MY FIT FRIEND - Multilevel involvement of physical activity and sport actors in early detection and management of body image disorders among young people

TRAINING MANUAL

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INTRODUCTION

Body Image Disorders or Body Dysmorphic Disorders (BDDs) and Eating Disorders (EDs) represent a complex and heterogeneous group of conditions characterized by severe disturbances in eating behaviours, thoughts, and emotions related to food and body weight or shape, with potential profound physical and health consequences. Often, visible physiological changes in the body can precede a formal diagnosis.

Thus, the role of people involved in Motor/Sport field and Physical Education is crucial.

You are often in a unique position to detect early signs of BDDs and EDs due to your close observation of physical appearance, individuals' physical activity levels, body composition, and dietary habits. The knowledge of classification of these disorders and their often-subtle clinical presentations enables better recognition, prevention, and support strategies for individuals at risk or affected by these conditions.

While several types exist, this manual will focus on Anorexia Nervosa (AN), Bulimia Nervosa (BN), and Bigorexia (also called Muscle Dysmorphia), equipping you with the knowledge to recognize potential issues and understand their impact.

EPIDEMIOLOGY

Epidemiological Terminology

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

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

- **Incidence:** Refers to the number of new cases of a disorder occurring within a population during a defined time period, typically one year.
- **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 as it includes both new and pre-existing cases, whereas incidence only counts new cases. Prevalence is particularly useful for estimating the overall burden of disease and helps predict the demand on healthcare services.

General Epidemiology of Eating Disorders

The epidemiology of EDs can be particularly challenging, and available data may often be misleading. Epidemiological figures are believed to underestimate the true burden of eating disorders. This underestimation is due to several factors, including the relative rarity of EDs in the general population, the difficulty to recognize them for lack of awareness and underestimation of symptom severity, the reluctance of affected individuals to seek help due to denial or shame and the absence of official disease registries. Therefore, there is a pressing need to enhance awareness of the prevalence and diversity of BDDs and EDs symptoms among professionals, especially those working closely with adolescents and young adults, to promote early identification and engagement with treatment.

Historically, prevalence studies of eating disorders have focused on Western countries. However, recent research indicates that eating disorders are now a significant global concern. Eating disorders can affect individuals of any age, sex, or socioeconomic background.

They are most commonly observed in young women aged 15 to 25, although some studies suggest that Anorexia Nervosa is manifesting at even younger ages. Furthermore, there is increasing evidence that young men and gender-diverse youth are affected by eating disorders more than previously recognized. The male-to-female ratio for EDs is certainly evolving, despite the fact that many investigations have not included enough males to establish reliable epidemiological estimates. Recent studies highlight that students

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

Overall, athletes obviously perform higher rates of physical activity than non-athletes and seem to be more likely to screen positive for an EDs, being also less likely to seek treatment for it.

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. **It is estimated that approximately 20 million people in Europe are currently living with eating disorders** (van Eeden AE, van Hoeken D, Hoek HW. Incidence, prevalence and mortality of anorexia nervosa and bulimia nervosa. Curr Opin Psychiatry. 2021 Nov 1;34(6):515-524. doi: 10.1097/YCO.0000000000000739).

EDs are associated with a high illness burden and a high risk of mortality. Comorbidities are common and include other psychiatric conditions such as depression and post-traumatic stress disorder, along with organic disease such as cardiovascular, renal, and musculoskeletal complications. Thus, a tight association between EDs and high health care costs is evident, with both psychiatric and non-psychiatric hospitalizations.

Anorexia Nervosa (AN)

Regarding Anorexia Nervosa, the highest incidence rates are observed among females, particularly those aged 10 to 29 years. The lifetime prevalence in Europe is estimated at 4% in females and 0.3% in males (van Eeden AE, van Hoeken D, Hoek HW. Incidence, prevalence and mortality of anorexia nervosa and bulimia nervosa. Curr Opin Psychiatry. 2021 Nov 1;34(6):515-524. doi: 10.1097/YCO.0000000000000739). Incidence rates vary significantly based on the studied population, methods, and diagnostic criteria. For example, population-based studies have reported incidence rates of 120 per 100,000 among Swedish females aged 20-32 years, and 200 per 100,000 among Spanish females aged 12-22 years. Recent trends indicate a rising incidence in girls under 15 years of age and a potential second peak among peri-menopausal women. Rates among males are estimated to be 10-14 times lower. However, incidence and prevalence rates among males are likely underestimated due to stigma and underdiagnosis. Recent findings suggest that among males, specific sub-populations, particularly athletes involved in body- and strength-focused sports like cycling, running, and wrestling, are at higher risk of AN.

Local data

In Italy, the typical differences in incidence between sexes for Anorexia Nervosa are reported as 8/100,000 for females and 0.02-1.4/100,000 for males.

In Spain, the prevalence of AN in adolescent girls is approximately 1%, with a female-to-male ratio of 9:1. The typical age of onset is most common between 13 and 14 years.

National data from Turkey estimates the annual incidence rate of AN at approximately 8 per 100,000 people. Lifetime prevalence among adolescent girls in Turkey ranges from 0.3% to 2.6%, and among boys, it is between 0.1% and 0.3%. Approximately 95% of AN case in Turkey occur in females. The typical onset age in Turkey is between 13 and 20 years, with an average age of 17.

Bulimia Nervosa (BN)

For Bulimia Nervosa, fewer studies are available. The peak incidence occurs among females aged 20 to 29 years, although cases may also emerge later in life. Male incidence rates are considerably lower. The estimated lifetime prevalence of bulimia nervosa ranges from 0.3% to 4.6% in females and 0.1% to 1.3% in males (van Eeden AE, van Hoeken D, Hoek HW. Incidence, prevalence and mortality of anorexia nervosa and bulimia nervosa. Curr Opin Psychiatry. 2021 Nov 1;34(6):515-524. doi: 10.1097/YCO.0000000000000739).

Local data

In Italy, the typical incidence of Bulimia Nervosa is 12/100,000 for females and 0.8/100,000 for males.

In Spain, the prevalence of BN among young women (ages 9–25) is between 0.3% and 2.9%, and among men, it is between 0% and 0.4%. Onset typically starts around ages 19-20.

A scoping review in Turkey reported a 0.8% prevalence of BN among adolescents and young adults, consistent with rates in other Middle Eastern countries. A study involving 783 Turkish university students found that 13.1% of females and 9.2% of males exhibited abnormal eating habits that might include BN-associated behaviors. While BN is more prevalent among females globally, increasing rates among males have been observed in Turkey, underscoring the need for gender-inclusive awareness and interventions. BN typically manifests during late adolescence to early adulthood, with university students (ages 17-23) identified as a high-risk group in Turkey.

Bigorexia (Muscle Dysmorphia)

Data regarding Bigorexia, also known as Muscle Dysmorphia, are even more scarce and often unreliable. No official incidence rates exist due to the absence of longitudinal studies. As expected, studies consistently report a higher prevalence among boys and men, with peak onset typically occurring in late adolescence or early adulthood. The reported prevalence is 2.2% in males and 1.4% in females (Mitchison D, Mond J, Griffiths S, Hay P, Nagata JM, Bussey K, Trompeter N, Lonergan A, Murray SB. Prevalence of muscle dysmorphia in adolescents: findings from the EveryBODY study. Psychol Med. 2022 Oct;52(14):3142-3149. doi: 10.1017/S0033291720005206).

Local data

In Spain, there are no official statistics specifically for Muscle Dysmorphia prevalence. The most affected population is mainly young males between 18 and 35 years old. Key features include excessive concern with muscularity, body image distortion, compulsive exercise, and in some cases, anabolic steroid use.

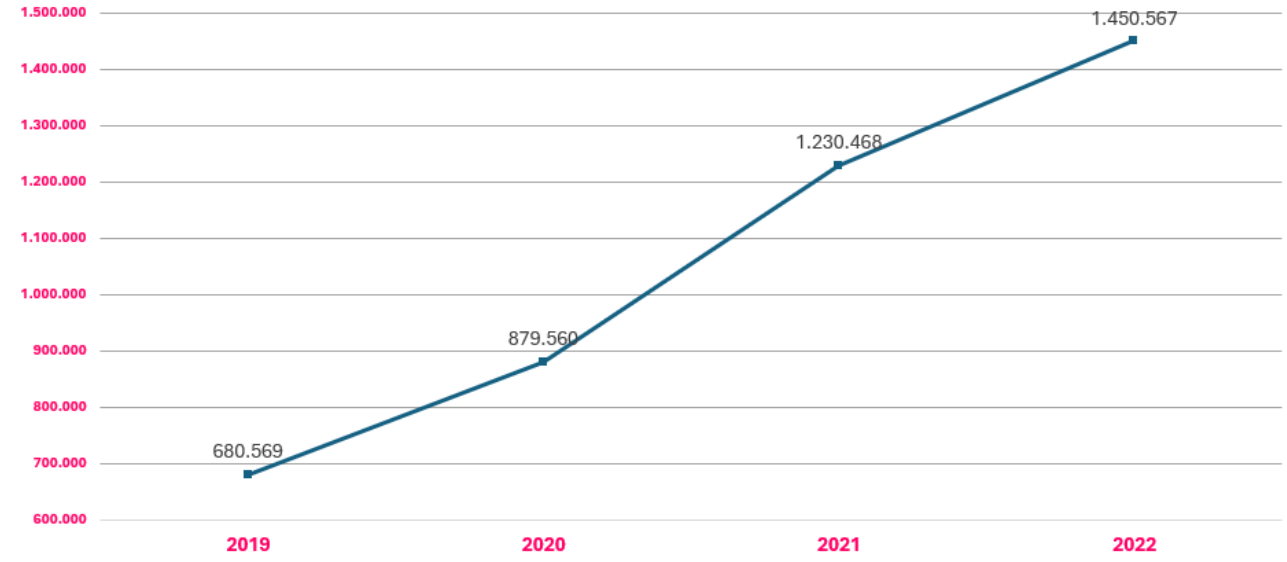
In Turkey, a cross-sectional study of 430 male university students found that 16.3% of those in sports sciences faculties and 6% in nursing faculties exhibited tendencies toward Muscle Dysmorphia. Among professional, university, and recreational bodybuilders, studies reported Muscle Dysmorphia symptom prevalence rates of 58.3%, 11.2%, and 5.7%, respectively.

Impact of the COVID-19 Pandemic

The COVID-19 pandemic appears to have significantly exacerbated ED symptoms, leading to a sharp increase in hospital admissions across Europe. Besides an increase in prevalence, young patients are presenting with more severe symptoms compared to the pre-pandemic period. Several factors contributed to this deterioration in mental health, including the disruption of daily routines, interruption of regular physical activity, limitations on personal freedom, increased free time, reduced social interactions, greater exposure to triggering online content, reduced access to support networks and healthcare services, and diminished feelings of control.

Local data

In Italy, it is estimated that about 3 million people suffer from eating disorders, which is approximately 5% of the population. The trend of new cases of eating disorders (all types) detected by territorial services increased dramatically after pandemic.



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

Historically, in Italy EDs mainly affected individuals between the ages of 14 and 25, manifesting at two critical moments: puberty and the transition to adulthood. However, there are two significant recent trends: the lowering age of onset of disorders, with 30% of new patients in 2023 being under the age of 14, and a worrying increase in cases in childhood, where children aged 8-9 are showing symptoms typically observed in adolescents. Additionally, there's an increase in the male population affected, with 10% of cases between the ages of 12 and 17 concerning males.

A nationwide study in Portugal during COVID-19 with 580 women showed 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. The most common eating changes included 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.

In Spain, the pandemic led to a clear increase in ED incidence, hospital admissions, and severity among adolescents during 2020–2021. Adolescent girls, especially between ages 13 and 17, were identified as the main risk group. Gender influence played a strong role due to sociocultural pressures and body image ideals on women. Eating disorders are considered a growing public health problem in Spain due to their high prevalence, chronic course, and associated mortality. The average length of hospital stays for AN case doubled during the pandemic (from 10.89 to 22.67 days). Food restriction behavior was observed in

95.7% of hospitalized cases in 2020–2021, and exposure to social media significantly increased during the pandemic (from 11% to 65.2% of patients). For BN, associated behaviors included purging (39.1% of cases in 2020–2021) and excessive exercise (73.9%).

Conclusions

The epidemiological data presented highlight the growing and complex nature of EDs, emphasizing their impact across various demographics and the exacerbating effects of global events like the COVID-19 pandemic. For professionals in Motor/Sport Sciences and Physical Education, this information is invaluable for early identification and intervention. Recognizing the prevalence, specific demographic trends, and the influence of factors such as social media and sports participation is critical.

PHYSIOLOGY BACKGROUND

The Foundation: Energy Balance and Hunger

To grasp the physiological consequences of EDs, it's essential to first understand basic energy balance and hunger mechanisms.

Energy Balance: Intake vs. Expenditure

Energy balance refers to the relationship between energy introduced through food and drinks and energy expended by the body.

Energy expenditure comprises:

- **Basal Metabolism:** The energy required for basic bodily functions **at rest**. Basal metabolic rate (BMR) accounts for the largest portion of daily energy use and reflects the energy required to maintain basic physiological functions like breathing and temperature regulation.
- **Physical Activity:** Energy used during movement and exercise.
- **Digestive Thermogenesis:** Energy expended during the digestion, absorption, and metabolism of food.

The human body functions optimally when energy intake matches energy expenditure. A negative energy balance occurs when energy introduced is less than energy consumed. This can happen voluntarily – as in the case of excessive dietary restrictions – or involuntarily.

When the energy intake consistently falls below the expenditure, such in anorexia or vigorexia, this imbalance is chronic and profound, and the body enters a state of negative energy balance. This imbalance triggers emergency mechanisms and the body initiates adaptive mechanisms to conserve energy, such as reducing metabolic rate, slowing non-essential functions and breaking down energy stores as muscle tissue; it can result in fatigue, hypothermia and impaired organ function. These adaptations can lead to significant physiological impairments over time, especially when prolonged or extreme.

It is the starting point of many physiological alterations that we will see shortly. As a trainer, learning to recognize a state of persistent negative balance can really make the difference.

On the contrary, when energy intake exceeds energy expenditure, the body stores the excess energy.

Types of Hunger: Biological vs. Hedonic

Hunger is not solely about physiological need; it also has a psychological component:

- **Biological Hunger:** This is the internal regulation of body needs, a physiological signal indicating the necessity to eat to maintain energy balance. The prefrontal cortex is involved in conscious decisions about food intake related to biological hunger.
- **Hedonic Hunger:** This refers to the desire to eat for pleasure rather than necessity. It is heavily influenced by psychological and environmental factors like emotions, stress, mood and social context. The limbic system, especially areas like the amygdala and nucleus accumbens, modulates hedonic eating behaviors through dopamine signaling, which reinforces the rewarding aspects of food and plays a role in regulating emotions and pleasure associated with food.

The prefrontal cortex helps in making conscious decisions about eating, while the limbic system influences emotional responses to food. Neurotransmitters like dopamine and serotonin also impact eating behavior, especially in relation to reward and mood regulation.

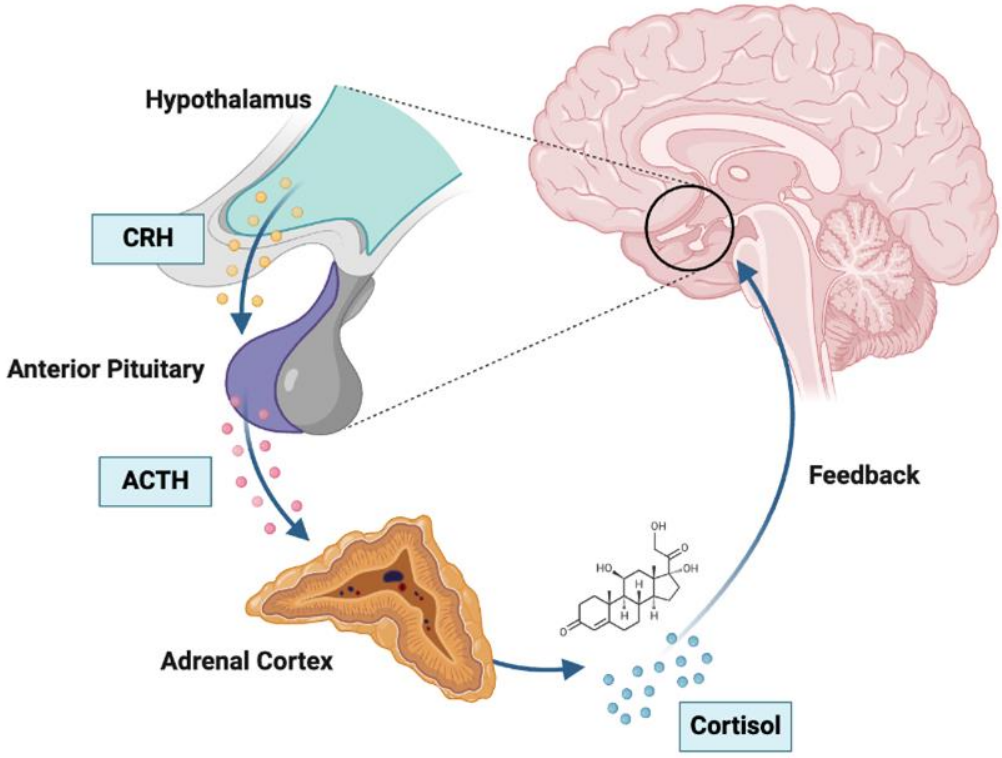
The interplay between homeostasis (biological balance) and hedonism (pleasure-seeking) is critical in understanding eating behaviours.

Appetite Regulation: The Role of the Hypothalamus and Hormones

To understand EDs, we first need to examine how appetite is regulated. The regulation of hunger and satiety involves a complex interplay between the brain, endocrine system, and digestive tract.

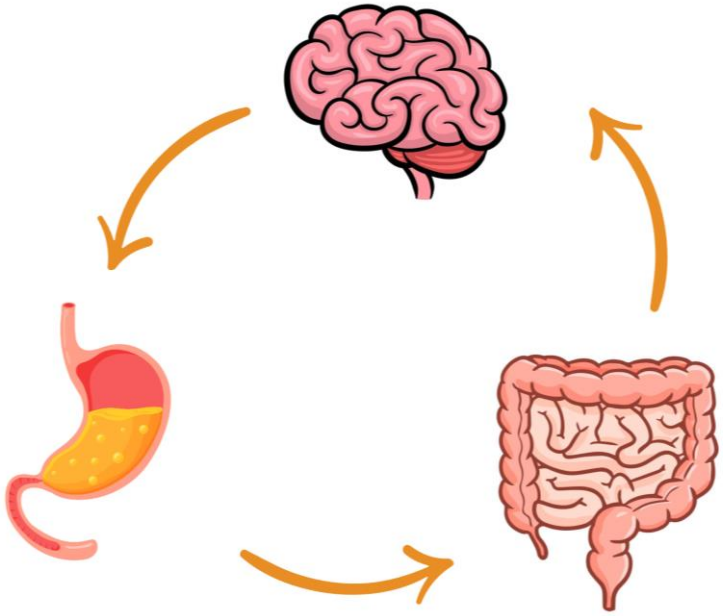
Understanding these mechanisms helps us see why eating disorders are not just about willpower, they involve complex neurobiological disruptions.

The **hypothalamus** is the key brain region responsible for hunger and satiety. Inside the hypothalamus, we have two main groups of neurons that control eating behavior: the **NPY/AgRP neurons**, which **stimulate hunger**, and the **POMC neurons**, which **promote satiety**. The hypothalamus acts as a central regulatory hub for appetite, receiving signals from hormones and nutrients to manage appetite. It communicates with the pituitary and adrenal glands, forming the Hypothalamic-Pituitary-Adrenal (HPA) axis, which is significantly impacted by stress.



These neurons receive signals from the body through several **key hormones** playing a crucial role in appetite regulation:

- **Ghrelin:** Produced in the stomach, ghrelin stimulates appetite, with levels rising before meals and falling afterwards. It is often referred to as the 'hunger hormone'.
- **Leptin:** Secreted by adipose tissue, leptin signals satiety and informs the brain about stored energy levels.
- **Insulin:** Produced by the pancreas, insulin regulates blood glucose and promotes long-term satiety.
- **Cholecystokinin (CCK):** Released by the duodenum and jejunum, CCK aids in the digestion of fats and proteins and induces short-term satiety telling the brain you're full.



The body constantly sends signals to the brain — from the gut, fat tissue, muscles. The brain processes these messages and decides whether to eat, rest, or move. In EDs, this communication is disrupted. These disruptions help explain why individuals with eating disorders often experience extreme emotional responses to food. The body says '*I'm starving*', but the brain, for psychological or biological reasons, doesn't respond appropriately. In anorexia nervosa, studies show altered leptin signaling, which may contribute to the suppression of hunger cues. In contrast, individuals with binge eating disorder may have a reduced response to leptin, leading to difficulties in recognizing satiety.

Beyond hunger hormones, **neurotransmitters** also play a crucial role in eating behavior. The three key players are serotonin, dopamine, and cortisol.

- **Serotonin** helps regulate mood and satiety. In anorexia, we see high serotonin levels, which may contribute to anxiety and excessive self-control around food.
- **Dopamine** is linked to the brain's reward system. In disorders like binge eating, this system is often overactivated, with increased dopamine activity, which can make high-calorie foods feel more rewarding, leading to compulsive overeating. Food isn't just fuel, it's also a source of pleasure. People may eat compulsively, not because they're hungry, but because their brain is seeking pleasure or relief. And in restrictive EDs, pleasure is often replaced by anxiety or guilt.
- **Cortisol**, the stress hormone, is frequently elevated in eating disorders. Chronic stress can disrupt appetite regulation, increase cravings for high-energy foods, and contribute to emotional eating.

Long-Term Physiological Effects of Eating Disorders

Eating disorders can lead to severe and widespread long-term effects on various body systems.

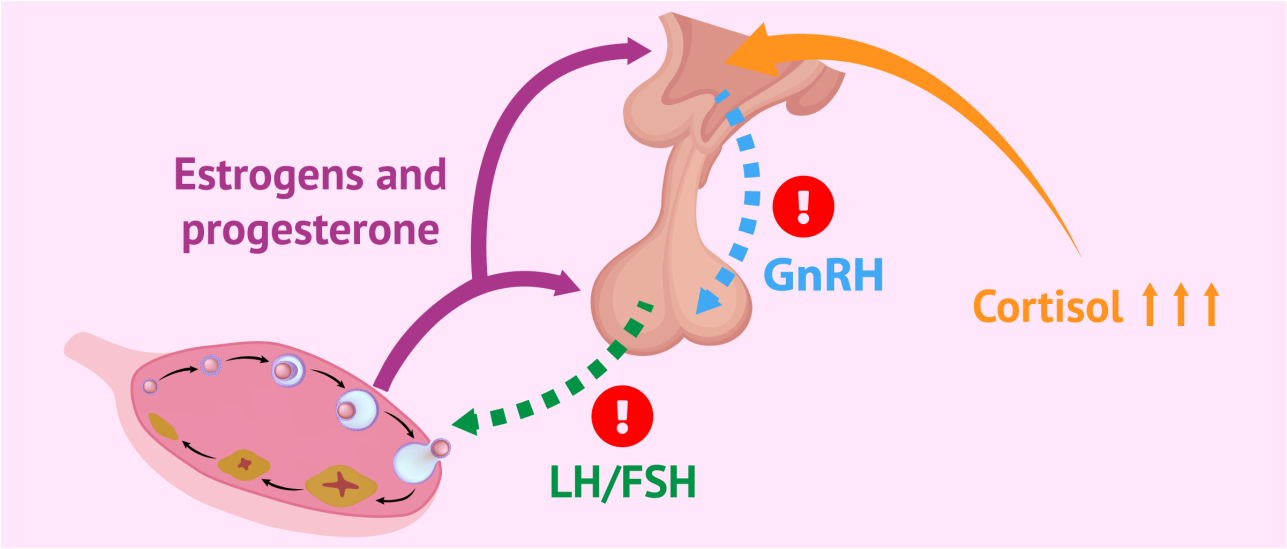
Basal Metabolism and Energy Saving

In response to caloric restriction, the basal metabolic rate often decreases as the body attempts to conserve energy. This adaptation can lead to effects on the autonomic nervous system, resulting in bradycardia (slow heart rate), hypothermia (low body temperature), and hypotension (low blood pressure).

Hormonal and Metabolic Impact

The endocrine system is significantly affected. Caloric restriction and low body fat can disrupt the hypothalamic-pituitary-gonadal axis:

- Inhibition of the hypothalamic-pituitary-gonadal (HPG) axis
- Reduction of GnRH, LH and FSH
- Decrease in anabolic hormones
- Decrease in estrogen → amenorrhea
- Thyroid hormone production may also decline, reducing metabolic activity.
- Cortisol levels often rise due to chronic stress and malnutrition, contributing to catabolism, anxiety, and sleep disturbances



Lean and Muscle Mass Changes

When the body enters a state of energy restriction, as happens in many EDs, it begins to consume itself. Muscle, while essential for strength and metabolic health, becomes a source of energy. This leads to a loss of lean mass and a reduction in physical strength and physical performance.

The paradox is that even those who appear 'fit' can hide deep muscle catabolism. A toned body due to low body fat is not always a healthy body. For a trainer, it is essential to look beyond the external appearance and question the real physiological condition of the athlete.

Effects on Bone Density

One of the most serious and subtle effects of energy restriction in EDs is the compromise of bone health.

When the body is in deficit, it reduces the production of sexual hormones such as estrogen, which are essential for maintaining bone density.

In addition, with a slowed-down intestine and a poor diet, calcium absorption also decreases.

The result? Even very young girls can develop osteopenia or even early-onset osteoporosis, with a real risk of stress fractures. For those who train, this is an alarm bell that should not be ignored

Effects on the Cardiovascular System

The heart, like any muscle, is affected by malnutrition. Bradycardia and hypotension are common adaptations to energy deficit. Individuals may experience syncope (fainting) or collapse, especially during exertion. In severe cases, there may be structural changes in cardiac tissue and a reduction in cardiac mass. In addition, electrolyte depletion can alter electrical conduction. Prolongation of the QT interval, an electrical activity in the heart, increases the risk of severe arrhythmias, or even sudden death.

Gastrointestinal System

Eating disorders can cause a range of gastrointestinal issues:

- Gastroparesis: slow gastric emptying, leading to nausea and early satiety.
- Abdominal Pain, Bloating, Heaviness: frequent complaints.
- Chronic Constipation: due to slow intestinal motility.
- Consequences of Self-Induced Vomiting or Laxative Abuse: esophagitis (inflammation of the esophagus), gastritis and severe electrolyte imbalances are

common. Chronic use of laxatives also leads to intestinal damage and loss of the normal evacuation reflex.

These symptoms are not just secondary: they often fuel a vicious cycle of bodily discomfort and further restriction

Immune System and Inflammation

The immune system also undergoes profound alterations in EDs.

In conditions of anorexia, severe malnutrition causes a collapse of the immune defenses, making the body more vulnerable to recurrent infections, even trivial ones.

In disorders such as bulimia or binge eating disorder, on the contrary, a state of chronic inflammation is observed: the fat cells release proinflammatory cytokines and oxidative stress processes are activated.

There can also be a dysfunction of the intestinal microbiota, which plays a key role in regulating immunity and metabolism, impacting muscle healing and resistance to effort.

The result? The body recovers more slowly, is less resistant to effort and more exposed to chronic problems.

Brain and Neuroplasticity

Neuroplasticity also needs energy: this is an important concept to understand that ‘nourishing the brain’ is essential to truly healing.

EDs can cause structural and functional changes in the brain:

- Reduction of Brain Volume: in AN patients atrophy especially in the cortex and grey matter. This is a direct effect of the lack of essential nutrients for neuronal metabolism.
- Alterations in Functional Connectivity: between emotional and cognitive areas.
- Cognitive Deficits: including issues with attention, memory, and mental flexibility.

The good news is that many of these alterations are partially reversible with nutritional recovery and therapy.

Sleep Disturbances

People on calorie restriction often sleep little and badly. The body, deprived of energy, enters a state of metabolic hypervigilance: it is as if it were ‘on alert’, looking for food, and struggles to enter a phase of deep sleep. Therefore, individuals with EDs often experience initial insomnia or frequent awakenings, leading to light and non-restorative sleep. Caloric restriction and serotonin levels all impact sleep. Furthermore, the neuroendocrine

imbalance, especially at the level of the hypothalamic-pituitary-adrenal axis, generates an increase in cortisol, the stress hormone, which hinders falling asleep.

In cases of bulimia and binge eating, glycemic swings and nocturnal digestion can further disturb rest.

For a trainer, observing chronic fatigue, difficulty concentrating or poor post-workout recovery can be a sign that sleep, and therefore the body, is not functioning properly.

Conclusions

Eating disorders are deeply rooted in neurobiology, with the hypothalamus, hormones and neurotransmitters playing crucial roles in appetite regulation and eating behavior. The hormonal and metabolic disruptions caused by EDs can lead to severe health risks. For people involved in Motor/Sport field and Physical Education, understanding these physiological mechanisms is vital. Your role in early detection and appropriate referral to healthcare professionals can be life-changing. You can contribute to developing better treatment strategies that address both the mind and body of individuals struggling with eating disorders.

CLASSIFICATION

General Information

Eating disorders represent a varied group, ranging from typical patterns in early childhood to those more characteristic of adolescence and young adulthood.

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5 TR) provides the current diagnostic framework. Key disorders include Anorexia Nervosa, Bulimia Nervosa, Bigorexia (Muscle Dysmorphia), and Binge-eating disorder, as well as newer classifications like Avoidant/Restrictive Food Intake Disorder (ARFID) and conditions such as Orthorexia Nervosa.

Anorexia Nervosa

Anorexia Nervosa (AN) is a severe eating disorder characterized by a restrictive eating pattern with an intense fear of gaining weight, a distorted body image, and a refusal to maintain a minimally healthy body weight.

Physiologically, it is strongly associated with the severe negative energy balance and its widespread consequences discussed above, impacting nearly all systems, including significant metabolic slowdown, hormonal disruptions leading to amenorrhea and bone density loss, and cardiovascular issues like bradycardia. If not promptly recognized and treated, AN during growth can severely impair physical and psychological development, leading to disability and interruption of the growth process, with potentially significant long-term consequences.

AN was historically associated with the highest rate of mortality among psychiatric disorders, with 5.1 deaths per 1000 person-year, and 1 in 5 individuals with AN who died committed suicide (Smink FR, van Hoeken D, Hoek HW. Epidemiology of eating disorders: incidence, prevalence and mortality rates. Curr Psychiatry Rep. 2012 Aug;14(4):406-14. doi: 10.1007/s11920-012-0282-y).

Diagnostic Criteria (DSM-5 TR)

1. Gradual or rapid restriction of energy intake relative to requirements: this leads to a significantly low body weight in the context of age, sex, developmental trajectory, and physical health. "Significantly low weight" is defined as a weight that is less than minimally normal, or, for children and adolescents, less than that minimally expected.

2. Intense fear of gaining weight or becoming fat, or persistent behavior that interferes with weight gain, even though at a significantly low weight. This fear is not alleviated by weight loss; in fact, it often intensifies as the individual loses more weight.
3. Disturbance in the way in which one's body weight or shape is experienced: undue influence of body weight or shape on self-evaluation, or persistent lack of recognition of the seriousness of the current low body weight. Individuals with AN often deny the severity of their low weight and may view their emaciation as a sign of achievement.

Clinical Presentation and Specifiers

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 preadolescents may differ slightly, often presenting with a rapid decline in food intake rather than a gradual process, and they may not exhibit the same level of concern about body image, focusing more on abdominal pain, nausea, or early satiety.

Bulimia Nervosa

Bulimia Nervosa (BN) is characterized by recurrent episodes of binge eating followed by inappropriate compensatory behaviors to prevent weight gain such as self-induced vomiting, fasting, excessive exercise, or laxatives, diuretics, enemas or other medications misuse. Unlike AN, individuals with BN typically maintain a body weight within or above the normal range.

While individuals with bulimia may maintain a normal weight, the physiological impacts are significant, particularly due to the compensatory behaviors. Electrolyte imbalances from purging are a major concern, posing a risk for cardiac arrhythmias, gastrointestinal issues like gastro-esophagitis and chronic constipation are also common. The chronic inflammatory state and potential intestinal microbiota dysfunction are also important physiological considerations.

BN is frequently comorbid with depression, anxiety, hopelessness, and shame. There is an increased risk of non-suicidal self-injury, suicidal ideation, and death by suicide, with suicide risk being 8 times higher than in the general population.

Diagnostic Criteria (DSM-5 TR)

1. Recurrent episodes of binge eating: An episode of binge eating is characterized by both of the following:

- Eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than what most individuals would eat in a similar period under similar circumstances.
- A sense of lack of control overeating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating).

2. Recurrent inappropriate compensatory behaviors in order to prevent weight gain: these include self-induced vomiting; misuse of laxatives, diuretics, enemas or other medications; fasting or excessive exercise.
3. The binge eating and inappropriate compensatory behaviors both occur, on average, at least once a week for 3 months.
4. Self-evaluation is unduly influenced by body shape and weight.
5. The disturbance does not occur exclusively during episodes of Anorexia Nervosa.

Clinical Presentation and Specifiers

The onset of BN typically occurs in late adolescence or early adulthood. Unlike AN, individuals with BN may not exhibit visible signs of extreme weight loss, making detection more challenging. Professionals might observe secretive behaviors around food or an unusual preoccupation with weight and body shape despite a normal appearance.

Bigorexia (Muscle Dysmorphia): The Paradox

Bigorexia, or Vigorexia, or Muscle Dysmorphia, is a form of body dysmorphic disorder, dysmorphophobia, characterized by an obsessive preoccupation with the idea that one's body is too small or not muscular enough. It is also often informally referred to as "reverse anorexia" due to the contrasting body image distortion.

Individuals often engage in excessive physical activity and rigid dietary practices, despite an athletic appearance. They may consume low-calorie diets and misuse supplements or anabolic steroids.

The paradox lies in the fact that despite their muscular appearance, individuals with bigorexia often exhibit signs of energy deficit, similar to other EDs. This can lead to muscle catabolism, reduced physical strength, and hormonal imbalances even as they strive for increased musculature. This condition is often unrecognized within sports contexts. It can also be related to RED-S (Relative Energy Deficiency in Sport), where the energy consumed is insufficient to support the energy expended in sport, leading to impaired physiological function, the same kinds of physiological disruptions (affecting metabolic

rate, bone health, menstrual function, immunity and cardiovascular health) observed in classical EDs. It encompasses a range of physiological impairments. RED-S highlights the risk of undernutrition, often lacking in calories, micronutrients and essential fats even in individuals who do not meet clinical criteria for an EDs but suffer from similar energy deficits.

Diagnostic Features

(Bigorexia is classified within the DSM-5 TR under "Obsessive-Compulsive and Related Disorders" as a specifier for Body Dysmorphic Disorder).

1. **Preoccupation with musculature:** The individual is preoccupied with the idea that their body is too small, weak or not sufficiently muscular, even though they may be objectively very muscular. This preoccupation causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
2. **Repetitive behaviors or mental acts:** The individual performs repetitive behaviors (e.g., including excessive exercise, spending hours in a gym, excessive weightlifting, compulsive checking of muscularity in mirrors, excessive grooming, skin picking, excessive tanning) or mental acts (e.g., comparing one's body with others') in response to the appearance concerns.
3. **Disturbance is not better explained by another mental disorder** (e.g., an eating disorder, where the concern is primarily with body fat and weight loss).

Clinical Presentation

Bigorexia is most commonly observed in males, though it can affect females as well, particularly those involved in strength sports. Key characteristics include:

- **Excessive and compulsive exercise:** Often prioritizing training over other life activities, leading to injuries or social isolation with an idealized vision of working in fitness to justify and maintain current habits.
- **Distorted self-perception:** Despite being objectively muscular, individuals perceive themselves as small or inadequate, leading to persistent body dissatisfaction and low self-esteem.
- **Emotional distress:** Experiencing feelings of hopelessness, depression, and anxiety related to their body image. There can be significant emotional toll, with persistent body dissatisfaction despite visible muscularity, impacting intimacy due to discomfort with nudity and sexual activity. Individuals may question the purpose of continued effort despite achievements.

- **Social isolation:** Avoiding social gatherings, especially those involving food or where their physique might be exposed or judged.
- **Rigid and extreme dietary practices:** Adherence to highly restrictive diets aimed at maximizing muscle gain and minimizing body fat, often involving large amounts of protein, the strict avoidance of certain foods.
- **Financial strain:** Spending excessive amounts of money on supplements, gym memberships, and specialized food, sometimes leading to financial difficulties.
- **Misuse of supplements and anabolic steroids:** some authors reported that muscle dysmorphia preceded steroid use in a high percentage.

  There is a significant concern due to the serious health risks associated with these substances:
  - Physical side effects including acne, hair loss, gynecomastia (in males), and menstrual irregularities (in females).
  - Very frequent mood swings and irritability.
  - After stopping a cycle, withdrawal symptoms may occur leading to depression and fear of losing muscle mass or progress.

Conclusions

Understanding the diagnostic criteria and clinical presentations of Anorexia Nervosa, Bulimia Nervosa, and Bigorexia is fundamental for people involved in Motor/Sport field and Physical Education. Your unique position allows for early detection of subtle changes in physical appearance, behavior and emotional well-being. By recognizing these signs, you can play a crucial role in directing individuals towards appropriate medical and psychological support.

BODY IMAGE

Introduction

For people involved in Motor/Sport field and Physical Education, understanding body image is fundamental. It's not "just aesthetics". Crucially, warning signs of body image disorders are not always visible. An obsession with fitness does not equate to wellness, and training and diet can be used as a means of control. This manual aims to equip you

with the knowledge to recognize, understand, and appropriately support youth struggling with body image disorders, empowering you to identify warning signs, listen effectively, and know when and where to direct those who need help.

Burden

In hypermodern society 'the body' is a communication tool to transmit one's identity, and body manipulation allows to achieve certain communication objectives.

In the past, advertisers and traditional media have played an important role in establishing unrealistic standards of the "ideal" body and beauty standards, until recently, social media (SM), in particular the highly visual nature of Instagram, Snapchat, and TikTok reinforces body image sensitivity and supports concepts related to health, body image and sport, sometimes spreading distorted messages that are harmful to adolescents and pre-adolescents.

Body Dissatisfaction affects pre-adolescents, adolescents and young in different ways. The pressure is different, but there are similar risks.

Boys tend to suffer socio-cultural pressure encouraging them to have bigger, more muscular bodies, study of the evolution of male action figures over the course of 30 years, even in video game avatars and hyper-realistic computer-generated images, found that they had grown much more muscular over time. Girls are under pressure to have a thin or ultra-thin body. Over twelve hundred adolescents, around 72% of them said that they felt tremendous pressure to be beautiful. Of course, there is a universal increase in beauty pressure and a decrease in girls' confidence as they grow older. It is estimated that only 4% of women around the world consider themselves as beautiful (Helfert S, Warschburger P. The face of appearance-related social pressure: gender, age and body mass variations in peer and parental pressure during adolescence. Child Adolesc Psychiatry Ment Health. 2013 May 17;7(1):16. doi: 10.1186/1753-2000-7-16). Photoshopped images produce a "drive for thinness" in girls and women.

The apps also provide near-constant opportunities for teenagers to compare themselves with filtered and curated images of both celebrities and peers.

With regards to physical exercise images featuring beautiful people doing exercise, with increasingly toned and defined bodies, that emphasize muscularity are particularly damaging; "before and after" pictures give the impression that an ideal is attainable

through diet or exercise where in fact, the media-driven ideal body is not physiologically possible for most people.

What is Body Image?

Body image is how an individual perceives their physical self and the feelings they experience as a result of this perception. It encompasses how you see yourself in the mirror or picture yourself in your mind, what you believe about your appearance, how you think other people see you, and how you feel about your body. Body image is subjective; a person can weigh 50kg and feel "fat" or have obvious muscles and never perceive themselves as sufficient. It is not an objective fact.

A negative body image, with an ideal body image that is unattainable, can lead to behaviors such as avoidance of certain exercises due to body dissatisfaction, excessive exercising to 'fix' perceived flaws, unhealthy dieting or food restriction and social withdrawal due to self-consciousness about appearance.

How Body Image Develops and is Influenced

There are several factors influencing body image.

Individual factors

- *Personality traits*: certain individual characteristics like high standards and self-criticism, with anxious or perfectionist temperament can make someone more vulnerable to body image issues.
- *Self-esteem*: as body esteem is included in the umbrella term of self-esteem and it is related to the thoughts and feelings a person has about their appearance, shape, or size. A positive self-evaluation acts as a buffer against negative body images.
- *Past experiences*: comments, judgments, trauma, or teasing. A negative joke in adolescence is enough to trigger an eternal comparison with the image in the mirror.

Body image is primarily constructed through internalization of appearance ideals, all influenced by observations of and interactions with others. There are two main types of influences:

Proximal Influences (direct and immediate influences) such as:

- *Family:* Critical comments from parents about weight or body shape, whether directed at the child or themselves, can significantly impact a child's body image.

The educational style like parental overcontrol in eating or bad eating habits are crucial. Conversely, parents who respect body diversity, avoid weight-related discussions, promote healthy eating without restriction and build positive self-esteem are more likely to have children with positive body images. Family meals and positive mealtime experiences are also crucial, while dysfunctional relationships drive to lower self-esteem.

- *Peers:* Teasing, bullying, or critical comments from peers, but even sharing pics and selfies about appearance are significant risk factors for body image issues. Moreover, a boy who only gets compliments when he's sculpted will learn to use his body as a tool for approval. On the other hand, a sense of belonging and support from peers can foster a healthier body image. Group peer influence can drive both positive and negative behaviors related to body image.
- *Sport Coaches/Teachers:* Coaches and teachers hold significant influence over athletes' body image due to their roles in shaping expectations about body composition and performance. An excessively critical or weight-focused coaching style can contribute to negative body image. Conversely positive, supportive coaching that emphasizes skill development, effort, and overall health rather than appearance can promote a healthier body image.
- *Media and Social Media use:* SM amplifies this effect through curated and filtered images, facilitating constant social comparison and the internalization of unrealistic beauty ideals. Likes and comments act as a measure of value

  The pursuit of a "perfect" digital self can lead to anxiety, depression, and body dissatisfaction.

  Some studies have indicated that there is an association between social-networking-site use and the internalization of a thin/muscular ideal, suggesting that constant exposure to unrealistic body ideals may trigger body dissatisfaction and the need to modify eating and training habits. Specifically, body image disorders and Excessive Internet Use (EIU) may largely overlap due to the fact that they share risk factors and underlying psychological principles. and the fact that the average age of onset in recent years has dropped considerably, should not be overlooked, affecting young people from the age of 13, probably even due to the progressive lowering of the average age at which one accesses social networks. In

particular, several studies have highlighted a close link between the onset of bigorexia and the advent of SM.

The apps make adolescents very conscious about body weight, body shape, calorie intake, and exercise, but they need to be taught to filter the information they receive from the mass media in order to prevent the negative impact that the media may have.

Individuals with a positive body image tend to critically evaluate, filter and deconstruct unreal images in the media to protect their own body image. On the contrary, adolescents with low physical fitness levels might increase body dissatisfaction, which in turn would increase disordered eating symptoms. Many interviewees say they have abandoned sport because they feel inadequate, both in terms of performance and their appearance compared to that of the athletes they see in the media and on SM, those who were less confident in their athletic abilities rated themselves as “less fit” compared to their perceived idea of what an athlete should be. And it is mostly girls who give up sport due to competitive pressure.

Distal Influences These are broader, more systemic influences that shape body image over time:

- *Culture:* Cultural ideals of beauty and body shape, often reinforced by societal norms, significantly impact body image. Different cultures may value different body types, influencing what is considered "attractive" or "healthy".
- *Society:* Societal pressures related to success, status, and acceptance can be intertwined with physical appearance, contributing to body dissatisfaction. The emphasis on thinness for women and muscularity for men in Western societies is a pervasive societal influence. In fact, it is possible to build a positive body image only if one perceives that one's physical appearance is acceptable for the society to which one belongs and for the people who make up one's social environment.

Body Image Across the Lifespan: The Developmental Continuum

Body image development is a dynamic process influenced by various factors at different life stages.

- **Early Childhood (3-6 years):** Children begin to notice physical differences and associate them with gender, size, and abilities. They often mimic adult attitudes

towards appearance. Early body dissatisfaction can be triggered by critical comments from family or peers, even at this young age.

- **Late Childhood (7-11 years):** Children become more aware of societal beauty ideals through media and peer interactions. They may start comparing their bodies to others and express concerns about weight or appearance. Involvement in sports can positively influence body image by fostering a sense of competence and valuing physical abilities but can also introduce pressures if the focus is on appearance.
- **Adolescence (12-18 years):** This is a critical period due to rapid significant physical changes (puberty), often experienced as 'disharmonious' and heightened social awareness. Adolescents increase comparison, decrease tolerance for frustration and therefore are highly susceptible to peer influence and media messages about ideal body types. Body dissatisfaction often increases, particularly among girls. The body is a 'battlefield'. Eating disorders frequently emerge during this stage.
- **Young Adulthood (19-25 years):** While physical development stabilizes, individuals navigate new social environments (e.g., university, work) where body image pressures persist. The emphasis on maintaining a "healthy lifestyle" can sometimes mask underlying eating disorder behaviors. Increased independence means symptoms may be hidden more effectively, and individuals may be less likely to seek help or disclose difficulties. They are often managing studies, jobs, and social pressures.
- **Adulthood (26+ years):** Body image concerns can continue, influenced by aging, parenthood, career demands, and shifts in personal values. While eating disorders are less likely to have a new onset in adulthood, they can persist from earlier stages. The focus might shift from achieving an "ideal" body to maintaining health and vitality.

Risk and Protective Factors for Body Image and Eating Disorders

Understanding the factors that increase or decrease the risk of body image and eating disorders is crucial for targeted prevention and intervention.

Risk Factors

- **Childhood Obesity:** A history of childhood obesity increases the risk of developing eating disorders later in life.
- **Neurodevelopmental Disorders:** Conditions like Autism Spectrum Disorder (ASD) and Attention-Deficit/Hyperactivity Disorder (ADHD) can be associated with higher rates of body image and eating disorders.
- **Alexithymia:** Difficulty identifying and expressing emotions, which can lead to using food or exercise as a coping mechanism.
- **Childhood Trauma:** Experiences of trauma, including physical, emotional, or sexual abuse, are significant risk factors.
- **Social Isolation:** Lack of social support and feeling disconnected from others can exacerbate BDDs and EDs.
- **Peer Teasing/Bullying Experiences:** being ridiculed for one's appearance by peers.
- **Participation in Sports with High Aesthetic Demands:** Sports like ballet, gymnastics, figure skating, and wrestling often emphasize leanness and specific body types, increasing risk.

Protective Factors

- **Sports Participation Focused on Health and Performance:** Involvement in sports that emphasize skill, effort, teamwork, and overall health rather than appearance.
- **Coping Skills and Emotion Regulation:** Effective strategies for managing stress and emotions without resorting to disordered eating or compulsive exercise.
- **Strong Social Support Network:** Having a network of family and friends who provide encouragement and acceptance rather than focusing on appearance and emotional support.

PERFORMANCE and APPEARANCE-ENHANCING DRUGS (PAEDs)

Introduction

For centuries, the ideal of a "healthy mind in a healthy body" (*Anima sana in corpore sano*) has been central to human well-being, a concept popularized by the ancient Greeks and Romans who even had "pharmacists and physiotherapists" in their gyms. However, in modern times, this focus has subtly shifted. The emphasis has increasingly moved towards becoming "harder, better, faster, stronger" rather than solely healthy. This pressure, especially within sports and fitness cultures, has created a "need" for shortcuts, leading to the rise of appearance-enhancing drugs and other potentially unhealthy practices.

For people involved in Motor/Sport field and Physical Education, understanding these trends is crucial to supporting the holistic well-being of individuals under their guidance.

The Influence of Professional and Social Pressures

Several factors contribute to this shift and the increasing use of appearance-enhancing methods:

- **Professional Pressures:** In various competitive fields, athletes and performers are required to maintain peak performance for extended periods and perform more physically demanding activities. These demands may lead individuals to seek external assistance.
- **Social Media and Fashion:** The pervasive influence of SM and fashion heavily scrutinizes physical attributes like weight, height, and BMI against evolving social standards of health and attractiveness. The "solution" often promoted includes drugs, injections, operations, and adherence to unhealthy practices.

Performance and Appearance-Enhancing Drugs (PAEDs)

This concept goes beyond sports and exercise; people may want to improve their bodies, not only to increase performance, but also to achieve aesthetic, social, cultural, and professional goals. Examples are cognitive stimulants for studying, steroids to increase muscle hypertrophy and supplements to maintain a desired physique.

Doping is defined as the use of prohibited substances or methods with the intention of enhancing athletic performance. For the past 20 years, antidoping bodies and researchers

have scrutinized the use of doping in elite sport, but many questions remain when it comes to recreational sports, mass sports, and leisure sports especially for appearance-enhancing drugs rather than performance-enhancing drugs. The use of substances for aesthetic or non-regulated purposes is not, in itself, considered doping, especially when much of their usage occurs outside of sports, and therefore poorly regulated. 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.

In addition, many image-enhancing drugs such as anabolic androgenic steroids can easily be acquired over the internet, leading to a substantial black market but are of substandard quality and counterfeit. The fake drugs black-market causes a situation of unpredictable uncertainty and a considerable individual and public health threat.

Many of these substances cause significant risks: hepatotoxicity, infertility, gynecomastia, cardiovascular changes, testicular atrophy, severe acne and, even, death. There is also reports of psychological dependence, irritability, impulsivity, etc. Worse, the use of dietary supplements is linked to an increase in permissive attitudes towards doping.

The use of performance and appearance enhancing drugs (PAEDs) appears to be associated with several psychopathological disorders of unclear prevalence, especially substance use disorder, higher physical activity levels, more diagnoses of psychiatric disorders, BDDs and EDs.

Traditional doping agents

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

- **Androgenic steroids**: which promote muscle growth and rapid recovery;
- **Growth hormone**: used to reduce body fat and increase lean mass;
- **Erythropoietin:** which increases carrying capacity;
- **Stimulants such as ephedrine and amphetamines**: used to boot focus and fatigue resistance.

Substances with direct effects on body image

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

- **Anabolic steroids:** used outside competitive sports;

- **Diuretics:** to reduce water retention and enhance muscle definition;
- **Laxatives:** for rapid weight loss;
- **Appetite suppressants:** such as substances banned in several countries.

Dietary supplements

Supplements occupy an ambiguous space: they are legal, meant to complement nutrition: 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.

Among them whey protein, creatine, caffeine, beta-alanine, etc.

There are some performance benefits in using protein products, namely increase of muscle mass and decrease in recovery time; however, most people do not need protein supplements, the average gym goer, for example, does not exercise enough to gain any benefits. There are even some evidences that intakes of more than 1.5g/kg/day of proteins have detrimental effects (homeostasis, renal function, liver function, coronary heart disease).

Appearance-Enhancing Drugs (AEDs) and Body Image

Considering that appearance-enhancing drugs (AEDs) are substances used to alter one's physical appearance, often with the goal of improving body shape, muscle mass, or reducing fat, AEDs consumption is correlated with feelings of bodily inadequacy, low self-esteem, or even erroneous perceptions as muscle dysmorphia. AEDs rarely follow a purely instrumental logic: there is a deep emotional dimension tied to the desire to alter the body, others use AEDs as a form of psychological compensation after experiences of bullying, relational failure and performance pressure (either in sports sexuality or even professional life). There is also a communal dimension.

Case Study: Anna, 25 years-old

Anna, a 25-year-old individual, She is a university student, and follows fitness influencers on Instagram and TikTok; presents a common scenario in the fitness world. She regularly attends the gym and consumes a significant amount of protein supplements, casein, and caffeine to build muscle and increase resistance. Despite consuming enough protein from her meals and not having a protein deficiency or engaging in high-intensity training, she believes taking supplements is an essential part of "being fit".

Anna's belief in supplements advantages but there are

- ***Sense of Belonging and Motivation:*** *She feels she is aligning with what others do to achieve fitness goals, which increases her sense of belonging and motivation, making her more committed to training and sharing experiences.*
- ***Erroneous Beliefs:*** *This practice is associated with the development of erroneous beliefs about her body image, such as "if I don't take these supplements I am not able to have a desirable body".*
- ***Financial Impact:*** *Her supplement use has a noticeable financial impact on her monthly budget.*
- ***Risk of Escalation:*** *There is a higher risk that if she is unable to achieve her goals, she might transition to more powerful substances.*

Case study: Steven McRae, a Professional's Perspective

Steven McRae, a prominent ballet dancer, offers a poignant perspective on the consequences of extreme physical demands and under-fueling. He snapped his Achilles tendon during a live performance and openly discusses his years of battling injuries, pushing himself, and ignoring warning signs. He described living in a "constant state of burnout" and being "greatly under-fuelled". McRae has now become a vocal advocate for changes in the ballet world. Interestingly, despite his increased muscle mass and strength post-injury, some critics argue he is now a "less interesting and less gracious dancer". This highlights the complex interplay between physical capabilities, aesthetic ideals, and the pressures faced by professionals.

Conclusions

The case studies underscore the critical role that people involved in Motor/Sport field and Physical Education play in guiding healthy body image and training practices. It is essential to recognize the subtle influences of professional demands, peer culture and SM that can lead to unhealthy choices. By fostering environments that prioritize holistic health, balanced nutrition, and realistic expectations, educators and trainers can help individuals develop sustainable and healthy relationships with their bodies and physical activity, mitigating the risks associated with PAEDs.

MANAGEMENT

Introduction

As described above EDs show a growing incidence in recent years.

It is crucial to remember that BDDs and EDs are often difficult to recognize due to affected individuals' lack of awareness, underestimation of symptom severity, and frequent ambivalence toward treatment. The high rate of co-occurrence with other psychiatric conditions further complicates diagnosis. Only a small percentage of those suffering from BDDs and EDs receive an appropriate diagnosis and treatment, highlighting the need for increased awareness among all professionals who interact with individuals, especially adolescents and young adults. These disturbances not only affect the individual, but also involve the entire family system, requiring a comprehensive approach, particularly when onset occurs in childhood or adolescence.

Understanding the initial presentations, evolving symptoms, and profound impacts of AN, BN, and Bigorexia is critical. Your close observation of individuals and the relationship of trust and listening, particularly in athletic and educational settings, places you in a unique position. For these subjects physical activity is not the goal, but it is the means to achieve weight loss or overdeveloped musculature. By recognizing the subtle and overt signs of these disorders, you can play a crucial role in facilitating timely referrals to healthcare professionals, thereby contributing to better outcomes for affected individuals. Promoting a healthy body image and healthy relationships with food and exercise, emphasizing performance and well-being over aesthetic ideals, and fostering open communication are vital steps for individuals at risk or struggling with BDDs and EDs. Recognizing the multifaceted nature of these disorders, and the potential for co-occurring psychiatric conditions, will enable you to provide more holistic and effective support to your athletes and students.

Recognize EDs

Eating disorders represent a diverse group of conditions that can manifest differently depending on age.

Anorexia Nervosa (AN)

Initial Behaviors: Individuals with AN usually restrict food intake by adhering to often "self-managed" diets aimed at weight loss, characterized by poor caloric intake, avoidance of carbohydrates and fats, intermittent fasting, or small food portions. Patients often rationalize their food restrictions by claiming intolerances or allergies, or by reporting feeling unwell or bloated after eating certain foods.

Evolution of the Disorder (Adolescence): Adolescents with AN may constantly check their weight and body shape in front of mirrors. Initially, weight loss can be a source of empowerment, leading to a sense of increased well-being and self-efficacy. They may develop false beliefs that controlling their body can help them cope with negative emotions, low self-esteem, inadequacy, and a perceived chaotic environment, thereby asserting personal strength and capability.

The desire for weight loss often evolves into a fear of gaining weight. This fear leads to anxiety and guilt after eating, resulting in mood instability. Individuals with AN may develop compulsive behaviors to manage anxiety and avoid unforeseen events, such as obsessive weight checking, body checking, calorie counting, and rigid mealtime rituals (e.g., cutting food into small pieces, prolonged cooking, eating very slowly). Gaining weight can signify losing control over one's identity and autonomy. Feelings of guilt after eating are often alleviated through eliminatory behaviors like excessive physical exercise (motorism), self-induced vomiting, or misuse of laxatives and/or diuretics.

AN in Preadolescence: Preadolescents with AN often deny concerns about body shape and weight, instead reporting a lack of appetite or abdominal pain. They may have a greater presence of neurodevelopmental disorders or previous psychopathology (e.g., ARFID, depression, anxiety, obsessive–compulsive disorder), but exhibit rapid weight loss that leads to quicker medical attention. Warning signs include slowed growth, changes in BMI, repeated nausea, or abdominal pain. Family factors (difficult relational patterns, mutual overcontrol, critical comments) and peer victimization are crucial. 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.

High-Risk Populations for AN: Individuals in dance or competitive sports requiring weight and body shape control are at higher risk. Those with chronic illnesses demanding dietary

restrictions (e.g., Type 1 diabetes, Cystic fibrosis, Inflammatory bowel disease, Celiac disease).

Complications and Maintenance: Extreme weight loss can impair growth and lead to irregular menstrual cycles in girls. All symptoms tend to worsen with further weight loss and deterioration of both physical and mental health. Individuals with AN often do not recognize their condition and avoid seeking help. If chronic, symptoms may become part of the individual's identity, especially if the disorder is perceived as "ego-syntonic".

Warning Signs for Parents/Sport Professionals: Parents might notice tendencies to hide food or avoid meals with others. Other signs include cutting food into very small pieces or constantly rearranging food on the plate, frequent skipping of meals with excuses like "not hungry" or "already ate" or "gastrointestinal complaints" and rigid food preparation rituals. A large percentage of individuals with AN show excessive physical activity, which usually precedes the onset of the disorder, and thus could be considered as one of the early signs to intercept.

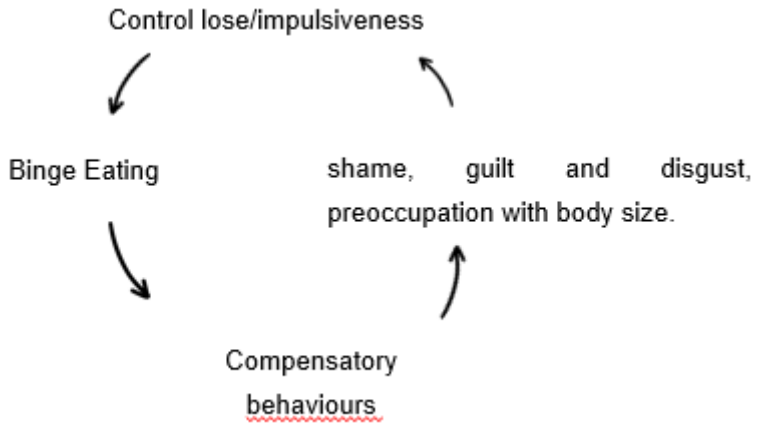
Indirect signs of compensatory behaviors, such as prolonged bathroom visits after meals or excessive physical activity, compulsive movements, and excessive exercise even when fatigued may emerge. Emotional and behavioral changes, including mood swings and disturbed sleep patterns, are also common. Further observations include social withdrawal, progressive isolation from family, peers, and social settings, intense dedication to school and sports (often with initially preserved performance and a progressive decline in final phases), low tolerance for failure. Hydration issues, such as excessive water intake or intentional dehydration, may be present. Unusual clothing choices, from overly covering clothes (early stages) to minimal clothing to promote heat loss (later stages), can occur. Amenorrhea or menstrual irregularities in girls, beyond two years after menarche, are significant physical indicators.

Psychological and Cognitive Aspects: Clinicians commonly observe alexithymia (poor recognition and regulation of emotional states), dependency, and self-criticism, often linked to difficulties in the separation-individuation process. Low self-esteem and difficulties in self-assertion are common. Avoidance of the transition from childhood to adulthood is frequent, often manifesting as a desire to maintain a childlike, asexual body. Parent-child relationships, particularly with mothers, can be characterized by role reversal and controlling dynamics. An inner conflict may exist between a healthy part and an "anorexic part" that maintains symptoms (e.g., internal voices guiding and controlling behavior). Peer

relationships are often dependent, with separations and emotional detachment causing significant distress.

Bulimia Nervosa (BN)

Warning Signs for Parents/Sport Professionals: The binge eating and compensatory behaviors can become compulsive and obsessive, often hidden (e.g., eating during the night, frequent trips to the bathroom after meals). Parents might notice food missing from the pantry. Binge eating is followed by shame, guilt, and disgust, coupled with preoccupation with body size. Individuals with BN experience a loss of control and impulsiveness. Like those with AN, individuals with BN fear weight gain and are strongly motivated to lose weight, despite a normal appearance. As they are typically of normal weight or overweight, the disorder may go unnoticed and untreated for a long time.



Purging-related complications include dental erosion, salivary gland hypertrophy, callosities or abrasions on the hands (e.g., Russell's sign), nail damage, mouth sores, and significant electrolyte imbalances. Hormonal and gastrointestinal issues such as irregular menses, endocrine disruption, bloating, dysphagia, or acid reflux are also common.

Psychiatric Comorbidities and Clinical Complications: BN is frequently comorbid with psychiatric disturbances.

Bigorexia

Driving Factors: Individuals with Bigorexia are often driven by early body dissatisfaction (feeling "scrawny" or "weak" in childhood), distorted self-perception, low self-esteem, and the pursuit of muscularity can serve as a coping strategy for body-related anxiety. The social comparison with popular peers may lead to a positive reinforcement from quick visible results, gaining admiration and respect from male peers, desire for attractiveness

being perceived as more appealing by girls, and a sense of control gained from weightlifting.

Warning Signs for Parents/Sport Professionals:

- Distorted Body Image: A persistent and irrational belief that their body is too small, weak, or underdeveloped, even when objectively muscular. This distortion is similar to AN but focused on muscularity.
- Obsessive Focus on Appearance: Thoughts are dominated by concerns about physique, muscle size, and definition. This leads to frequent bodychecking in mirrors, comparisons with others, and distress if the desired appearance is not maintained. They may frequently check their appearance or. On the other hand, some individuals avoid situations where their body might be exposed, with discomfort with nudity and sexual activity due to body shame.
- Excessive Exercise and Weightlifting: Individuals follow rigid and intense workout routines, often spending multiple hours daily at the gym. Training choices are often aesthetically focused, influenced by bodybuilding culture, and characterized by a rigid mindset where less-than-intense workouts are seen as failures. Irritability and frustration arise when unable to complete a planned routine. Bigorexia subjects may continue exercising despite pain, injuries, or exhaustion, prioritizing muscle gain over health ‘no pain, no gain’. This compulsive behavior can lead to overtraining syndrome, fatigue, and long-term joint and muscle damage.
- High-Protein Diets and Supplement Use: An obsession with dietary control, inspired by fitness magazines and pro bodybuilders especially increasing protein intake for muscle growth up to 3g of protein per kg of body weight, eating every few hours, even when not hungry, common cycles of "bulking" (high protein and carbs to fuel muscle growth) and "cutting" (near-total carb restriction to enhance muscle definition), tracking every gram of carbohydrate. Meal preparation is meticulous to control nutrients and avoid "unclean" foods. This may involve excessive use of protein shakes, creatine, and various supplements, squandering excessive amounts of money. This intense dietary regimen often interferes with daily life but is perceived as necessary for achieving the ideal physique.
- Attitudes Towards Steroid Use: Illegal substances like steroid use are often normalized in gym culture, with a distrust of medical advice, considering that professionals overstate risks or lack real knowledge with reliance on online research for self-

education to justify and manage use. Bigorexic subjects believe that steroids are not worse than unhealthy diets or lifestyles. After stopping cycles, psychological symptoms such as depression and suicidal thoughts may occur, with an intense fear of losing muscle mass or progress without continued use.

- Impact on Quality of Life and Emotional Toll: Bigorexia can lead to important social isolation, avoiding eating out or social gatherings to stick to strict diet, financial strain due to large sums spent on supplements (e.g., protein powders, fat burners), limited friendships because of the little time or energy left for maintaining relationships, and work-life conflict as training takes precedence. There is a constant preoccupation with food, training, and appearance, with life revolving around the gym.

Identifying Red Flags: The 10 Key Questions for Professionals

Here are 10 key questions to guide your observations and conversations:

1. **How is their relationship with training and physical activity?**

   What do you like most about working out? What's your goal for yourself? Do you ever work out when you're tired or sick?

   Look for signs of excessive, compulsive, or rigid exercise. When the subject can't sit still, it's an important signal. Training is not a resource, but an obligation or compensation for binges or 'slip-ups'. There may be unexpected changes in sports behavior; some individuals may increase their workout sessions, leading to overtraining and isolation, while others might stop attending training sessions and feel ashamed.

2. **How do they react to changes in their body?**

   Observe extreme distress or fixation on minor changes. Many guys weight themselves several times a day. If the number changes, the mood changes. This is a sign to look for '*I want to see the bones/definition'*.

3. **How is their relationship with food? Do they avoid foods or situations related to food?**

   Are there any foods you always avoid? How do you feel after eating? How has your eating changed in the last few months?

Note any consistent excuses for not eating or avoiding social meals. There is loss of spontaneity and social life. '*I only eat if I've trained enough'*.

4. **Do they often talk about their body in negative terms?**

   Do you ever look in the mirror and not like what you see?

   Listen for frequent self-criticism or expressions of dissatisfaction with their appearance. '*I'll never like myself'*.

5. **Are they hyper-critical of themselves?**

   Observe overall perfectionistic tendencies and harsh self-judgment beyond body image. They use, without flexibility, apps for counting calories, steps, fat, through smartwatches and wearable fitness, because monitoring provide them with security. These subjects are always comparing themselves with others in terms of aesthetic results, some subjects cover themselves and avoid the mirror, while others flaunt their bodies with a narcissistic hyper investment.

6. **Do they show anxiety when they don't train?**

   How do you feel when you can't work out?

   Note irritability or distress if a planned workout is missed. '*I can't stop, if I skip a day, I feel bad*'.

7. **Do they constantly seek confirmation?**

   Observe if they frequently ask for reassurance about their appearance or efforts. These subjects may develop feeling of '*not being worthy*' if they don't improve, difficulty managing frustration or lapses. There are emotional oscillations related to the body, with emotional reactivity to comments (*You've Lost Weight!*, *You're Bigger*), with good/bad days based on scale number, strong post-eat guilt or, on the contrary, intense workout gratification.

8. **Are they influenced a lot by social media?**

   Look for excessive engagement with "fitness" accounts with extreme messages and toxic language or comparison to social media content with influencers considered as an ideal measure.

9. **Do they have rigid or ritualistic behaviors?**

   This could involve strict dietary rules, specific exercise routines, or checking behaviors.

10. **Are they willing to talk or do they close themselves off?**

Note any increasing social withdrawal or reluctance to discuss their feelings or habits. They often use phrases such as '*I don't want to get big, I have to define myself*'.

Situations That Require Immediate Attention

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

You must not look only for extremes, the difference between health and obsession may be subtle. The most dangerous signals are often the mildest and most constant, such as apparently 'normal' clients with subtle and less visible behaviors, referring to rigorous but '*healthy*' training, controlled diet, but '*without excesses'*.

Case studies

Case study n.1

Sofia is a 17-year-old girl that attends the gym you're currently working for. She's visibly underweight, she works out every day of the week (and maybe during weekends too), and looks very determined and committed, spending most of her time on the treadmill. Her family is worried, but helpless.

Case study n.2

Max is a 21-year-old man that spends several hours in the gym. He eats only 'healthy' food, counts proteins and kcals, he uses 'mild' supplements, but even anabolics. He never feels strong enough.

What do these two cases have in common?

In both cases, identity is all hanging on the body. Behind the appearance of different bodies, there is the same dynamic with similar patterns:

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

Strategies for Support

Create a supportive and empathetic environment

- **Create a welcoming climate:** Foster an inclusive and non-judgmental atmosphere in the gym or classroom. It is important to provide a safe space where young people feel heard and understood.
- **Avoid dismissive remarks and comments about body and weight:** Adolescents with body image disorders often experience feelings of shame and secrecy about their condition.

  Criticizing a young person's eating habits, exercise routines, or body image concerns can reinforce feelings of inadequacy and resistance to help. Even worse is minimize or laugh at the problem. Instead, offering support in a compassionate manner. Rather than saying, '*You shouldn't be starving yourself*' or '*You look fine!*', try neutral phrases like, '*I've noticed you seem really stressed about your body lately. I'm here to support you'.* Acknowledging their struggles without judgment helps build a foundation for trust and eventually recovery.
- **Provide active listening and feelings validation:** This can help build trust and encourage BDDs and EDs to open up about their struggles. Use supportive phrases like: *'It's normal to feel this way…'*
- **Value body diversity:** Promote the idea that healthy bodies come in various shapes and sizes and avoid direct confrontation. Provide reassurance that health is not determined solely by weight or appearance.
- **Talk about strength, health, and balance:** Shift the narrative from appearance to overall well-being and functional fitness, focusing on performance, energy levels and skills, in the meantime encouraging intrinsic motivation.
- **Creative activities:** Encouraging adolescents to express their thoughts through journaling or creative activities can also help them articulate their struggles in a non-confrontational manner.
- **Choose the right moment:** never at the end of the work out or in front of other people
- **Dialogue techniques:** Use open-ended questions and do not force confidence, be empathetic, not inquisitive. Give space: even silence communicates!

Educating without pressuring

- **Provide accurate, age-appropriate information:** It can be helpful to inform about the physical and mental consequences of AN, BN and vigorexia, but it should be done carefully.
- **Things to avoid:**
  - simplistic solutions such as '*eat more*!'.
  - strong-arm solutions such as prohibition, control, and punishment.
- **Avoid overwhelming facts and use relatable examples:** Overwhelming an adolescent with facts may cause them to withdraw. Using gentle, appropriate age discussions and real-life examples can make the information more relatable.
- **Engage through interactive methods (videos, discussions, role models)**
- **Discuss media influence and unrealistic body standards:** It is important to invest in critical education about the body, health, and appearance from an early age and foster critical thinking about imposed body ideals.

Encouraging professional help

The early identification and a consequent appropriate treatment are crucial as AN and other BDDs are potentially life-threatening conditions.

These disturbances often require professional intervention including therapy, medical monitoring, nutritional support and sometimes medication, often used in conjunction with each other, described and validated by a large body of literature. Encouraging the individual to seek help from a psychiatrist, psychologist or nutritionist who specializes in eating disorders is essential.

Different therapeutic approaches, such as Cognitive Behavioral Therapy (CBT), Acceptance and Commitment Therapy (ACT), and Family-Based Therapy (FBT), have proven effective in treating BDDs. Framing therapy as a means of self-care rather than punishment can reduce resistance; educating adolescents about the benefits of these therapies and allowing them to be involved in choosing their care path can increase their willingness to participate.

Avoid propose "do-it-yourself" solutions but offer contacts.

'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?'.

As described before, physical activity would be very important to recover in "early" EDs and bigorexia subjects all the beneficial effects of sport, which otherwise are not

perceived and enjoyed. Moreover, a supervised physical therapy is also included among the optimal interventions for EDs, with potential benefits on weight gain and in the overall condition improvement; it not only does not adversely affect the health of these individuals but also provides beneficial effects both on the symptomatology and on psychophysical health. For example, resistance training and low-intensity exercise produced improving in muscular strength and in BMI due to a skeletal muscle mass gain.

Involving family and support networks

Family members, teachers, and close friends play a crucial role in supporting a young person's recovery.

Parents and caregivers can benefit from family counselling or support groups to learn how to approach conversations about BDDs and EDs providing positive reinforcement without enabling harmful behaviors. Similarly educating the network about the disorders can create a strong support system with socially valued alternatives for identity construction.

Schools can also implement programs that promote self-esteem and body positivity to create a supportive environment for all students.

Promoting a healthy relationship with food and exercise

Shifting the focus from body image to overall well-being can be beneficial. Encouraging balanced eating habits and moderate exercise as ways to maintain health, rather than achieve an idealized physique, helps reduce the pressure to conform to unrealistic body standards.

Health professionals and mentors should emphasize intuitive eating, which encourages individuals to listen to their body's hunger and fullness cues. Exercise should be framed as a way to obtain enjoyment and mental well-being rather than a means to alter aesthetics. Providing structured but flexible meal plans and workout routines can help those recovering from body image disorders regain a sense of normalcy and control, without rigid rules.

Challenging unrealistic social and media influences

Helping adolescents critically analyze and question external influences can empower them to develop a healthier self-perception. Teaching media literacy skills can improve their ability to recognize and challenge unrealistic and harmful beauty and fitness standards and images.

Encouraging a diverse and realistic view of body types through exposure to positive role models can also be effective as curating feeds to include body-positive.

Schools and organizations can implement campaigns that celebrate body diversity and educate youth about the dangers of digitally altered images.

Precautions

- **Don't be overwhelmed**: Working on other people's discomfort carries with it the risk to be overwhelmed. It is important to acknowledge your involvement. Don't make diagnosis, don't treat, don't become an "exclusive confidant", but talk to colleagues or referents. You don't replace the clinician, but you can be a bridge. Always maintain clear professional boundaries and try to use supervision or decompression moments.
- **Recognize when you are making a difference** by observing subtle shifts: the youth contacts you more often, starts using different language, thanks you for "being there," and agrees to talk to a specialist.
- **Young adults**: For young adults (after adolescence), eating disorders may be masked by a "healthy lifestyle". They navigate increased independence and self-responsibility, which can make it easier to hide symptoms. They may be less likely to seek help or disclose difficulties as they manage studies, jobs, and social pressures. Professionals working with this age group should be particularly attuned to subtle changes and be prepared to initiate sensitive conversations.

Conclusions

By understanding the complexities of body image development, recognizing risk and protective factors, and actively observing for warning signs, you can contribute significantly to the early identification and support of individuals struggling with body image disorders and eating disorders. Your intervention can be life-changing. Creating an environment that champions health, functionality, and body diversity, rather than narrow aesthetic ideals, is paramount. Your empathetic approach and knowledge can guide individuals towards healthier paths, ensuring that the pursuit of physical activity genuinely contributes to a 'healthy mind in a healthy body'.