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Epidemiology

Epidemiology is the study of the distribution and determinants of health-related states and diseases within specific populations.

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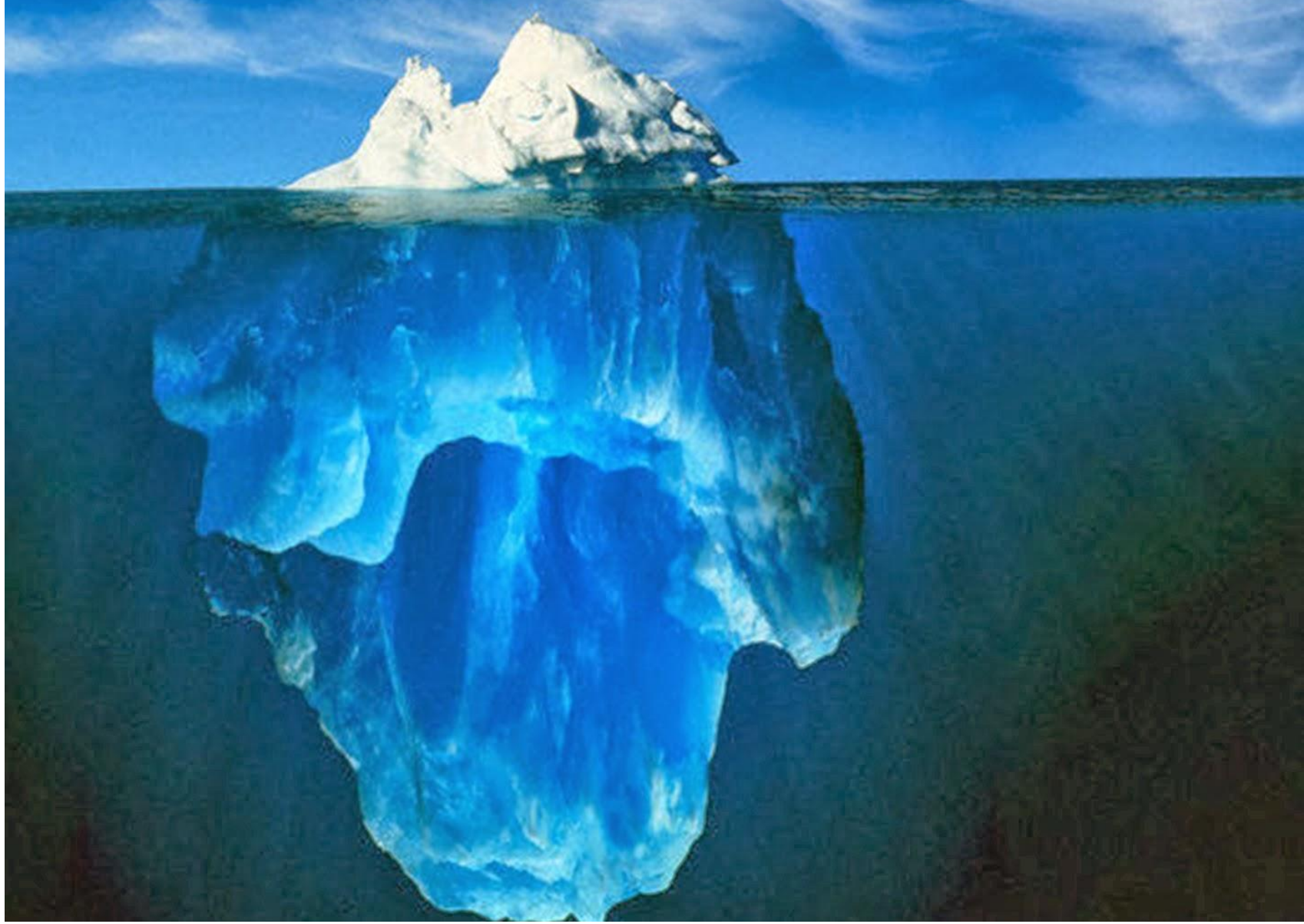
The epidemiology of eating disorders is particularly challenging, and available data can often be misleading.

Epidemiological figures are believed to underestimate the true burden of eating disorders.



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Several factors contribute to this underestimation: eating disorders are relatively rare in the general population, and many affected individuals do not seek help due to feelings of denial or shame.

Additionally, the absence of official disease registries and the frequent under-detection by general practitioners further complicate accurate assessment.

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There is a pressing need to enhance awareness of the prevalence and diversity of eating disorder symptoms among healthcare professionals, especially those working closely with adolescents and young adults, in order to promote early identification and engagement with treatment.

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A solid understanding of epidemiological data requires familiarity with specific terminology.

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Incidence refers to the number of new cases of a disorder occurring within a population during a defined time period (typically one year).

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- In contrast, prevalence refers to the proportion of individuals within a population who are affected by a disorder at a specific point in time.
- Prevalence differs from incidence because it includes both new and pre-existing cases, whereas incidence counts only new cases.
- Prevalence is particularly useful for estimating the overall burden of disease, helping to predict the demand on healthcare services.

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Historically, prevalence studies of eating disorders have been concentrated in Western countries.

However, recent research suggests that eating disorders are now a significant global concern.

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Eating disorders can affect individuals of any age, sex, or socioeconomic background, although they are most commonly observed in young women aged 15 to 25.

Notably, some studies indicate that anorexia nervosa is beginning to manifest at even younger ages.

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Furthermore, there is growing evidence that young men and gender-diverse youth are affected by eating disorders more than previously recognized.

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Sex ratio (male:female) for EDs evolves over time, despite the fact that the majority of the investigations of EDs did not include enough males to establish reliable epidemiological estimates.

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Recent studies have shown that students identifying as bisexual, queer, or having a cross-gender identity have higher odds of probable eating disorder diagnoses and exhibit greater concerns about weight and body shape compared to heterosexual students.

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It is estimated that approximately 20 million people in Europe are currently living with eating disorders.

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Current prevalence estimates for ALL eating disorders classified under the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition) range from 3.7% to 32.9% in women and 0.5% to 12.8% in men.

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ANOREXIA NERVOSA (AN)

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Regarding anorexia nervosa, the highest incidence rates are observed among females, particularly those aged 10 to 29 years.

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Recent trends highlight:

- a rising incidence in girls under 15 years of age,
- a potential second peak among peri-menopausal women.

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The lifetime prevalence in Europe is estimated at 4% in females and 0.3% in males.

However, incidence and prevalence rates among males are likely underestimated due to stigma and underdiagnosis.

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Recent findings showed how, among males, specific sub-populations are at higher risk of AN, particularly athletes involved in body- and strength-focused sports such as cycling, running, and wrestling.

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BULIMIA NERVOSA (BN)

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In the case of bulimia nervosa, available studies are fewer.

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Peak incidence occurs among females aged 20 to 29 years, although cases may also emerge later in life.

Male incidence rates are considerably lower.

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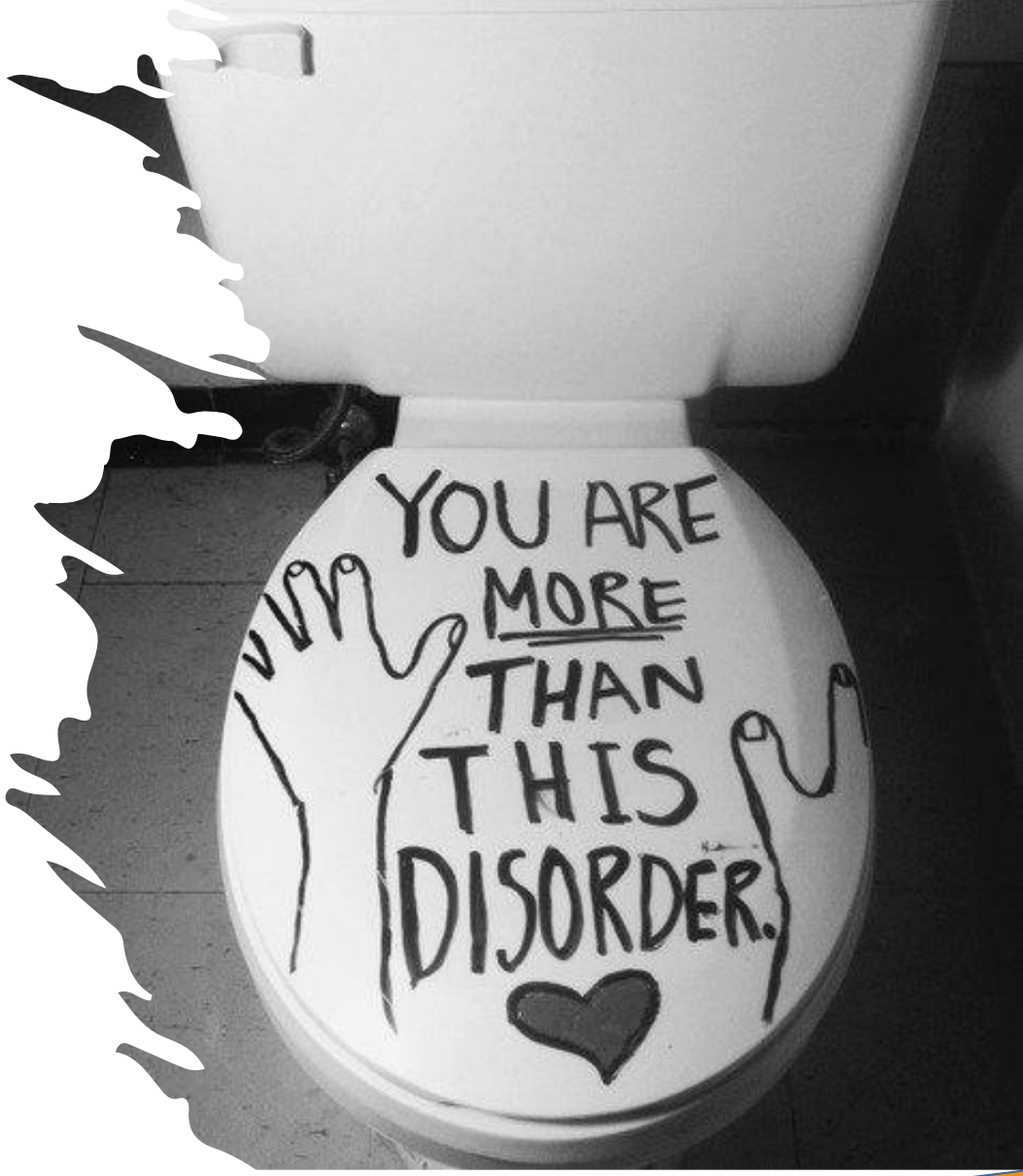
The estimated lifetime prevalence of bulimia nervosa is ranging from:

- **0.3% to 4.6% in females**
- **0.1% to 1.3% in males**



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BIGOREXIA

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Data regarding bigorexia (muscle dysmorphia) are even more scarce and often unreliable.

No official incidence rates exist due to the absence of longitudinal studies.

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- **The prevalence is reported at 2.2% in males and 1.4% in females. prevalence estimates of and 1.4%.**
- **As expected, studies consistently report a higher prevalence among boys and men, with peak onset typically occurring in late adolescence or early adulthood.**

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COVID-19 PANDEMIC INCREASE

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The COVID-19 pandemic appears to have significantly exacerbated eating disorder symptoms, as reflected by a sharp increase in hospital admissions across Europe. Besides an increase in prevalence, young patients also appear to be presenting with more severe symptoms compared to the pre-pandemic period.

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Several factors contributed to the deterioration in mental health, including: disruption of daily routines, increased free time, reduced social interactions, limitations on personal freedom, reduced access to support networks and health care services, interruption of regular physical activity, greater exposure to triggering online content, and diminished feelings of control.

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ITALY

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National data

- In Italy it is estimated that about 3 million people suffer from eating disorders, equal to about 5% of the population.

- Historically, eating disorders mainly affected between the ages of 14 and 25, manifesting themselves at two critical moments: puberty and the transition to adulthood.

- There are typical differences in incidence between the sex

	FEMALES	MALES
ANOREXIA	8/100.000	0,02-1,4/100.000
BULIMIA	12/100.000	0,8/100.000

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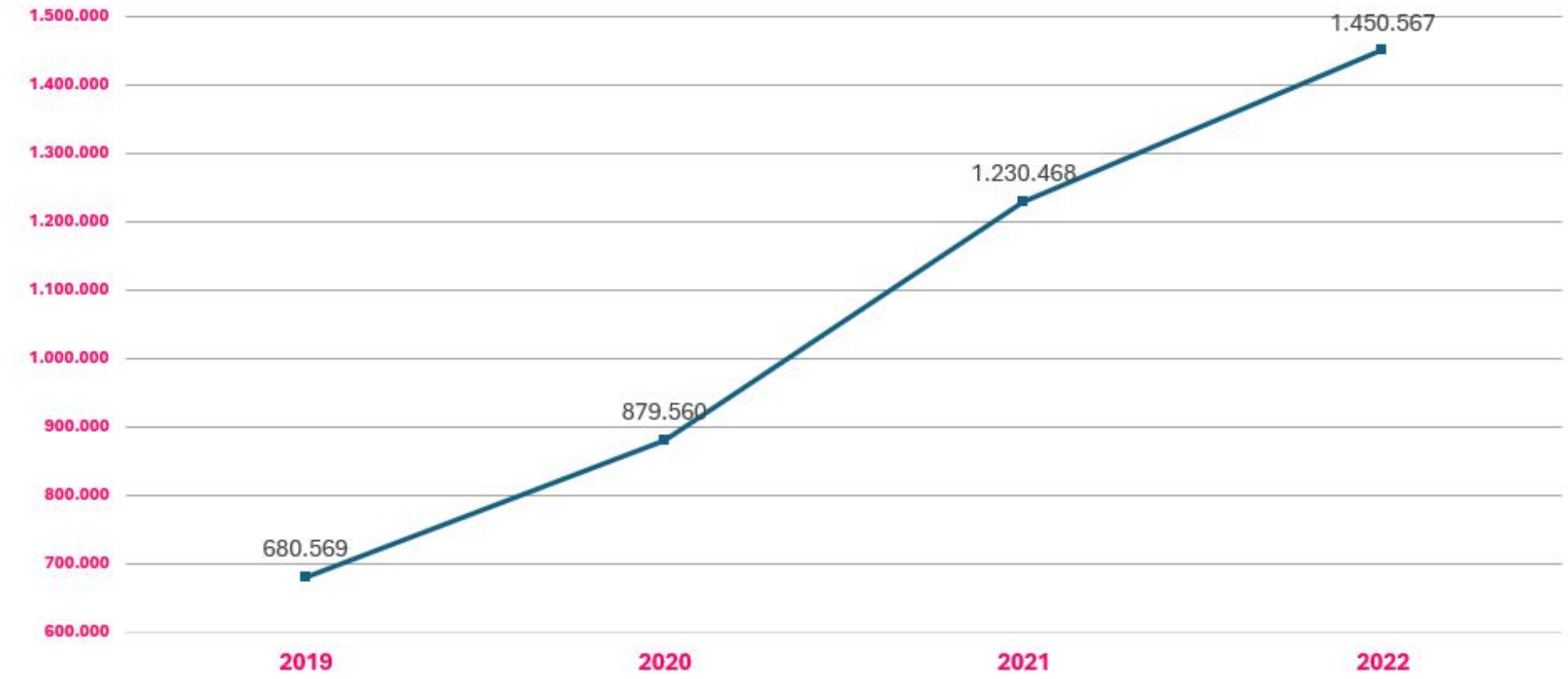
New cases of eating disorders detected by the territorial services



National Survey Ministry of Health 2019-2023 (Edited by Laura Dalla Ragione Scientific Director of the CCM Project Ministry of Health DCA) Sole 24 ore Apr 4, 2023

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Two important news

Lowering the age of onset of disorders: 30% of new patients in 2023 are under the age of 14.

In recent years, there has been a worrying increase in cases in childhood, with children aged 8-9 showing symptoms usually typical of adolescents.

Increase in the male population:

10% of cases between the ages of 12 and 17 concern the male population.

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PORTUGAL

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Scientific Report – Portuga
Nationwide study from 2000 to 201

International Journal of
EATING DISORDERS

BRIEF REPORT

Eating disorders—Related hospitalizations in Portugal: A nationwide study from 2000 to 2014

Ana Margarida Cruz, Manuel Gonçalves-Pinho, João Vasco Santos, Francisco Coutinho, Isabel Brandão, Alberto Freitas

First published: 28 September 2018 | https://doi.org/10.1002/eat.22955 | Citations: 25

KEY FINDINGS – EATING DISORDER HOSPITALIZATIONS IN PORTUGAL (2000–2014)

4,485 hospitalizations
related to eating disorders were recorded

Anorexia nervosa
was the most common diagnosis (54%)

Hospitalization rate for anorexia increased
from 12,8 to 23,7 per million

87% of patients were female, average age 26

0,9% in-hospital mortality
for anorexia nervosa
(25 deaths)

5% attempted suicide,
mostly women;
10% among bulimia cases

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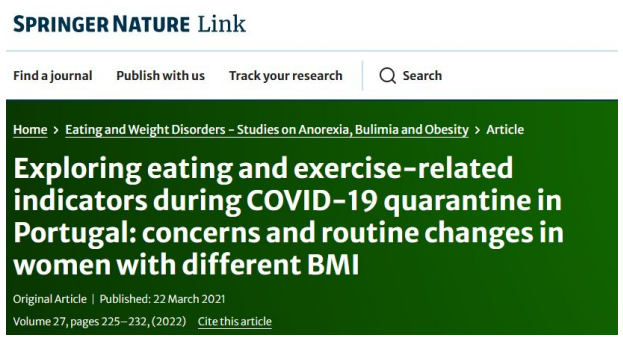
Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity, during COVID-19



- 🧍‍♀️ 580 women participated (mean age: 26.9), grouped by BMI: underweight, normal, pre-obesity, and obesity
- 🍽️ No significant BMI differences in overall eating/exercise routine changes, but body image and binge eating symptoms were higher in pre-obesity and obesity groups
- 📈 Shape concern, weight concern, and binge eating significantly increased with BMI
- 🍫 Most common eating changes: increased craving for comfort food (up to 71%) and snacking between meals (up to 51%)
- 🏋️‍♀️ Higher BMI groups reported more attempts to control weight through exercise, but also more interruptions in physical activity

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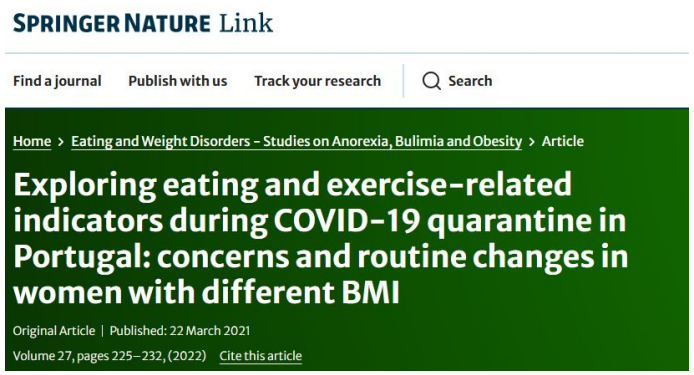
Eating and Weight Disorders - Studies on Anorexia, Bulimia and Obesity, during COVID-19



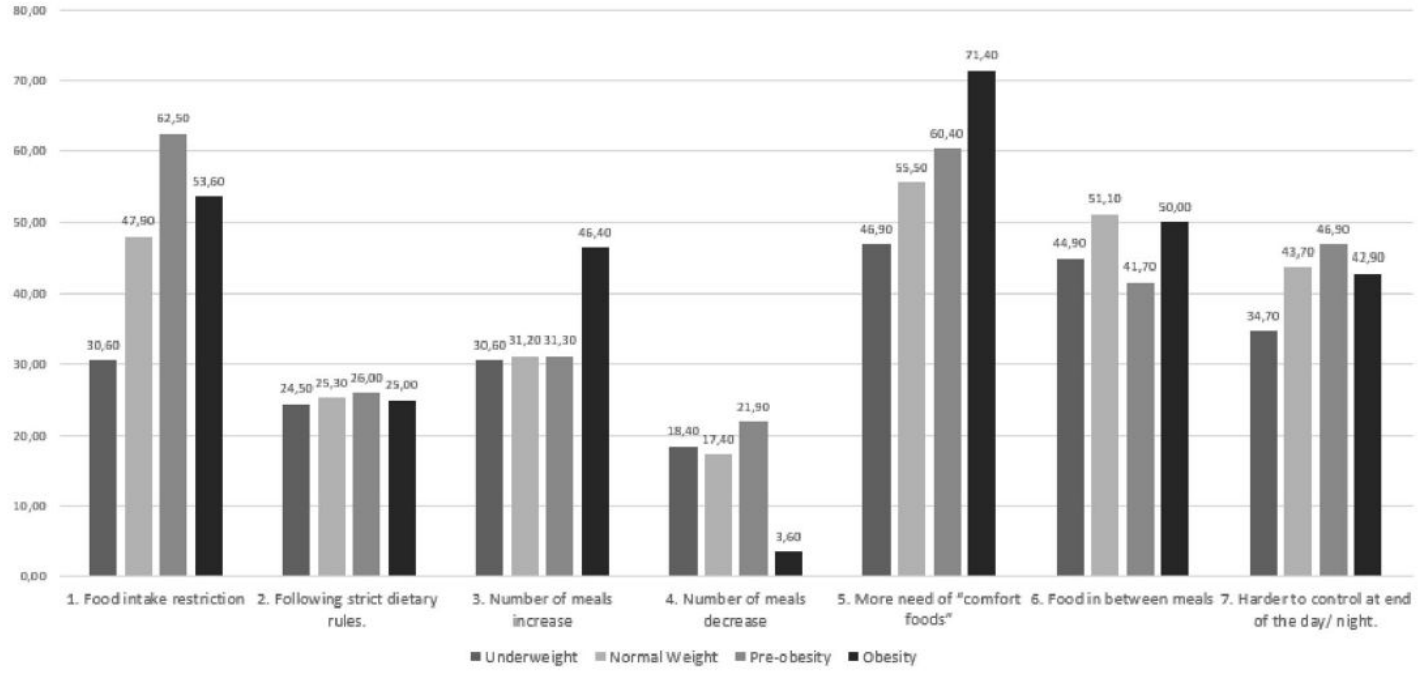


Fig. 1 Reported eating routine changes introduced during COVID-19 quarantine (percentage of affirmative answers) by BMI groups

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SPAIN

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Anorexia Nervosa (AN)

- **Prevalence in adolescent girls:** Approximately 1% (based on Spanish adolescent female population estimates).
- **Female-to-male ratio:** 9:1.
- **Typical age of onset:** Most common between ages 13 and 14.
- **Average length of hospital stay:** Doubled during the pandemic (from 10.89 to 22.67 days).
- **Food restriction behavior:** Observed in 95.7% of hospitalized cases in 2020–2021.
- **Exposure to social media:** Significant increase during the pandemic (from 11% to 65.2% of patients).

Source: infocop.es, univadis.es, tca-aragon.org

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Bulimia Nervosa (BN)

- **Prevalence among young women (ages 9–25):** Between 0.3% and 2.9%.
- **Prevalence among men:** Between 0% and 0.4%.
- **Associated behaviors:** Purging (39.1% of cases in 2020–2021), excessive exercise (73.9%).
- **Onset age:** Typically starts around ages 19–20.

Source: infocop.es, univadis.es

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Muscle Dysmorphia (Bigorexia)

- **Prevalence:** No official statistics specifically for Spain.
- **Most affected population:** Mainly young males between 18 and 35 years old.
- **Key features:** Excessive concern with muscularity, body image distortion, compulsive exercise, and in some cases, anabolic steroid use.

Source: mgyf.org

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National trends and clinical observations

- **Pandemic impact:** Clear increase in ED incidence, hospital admissions, and severity among Spanish adolescents during 2020–2021.
- **Main risk group:** Adolescent girls, especially between ages 13 and 17.
- **Gender influence:** Strong impact on women due to sociocultural pressures and body image ideals.
- **Public health status:** EDs are considered a growing public health problem in Spain due to their high prevalence, chronic course, and associated mortality.

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TURKEY

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Anorexia Nervosa

Annual incidence: In Türkiye, the annual incidence rate of Anorexia Nervosa (AN) is estimated at approximately **8 per 100,000 people**
https://www.turkiyeklinikleri.com/article/tr-anoreksiya-nervoza-ve-diger-yeme-bozukluklarinin-sikligi-yayginligi-ve-mortalitesi-46916.html

Lifetime prevalence: Among adolescent girls, lifetime prevalence ranges from **0.3% to 2.6%**, while among boys, it is between **0.1% and 0.3%**
https://www.turkiyeklinikleri.com/article/tr-ergenlerde-anoreksiya-nervoza-88193.html

Gender distribution: Approximately **95% of AN cases** occur in females
https://www.avasirintav.com/makaleler/anoreksiya-nervoza-zayiflama-hastaligi

Age of onset: The typical onset age is between **13 and 20 years**, with an average age of **17**
https://www.cnnturk.com/saglik/anoreksiya-nervoza-hastaliginin-baslangic-yasi-17

Mortality rate: AN has one of the highest mortality rates among all psychiatric disorders
https://www.cnnturk.com/saglik/anoreksiya-nervoza-hastaliginin-baslangic-yasi-17

Access to treatment: Only a small proportion of patients with eating disorders, especially those with bulimia nervosa, benefit from mental health services
https://www.turkiyeklinikleri.com/article/tr-anoreksiya-nervoza-ve-diger-yeme-bozukluklarinin-sikligi-yayginligi-ve-mortalitesi-46916.html

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Bulimia Nervosa

General Prevalence: A scoping review reported a **0.8%** prevalence of BN among adolescents and young adults in Türkiye, aligning with rates observed in other Middle Eastern countries .

University Students: A study involving 783 Turkish university students found that **13.1% of females** and **9.2% of males** exhibited abnormal eating habits, which may include behaviors associated with BN
https://www.sciencedirect.com/science/article/abs/pii/S0195666308004893

Gender Distribution: Consistent with global trends, BN is more prevalent among females. However, increasing rates among males have been observed in Türkiye, highlighting the need for gender-inclusive awareness and interventions

Age of Onset: BN typically manifests during late adolescence to early adulthood. In Türkiye, studies have identified university students (ages 17–23) as a high-risk group .
https://pubmed.ncbi.nlm.nih.gov/18584912/

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Muscle Dysmorphia (Bigorexia)

University Students: A cross-sectional study involving 430 male students found that **16.3%** of those in sports sciences faculties and **6%** in nursing faculties exhibited tendencies toward MD
https://pubmed.ncbi.nlm.nih.gov/32227487/

Bodybuilders: Among professional bodybuilders, university students and recreational bodybuilders studies reported MD symptom prevalence rates of **58.3%**, **11.2%**, and **5.7%**, respectively.
https://www.sciencedirect.com/science/article/pii/S2211266923000166

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Physiological Background of EDs

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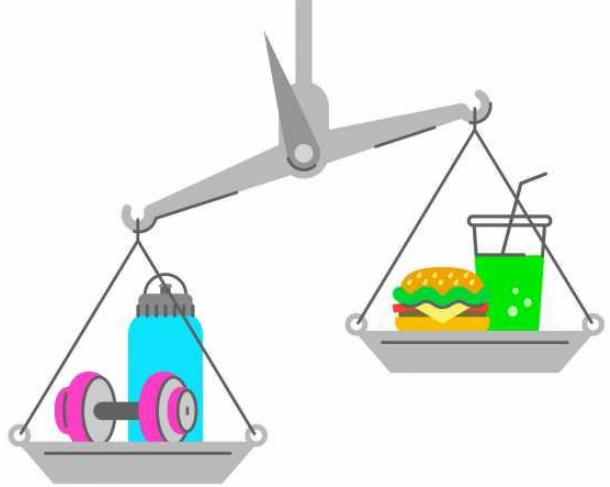
Negative Energy Balance



- Consumption exceeds intake → activation of emergency mechanisms
- Consequences of energy deficiency:
  - loss of muscle mass
  - metabolic slowdown
  - impairment of physiological functions

Negative Energy Balance: Energy introduced < Energy consumed

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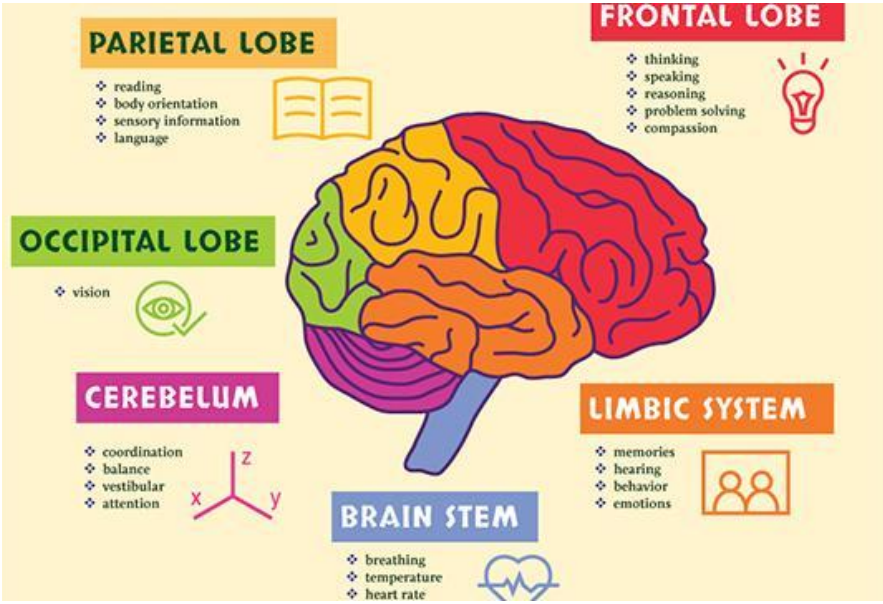
Homeostasis vs. Hedonism

Biological hunger:

- Internal regulation of body needs
- Physiology of the body that signals when it is necessary to eat to maintain energy balance

(**Prefrontal Cortex**: conscious decisions about food)



Hedonic hunger:

- Desire to eat for pleasure, not necessity
- Influenced by psychological and environmental factors (emotions, stress, social context)

(Limbic System: regulates emotions and pleasure related to food)

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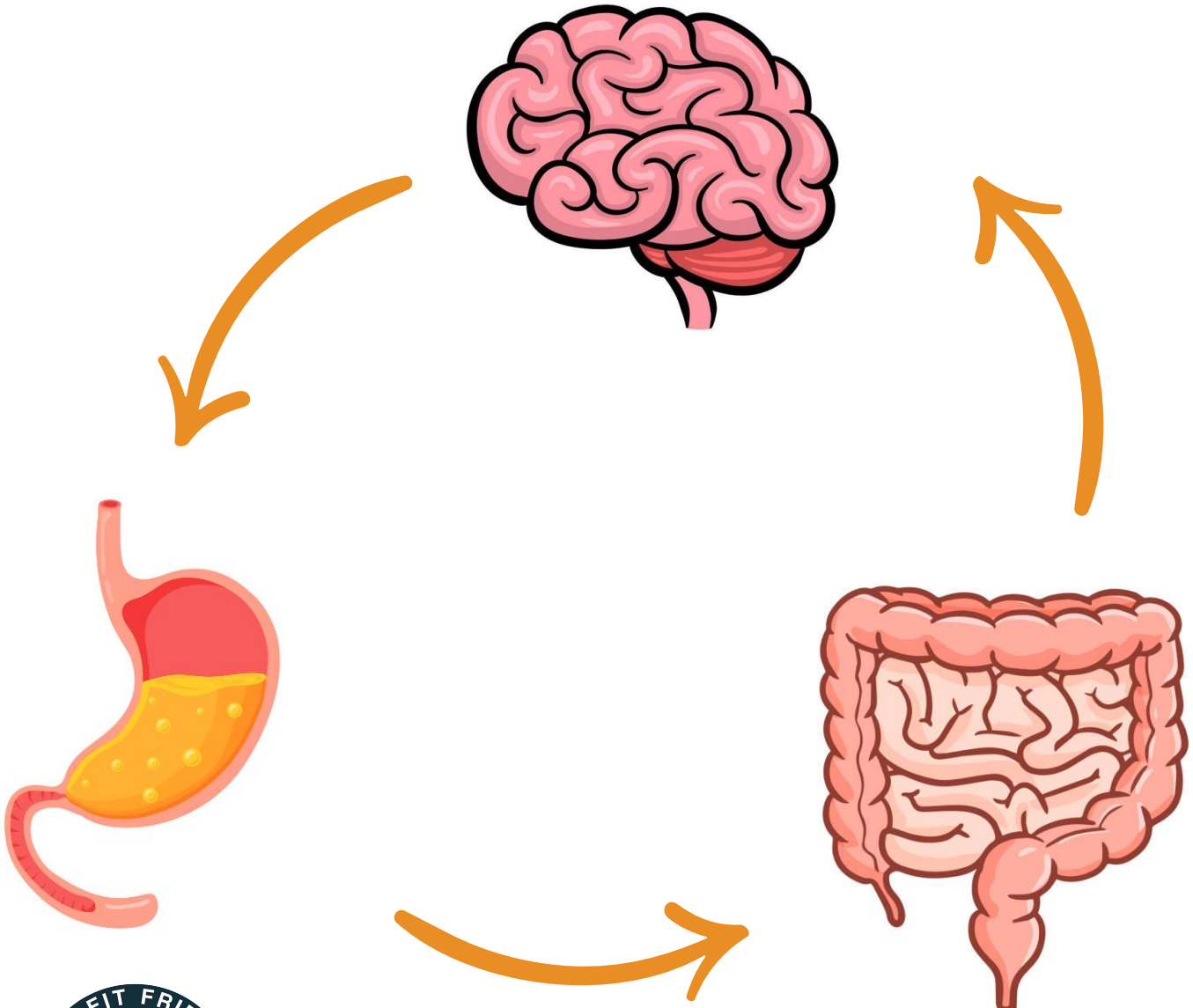

Peripheral and Central Signals

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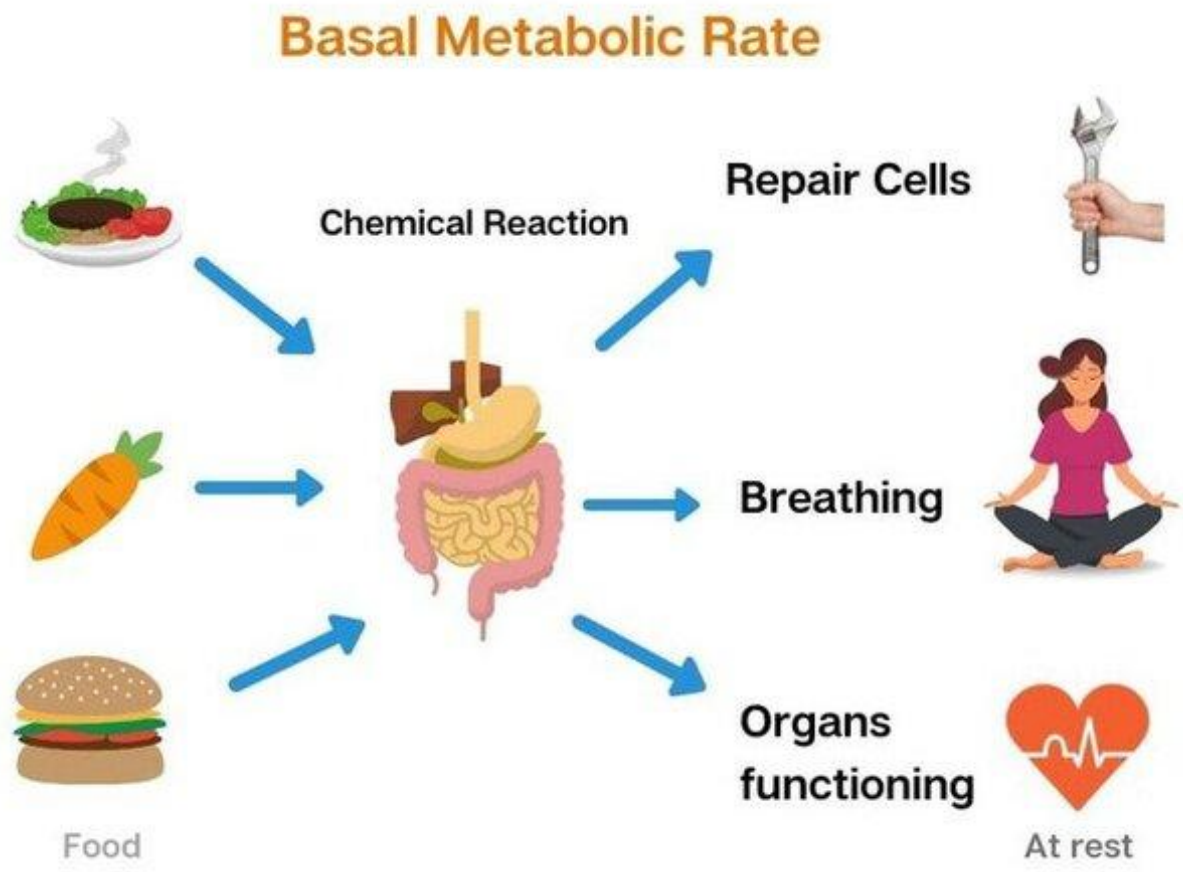
Basal Metabolism and Energy Saving

- Reduction of basal metabolic rate in response to caloric restriction
- Effects on the autonomic nervous system
- Bradycardia, hypothermia, hypotension



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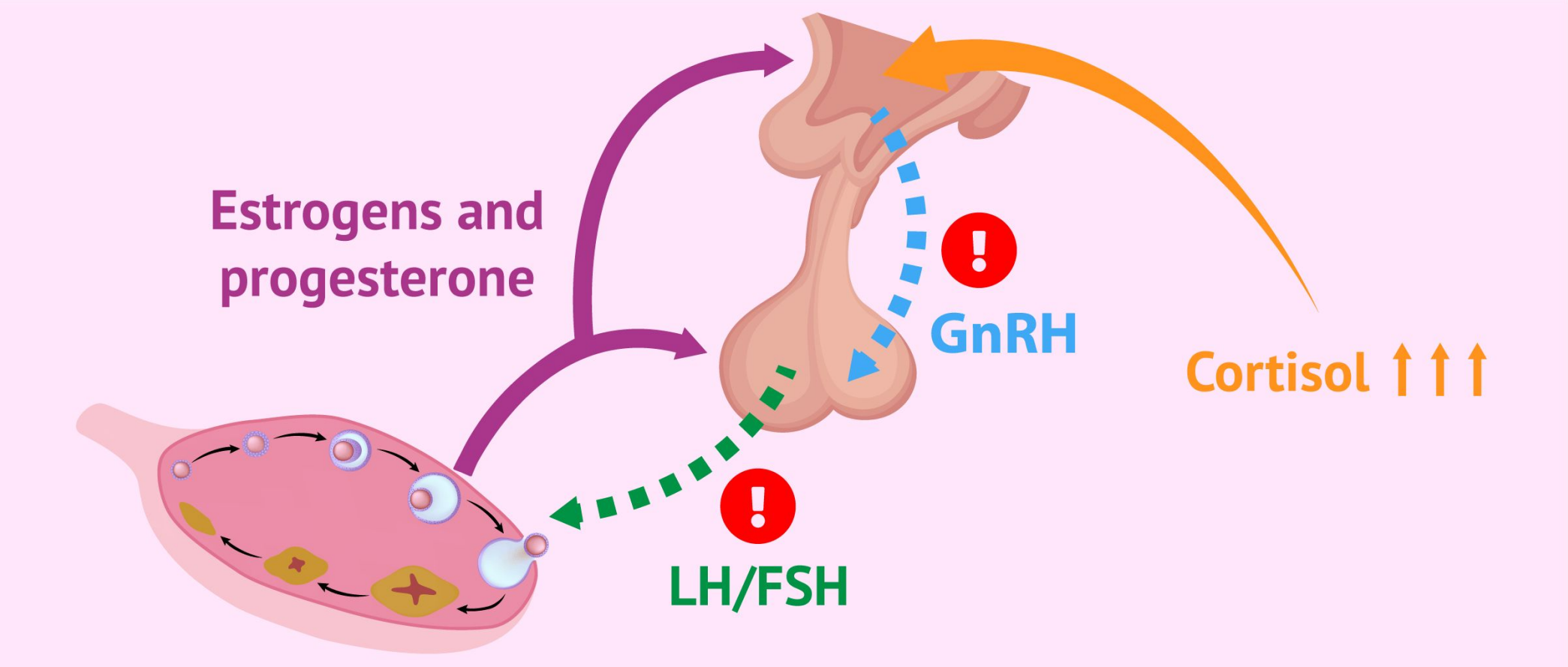
Endocrine System and Amenorrhea



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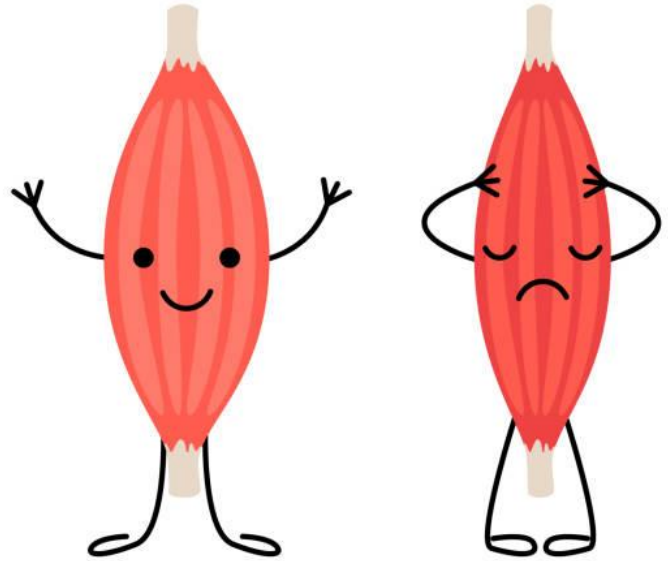
Lean and Muscle Mass Changes

- Muscle catabolism in energy deficiency
- Reduction of physical strength and performance
- Loss of lean mass even with a "toned" appearance



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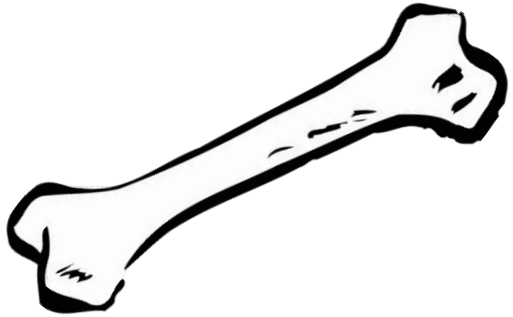
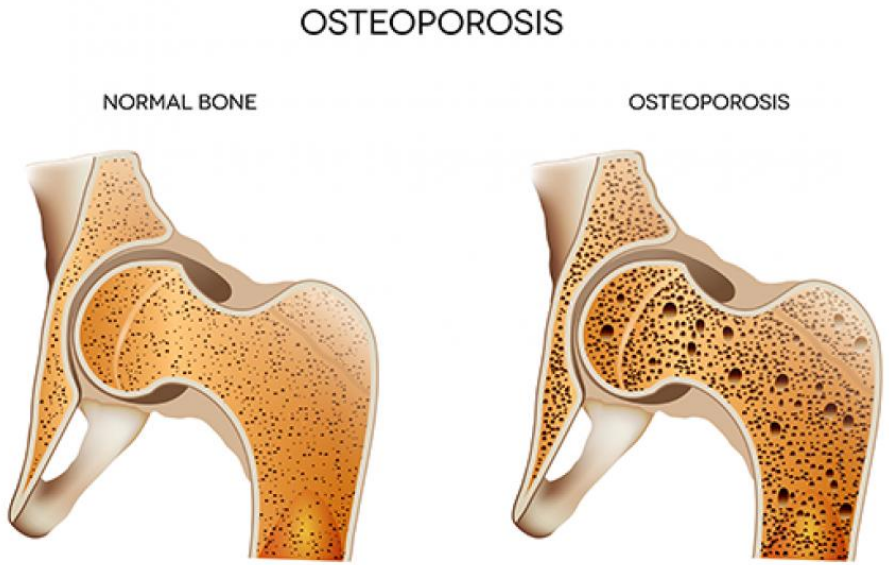
Bone Density and Osteoporosis Risk



- Reduced estrogen production → loss of bone density
- Impaired intestinal calcium absorption
- Risk of osteopenia and early osteoporosis
- Stress fractures also in young athletes



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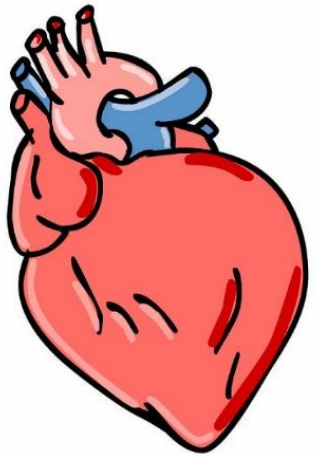
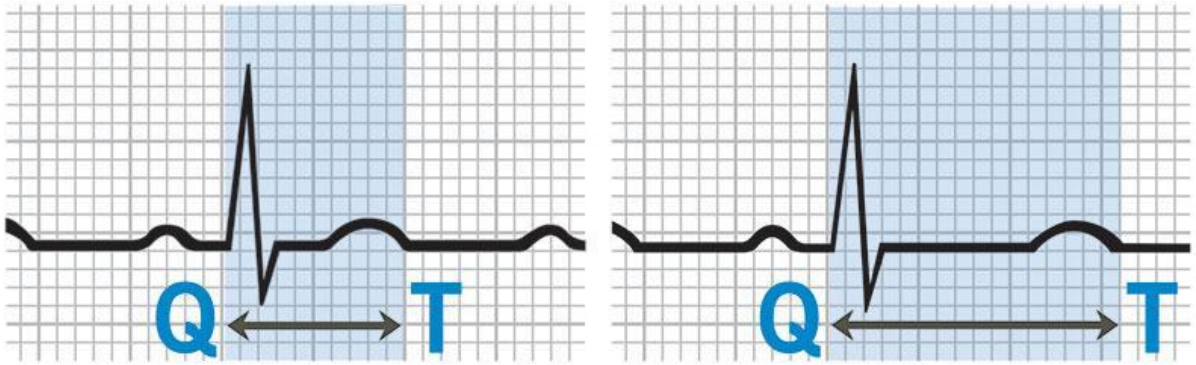
Effects on Cardiovascular System



- Bradycardia and hypotension as an adaptation to energy deficit
- Reduction of cardiac mass in severe cases
- Prolongation of QT interval → risk of arrhythmias
- Possible syncope and collapse from exertion



Normal QT Interval Long QT Interval

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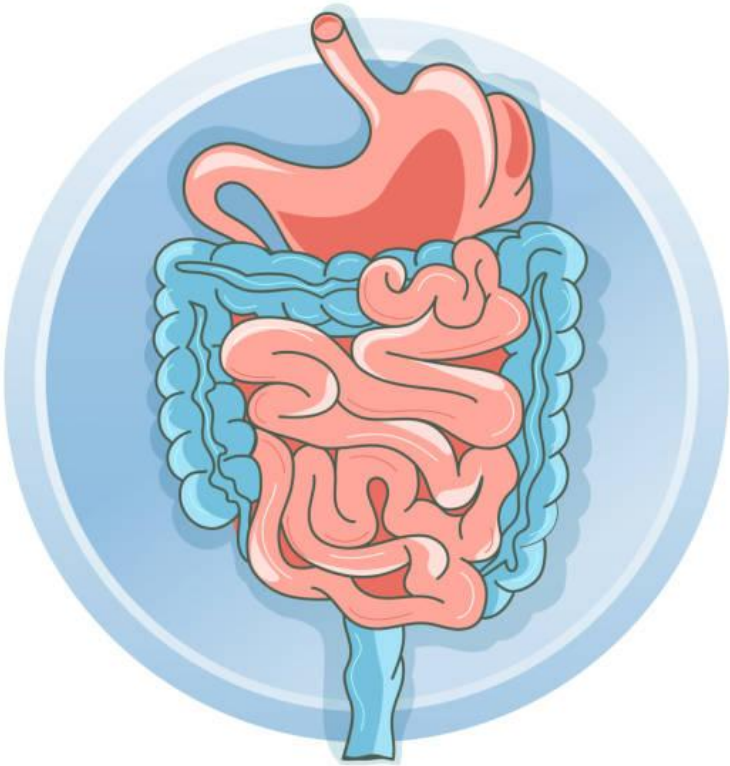
Gastrointestinal System

- Gastroparesis: slow gastric emptying → nausea, early satiety
- Chronic constipation due to slow intestinal motility
- Recurrent abdominal pain, bloating, feeling of heaviness
- Consequences of self-induced vomiting or laxatives: esophagitis, electrolyte imbalances



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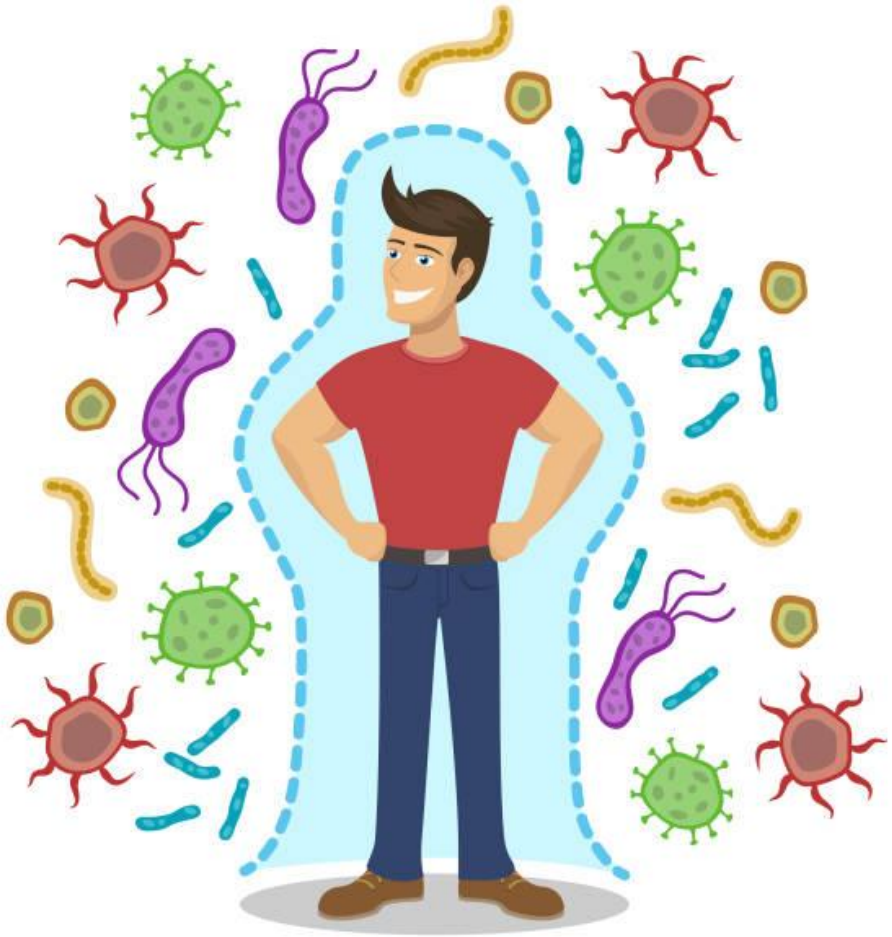
Immune System and Inflammation

- Anorexia: immunosuppression due to malnutrition → increased risk of infections
- Bulimia and BED: chronic proinflammatory state (↑ cytokines, oxidative stress)
- Dysfunction of the intestinal microbiota
- Impact on muscle healing and resistance to effort



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Brain and Neuroplasticity

- Reduction of brain volume (especially cortex and gray matter)
- Alterations in functional connectivity between emotional and cognitive areas
- Cognitive deficits: attention, memory, mental flexibility
- Effects reversible with adequate nutrition (in part)

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Sleep Disturbances

- Initial insomnia or frequent awakenings
- Light and non-restorative sleep
- Impact of caloric restriction
- Involvement of the HPA axis and serotonin
- Relationship with anxiety and hyperactivity

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Bigorexia: the Paradox

- Excessive physical activity and dietary rigidity
- Body dysmorphic disorder with focus on muscles and definition
- Low-calorie diet and use of supplements/anabolics
- Athletic appearance but signs of energy deficit
- Often unrecognized in sports contexts

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Eating Disorders (ED): Classification

General information

- ED represent a heterogeneous and varied group of conditions, ranging from typical patterns in early childhood to those more characteristic of adolescence and young adulthood.
- ED include Anorexia Nervosa, Bulimia Nervosa, Bigorexia, and Binge-Eating Disorder, ARFID, Orthorexia Nervosa, …
- ED are difficult to recognize, as affected individuals often lack awareness and underestimate the severity of the clinical symptoms, frequently exhibiting ambivalence toward treatment.
- The rate of co-occurrence with other psychiatric conditions is high.
- Only a small percentage of those suffering from ED receive an appropriate diagnosis and treatment.
- ED not only affect the individual but also involve the entire family system, requiring a comprehensive approach, especially when the onset occurs in childhood or adolescence.

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ANOREXIA NERVOSA

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Anorexia Nervosa (AN)

Diagnostic criteria according to DSM-5 TR:

- a gradual or rapid decrease in food intake resulting in weight loss;
- an intense fear of gaining weight despite progressive weight loss and/or underweight, which can reach severe levels;
- a distorted perception of body image.

The typical peak onset occurs in both sexes between the **ages of 15-19**. However, in recent years, there has been an **earlier age of onset**, coinciding with the general trend of earlier puberty.

The clinical presentation of the disorder in preadolescence can differ from that in adolescence.

If not recognized and treated promptly, AN can negatively affect physical and psychological development, leading to disability and interruption of the growth process, with potentially significant long-term consequences.

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AN: How It Starts In Adolescence

- Usually with food restriction:
  - following a diet aimed to weight loss (poor caloric intake, avoiding carbohydrates and fats/intermitting fasting/small food portions).
- Patients with AN often rationalize their food restrictions by claiming food intolerances or allergies, stating that certain foods make them feel unwell or by reporting feeling particularly bloated after eating certain foods.
- Primary goal: modify body image in response to dissatisfaction with physical appearance and low self-esteem according to personal ideals of beauty. These beauty ideals are often unrealistic and influenced by distorted images on the web.
- At early stages of disease, people with AN may refer a traumatic event.

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Perfectionism and control in AN: first steps

- Adolescence with AN may costant check their weight and body shape in front of mirrors.
- Initially, weight loss becomes a source of empowerment: adolescence with AN may experience a sense of increased well-being and self-efficacy from weight loss and changes in body shape.
- False beliefs that controlling the body may help them cope with negative emotions, low self-esteem, inadequacy and a perceived chaotic or out-of-control environment leading to self-discipline and personal success.
- Weight loss becomes a way to assert personal strength and capability.

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Perfectionism and control in AN: the evolution

- The desire for weight loss usually becomes the fear of gaining weight.
- The fear of gaining weight leads to anxiety and guilt after eating = mood instability related to self-judgment and conduct.
- People with AN try to menage anxiety and avoid unforeseen events through compulsive behaviors: weight checking before and after meals (weight becomes an obsessive thought), body checking in front of mirrors, calorie counting, rituals during meals (such as cutting food into small pieces, cooking for long periods, or eating very slowly).
- Gaining weight leads to hunger and may significantly mean losing control over one's identity and autonomy (personal relationships, internal reactions, and external events)

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AN: eliminatory behaviors

- Feelings of guilty after eating are alleviated through **eliminatory behaviors**, such as excessive physical exercise (motorism), self-induced vomiting, and the misuse of laxatives and/or diuretics.

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AN: complications

- Extreme weight loss may lead to impaired growth and irregular menstrual cycles in girls.
- All symptoms tend to worsen with further weight loss and deterioration of both physical and mental health.
- *Negative judgment, criticism, and family conflict can contribute to the maintenance of the disorder.*
- People with AN do not often recognize their condition and avoid seeking help. If chronic, the symptoms may become part of the individual's identity, especially if the disorder is perceived as **ego-syntonic.**

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What parents might notice 1/2

- Tendency to hide food and avoid meals with others.
- Cutting food into very small pieces or constantly rearranging food on the plate.
- Skipping meals becomes frequent, often with excuses such as “not hungry” or “already ate.”
- Food preparation may involve rigid rituals, avoiding entire food groups (e.g., carbs, fats).
- Indirect signs of compensatory behaviors can emerge, like spending a long time in the bathroom right after meals, excessive physical activity.
- Emotional and behavioral changes may be present, including mood swings and disturbed sleep patterns.

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What parents might notice 2/2

- **Social Withdrawal:** progressive isolation from family, peers, and social settings.
- **Academic & Athletic Overcommitment:** intense dedication to school and sports, often with initially preserved performance. Low tolerance for failure or academic setbacks.
- **Compulsive Behaviors:** constant movement, excessive exercise, sometimes even when lacking energy.
- **Hydration Issues:** either excessive water intake or intentional dehydration.
- **Unusual Clothing Choices:** overly covering clothes due to perceived cold (early stages) vs minimal clothing to promote heat loss and "burn calories" (later stages).
- **Mood Symptoms, disturbed sleep patterns, gastrointestinal complaints, asthenia and in the final phases progressive decline in performance.**
- **Amenorrhea or menstrual irregularities in girls, beyond two years after menarche.**

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What Clinicians Commonly Observe in Adolescent with AN

- **Alexithymia**

Poor recognition and regulation of internal emotional states is common.

- **Psychological Dynamics**

Dependency and self-criticism are often present, typically linked to difficulties in the separation–individuation process. Avoidance of the developmental transition from childhood to adulthood is frequently observed (e.g., maintaining a childlike, asexual body). Parent–child relationships, especially with mothers, may be marked by role reversal and controlling dynamics.

- **Cognitive Aspects**

Low self-esteem and difficulties in self-assertion are frequently reported.

- **Inner Conflict**

A split may exist between a healthy/adaptive part and an anorexic part that irrationally maintains the symptoms (e.g., internal voices guiding and controlling behavior).

- **Peer Relationships**

- Often characterized by dependency; separations and emotional detachment are experienced with significant distress.

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AN: How it starts in preadolescence

- Preadolescence often deny concerns about body shape and weight, only reporting a lack of appetite or abdominal pain.
- Greater presence of neurodevelopmental disorders and/or previous psychopathology (such as avoidant/restrictive food intake disorder, known as ARFID, depression, anxiety, obsessive-compulsive disorder), while clinically, they exhibit rapid weight loss that brings them to medical attention more quickly.
- Warning signs may include slowed growth, changes in body mass index (BMI), repeated nausea, or abdominal pain.
- Family factors play a crucial role (e.g., difficult relational patterns, mutual overcontrol, critical comments).
- Peer victimization episodes are frequently reported.

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High-Risk Populations for AN

- Adolescents involved in dance or competitive sports requiring weight and body shape control.
- Children and adolescents with a history of childhood obesity.
- Individuals with chronic illnesses that demand dietary restrictions, such as: Type 1 diabetes, Cystic fibrosis, Inflammatory bowel disease and Celiac disease.
- Sexual abuse history in childhood

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Bulimia nervosa (BN)

Diagnostic Criteria According to DSM-5-TR:

- **Recurrent episodes of binge eating**, characterized by both:
  - Eating, in a discrete period of time, an amount of food that is definitely larger than what most individuals would eat under similar circumstances.
  - A sense of **lack of control** over eating during the episode.
- Binge eating episodes occur, on average, at least **once per week for 3 months**.
- Recurrent **inappropriate compensatory behaviors** to prevent weight gain, such as:
  - Self-induced vomiting
  - Misuse of laxatives, diuretics, or enemas
  - Fasting or excessive exercise
- Self-evaluation is unduly influenced by body shape and weight.
- The disturbance does not occur exclusively during episodes of anorexia nervosa.

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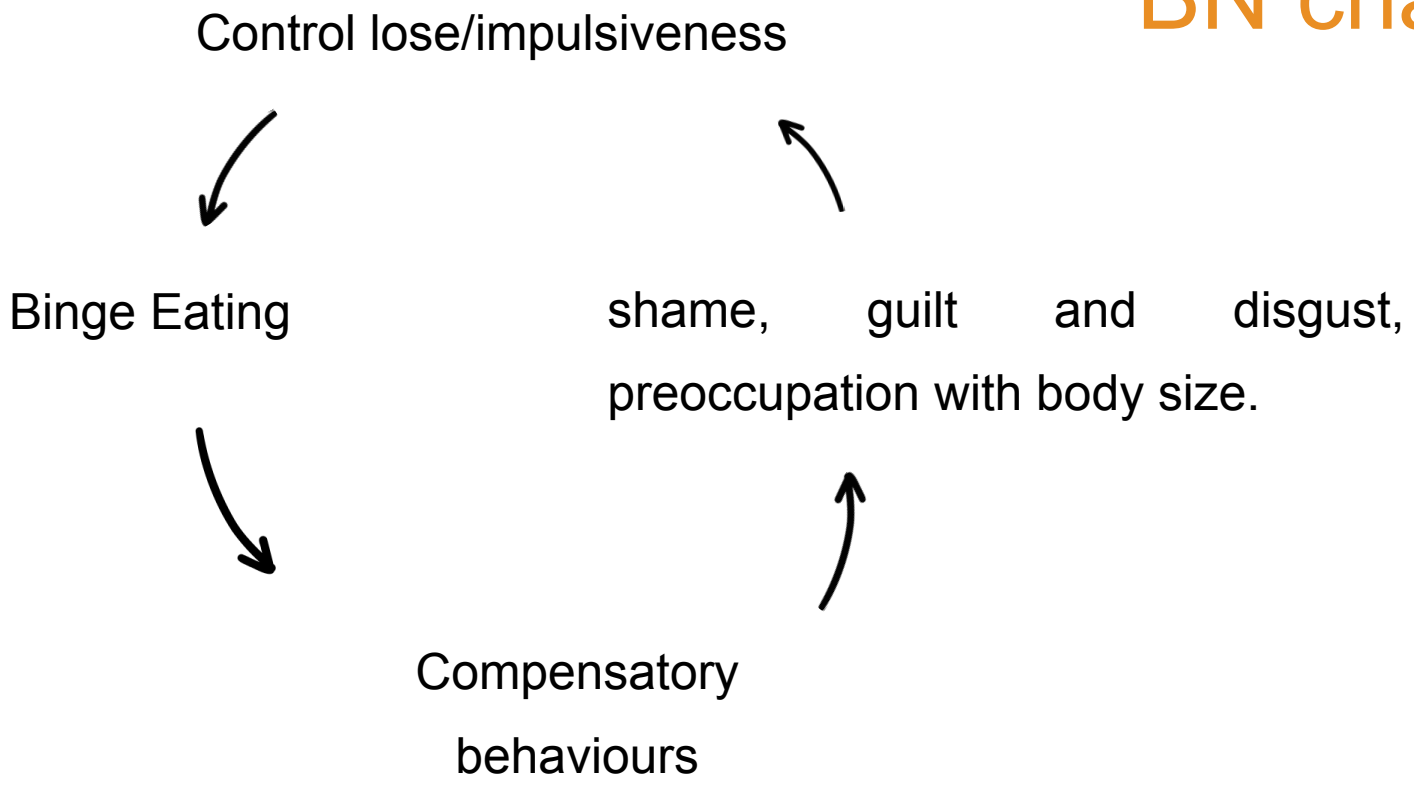
BN characteristics



These behaviors can become **compulsive and obsessive and are usually hidden (e.g. eating during the night).**

The disorder may go unnoticed and untreated for a long time.
Parents may notice food missing from the pantry.

As with individuals with AN, those with BN fear weight gain and are strongly motivated to lose weight.

Individuals with BN are typically within the **normal weight or overweight range.**

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BN comorbidities

Psychiatric Comorbidities

- Depression, anxiety, hopelessness, and shame
- Increased risk of non-suicidal self-injury, suicidal ideation, and death by suicide

Suicide risk is 8 times higher than in the general population

Complications Purging-related:

- Dental erosion, salivary gland hypertrophy
- Callosities or abrasions on the hands (e.g., Russell's sign), nail damage
- Mouth sores
- Electrolyte imbalances → ↑ risk of cardiovascular disease
- Pharyngeal trauma

Hormonal and gastrointestinal issues:

- Irregular menses, endocrine disruption

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Bigorexia

- Bigorexia or vigorexia or muscle dysmorphia (MD) or reverse anorexia
- Diagnostic criteria according to DSM-V TR:

✔ Distorted body image: persistent belief of not being muscular or strong enough. Individuals perceive themselves as small and weak even if they look normal or very muscular.

✔ Obsessive focus on appearance.

✔ Compulsive behaviors: excessive exercise and weightlifting (spending hours in a gym), following a rigid high-protein diet (squandering excessive amounts of money), supplement use (sometimes including anabolic-androgenic steroids).

- Bigorexia may be driven by social ideals of hypermesomorphic male physique.
- Muscularity pursuit may serve as a coping strategy for body-related anxiety.
- Body builders are at higher risk

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Bigorexia characteristics 1/2

- **Distorted Body Image:** persistent and irrational belief that their body is too small, weak, or underdeveloped, even when they are objectively muscular.

This body image distortion is similar in mechanism to that seen in anorexia nervosa but focused on muscularity rather than thinness.

They may frequently check their appearance in mirrors or avoid situations where their body could be exposed (e.g., swimming pools).

- **Obsessive Focus on Appearance:** thoughts dominated by concerns about their physique, particularly muscle size and definition.

This leads to frequent body-checking, comparisons with others, and distress if the desired appearance is not maintained.

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Bigorexia characteristics 2/2

- **Excessive Exercise and Weightlifting:** individuals typically follow rigid and intense workout routines, often spending multiple hours a day at the gym.

They may continue exercising despite pain, injuries, or exhaustion, prioritizing muscle gain over health. This compulsive behavior can result in overtraining syndrome, fatigue, and long-term joint and muscle damage.

- **High-Protein Diets and Supplement Use:** there is often an obsession with dietary control, especially increasing protein intake to support muscle growth.

This may include the *excessive use of protein shakes, creatine, anabolic supplements, or even illegal substances like steroids*.

Individuals with MD frequently avoid important social, academic or occupational activities because of the compulsive need to maintain their excessive exercise and rigid diet.

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What Drives Individuals Toward Bodybuilding in Bigorexia?

- **Early body dissatisfaction:** feeling scrawny or weak during childhood
- **Social comparison:** envy of athletic or popular peers
- **Positive reinforcement:** quick visible results increase self-esteem
- **Peer validation:** gaining admiration and respect from male peers
- **Desire for attractiveness:** being perceived as more appealing by girls
- **Sense of control:** using weightlifting to reshape the body and gain confidence

🗣️ *"I was scrawny as a kid and envied the athletic boys. Lifting made me feel strong—and for once, proud of my body."*

“I can easly impress the girls while flexing my biceps in gym... it makes me feel good about myself."

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Current Attitudes Toward Weightlifting in bigorexia

- **Aesthetic focus:** workout choices based on how they shape the body (e.g., training legs more if quads seem smaller).
- **Influenced by bodybuilding culture:** techniques learned from magazines and peers, always looking to “shock” muscles.
- **Rigid mindset:** feeling like a failure if training isn’t intense enough or if the session is interrupted.
- **Emotional impact**: irritability and frustration when unable to complete a planned routine.

🗣️ *"If I haven’t pushed myself to the limit, I feel like I’ve wasted my time."*

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Current Attitudes Toward Diet in bigorexia

- **Extreme protein intake:** aiming for up to 3g of protein per kg of body weight, eating every few hours—even when not hungry.
- **Bulking vs. cutting cycles:**
  - Bulking: high protein and carbs to fuel muscle growth.
  - Cutting: near-total carb restriction to enhance muscle definition.
- **Carb-cycling:** inspired by fitness magazines and pro bodybuilders, involves tracking every gram of carbohydrate
- **Prepping all meals in advance:** to control nutrient quality and avoid "unclean" foods.
- **Social and emotional toll:** diet requires intense effort and interferes with normal daily life, but is perceived as necessary for achieving the ideal physique.

🗣 *"It's hard to maintain this kind of diet and live a normal life, but I persevere—because that's what it takes to build the body I want."*

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Attitudes Toward Steroid Use in bigorexia

- **Normalization:** steroid use seen as common and expected in gym culture.
- **Minimization of risk:** belief that steroids are not worse than unhealthy diets or lifestyles.
- **Not seen as "cheating":** effort at the gym and strict diet still considered key.
- **Distrust of medical advice:** perception that professionals overstate risks or lack real knowledge.
- **Self-education:** reliance on online research to justify and manage use.
- **Psychological risks:**
  - Depression and suicidal thoughts after stopping a cycle;
  - Fear of losing muscle mass or progress without continued use.

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Impact on Quality of Life in Bigorexia

- **Social isolation:** avoids eating out or social gatherings to stick to strict diet.
- **Financial strain:** large sums spent on supplements (e.g., protein powders, fat burners), leaving little for other activities
- **Limited friendships:** little time or energy left for maintaining relationships.
- **Work-life conflict:** training prioritized over job responsibilities → late arrivals, early departures.
- **Constant preoccupation:** obsessive thoughts about food, training, and appearance throughout the day.
- **Life revolving around the gym:** idealized vision of working in fitness to justify and maintain current habits.

🗣️ *"I don't have many friends… I'm either training, thinking about training, or eating for training."*

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Bigorexia: The Hidden Emotional Toll

- **Persistent body dissatisfaction** despite visible muscularity.
- **Distorted self-perception:** feels inadequate even when objectively more muscular than peers.
- **Low self-esteem:** ongoing negative thoughts about appearance.
- **Impact on intimacy:** discomfort with nudity and sexual activity due to body shame.
- **Emotional distress:** feelings of hopelessness and questioning the purpose of continued effort.

🗣️ *"I know I'm bigger than most guys, but I still feel inadequate. Even looking in the mirror makes me feel horrible."*

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Appearance-enhancing drugs

André Silva, Assistant Professor at Instituto Piaget, Almada

Is this new?

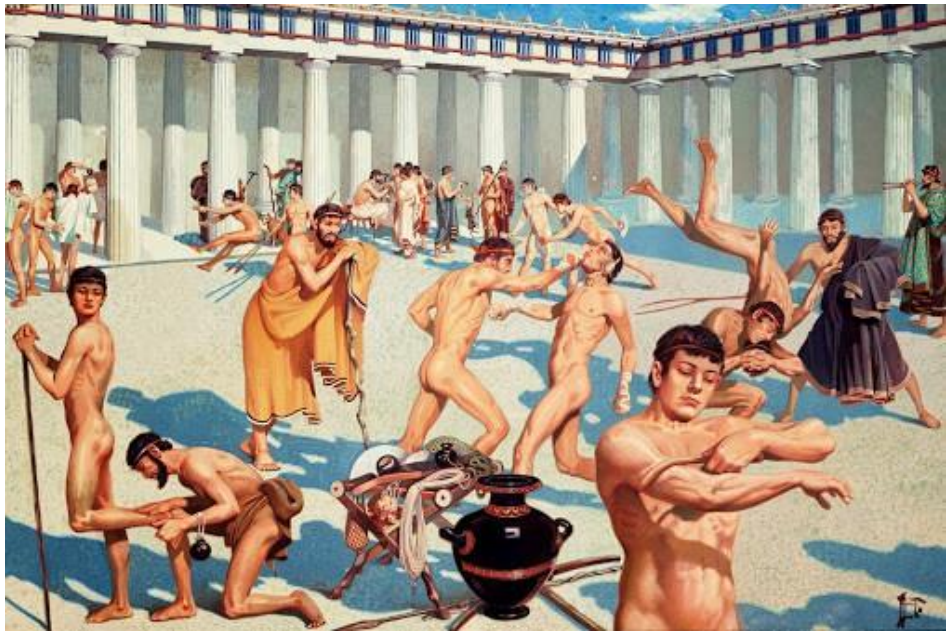
Anima sana in corpore sano

(in English: healthy mind in a healthy body)

c. 100-127 CE

Is this new?

In fact, the ancient greeks and romans popularised the idea of gyms - from the greek *gymnós* = exercising naked - that also employed ancient pharmacists and physiotherapists;



What went wrong?

Eventually, there was a shift in focus: the point was to become harder, better, faster, stronger, not (just) healthy, and with these pressures came the “need” for shortcuts;

Then, there are the professional pressures:

Ballet dancers, for example, are now required to dance for longer, in more complex roles with more physically taxing moves;

What went wrong?

Then, there's social media and fashion:

- As physical attributes such as weight, height and BMI are scrutinised under social standards of health and attractiveness, body perceptions are warped and psychology well-being can suffer (e.g., de Valle et al., 2021; Merino et al., 2024);

The "solution" for all of this? Drugs, injections, operations, adhesion to unhealthy or unnecessary trends in nutrition among other factors.

What are appearance-enhancing drugs?

PIEDs - *Performance and Image Enhancing Drugs*

This concept goes beyond sports and exercise - people may want to improve their bodies as a means of increasing performance, but also to achieve aesthetic, social, cultural, and professional goals;

Includes cognitive stimulants for studying, anabolic steroids to increase muscle dietary hypertrophy, supplements to maintain a desired physique…

Categories of PIEDs

- **Traditional doping agents;**
- **Substances with direct effects on body image;**
- **Dietary supplements.**

Traditional doping agents

These include:

- **Androgenic steroids** - which promote muscle growth and rapid recovery;
- **Growth hormone** - used to reduce body fat and increase lean mass;
- **Erythropoietin**, which increases blood's oxygen-carrying capacity;
- **Stimulants** such as ephedrine and amphetamines used to boots focus and endurance.

Many are on the World Anti-Doping Agency banned list but continue to be used.

Substances related to body image

These include:

- **Anabolic steroids** used outside competitive sports;
- **Diuretics** to reduce water retention and enhance muscle definition;
- **Laxatives** for rapid weight loss;
- **Appetite suppressants** such as sibutramine, banned in several countries (but not in Brazil, etc.);

The focus is less on performance but more on appearance, often influenced by unrealistic body ideals.

Dietary supplements

They occupy an ambiguous space:

They are legal, meant to complement nutrition - whey protein, creatine, caffeine, beta-alanine, etc;

However, they are poorly regulated, and some have unclear compositions or are even contaminated;

Psychologically, supplements act as **markers of commitment** to the ideal body - used not because of their effects, but as a ritual in body-focused circles.

PIEDs and motivation

PIEDs rarely follow a purely instrumental logic: **there is a deep emotional dimension** tied to the desire to alter the body;

PEIDs consumption is correlated with feelings of bodily inadequacy, low self-esteem, or even erroneous perceptions muscle dysmorphia;

Others usePIEDs as a form of psychological compensation after experiences bullying, of failure, and performance relational (either pressure in sports, sexuality or even professional life).

There is also a communal dimension.

But… are they doping?

Doping is defined as the **use of prohibited substances** or methods with the intention of enhancing athletic performance, **violating rules** and regulations;

The use of substances for aesthetic or non-regulated purposes is not, in itself, considered doping: specially when much of PIEDs usage occurs outside of sports, and therefore poorly regulated;

Then… are they OK to use?

Are PIEDs safe?

There is a growing normalisation of these substances, especially among young adults;

The usage of Selective Androgen Receptor Modulators (SARMs), synthetic peptides, and hormone micro dosing are oftentimes based on non-scientific forums;

The risks are significant: hepatotoxicity, infertility, gynecomastia, cardiovascular changes, testicular atrophy, severe acne and, even, death.

There is also reports of psychological dependence, irritability, impulsivity, etc.

So… what can we do about it?

We must go beyond prohibition, control, and punishment;

Regulation is important, but they overlook users' subjective motivations;

It is important to invest in critical education about the body, health, and appearance from an early age;

Psychosocial interventions should promote self-esteem, foster critical thinking about imposed body ideals, offer support, and create socially valued alternatives for identity construction.

Now let’s look at some cases!

Protein products

- There are some performance benefits in using protein products, namely increase of muscle mass and strength (up to 1.6g/kg/day) and decrease in recovery time (Cermak, 2012);

- However, most people do not need protein supplements - the average gym goer, for example, does not exercise enough to gain any benefits (Morton et al., 2017);

- Worse, the use of dietary supplements is linked to an increase in permissive attitudes towards doping (Yager & O'dea, 2014).

Protein products

Some evidence that intakes of more than 1.5g/kg/day have detrimental effects (homeostasis, renal function, liver function, coronary heart disease) (Delimaris, 2013);

For a 70 kg individual this equates to “just” 105g/day.

Anna, 25 years-old

- Anna trains three times a week at a local gym, with a focus on gaining a moderate amount of muscle. She is a university student, and follows fitness influencers on Instagram and TikTok;

- She uses whey protein supplements, casein, and caffeine to gain muscle and increase resistance. She thinks taking supplements is an essential part of “being fit”.

- But she already consumes enough protein from her meals and she has no protein deficiency nor does she do high intensity training.

Anna, 25 years-old

- She believes there are advantages in taking these supplements: she feels she is doing what others do to achieve their fitness goals, and in turn this increases her sense of belonging, her motivation increases, and she becomes more committed to training and sharing her experiences;
- However, this has a financial impact in her monthly budget, and is associated with the development of erroneous beliefs about her body image ("if I don't take these supplements I am not able to have a desirable body");
- If she is unable to achieve her goals, there is a higher risk to transition to more powerful substances.

Steven McRae

ROYAL BALLET & OPERA

Photo by Darian Volkovo and The Royal Ballet

Steven McRae

- Steven snapped his Achilles tendon during a live performance at the Royal Opera House;
- He states that for years he was battling with injuries, and pushed and pushed and ignored all the signs that something worse could happen… "I had been living in a constant state of burnout" and was "greatly under-fuelled";
- He is now one of the more vocal voices advocating for changes in the Ballet world;
- Side note: He has increased by a lot his muscle mass and strength and… there were critics saying that he is now a less interesting and less gracious dancer…

How to Approach a Youth with a Body Image Disorder

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My Fit Friend

It’s Not ‘Just Aesthetics’

- Obsession with fitness ≠ wellness
- Training and diet can be used as a control
- Warning signs are not always visible

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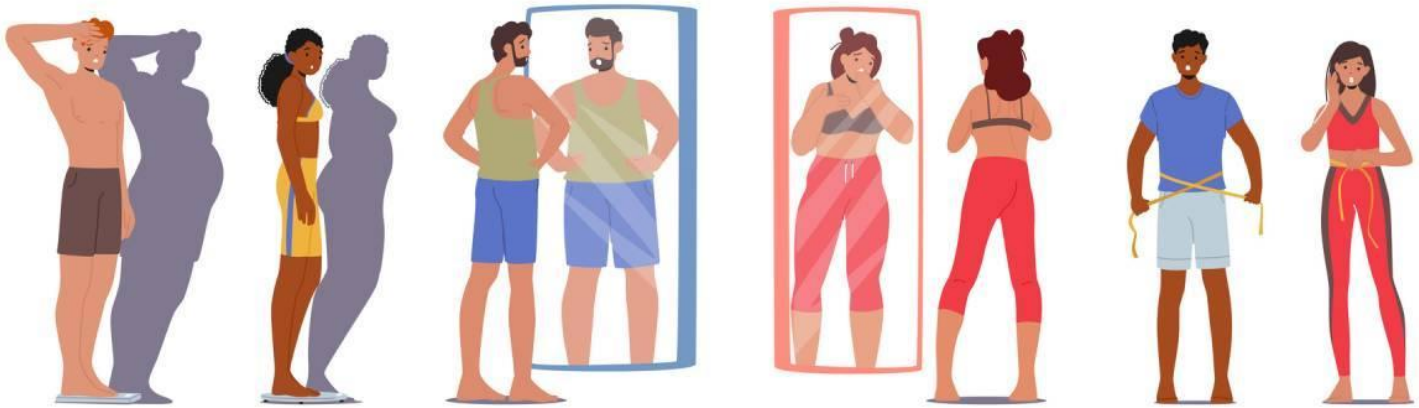
What is Body



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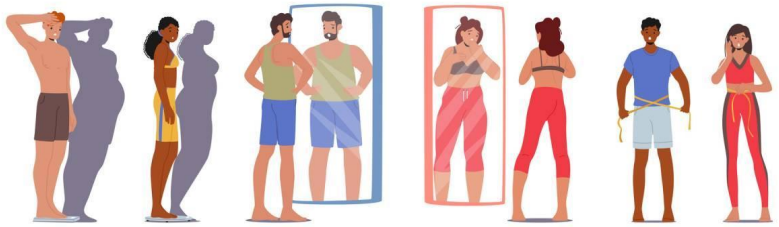

What is Body Image?

How you see yourself when you look in the mirror or picture yourself in your mind.

A person can weigh 50kg and feel ‘fat’ or have obvious muscles and never see themselves as enough. Body image is not an objective fact.

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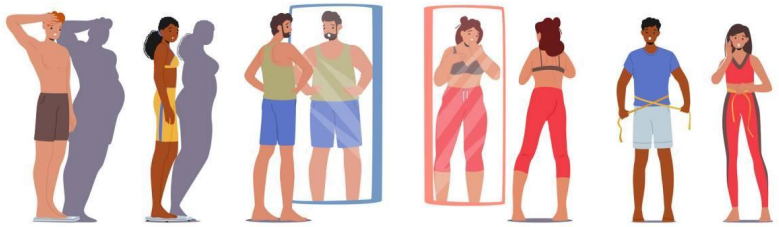

What is Body Image?

Body Image is the perception that one has of their physical self and the feelings they experience as a result of this perception

What you believe about
- Your appearance
- How you think other people see you
- How you feel about your body

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When Body Image Becomes Toxic

Positive BI	Negative BI
Acceptance	Shame
Body care	Obsessive control
Activities for pleasure	Activities for compensation
Trust	Self-depreciation

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When Body Image Becomes Toxic

- Avoidance of certain exercises due to body dissatisfaction
- Excessive exercising to ‘fix’ perceived flaws
- Unhealthy dieting or food restriction
- Social withdrawal due to self-consciousness about appearance

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A Complex Issue for Young People

- In the US, 1-2/100 students struggle with an eating disorder
- Only 4% of women around the world consider themselves beautiful
- In a study of over 1,200 10–17-year-olds, 72% said they felt tremendous pressure to be beautiful
- There is a universal increase in beauty pressure and a decrease in girls' confidence as they grow older

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Individual factors:

- Self-esteem
- Personality traits
- Internalization of appearance and beauty ideals
- Body comparison tendencies

Environmental factors:

- Family
- Friends and peers
- Coaches and mentors
- Role models
- Media and popular culture

What Influences BI?

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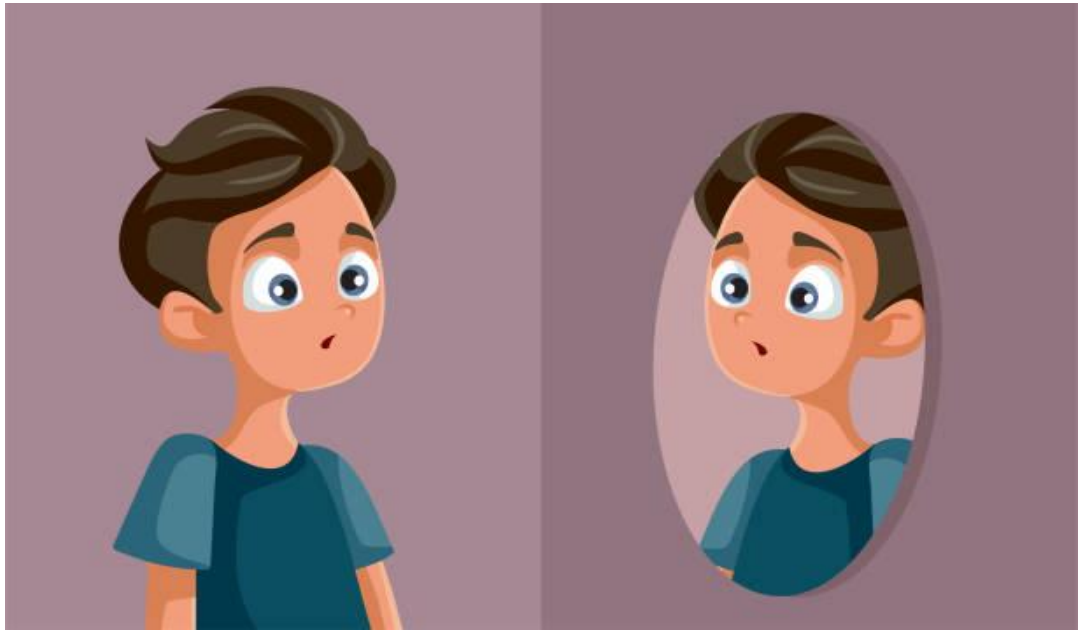
Individual Factors



- Anxious or perfectionist temperament
- Self-esteem and sense of efficacy
- Early experiences (comments, judgments)
- Any trauma or teasing

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The Weight of Familiar Glances

- Parental comments on weight/appetite
- Educational style (controlling vs. accepting)
- Family patterns of body care
- Dysfunctional relationships = lower self-esteem

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Comparison and Competition Among Peers

- Comments between friends
- Sharing pics and selfies
- Comparisons on performance, measurements, weight
- The group as reinforcement or threat

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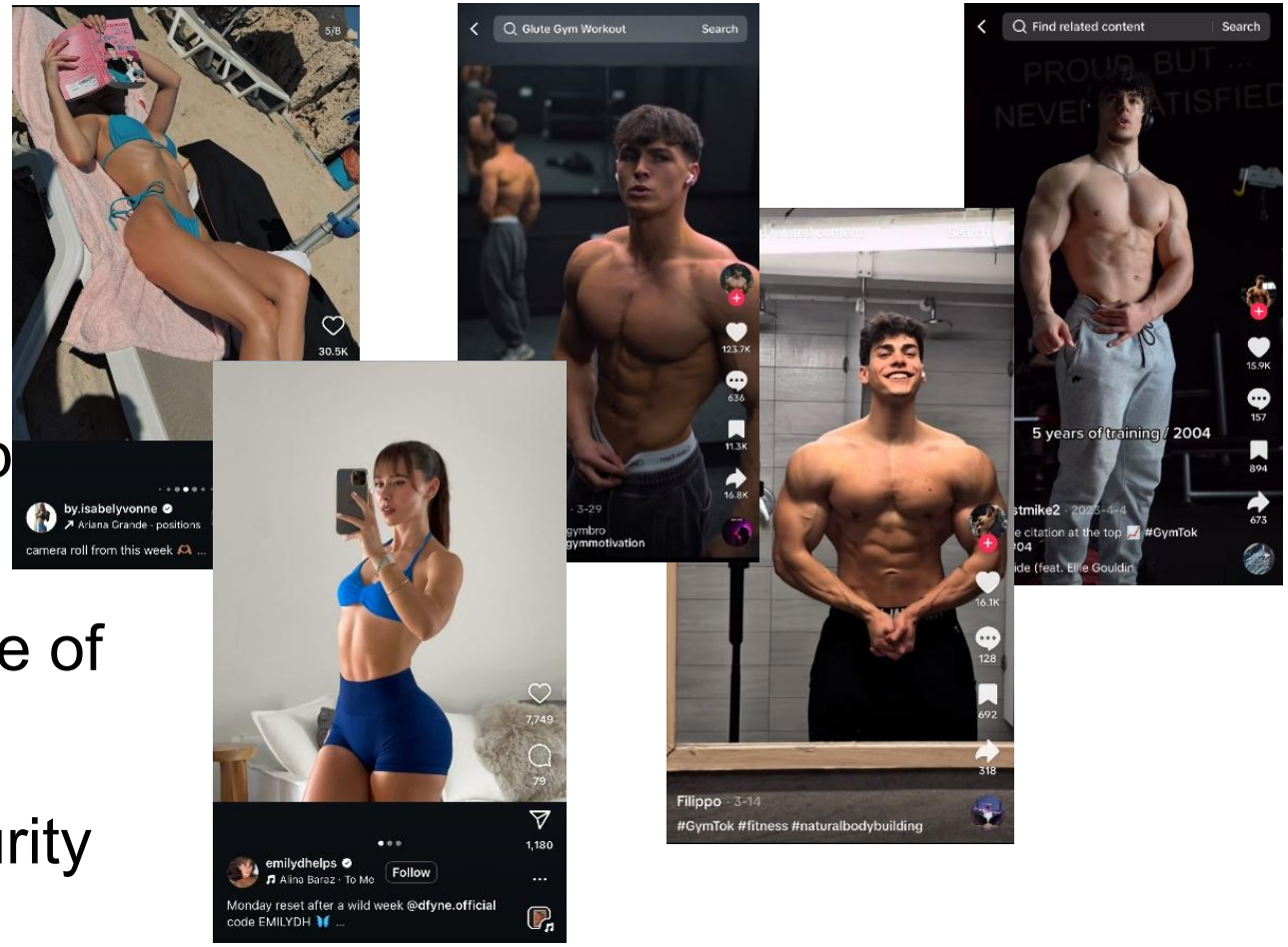
The Digital Mirror

- Filtered and idealized images
- Fitness influencers and unattainab models
- Likes and comments as a measure of value
- Constant “body check” and insecurity



> Social media is a platform for people to spread lies about themselves

L.G. Davis

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Boys vs. Girls: Different Pressure

- Girls: thin, smooth skin, proportionate curves
- Boys: muscularity, strength, no fat
- Different pressure, same risks
- Bigorexia as an emerging disorder in males!

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Adolescence: Identity and Body Storm

- Rapid bodily changes that are often experienced as ‘disharmonious’
- Identity construction also through the body
- Increases comparison, decreases tolerance for frustration
- The body as a ‘battlefield’

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Fitness and Body Dysmorphia: The Risk of a Wrong Message

- 'Working out is always good' → not always true
- Overlap between health and appearance
- Aesthetics sold as wellness
- 'No pain, no gain': a mental trap

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How to Recognize a BI Disorder

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How to Recognize a BI Disorder

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When Discomfort is Before Your Eyes

- 17 years old, visibly underweight
- Daily workout, no carbohydrates
- She speaks proudly: "I'm determined"
- Family worried but helpless

Sofia

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When Muscle Becomes a Priso

- 21 years old, spends hours in the gym
- Eats only ‘healthy’ food, counts proteins and kcals
- Uses ‘mild’ supplements and anabolics
- Never feels strong enough

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Behind The Appearance, The Same Dynamic

- Obsessive Control
- Using the body to regulate emotions
- Low self-esteem masquerading as determination
- Identity hanging on weight/performance

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A Silent Discomfort

- Apparently ‘normal’
- Rigorous but ‘healthy’ training
- Controlled diet, but ‘without excesses’
- Subtle and less visible behaviors

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Obsessions Masquerading as Discipline

- “I only eat healthy foods” → orthorexia?
- “I can’t cheat, I feel bad”
- Avoidance of social moments with food
- Feeling guilty after an ‘out of control’ meal

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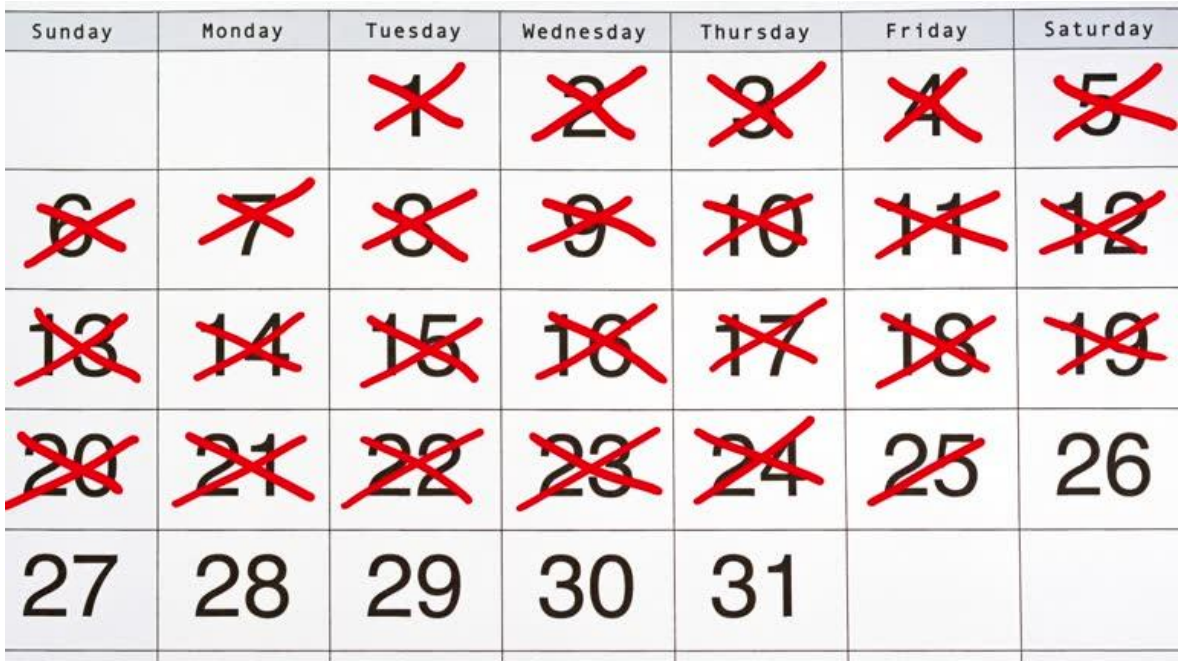
When Physical Activity Becomes Compulsive



Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		~~1~~	~~2~~	~~3~~	~~4~~	~~5~~
~~6~~	~~7~~	~~8~~	~~9~~	~~10~~	~~11~~	~~12~~
~~13~~	~~14~~	~~15~~	~~16~~	~~17~~	~~18~~	~~19~~
~~20~~	~~21~~	~~22~~	~~23~~	~~24~~	~~25~~	26
27	28	29	30	31		

- Training even with fever or pain
- Anger or anxiety if you miss a day
- Obsessively planning sessions
- Compensating for binges or ‘slip-ups’

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Mirror, Scales, Measures: a Continuous Control

- Obsessive body checking
- Frequent measurements (weight, circumferences)
- Checking in front of the mirror or selfies at the gym
- Emotional oscillations related to the numerical data

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Apps, Smartwatches, etc.: When Monitoring Becomes an Obsessi

- App for counting calories, steps, fat
- Smartwatch and wearable fitness
- Tendency to lose flexibility
- Monitoring as security → anxiety if it skips

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Shame or Overinvestment? Two Faces of the Same Discomfort

- Some cover themselves, avoid the mirror
- Others flaunt their bodies: narcissistic hyperinvestment
- In both cases, the body is central to one's self-esteem

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Always Competing with Others (and with Themselves)

- Continuous comparisons between bodies
- Competition on aesthetic results
- Influencers as an ideal measure

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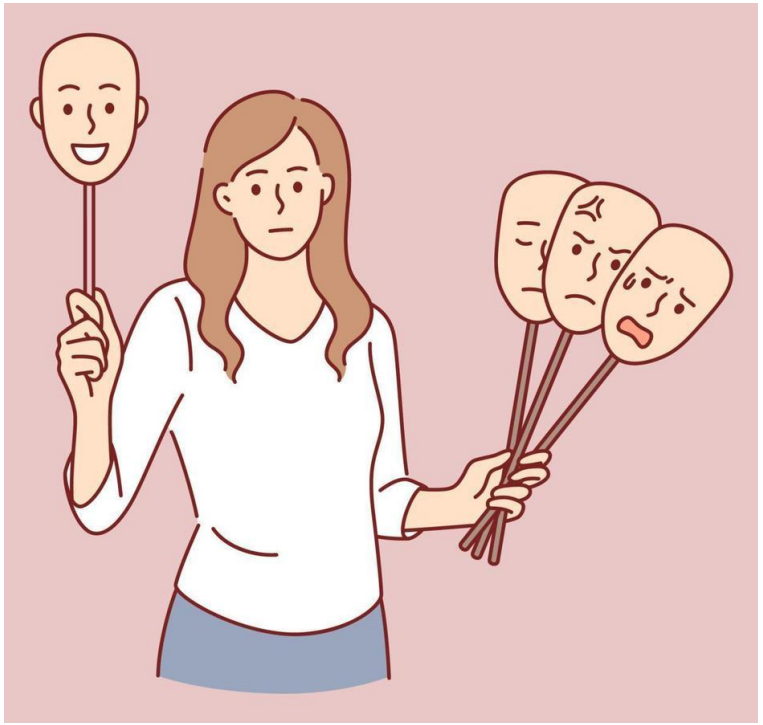
Emotional Oscillations Related to the Body

- Good/Bad Days Based on Scale Number
- Emotional Reactivity to Comments (“You’ve Lost Weight!”, “You’re Bigger”)
- Post-Eat Guilt or Intense Workout Gratification



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Drop-out or Over-involvement

- Some drop out: avoid training, shame
- Others increase: overtraining, isolation
- Sudden changes in sports behavior

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In a Nutshell: Signals to Be Seized Upon

- Rigid control over food and body
- Negative emotions related to appearance
- Workout seen as an obligation
- Loss of spontaneity and social life
- Constant comparison and judgment

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Coach or Privileged Observer?

- Continuous and non-judgmental relationship
- Privileged access to daily dynamics
- Possibility to pick up early signals
- It does not replace the clinician, but it can be a bridge

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Behaviors to Observe

- Rigidity or avoidance of specific exercises
- Obsession with aesthetic results and exercis duration
- Phrases such as: “I don’t want to get big,” “I have to define myself”
- Strong emotional reactions to small physical changes

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Check for Eating Behavior

Food: friend or enemy?

- Skipped or extremely controlled lunch breaks
- ‘Self-managed’ and restrictive diets
- Obsession with calories
- Guilty comments about food
- Refusal to eat in groups or after training

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What to Look for in Social Media

- Selfie and physique obsession
- “Fitness” accounts with extreme messages
- Emergence of “before and after”
- Toxic language in the guise of motivation

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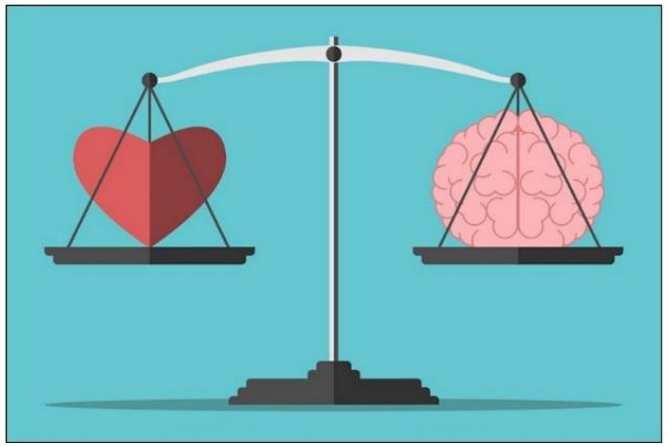
Psychological Red Flags



- Irritability, perfectionism, self-criticism
- Body-related self-esteem swings
- Difficulty managing frustration or lapses
- Feeling of ‘not being worthy’ if you don’t improve

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Approaching a Youth with a BI Disorder

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Approaching a Youth with a BI Disorder

- Building trust and open communication
- Avoiding blame and criticism
- Educating without pressuring
- Involving family and support networks
- Encouraging professional help
- Promoting a healthy relationship with food and exercise
- Challenging unrealistic social and media influences

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Approaching a Youth with a BI Disorder

- Building trust and open communication

  - Establish a non-judgmental and empathetic environment
  - Active listening: validate emotions and struggles
  - Use open-ended questions, avoid direct confrontation
  - Encourage self-expression through journaling, creative outlets

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Approaching a Youth with a BI Disorder

- Avoiding blame and criticism

Criticism reinforces shame and resistance to help

- Avoid negative comments about food, exercise, or appearance
- Express concern through supportive language
- Examples:

Instead of “You shouldn’t starve yourself” → “I’ve noticed you’re stressed about your body. I’m here for you.”

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Approaching a Youth with a BI Disorder

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Approaching a Youth with a BI Disorder

- Educating without pressuring

  - Provide accurate, age-appropriate information
  - Avoid overwhelming facts; use relatable examples
  - Discuss media influence and unrealistic body standards
  - Engage through interactive methods (videos, discussions, role models)

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Approaching a Youth with a BI Disorder

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Approaching a Youth with a BI Disorder

- Encouraging professional help

- Therapy as self-care, not punishment
- Cognitive Behavioral Therapy (CBT), Acceptance & Commitment Therapy (ACT), Family-Based Therapy (FBT)
- Medical monitoring and nutritional counseling
- Offer choices in care to increase willingness

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Approaching a Youth with a BI Disorder

- Involving family and support networks
  - Educate families on body image disorders
  - Teach positive reinforcement without enabling behaviors
  - Encourage school-based programs promoting body positivity
  - Support groups for parents and caregivers

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Approaching a Youth with a BI Disorder

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Approaching a Youth with a BI Disorder

- Promoting a healthy relationship with food and exercise
  - Shift focus from appearance to overall well-being
  - Encourage balanced eating without rigid rules
  - Promote exercise for health and enjoyment, not aesthetics
  - Teach intuitive eating: listening to hunger and fullness cues

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Approaching a Youth with a BI Disorder

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Approaching a Youth with a BI Disorder

- Address harmful beauty and fitness ideals in media
- Teach media literacy: question and analyze images
- Encourage diverse role models and positive social media use
- Suggest social media detoxes or curated content for body positivity

  - Challenging unrealistic social and media influences

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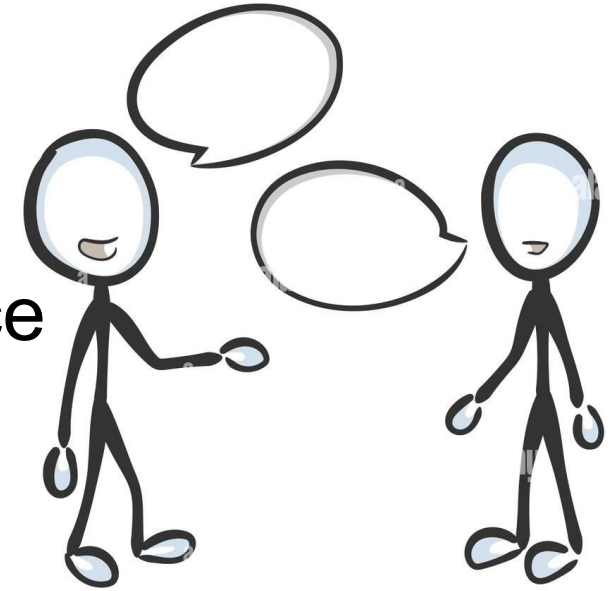
How to Start a Dialogue

- Choose the right moment: never at the end of the work out or in front of other people
- Be empathetic, not inquisitive
- Use neutral language
- Use open-ended questions and do not force
- Listen actively
- Give space: even silence communicates!



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Probing the Relationship with Training

- ❑ “How do you feel when you can’t work out?”
- ❑ “What do you like most about working out?”
- ❑ “Do you ever work out when you’re tired or sick?”
- ❑ “What’s your goal for yourself?”

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Investigating the Relationship with Food and the Body

- “Are there any foods you always avoid?”
- “How do you feel after eating?”
- “Do you ever look in the mirror and not like what you see?”
- “How has your eating changed in the last few months?”

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Answers That Deserve Attention

- “I only eat if I’ve trained enough”
- “I can’t stop, if I skip a day, I feel bad”
- “I’ll never like myself”
- “I want to see the bones/definition”

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What to Do

- Validate emotions without minimizing
- Use phrases like: “It’s normal to feel this way…”
- Always leave the door open for dialogue

What to Avoid

- Minimize or laugh at the problem
- Suggest simplistic solutions (“eat more”)
- Make comments about physical appearance
- Force confidence
- Use comparisons with other clients
- Propose “do-it-yourself” solutions

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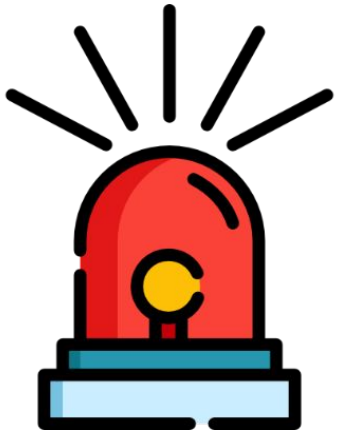
Situations That Require Immediate Attention



- Significant weight loss
- Suspected use of performance-enhancing drugs
- Social and scholastic withdrawal
- Self-harming or depressive speech

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You Are Not Alone: Building Alliances

- Collaborate with family (if underage)
- Talk to a colleague or manager
- Report to professionals (psychologists, child psychiatrists)
- Offer contacts, not solutions

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Offer Help without Invading

- “Have you ever thought about talking to someone about this?”
- “I know a counseling center, if you want…”
- “Do you want to talk about this another time?”

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Do Your Best, not All of It

- Don't diagnose
- Don't treat
- Don't become an "exclusive confidant"
- Maintain clear professional boundaries

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Working on Other People's Discomfort without Being Overwhelmed by It

- Talk to colleagues or referents
- Acknowledge your involvement
- Use supervision or decompression moments
- Always train yourself

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Recognize When You're Making a Difference

- The youth contacts you more often
- Starts using different language
- Thanks you for 'being there'
- Agrees to talk to a specialist

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The Culture of Respect Starts in the Gym

- Avoid comments about body and weight
- Value body diversity
- Talk about strength, health, balance
- Create a welcoming climate

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The 10 Key Questions

- How is their relationship with training and PA?
- How do they react to changes in their body?
- Do they avoid foods or situations related to food?
- Do they often talk about their body in negative terms?
- Are they hyper-critical of themselves?
  - Do they show anxiety when they don't train?
  - Do they constantly seek confirmation?
  - Are they influenced a lot by social media?
  - Do they have rigid or ritualistic behaviors?
  - Are they willing to talk or do they close themselves off?

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Observation Table

Feature	Observed behavior	Notes
Work out	Frequency, intensity, stiffness	
Language	Negative comments about the body	
Diet	Rigidity, restriction, avoidance	
Emotions	Irritability, perfectionism	
Social Media	Extreme or dysmorphic content	

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Young Adults: Eating Disorders after Adolescence

- Masking with ‘healthy lifestyle’
- Social pressure vs. balance
- Increased independence and self-responsibility
- May hide symptoms more effectively
- Less likely to seek help or disclose difficulties
- Often managing studies, jobs, and social pressures

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