ANOREXIA NERVOSA

OVERVIEW

- Introduction
- Etymology
- History
- Epidemiology
- Etiology
- Clinical features
- Diagnostic criteria

OVERVIEW

- Assessment
- Co-morbidities
- Differential diagnosis
- Treatment
- Summary

INTRODUCTION

- low weight
- persistent and relentless drive for thinness
- behaviors that cause weight loss
- Body image distortions
- Weight and shape predominate self-schema
- Failure to recognize implications of their weight

ETYMOLOGY

- The term anorexia nervosa (Greek) -“loss of appetite”
- The German term - pubertetsmaigresucht (thinness seeking of adolescents)
- The French - anorexia nervosa anorexie mentale (mental anorexia) and anorexie hysterique (hysterical anorexia).

HISTORY

- BCE- Sallekhana- thinning of passions and body
- Medieval ages- gnostic sect and ‘holy anorexia’
- 1689- Richard Morton- woman with weight loss attributed to mental state
- 1860-70s - Sir William ‘anorexia nervosa’, and Dr. Charles Laségue ‘anorexia hysterique’- clinical description

HISTORY

- Late 1800s- abnormality of endocrine function
- Early 20th century- oral impregnation fear
- 1950s- hilda bruch- modern hypothesis
- 1960s- gerald russell, arthur crisp, and pierre
- Beaumont- empirical studies

TYPES OF ANOREXIA NERVOSA

- In classic historical form of anorexia nervosa

1. Restrictive type-

- 50%
- Food intake is highly restricted
- Relentlessly and compulsively overactive
- Overuse athletic injuries such as stress fractures and soft tissue tears.

TYPES OF ANOREXIA NERVOSA

2. Second subtype

- Binge or purge
- Patients alternate attempts at rigorous dieting with intermittent binge or purge episodes.

EPIDEMIOLOGY

- LIMITATIONS

1. The changing definition of what constitutes an eating disorder
2. The lack of recognition by health professionals- lack of clear diagnostic criteria and reliable assessment methods

EPIDEMIOLOGY

- Increased diagnosis since dsm-5
- Stable rates (including sub-syndromal)of prevalence- 1970
- Point prevalence in woman- 0.6-0.7 %
- Increased incidence rate in female adolescents
- Male- underdiagnosed
- Across all classes and races

EPIDEMIOLOGY

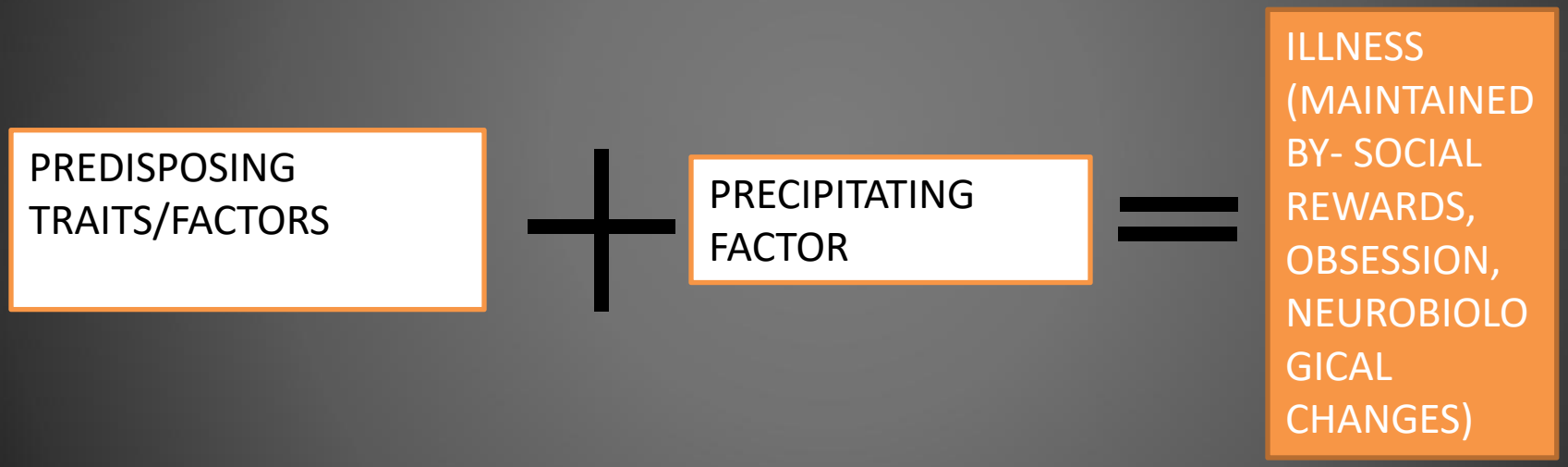
Life-time prevalence	2-4%
Mortality risk	6x greater than general population (1 in 5 from suicide)
Gender	F> M (10:1)
Typical age of onset	Early mid-adolescence

EPIDEMIOLOGY

- **Premature mortality:** 0 to 19% on 10- to 20-year follow-up after hospitalization (medical causes, closely followed by suicide)

- Outcome -higher rates of full recovery and lower mortality in adolescents than in adults

ETIOLOGY


PREDISPOSING TRAITS/FACTORS
PRECIPITATING FACTOR
ILLNESS (MAINTAINED BY- SOCIAL REWARDS, OBSESSION, NEUROBIOLOGICAL CHANGES)

ETIOLOGY

1. GENETIC

- Genetic vulnerability
- Family studies-
- 11 x risk in first-degree relative
- Increased risk if relative with different eating disorder

ETIOLOGY

- Twin studies-
- Higher concordance rate in monozygotic twins
- Monozygotic to dizygotic ratio: 3:1

- Seretonin transporter gene abnormalities

ETIOLOGY

- NEUROBIOLOGICAL FACTORS
- Reward pathway abnormalities
- Ghrelin insensitivity
- Gut microbiota
- Dysimmune neuropeptide signaling
- Neurotransmitter balance

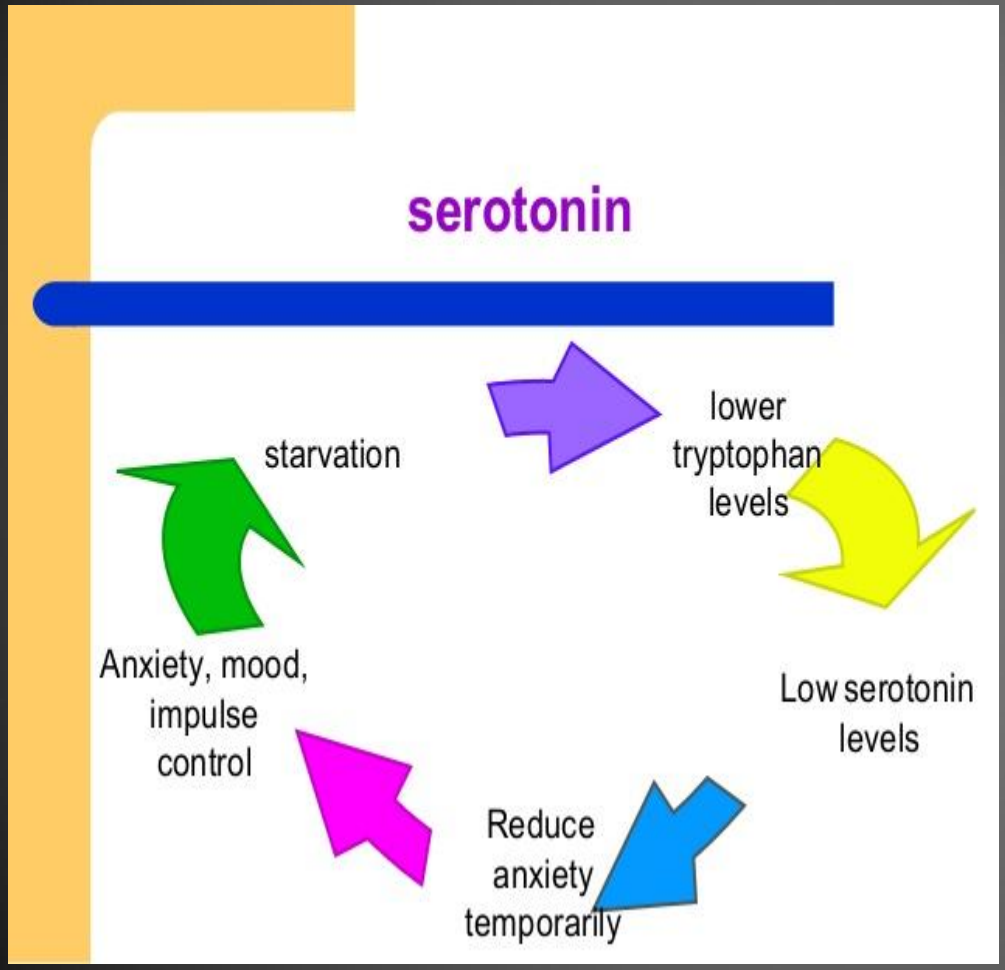
ETIOLOGY

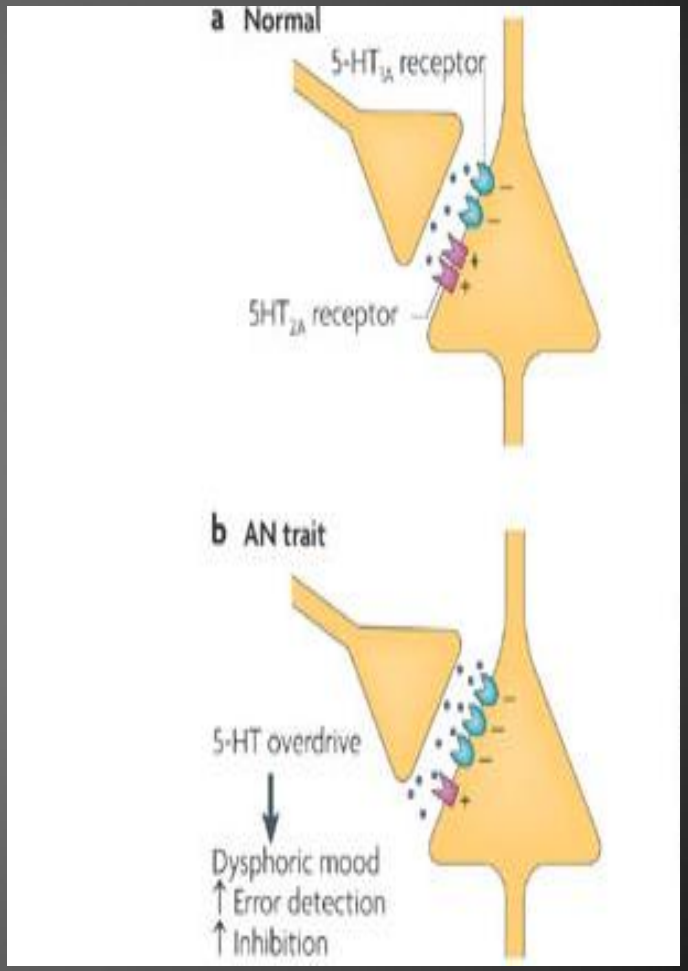
- Greater activation- ventral striatum, insula and frontal cortex
- Multidimensional construct
- Posterior parietal network- perceptive component
- Prefrontal cortex-insula-amygdala network- affective component of body-image distortion

ETIOLOGY

- Anterior insula- interoceptive processing
- Increased right ant insula matter
- Interoceptive disturbance – inability to identify accurately and respond to internal sensations, e.G. Hunger, fullness, mood state, touch, temp etc.
- Altered interoceptive awareness
- Distorted body image , lack of recognition of symptoms of malnutrition could be related to disturbed interoceptive awareness.

ETIOLOGY





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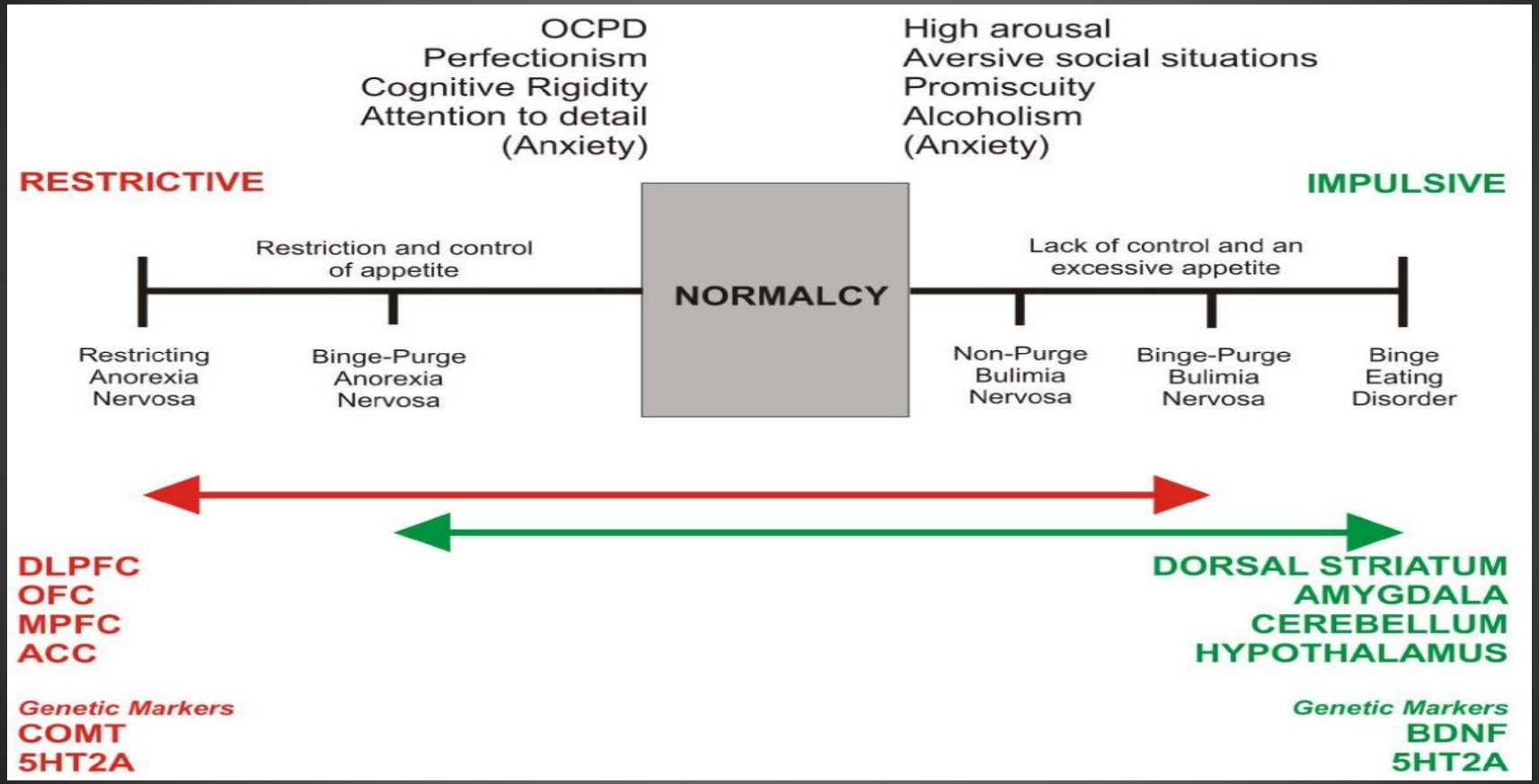
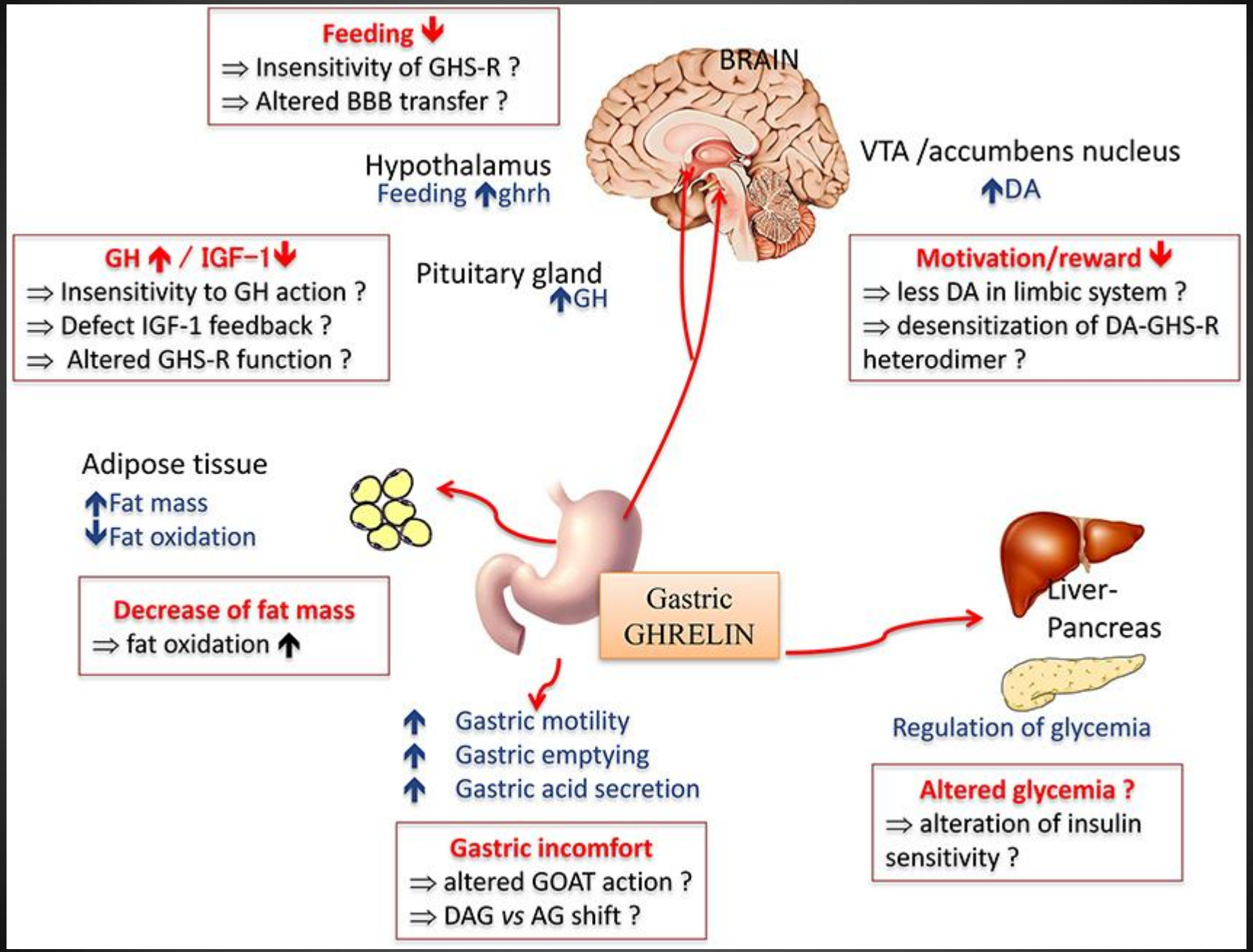

OCPD
Perfectionism
Cognitive Rigidity
Attention to detail
(Anxiety)
High arousal
Aversive social situations
Promiscuity
Alcoholism
(Anxiety)
RESTRICTIVE
IMPULSIVE
Restriction and control of appetite
NORMALCY
Lack of control and an excessive appetite
Restricting Anorexia Nervosa
Binge-Purge Anorexia Nervosa
Non-Purge Bulimia Nervosa
Binge-Purge Bulimia Nervosa
Binge Eating Disorder
DLPFC
OFC
MPFC
ACC
DORSAL STRIATUM
AMYGDALA
CEREBELLUM
HYPOTHALAMUS
Genetic Markers
COMT
5HT2A
Genetic Markers
BDNF
5HT2A


Feeding ↓
⇒ Insensitivity of GHS-R ?
⇒ Altered BBB transfer ?
BRAIN
Hypothalamus
Feeding ↑ghrh
VTA /accumbens nucleus
↑DA
GH ↑ / IGF-1↓
⇒ Insensitivity to GH action ?
⇒ Defect IGF-1 feedback ?
⇒ Altered GHS-R function ?
Pituitary gland
↑GH
Motivation/reward ↓
⇒ less DA in limbic system ?
⇒ desensitization of DA-GHS-R heterodimer ?
Adipose tissue
↑Fat mass
↓Fat oxidation
Decrease of fat mass
⇒ fat oxidation ↑
Gastric GHRELIN
Liver-
Pancreas
↑ Gastric motility
↑ Gastric emptying
↑ Gastric acid secretion
Regulation of glycemia
Gastric incomfort
⇒ altered GOAT action ?
⇒ DAG vs AG shift ?
Altered glycemia ?
⇒ alteration of insulin sensitivity ?

ETIOLOGY

3. DEVELOPMENTAL FACTORS

- Adolescence
- Biological factors- hormone estrogen

ETIOLOGY

- Social and psychological change-
- Pubertal body changes and dissatisfaction
- Low self esteem
- Weight related teasing and bullying
- Identity formation
- Higher with gay orientation
- Independence from parents
- Initiation of romantic relationships

ETIOLOGY

4. PSYCHOLOGICAL FACTORS

- High levels of perfectionism
- Self-discipline
- Harm avoidance
- Self-criticism
- Low impulsivity

ETIOLOGY

- Reward delay
- Cognitive inflexibility
- Childhood and early adolescent anxiety, mood, and obsessive-compulsive disorders and OCD traits
- Cluster C personality

ETIOLOGY

- Hsu and Lee (1993) - primary psychological motives included in DSM IV TR
  - "Intense **fear of gaining weight** or becoming fat" is not commonly described as the motivating factor until 1960's
  - **Body image disturbance-**
  - In an attempt to control feeling of "fatness", they employ measures to "check" their body shape .
  - They include self evaluations, weighing & measurements

ETIOLOGY

5. SOCIO-CULTURAL FACTORS

- Cultural ideal of thinness
- Perpetuated by media
- Fiji- increased incidence since introduction of western media
- Misconception- western illness, not sole factor

Karen Carpenter

- **A popular american vocal and drummer musician.**
- **Her death on february 4, 1983, was attributed to heart failure as a consequence of anorexia nervosa.**

ETIOLOGY

- Activities/vocation with weight emphasis
- Ballet
- Modelling
- Gymnastics
- Weight restricted sports
- In public eye

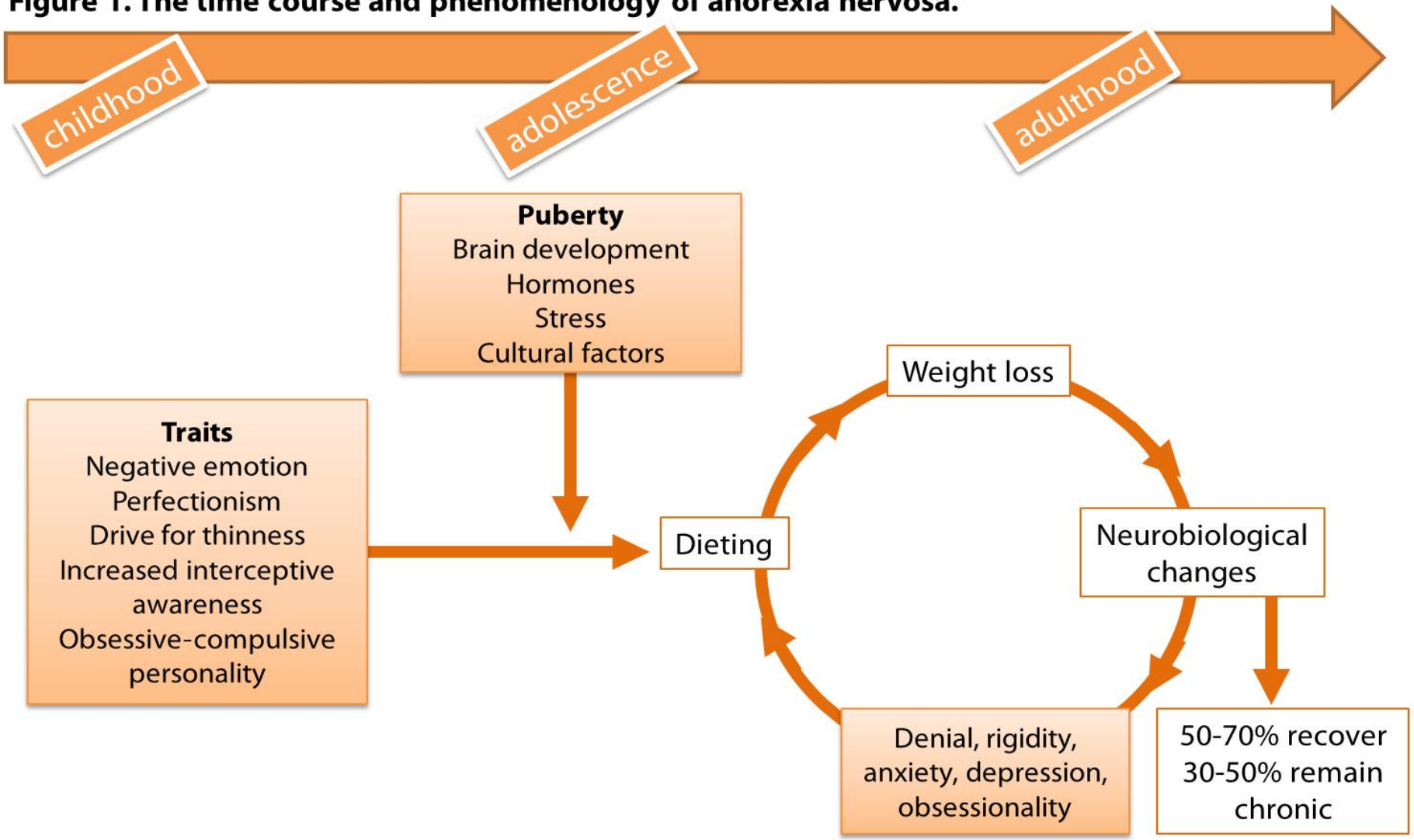
CHRISTY HENRICH

- American gymnast
- 1988- lose weight to make to olympics
- Attributed failure to weight
- Anorexia nervosa
- 1994- died of MODS, attributed to anorexia

ETIOLOGY

- Move from rural to urban
- Dysfunctional families
- Childhood abuse
- Historically- white wealthy woman- misconception

Figure 1. The time course and phenomenology of anorexia nervosa.



Note. Adapted from "New insights into symptoms and neurocircuit function of anorexia nervosa," by W.H. Kaye, J.L. Fudge, and M. Paulus, 2009, *Nature Reviews Neuroscience, 10,* pp. 573-84. Copyright 2009 by Nature Publishing Group.

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CLINICAL FEATURES

- Insidious onset
- 3 core features-

1. Significantly low body weight based on age and height
2. An intense fear of gaining weight or becoming fat. (Behavioral component in those who don’t articulate)
3. Disturbances of body image

CLINICAL FEATURES

Present with-

- An unusually low BMI
- Rapid weight loss
- Dieting or restrictive eating practices
- Family members or carers report a change in eating behaviour
- Social withdrawal, particularly from situations that involve food
- A disproportionate concern about weight or shape

CLINICAL FEATURES

- Menstrual ,other endocrine disturbances or unexplained gastrointestinal symptoms
- Physical signs of: malnutrition, dizziness, palpitations, fainting or pallor
- Compensatory behaviours- laxative or diet pill misuse, vomiting or excessive exercise
- Other mental health problems

CLINICAL FEATURES

Restrictive type-

- Limiting their daily food intake
- Counting calories,
- Controlling portion size
- Avoiding specific food items (e.G., Cake, red meat) or classes of foods (e.G., Fats, desserts),
- Only eating at certain times of the day
- Compulsive exercise

CLINICAL FEATURES

Purge subtype-

- Restrictive eating anf compulsive exercise
- Recurrent eating binges
- Purging through self-induced vomiting, laxative, or diuretic use.

- Lack of insight/denial

CLINICAL FEATURES

Non specific features-

- Irritability & symptoms of depression
- Ideas of undeserving of love/food.
- Self injurious behaviors.
- Somatic symptoms.

CLINICAL FEATURES

MEDICAL FINDINGS

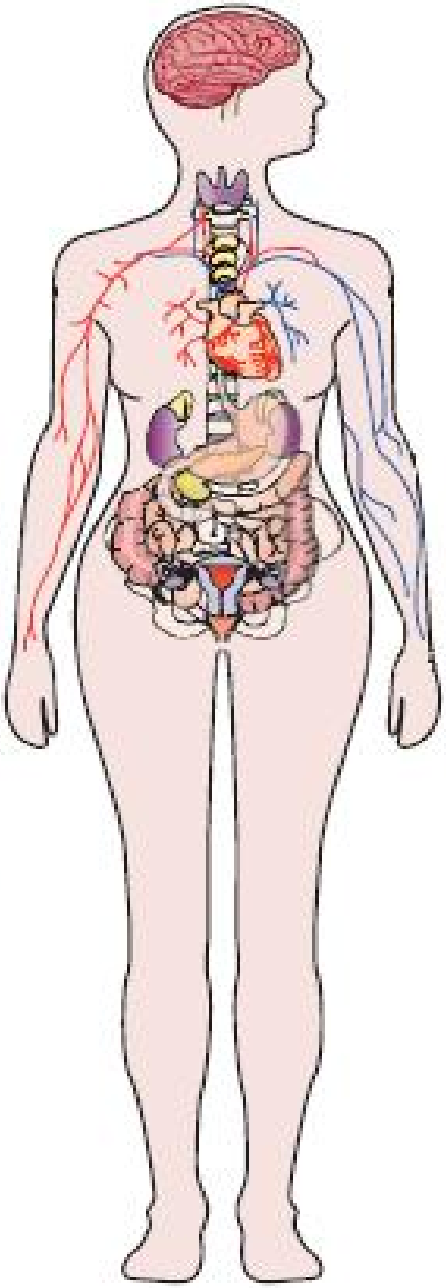
- **General examination-**

1. Dry skin
2. Lanugo hair
3. Acrocyanosis
4. Alopecia
5. Low body temperature
6. Dehydration

CLINICAL FEATURES

- Growth and pubertal developmental retardation
- Pallor
- Edema

Organ systems or organ	Pathological findings	Leading systems
CNS	Morphological and functional cerebral changes; volume reduction in cerebral grey and white matter	Cognitive deficits
Dental system and parotis glands	Impaired dental status, dental caries, increased serum amylase	Dental caries, enlargement of the parotid glands
Endocrine system and reproductive function	Hypothalamus-pituritary-gonadal-axis, low T_3 syndrome, hypercortisol	Amenorrhoea in women, symptoms of hypothyroidism , depression, elevated stress levels
Cardiovascular system	Hypotension, bradycardia, arrhythmia	Syncope
Gastrointestinal tract	Impaired gastric emptying, gastric dilation, gastro-duodenal ulcers	Constipation, ileus, upper gastrointestinal bleeding
Haematological and immune system	Bone marrow hypoplasia, anaemia with reduced leucocytes and immunoglobulin	Anaemia, (bacterial) infections, compromised immune competence
Renal tract	Hypokalaemia, hypophosphataemia, hypernatraemia	Nephrolithiasis, oedema, syncope
Bone	Reduced bone density (osteopenia) or osteoporosis	Bone fractures and concomitant pain, spinal compression



DIAGNOSTIC CRITERIA

DSM-IV	DSM-5
Weight loss, failure to make expected weight gain- body weight below 85%,	Intake restriction, significantly low body weight- age, sex, developmental trajectory and physical health
Intense fear of gaining weight or becoming fat, even though underweight	Intense fear of gaining weight or becoming fat, behaviour that interferes with weight gain even though underweight
Body weight/image disturbances, undue influence, denial of current seriousness	Body weight/image disturbances, undue influence, denial of current seriousness
amenorrhea	-
-	3 months

DIAGNOSTIC CRITERIA

ICD-10	ICD-11 (PROPOSED)
Weight loss/lack of gain- 15% below normal(age & height)	Significantly low body weight- age, height, developmental stage
Induced weight loss- food avoidance	Persistent behaviour pattern to prevent gain- restriction, purging, excessive exercise
Self-perception- too fat Intrusive dread of fatness Self-imposed low weight	Low body weight/ shape central to self-evaluation, inaccurate perception as normal
HPA disorder- amennorhoea, loss of sexual interest and potency	-
Doesn't meet A & B of bulimia nervosa	-

ASSESSMENT

- Good rapport- pts ambivalent, fearful
- In-depth interview
- Physical and mental examination
- Investigations
- Comorbid psychological and physical symptoms
- Diagnoses and risk
- Past treatments
- Current motivation for treatment
- Available supports

ASSESSMENT - HISTORY

History of food intake:

- Intake of previous day
- Breakfast is often missed
- Stereotyped selection of fruits & vegetables
- Avoidance of carbohydrate, fat containing foods
- Black coffee, ‘diet’ drinks.
- Attendent history

ASSESSMENT - HISTORY

Weight history:

- Patient percieves current weight as correct
- May express pride in ‘self-control’.
- Ask her ‘desired’ weight

History of exercising:

- Vigorous, excessive exercises.

ASSESSMENT - HISTORY

Additional harmful behaviors:

- Self induced vomiting
- Laxative abuse
- Self injury

Menstrual history:

- May not say that she has ceased menstruating.
- May be relieved that her periods have stopped.

ASSESSMENT- MENTAL STATE

Specific psychopathology

- Sensitivity about body shape
- Fatness- unattractive & indicative of greed & social failure.
- Overestimate their body size - usually assoc with negative affect.
- Dread of fatness
- Overvalued ideas rather than delusions

ASSESSMENT- MENTAL STATE

Denial

- Multilayered and dynamic concept, difficult to measure.
- Pt denies hunger or fatigue & thinness
- Lack of concern for physical & psychological sequelae
- Unintentional denial (self-esteem)
- Deliberate denial- pretence of being healthy & avoiding treatment

ASSESSMENT- MENTAL STATE

Co-morbidities

- Depressive, OCD features and other psychiatric co-morbidities

Neuropsychological deficits

- seldom detected clinically.
- Deficits in attention, memory, visuospatial ability

ASSESSMENT- SCREENIING

- The most commonly used screening test- Eating Attitudes Test (**EAT**)
- Eating disorder inventory
- Eating disorder symptom checklist
- Eating disorder referral form
- SCOFF

ASSESSMENT- STRUCTURED INTERVIEW

- SCID I AND II
- EDE (eating disorder examination interview)

ASSESSMENT- PHYSICAL

- Physical examination
- Height
- Postvoiding weight in a hospital gown (observing for hidden weights)
- Vital signs (bradycardia, hypotension)
- Skin, muscle, and subcutaneous fat(noting the degree of starvation)
- Neurological examination

ASSESSMENT-LABORATORY

For all patients:

- Complete blood count- anemia, leukopenia, thrombocytopenia
- Severe anemia- reticulocytes, iron, transferrin, vit-b12
- Electrolytes- decreased Na+, K+, Mg++, Ca++, PO4-, Cl-, alkalosis

ASSESSMENT-LABORATORY

- Blood urea nitrogen, creatinine- elevated
- Thyroid-stimulating hormone, free thyroxine- hypothryoidism
- Total protein and prealbumin- severe oedema
- Fasting glucose- reduced
- AST, ALT- increased in severe fasting

ASSESSMENT-LABORATORY

- Amylase if purging occurs
- Electrocardiogram- bradycardia, prolonged Q-T interval, pericardial effusion

- *If underweight or experiencing amenorrhea:*

► Bone mineral density (dual energy x-ray absorptiometry)- osteoporosis

CO-MORBIDITIES

PSYCHIATRIC

- ¾ th pts- lifetime mood disorder- mc- MDD
- 25-75%- precedence of anxiety disorders
- 15-29%- OCD
- 40%- BDD
- 9-25%- alcohol misuse/dependence
- Genetic correlation- Schizophrenia & OCD

CO-MORBIDITIES

- Study from South India (CMC ,Vellore)
- Patients with anorexia more often had co-morbidity (66.7%)
- The most common co-morbidities were
  - Depression (27.8%)
  - Intellectual disability (22.2%)
  - Dissociative disorders (16.7%)
  - Substance abuse
  - Sleep disorder
  - Elimination disorders,
  - Adjustment Disorder

CO-MORBIDITIES

MEDICAL

- 54%- osteopenia of spine
- 21%- osteoporosis
- DM-1- onset precedes anorexia
- Increased risk of autoimmune disease
- Paediatric autoimmune neuropsychiatric disorder associated with streptococcal infections (PANDAS)- variant of childhood onset anorexia

DIFFERENTIAL DIAGNOSIS

- Depressive disorder- loss of weight and appetite but no drive for thinness.
- Depressive symptoms secondary to anorexia- no melancholia or psychotic features
- Certain anxiety disorders- eg. Specific phobia of vomit, fear of recurrent choking
- OCD- ritualistic eating patterns, thoughts ego-dystonic, attempts at resistence

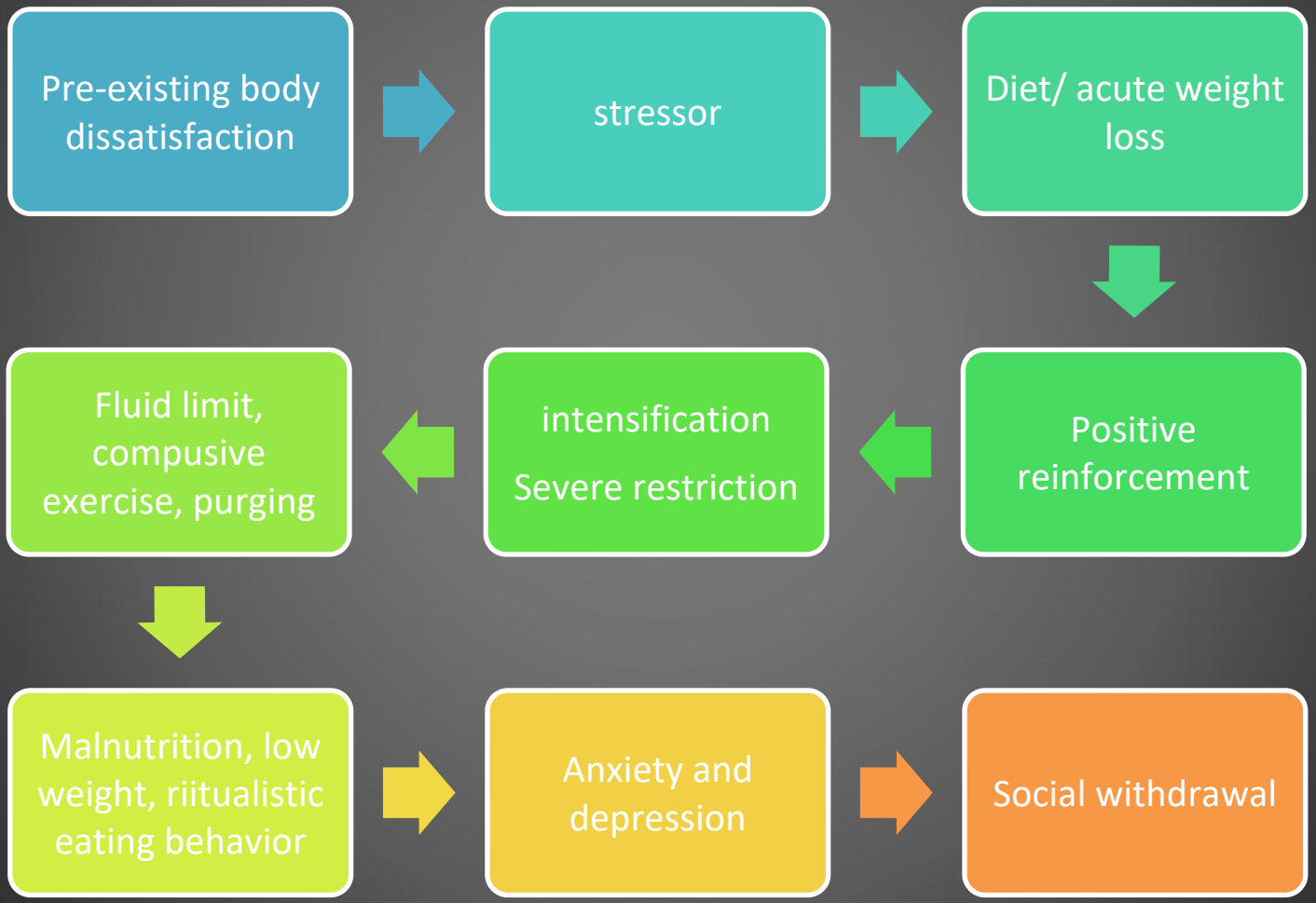
DIFFERENTIAL DIAGNOSIS

- BDD- obsessions focus on specific body parts, not on the body as a whole or on weight or shape.
- ARFID- no concern of weight and shape
- Bulimia nervosa- weight status
- Complicated- borderline weight and recurrent bingeing- detailed weight history

DIFFERENTIAL DIAGNOSIS

- Atypical anorexia (OSEFD)- psychopathology present but weight normal
- Delusional disorder- avoidance due to fear of poisoning
- Substance use disorders- stimulants, nicotine, alcohol, laxatives
- Medical conditions- malignancy, hyperthyroidism, pheochromocytoma, GI disorders, chronic diseases

COURSE & PROGNOSIS



COURSE & PROGNOSIS

- Variable course
- 30-50%- complete recovery
- 10-20%- chronic illness
- Rest- partial recovery
- Time to complete remission- 5-6 years
- Complications- 54%
- Suicide- 27%

COURSE & PROGNOSIS

- Comorbid DM-1- 34.8% mortality
- Comorbid Alcohol use- 57 times higher completed suicides
- Transition from anorexia nervosa to bulimia nervosa—seen in 50%

Course & Prognosis

Good prognostic indicators

- Onset- between post-pubertal and before 17 years
- Weight restoration in IPD
- Weight maintained at 1 month
- Variable and energy-dense diet
- shorter duration of illness
- less psychiatric comorbidity
- less severe decrease in weight at admission

COURSE & PROGNOSIS

Poor prognostic indicators

- Lower BMI at discharge
- Weight loss in 1st month after discharge
- Males- older age, lower BMI at admission andpurging subtype

- For all eating disorders, the greatest risk of relapse occurs in the first 12 months after successful treatment.

TREATMENT

TREATMENT APPROACH

- Difficult- ego-syntonic, ambivalent, fear of weight gain
- Establish rapport
- Psychoeducation- medical risks of low weight- initial motivation

TREATMENT

- Multi-disciplinary approch- therapist, psychiatrist, nutritionist and physician
- Active parental involvement
- Setting- OPD/IPD- safety with minimum restriction

Panel 1: Indicators of high medical risk and other reasons for considering inpatient treatment

Weight

- BMI <14 kg/m² or rapid weight loss (adults) or <75% of expected bodyweight or rapid weight loss (adolescents)

Medical status

- Heart rate <50 bpm
- Cardiac arrhythmia
- Postural tachycardia (increase >20 bpm)
- Blood pressure <80/50 mm Hg
- Postural hypotension >20 mm Hg
- QTc >450 ms
- Temperature <35·5°C
- Hypokalaemia <3·0 mmol/L
- Neutropenia
- Phosphate <0·5 mmol/L

Additional indicators

- Severe bingeing and purging (eg, several times daily)
- Failure to respond to outpatient or daypatient treatment
- Severe psychiatric comorbidity
- Suicidality

These indicators are only a guide and do not replace the need for individual clinical judgement (adapted from Hay and colleagues, 2014,[73] and Treasure and colleagues, 2010[4]). QTc=corrected QT.

TREATMENT

- PRIMARY GOALS

1. Disrupt disordered eating pattern
2. Weight stabilization and normalization

- SECONDARY GOAL

1. Altering problematic cognitions, attitudes and beliefs

- All three complementary
- Address co-morbidities

NURITION AND WEIGHT RESTORATION

- In-patient most effective
- Structured protocol-

1. Calorie prescriptions
2. Meal plans
3. Structured and supportive meals
4. Disruption of compensatory behaviors (including purging and exercise)
5. Expectations of regular weight gain

NURITION AND WEIGHT RESTORATION

- Following protocol

1. Privilege system
2. Failure to gain weight- activity restriction and bed rest
3. Macronutrients prescription
4. Nutritional supplements
5. Nasogastric feeding

NURITION AND WEIGHT RESTORATION

1500-1800 kcal/day(3-4 meals and snacks) for several days

Watch for Refeeding syndrome

Medically stable

NURITION AND WEIGHT RESTORATION

Increase several 100 cal alternate day

3500-4000 kcal/day

2-5 lbs/week

NURITION AND WEIGHT RESTORATION

- **End goal- 18.5-20 kg/ square meter**

- Effects of weight restoration

1. Decreased obsessional thoughts
2. Resolution of depression and anxiety
3. Additional therapy- disordered thoughts and behavior, underlying self-image issues

NURITION AND WEIGHT RESTORATION

Signs of Refeeding Syndrome

Lab abnormalities
Hypophosphatemia
Hypokalemia
Hypomagnesemia
Thiamine deficiency
Glucose intolerance

EKG abnormalities
Dysrhythmias
Torsades de pointes

Physical symptoms
Edema
Respiratory difficulty
Muscle pain and weakness
Gastrointestinal disturbances (e.g., constipation, diarrhea)

PSYCHOTHERAPY

TO ADRRESS

- Alter disordered cognition, attitude, beliefs and behaviour
- Work through ingrained beliefs- tying weight and shape to self-worth
- Treat obsessional, depressive and anxiety symptoms

PSYCHOTHERAPY

- Adults- all therapies equally effective, CBT most widely studied
- Children- family based therapies (Maudsley method)

PSYCHOTHERAPY

1. Family-based treatment (FBT)

- Three-phase treatment for adolescent
- 16 1-h sessions and a 9-month period
- First phase- absolve parents and compliment positive aspects of their parenting and work out strategy- **Parents take control**
- Phase 2- transition eating and weight control back to the adolescent
- Third phase- healthy relationship

PSYCHOTHERAPY

2. Maudsley model of anorexia treatment for adults (MANTRA)

- Cognitive-interpersonal treatment
- 4 broad factors
- (1) inflexibility, excessive attention to detail, and fear of making mistakes
- (2) impairments in the socio-emotional domain
- (3) positive beliefs about how anorexia nervosa helps
- (4) unhelpful responses of close others

PSYCHOTHERAPY

- Aim- improving weight, eating disorder and other symptoms, and psychosocial adjustment
- Patient manual- core and optional module
- Patient workbook
- Tailor-made for anorexia

PSYCHOTHERAPY

3. Enhanced cognitive behaviour therapy (CBT-E)

- "Transdiagnostic" personalised psychological treatment for eating disorders
- 4 stages
- Short (20 sessions) and longer version (40 sessions).
- 1- mutual understanding of the person's eating problem modify and stabilise eating pattern

PSYCHOTHERAPY

- 2- review and future plans
- 3- processes that are maintaining the person's eating problem (eg, addressing concerns about shape and eating).
- 4- dealing with setbacks and maintaining the changes that have been obtained

PSYCHOTHERAPY

4. Focal psychodynamic psychotherapy (FPT)

- 40 –h outpatient psychodynamic-oriented
- Psychodynamic relevant foci
- 1-therapeutic alliance, pro-anorectic behaviour and ego-syntonic beliefs ,self-esteem.
- 2- relevant relationships and the association between interpersonal relationships and eating (anorectic) behaviour.
- 3- transfer to everyday life, anticipation of treatment termination and parting.

PHARMACOTHERAPY

- SSRI and anti-depressants not effective- weight gain, obsessional, depressive and anxiety symptoms
- Can initiate if persisting depression
- Olanzapine- promote weight gain and reduce obsessionality
- Zinc and calcium

RELAPSE PREVENTION

- 30–50% successfully treated - re-hospitalization within 1 year of discharge.
- Post-hospitalization outpatient treatments are recommended.
- Psychotherapy and regular follow-ups

PREVENTION

- The interventions tested so far -“universal” interventions
- Spread awareness of disorder and weight regulation
- Failed to alter attitudes or actual behavior
- An unmet challenge- integrate interventions aimed at reducing weight consciousness and obesity

SUMMARY

- Female adolescent across all strata and races
- Multifactorial causation
- Weight loss, distorted thinking, fear of fatness
- Multiple medical and psychiatric complications
- Multidisciplinary approach to treatment

1. Weight restoration
2. Cognitive and behavioural normalisation

SUMMARY

- No effective pharmacotherapy so far
- Limited research- need for targeted interventions

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"Eating disorders are deadly...

and the silence around them even more so."

- ANASTASIA AMOUR