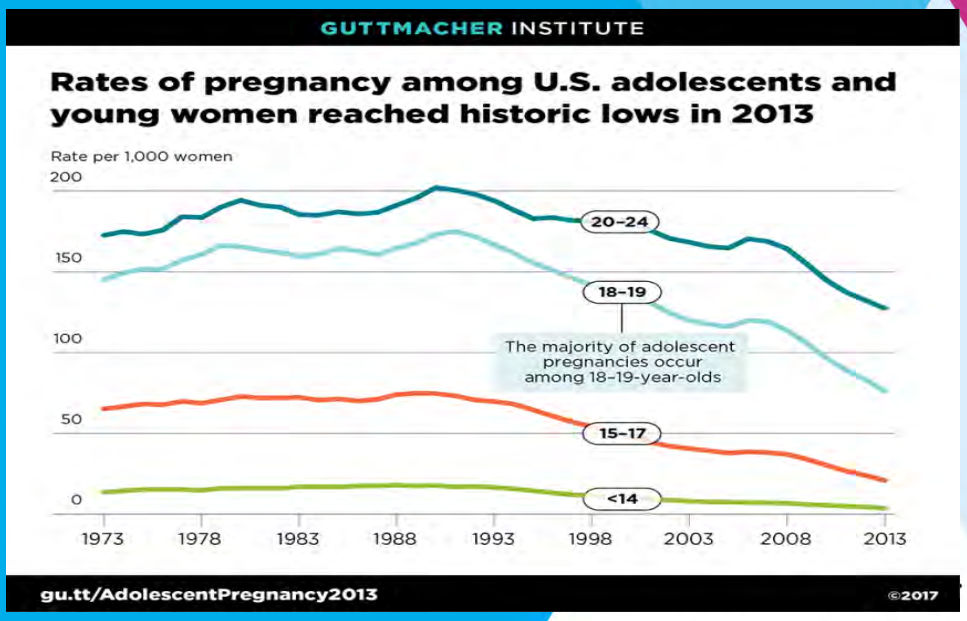
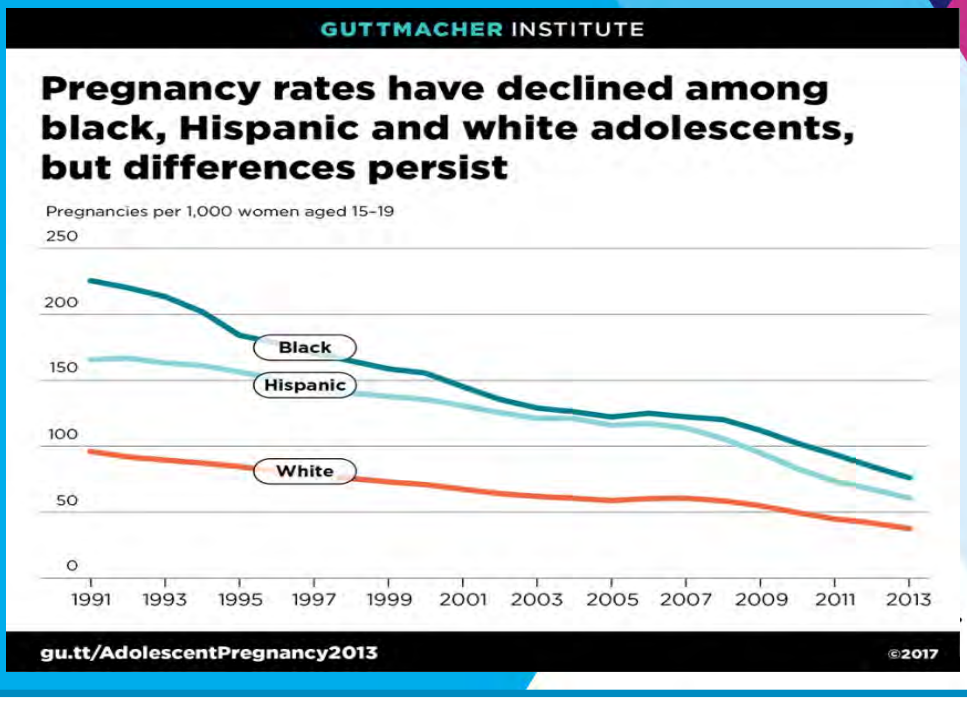
Pregnancy by Age

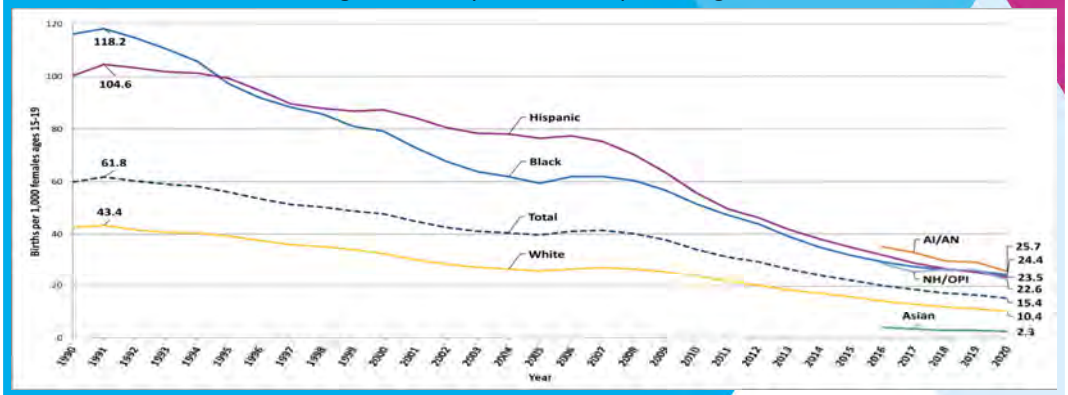


Pregnancy by Race



Teen Birth Rates

Birth rates for females ages 15-19, by race and Hispanic origin of mother, 1990-2020



Sources:

For 1990-2015: Centers for Disease Control and Prevention. (2017). Births: Final data for 2015. National Vital Statistics Reports, 66(1).
https://www.cdc.gov/nchs/data/nvsr/nvsr66/nvsr66_01.pdf

For 2016-2020: Centers for Disease Control and Prevention. (2022). Births: Final data for 2020. National Vital Statistics Reports, 70(17).
https://www.cdc.gov/nchs/data/nvsr/nvsr70/nvsr70-17.pdf

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Why the decline?

Decrease age of onset of sexual activity

Increase in contraceptive Usage- especially the long-acting reversible contraceptives- IUDs, Implants, and Shot.

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Teen Birth Outcomes

- Most Teen Pregnancies are unintended (mistimed or unwanted)
- Less likely to finish high school
- More likely to need public assistance
- More likely to have low income as adults, and as a result,
- More likely to have children who face challenges like poorer educational, behavioral, and health outcomes
- 17% repeat pregnancy
  - Risk: depression, hx of abortion, living with partner, lower SES, lack of access to publicly funded services
  - Protective: LARC usage, higher education

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Diagnosing Pregnancy

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History

- LMP and was it like your usual-? Implantation bleeding
- Last time you had sex
- Do you engage in vaginal-penile sex?
- Do you use anything to prevent pregnancy?
- Ask about early signs of pregnancy?
  - Urinary frequency, nausea, breast tenderness, appetite change
- Do you think you may be pregnant?

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Option counseling

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Key components of option counseling

- Pretest Counseling- if not already known
  - -Assess what the teens thoughts are if positive or negative
- Positive Test
  - -Give results, how far along, due date
- Assess your own feelings- **Honestly**

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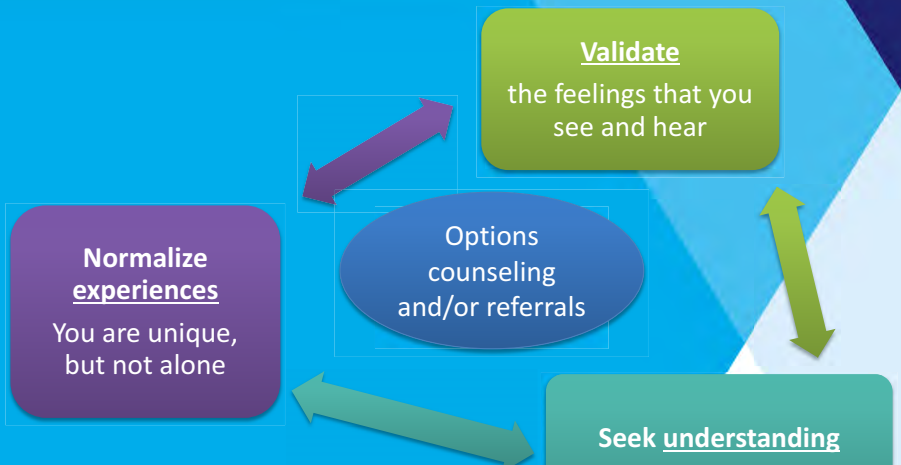

Source: Physician for reproductive Health

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Options Counseling KIT

- https://vimeo.com/887031432

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Options Counseling Sophia

- https://vimeo.com/887056827

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Summary

- Teen pregnancy rates are declining but there is still disparity among different races
- A pregnant adolescent presentation may differ from an adult – have a low threshold for pregnancy testing
- Option counseling of teens should be non-judgmental and non-directive
- There are many on-line resources

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17

References

- www.guttmacher.org—Guttmacher Institute
- www.prh.org—Physicians for Reproductive Health
- www.adolescenthealth.org—Society for Adolescent Health and Medicine
- https://rhntc.org/resources/exploring-all-options-pregnancy-counseling-without-bias-video-series
- https://opa.hhs.gov/adolescent-health/reproductive-health-and-teen-pregnancy/trends-teen-pregnancy-and-childbearing

Mount Sinai Adolescent Health Center

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Long-acting Reversible Contraception for the Primary Care Provider

Mary Guillot, MD and Lisa Ditchek, MD
Mount Sinai Adolescent Health Center
June 13th, 2024

Purpose and Objectives

Purpose: To increase primary care provider knowledge of LARC methods

Objective 1: Learn the various LARC options

Objective 2: Understand barriers to LARC uptake

Objective 3: Improve competency in LARC

Financial disclosure: none

Overview

1. Brief Historical Context
2. Clinical case
3. Review of LARCs
4. Barriers to LARC uptake
5. How to counsel
6. Summary & Q/A

Not your mom's IUD

Overview

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Clinical case

Cassandra is a 17 year old female presenting for annual physical before leaving to college

She has **no medical problems** and is on **no medications**

Menstrual History:

- Menarche: 12 years old
- Regular periods (approx 28 day cycles), 5 days each
- Flow: 3 pads/day on heaviest days, 1-2 pads on light days
- Cramping: minimal, able to go to school; ibuprofen helps when needed

Sexual History:

- Coitarche: 16 years old
- Currently sexually active with one male partner (age 17) - in safe, consensual relationship.
- inconsistent condom use

Getting to know Cassandra

What Cassandra Wants…

- She wants to postpone pregnancy until at least after finishing college
- She is interested today in hearing about proactive contraception methods that could work for her

Getting to know Cassandra (continued)

Considerations affecting Cassandra's birth control options…

- No Known contraindications to estrogen

- **"I need a method that I won't have to think about daily…As a busy college student I dont think ill have time to remember to take a pill everyday"**

- She is considering getting an IUD, but has specific concerns:
  - **Worried about possible infertility.**
  - **Might not be effective.**
  - **Worried about pain during the procedure**

Overview

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LARCs: Long-Acting Reversible Contraception

- Highly effective for contraception (see next slide)
- Completely reversible with no long-term negative effects on patient's fertility
- Adolescents tend to stick with their choice:
    - 12-month continuation rates (based on systematic review & Meta-analysis)
        - **84%** (95% CI, 79.0%-89.0%) **for all LARC methods**,
        - **74%** (95% CI, 61.0%- 87.0%) **for IUD users**, and
        - **84%** (95% CI, 77.0%-91.0%) **for ENG implant users**

Birth Control methods: Efficacy comparison

Table. Percentage of women experiencing unintended pregnancy during first year of typical use and the first year of perfect use of contraception

Method	Typical Use (%)	Perfect Use (%)
Contraceptive implant (Nexplanon®)	0.05	0.05
52 mg levonorgestrel intrauterine device (Mirena®)	0.2	0.2
Copper intrauterine device (Paragard®)	0.8	0.6
Progestin-only injectable contraception (Depo Provera®)	6	0.2
Pill/patch/ring	9	0.3
Diaphragm	12	6
Male condom	18	2
Withdrawal	22	4
Fertility awareness	24	0.4-5

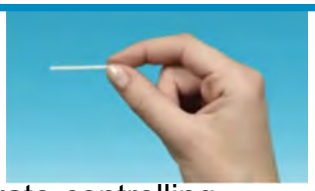
Adapted with permission from Trussell J. Contraceptive failure in the United States. *Contraception*. 2011;83(5):397-404. DOI: 10.1016/j.contraception.2011.01.021

LARCs: non-contraceptive considerations

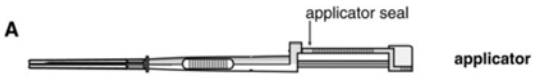
- FDA approved treatment for:
  - Severe dysmenorrhea
  - Endometriosis
  - Heavy menstrual bleeding [ex. Mirena & Liletta]
  - Prevention of ovarian cyst development

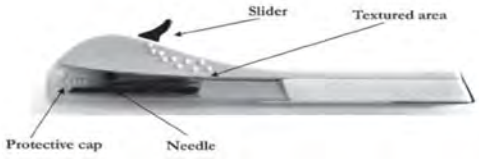
- Also can be useful for:
  - Menstrual suppression due to personal preference or when menses pose a personal hygiene challenge for patient (such as those with developmental delays)
  - Ensuring uterine/endometrial health in setting of secondary oligomenorrhea or emerging PCOS

Nexplanon (Etonorgestrel, ENG)



- 4cm flexible Subdermal implant with ENG core surrounded by a rate-controlling membrane by Merck, has been available since 2011
  - Improved implant (radio-opaque) & applicator (safer & easier insertion)





- MOA: primary - suppresses ovulation by blocking LH surge;
  - Secondary - thickens cervical mucus & thins endometrium
- Side effects (not necessarily bad):
  - dysmenorrhea (most resolved/improved; ~5% worsened or new)
  - Menstrual pattern change: amenorrhea (22.2%), infreq bleeding (33.6%), freq bleeding (6.7%) & prolonged bleeding (17.7%)
    - The most common reason for early Implant removal
  - Acne mood changes/emotional lability weight increase

Nexplanon Placement

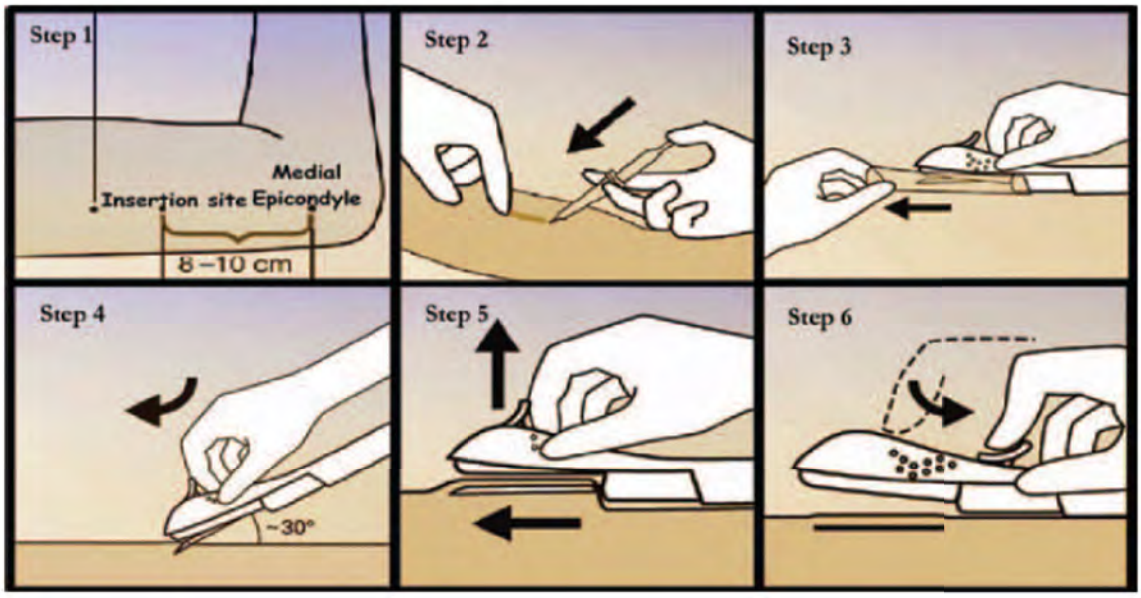
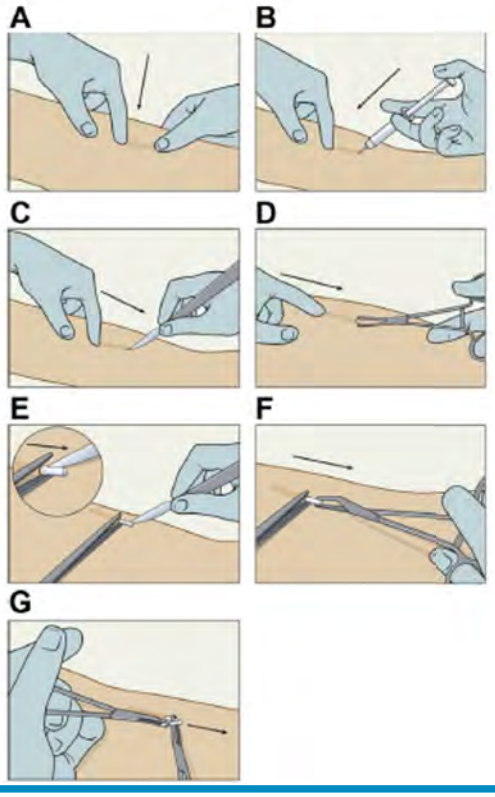


Figure 1. Steps of insertion procedure.

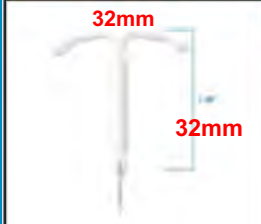
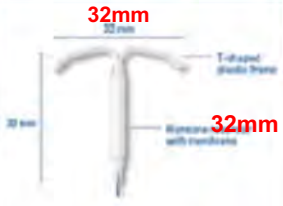
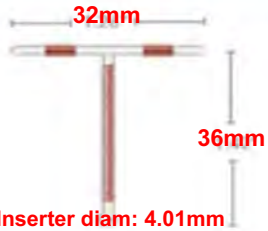
Nexplanon Removal



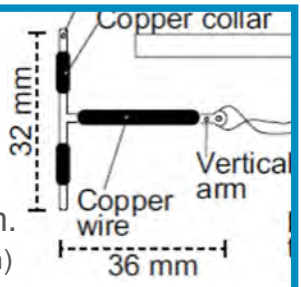
Progestin-Only IUDS (Levonorgestrel; LNG)

- LNG is released continuously from the vertical stem of the T-shaped device. The amount of hormone declines steadily over time.
  - Safe for Nulliparous adolescents.
  - Barium-sulfate in the T-frame of all the LNG IUDs, permitting visualization on X-ray.
- MOA: Primary - prevention of fertilization (d/t thickened cervical mucus)
  - Secondary: inhibits sperm motility, thins endometrium (to various degrees), & suppresses ovulation (10-55%)
- Effect on cycle: lead to a variable amount of reduction in menstrual flow over time. might stop over time
- Non-Contraceptive benefits: Mirena & Liletta are both FDA approved for heavy menstrual bleeding management

Comparison progestin only IUD

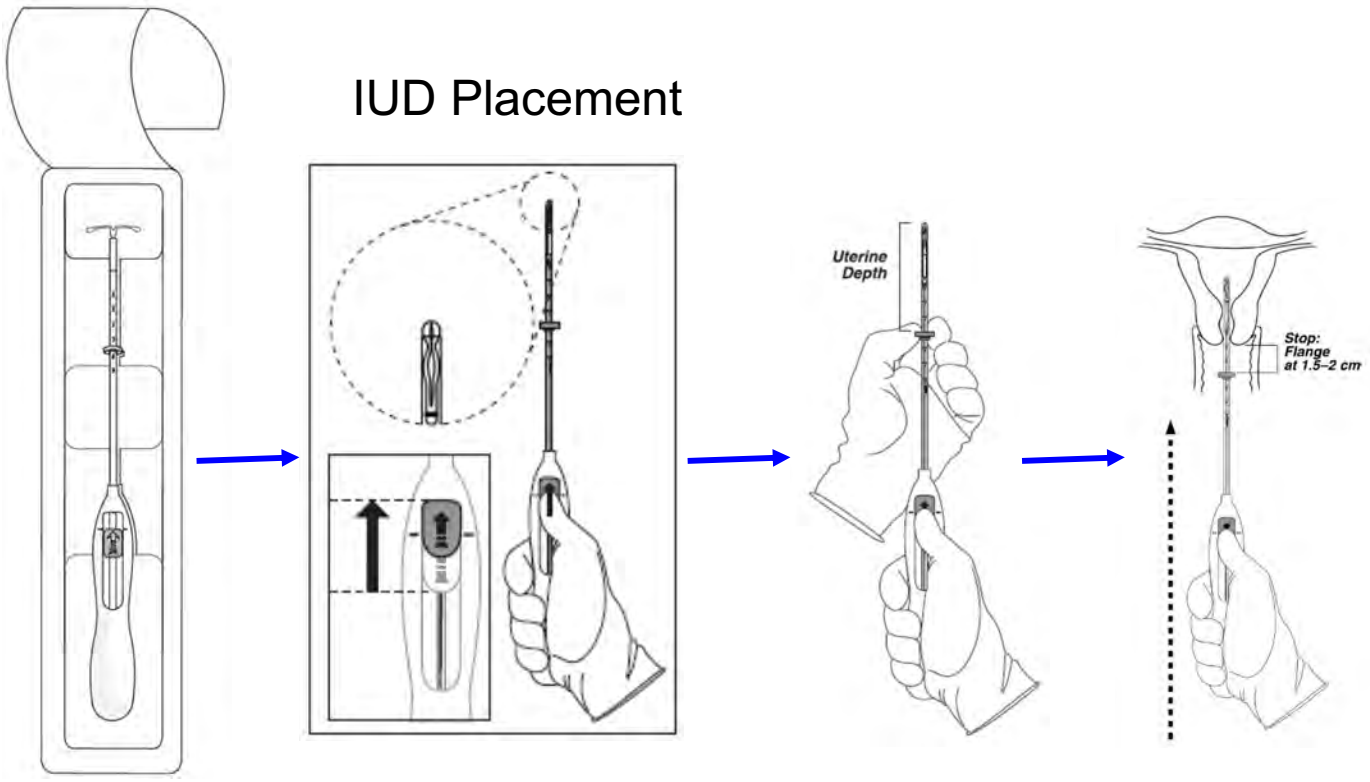
Levonorgestrel IUD				Copper IUD
Mirena	**Liletta**	**Skyla**	**Kyleena**	**Paragard**
				
Inserter diam: 4.4mm	Inserter diam: 4.8mm	Inserter diam: 3.8mm	Inserter diam: 3.8mm	Inserter diam: 4.01mm
2000	2015	2013	2016	1988
8 years [5yrs for HMB]	**8 years [5yrs for HMB]**	3 years	5 years	10 years (12 years)
52 mg	52 mg	13.5 mg	19.5 mg	N/A
20-60% amenorrhea @ 1 year	**19% amenorrhea & 31% infreq menses @ 1 year**	**6% amenorrhea & 20% infreq menses @ 1 year**	**12% amenorrhea & 26% infreq menses @ 1 year**	

Copper IUD (ParaGard)

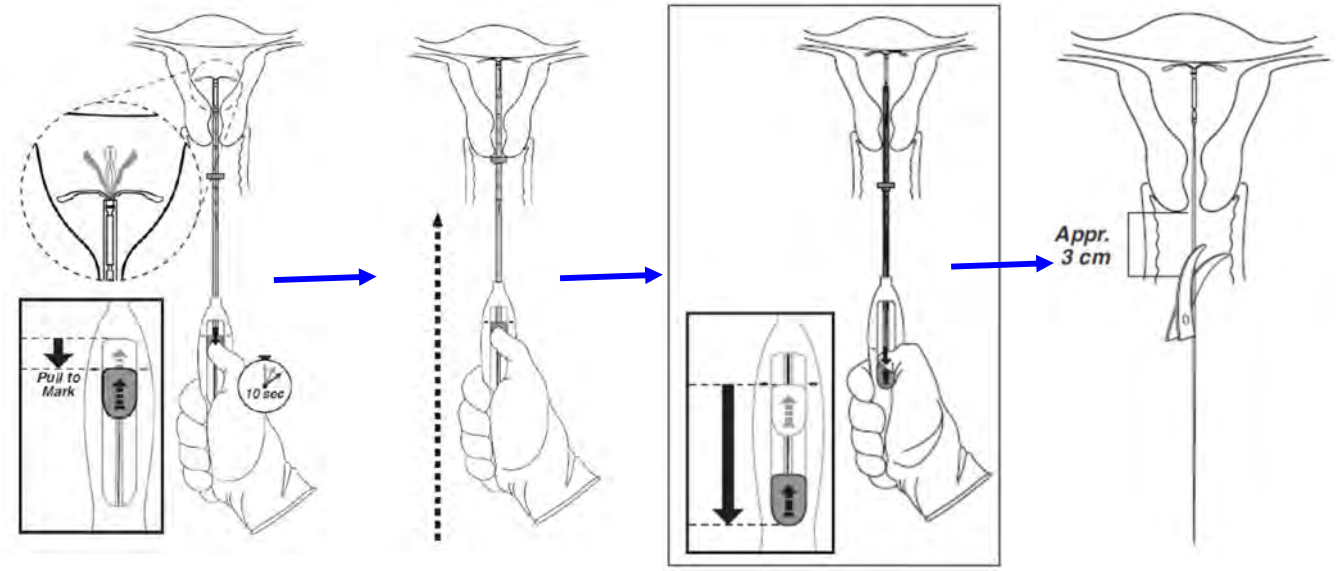


- IUD with copper bands around each arm and wire around the stem.
  - Bands allow for significant extension of duration of action (d/t slowed dissolution)
- **MOA:** The copper acts as a spermicide - copper changes the endometrium and inhibits sperm motility & impairs sperm viability
- **Effect on Cycle:** Menstrual bleeding is invariably heavier and longer in duration with IUD in place. May also experience spotting between periods & more significant menstrual cramping
- **Ideal Candidate:** patient with light monthly period without dysmenorrhea
  - Dysmenorrhea is not an absolute contraindication
- Continuation rate for Adolescents is about 80%
- **FDA approved for Emergency Contraception:**
  - 99.9% effective at preventing pregnancy if inserted within 5 days of unprotected intercourse

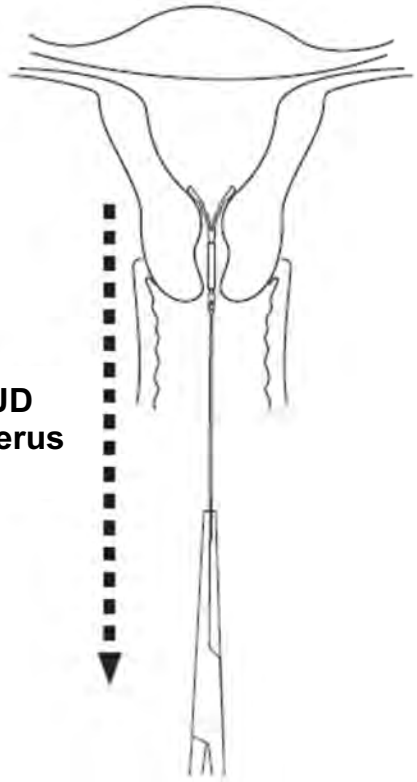
IUD Placement



IUD Placement



IUD Removal



Withdraw IUD from the Uterus

Note: if unable to remove IUD with gentle traction, consider ultrasound to evaluate IUD location & exclude perforation

Common Post-LARC Concerns

- **Irregular Bleeding** - pre-placement counseling to ensure patients understand the possibility of irregular bleeding & that we can help if it becomes annoying/bothersome
- **Weight changes** - although possible, not an expected outcome of LARC
- **Acne** - unlike combined hormonal contraceptives, LARC methods don't also treat acne. Although, if patient's acne has monthly flares they might see improvement
- **Mood changes** - not commonly caused by LARCs, but is possible. Evaluate for more common causes before removing LARC, unless removal desired by patient

Overview

1. Brief Historical Context
2. Clinical case
3. Review of LARCs
4. Barriers to LARC uptake
5. How to counsel
6. Summary & Q/A

Barriers to LARC uptake: provider discomfort

"It's interesting. If they're 16 and they've already had a baby, I have no trouble with it. But when they've not had a child before…[LARC use for an adolescent beyond insertion] is not the issue, it's more insertion."

– APN 3

I'm just not as familiar with it. It doesn't, it just doesn't occur to me as quickly.

– Pediatrician 3

Barriers to LARC uptake: Provider Discomfort

Adolescents view healthcare providers are their main source of info about LARCs

Many pediatricians approach the conversation with framework that adolescent population wouldn't choose larc, wouldn't tolerate SE, therefore do not present it as an option

Results from Contraceptive CHOICE project showed that when perceived barriers were removed (like cost) and accurate counseling was provided 70% teens chose LARCs

Return of fertility after discontinuation of contraception: a systematic review and meta-analysis

Tadele Girum* and Abebaw Wasie

Systematic review/meta analysis

Included articles 1985- 2017

22 studies included, Total N 14,884

Pooled rate of pregnancy 83.1% within first 12 mo of contraception discontinuation

No difference between methods IUD vs OCPs

Other common LARC misconceptions

- **Ectopic Pregnancy:** risk of pregnancy is lower in general, and absolute risk is low, 1/1000
- **Uterine perforation:** Absolute risk up to 0.1%
- **Infection:** "IUD is not significantly associated with upper gential tract infections" (Menon)
  - Absolute risk for adverse event of upper genital tract infection is low (0.5-0.6%)
- **Failure Rate:** "despite failure rates of <0.5%, a survey of over one thousand urban adolescents and YA found that 11.5% reported knowing someone else who got pregnant on the IUD" (Durante)
- **"Blocked blood":** concern that amenorrhea is "blocked blood" that can cause health issues (infertility and death) (Kalata)

Common LARC misconceptions and how to address

LARC Myth	How to Address Myth	Rationale for Response
LARC methods can decrease my ability to get pregnant in the future (or reduce my future fertility).	The ability of the implant and IUD to prevent pregnancy is reversed as soon as the device is removed. There is no long-term reduction in your ability to get pregnant.	Many adolescents are concerned about returning to fertility after discontinuing a contraceptive method. The depot medroxyprogesterone acetate injection (Depo-Provera) is the only method associated with some delay in return to fertility; even this effect is not universal.
It is unsafe to skip or have no period, and I am worried that if LARC stops my periods, it could cause problems.	LARC methods stop the uterus lining from building up, so your period can be lighter or may stop altogether because there may not be much uterine lining to shed each month.	Setting expectations regarding changes to the menstrual cycle before initiating a LARC method will improve satisfaction and continuation. This is especially important for those whose goals include improving menstrual bleeding and decreased cramping.

Durante JC, Sims J, Jarin J, Gold MA, Messiah SE, Francis JK. Long-Acting Reversible Contraception for Adolescents: A Review of Practices to Support Better Communication, Counseling, and Adherence. Adolescent Health, Medicine and Therapeutics. 2023;14:97-114. doi:10.2147/AHMT.S374268

Overview

1. Brief Historical Context
2. Clinical case
3. Review of LARCs
4. Barriers to LARC uptake
5. How to counsel
6. Summary & Q/A

Back to Cassandra

- **"I need a method that I won't have to think about daily…As a busy college student I dont think ill have time to remember to take a pill everyday"**

- She is considering getting an IUD, but has specific concerns:
  - **Worried about possible infertility.**
  - **Might not be effective.**
  - **Worried about pain during the procedure**

Table 2 Communication Strategies When Considering LARC Placement with Adolescents

Areas of Focus	Consider Saying:	Avoid Saying:	Why This Matters
Introduction of contraceptive options	Long-acting reversible contraception (LARC) methods are the most reliable and effective methods for preventing pregnancy.	The best options for you are LARC methods. I recommend LARC methods above all others for all my adolescent patients.	Comprehensive contraceptive options should be discussed, and providers should avoid being coercive or overly directive. Providers should not assume LARCs are the best options for all their patients.

Overview

1. Brief Historical Context
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Summary

- LARC devices are efficacious, private, cost effective, and easy to use methods of contraception that are extremely safe!
- There are many types of LARCs with varying side effects.
- Despite LARC methods being the most effective forms of contraception for adolescents, provider comfort in counseling and misconceptions regarding risks of use remain barriers to access

- **Through comprehensive Patient centered discussion,** providers can help patients make informed decisions on choosing their MOC

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Thank You! Questions?

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