



# Eating Disorders:

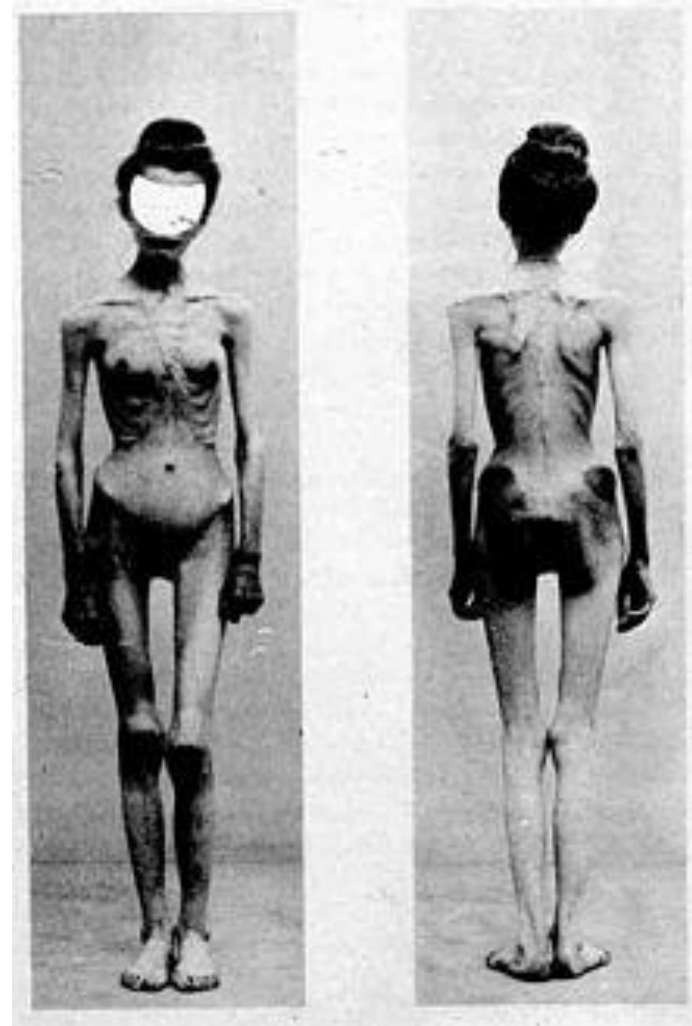
Identification and Treatment

Michelle Jorgensen MD

Sanford Health System

Eating Disorder Unit

# History of Eating Disorder



# In the Media



# Eating Disorders



- ...a spectrum of overlapping conditions requiring both medical and mental health interventions
- Eating disorders rank among the 10 leading causes of disability among young women
- Anorexia Nervosa has highest mortality rate of any psychiatric disorder
- Eating disorders have higher prevalence than type 1 diabetes in youth

# Subtypes of Eating Disorders



- Anorexia Nervosa
- Bulimia nervosa
- Avoidant Restrictive Food Intake Disorder (ARFID)
- Binge eating disorder
- Other specified Feeding or Eating Disorder
  - PICA
  - Rumination Disorder



# Epidemiology



- 8 million have eating disorders in the United States
- Peaks of onset: 14, 18
- *Males represent 25% of individuals with AN and BN and 36% of those with BED*


# Kent



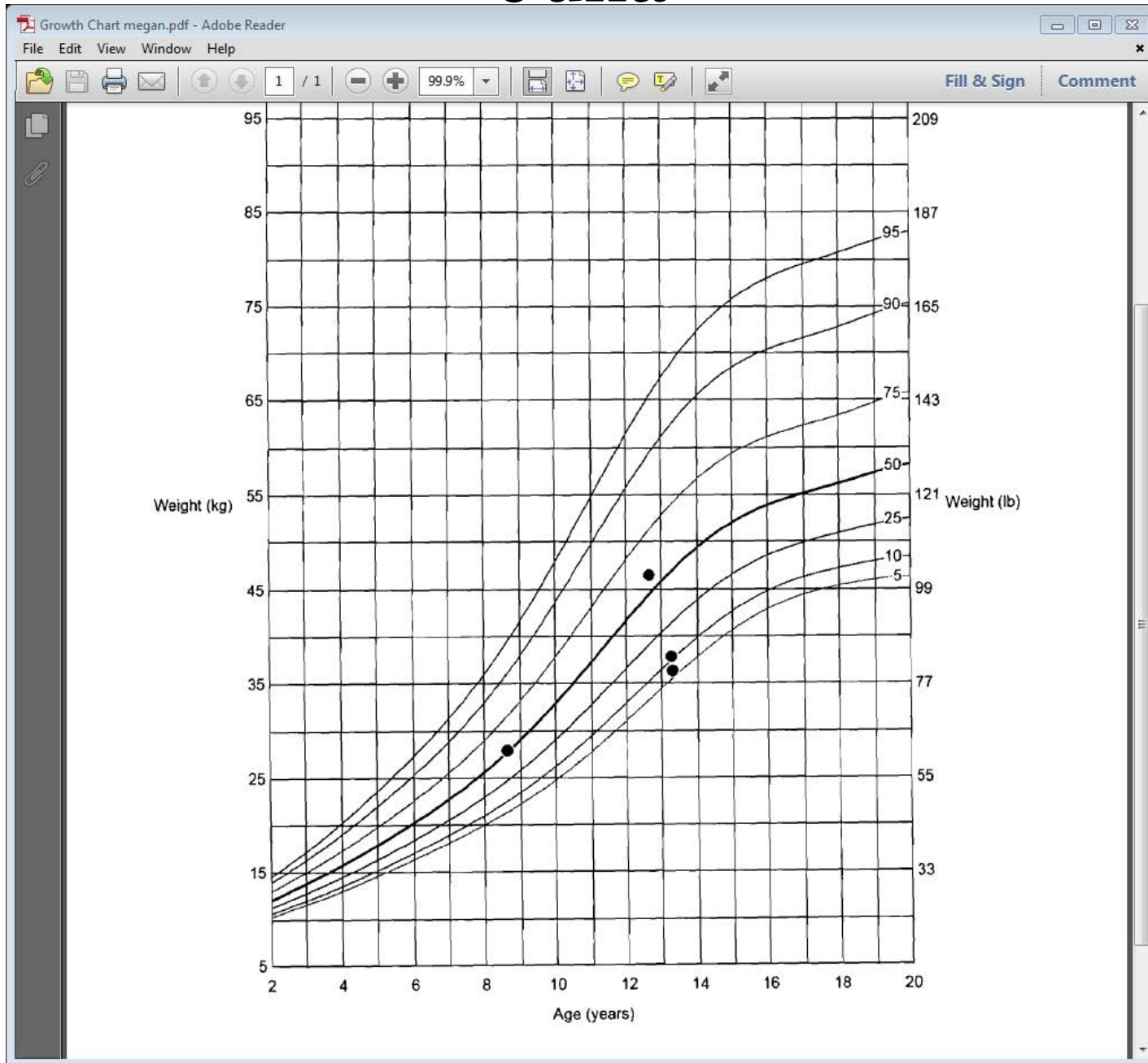
- Freshman in college
- Presented to Student Health with syncope
- Holter monitor HR 25 with 3 second pauses overnight



# How common?

- 
- Anorexia: .5 - 1%
  - Bulimia: 1 - 3%
  - Binge Eating Disorder: 2 - 5%
  - ARFID ?
  - Problematic Eating Behaviors: 15 - 40%

# Julia



# EKG Tracings

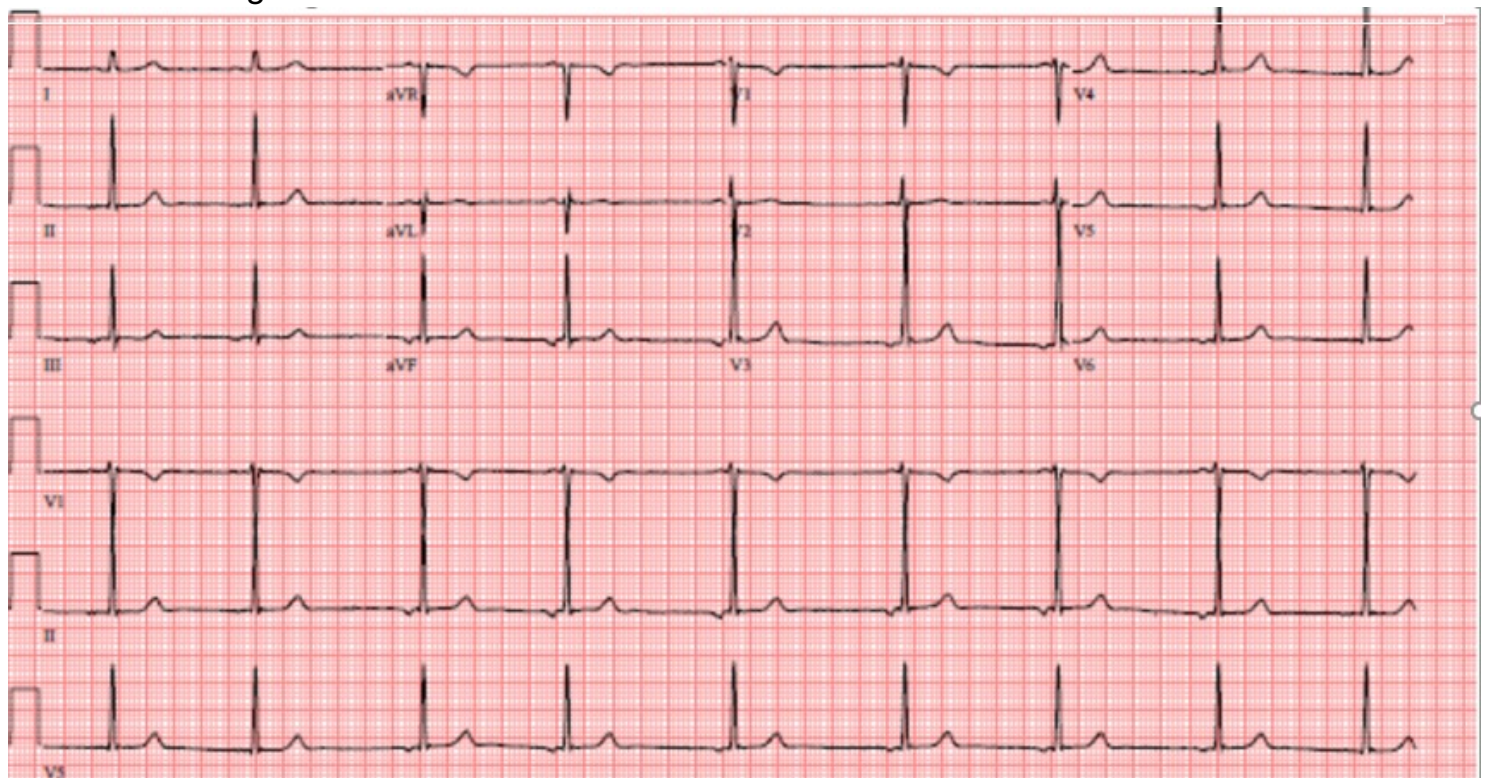
□ KGLik

## Component 1: ~~1:1~~

### WAVEFORM

Low right atrial bradycardic rhythm with varying Pwave morphology No previous tracing available

Ventricular Rate:	53 BPM
Atrial Rate:	53 BPM
P-R Interval:	140 ms
QRS Duration:	84 ms
Q-T Interval:	436 ms
QTc Calculation(Bazett):	409 ms
Calculated P Axis:	-79 degrees
Calculated R Axis:	78 degrees
Calculated T Axis:	51 degrees



# Anorexia Nervosa

- 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.
- Intense fear of gaining weight or of becoming fat, or persistent behaviour that interferes with weight gain, even though at a significantly low weight.
- 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 recognition of the seriousness of the current low body weight.
- Specify whether:  
Restricting type:  
Binge-eating/purging type

# Metropolitan Tables Ideal Body Weight -1959 Female

Height	Small Frame	Medium Frame	Large Frame
4'09"	90-97	94-106	102-118
4'10"	92-100	97-109	105-121
4'11"	95-103	100-112	108-124
5'00"	98-106	103-115	111-127
5'01"	101-109	106-118	114-130
5'02"	104-112	109-122	117-134
5'03"	107-115	112-126	121-138
5'04"	110-119	116-131	125-142
5'05"	114-123	120-135	129-146
5'06"	118-127	124-139	133-150
5'07"	122-131	128-143	137-154
5'08"	126-136	132-147	141-159
5'09"	130-140	136-151	145-164
5'10"	133-144	140-155	149-169

# BMI Chart

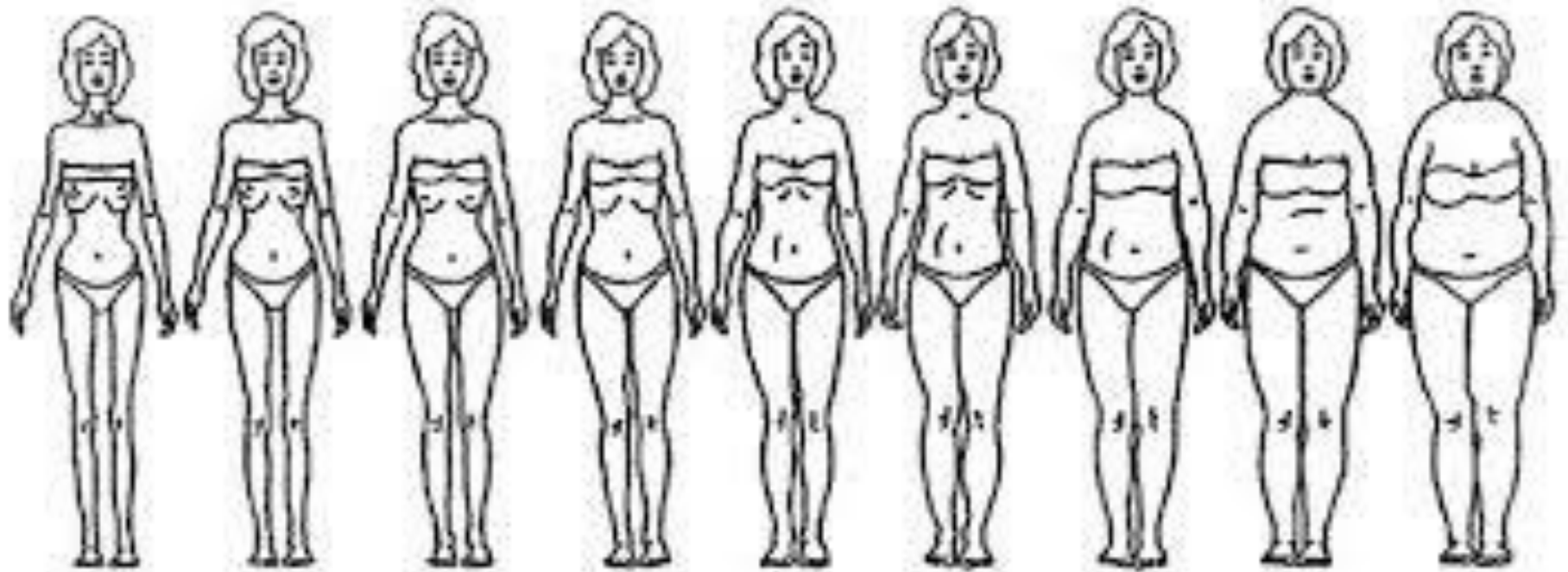
WEIGHT lbs	100	105	110	115	120	125	130	135	140	145	150	155	160	165	170	175	180	185	190	195	200	205	210	215
kgs	45.5	47.7	50.0	52.3	54.5	56.8	59.1	61.4	63.6	65.9	68.2	70.5	72.7	75.0	77.3	79.5	81.8	84.1	86.4	88.6	90.9	93.2	95.5	97.7
HEIGHT in/cm	Underweight	Healthy					Overweight					Obese					Extremely obese							
5'0" - 152.4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
5'1" - 154.9	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	36	37	38	39	40
5'2" - 157.4	18	19	20	21	22	22	23	24	25	26	27	28	29	30	31	32	33	33	34	35	36	37	38	39
5'3" - 160.0	17	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	32	32	33	34	35	36	37	38
5'4" - 162.5	17	18	18	19	20	21	22	23	24	24	25	26	27	28	29	30	31	31	32	33	34	35	36	37
5'5" - 165.1	16	17	18	19	20	20	21	22	23	24	25	25	26	27	28	29	30	30	31	32	33	34	35	35
5'6" - 167.6	16	17	17	18	19	20	21	21	22	23	24	25	25	26	27	28	29	29	30	31	32	33	34	34
5'7" - 170.1	15	16	17	18	18	19	20	21	22	22	23	24	25	25	26	27	28	29	29	30	31	32	33	33
5'8" - 172.7	15	16	16	17	18	19	19	20	21	22	22	23	24	25	25	26	27	28	28	29	30	31	32	32
5'9" - 175.2	14	15	16	17	17	18	19	20	20	21	22	22	23	24	25	25	26	27	28	28	29	30	31	31
5'10" - 177.8	14	15	15	16	17	18	18	19	20	20	21	22	23	23	24	25	25	26	27	28	28	29	30	30
5'11" - 180.3	14	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	25	26	27	28	28	29	30
6'0" - 182.8	13	14	14	15	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28	29
6'1" - 185.4	13	13	14	15	15	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27	28
6'2" - 187.9	12	13	14	14	15	16	16	17	18	18	19	19	20	21	21	22	23	23	24	25	25	26	27	27
6'3" - 190.5	12	13	13	14	15	15	16	16	17	18	18	19	20	20	21	21	22	23	23	24	25	25	26	26
6'4" - 193.0	12	12	13	14	14	15	15	16	17	17	18	18	19	20	20	21	22	22	23	23	24	25	25	26











# Anorexia Nervosa: Behavioral Signs



- Restrictive eating
- Odd food rituals
- Fear/avoidance of food situations
- Rigid exercise rituals
- Dressing in layers

# Megan

Glucose	89
Sodium	131** (135-145)
Potassium	2.8 ** (3.5 to 5.3)
Chloride	76** (99 to 110)
CO <sub>2</sub>	36** (20-29)
Anion Gap w/K	22** (6-20)
BUN	28** (6-22)
Creatinine	2.11
Calcium	9.2
Phosphorus	3.2
Magnesium	2.8** (.2-1.2)
ALT	13
AST	20
Total Protein	8.8** (3.5 to 5)
Amylase	215 ** (50-80)

## Component

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### EKG

#### WAVEFORM

Normal sinus rhythm

Prolonged QT interval or tu fusion, consider myocardial disease, electrolyte imbalance, or drug effects

Abnormal ECG

Ventricular Rate: 69 BPM

Atrial Rate: 69 BPM

P-R Interval: 142 ms

QRS Duration: 96 ms

Q-T Interval: 466 ms

QTC Calculation(Bazett): 499 ms

Calculated P Axis: 79 degrees

Calculated R Axis: 82 degrees

Calculated T Axis: 63 degrees

## Bulimia Nervosa- **DSM-5** Diagnostic Criteria

- A. Recurrent episodes of binge eating characterized by BOTH of the following:
  1. Eating in a discrete amount of time (within a 2 hour period)large amounts of food.
  2. Sense of lack of control over eating during an episode.
- B. Recurrent inappropriate compensatory behavior in order to prevent weight gain (purging).
- C. The binge eating and compensatory behaviors both occur, on average, at least once a week for three months.
- D. Self-evaluation is unduly influenced by body shape and weight.
- E. The disturbance does not occur exclusively during episodes of anorexia nervosa.

# Bulimia Nervosa: Behavioral Signs

- Binge eating (food gone, wrappers present)
- Eating in secret
- Avoidance of social situations with food
- Bathroom visits/showers after meals
- Abuse of diet pills/laxatives/diuretics
- Rigid/intense exercise

# Avoidant Restrictive Food Intake Disorder



Lack of interested in food, avoidance based on sensory characteristics, concern about aversive consequences of eating

- Weight loss or failure to achieve expected gains
- Significant nutritional deficiency
- Dependence on enteral feeding or oral nutritional supplements
- Marked interference with social functioning





# Risk Factors



- Genetics
- Age
- Race/Socioeconomic Status
- Family History/Genetics
- Societal Emphasis on Thinness
- Personality characteristics
- High risk activities

# Media Influences



- Thinspiration

- Pro ana

- Pro Mia

# SCOFF



- Do you make yourself **Sick** because you feel uncomfortably full?
- Do you worry you have lost **Control** over how much you eat?
- Have you recently lost more than **One** stone (14 lbs) in a 3 month period?
- Do you believe yourself to be **Fat** when others say you are too thin?
- Would you say that **Food** dominates your life?
- \*One point for every "yes"; a score of 2 indicates a likely case of anorexia nervosa or bulimia

**BED**



# AFRID



# RUMINATION



# PICA



# Comorbidity

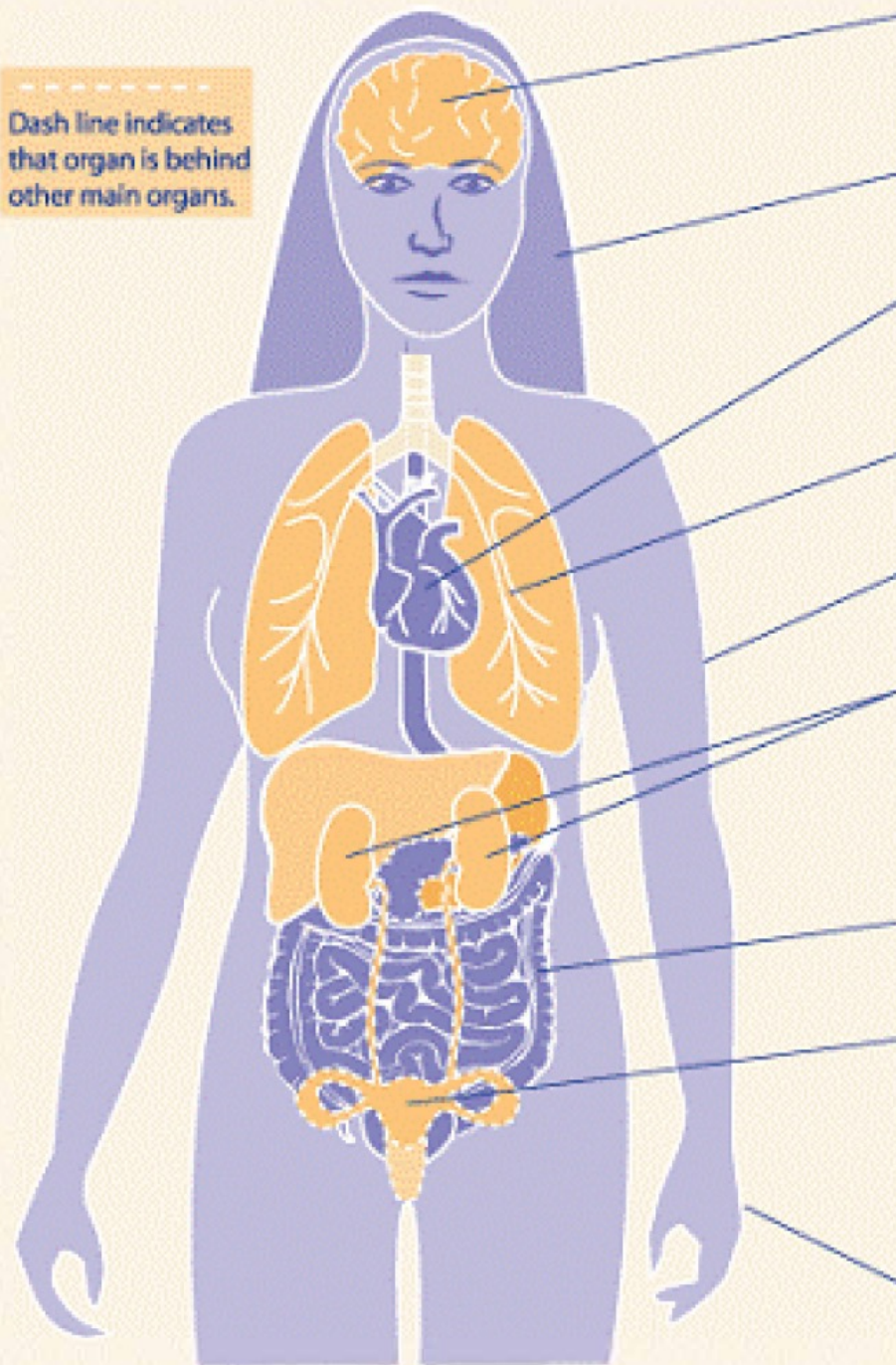


- Depression
- Anxiety
- Drugs/Alcohol
- ADHD
- Perfectionism/Low self-esteem
- Personality disorders
- Trauma



## Anorexia affects your whole body

Dash line indicates that organ is behind other main organs.



### **Brain and Nerves**

can't think right, fear of gaining weight, sad, moody, irritable, bad memory, fainting, changes in brain chemistry

### **Hair**

hair thins and gets brittle

### **Heart**

low blood pressure, slow heart rate, fluttering of the heart (palpitations), heart failure

### **Blood**

anemia and other blood problems

### **Muscles and Joints**

weak muscles, swollen joints, fractures, osteoporosis

### **Kidneys**

kidney stones, kidney failure

### **Body Fluids**

low potassium, magnesium, and sodium

### **Intestines**

constipation, bloating

### **Hormones**

periods stop, bone loss, problems growing, trouble getting pregnant. If pregnant, higher risk for miscarriage, having a C-section, baby with low birthweight, and post partum depression.

### **Skin**

bruise easily, dry skin, growth of fine hair all over body, get cold easily, yellow skin, nails get brittle

# Eating Disordered Behaviors



- Starvation
- Self Induced Vomiting
- Laxative Abuse
- Diuretic Abuse
- Diet Pills
- Ipecac Syrup
- Other Purging Behavior
  - Insulin Abuse
  - Prolonged Lactation
  - Enemas
  - Chewing and spitting
  - Rumination
  - Sweating

# Prevalence of behaviors in Eating Disorders



<b>Vomiting</b>	<b>90%</b>
<b>Laxatives</b>	<b>60%</b>
<b>Diet Pills</b>	<b>50%</b>
<b>Fasting</b>	<b>40%</b>
<b>Rumination</b>	<b>30%</b>
<b>Chew and Spit</b>	<b>20%</b>
<b>Diuretics</b>	<b>15%</b>
<b>Ipecac</b>	<b>8%</b>
<b>Enemas</b>	<b>7%</b>
<b>Saunas</b>	<b>5%</b>
<b>Water Loading</b>	<b>30%</b>

# Signs and Symptoms of Eating Disorders



- Russell's sign - scarring on back of hand from inducing vomiting



# Signs and Symptoms of Eating Disorders

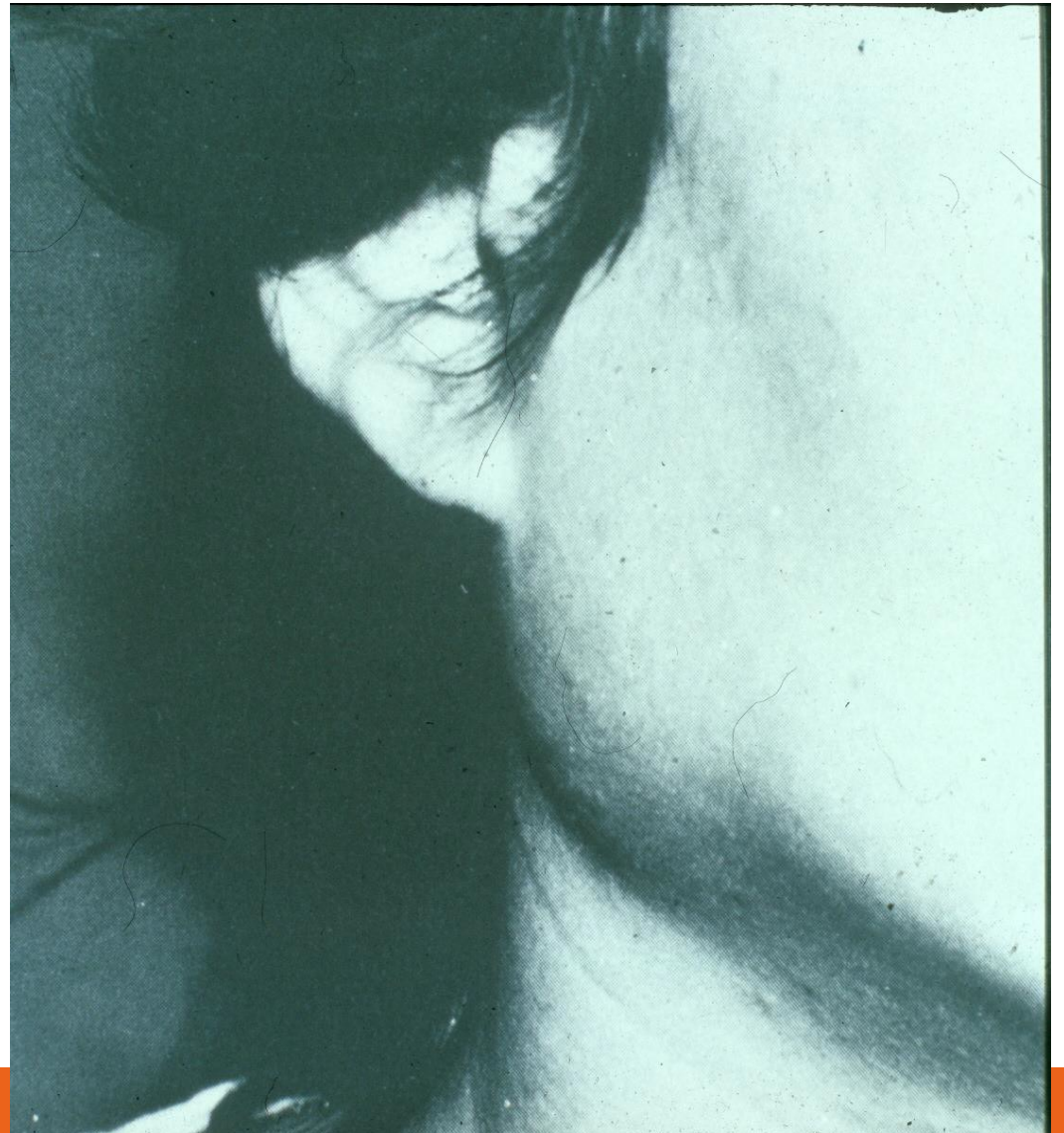
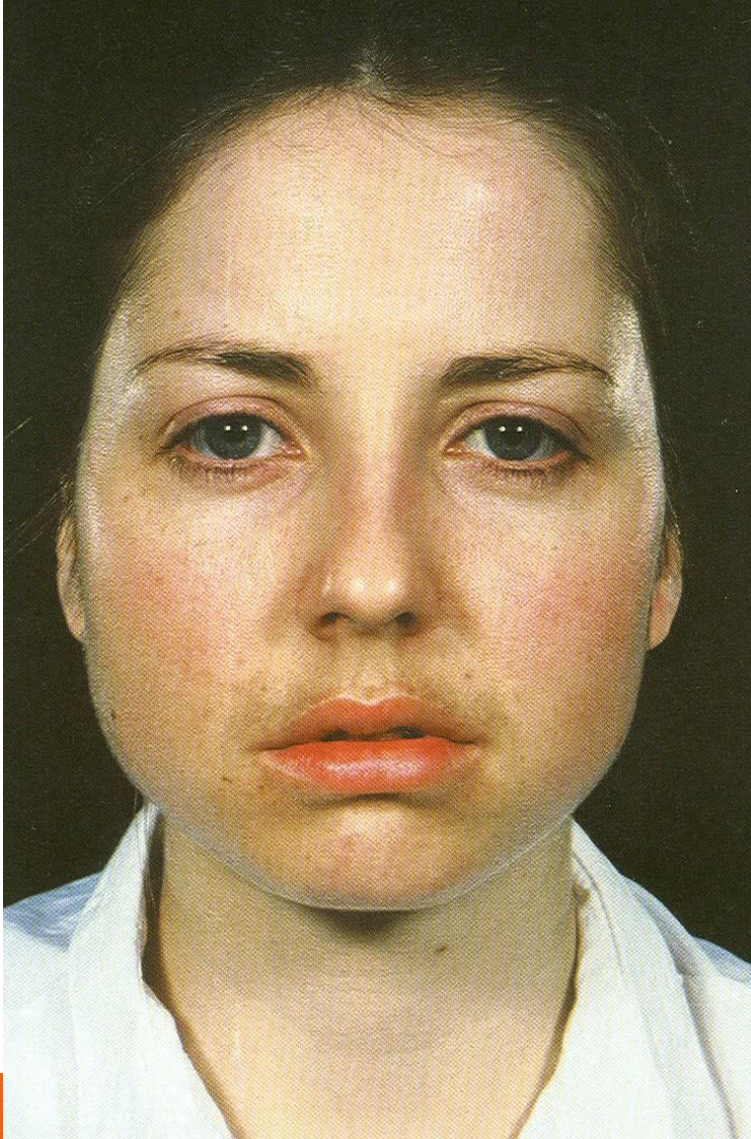


- Russell's sign
- Enlarged salivary glands – 10-66% of patients with Bulimia Nervosa
  - Cholinergic nerve stimulus from repetitive regurgitation
  - Work hypertrophy from high calorie consumption over short time periods
  - Chronic metabolic alkalosis
  - Increased autonomic stimulation secondary to stimulation lingual taste receptors by pancreatic proteolytic enzymes

# Signs and Symptoms of Eating Disorders



## Sialadenosis



# Treatment - Sialadenosis



- Stop Purging
- NSAIDS
- Hot Compress
- Tart candies – Altoid sours
- Antibiotics – if evidence of infection
- Pilocarpine 1.25 to 5 mg daily in TID doses
- Parotidectomy

# Sign and Symptoms of Bulimia Nervosa



- Russell's sign
- Enlarged salivary glands
- Angular cheilosis





HIV Web Study ([www.HIVwebstudy.org](http://www.HIVwebstudy.org))

*Supported by HRSA*

# Treatment Angular Cheiiosis

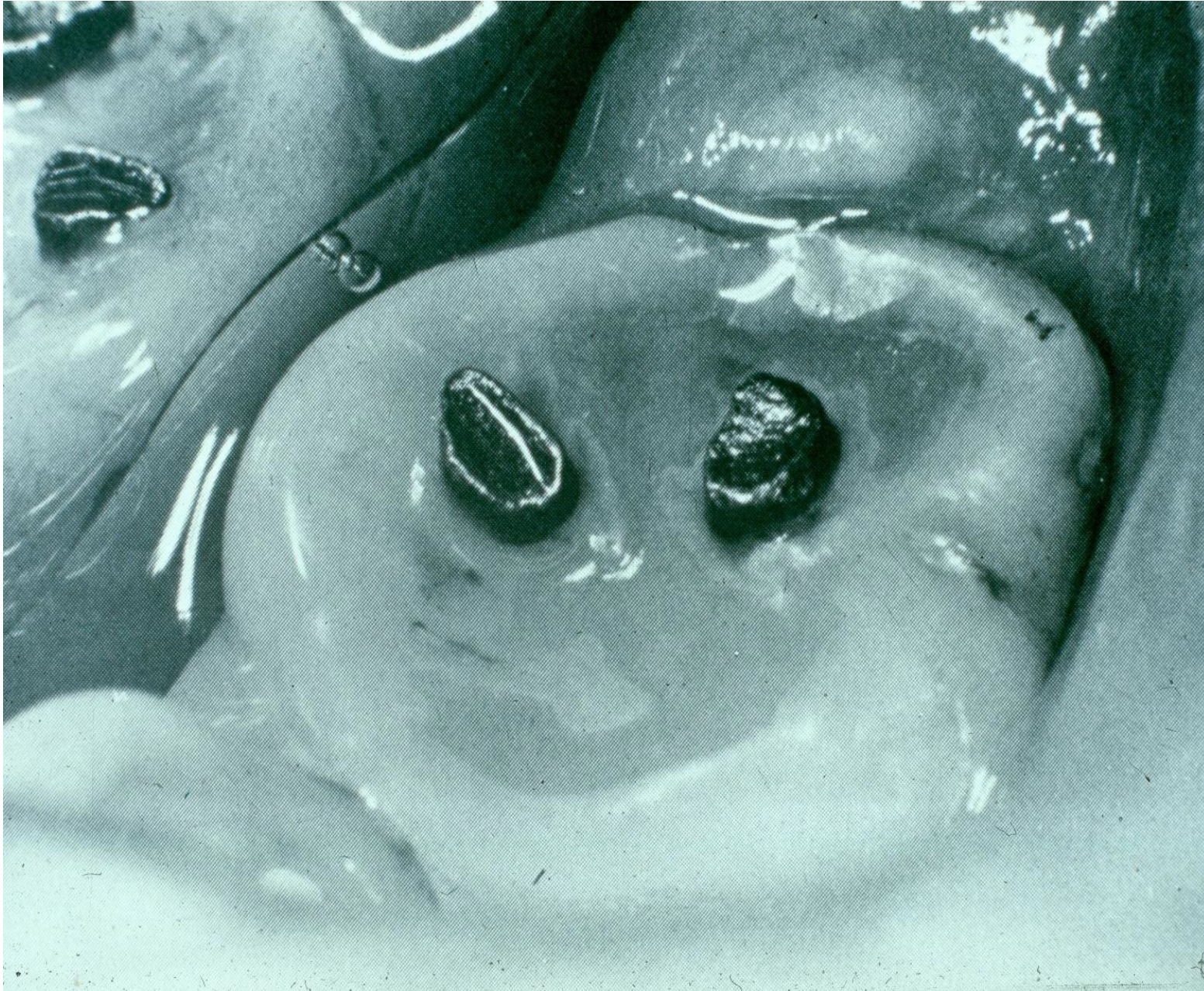


- Vitamin B complex
- Warm water- cover petroleum jelly

# Sign and Symptoms of Bulimia Nervosa



- Russell's sign
- Angular cheilosis
- Enlarged salivary glands
- Dental complications
  - erosions on upper teeth
  - predisposition to cavities
  - temperature sensitivity



Enamel  
Erosion

# Dental Care After Purging



- Brush Gently with flouride toothpaste
- Rinse with alkaline mouthwash
- Dental consult for pro-enamel toothpaste

# Sign and Symptoms of Bulimia Nervosa



- Russell's sign
- Enlarged salivary glands
- Dental complications
- Petechial hemorrhage cornea, soft palate or face



# Sign and Symptoms of Anorexia Nervosa

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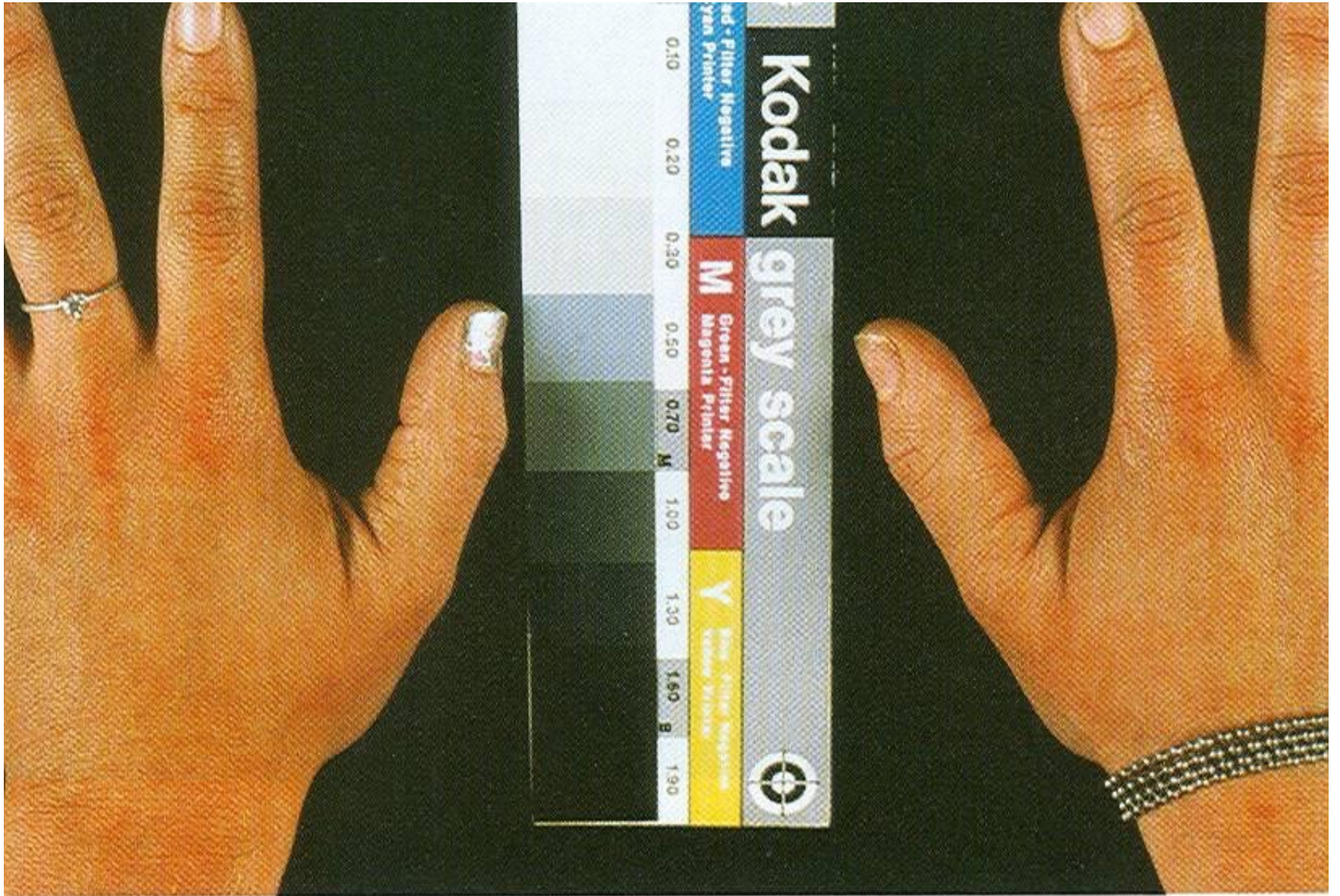


- Acrodermatitis
- Hypercarotenemia
- Acrocyanosis
- Muscles Wasting
- Lanugo



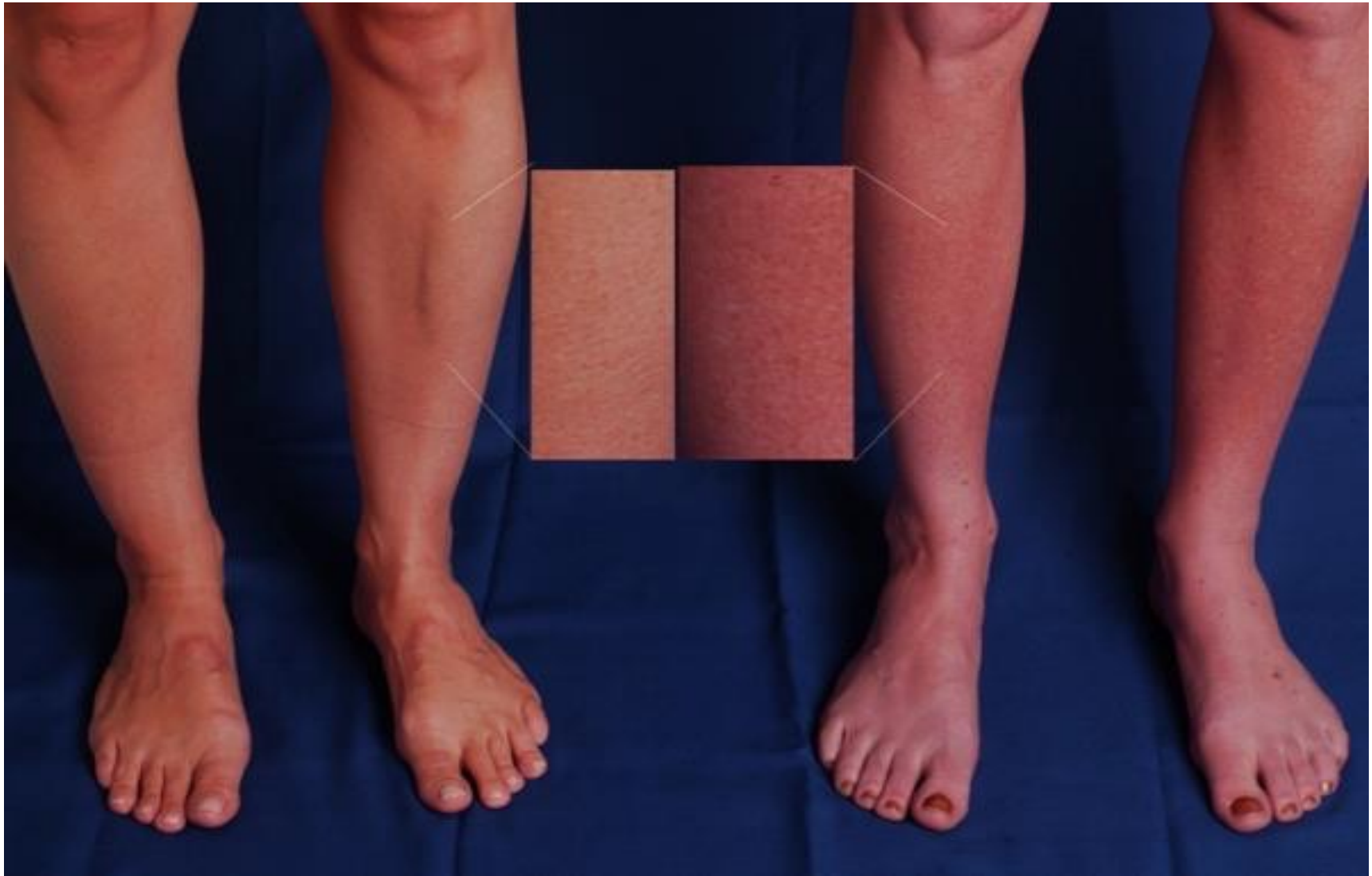
# Acrodermatitis



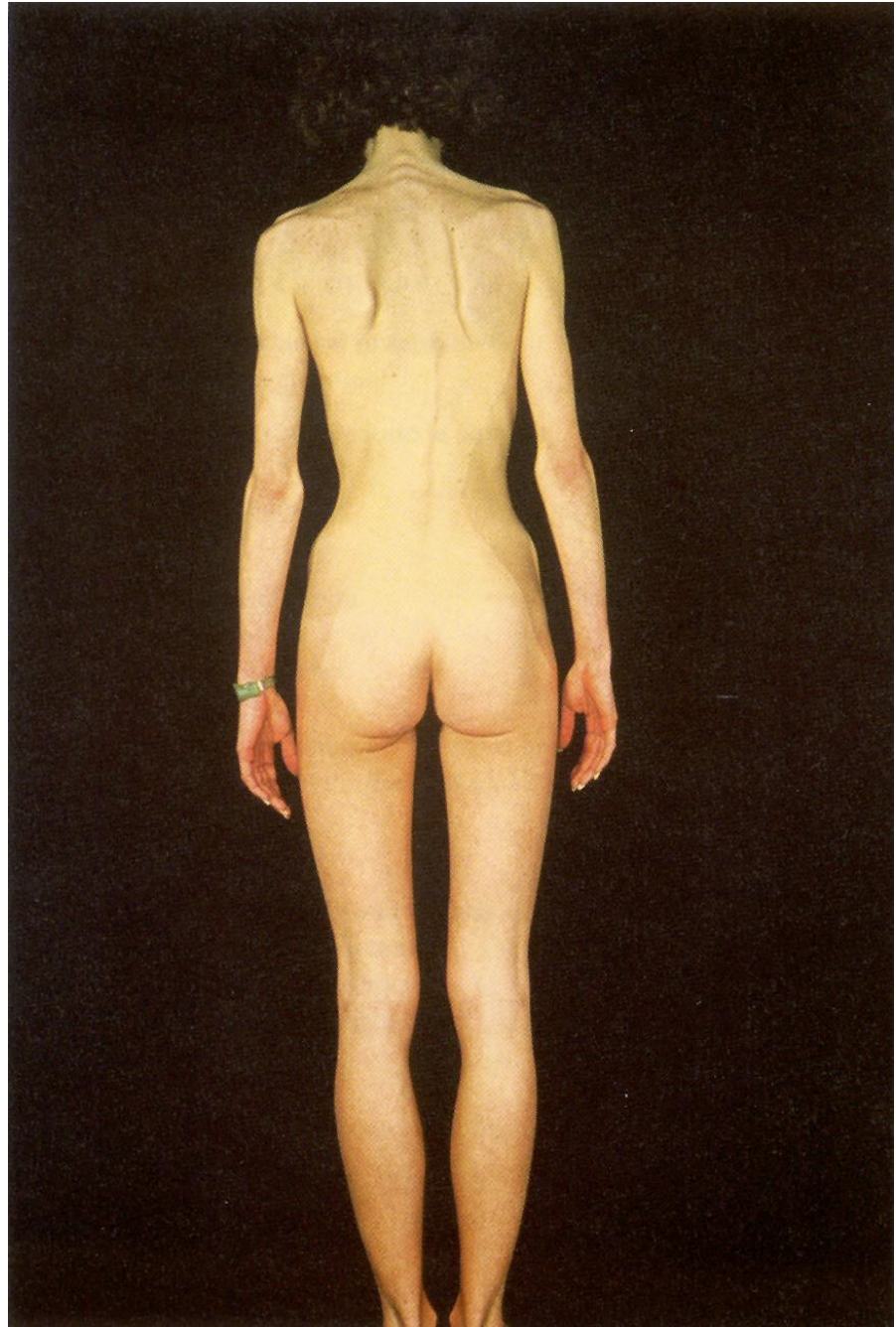


Hypercarotenemia

# Acrocyanosis



# Wasting





# Muscle Wasting

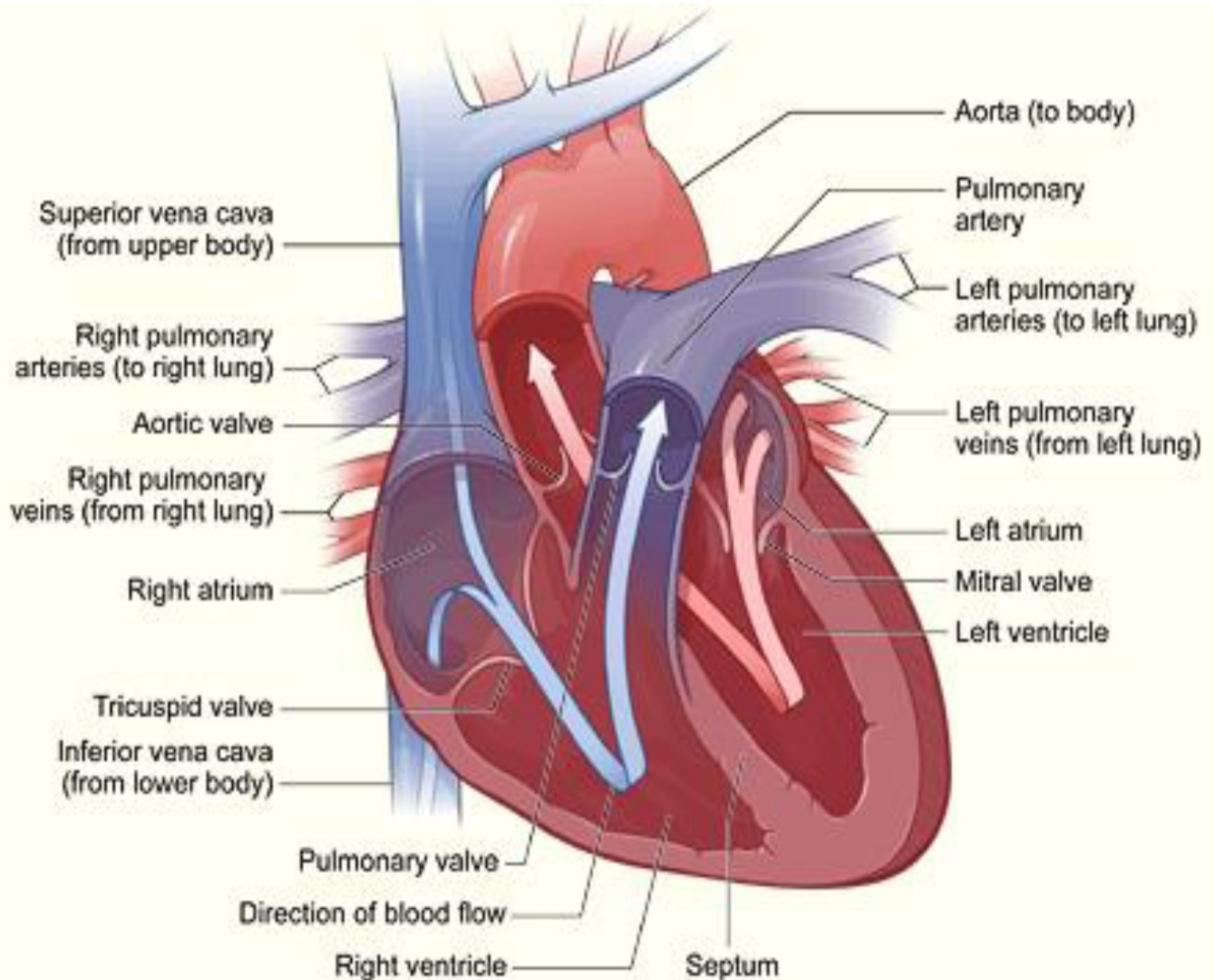


Lanugo

# Brain Effects



- Pseudoatrophy – enlargement of cerebral spinal fluid spaces. Partly reversible with refeeding
- Reduced seizure threshold - electrolyte disturbance
- Cerebral hypoperfusion - reduced blood flow





# Cardiovascular Complications



- Structural changes –
  - decreased cardiac mass
  - mitral valve prolapse (30 to 50% patients with severe anorexia)
- Rhythm Changes
  - QTc Prolongation
  - QT dispersion
- Heart Rate
  - Bradycardia
  - Tachycardia
- Hypotension
- Sudden Cardiac Death

# Cardiovascular

	<u>AN</u>	<u>BN</u>
<b>Bradycardia</b>	++	--
<b>Tachycardia</b>	(+)	+
<b>Hypotension</b>	++	+
<b>Arrhythmias</b>	(+)	(+)
<b>Mitral Valve Prolapse</b>	+	(+)
<b>Myopathy</b>	(+)	(+)

# Functional Abnormalities

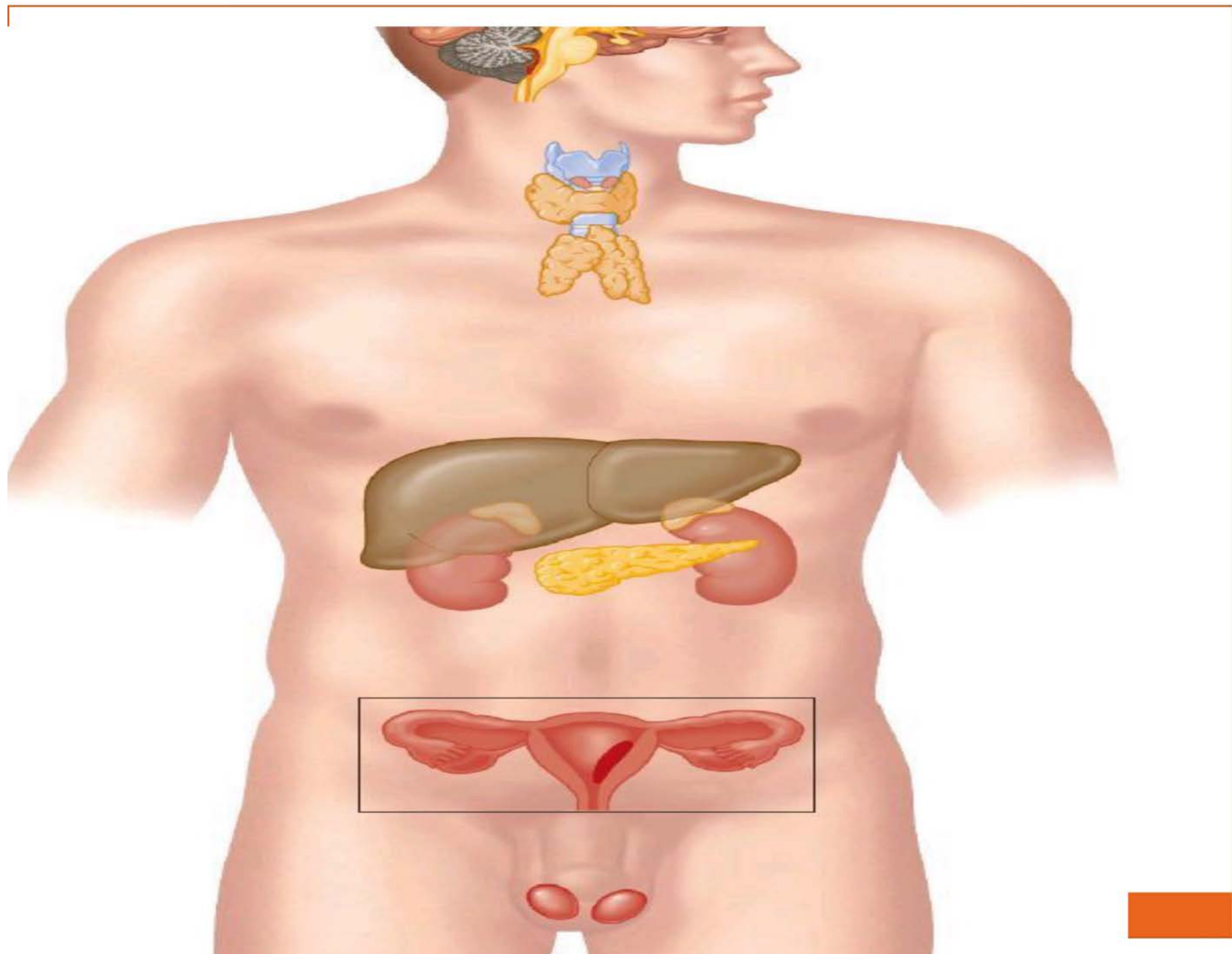


- Decreased cardiac contractility with lower ejection fraction
- Decreased exercise capacity with blunted blood pressure response
- Orthostatic Hypotension
- Hypotension

# Treatment of Cardiac Complications

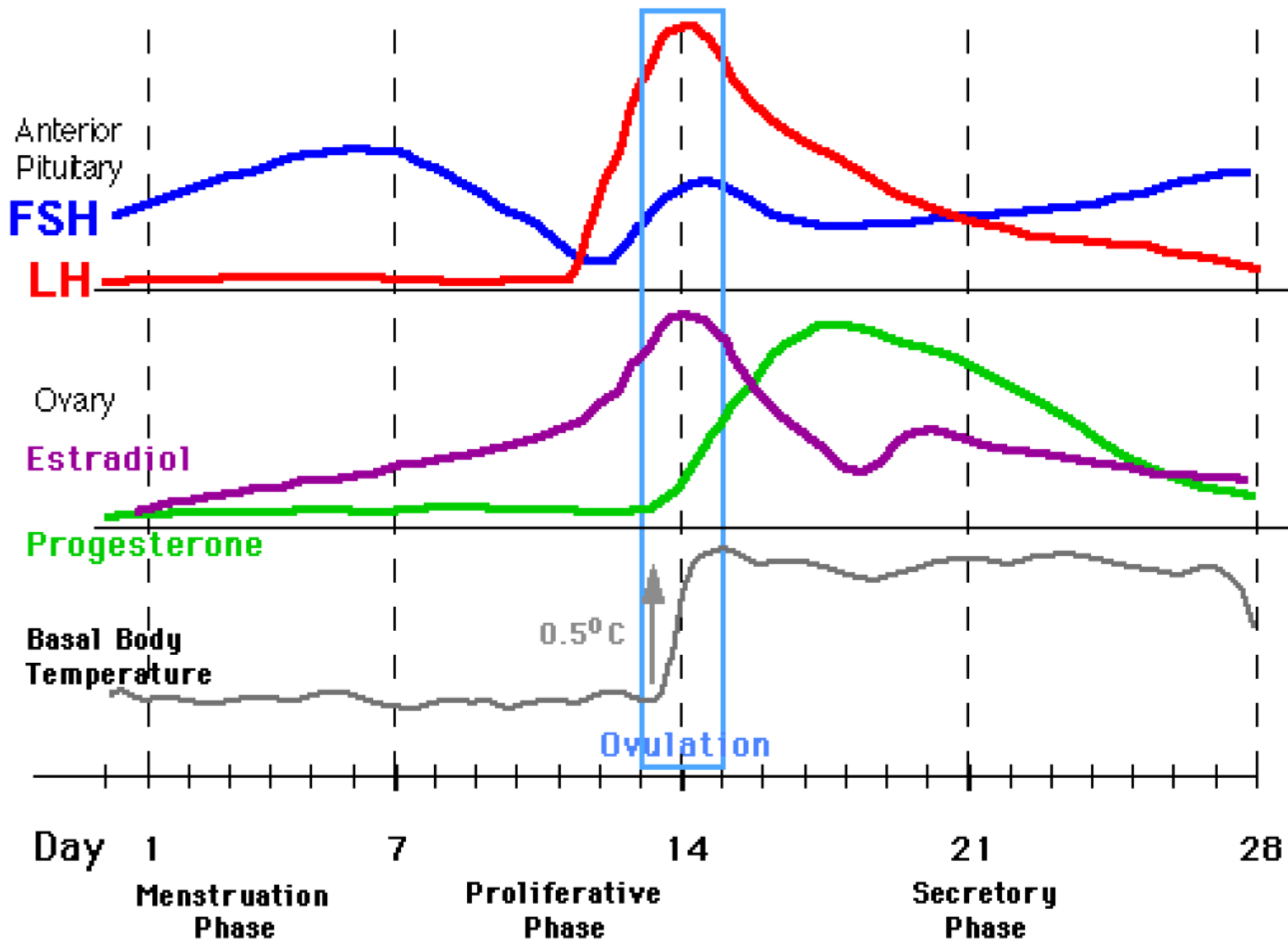


- EKG at admission
- Telemetry for HR  $<40$  or QTc  $> 440$
- HR  $<30$  overnite waken
- Encourage fluid
- Liberal salting



# Neuroendocrine

		<u>AN</u>	<u>BN</u>
<b>Adrenal (Cortisol)</b>		↑	( ↑ )
<b>Thyroid</b>	<b>T4</b>	↓	--
	<b>T3</b>	↓	↓
	<b>RT3</b>	↑	( ↑ ? )
<b>Ovarian</b>	<b>Estrogen</b>	↓ ↓	↓
	<b>Progesterone</b>	↓ ↓	↓
	<b>LH/FSH</b>	↓ ↓	↓



# Bone



- Osteopenia/Osteoporosis
- Growth Retardation



# Osteoporosis



- Definitions:
  - Osteopenia: bone mineral density 1-2.5 S.D. below age matched controls
  - Osteoporosis: 2.5 S.D. or greater
- Seen in over 60% of AN patients and many patients with past history of A
- Starts within 6 months of weight loss

# Osteoporosis DX



- Dexa Scan lumbar spine and hip when reach goal weight.

# Treatment of Osteopenia/porosis

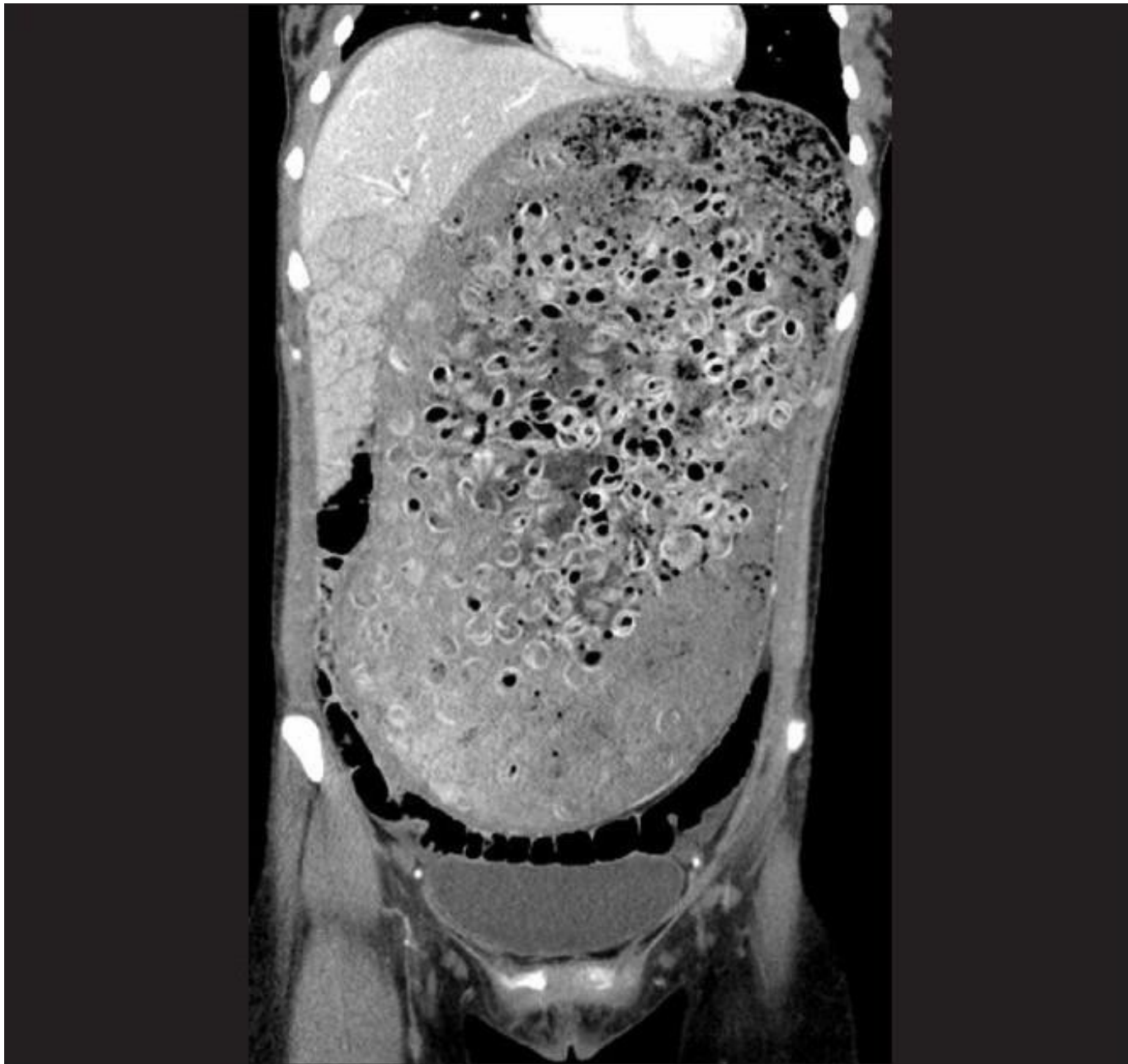


- Oral contraceptives
  - No difference in bone mass from controls
  - Small subset of patients have no further loss
  - Not recommended to treat amenorrhea
- Bisphosphonates
  - No significant improvement
  - Increase fetal anomalies in future pregnancies
- Calcium
- Weight bearing activity

# Gastrointestinal

	<u>AN</u>	<u>BN</u>
<b>Dental Erosion</b>	+	++
<b>Sialadenosis</b>	++	+
<b>Esophageal Rupture</b>	(+)	(+)
<b>Delayed Gastric Emptying</b>	++	+
<b>Superior Mesenteric Artery Syndrome</b>	(+)	-
<b>Gastric Rupture</b>	(+)	(+)
<b>Constipation / Diarrhea</b>	++	++
<b>G.I. Bleeding</b>	(+)	(+)





# Gastric Motility/Fullness



- Metoclopramide 5 to 10mg TID
- Prochlorperazine 5 to 10 mg TID
- Ondansetron 8mg daily
- Omeprazole 20mg BID
- Simethicone 180mg TID

# Bowel Regimen



- Psyllium Fiber twice daily/Power Pudding QID
- Colace 200mg BID
- Magnesium Hydroxide 2400 mg daily
- Miralax 17gm in 8 oz fluid QID
- Lactulose 30ml QID
- Glycerin suppository
- Fleets Enema
- GoLyteLy



# Renal

	<u>AN</u>	<u>BN</u>
<b>Impaired Concentration</b>	<b>++</b>	<b>(+?)</b>
<b>↓ GFR</b>	<b>+</b>	<b>(+)</b>

# Hepatitis



- Refeeding hepatitis

# Electrolytes



- Dehydration
  - dizzy, lightheaded, weak
- Hypokalemia
  - generalized weakness, reduced gut motility, cardiac arrhythmia
- Hypophosphatemia
  - muscle weakness, fatigue, congestive heart failure, respiratory failure
- Hypomagnesemia
  - Muscle cramp, weakness, unfocused vision, impaired short term memory, heart arrhythmias
- Hypoglycemia
  - Seizure, Stupor, Coma

# Replacement



- Potassium
- Phosphorus
- Magnesium
- Glucose

# Refeeding Edema



- Elevate feet
- TED hose
- Increase protein content

# Hematology



- Hemoconcentration
- Hemolytic anemia secondary to hypophosphatemia

# Heme

	<u>AN</u>	<u>BN</u>
<b>WBC</b>	↓	--
<b>Lymphocytes</b>	↓ ( Rel ↑ )	--
<b>Platelets</b>	) ↓ (	--
<b>Cytokines</b>	+ / -	( - ? )
<b>Bone marrow hypoplasia</b>	+	

# Permanent Sequelae



- Dental Enamel
- Growth Retardation
- Bone Demineralization
- CNS Changes?
- Other?



# Fatalities – Anorexia Nervosa



- Suicide
- Multiple organ system failure
- Arrhythmias
- Fluid/Electrolytes
- Refeeding Heart Failure
- Hypophosphatemia
- Hypomagnesemia
- Ipecac
- Renal Failure

# Fatalities – Bulimia Nervosa



- Suicide
- Gastric Rupture
- Esophageal Rupture
- Fluid / Electrolyte
- Ipecac
- Renal Failure

AED REPORT 2016 | 3RD EDITION



# EATING DISORDERS

A GUIDE TO  
**MEDICAL CARE**

Critical Points for Early Recognition & Medical Risk  
Management in the Care of Individuals with Eating Disorders

[WWW.AEDWEB.ORG](http://WWW.AEDWEB.ORG)

# Initial workup



- Low Weight (BMI 18.5 or less, significant drop on growth curve)
  - Comprehensive Metabolic Profile
  - Magnesium
  - Phosphorus
  - TSH
  - Sedimentation rate
  - Vitamin B 12
  - Complete Blood Count
  - Electrocardiogram
  - Urine Drug Screen
  - Urinalysis with Culture
  - Urine Pregnancy
  - If BMI < 16 add Complement 3 and fasting thiamine level

# Initial Workup - Purging



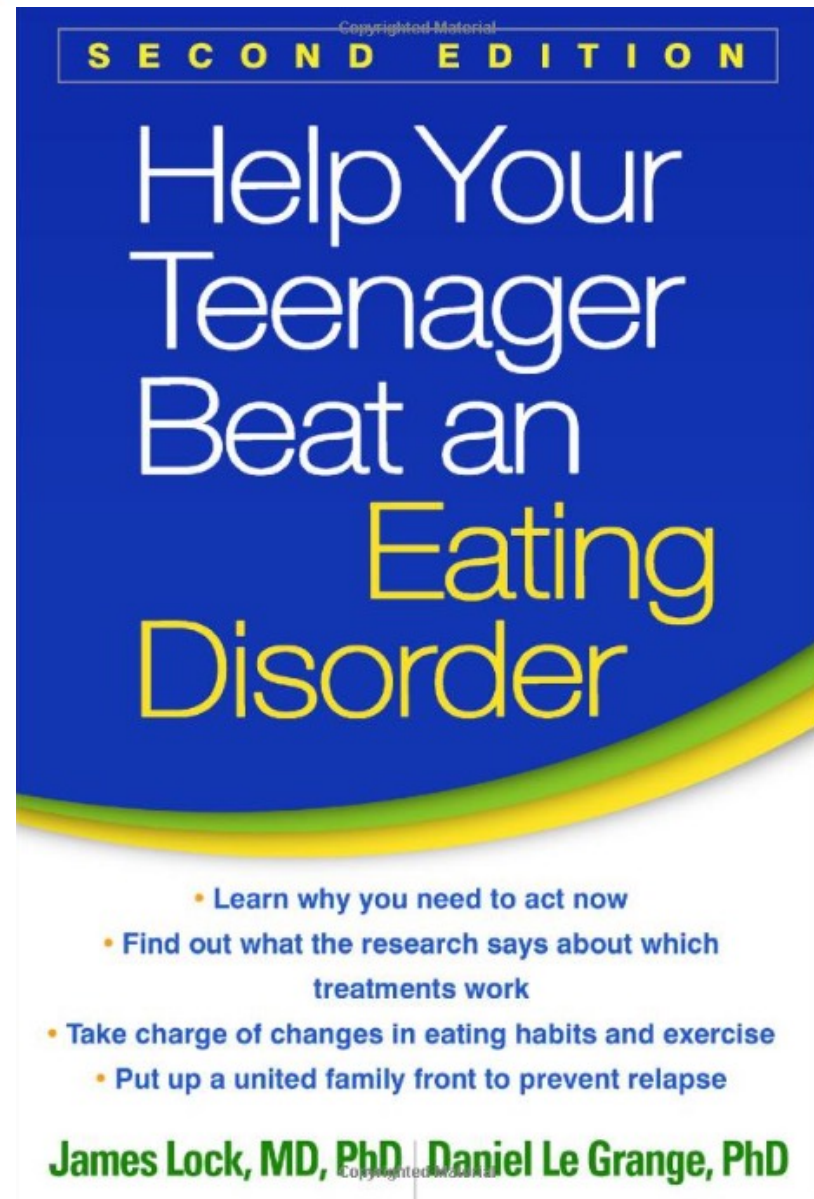
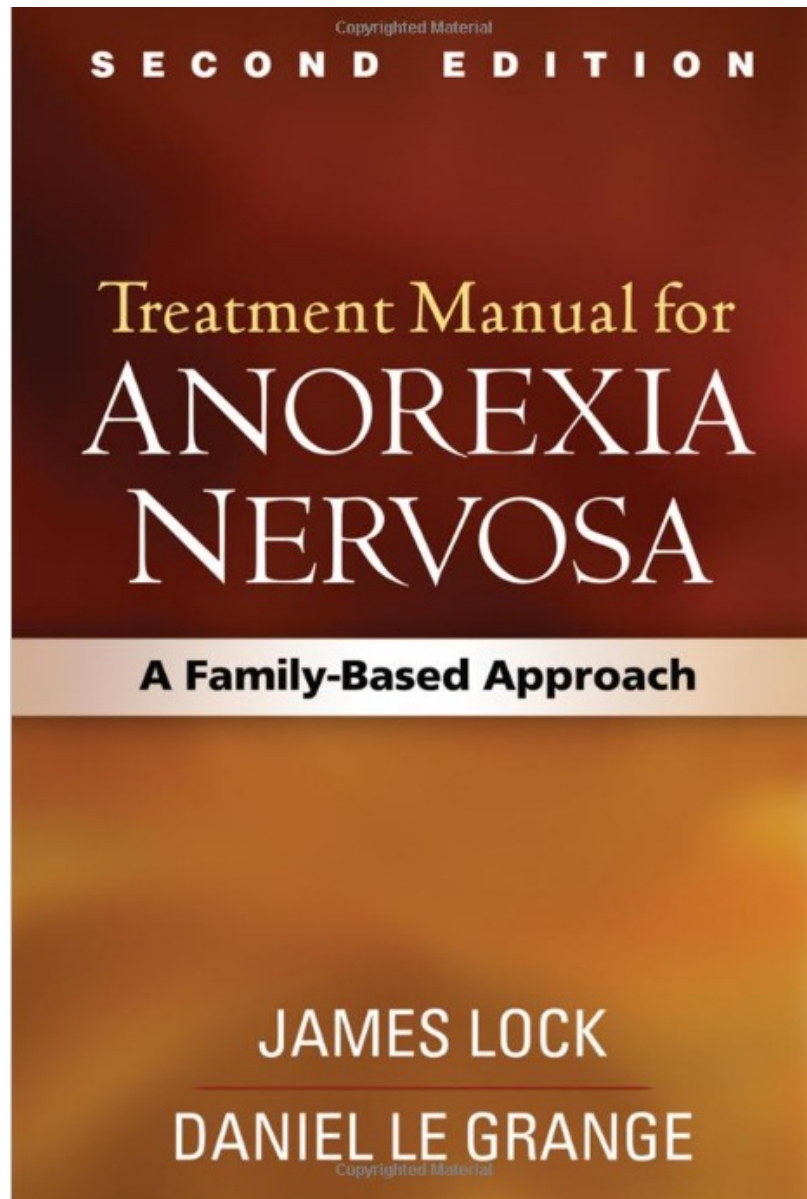
- Complete Metabolic Panel
- Complete Blood Count
- Amylase level/ fractionated amylase
- Phosphorus
- Magnesium
- Electrocardiogram
- Urine Drug Screen
- Urine Pregnancy

# Psychotherapeutic Treatment for Anorexia Nervosa



- Adolescent/Children - Maudsley method of family therapy for patients 19 years and younger.
- Adults - High drop out rate (50-70%) in all treatment studies
  - CBT alone reduced relapse, increases likelihood of a good outcome

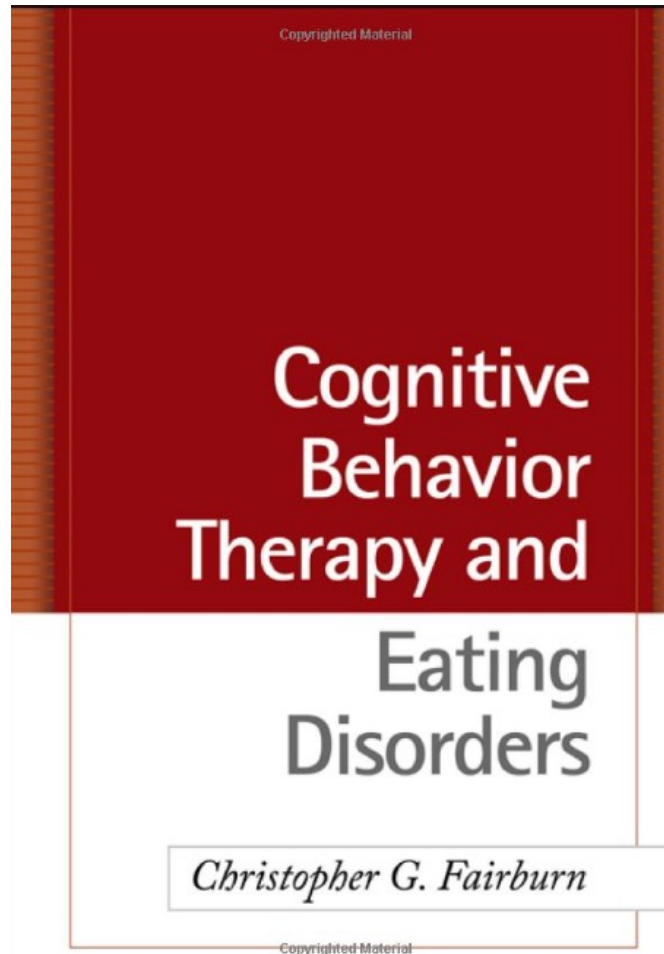
# Treatment Resources – Anorexia Nervosa



# CBT-E



- **ADULTS** over age 19. BMI 15 or better





# Pharmacotherapy of AN



- Serotonin - implicated in pathophysiology of AN...  
lack of tryptophan precursor
- With lack of tryptophan in starved state SSRI not effective.

# Psychopharm of AN



- Histamine is depleted due to protein deficient diet which results in elevated synthesis of Histamine<sub>1</sub> in CNS and decreased appetite
- Cyproheptadine has been shown to have positive effect in AN 32 mg/day. Faster weight gain, increased caloric intake, reduced depression.

# Psychopharm of AN



- Antipsychotics lead to weight gain and can help with the psychotic level of body image distortions
- Risperidol and Olanzapine most studied... case reports and open trials showed olanzapine to aid with weight gain.

# Psychopharm of AN



- Oral contraceptive not helpful to restore or prevent loss of bone mass in low weight anorexic

# Therapy in Bulimia



- CBT plus Fluoxetine
- CBT individual or groups
- Light Therapy
- Self Help/Guided Self Help

# Psychopharm in BN



- Fluoxetine 60mg daily - decreases binge eating and purging.
- Single study medications
  - Fluvoxamine 182mg daily - decreases urges to binge and purge (high dropout in study)
  - Trazadone 400mg - decreases frequency of binge/purge
  - Topiramate 100mg - decreases number days per month binge/purge. Decreases body dissatisfaction
- 5HT<sub>3</sub> antagonist - decrease binge purge behaviors. Decreases amount of time spent in a binge.

# BED treatment



- Psychotherapy
  - CBT
  - Interpersonal Psychotherapy
  - DBT
- Medications – including off label
  - Lisdexamfetamine (Vyvanse) - FDA approved
  - Topiramate (topomax)
  - SSRI (Fluoxetine, Paroxetine, Sertraline, Citalopram, Escitalopram)

# BED



- 50% remission within 6 months. 80% recovery in 5 years.



# Pharmacology of PICA



- Labs –
  - Hgb/Hct
  - Lead Levels
- Medications -
  - Chelation for elevated lead level
  - Iron supplementation for anemia

# Pharmacology of Rumination Disorder



# References



- Lock and LaGrange. Treatment Manual for Anorexia Nervosa - A Family Based Approach
- Fairburn. Overcoming Binge Eating
- International Academy of Eating Disorders.  
[www.aedweb.org](http://www.aedweb.org)

# INTERNET RESOURCES



[NATIONALEATING DISORDERS ASSOCIATION  
\(NEDA\)](#)

[ACADEMY FOR EATING DISORDER](#)

[NATIONAL INSTITUTE OF HEALTH](#)

[GURZE BOOKS](#)