Adolescent Medicine

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Adolescent Growth and Development

- **Physiology of Pubescence**
  - Pubescence results from the decreased sensitivity of the axis to negative feedback
  - GnRH stimulates production of LH and FSH, which stimulates the ovaries and testes to make estrogen and testosterone
  - Bone age (skeletal maturity) may be disparate by as much as two years from chronological age and still be normal
  - Pubescence is a dynamic process that can take 2.5 to 5 years to complete
  - Individuals who begin growth spurt early are initially taller than peers, but they will ultimately be relatively shorter than those who begin their growth spurt later

Pubescence is a dynamic process that takes two and a half to five years to complete. The word pubescence is used, instead of puberty, because pubescence implies that it is an extended process. Puberty is a process. Also, remember that individuals may start the growth spurt early. Two young men, fourteen years of age, they have different growth patterns. And the implications of that are terrific among the adolescents themselves. The nice thing that we can do for smaller adolescent, is that we can assure him that when he comes back for the 10 year reunion, that he is probably going to be taller than the guy that started developing early.

Physical Development

- The first sign of pubescence in males in usually testicular enlargement (normal age of onset is 11.5 years with a range of 9-14 years)
- The first sign of pubescence in females is usually breast bud formation (normal age of onset has a range of 8-14 years)

As far as physical development, the first sign of pubescence in males is usually testicular enlargement. It usually starts around 11½ years of age. The first sign of pubescence in females is breast bud development with the usual onset is somewhere between eight and 14 years of age.

Secondary Sexual Characteristics

- Males - testicular growth, pubarche, penile growth, peak height velocity
- Females - breast budding, pubarche, peak height velocity, menarche
- Menarche usually occurs around 2 years after thelarche (usually SMR 4)
- The height of girls will rarely increase more than two inches after menarche

Another important concept from the growth and development standpoint is the sequence of secondary sexual characteristics. In males, that sequence is the following: testicular growth, pubarche, penile growth, and finally peak height velocity. From the graph over here, you can see that for females, peak height velocity occurs much earlier, about two years earlier than males. Remember too, that menarche usually occurs around two years after thelarche, or the onset of breast bud development, and it usually is a sexual maturity rating of 4 for females. Girls height rarely increases more than a couple of inches after menarche.

Tanner Staging of Breasts

- **Stage 1** - no palpable glands
- **Stage 2** - breast bud develops directly below areola
- **Stage 3** - gland is larger than areola
- **Stage 4** - "mound on mound" configuration with glands in areolar region elevated separately from the other glands
- **Stage 5** - mature breast with flat areola

Tanner staging. This is the breast staging with stage 1, the top two pictures, lateral and AP being Tanner stage 1, which is really just child-like. No palpable glands. Tanner stage 2 with a breast lump right under the breast bud directly below the areola. Tanner stage 3 being when the breast extends beyond the areola and is palpable beyond the areola. Stage 4 is when we get the typical mound on mound configuration. The first mound is actually the gland of the breast itself and the second mound is where the areola and the nipple form one complex that becomes the second mound on top of the first mound. And finally, stage 5, or the mature breast of the female where the puffiness of the areola goes away and the areola becomes contiguous with the skin of the rest of the breast with a protuberant nipple.

Gynecomastia

- Gynecomastia occurs very commonly in pubertal males.
- Pubertal gynecomastia can be asymmetric and not indicate pathology.
- Gynecomastia can cause a change in dressing habits and physical activity.
- Usually resolves in 1 to 2 years, and it rarely needs plastic surgery for correction.

Another common finding in most of your practices and certainly in the adolescent medicine world is that we see a lot of gynecomastia in males. It is very common. Some estimates say that at least 25% of males have gynecomastia to some extent or another. And certainly it can also be represented in the female population as simple breast asymmetry and there will be a huge disparity between one breast and the other, which from a psychological standpoint can be traumatizing to the adolescent female. We may need to refer those girls either for reduction or augmentation of one of the breasts.

Gynecomastia in males can certainly change a lot of habits, including whether they decide to dress a certain way. One of the common things is that the guy wears a very tight T-shirt with lots of layers over to totally disguise the prominence of the breast. The other thing we hear is that physical activity changes. That they stop going swimming. If the P.E. at school requires that they take a shower with everybody, they avoid P.E. at all costs. Go to the showers as everyone else is getting dressed which makes them late to class and therefore they're constantly tardy. Gynecomastia in males will resolve within a year or two. Most of the time you don't need to do anything but give a little reassurance. Rarely, we will send someone over for plastic surgery. When they are Tanner stage 4 or sexual maturity rating of 4 and preferably even 5, but it depends again upon how psychologically traumatizing the gynecomastia has been.

Stages of Pubic Hair Development

- **Stage 1** - no hair
- **Stage 2** - few straight hairs around base of penis or on labia majoris
- **Stage 3** - dense hair in circumscribed limits
- **Stage 4** - dense, curly hair in mons pubis area out to thighs
- **Stage 5** - hair extending laterally onto thighs or upwards toward umbilicus

Pubic area. Prepubertal or stage 1 is basically no hair. These are two pictures of stage 2. I think if you look closely you can see a little bit of hair here and a little more here. Stage 3 is when the dense hair is in very circumscribed limits and moving on to 4, where basically the mons area is filled out with dense, curly hair, and then 5 where the hair extends onto the thighs or upwards toward the umbilicus.

Stages of Testicular Development

- **Stage 1** - prepubescent, child-like, < 4 mL volume
- **Stage 2** - enlargement, usually first sign of pubescence, 4 to 6 mL volume
- **Stage 3** - proliferation of seminiferous tubules, 8 to 10 mL volume
- **Stage 4** - 10 to 15 mL volume
- **Stage 5** - 15 to 25 mL volume

Testicles Development. Stage 1 is prepubescent or childlike, very small volume in testicles. Stage 2 is where the testicles begin to enlarge and 3 a little larger, Tanner 4 a little larger and Tanner 5 a typical adult male. The other thing I would like to point out on this slide is that it is an uncircumcised adult male.

Psychosocial Development

- **Characteristics of Adolescent Psychosocial Development**
  - Emancipation from parents and adults
  - Self identity based in reality
  - Psychosexual differentiation
  - Intellectual development with economic independence

Now for teenagers, many of us in the field say that it is basically like going through the "terrible twos" but this time around it is "too tall", "too fat", "too short", "too little", "too smart, "too dumb". Whatever. But there are jobs that are really expected to occur during adolescence and this is how you know that "you've arrived", so to speak, as an adult. Adolescence need to emancipate or to break off from parents and adults.

They try desperately to look different from adults. Hence, all of the tattooing and piercing and shades of hair and braiding - they try to look different. Psychosexual differentiation also occurs. Becoming a loving, caring person responsible in a relationship, the intellectual development also occurs, understanding the need to go out and support yourself and get a job.

The family goes through struggles, too. It is the job of a pediatrician to evaluate how that family is handling this process and many families don't handle it very well.

Psychosocial Stages

- Rapid body changes affect self esteem.
- Evaluation of family dynamics requires one to look for sources of stress and also predominant modes of coping with stress.
- Family influence influences early modeling health behaviors, such as smoking, drinking, conflict resolution and violence.

Psychosocial stages of adolescence are divided into early, middle and late. With early adolescence usually it is 11, 12, 13 and it goes up to 14 or 15 years of age. Certainly, adolescents that are in the early phases are preoccupied with their body image. These are the guys that every time they go by the mirror they stop and look or they have a comb in their back pocket and just have to pause a little bit to make sure every hair is in the right place. There are minor parental conflicts and rebellion that commonly occurs. The peers are usually same sex and age. Peer acceptance is what's paramount. The parent and the family are replaced by the peer group as the most influential group in what they do. That peer education or peer mentoring can work because of these principles. Early adolescents are very concrete thinkers- they take thing literally.

Characteristics of Early Adolescence

- 11-13 through 14-15 years of age
- Preoccupation with body changes in search for identity
- Minor parental conflicts and rebellion common
- Peers are usually same sex and age, peer acceptance paramount
- Concrete cognition
- Beginning to seek independence
- Limited dating
- Limited ability to imagine the consequences of risky behavior
- Limited ability to link cause and effect in regard to health behavior (eg, smoking, reckless driving, overeating)
- Attachment to non-parental adults is common

Early adolescents are beginning to seek independence. Therefore, you frequently see them alone and in their rooms trying to block out the rest of the world, particularly parents and what you are trying to tell them. Very limited dating occurs. It is usually the pack or the group mentality where there are several guys and several girls and they may pair up, or go over and say, "Did you know that Sally likes you and she'd really like to hold your hand and go out with you?"

There is this limited ability to imagine the consequences of risky behavior. If they haven't experienced it, since they are concrete thinkers, they can't carry through on prevention. Because as a concrete thinker, you have to have done it before you can really process it. There is also a limited ability to link the cause and effect in regard to health behaviors. We can tell them that smoking is bad for them, but if you want to be cool and you want to fit the image, then the image wins out.

What also happens here is that oftentimes the parent role is replaced by another caring adult, and this should not be downplayed in the communities.

Characteristics of Middle Adolescence

- 14-15 through 16-17 years of age
- Peer group remains very important for social and behavioral norms
- Dating a major activity
- Conflicts with parents, emancipation issues become dominant themes
- Beginning of abstract cognition
- Feelings of omnipotence and invincibility
- Pubescence almost complete
- Risk-taking behaviors, rebellion, and impulsiveness are necessary as part of achieving independence
- Rejection of authority and risk-taking tendencies may include rejection of medical advice and treatment previously accepted

Middle adolescence is really when peer pressure mounts up. They really look to the peers for the social norm. This is paramount in this group. Dating becomes a major activity. Conflicts with parents and emancipation issues.

There is also the beginning of abstract thinking during middle adolescence. There are also feelings of omnipotence and invincibility. This is what drives them to do the weird things they do. Driving 120 miles per hour down the road, popping pills. They have to feel like they can take on the world because that is what we are asking them to do. Leave the home, go establish yourself somewhere else, find a job, support yourself and raise a family.

Pubescence is almost complete now. There are lots of risk-taking behaviors which sometimes are a little more severe than others. There is also a rejection of authority. This may take on that they used to listen to your medical advice and they've had asthma for years and now they are beginning to reject that authority also.

Late Adolescence

- 17-21 years of age (or older)
- Emancipation complete, parent-child relationship is adult to adult
- Peer group superseded by strong individual relationships
- Intimacy with commitment rather than exploration
- Planning for the future
- Self-identity established
- Understands consequences of actions and risk-taking behavior
- Consistent abstract thinker
- Age does not equate to stage

Finally they start becoming human again and move into late adolescence which is 17-21 years of age, where they really do have that emancipation complete. The parent-child relationship goes back to more of an adult to adult kind of thing. The peer group is superseded by the need for strong individual relationships and there is intimacy with commitment rather than exploration. There is lots of planning for the future. The self identity is established. They understand the consequences and at this point are pretty consistent abstract thinkers.

Chronic Illness or Disease in Adolescents

- **Consequences of Chronic Illness or Disease**
  - May cause pubertal delay
  - May cause decreased self-esteem or depression
  - Efforts to be "normal" may be detrimental to therapy
  - Social isolation
  - Emancipation from parents becomes more difficult

Certainly, chronic disease and illness gets in the way of adolescent growth and development. When they have chronic diseases, it can interrupt not only the physical stuff, but certainly can cause the social isolation that occurs and causes a real problem for emancipation.

Compliance Issues in Adolescence

- **Barriers to Compliance**
  - time and financial costs
  - inconvenience
  - pain
  - embarrassment or the acknowledgment of personal vulnerability
  - Most difficult part of achieving compliance may be to change established behaviors (eg, stop smoking, reduce fat intake, exercise).

Psychosocial screening tool, HEADS. It takes just a few minutes to get an enormous amount of information from the adolescent about the home environment, the education environment, all the different things. Like "E" is originally for "education". "A" is for "activities", finding out what they do in their spare time and particularly what their friends do. What is going on in the drug, alcohol, tobacco world with them, and finally sexuality and what is going on with that. So, remember HEADS. And it describes and guides you with certain questions you can use in your practice to try to get that done.

Methods of Improving Compliance

- Allow the adolescent to help formulate treatment plan
- Make the regimen simple and inconspicuous
- Choose the battles that are important and ignoring the insignificant problems
- Use motivation and positive consequences, not fear or negative consequences
- Encourage praise and acceptance by family

Clinical Assessment of Psychosocial Functional Status

- **Home Situation**
  - Who lives with the patient?
  - What are relationships like at home?
  - What do caretakers do for a living?
  - Recent changes in the family?
  - Divorce or separation?

- Education, employment, eating
  - School/grade performance?
  - Favorite subjects?
  - Career aspirations?
  - Employment history?
  - Weight and diet history?

- Activities, affect
  - Activities with peers?
  - Interests?
  - Abuse/rape/acquaintance rape?
  - Extracurricular activities?
  - Use of automobile/seatbelts?
  - Sleep problems?
  - Feeling sad, crying for no reason?
  - History of suicidal thoughts?

- **Drugs**
  - Use of substances by peers?
  - Use of substances by family?
  - Alcohol - frequency, amount?
  - Tobacco - frequency, amount?

- **Sexuality**
  - History of sexual behaviors, frequency, number and sex of partners?
  - History of pregnancy/abortion?
  - Sexually transmitted diseases?
  - Contraception - attitudes, use?

Behavioral Health Issues

- Leading cause of death among adolescents is motor vehicle accidents, followed by firearm deaths.
- Adolescents feel a tremendous amount of stress and pressure which may come from school (expectations or teachers), peers, relationships, parents, siblings or others.

Delinquency

- Risks for adolescent delinquency include poverty, parental addiction and psychiatric disorders and school failure.
- Most common medical problems of incarcerated youth include trauma, affective disorders, substance use and acute primary care problems.

Consent and Confidentiality

- Minors can give consent for medical treatment under the following legal circumstances:
  - After they are married
  - After they have become a parent
  - Military service
  - Living on one's own
  - Supporting one's self
- A minor is allowed to seek diagnosis and treatment for the following conditions without parental consent:
  - Sexually transmitted diseases
  - Pregnancy
  - Contraception
  - Substance abuse

Consent and confidentiality is usually defined by a state's definition. Nationally there is a Supreme Court decision that takes priority over state law that grants us the privilege to give teenagers contraception. Many states describe those circumstances in detail where minors can consent for medical treatment without parental consent, and this often involve things like marriage, parenthood, military service, living on your own and supporting yourself. Another one that is not listed is legal emancipation by court. Usually adolescents are given the ability to seek diagnosis and treatment for sexually transmitted diseases, pregnancy, contraception and substance abuse by state statutes.

Eating Disorders

- Classic anorexia nervosa characteristics
  - Majority of patients are female
  - These patients are usually very neat and particular about grooming and dress
  - They are very careful that their rooms are extremely tidy
  - They usually display good academic performance, and they may rewrite homework until perceived to be perfectly done
  - Enmeshment of the family is common
  - Parents are usually overprotective, and involvement of the child in parental conflict is common
  - Patients may be controlling and manipulative
  - Concrete operational thought processes are typical
  - Anorexia nervosa is common among gymnasts and dancers
  - Vomiting is unusual. The main focus of their attention is restriction

Eating disorders. First is the classic anorexia nervosa. Females are constantly bombarded with the message that this is what you are expected to look like. Certainly just looking at pictures of pretty girls doesn't make you become anorexic. There are lots of complexities. Complexities with the family, with yourself, with your self image, control, manipulation, etc.

Anorexia Nervosa -- DSM IV Criteria

- Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g., maintenance of body weight <85% of that expected)
- Intense fear of gaining weight or becoming fat, even though underweight
- Disturbance in the way which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation or denial of the seriousness of the current low body weight
- Amenorrhea (absence of at least three consecutive menstrual cycles or requirement of hormone therapy after three missed cycles)

The girls who do have anorexia nervosa are usually very neat and particular about their dress. Everything around them is in order. They have neat and tidy rooms for instance and usually are very good students. Actually, most of them are straight "A" students. They repeat their homework assignments for instance until things are absolutely perfect. If there is a smudge on the paper, they will rewrite the paper so it is perfect. Over and over. Obsessive-compulsive disorders are sometimes a co-morbid diagnosis that is given to the anorectic patient. It is also a fair amount of enmeshment of the family. Once those kinds of things start coming out, you can see how difficult it is to be an individual and to have that normal developmental milestone of separation that is supposed to occur.

Differential Diagnosis of Anorexia Nervosa

- **Gastrointestinal Disorders**
  - Crohn's disease
  - Ulcerative colitis
  - Pancreatitis
  - Malabsorption syndromes
  - Achalasia
- **Neurologic Disorders**
  - CNS tumor or lesion, especially midline
  - Seizure disorder
- **Psychiatric Disorders**
  - Schizophrenia
  - Paranoid disorders
  - Affective disorders
  - Obsessive-compulsive disorder
- **Endocrine Disorders**
  - Diabetes mellitus or insipidus
  - Hypo- or hyperthyroidism
  - Addison syndrome
  - Gonadal dysfunction
  - Pregnancy
  - Panhypopituitarism

We also see sometimes overprotective parents and, in particular, involvement in parental conflict by the anorectic patient themselves. These patients are extremely controlling and manipulative. Often times the staff is pitted against each other, and pretty soon people are beginning to get unhappy with each other on the team and saying, "You told her that blah, blah, blah and you told her she didn't have to have two bites of food." What is driving all that is that they are accomplishing what they want to and that is to create chaos and confusion which then puts them more and more in control. These patients also usually have concrete operational thought processes. They are very commonly involved in certain sports, gymnasts or dancers. In the anorectic patient, vomiting is unusual. These are the restricters. They just don't eat. Exercise is a major portion of the disease.

The patients also get very secretive and controlling about their food intake to the point that one of the patients what we were caring for was hiding her food in the suspended ceiling in her room.

DSM IV criteria. It is basically a refusal to maintain body weight at least less than 85% of expected body weight or ideal body weight. There is also an intense fear of gaining weight or becoming fat even though they are very thin. This is truly inner self and deep inner sole kind of intense fear that if they eat those three or four peas on the plate, they are just going to blossom into this obese person. Males who only comprise about 5-10% of the anorectic population, males don't see as much as this kind of media presentation about the male body that the females do.

There definitely is, with the DSM IV criteria, a disturbance in the way that they look at their body and the shape. There have been lots of study of the perception of the body image by the anorectic and it is always much bigger than the actual body is. In one picture, that is just a severely emaciated patient, they still feel like they are just grossly obese and will continue to get bigger. Also, in menstruating females if amenorrhea is present, which is defined as an absence of three cycles in a row and that also includes if they must receive hormonal therapy in order to have periods. That counts as amenorrhea.

Certainly with anorexia, before the diagnosis sticks, we need to make sure there's not something else causing this patient to be very thin. There are lots and lots of things we have to exclude before we treat them with strictly a psychiatric approach.

Certainly gastrointestinal problems including Crohn's are things that we have seen at our center. Under the neurologic category, we have to look for CNS tumors and about every four to five years in our center we again have someone referred in for evaluation of an eating disorder that ends up with a brain tumor that has caused her problems to begin with, especially the midline tumors. Other brain abnormalities which may present as a seizure disorder include vasculitis and other autoimmune disorders. Psychiatric disorders, including schizophrenia and especially affective disorders with severe depression may cause lack of appetite..

Treatment of Anorexia Nervosa

- Rapid diagnosis and aggressive treatment of both psychiatric and medical symptomatology
- Initial phase concentrates on restoration of physiologic and psychological functioning
- Long-term phase focuses on change of individual and family pathology and maintenance of healthy eating behavior

Endocrine differential diagnosis, thyroid problems with exophthalmos and the fullness. But again I am just trying to make the point certainly don't just jump on it that every 14-year-old that shows up in your practice that wants to lose weight and watches all of her fat grams, has anorexia if she is a little too thin. Keep looking for new diagnoses even in the treatment of anorexia nervosa patients, because there can exist other co-morbid physical diagnoses also.

Anorexia treatment principles. The first thing that we have to do is to attack them basically from the psychiatric and a medical aspect. The team usually consists of a medical person, a psychiatric person or psychologist, a nutritionist, specialized nurses and certainly family therapy is vital to the success of the treatment. In the initial phase, we have to work on the life threatening kinds of things and work on the physiologic and psychological emergencies, to get the patient functioning to the highest degree that you can. The long term phase is what is really the tough part. That is where we try to get the family as well as the patient functioning to the best of their ability and to maintain that healthy lifestyle or healthy attitude towards eating behaviors and to address the communication issues in the dysfunctional situations in other ways besides controlling food.

Indications for Hospitalization

- Severe malnutrition, with weight <75% of ideal body weight
- Acute medical complications
  - Dehydration and electrolyte imbalances
  - ECG abnormalities
  - Acute psychiatric emergencies
  - Failure of outpatient treatment
- Comorbid diagnosis that interferes with therapy

Characteristics of Bulimia Nervosa

- These patients are usually of normal weight
- Food consumption is often described as an addiction
- Binge eating is not a response to hunger
- Binge eating may occur in groups or cliques
- Binge eating may be related to anxiety caused by a stressor
- The disorder is often complicated by depression, feelings of inadequacy, lack of control and strained relationship with parents
- Preoccupation with control over eating is common
- Mood swings are frequent
- Half of patients have a relative who is alcoholic
- Beware of substance abuse in these patients

Bulimia. These girls are often normal weight or even perhaps a little overweight that have the same kind of control issues of food consumption or food eating behavior described almost like an addiction. Binge eating is definitely not a response to hunger. It may occur in groups or cliques. It seems to be bimodal as far as age distribution, with young middle school students and then again freshmen in college. It is probably related to anxiety. The transition from one peer group to another, with the change from middle school to high school, and high school to college, may contribute. Often depression is present and lots of feelings of inadequacy and low self-esteem. Lack of control and very strained relationships.

With bulimic patients, I think that we also need to look out for substance abuse. Over half of the patients have an alcoholic somewhere in their family. Substance abuse is also very common among the bulimic patients, so this may complicate the treatment. Once you get the bulimia under control, you may still have chronic substance abuse that continues for years and years to come unless it is arrested from the beginning.

DSM IV Criteria for Bulimia Nervosa

- Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
  - eating, in a discrete period of time (e.g. within any 2 hr period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances
  - a sense of lack of control over eating during the episode (e.g. a feeling that one cannot stop eating or control what or how much one is eating)
- Recurrent inappropriate compensatory behavior in order to prevent weight gain such as: self-induced vomiting; misuse of laxative, diuretics, enemas or other medications; fasting; or excessive exercise
- The binge eating and inappropriate compensatory behaviors both occur, on average, at least twice a week for three months
- Self evaluation is unduly influenced hy body shape and weight
- The disturbance does not occur exclusively during episodes of Anorexia Nervosa

DSM IV criteria basically is recurrent binge eating. It is characterized by eating, in a discrete period of time, more than the usual person would eat. They eat two gallons of ice cream, an entire large bag of potato chips within an hour and a half and then purge and binge in another hour or two. Again, not a response to hunger. They also describe it as out of control behavior. That they can't stop the eating. They just go on and on. There is this recurrent inappropriate behavior to keep from gaining weight which may include diuretics, laxatives, purging, extreme fasting, lots of exercise. The binge eating has to occur twice a week for three months to really meet the DSM criteria. The bulimic patients, again mostly girls, also have this really undue response to their body shape and their weight. It is just overwhelming how much they think about body image and weight. The other criteria is that it can't be anorexia nervosa. It is really a continuum of eating disorders and you can have any combination in between these two.

The treatment for bulimia is basically that for anorexia, with handling the emergencies to begin with, although they are less common, and then working on the long term phase which is again the hard part. Trying to heal the family.

Diagnosis of Obesity

- Identification
  - >85 percentile of body mass index (BMI) which is weight (in kilograms) divided by the height squared (in meters) or kg/m^2
  - >85 percentile of triceps skinfold thickness

Obesity. Obesity is one of those really frustrating ones for me personally because it seems like there is not a lot that you can really do unless the patient decides that they want something done.. With obesity, the family does not see it as a major threat to health or a major problem, commonly because they are obese themselves. Diagnosis consists of greater than the 85 percentile for body mass index (BMI) or greater than the 85 percentile for triceps skinfold thickness.

Treatment of Obesity

- **Effective Interventions**
  - Motivated adolescent
  - Peer group process and support
  - Positive role models within the family
  - Change in exercise and eating behaviors
- **Ineffective Interventions**
  - Unmotivated or apathetic adolescent
  - Crash diets

Obesity treatment. The effective interventions are when the adolescents themselves want treatment to occur. It usually needs to be a multidisciplinary approach. Support groups are helpful. Crash diets don't work. The newest thing on the scene for adolescent obesity is the Phen-Fen diets. The question is however that they need to be on it for the rest of their lives and there are some serious cardiac side effects. This is used a lot more in internal medicine and family practice people with older adults who have seemed to have tried everything and can't lose weight and get put on this Phen-Fen diet and it does work. They are not prescribed routinely for adolescents.

Adolescent Pregnancy

- Close association exists between school failure or dropout and adolescent pregnancy. When a girl gets pregnant and decides to parent, she is often already two years behind in grade level
- Youth itself may not be the risk factor
  - Racial vs. socioeconomic status
  - Resiliency factors
  - Environmental factors

Primary amenorrhea. This is defined as the absence of menarche by the age of 16 with otherwise normal growth or by the age of 14 with no secondary sexual characteristics present or no menses two years after completed sexual maturity. Imperforate hymen can be a cause of an apparent primary amenorrhea. History and physical is really important in figuring out where to start with amenorrhea. This system is based on the fact that if you have breasts absent and uterus present, here are the things you need to worry about. Then if breasts and uterus are both present, then the breakout is either cyclical or non cyclical. Pregnancy is by far and away the most important thing for a woman to worry about with secondary amenorrhea. The differential diagnosis includes pregnancy, pregnancy, pregnancy when you are dealing with secondary amenorrhea.

Causes of Adolescent Pregnancy

- Sexual promiscuity
- Denial
- "Myth-information"
- Magical thinking
- Poor planning/foresight
- Trying to make alternate situation
- Fail to take responsibility
- Wrong information sources
- Low self-esteem
- Absent fathers
- Poor communications skills
- Poor insight
- Peer pressure
- Easily pressured

Maternal Complications of Teenage Pregnancy

- Anemia
- Hypertension and preeclampsia
- Fewer years of education
- Poorer socioeconomic status
- Social isolation, depression, stress
- High risk for repeat pregnancy
- Prenatal care received less often than older women

Neonatal Complications of Teenage Pregnancy

- Prematurity
- Sudden Infant Death Syndrome
- Poor school performance
- Behavior problems
- Developmental delay
- Neglect
- Low birth weight

Diagnosis Primary Amenorrhea

- Defined as absence of menarche by age 16 with otherwise normal growth and development or no menses 2 years after completed sexual maturity
- Imperforate hymen can cause primary amenorrhea

Differential Diagnosis of Amenorrhea with Breasts and Uterus Present

- **Hypogonadotropic hypogonadism**
  - CNS lesion
  - Kallman syndrome
  - Pituitary gonadotropic deficiencies (e.g. chronic disease, anorexia nervosa)
- **Hypergonadotropic hypogonadism (Gonadal dysgenesis)**
  - Turner syndrome (45 XO or mosaic)
  - Radiation or chemotherapy leading to functional oophorectomy

Breast Absent Uterus Absent

- Gonadal enzyme deficiency (17-alpha-hydroxylase deficiency)
- Agonadism

Breasts Present Uterus Absent

- Mullerian agenesis (Meyer-Rokitansky-Kuster-Hauser syndrome) XX karyotype
- Androgen insensitivity (testicular feminization) XY karyotype

Breasts Present Uterus Present

- If cyclical pain present, rule out vaginal outlet obstruction (eg, imperforate hymen, transverse vaginal septum, rarely pregnancy)
- If cyclical pain not present, hypothalamic-pituitary ovarian axis disturbance (evaluate as secondary amenorrhea)

Secondary Amenorrhea

- Defined as cessation of menses after menarche
- Irregular bleeding is normal during the first 2 years post-menarche. Sporadic periods with absence of menses for several months is normal.
- After regular cyclical pattern established, missing three cycles in a row is considered secondary amenorrhea

Differential Diagnosis of Secondary Amenorrhea

- Pregnancy is the most common cause, and it must always be excluded.
- Hypothalamic disruption
  - Stress
  - Systemic disease (e.g. anorexia nervosa, inflammatory bowel disease, diabetes mellitus, thyroid disease, pituitary adenoma or infarction)
  - Exercise-induced amenorrhea
- Uterine adhesions/Asherman syndrome
- If hirsutism is present consider:
  - Congenital adrenal hyperplasia (C21-hydroxylase deficiency)
  - Polycystic ovary syndrome/chronic anovulation
    1. Virilization with ache, hirsutism (be sure to ask about hair removal cream use)
    2. LH/FSH ratio >2.5:1
    3. Sonogram evidence of multicystic ovaries is not necessary for diagnosis
  - Cushing syndrome

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