This chapter describes the major eating disorders encountered during adolescence including anorexia nervosa, bulimia nervosa, and eating disorders not otherwise specified (EDNOS). The latter group accounts for most adolescents seeking treatment for an eating disorder and refers to those patients not meeting full Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for either anorexia nervosa or bulimia nervosa. In one study, using the DSM-IV criteria, >50% of children were classified as having EDNOS (Nicholls et al., 2000).

ANOREXIA NERVOSA

Anorexia nervosa is an eating disorder that primarily affects adolescent girls and requires a comprehensive and integrated approach to assessment and treatment. This disorder is a classic biopsychosocial syndrome because the psychological and physiological manifestations are intertwined. The core features are self-induced weight loss accompanied by distorted body image, intense fear of weight gain, denial of the seriousness of weight loss, and amenorrhea (absence of at least three consecutive menstrual periods in the postmenarcheal female). Anorexia nervosa is subdivided into a restrictive subtype and a binge eating and purging subtype (Table 33.1). Adolescents diagnosed with anorexia nervosa are reported to have a good prognosis with 76% having a full recovery (Strober et al., 1997).

Etiology

The etiology of anorexia nervosa is multifactorial with a combination of biological, psychological, and sociocultural factors contributing to the development of the disorder. The specific etiology may be different for different individuals. The biopsychosocial model for anorexia nervosa described by Lucas (1981) is shown in Figure 33.1. This figure demonstrates how biological vulnerability, psychological predisposition, and sociocultural influence precipitate dieting and weight loss in a vulnerable individual. This weight loss, in turn, leads to malnutrition, which contributes to the physical, psychological, and emotional changes. Over the last decade, research has focused on the contributions of genetics to biological vulnerability, the personality type associated with anorexia nervosa, and the potential role of neurotransmitters in the etiology of the disorder.

There is a familial predisposition to eating disorders, with female relatives most often affected. There is a higher rate of anorexia nervosa among identical twins compared to fraternal twins. In addition, relatives of individuals with an eating disorder are at higher risk of developing an eating disorder. These findings suggest that genetic factors may predispose some people to eating disorders.

To date, no single gene or combination of genes have been identified. Recent research has suggested that certain areas of the human genome may harbor susceptibility genes for anorexia nervosa on chromosome 1 (Grice et al., 2002).

Certain personality traits such as perfectionism, low self-esteem, obsessionality, social isolation, and feelings of ineffectiveness often predate the onset of the illness and persist to a varying degree after recovery. Researchers have discovered disturbances in a number of different neurotransmitters including serotonin, norepinephrine, and dopamine in those with anorexia nervosa. There is evidence that starvation, binging, and excessive exercising can lead to changes in neurotransmitters and conversely, there is evidence that neurotransmitter abnormalities can lead to these behaviors. The role of disturbances in transmission of serotonin, a neurotransmitter that is known to play a role in modulating appetite, obsessionality, and impulsivity, has received particular interest in recent years (Kaye et al., 1991, 2003).

Weight concerns and societal emphasis on thinness are pervasive in westernized societies and adolescent girls tend to be more vulnerable to these influences. The slim body ideal is thought to be the key contributor to the gender differences seen in both anorexia nervosa and bulimia nervosa. In the typical situation, in a biologically predisposed individual, feelings of ineffectiveness and loss of control during adolescence, compounded by societal pressures to be thin, lead to dieting to obtain a sense of control. Dieting itself, leads to further preoccupation with shape and weight, perpetuating the cycle. Many of the behaviors, physical signs, and symptoms seen in anorexia nervosa can be attributed to malnutrition.

Epidemiology

1. Prevalence: Most recent data suggest that the estimated prevalence for anorexia nervosa in young women is 0.3% to 0.5% (Hoek and van Hoeken, 2003). The incidence
**TABLE 33.1**

**DSM-IV Diagnostic Criteria for Anorexia Nervosa**

1. Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g., weight loss leading to maintenance of body weight <85% of that expected), or failure to make expected weight gain during period of growth, leading to body weight <85% of that expected.

2. Intense fear of gaining weight or becoming fat, although underweight.

3. Disturbance in the way in which one’s body weight or shape is experienced, undue influence of body shape and weight on self-evaluation, or denial of the seriousness of current low body weight.

4. In postmenarcheal females, amenorrhea, that is, the absence of at least three consecutive menstrual cycles.

(A woman is considered to have amenorrhea if her periods occur only following hormone, e.g., estrogen administration.)

**Specify type**

- **Restricting type:** During the current episode of anorexia nervosa, the person has not regularly engaged in binge eating or purging (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas).

- **Binge eating/purging type:** During the current episode of anorexia nervosa, the person has regularly engaged in binge eating or purging (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas).


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rate is estimated at 8 cases per 100,000 population. Incidence rates for anorexia nervosa are highest in 15- to 19-year-old girls, and have increased dramatically over the last 50 years in this age-group (Lucas et al., 1999). There are anecdotal reports of increasing presentations in prepubertal children. Rates for partial syndrome anorexia nervosa are typically higher.

2. **Age:** Most eating disorders begin during adolescence and more than 90% of individuals with eating disorders are diagnosed before the age of 25 years. The peak age at onset is midadolescence (13–15 years). However, the age range for the development of anorexia nervosa is approximately 10 to 25 years old. Increasing numbers of younger children and adolescents are being referred for assessment and treatment.

3. **Gender:** Females are more likely than males to develop eating disorders. Approximately 85% to 90% of adolescents with eating disorders are female. Recent research has shown that eating disorders are more widespread in males than previously thought. In fact, one in eight adolescents with anorexia nervosa younger than 14 years are boys (Katzman et al., 2005).

4. **Comorbidity:** Anorexia nervosa may coexist with other psychiatric conditions such as anxiety disorders, depression, obsessive-compulsive disorder (OCD), and anxiety disorders. 

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**FIGURE 33.1** Biopsychosocial model for anorexia nervosa. (From Lucas AR. Toward the understanding of anorexia nervosa as a disease entity. Mayo Clin Proc 1981;56:254, with permission.)
substance abuse disorders. It may also coexist with medical conditions such as diabetes mellitus and cystic fibrosis.

Risk Factors

Risk factors for anorexia nervosa are factors that do not seem to be a direct cause of the disorder but increase the probability of developing the disorder. The absence of any risk factor or the presence of a protective factor does not necessarily protect one against developing anorexia nervosa. According to a recent review (Walsh et al., 2005), potential risk factors predisposing an adolescent to anorexia nervosa include:

1. Age and gender: See preceding text. Anorexia nervosa usually develops during adolescence. Being female is probably the most reliable risk factor for anorexia nervosa.
2. Early childhood eating problems: Picky eating, anorexic symptoms in childhood, digestive and early eating-related problems, eating conflicts, struggles concerning meals are thought to be risk factors for anorexia nervosa.
3. Weight concerns/negative body image/dieting: Studies have shown that there is a link between dieting and the development of eating disorders in teenagers. Adolescent girls who diet are more likely to develop an eating disorder than girls who do not diet.
4. Perinatal events: Perinatal adverse events (prematurity, small for gestational age, and cephalohematoma) may increase the risk of developing anorexia nervosa. Furthermore, young women with a past history of anorexia nervosa may have an increased risk of experiencing adverse perinatal events.
5. Personality traits: The personalities of adolescents with anorexia nervosa are characterized by perfectionism, anxiety, low self-esteem, and obsessionalism.
6. Early puberty: There is a greater risk for developing an eating disorder in girls who experience early puberty. Puberty is a time for biological changes in body weight, shape, and size with increased deposition of body fat.
7. Chronic illness: Teenagers with chronic illness, such as diabetes mellitus, are at greater risk for developing an eating disorder.
8. Physical and sexual abuse: Research suggests that adolescents who have been sexually abused have about the same or only slightly higher incidence of anorexia nervosa as those who have not been abused.
9. Family history/family psychopathology: There are elevated rates of psychiatric disorders (anxiety disorders and affective disorders) in first-degree relatives of patients with anorexia nervosa.
10. Competitive athletics: Participation in certain sports or activities that place a high emphasis on body weight and appearance (e.g., ballet and gymnastics) put young people at risk for anorexia nervosa.

Clinical Manifestations—Typical Presentation

The common behaviors, signs, and symptoms associated with adolescents with anorexia nervosa are outlined in the subsequent text.

Behaviors

1. Dieting: Dieting in young people may be the result of a comment about body weight, shape, or size by a family member, teacher, coach, physician, or peer. Young people can often identify exactly when the dieting began.
2. Relentless pursuit of thinness: Initially, weight loss may be reinforced by positive comments from parents or peers who admire the patient’s will power and sense of control. Eventually, preoccupation with food, shape, and weight progress and the patient loses control over eating.
3. Distorted body image: The distortion of body image and denial of feelings of hunger result in continued weight loss, eventually leading to a state of emaciation.
4. Unusual eating attitudes and behaviors: Low-calorie foods (e.g., salad with vinegar and no oil, diet foods, and soft drinks) or foods low in fat are preferred. Foods previously enjoyed by the adolescent with anorexia nervosa are avoided. Adolescents with eating disorders tend to eat the same foods at the same time each day. Adolescents with anorexia nervosa may break food into small portions, eat foods of the same color, hide food, or secretly throw food away. Often large amounts of water or diet sodas with caffeine are consumed to satisfy hunger or to cause diuresis. Many adolescents with anorexia nervosa enjoy reading cookbooks, collecting recipes, watching cooking shows on television, cooking, and preparing food for others, although they themselves will not eat.
5. Increased physical activity: Some adolescents will engage in increased physical activity as a means to control their weight. They may stand constantly, move their arms and legs, run up and down stairs, jog, do floor exercises or calisthenics in an effort to expend energy. As weight loss continues, activity level often increases.
6. Purging behaviors: Some patients with anorexia nervosa purge to augment weight loss. Purging may take the form of vomiting, diuresis, food restriction, excessive exercise, or the use of herbal remedies or complementary and alternative medicines (CAM).
7. Frequent weighing: Adolescents with anorexia nervosa may weigh themselves daily or multiple times a day. The weight on the scale often determines how the adolescent feels about him or herself.
8. Wearing baggy clothes: Often adolescents with anorexia nervosa will wear baggy or layered clothing to conceal their weight loss or because they are cold.
9. Poor self-esteem: Adolescents with anorexia nervosa often have feelings of insecurity and helplessness when dealing with people or certain situations. Many young people will control their weight and eating habits in an attempt to reduce these negative feelings.
10. Isolation: Young people with anorexia nervosa usually withdraw from friends and family. This may reflect an attempt to minimize contact with criticizing or teasing peers. It is also a manifestation of low self-esteem and impaired social skills. The teen with anorexia nervosa tends to avoid social situations, as these circumstances are often associated with food.
11. Inflexibility: There is a strong sense of “right and wrong” in the point of not accepting individual differences.
12. Irritability and mood changes: It is not uncommon for parents to describe their adolescent with anorexia nervosa...
nervosa as moody or irritable. Starvation can cause some of these changes in mood.

Signs and Symptoms
Signs and symptoms may be minimal but can include the following:

1. Signs
   a. Weight loss: Adolescence is a time of intense growth and development. There is great variability in the rate, timing, and magnitude of weight gain; changes in height, and sexual maturation during normal puberty. The diagnostic criteria for anorexia nervosa outlined in the DSM-IV includes weight loss defined as refusal to maintain body weight at or above a minimally normal weight for age and height (e.g., weight loss leading to maintenance of body weight <85% of that expected or failure to make expected weight gain during period of growth, leading to body weight <85% of that expected). There are concerns about this weight criterion, especially the threshold when considering an adolescent underweight. Although formalized diagnostic criteria can be helpful, it is essential to consider the multiple and varied aspects of normal pubertal growth and adolescent development when diagnosing anorexia nervosa. Therefore, any significant or unexpected weight loss in an adolescent is cause for concern. The signs of malnutrition include loss of subcutaneous tissue, temporal wasting, loss of muscle mass, and prominence of bony protuberances.
   b. Amenorrhea: This is one of the diagnostic criteria outlined in the DSM-IV for postmenarcheal females. In 20% to 25% of patients with anorexia nervosa, the amenorrhea precedes the weight loss; in approximately 50%, the amenorrhea occurs at about the same time as the weight loss, and in approximately 25%, the amenorrhea occurs after substantial weight loss. One study found that amenorrhea did not discriminate between women with anorexia nervosa and those with all the features except amenorrhea across a number of relevant variables. As such, the utility of amenorrhea as a diagnostic criterion has been questioned in the postmenarcheal female (Garfinkel et al., 1996). Finally, an increasing number of patients are being seen with premenarcheal onset of the disorder. Resumption of menses usually occurs within 3 to 6 months of achieving goal weight when normal hypothalamic-pituitary-ovarian function is restored (Golden et al., 1997).
   c. Pubertal delay: Anorexia nervosa can delay the start or progression of puberty in adolescents. An episode of anorexia nervosa before or during pubertal development has the potential for long-term adverse effects on sexual maturation (in particular breast development), menarche, or normal menstrual function. Early treatment is critical to avoid delay or irreversible effects on pubertal growth and development.
   d. Lack of growth or poor growth: An adolescent who develops anorexia nervosa before growth is complete may develop growth retardation (Lantzouni et al., 2002; Modan-Moses et al., 2003). It is important to review the growth chart to determine whether the patient has crossed growth percentiles. Lack of growth or poor growth is more likely to occur in males because of the longer growth period of males.
   e. Changes in body hair: Young people with anorexia nervosa often develop lanugo hair, a fine downy hair commonly seen on the back, stomach, or face. They may also complain of hair loss or thinning.
   f. Skin: The skin is often dry with hyperkeratotic areas. There may be yellow or orange discoloration, most noticeable on the palms of the hand. Nail changes have been described in the form of pitting and ridging.

2. Symptoms
   a. Cold intolerance: Young people with anorexia nervosa may report that they feel cold when others around them feel fine.
   b. Postural dizziness and fainting
   c. Early satiety, abdominal bloating, discomfort, and pain.
   d. Constipation (secondary to reduced fluid and dietary intake and lack of response to the usual enteroceptive cues to defecation).
   e. Fatigue, muscle weakness, and cramps
   f. Poor concentration

Laboratory Features
Laboratory findings in patients with anorexia nervosa can include the following:

1. Hematological
   a. Leukopenia: May be a relative lymphocytosis
   b. Anemia: Not common and usually a late finding
   c. Thrombocytopenia
   d. Decreased serum complement C3 levels (but reference range levels of C4) and granulocyte killing defect; no evidence for increased susceptibility to bacterial infection
   e. Decreased erythrocyte sedimentation rate (ESR <4 mm/hour); if the ESR is elevated, consider another diagnosis

2. Chemistry
   a. Increased blood urea nitrogen (BUN) concentration
   b. Mildly increased serum glutamic-oxaloacetic transaminase and serum glutamic-pyruvic transaminase levels
   c. Hypophosphatemia
   d. Depressed serum magnesium and calcium concentrations
   e. Increased cholesterol
   f. Increased serum carotene level in 15% to 40% of patients
   g. Decrease vitamin A level
   h. Decreased serum zinc and copper levels

3. Endocrine: The hormonal changes in anorexia nervosa reflect an adaptive response to malnutrition.
   a. Thyroid
      • Thyrotropin (TSH): Within the reference range
ANOREXIA NERVOSA AND BULIMIA NERVOSA

The differential diagnosis includes both medical and psychiatric conditions:

1. Medical conditions
   a. Inflammatory bowel disease
   b. Malabsorption
   c. Endocrine conditions—hyperthyroidism, Addison’s disease, diabetes mellitus
   d. Collagen vascular disease
   e. Central nervous system (CNS) lesions—hypothalamic or pituitary tumors
   f. Malignancies
   g. Chronic infections—tuberculosis, human immunodeficiency virus (HIV)
   h. Immunodeficiency

2. Psychiatric conditions
   a. Mood disorders
   b. Anxiety disorders
   c. Somatization disorder
   d. Substance abuse disorder
   e. Psychosis

**Evaluation**

The evaluation of the patient with a suspected eating disorder should include a comprehensive history and physical examination and certain preliminary laboratory tests.

**History**

Helpful questions regarding eating, weight-control behavior, and other issues include:

1. Why has the teen and/or family come for an assessment?
2. How does the teen feel about the way she/he looks?
3. Is the teen trying to change the way she/he looks?
4. Has there been any change in the teen’s weight? If yes, what methods has the teen used to control his or her weight?
5. How much does the teen want to weigh?
6. Does the teen binge? Describe a “binge”? How often does the teen binge?
7. Are there any purging behaviors such as vomiting, laxative abuse, diuretic use, ipecac use, diet pills, herbal medications or other CAM?
8. What was the most and least the teen has weighed and when was that?
9. Does the teen’s feelings about her/his body affect her/his mood?
10. Is there any particular part of the teen’s body that he or she is uncomfortable with and why (e.g., buttocks or thighs)?
11. How much does the disordered eating interfere with the teen’s life? How much time does he or she spend preparing food, exercising, and weighing him or herself?
12. How much does the teen worry about eating or her/his weight?
13. Exercise history? Type, amount, and frequency?
14. What has the teen eaten in the last 24 hours?
15. Has the teen ever had a menstrual period? If yes, when was her last menstrual period? How often does she get her period? Has there been any change in her periods? Is the teen on oral contraceptive pill (OCP)?
16. Family medical and psychiatric history including teen or other family members with an eating disorder, mental illness, or substance abuse problem/disorder.
Laboratory Assessment

Instruments
Several instruments have been developed to aid in the diagnosis of eating disorders and the differentiation of anorexia from bulimia nervosa. These include the following:

1. Eating Attitudes Test (EAT-26): This screening test is a 26-item self-report questionnaire that examines attitudes and behaviors regarding food, weight, and body image. A score > 21 is suggestive of an eating disorder and warrants further evaluation (Garner and Garfinkel, 1979). The EAT-26 has been validated for use in adolescents.

2. Eating Disorders Inventory: A 91-item questionnaire that can be used both for screening and monitoring the emergence of an eating disorder in a high-risk group but not for diagnosis. It assesses drive for thinness, body dissatisfaction, bulimic behaviors as well as other dimensions associated with eating disorders including ineffectiveness, perfectionism, interpersonal distrust, interpersonal awareness, and maturity fears. Scores reflect percentiles for normal populations (Garner et al., 1983).

3. Eating Disorders Examination Questionnaire (EDE-Q): The EDE-Q (Fairburn and Beglin, 1994) is a 38-item self-report version of the Eating Disorders Examination administered to assess eating disorder pathology. The questionnaire assesses restraint and concerns about eating, body shape, and weight control.

4. Kids' Eating Disorders Survey (KEDS): The KEDS (Childress et al., 1993) is a 14-item self-report instrument requiring a 2nd grade reading level. It includes a three-point scale and eight figure drawings for assessing body shape concerns. Normal values are available.

Physical Examination
The physical examination should focus on the signs of malnutrition previously described. Height and weight should be carefully measured and plotted on the Centers for Disease Control and Prevention (CDC) growth charts. Previous growth curves are very helpful. Abnormal growth in height and weight may be an indication that there is a medical problem, such as anorexia nervosa. Weight should be measured in a hospital gown or light clothing after the medical problem, such as anorexia nervosa.

Treatment
1. Team approach: Treatment is best conducted by an interdisciplinary team of individuals who are skilled and knowledgeable in working with adolescents with eating disorders and their families. The treatment team typically consists of a physician, therapist, and nutritionist. It is critical that there is excellent communication among the members of the team and that information is shared as appropriate.

2. Diagnosis: The most critical step in treating anorexia nervosa is to recognize and address the eating disorder as soon as possible. It is important to inform the
adolescent and the family of the diagnosis and treatment plan.
3. Medical and nutritional intervention: The goals of medical intervention are nutritional rehabilitation, weight restoration, and reversal of the acute medical complications. Once there is improvement in the physiological symptoms of starvation, psychological treatment can begin.
4. Psychological intervention: Psychotherapy is an important component of the treatment of adolescents with anorexia nervosa. For the adolescent to be involved in a psychotherapeutic treatment program, he or she needs to be motivated to some extent. The psychological therapies currently used for the treatment of anorexia nervosa include family psychoeducation, interpersonal therapy, and family therapy. Recently, family-based treatment has been found to be effective in the adolescent age group (Le Grange et al., 2003). It is also important to remember that teens with eating disorders may suffer from a coexisting mental illness such as an anxiety disorder or depression and this needs to be considered in making treatment recommendations.
5. Pharmacological treatment: Some adolescents with eating disorders may benefit from the use of psychotropic medications. Fluoxetine does not appear to be effective in treating the primary symptoms of anorexia nervosa (Attia et al., 1998). Other studies have explored the efficacy of medication after weight restoration, with differing results. One study reported that fluoxetine prevented relapse in older adolescents with anorexia nervosa who have attained 85% of their expected body weight (Kaye et al., 2001), whereas a recent study failed to demonstrate any benefit from fluoxetine in weight restored patients with anorexia nervosa (Walsh et al., 2006). The most common medications used have included the SSRIs such as: fluoxetine, sertraline, paroxetine, fluvoxamine, and citalopram. These medications are also useful in treating comorbid depression or OCD. Health care providers need to be aware that the U.S. Food and Drug Administration has required manufacturers of these medications to include a “black box” warning label that alerts health care providers and consumers to an increased risk of suicidal thinking and behavior in adolescents being treated with the medications (Lock et al., 2005). In addition, there are some recent reports that the atypical antipsychotic medications such as risperidone, olanzapine, and quetiapine may be effective in adolescents with anorexia nervosa. Case reports and small cohort studies have shown that these medications have been helpful in reducing anxiety and obsessive thinking and enhancing weight gain. Further research is required to understand the benefits of these medications in the treatment of anorexia nervosa in adolescents.
6. Treatment setting: The actual treatment setting for the adolescent with anorexia nervosa may involve inpatient treatment, outpatient treatment, partial hospitalization, or residential treatment. Indications for hospitalization are outlined in Table 33.2 (Golden et al., 2003). The goals of hospitalization should be weight gain and reversal of the acute medical complications such as electrolyte disturbances and vital sign instability. Attempts should be made to achieve weight gain through the oral route, if possible. Short-term nasogastric feeding may be necessary in those with severe malnutrition. Behavioral contracts have been helpful and are used in most inpatient programs. Nutritional rehabilitation needs to be performed slowly to prevent the “refeeding syndrome”—a constellation of cardiac, hematological, and neurological symptoms associated with refeeding a

**Table 33.2**

Indications for Hospitalization in an Adolescent with an Eating Disorder

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

malnourished patient. The most serious feature of this syndrome is sudden unexpected death associated with hypophosphatemia and cardiac arrhythmias. A weight gain of 2 to 3 lb a week is optimal. Most, but not all, of the medical complications are reversible with nutritional rehabilitation (Golden and Meyer, 2004). Those conditions that may not be reversible include growth retardation, osteopenia, and structural brain changes (Katzman, 2005). A timeline for resolution of the medical complications of anorexia nervosa is shown in Figure 33.2.

7. Advice for parents or other caretakers: Several suggestions may be helpful in advising parents who have teenagers with an eating disorder. These include the following:
   a. Be patient: The recovery from anorexia nervosa is a long and hard process. There is no quick or easy cure. The recovery often takes 5 to 6 years.
   b. Avoid blaming: It is helpful for family members to avoid blaming themselves or others for the cause of the eating disorder.
   c. Avoid comments: Avoid comments about your adolescent’s weight and appearance. This is often perceived as criticism. Also, avoid comments about your own weight and appearance and the weight and appearance of others. Focus on traits that are not appearance-related.
   d. Promote a positive body image and healthy attitude toward eating and activity.
   e. Encourage family meals as often as reasonably possible.
   f. Avoid making food the struggle. Food often becomes the central topic of discussions and arguments. Parents often become concerned and frustrated when their adolescent refuses to eat. As the adolescent loses weight, it becomes more difficult to change the adolescent’s eating attitudes and behaviors.
   g. Work with your health care team. The health care team consists of skilled professionals who can treat the adolescent with the eating disorder and support the family through the course of the illness.

Complications
1. Fluid and electrolytes related
   a. Dehydration
   b. Hypokalemia
   c. Hyponatremia
   d. Hypophosphatemia
   e. Hypomagnesemia
   f. Hypoglycemia
2. Cardiovascular
   a. Sinus bradycardia; sinus arrhythmia
   b. Orthostatic hypotension
   c. Ventricular dysrhythmias
   d. Reduced myocardial contractility
   e. Sudden death, secondary to arrhythmias
   f. Cardiomyopathy secondary to ipecac use
   g. Mitral valve prolapse
   h. ECG abnormalities including low voltage, prolonged QTc interval, and prominent U waves
   i. Pericardial effusion
   j. Congestive heart failure
3. Renal
   a. Increased BUN
   b. Decreased glomerular filtration rate
   c. Renal calculi
   d. Edema
   e. Renal concentrating defect
4. GI
   a. Delayed gastric emptying
   b. Constipation
   c. Elevated liver enzymes (acute fatty necrosis)
   d. Superior mesenteric artery syndrome
   e. Rectal prolapse
   f. Gallstones
5. Hematological
   a. Anemia
   b. Leukopenia
   c. Thrombocytopenia
6. Endocrine or metabolic
   a. Primary or secondary amenorrhea
   b. Pubertal delay
   c. Thrombocytopenia

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Clinical and Laboratory Findings Associated with Sudden Death

a. Prolonged QTc interval
b. Decreased serum phosphate concentration
c. Ipecac cardiomyopathy
d. Severe emaciation (<70% of ideal body weight)
e. Suicide

Outcome

More than 100 studies have been conducted on the outcome of anorexia nervosa over the last 50 years with wide variability in the results. Comparisons among studies are limited by differences in definitions of “cases,” length of follow-up, and type of data collected (Fisher, 2003). General consensus is that the prognosis for adolescents with anorexia nervosa is better than that for adults, due in part to the shorter duration of symptoms in adolescents. Approximately 50% of adolescents have a “good” outcome, approximately 30% have a “fair” outcome, and 20% a “poor” outcome.

In a well-designed prospective study, 95 adolescents with anorexia nervosa (ages 12–17) were followed up at 6 to 12-month intervals for 10 to 15 years (Strober et al., 1997). There was full recovery in 75.8%, partial recovery in an additional 10.5%, and chronicity or no recovery in 13.7%. However, the time to full recovery was prolonged and ranged from 57 to 79 months. Readmission to the hospital within the first year of treatment occurred in 30% of patients but did not portend a poor prognosis. Adolescents with anorexia nervosa can fully recover, but the time to recovery may take many years and the path may be difficult. The following are some of the findings pertaining to recovery:

1. Weight restoration: At follow-up, 22% to 79% were at normal weight, 15% to 43% were 11% to 21% below normal, 2% to 10% were overweight.
2. Menses: Sixty-five percent to 95% of patients with anorexia nervosa were menstruating at follow-up.
3. Eating difficulties: Only a third of subjects were eating normally at follow-up (Bha, 1980), 23% to 67% had restricted food intake, 11% to 50% were still vomiting or abusing laxatives.
4. Psychological disturbances: Psychiatric comorbidity was common in follow-up studies. Important findings include a lifetime incidence of depression in 50% to 68%, anxiety disorders (especially OCD and social phobia) in 30% to 65%, substance abuse in 12% to 21%, and comorbid personality disorders in 20% to 80%. Estimates of good or satisfactory psychosocial functioning ranged from 22% to 73%. Approximately one third of patients with anorexia nervosa develop bulimia nervosa.
5. Psychosocial: Most patients were engaged in full-time employment, with good work attendance.
6. Mortality: The mortality rate ranges from 2% to 8% with longer-term studies revealing a mortality as high as 15% (Ratnasuria et al., 1991). Patients with anorexia nervosa are 12 times more likely to die than women of a similar age in the general population (Keel et al., 2003).

Bulimia Nervosa

Bulimia nervosa is an eating disorder characterized by binge eating coupled with compensatory behaviors
intended to promote weight loss such as self-induced vomiting, laxative abuse, excessive exercise, or prolonged fasting. The profound emaciation associated with anorexia nervosa is not present in adolescents with bulimia nervosa, and most individuals have a normal weight. Menses are usually normal but may be irregular. The adolescent with bulimia nervosa is usually quite aware of the abnormal eating attitudes and behaviors and is quite distressed by them. The DSM-IV diagnostic criteria for bulimia nervosa are listed in Table 33.3. Adolescents who meet the criteria for anorexia nervosa but also binge or purge are classified as anorexia nervosa, binge eating/purging type. Approximately one third of patients with anorexia nervosa “cross over” to bulimia nervosa at some time in their illness.

**Epidemiology**

1. **Prevalence:** Large-scale studies from several countries have found that up to 15% of adolescents report binge eating or purging behaviors (Schneider, 2003). The numbers are even higher for college students. Zucker et al. (1986) found that 23% of college women and 14% of college men reported binging at least once each week, and 23% of the females and 9% of the males used vomiting, laxatives, or diuretics for weight control. However, most of these young people do not meet DSM-IV criteria for bulimia nervosa. The lifetime prevalence of bulimia nervosa in young females living in western industrialized countries is estimated to be 1% to 4%. Adolescents who meet the criteria for anorexia nervosa but also binge or purge are classified as anorexia nervosa, binge eating/purging type.

2. **Age:** Onset is usually during late adolescence or early adulthood with a modal age at onset of 18 to 19 years old. Bulimia nervosa developing in patients younger than 14 years is rare.

3. **Gender:** Ninety percent to 95% are female, although recently there has been a reported increased prevalence in males, particularly in those who must weight qualify for interscholastic events (e.g., wrestlers).

4. **Comorbidity:** Approximately 80% of patients with bulimia nervosa report a lifetime prevalence of another psychiatric condition (Fichter and Quadfling, 1997). The major comorbid conditions are affective disorders (50%–80%), anxiety disorders (10%–45%), personality disorders (20%–80%), and substance abuse (25%) (Walsh et al., 2005). Patients with bulimia nervosa tend to be more impulsive than those with anorexia nervosa and may engage in shoplifting, stealing, self-destructive acts, and sexual acting out.

**Risk Factors**

As for anorexia nervosa, risk factors for bulimia nervosa are not a direct cause of the disease, but increase the likelihood of developing the condition.

1. **Age and gender:** Bulimia nervosa is more likely to develop during adolescence. Females are more likely to be affected than males.

2. **Early childhood eating and health problems:** Some studies have shown that early childhood eating problems (pica, early digestive problems, and weight reduction efforts) are associated with the later development of bulimia nervosa.

3. **Weight concerns, negative body image, and dieting:** Body dissatisfaction, perceived pressure to be thin, and dieting have all been identified as risk factors for the development of bulimic symptoms.

4. **Personality traits:** Negative affect, impulsivity, stressful life events, and family conflict have been associated with increased risk of developing bulimia nervosa.

5. **Early puberty:** Some studies have shown that early menarche increases the risk of developing bulimia.

6. **Family history:** As for anorexia nervosa, there is an increased risk of developing bulimia nervosa if a family member has an eating disorder. Concordance rates are higher for monozygotic than for dizygotic twins and

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**Table 33.3 DSM-IV Diagnostic Criteria for Bulimia Nervosa**

1. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
   a. Eating, in a discreet period of time (e.g., within any 2 hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances.
   b. A sense of lack of control over eating 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 behavior to prevent weight gain, such as 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 twice a week for 3 mo.

4. Self-evaluation is unduly influenced by body shape and weight.

5. The disturbance does not occur exclusively during episodes of anorexia nervosa.

- **Purging type:** During the current episode of bulimia nervosa, the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.
- **Nonpurging type:** During the current episode of bulimia nervosa, the person has used other inappropriate compensatory behaviors, such as fasting or excessive exercise, but has not regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics, or enemas.

range from 27% to 83%. A susceptibility locus for bulimia nervosa has been identified on chromosome 10p (Bulik et al., 2003).

7. Childhood sexual abuse: Childhood sexual abuse is sometimes associated with the later development of bulimia nervosa (Wonderlich et al., 2001).

Clinical Manifestations—Typical Presentation

The common behaviors, signs, and symptoms associated with adolescents with bulimia nervosa are outlined in the subsequent text.

Behaviors

1. Binging and purging: The most important behaviors in adolescents with bulimia nervosa are the binging and purging. The binge episode is the rapid consumption of a large amount of high calorie food in a short period of time and associated with self-perceived loss of control over eating. The most common triggers for binge eating include negative mood, interpersonal stress, hunger due to dietary restriction, and negative feeling related to one’s body image. The individual often experiences feelings of being “out of control” during the binge episode. Binging occurs after a short period of starvation, typically in the afternoon after having skipped breakfast or lunch, or late in the evening. Binges can be enormously large in caloric content (as high as 3,000-5,000 kcal). After a binge, feelings of guilt and shame together with fear of weight gain result in purging. Methods of purging include vomiting, excessively exercising, fasting for a day or days after a binge, taking laxatives, diuretics, ipecac, diet pills, herbal remedies, or CAM. The binging and purging is often done secretly. Purging may initially have a calming effect and relieve guilt over a binge episode. This may lead to recurrent cycles of binging and purging in an attempt to manage feelings of depression and anxiety.

Initially, the binge-purge activity may be infrequent, but with time, it may increase to daily or even several times a day. In addition, as the condition progresses, some individuals with bulimia nervosa will purge even after ingesting normal or small amounts of any food that might be considered high in calories or fat. Therefore, over time, what began as a diet or weight-control measure turns into a means of mood regulation with the binging and purging behaviors becoming a source of coping.

2. Evidence of purging: Some adolescents will make frequent trips to the bathroom, particularly after eating. In addition, there may be signs and/or smells of vomit, presence of empty food containers, or packages of laxatives or diuretics.

3. Evidence of binge eating: Often family members of adolescents with bulimia nervosa report the disappearance of food or the presence of empty wrappers and containers indicating the consumption of large amounts of food. In addition, adolescents with bulimia nervosa may steal, hoard, or hide food, and eat in secret.

4. Frequently weighing self

5. Preoccupation with food

6. Overly concerned with food, body weight, shape, and size.

Signs and Symptoms

Signs and symptoms may be minimal but can include the following:

1. Signs
   a. Body weight is usually normal or above normal.
   b. Skin changes: Calluses on the dorsum of the hand secondary to abrasions from the central incisors when the fingers are used to induce vomiting. This physical sign is known as Russell sign’s.
   c. Enlargement of the salivary glands, particularly the parotid glands; usually bilateral and painless.
   d. Dental enamel erosion (perimolysis): Usually occurs in the lingual, palatal, and posterior occlusal surfaces of the teeth.
   e. Weight fluctuations.
   f. Edema (fluid retention).
   g. Chest pain and heartburn.
   h. Easy bruising (from hypokalemia/platelet dysfunction)
   i. Bloody diarrhea (in laxative abusers)

Table 33.4 contrasts anorexia nervosa with bulimia nervosa.

Diagnosis and Differential Diagnosis

The most commonly used diagnostic criteria used for the diagnosis of bulimia nervosa are outlined in the American Psychiatric Association’s DSM-IV (Table 33.3). The differential diagnosis includes both medical and psychiatric conditions:

1. Medical conditions
   a. Chronic cholecystitis
   b. Cholelithiasis
   c. Peptic ulcer disease
   d. Gastroesophageal reflux disease
   e. Superior mesenteric artery syndrome
   f. Malignancies (including CNS tumors)
   g. Infections—acute bacterial and viral GI infections, parasitic infections, and hepatitis
   h. Pregnancy

2. Psychiatric conditions
   a. Anorexia nervosa-binge/purge subtype
   b. Binge eating disorder
   c. Major depressive disorder, with atypical features
   d. Borderline personality disorder
   e. Kleine-Levin syndrome

Evaluation

Evaluation includes a complete history and physical examination.
<table>
<thead>
<tr>
<th>Area</th>
<th>Anorexia Nervosa</th>
<th>Bulimia Nervosa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidemiology</td>
<td>90% Female patients</td>
<td>Same</td>
</tr>
<tr>
<td></td>
<td>Increased prevalence of eating disorders and</td>
<td>Increased prevalence of eating disorders and</td>
</tr>
<tr>
<td></td>
<td>depression in families</td>
<td>depression in families</td>
</tr>
<tr>
<td>Onset</td>
<td>Early to midadolescence</td>
<td>Slightly older onset</td>
</tr>
<tr>
<td></td>
<td>Prevalence &lt; 1%</td>
<td>Prevalence 1%–4%</td>
</tr>
<tr>
<td>Psychopathology</td>
<td>Intense fear of gaining weight or becoming fat</td>
<td>Same</td>
</tr>
<tr>
<td></td>
<td>Introverted, obsessional, perfectionistic, rigid</td>
<td>More outgoing, impulsive, prone to acting-out</td>
</tr>
<tr>
<td></td>
<td></td>
<td>behaviors (shoplifting, sexual promiscuity, self-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>destructive acts)</td>
</tr>
<tr>
<td></td>
<td>Poor self-esteem</td>
<td>Same</td>
</tr>
<tr>
<td></td>
<td>Secretive about behaviors</td>
<td>More outgoing, impulsive, prone to acting-out</td>
</tr>
<tr>
<td></td>
<td>Binge eating not necessary</td>
<td>Binge eating must be present</td>
</tr>
<tr>
<td></td>
<td>Level of denial high</td>
<td>Aware of problem, wants help</td>
</tr>
<tr>
<td>Physical signs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>Underweight; must be &lt; 85% expected weight</td>
<td>Usually of normal weight</td>
</tr>
<tr>
<td>Menses</td>
<td>Must be amenorrheic</td>
<td>Weight can be normal, high, or low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May have normal, irregular, or absent menses</td>
</tr>
</tbody>
</table>

Laboratory screening includes:
1. CBC count
2. BUN and creatinine, electrolytes, glucose, calcium, phosphorus
3. Serum amylase
4. ECG with rhythm strip
5. Urinalysis—specific gravity

**Treatment**

Like adolescents with anorexia nervosa, the treatment of young people with bulimia nervosa requires an interdisciplinary team approach. The first step is to make a diagnosis and address the eating disorder as soon as possible. The principles of treatment include the following:

1. **Medical and nutritional intervention:** The goals of medical intervention include careful medical monitoring and the correction of any medical complication, in particular electrolyte abnormalities. A structured meal plan developed with the help of a nutritionist can be very helpful. Eating three normal meals a day will reduce the physiological drive to binge in the late afternoon or evening. The adolescent should be encouraged and supported to avoid foods that trigger a binge (e.g., ice cream or baked goods). Promoting moderate exercise can also be helpful. Adolescents should have routine dental care and consultation should be sought for those with dental damage secondary to vomiting.

2. **Psychological intervention:** In adults, multiple studies have shown that cognitive-behavioral therapy (CBT) reduces binge eating and purging activity in approximately 30% to 50% of patients. Attitudes about body shape and weight are also improved. Treatment with CBT is time limited and problem oriented. It focuses on strategies to cope with the emotional triggers that lead to binge eating and purging and addresses ways to modify abnormal attitudes to eating, body shape, and weight.

Complications

1. **Fluid and electrolytes related**
   a. Dehydration
   b. Hypokalemia (the most frequently seen electrolyte abnormality—either from vomiting or from laxative or diuretic use)
   c. Hyponatremia
   d. Hypophosphatemia (especially when binging occurs after a prolonged period of dietary restriction)

2. **Cardiovascular**
   a. Cardiac arrhythmias
   b. Ipecac cardiomyopathy

Individuals with bulimia nervosa, treatment with CBT has been found to be more effective than other psychological treatments such as supportive psychotherapy, interpersonal therapy, or stress management (Walsh et al., 2005).
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5. Dental
a. Erosion of dental enamel
b. Dental caries

Outcomes

Most adolescents with bulimia nervosa recover over time with recovery rates ranging from 35% to 75% at 5 years of follow-up (Fichter and Quadflieg, 1997). Bulimia nervosa tends to be a chronic relapsing condition and approximately one third of patients relapse in 1 to 2 years. Comorbidity is frequent but mortality is low. In one study, after a 90-month follow-up period, the full recovery rate in women with bulimia nervosa (14%) was significantly higher than that of women with anorexia nervosa (33%) (Herzog et al., 1999). No predictors of recovery emerged among bulimic subjects. Eighty-three percent of women with anorexia nervosa and 99% of those with bulimia nervosa achieved partial recovery. Approximately one third of each group relapsed after full recovery. No predictors of relapse emerged. Bulimia nervosa was characterized by higher rates of both partial and full recovery.

EATING DISORDERS NOT OTHERWISE SPECIFIED

EDNOS refers to the diagnostic category of patients who have problems with eating or body image but who do not meet full DSM-IV criteria for either anorexia nervosa or bulimia nervosa. This category accounts for most adolescents presenting for treatment (Fisher et al., 2001; Nicholls et al., 2000). Importantly, these adolescents suffer from the same medical complications and similar degree of psychological distress as those who meet full criteria. Some of the individuals in the EDNOS category represent those with subthreshold anorexia nervosa or bulimia nervosa, but others represent qualitatively distinct disorders. This heterogeneous diagnostic category is likely to undergo further refinement in the near future. Examples of individuals with EDNOS include:

1. Teens with all the criteria for anorexia nervosa but who have regular menses
2. Individuals who appear to have anorexia nervosa, but despite significant weight loss, their present weight is in the normal range
3. Individuals who meet all the criteria for bulimia nervosa except that the frequency of binging or purging is less than twice a week or lasts for <3 months

4. Teens who purge daily but never binge
5. Adolescents who repeatedly chew and spit out but do not swallow their food
6. Individuals who binge-eat but do not purge (see Binge Eating Disorder)

An alternative classification for the range of eating disorders of childhood and younger adolescents is outlined in the Great Ormond Street (GOS) criteria (Lask and Bryant-Waugh, 1993; Nicholls et al., 2000). The diagnoses within this classification not only consist of anorexia nervosa and bulimia nervosa but also include the following diagnostic categories:

1. Food avoidance emotional disorder (FAED): FAED refers to a condition seen in children 8 to 13 years old where the child refuses to eat. There is no fear of becoming fat and no distortion in body image. This condition may be accompanied by growth retardation and weight loss.
2. Selective eating disorder (SED): SED refers to those younger patients who will limit their foods to one or two foods for a prolonged period of time. They are unwilling to try new foods, which can be a major source of frustration for their parents. Similar to those with FAED, they do not have the cognitive distortions regarding weight or shape. Their weight and height are usually appropriate for age.
3. Functional dysphagia: Functional dysphagia refers to children who will avoid certain foods because of a fear of swallowing, choking, or vomiting. Often there is a history of an episode of choking on a specific food.
4. Pervasive food refusal: Pervasive food refusal refers to children and younger adolescents who have a profound refusal to eat, drink, walk, and talk or self-care and are resistant to efforts to help. The overriding similarities among these diagnostic criteria are the lack of abnormal cognitions and morbid preoccupation with weight and shape.

BINGE EATING DISORDER

Binge eating disorder is a newly recognized disorder and only recently appeared in the DSM-IV (1994) under the category of EDNOS and is also listed as a category for proposed diagnoses and further research. The DSM-IV proposed criteria include the following:

1. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:
   a. 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 people would eat during a similar period and under similar circumstances
   b. A sense of lack of control over eating during the episode (e.g., a feeling that one cannot stop eating or control what or how much one is eating)
2. The binge eating episodes are associated with three or more of the following:
   a. Eating more rapidly than normal
   b. Eating until feeling uncomfortably full
   c. Eating large amounts of food when not physically hungry
   d. Eating alone because of embarrassment
CONDITIONS AFFECTING NUTRITION AND WEIGHT

This type of eating pattern can lead to significant weight problems and obesity. Some of these individuals start these behaviors after a period of weight-loss diets and restrictive eating, whereas others use the binge as a calming mechanism unrelated to prior dietary restrictions. Because it is only a recently recognized disorder, there is very little research on binge eating disorder in this age-group. Community-based surveys suggest that binge eating disorder occurs in 1% to 2% of adolescents between the ages of 10 to 19 (Johnson et al., 1999; Zaider et al., 2000; Johnson et al., 2002). Most people with binge eating disorder are obese, but normal-weight people can also be affected (Schneider, 2003). Epidemiological studies in children and adolescents have shown that more boys report having binges than girls (19%–23% of boys versus 6%–7% of girls) (Whitaker et al., 1989; Childress et al., 1993); however, when the symptom of loss of control is included in the definition of binging, more girls than boys report binging (23.6% versus 12.5%) (Croll et al., 2012). Up to 20% of individuals who present with treatment for obesity meet the criteria for binge eating disorder. In contrast to anorexia nervosa and bulimia nervosa, binge eating disorder affects a more diverse population including more male and nonwhite individuals.

The causes of binge eating disorder are still unknown. Up to half of all people with binge eating disorder have a history of depression. The impact of dieting on binge eating disorder is also unclear. The major complications of binge eating disorder are the complications that are often associated with obesity. Obese adolescents with binge eating disorder are at higher risk for poor self-esteem and depression.

The most common behavior in people with binge eating disorder is the use of inappropriate compensatory behaviors (e.g., purging, fasting, and excessive exercise) and does not occur exclusively during the course of anorexia nervosa or bulimia nervosa.

This disorder often goes unrecognized because of the subtlety of the symptoms, the secretive nature of the disorder, the belief that amenorrhea is a common consequence of athletic training. The exact prevalence of the female athlete triad is unknown. The prevalence of disordered eating behavior in female college athletes ranges between 15% and 62%. In addition, the prevalence of amenorrhea is between 3.4% and 66% among female athletes, compared to 2% to 5% in the general population.

Early recognition of the female athlete triad is important and therefore requires careful screening and assessment. Every female athlete with amenorrhea should have a complete history and physical examination to evaluate for an underlying eating disorder and to rule out other treatable causes of amenorrhea. Principles of treatment include increasing caloric intake, calcium and vitamin D supplementation, restricting the intensity of training (if necessary), and monitoring for resumption of menses. Adolescent athletes, their parents, and coaches should be educated about this disorder and the associated health risks.

WEB SITES

For Teenagers and Parents

1. Involved in athletic activities where there is a focus on body weight and body image—body builders, wrestlers, dancers, swimmers, runners, rowers, gymnasts, and jockeys

2. Struggling with sexual identity conflict
3. Diagnosed with comorbid mental disorders
4. With a family history of an eating disorder
5. Feeling disgusted with self and depressed
3. Marked distress regarding binge eating is present
4. The binge eating occurs, on an average, at least 2 days a week for 6 months.
5. The binge eating is not associated with the regular use of inappropriate compensatory behaviors (e.g., purging, fasting, and excessive exercise) and does not occur exclusively during the course of anorexia nervosa or bulimia nervosa.

Although males of all types of sexual orientation develop eating disorders, several studies report that there is an increased incidence of homosexuality among males with eating disorders.

FEMALE ATHLETE TRIAD

The female athlete triad is a syndrome consisting of disordered eating, amenorrhea, and osteoporosis in female athletes. The key feature is that in these athletes, caloric intake is insufficient for energy expenditure. The resulting “energy deficit” causes hypothalamic amenorrhea (primary or secondary) and a low estrogen state. The low estrogen state is associated with osteoporosis and increased fracture risk.

Females at greatest risk are those participating in sports that emphasize a lean physique (e.g., figure skating, gymnastics, ballet, long distance running, and swimming). The triad is not restricted to elite athletes but is also seen with increasing frequency in recreational athletes. Frequent weigh-ins, consequences for weight gain, and pressure from parents or athletic coaches may also increase an athlete’s risk.

Many female athletes with the triad do not meet the strict DSM-IV criteria for anorexia nervosa or bulimia nervosa, but engage in similar disordered eating behaviors such as dietary restriction, prolonged fasting, self-induced vomiting, or the use of laxatives, diuretics, or diet pills to lose weight or maintain a thin physique. Body weight can be low, but often is in the normal range and usually there is no body image distortion.

MALES AND EATING DISORDERS

Approximately 10% of older adolescents suffering from eating disorders are male. The percentage of males with eating disorders is higher in young adolescent males than in adult males. The reasons for the growing prevalence in younger males remain unclear. Research indicates that eating disorders in adolescent males are clinically similar to eating disorders in females. Body image concerns appear to be one of the strongest variables in predicting eating disorders in males. Adolescent males at increased risk for developing an eating disorder include those who:

- Involved in athletic activities where there is a focus on body weight and body image—body builders, wrestlers, dancers, swimmers, runners, rowers, gymnasts, and jockeys
- Struggling with sexual identity conflict
- Diagnosed with comorbid mental disorders
- With a family history of an eating disorder
- Feeling disgusted with self and depressed
- Marked distress regarding binge eating is present
- The binge eating occurs, on an average, at least 2 days a week for 6 months
- The binge eating is not associated with the regular use of inappropriate compensatory behaviors (e.g., purging, fasting, and excessive exercise) and does not occur exclusively during the course of anorexia nervosa or bulimia nervosa.

The major complications of binge eating disorder are the complications that are often associated with obesity. Obese adolescents with binge eating disorder are at higher risk for poor self-esteem and depression.

The most common behavior in people with binge eating disorder is the use of inappropriate compensatory behaviors (e.g., purging, fasting, and excessive exercise) and does not occur exclusively during the course of anorexia nervosa or bulimia nervosa.

The causes of binge eating disorder are still unknown. Up to half of all people with binge eating disorder have a history of depression. The impact of dieting on binge eating disorder is also unclear. The major complications of binge eating disorder are the complications that are often associated with obesity. Obese adolescents with binge eating disorder are at higher risk for poor self-esteem and depression.

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ANOREXIA NERVOSA AND BULIMIA NERVOSA

http://www.anad.org/. The National Association of Anorexia Nervosa and Associated Disorders operates an international network of support groups for patients and families and offers referrals to health care professionals who treat eating disorders across the United States and in 15 other countries.


http://www.somethingfishy.org. The Something Fishy Web site on eating disorders has resources of all kinds, including information and online support.

REFERENCES AND ADDITIONAL READINGS


For Health Professionals


http://www.etcap.org. The National Eating Disorders Association (NEDA) is a nonprofit organization in the United States working to prevent eating disorders and provide treatment referrals to those suffering from anorexia, bulimia, and binge eating disorder and those concerned with body image and weight issues.


http://www.nationaleatingdisorders.org. The National Eating Disorders Association (NEDA) Web site offers information about eating disorders and body image; referrals to treatment centers, doctors, therapists, and support groups; opportunities to get involved in prevention efforts; prevention programs for all ages; and educational materials.

http://www.nedrc.org. Anorexia Nervosa and Related Eating Disorders Inc. (ANRED) is a nonprofit organization that provides information about eating disorders. The material includes self-help tips and information about recovery and prevention.

http://www.iaedp.com. International Association of Eating Disorder Professionals’ mission is to promote a high level of professionalism among practitioners who treat those suffering from eating disorders by emphasizing ethical and professional standards.


http://www.nedic.ca. The National Eating Disorder Information Centre (NEDIC) is a Canadian organization that provides information and resources on eating disorders and weight preoccupation.


Hsu LK. Outcome of anorexia nervosa: a review of the literature. Arch Gen Psychiatry 1980;37:1041.


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Walsh BT, Kaplan AS, Attia E, et al. Fluoxetine after weight restoration in anorexia nervosa: a randomized controlled trial. JAMA 2006;295:2605.


For Adolescents, Parents, and Teachers


Queries in Chapter 33

AQ1. Please provide the reference details for Johnson.

AQ2. Please check this correction.