Eating Disorders

Dr Amy Robinson (Adolescent Health)

Pediatric Telehealth Rounds

May 1st, 2015

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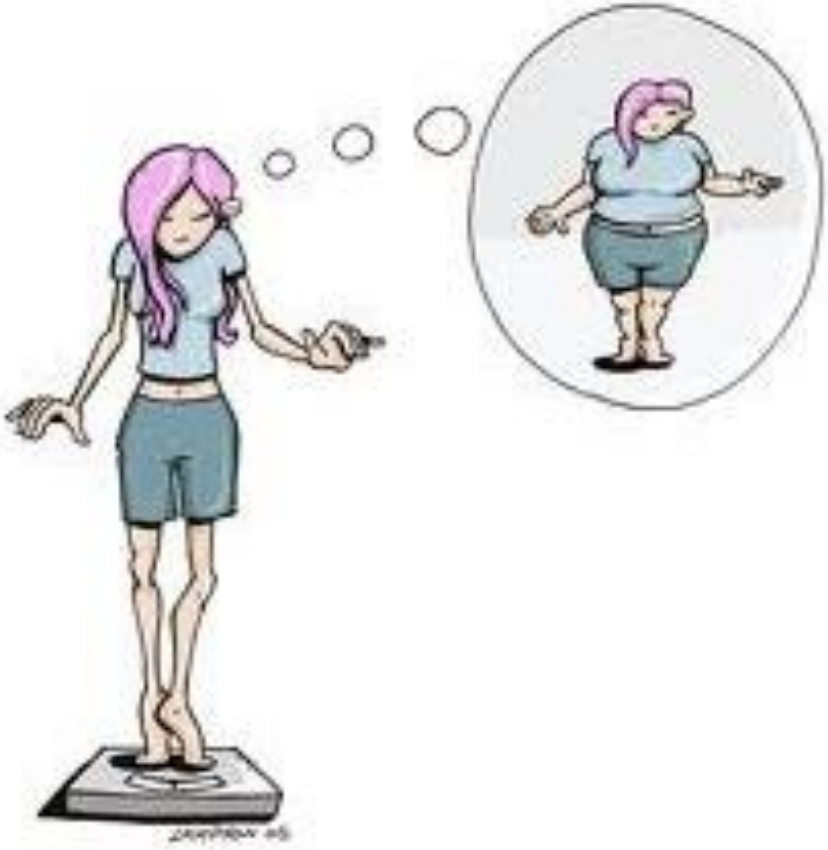
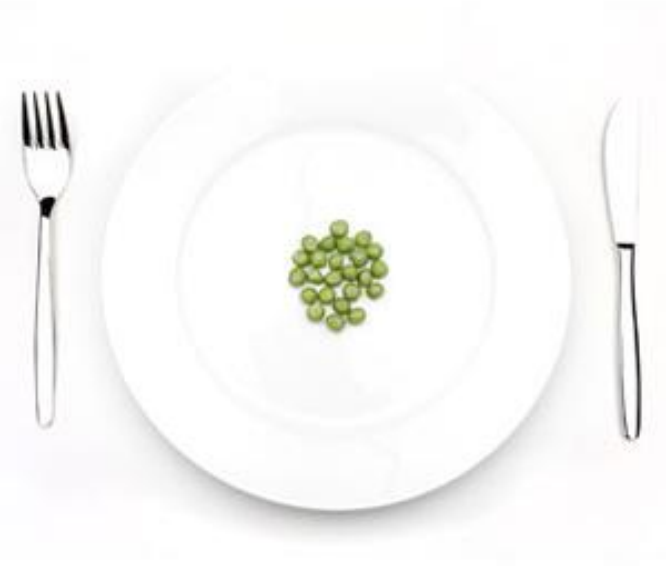
Objectives

- To review common pediatric eating disorder diagnoses, including Anorexia Nervosa, Bulimia Nervosa, and Avoidant Restrictive Food Intake Disorder (ARFID)
- To recognize symptoms/signs of an eating disorder, as well as understand the medical complications
- To discuss options for treatment of eating disorders



Case 1

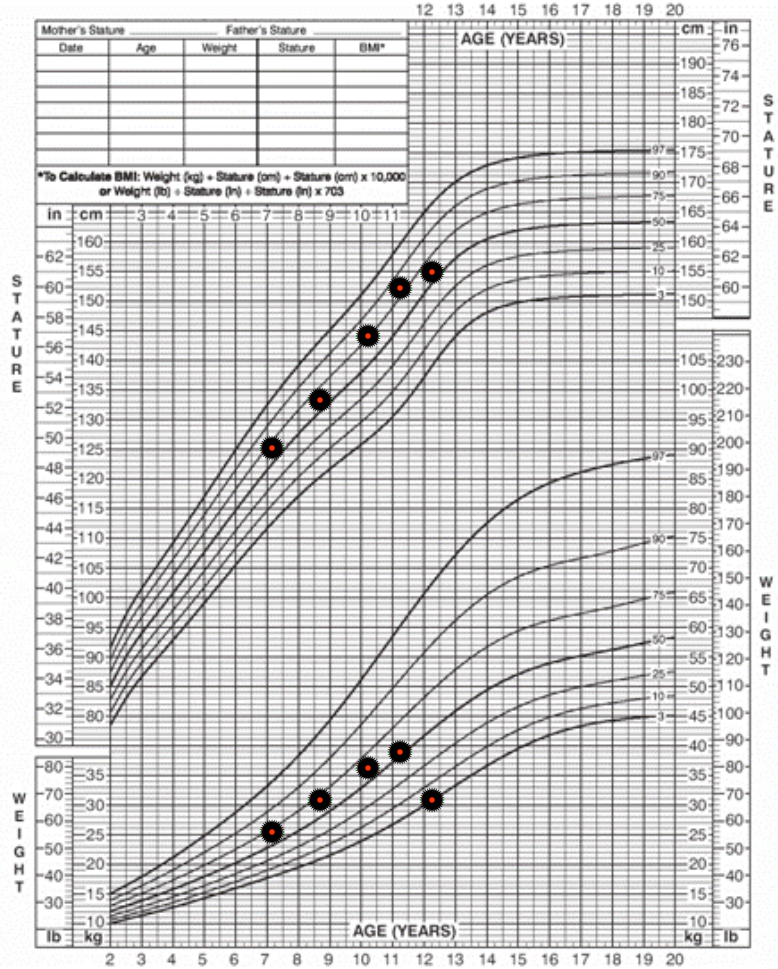
- Chief complaint
  - 12-year old female adolescent with weight loss
- HPI
  - Six month history of weight loss
  - Not reached menarche; mom's menarchal age 11 years
  - Moved schools
  - Started restriction types and quantity of food (caloric intake = 500 kcal/day)
  - Decreased appetite "I'm not hungry"
  - Developed an interest in cross-country running (5-10 km 3-4 x per week)
  - Spends a lot of time alone in room

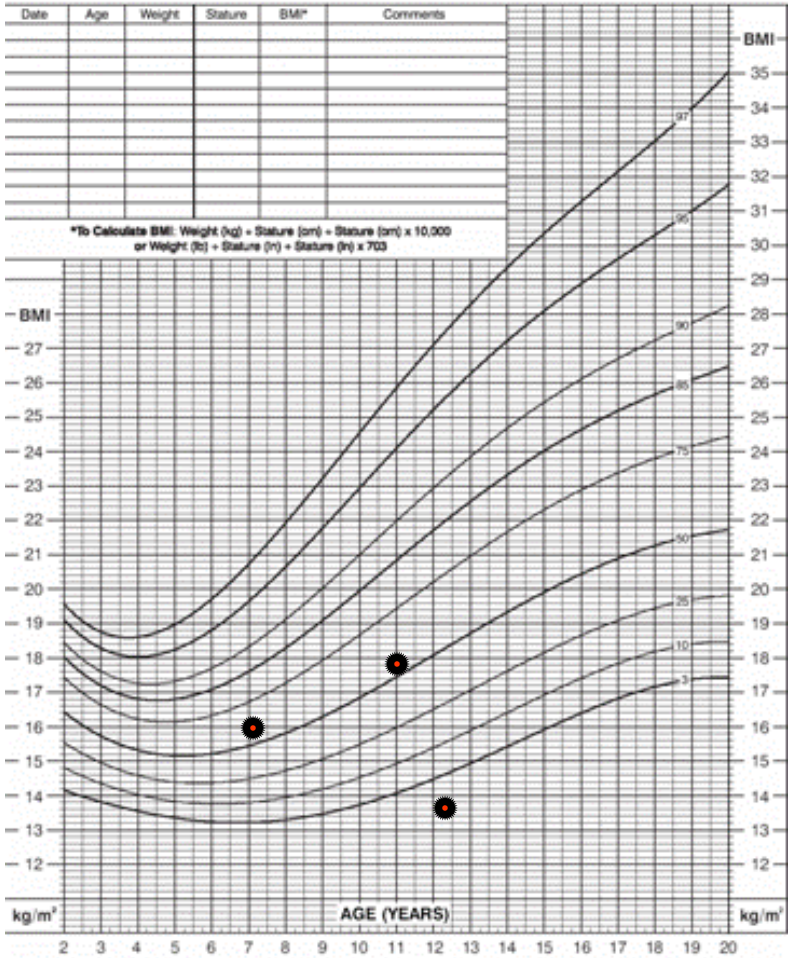


Case 1

- Physical exam:
  - Thin appearing female
  - Weight 30 kg (3rd %); Height 148 cm (50th%); BMI = 13.7 kg/m^2 (<3rd %)
  - Orthostatic vital signs
    - Lying HR 45 bpm; BP 90/50
    - Standing HR 50 bpm; BP 95/60
  - Temperature 36.0 C
  - Lanugo hair
  - Poor peripheral perfusion
  - Moveable mass LLQ

Growth curves





Eating disorder?

What is an Eating Disorder?

- Nutritional intake among teenagers thought of along a spectrum
  - Normal Eating → Disordered Eating → Eating Disorder
- Up to 80% of adolescent girls (and 65% of boys) care about controlling their weight
  - 2/3rds of females have tried to lose or maintain their weight in the last year (42% of boys)
    - "Unhealthy behaviours" used in over half of females, one-third of males

Neumark-Sztainer D. Weight-related concerns and behaviors among overweight and nonoverweight adolescents. Arch pediatr adolesc med, 2002.

What is an Eating Disorder?

4 main components to an Eating Disorder:

1. Intake (low, high)
2. Weight criteria
3. Level of Preoccupation
4. Body Image Distortion

Epidemiology

- 0.5 - 4.0% adolescent women fit criteria for either anorexia or bulimia in any given population
- Prevalence of DISORDERED eating much higher (estimates 5-10% post-pubertal females)
- Etiology complex – multiple mitigating factors
- These disorders have a chronic nature
  - Depending on the studies:
    - full recovery seen in 30 – 50 % patients
    - 30% have partial recovery
    - 20% no substantial improvement over time

What are the Eating Disorders?

DSM 5:

- Anorexia Nervosa
- Bulimia Nervosa
- Binge Eating Disorder
- Avoidant Restrictive Food Intake Disoder (ARFID)
- Other Specified Feeding or Eating Disorder (OSFED)

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Anorexia Nervosa

Anorexia nervosa	Bulimia nervosa
~ 0.5 % prevalence	1 – 4 % prevalence
Peak age of onset is midadolescence (13 – 15 years)	Onset during late adolescence or early adulthood (18 – 19 years)

Anorexia Nervosa

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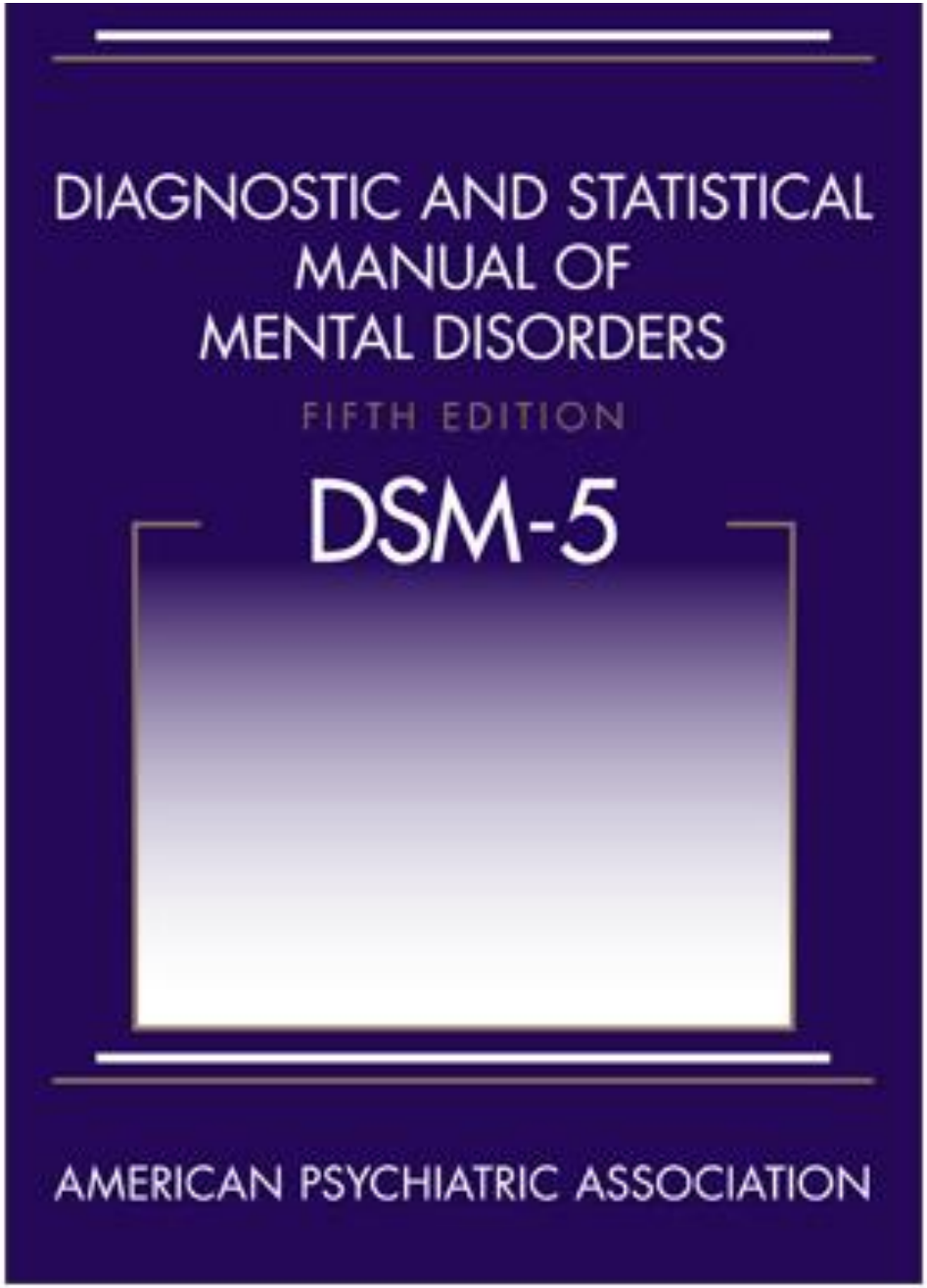
~ 0.5 % prevalence	1 – 4 % prevalence
Peak age of onset is midadolescence (13 – 15 years)	Onset during late adolescence or early adulthood (18 – 19 years)

- More than 90% of individuals with eating disorders diagnosed before age of 25 years
- ~ 90 % of adolescents with eating disorders are female
  - ?underrecognition, less likely to seek treatment
  - Higher prevalence of males in younger patients


DIAGNOSTIC AND STATISTICAL
MANUAL OF
MENTAL DISORDERS
FIFTH EDITION
DSM-5
AMERICAN PSYCHIATRIC ASSOCIATION

Anorexia nervosa – DSM 5 criteria

A. Restriction of energy intake relative to requirements leading to a significantly low body weight in the context of age, sex, developmental trajectory and physical health.

   Significantly low weight is defined as a weight that is less than minimally normal, or, for children and adolescents, less than minimally expected.

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Removed specific criteria of body weight <85% of that expected

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C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or persistent lack of seriousness of the current low body weight – Distorted body image

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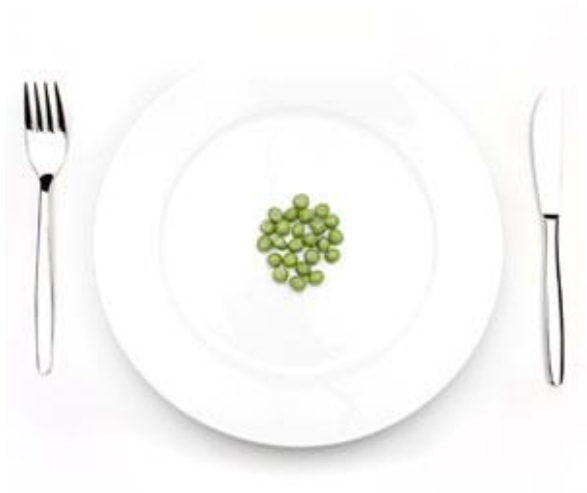
Removed amenorrhea criteria
(absence of 3 consecutive menstrual cycles)

Anorexia nervosa – DSM 5 criteria

Restricting type



Binge eating/purging type

- Regularly engages in binge eating or purging (self-induced vomiting or misuse of laxatives, diuretics or enemas)

Bulimia nervosa

- Recurrent binge eating episodes
  - Eating large amount in discrete time period
  - Lack of control over eating

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Bulimia nervosa

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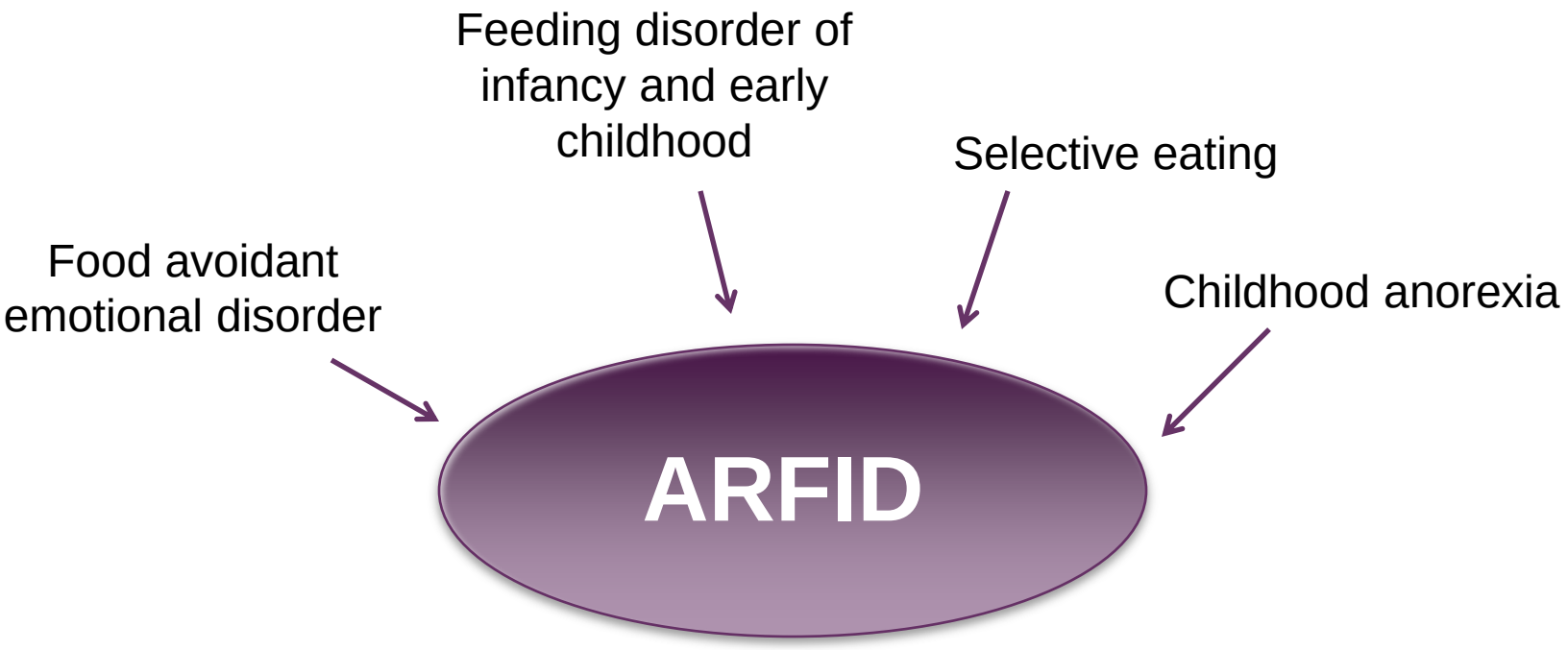
  - Eating large amount in discrete time period
  - Lack of control over eating
- Recurrent inappropriate compensatory behaviours to prevent weight gain
  - Self-induced vomiting, laxative/diuretic use, other medications, fasting, excessive exercise
- Frequency – at least once a week for 3 months

Previously twice weekly

- Self-evaluation unduly influenced by body shape and weight
- Disturbance does not occur exclusively during episodes of anorexia nervosa

Avoidant/Restrictive Food Intake Disorder (ARFID)



Avoidant/Restrictive Food Intake Disorder (ARFID)

A. An eating or feeding disturbance (e.g. apparent lack of interest in eating or food; avoidance based on the sensory characteristics of food; concern about aversive consequences of eating) as manifested by persistent failure to meet appropriate nutritional and/or energy needs associated with one (or more) of the following:
   1. Significant weight loss (or failure to achieve expected weight gain or faltering growth in children)
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   3. Dependence on enteral feeding or oral nutritional supplements
   4. Marked interference with psychosocial functioning

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C. Not occur in course of AN/BN; no evidence of body distortion.

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C. Not occur in course of AN/BN; no evidence of body distortion.

D. Not attributable to concurrent medical condition or not better explained by another mental disorder.
   - When eating disturbance does occur with another condition or disorder, the severity of the eating disturbance exceeds that routinely associated with the condition or disorder and warrants additional clinical attention.

Avoidant/Restrictive Food Intake Disorder (ARFID)

EMPIRICAL ARTICLE

Exploring Avoidant/Restrictive Food Intake Disorder in Eating Disordered Patients: A Descriptive Study

Mark L. Norris, MD[1,2,3]*
Amy Robinson, MD[1]
Nicole Obeid, PhD[2]
Megan Harrison, MD[1,2,3]
Wendy Spettigue, MD[2,3,4]
Katherine Henderson, PhD[5,6]

ABSTRACT

Objective: To assess and compare clinical characteristics of patients with avoidant/restrictive food intake disorder (ARFID) to those with anorexia nervosa (AN).

Method: A retrospective review of adolescent eating disorder (ED) patients assessed between 2000 and 2011 that qualified for a diagnosis of ARFID was completed. A matched AN sample was used to compare characteristics between groups.

Results: Two hundred and five patients met inclusion criteria and were reviewed in detail. Of these, 34 (5%) patients met criteria for ARFID. A matched sample of 36 patients with AN was used to draw comparisons. Patients with ARFID were younger than those with AN, more likely to present before age 12, and more likely to be male. Patients in both groups pre- fear of vomiting. Rates of comorbid psychiatric diagnoses and medical morbidity were high in both groups. Almost 80% of AN patients and one-third of ARFID patients required hospital admission as a result of medical instability. Symptom profiles in 4/34 ARFID patients resulted in eventual reclassification to AN.

Discussion: This study supports the notion that a small percentage of adolescent patients presenting with restrictive eating disorders meet criteria for ARFID. Patients are younger than average, more likely to be male compared to adolescent AN samples, and have high rates of psychiatric and medical morbidity. The study also suggests that a proportion of patients evolve into AN as treatment progresses. © 2013 Wiley Periodicals, Inc.

Keywords: eating disorder; ARFID;

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Patients with ARFID:
- Younger
- Higher % of males
- Very high co-morbidity with anxiety disorders

Eating disorder?

Approach to eating disorders

Making a diagnosis

- Complete history
  - History of presenting illness
  - Medical history (with complete review of systems)
  - Nutritional history
  - Psychological history
  - Parental / Caregiver collateral history
- Differential diagnosis
  - Organic versus non-organic causes of weight loss
- Thorough physical exam +/- laboratory testing
  - Identify serious complications of malnutrition

Differential diagnosis

TABLE 5 Differential Diagnosis of Eating Disorders

Gastrointestinal disorders
Inflammatory bowel disease
Celiac disease
Infectious diseases
Chronic infections (human immunodeficiency virus infection, tuberculosis, others)
Endocrine disorders
Hyperthyroidism (hypothyroidism)
Diabetes mellitus
Other endocrine disorders (eg, hypopituitarism, Addison disease)
Other psychiatric disorders
Obsessive-compulsive disorder and anxiety disorders
Substance abuse
Other disorders
Central nervous system lesions (including malignancies)
Other cancers
Superior mesenteric artery syndrome (more commonly a consequence of severe weight loss)

American Academy of Pediatrics. Clinical report – Identification and management of eating disorders in children and adolescents. *Pediatrics,* 2010.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

Guidance for the Clinician in Rendering Pediatric Care

Clinical Report—Identification and Management of Eating Disorders in Children and Adolescents

abstract

The incidence and prevalence of eating disorders in children and adolescents has increased significantly in recent decades, making it essential for pediatricians to consider these disorders in appropriate clinical settings, to evaluate patients suspected of having these disorders, and to manage (or refer) patients in whom eating disorders are diagnosed. This clinical report includes a discussion of diagnostic criteria and outlines the initial evaluation of the patient with disordered eating. Medical complications of eating disorders may affect any organ system, and careful monitoring for these complications is required. The range of treatment options, including pharmacotherapy, is described in this report. Pediatricians are encouraged to advocate for legislation and policies that ensure appropriate services for patients with eating disorders, including medical care, nutritional intervention, mental health treatment, and care coordination. *Pediatrics* 2010;126: 1240–1253

David S. Rosen, MD, MPH and THE COMMITTEE ON ADOLESCENCE

KEY WORDS

anorexia nervosa, bulimia nervosa, eating disorders

ABBREVIATIONS

AN—anorexia nervosa
BN—bulimia nervosa
DSM-IV-TR—*Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revision*
HPA—hypothalamic-pituitary-adrenal
SSRI—selective serotonin-reuptake inhibitor

The guidance in this report does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

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Laboratory/Diagnostic Testing

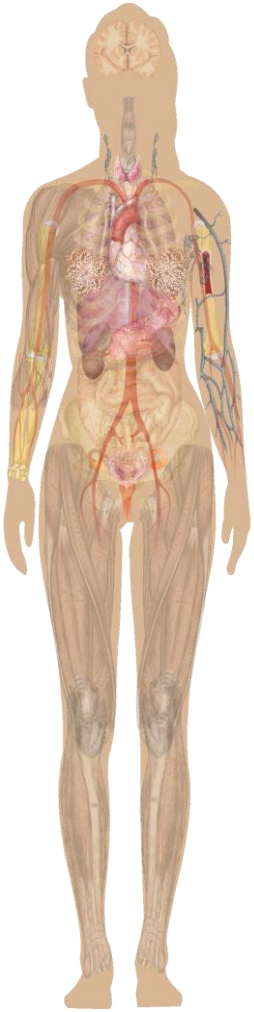
<u>Tests to consider:</u>

- *ECG*
  - Rate, Rhythm, Voltages, QTc
- *Bone Mineral Density*
- *Blood Work*
  - CBC + differential
  - Electrolytes – Sodium, Potassium, Chloride, Calcium, Phosphate, Magnesium
  - Hormone Screen – FSH, LH, Estradiol, Prolactin
  - Liver/Kidney Screen
  - TSH
  - ESR

Physical exam

Vital signs: ↓HR, ↓BP, ↓T

Growth parameters:
↓weight or fluctuations
height arrest
↓ BMI



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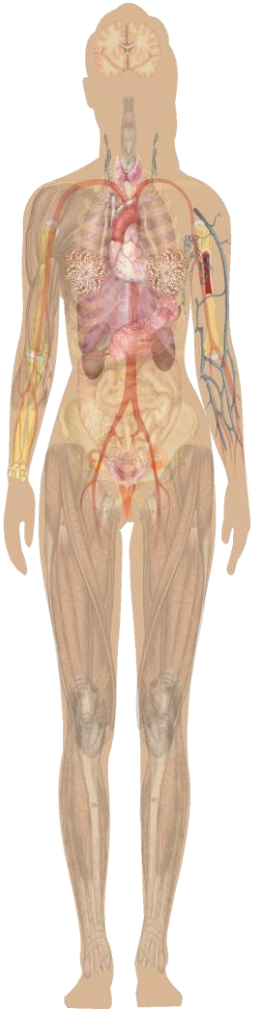
$$BMI = \frac{\text{weight (kg)}}{\text{height}^2\ \text{(m)}}$$



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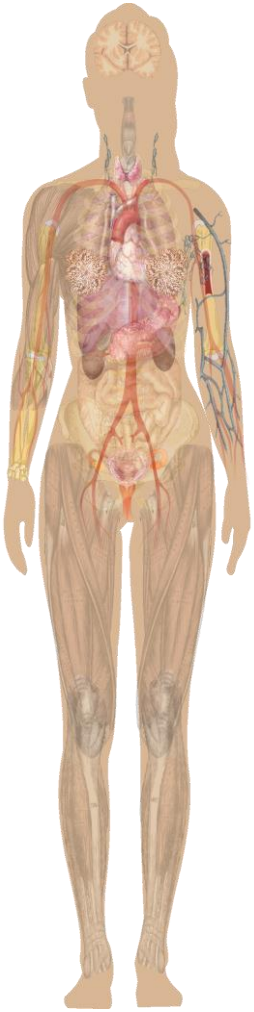
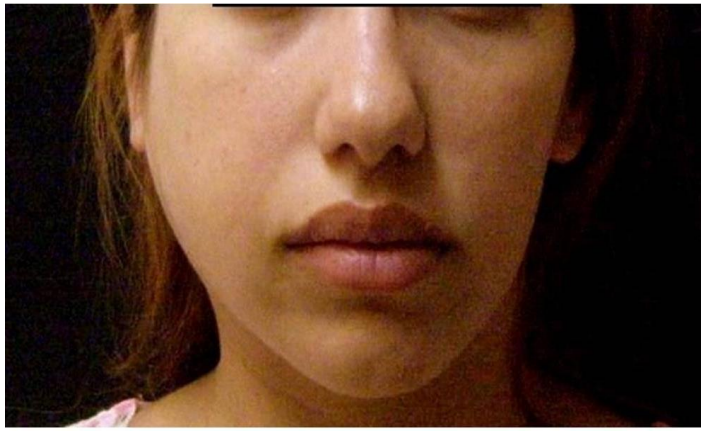


HEENT: hair loss, parotitis, dental enamel erosion



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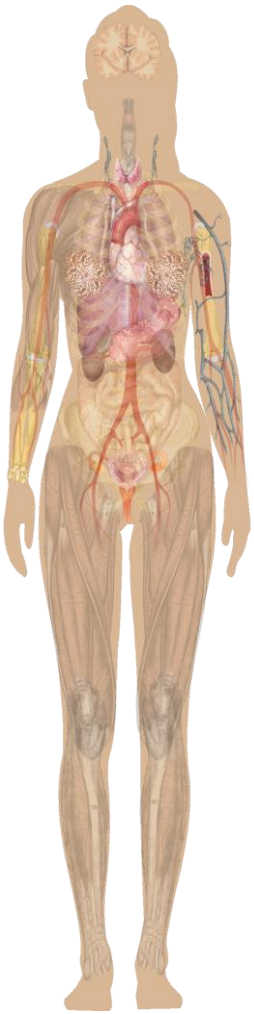

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CVS: delayed capillary refill >3s, faint peripheral pulses, acrocyanosis/cold extremities

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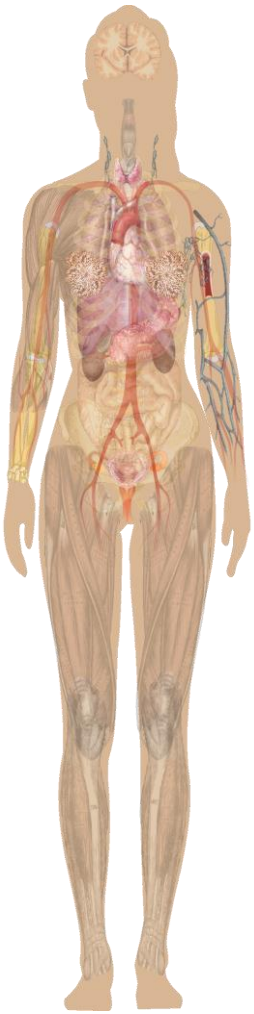

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Chest: delayed Tanner staging

GU: delayed Tanner staging

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Growth parameters:
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height arrest
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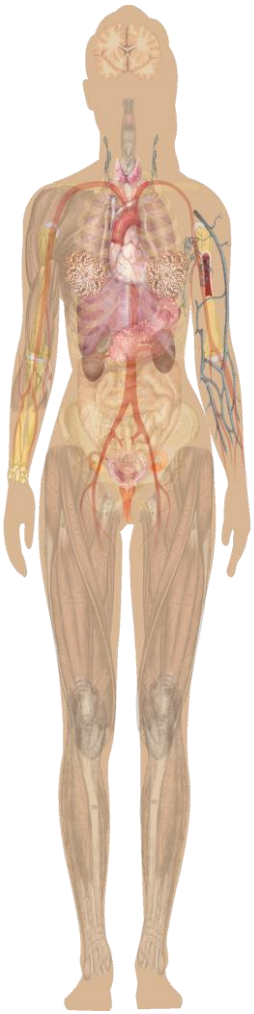

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Chest: delayed Tanner staging

GI: ↓BS, stool masses

GU: delayed Tanner staging

Physical exam

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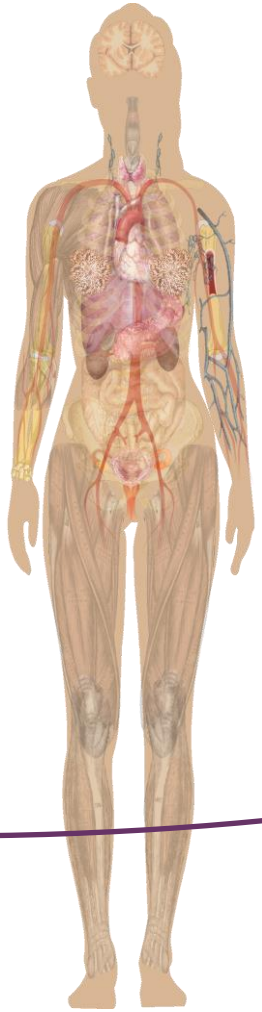

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Derm: dry skin, lanugo, yellowish skin, knuckles calluses

Physical exam

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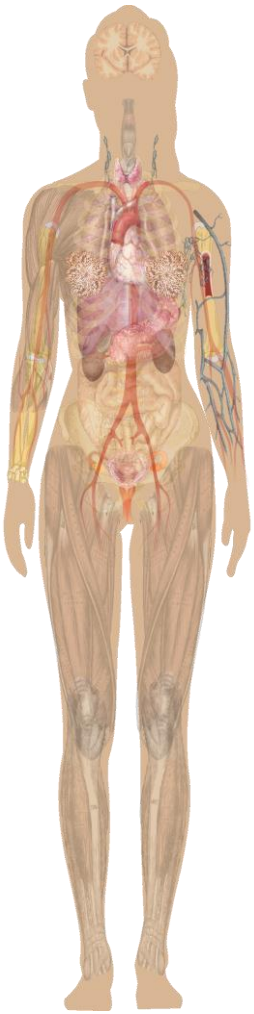

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Lanugo hair

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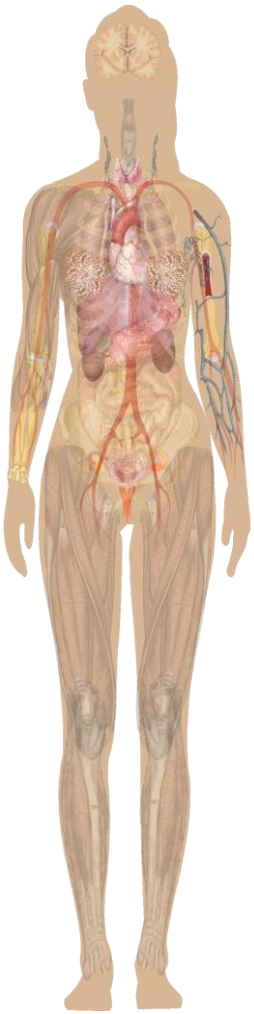

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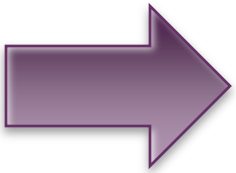
MSK: muscle/fat wasting

Medical Complications

Unique medical complications



- Cardiovascular
- Metabolic
- Gastrointestinal
- Pubertal delay/interruption
- Osteoporosis
- Growth Impairment
- Structural brain changes

Medical Complications

Unique medical complications

- Cardiovascular
- Metabolic
- Gastrointestinal
- Pubertal delay/interruption
- Osteoporosis
- Growth Impairment
- Structural brain changes

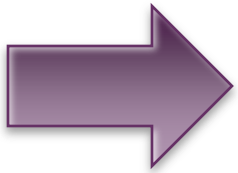
Cardiovascular Complications

- Functional and structural cardiac abnormalities:
  - *Electrocardiographic*
    - Sinus bradycardia
    - Decreased voltage
    - Prolonged QTc
    - Ventricular arrhythmias
  - *Orthostatic hypotension*
  - *Mitral valve prolapse*
  - *Silent pericardial effusion*

Katzman DK. Medical complications in adolescents with anorexia nervosa: A review of the literature. *International journal of eating disorders,* 2005.

Medical Complications

Unique medical complications



Cardiovascular

Metabolic

Gastrointestinal

Pubertal delay/interruption

Osteoporosis

Growth Impairment

Structural brain changes

Metabolic complications

Refeeding syndrome

- *'clinical and metabolic derangements that can occur during the refeeding of a malnourished patient'*
  - Surge of insulin with reintroduction of carbohydrates, shifts in fluid and electrolytes from extracellular to intracellular spaces
    - Main biochemical marker = hypophosphatemia (also hypokalemia, hyponatremia, hypomagnesemia, hypoglycemia)
      - Nadir usually in first week of refeeding
      - Correlates with BMI
    - Clinical features – cardiac arrhythmias, cardiac failure, muscle weakness, hemolytic anemia, delirium, seizures, coma, sudden death

Ornstein RM. Hypophosphatemia during nutritional rehabilitation in anorexia nervosa: implications for refeeding and monitoring. *Journal of adolescent health, 2003.*

Metabolic complications

Refeeding syndrome

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  - Surge of insulin with reintroduction of carbohydrates, shifts in fluid and electrolytes from extracellular to intracellular spaces
    - Main biochemical marker = **hypophosphatemia** (also hypokalemia, hyponatremia, hypomagnesemia, hypoglycemia)
      - Nadir usually in ***first week*** of refeeding
      - Correlates with BMI → **Highest risk <70% BMI**
    - Clinical features – cardiac arrhythmias, cardiac failure, muscle weakness, hemolytic anemia, delirium, seizures, coma, sudden death

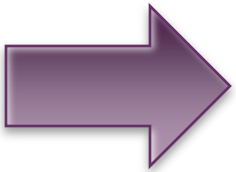
cardiac, neurologic, hematologic

Monitored refeeding with daily bloodwork for first 5 – 7 days of admission

Ornstein RM et al. Hypophosphatemia during nutritional rehabilitation in anorexia nervosa: implications for refeeding and monitoring. *Journal of adolescent health, 2003.*

Medical Complications

Unique medical complications



Cardiovascular

Metabolic

Gastrointestinal

Pubertal delay/interruption

Osteoporosis

Growth Impairment

Structural brain changes

Gastrointestinal Problems

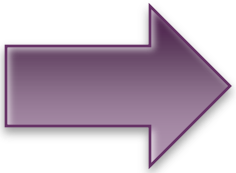
- GI symptoms frequent in eating disorders
- 80% report one or more severe GI complaints
  - delayed gastric emptying
  - constipation
  - superior mesenteric artery syndrome
  - elevated liver enzymes
  - acute pancreatitis
  - complications of vomiting

Common

Rare

Medical Complications

Unique medical complications



Cardiovascular

Metabolic

Gastrointestinal

Pubertal delay/interruption

Osteoporosis

Growth Impairment

Structural brain changes

Pubertal delay/interruption

- Eating disorders have variable impact on puberty
- Prepubertal onset
  - Absence of pubertal development
  - Failure of growth
  - Growth may be affected prior to the discovery of the ED
- Premenarchal onset
  - Causes arrest of pubertal development, which is most severe if weight loss occurs during the early stages of puberty
  - Menarche may be delayed beyond the normal age
- Postpubertal
  - Amenorrhea/irregular menstrual function

Pubertal delay/interruption

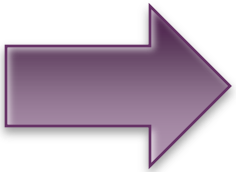
Return of menses

- Ideal body weight and return of menses:
  - Weight needs to be ~ 90% of ideal body weight
  - Weight needs to be 2 kg more than the weight at which menses was lost (menstrual threshold weight)
  - Serum estradiol level >100 pmol/L (30 pg/mL) at follow up
- 86% of adolescents with AN who achieved goal resumed menses within 6 months

Golden NH et al. Resumption of menses in anorexia nervosa. *Archives of Pediatrics & Adolescent Medicine*, 1997.

Medical Complications

Unique medical complications



Cardiovascular

Metabolic

Gastrointestinal

Pubertal delay/interruption

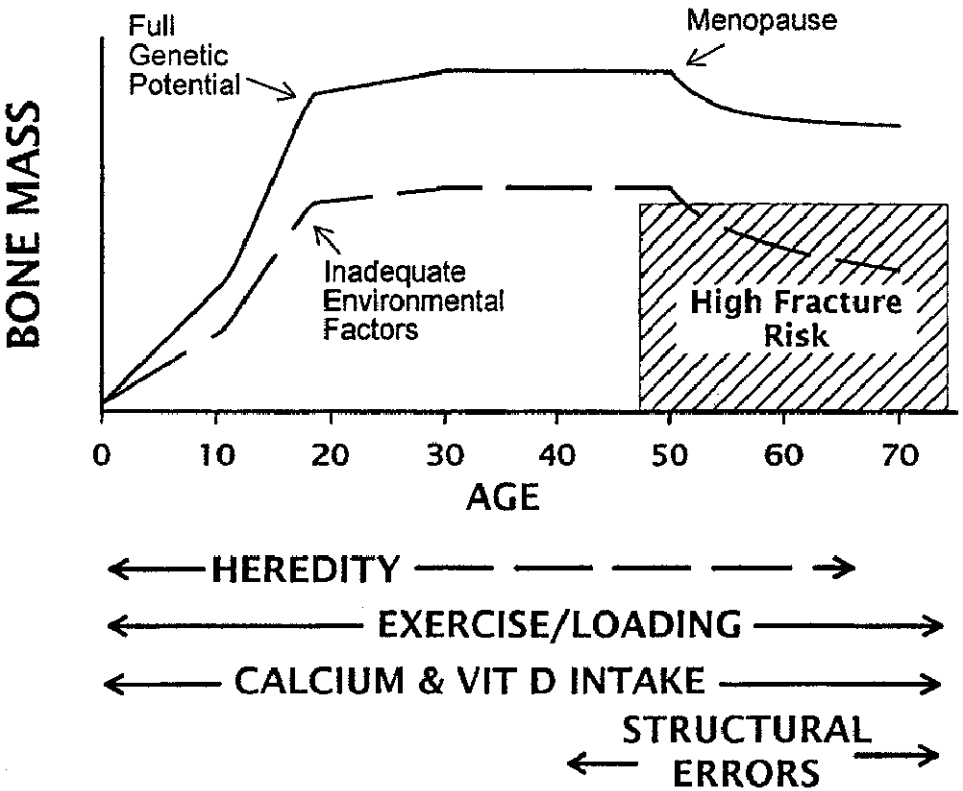
Osteoporosis

Growth Impairment

Structural brain changes

Peak bone mass

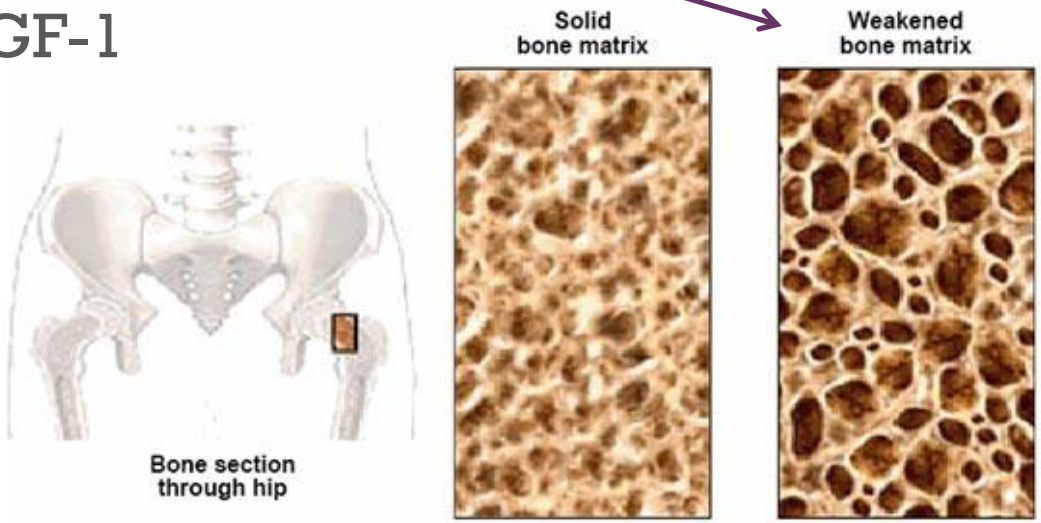
- Peak bone mass = highest level of bone mass achieved as result of normal growth
  - Timing varies, usually shortly after puberty between ages 17 – 22, then stable until third decade of life, with steady decline of ~1% annually



Heaney RP, Peak bone mass. *Osteoporosis International*, 2000.
Steelman J, Osteoporosis in Pediatrics. *Pediatrics in Review*, 2001.

Bone Mass in anorexia nervosa

- Poor nutrition
- Sex steroid deficiency
- Increased cortisol levels
- Decreased levels of IGF-1
- Low calcium intake
- Low vitamin D intake
- Low body mass



Osteoporosis

- Serious, frequent, and early consequence of AN
- May impose life-long limitations
- Associated with considerable morbidity
  - Commonly a "silent" condition in adolescence
  - 7-fold increase in the risk of nonspinal fractures

Katzman DK. Medical complications in adolescents with anorexia nervosa: A review of the literature. *International journal of eating disorders,* 2005.

Treatment for low BMD in AN

Oral co

BMD may not be fully recoverable

Weight restoration

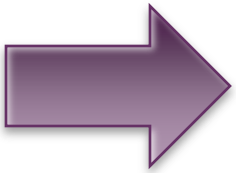
Bisphos ates

Optimal intervention is one that promotes weight restoration early before bone mineral loss has occurred

Mehler PS, 'Osteoporosis'. Eating Disorders: A guide to medical care and complications, 2010

Medical Complications

Unique medical complications



Cardiovascular

Metabolic

Gastrointestinal

Pubertal delay/interruption

Osteoporosis

Growth Impairment

Structural brain changes

Impact of AN on Growth

- Children and adolescents with AN may present with:
  - Growth failure or short stature
- Dramatic alteration in the GH–IGF axis
  - Low serum levels of IGF-1
  - Low growth-hormone-binding protein
  - State of growth-hormone resistance
- Indices of growth hormone normalize with weight recovery
- Studies inconsistent with respect to
  - Gain some height
  - Have complete catch-up growth
  - Fail to grow

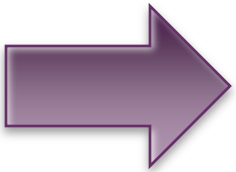
Katzman DK. Medical complications in adolescents with anorexia nervosa: A review of the literature. *International journal of eating disorders,* 2005.

Linear growth

- Early-onset eating disorders:
  - predispose to impaired linear growth
  - present with growth failure or short stature
  - inadequate weight gain and growth retardation may precede weight loss
  - catch-up growth with weight restoration varies
- Mechanism complex
  - interplay between malnutrition and growth impairment

Medical Complications

Unique medical complications



Cardiovascular

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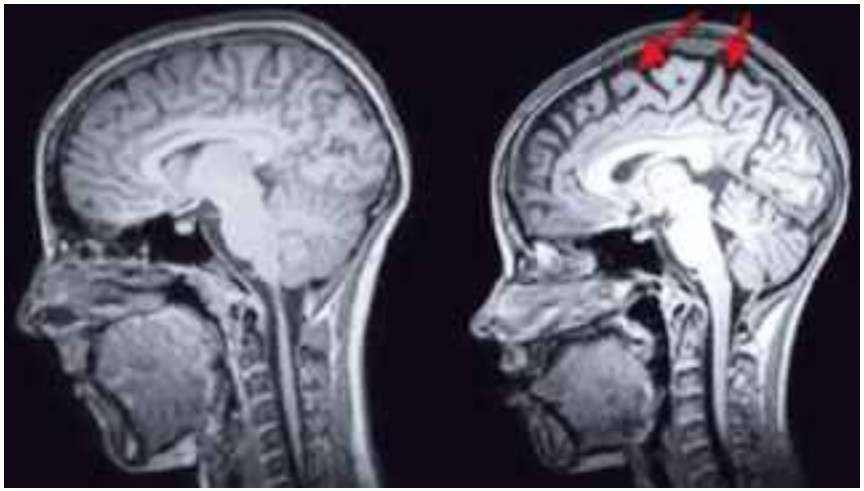
Structural brain changes

Structural Brain Changes in Adolescents With AN

- Adolescent females with AN
  - Have larger CSF volumes compared to healthy adolescent controls
  - Have deficits in cortical gray and white brain matter
  - Degree of gray matter and sulcal enlargement is related to the degree of starvation
  - Primary or secondary to the disorder?



Katzman DK et al. A Longitudinal Magnetic Resonance Imaging Study of Brain Changes in Adolescents With Anorexia Nervosa. *Archives of Pediatrics & Adolescent Medicine,* 1997.

Structural Brain Changes in Adolescents With AN

- Cross-sectional and longitudinal MRI studies reveal *(Katzman, 1997; Lambe, 1997)*
  - Persisting brain abnormalities after weight recovery
    - Larger sulcal CSF volumes
    - Smaller gray matter volumes
- Brain abnormalities may not be fully reversible

Katzman DK et al. A Longitudinal Magnetic Resonance Imaging Study of Brain Changes in Adolescents With Anorexia Nervosa. *Archives of Pediatrics & Adolescent Medicine,* 1997.

Eating disorder?

Case 1

- After a careful history and physical examination, you determine that your patient likely meets criteria for Anorexia Nervosa – Restrictive subtype
- What next???

Eating disorder treatment

- Outpatient therapy
  - Current standard of care is Family-based Therapy (FBT) for anorexia nervosa
- Day programs
- Inpatient intensive services
  - **medically unstable
- Residential services

Indications for hospitalization

Table 1. Indications for Hospitalization in an Adolescent With an Eating Disorder

One or more of the following justify hospitalization:

1. Severe malnutrition (weight ≤75% average body weight for age, sex, and height)
2. Dehydration
3. Electrolyte disturbances (hypokalemia, hyponatremia, hypophosphatemia)
4. Cardiac dysrhythmia
5. Physiological instability
   - Severe bradycardia (heart rate < 50 beats/minute daytime; <45 beats/minute at night)
   - Hypotension (< 80/50 mm Hg)
   - Hypothermia (body temperature < 96° F)
   - Orthostatic changes in pulse (> 20 beats per minute) or blood pressure (>10 mm Hg)
6. Arrested growth and development
7. Failure of outpatient treatment
8. Acute food refusal
9. Uncontrollable binging and purging
10. Acute medical complications of malnutrition (e.g., syncope, seizures, cardiac failure, pancreatitis, etc.)
11. Acute psychiatric emergencies (e.g., suicidal ideation, acute psychosis)
12. Comorbid diagnosis that interferes with the treatment of the eating disorder (e.g., severe depression, obsessive compulsive disorder, severe family dysfunction)

Impaired growth & development

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Impaired growth & development

Fluid & metabolic abnormalities

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Cardiac abnormalities

Behavioural

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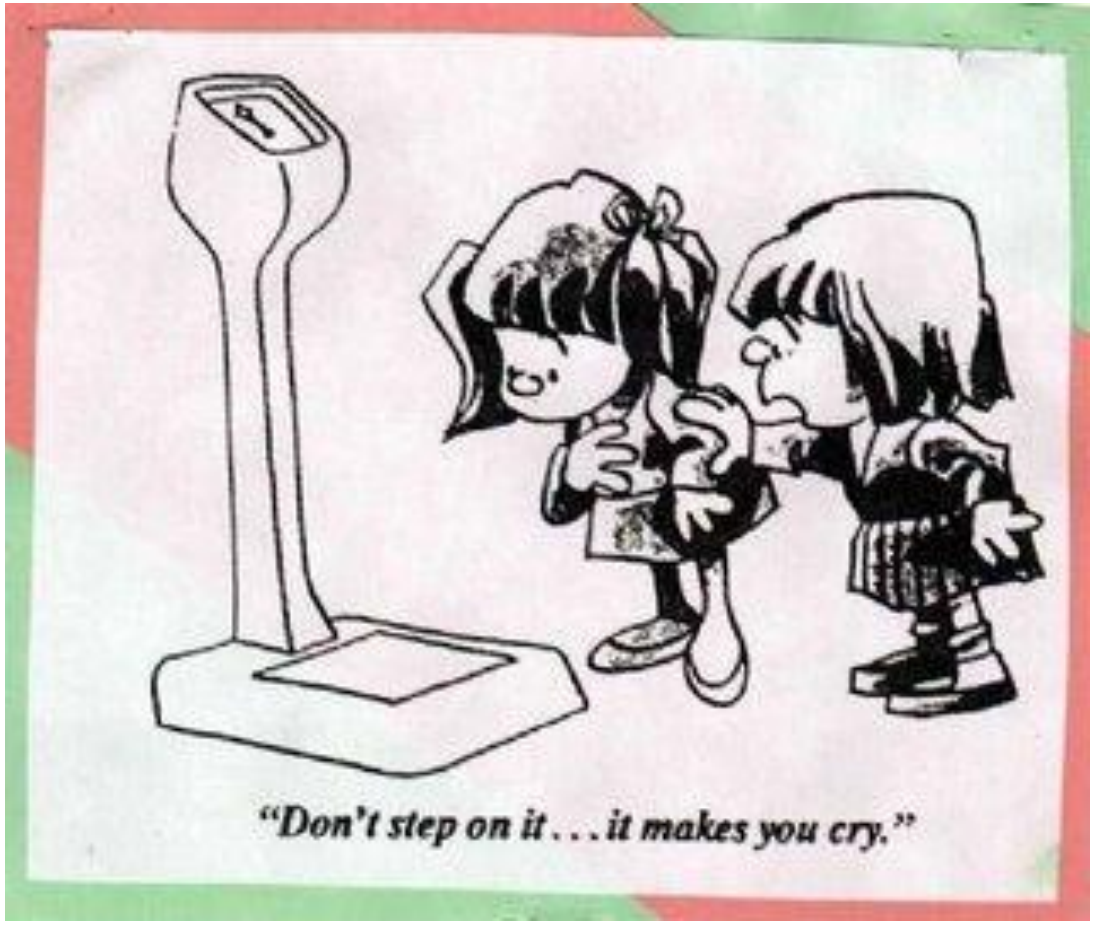
Great – the ED assessment waitlist is long…

1. Call Adolescent Health physician on call at CHEO – triage referrals
2. Use outpatient psychologists
3. Dietitian referrals
4. Follow closely

Questions? Comments?



Video-conferencers:
Unmute your system to ask a question

Webcasters:
Type your question

Thank you!

for participating in today's

Pediatric Telehealth Rounds

Join us next time:

with Dr. Jason Brophy for

Tics & Lyme Disease

May 8th, 2015

pedtelehealthrounds@cheo.on.ca