

Eating Disorders in Athletes: Managing the Risks

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There are many potential pitfalls on the road to sporting achievement. In pursuit of excellence, athletes take risks. Many of these risks are calculated and well-managed, but they are risks nonetheless. Athletes risk traumatic and overuse injuries and make personal sacrifices in their education, career, and personal relationships. The well-prepared athlete and his or her support team take steps to minimize these risks in pursuit of a goal.

Since the 1980s it has been apparent that the possibility of developing an eating disorder is to be added to the list of risks to be addressed and managed. Having an eating disorder is associated with considerable morbidity and significant mortality. Athletes who have eating disorders tend to have shorter careers characterized by inconsistency and recurrent injury. How likely is it that an athlete will develop an eating disorder? Who is at risk? Can eating disorders be prevented? How can athletes who have eating disorders be identified? What are the consequences of developing an eating disorder? What action can be taken to help an athlete who has an eating disorder?

PREVALENCE

Many attempts to quantify how many athletes have an eating disorder have been imprecise for a number of reasons [1]. Using screening instruments to measure prevalence is potentially inaccurate, because some standard rating scales have not been validated in athletic populations [2]. It has been noted that athletes may under-report eating problems and some symptoms more than others [3]. Eating

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disorders are not equally prevalent in all sports—sports in which low weight or leanness is related to the esthetic appeal of the sport, sports in which weight is related to performance (endurance sports and in particular running), and “weight-category” sports are associated with a higher prevalence of eating disorders [3–5]. Being an elite athlete may be associated with a lesser risk [5]. Competing successfully may either confer some degree of protection from developing an eating disorder, or may be incompatible with such a serious health problem. For these reasons, studies that use screening tools to examine heterogeneous groups of athletes across a range of sports and performance standards may provide unreliable estimates of prevalence.

Studies in which questionnaires are validated by clinical interviews, which involve large numbers of homogenous groups of athletes, and which contain a control or reference group are limited in number. Sundgot-Borgen and Torstveit’s 2004 study [6] is the largest and most recent to meet all of these criteria. This study is also important because it is one of the very few to include male subjects. 1620 elite Norwegian male and female athletes and 1696 control subjects were surveyed by screening questionnaire. All subjects identified as being at risk of an eating disorder were subject to a clinical interview (as were a proportion of those identified as not at risk). Seventy-four percent of those surveyed completed the study. The study was similar in design to a previous study [3], although with approximately three times as many subjects. The latter study confirms the conclusions of the earlier work. The overall prevalence of eating disorders (anorexia nervosa [AN], bulimia nervosa [BN], and eating disorders not otherwise specified [EDNOS]) was 13.5% in the elite athlete group and 4.6% in the control group. Male eating disorder cases (32.4% in the elite group versus 5.4% in the control group) and anorexia nervosa cases (6.5% in the elite group versus 3.6% in the control group) form a more substantial proportion of the athlete group compared with the nonathlete control group. These data are summarized in [Table 1](#).

Table 1
Prevalence of eating disorder by subtype

Athletes	n	Anorexia nervosa	Bulimia nervosa	EDNOS and AA	Total (%)
male	687	0	17	38	55 (7.7)
female	572	11	36	68	115 (20.1)
% of cases who are male	32.4				
% of cases who have anorexia	6.5				
Controls					
male	629	1	1	1	3 (0.5)
female	574	1	17	34	52 (9)
% of cases who are male	5.4				
% of cases who have anorexia	3.6				

Abbreviation: AA, anorexia athletica.

Data from Sundgot-Borgen J, Torstveit MK. Clin J Sport Med 2004;14(1):25–31.

There now seems little doubt that the association between sports participation and eating disorders exists. This represents a significant problem for the health and welfare of large numbers of athletes.

DIAGNOSIS

According to the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders, 4th edition" (DSM-IV) [7], AN is characterized by a refusal to maintain a minimally normal weight for age and height (less than 85% of that expected); intense fear of becoming fat despite being underweight; a body image distortion (denial of low body weight); and, in women, amenorrhea (the loss of three consecutive menstrual cycles). There are restricting and binge-eating/purging subtypes, although a mixture of the two is common. BN involves binge-eating with a sense of lack of control and inappropriate compensatory behaviors (purging or fasting) that occur, on average, at least twice a week for 3 months.

The criteria for EDNOS usually involve a similar picture to that of AN or BN. EDNOS may not meet the proper time frame or a part of a criterion for AN or BN, but still causes a general decrease in level of functioning. Binge-eating disorder is considered an EDNOS that involves recurrent episodes of binge eating in the absence of the regular use of inappropriate compensatory behaviors characteristic of BN [7]. Disordered eating is also part of the "female athlete triad," along with amenorrhea and osteoporosis [8]. This combination of pathological weight-control measures and associated hormonal disturbance (producing both the altered menstrual cycle and lower bone density) can have serious consequences, not just for sports participation but also for long-term health. It is especially important to note that although exercise may partially offset bone density changes, it does so only for load-bearing bones.

Many athletes who suffer from eating disorders have a greater lean body mass because of exercise, and may not be below the 85% expected cutoff. There is literature on "anorexia athletica" (AA) that removes the criterion of the 85% cutoff, and therefore it might be considered an EDNOS. Although AA may be a subclinical eating disorder, it can still lead to medical and mental health complications [9]. Sundgot-Borgen [3] set criteria for AA that must involve weight loss, gastrointestinal complaints, the absence of medical or affective disorder explaining the weight loss, excessive fear of becoming obese, and restriction of caloric intake. One of the following symptoms must also be present: delayed puberty, menstrual dysfunction, disturbance in body image, use of purging methods, binge eating, or compulsive exercising. Beals and Manore [9] presented similar criteria, except that distorted body image and limiting food choices or food groups were in the criteria absolutely necessary for diagnosis, and gastrointestinal complaints were in the relative criteria, only one of which is required for diagnosis. Beals and Manore suggested that further research was needed to determine what number of symptoms should be required to meet the criteria for AA. In this special population, the criteria should be validated for AA.

BOX 1: CHARACTERISTIC FEATURES OF EATING PATTERNS AND CLINICAL SYNDROMES

Athlete dietary concerns

Meticulous attention to diet and weight

Goal-directed

Aim is performance enhancement

Emphasizes adequate intake rather than restriction (what is needed rather than what is forbidden)

Likely to "normalize" when sport ceases

Disordered eating

Use of pathogenic weight control measures

Laxatives, diuretics, enemas, diet pills, stimulants

Self-induced vomiting

Excessive exercise (eg, secret or extra training)

Extreme, restrictive, or "faddy" diets

Anorexia nervosa core symptoms

Weight is 85% or less of expected

Intense fear of fatness/weight gain (even though underweight)

Body image disturbance

Amenorrhea

Anorexia athletica

Fear of weight gain although lean

Weight is 5% or more below expected

Muscular development maintains weight above anorexic threshold

Distorted body image

Restricted calorie intake

Often broken by planned binges

Excessive or compulsive exercise

Often with other pathogenic weight control measures

Menstrual dysfunction

May include delayed puberty

Gastrointestinal complaints

Bulimia nervosa core symptoms

Recurrent binge eating (excessive quantities with loss of control)

Compensatory purging, fasting, or overexercising

On average twice per week for 3 months

Self-evaluation overinfluenced by weight/shape

EDNOS

Meets some/most clinical criteria

Does not meet full criteria for specific disorder

Female athlete triad

Disordered eating

Amenorrhea

Osteoporosis (or osteopenia)

Making the diagnosis of an eating disorder can be a greater challenge in athletes. Denial, maintaining a sense of control, and secrecy are hallmarks of eating disorders. Because athletes are used to playing despite pain, and may have the “no pain, no gain” mentality, they may try to minimize their symptoms. Screening questionnaires may be helpful despite their limitations. A high suspicion for eating disorders is important. Screening for eating disorders should be part of the medical history-taking process for precompetitive physical evaluations. Eating disorders have one of the highest mortality rates of mental illnesses. Death may result from electrolyte abnormalities leading to seizures or arrhythmias.

Symptoms of eating disorders can include obsessions over food, weight, or body image; bingeing; and fasting. Purging can include self-induced vomiting; excessive exercise; and abuse of laxatives, enemas, diuretics, diet pills, or stimulants. The athlete may express feelings of guilt about eating or being “fat,” despite normal weight or after a small meal. Some athletes fear eating with others, preferring to eat alone, or will visit the rest room within minutes of finishing a meal to vomit. Weighing oneself multiple times a day may be an indication. Most athletes will have previously attempted multiple restrictive diets and will have counted calories.

Physical symptoms of eating disorders include dry skin and hair, constipation, cold hands and feet, digestive problems, fatigue or weakness, parotitis, and insomnia [10]. Presentation may not occur until the athlete has a fainting spell due to dehydration, ketosis, or electrolyte imbalances caused by eating disorders. Diminished immune response may lead to complaints of recurrent infections and colds. On examination, the athlete may have a diminished or absent gag reflex and swollen submandibular glands. The diagnosis of an eating disorder may not be suspected until an athlete has a stress fracture with radiographic evidence of osteopenia. Dentists may make the diagnosis if the enamel of the backs of the teeth is worn away by gastric acids. The key features of normal elite athlete dietary attitudes and concerns, and the characteristic features of the principal eating disorder syndromes are listed in [Box 1](#).

ETIOLOGY

Why do athletes get eating disorders? In large part this is for the same reasons as anyone else does. In addition, there are general etiological factors that

are more prevalent in a sporting environment, and factors that are genuinely specific to a particular athletic context; so called “sport-specific factors.” In reality, many factors described as sport-specific apply to the general population as well.

In an early review, Wilmore [11] noted how those who have established eating disorders could become drawn to sports. Factors such as characteristics of “athletic” personalities (goal orientation, perfectionism [11], compulsiveness and an ability to block distractions [12]), unusual dieting or eating behavior [13], performance anxiety or negative performance appraisal [14], inappropriate weight loss to aid performance, and a rechanneling of the athlete’s considerable drive from sport into eating [12] may combine with nonspecific vulnerability factors to promote the development of an eating disorder in sport. Conversely, in the absence of general vulnerability factors, unusual or apparently disordered eating may be relatively benign and resolve when sports participation ceases [13].

Burton [15] has also emphasized the interaction of athleticism and general vulnerability necessary to promote the development of an eating disorder. In particular, he has emphasized how an athlete’s experience of him or herself can become more distanced and detached from reality by participation in sport. This might happen via high technology approaches and preoccupation with physiological parameters and their measurement. If this distancing occurs in an otherwise vulnerable individual, then an eating disorder may result.

It has been suggested that both bodily focus and bodily satisfaction are enhanced by exercise—which might therefore offer some protection against eating disorders. Weight preoccupation (which some sporting environments encourage), on the other hand, increases bodily focus while reducing bodily satisfaction, and therefore increases eating disorder vulnerability [16]. This is consistent with the findings of Smolak and colleagues [17] in their 2000 meta-analysis, which concluded that sports participation could be either a protective or a risk factor in the development of eating problems. Some recent and as yet unpublished data from the United Kingdom and Kenya may shed light on the interrelationship of general vulnerability and sports participation. Hulley and coworkers [18] surveyed four groups: elite UK athletes and nonathletic controls, and elite Kenyan athletes and nonathletic controls. Both UK groups had significantly higher prevalence rates than either Kenyan group, with the rate in UK athletes only marginally exceeding that in UK nonathletes. In the Kenyan groups, athletes had a lower prevalence of eating disorders than nonathletes. This might suggest that in the absence of significant sociocultural pressures, some protection is conferred by sports participation; however, when general vulnerability is at a higher level, the overall rate of eating disorders is significantly higher, with athletes at a marginally increased risk.

The risk and trigger factors operating in athletic populations include early dieting, prolonged dieting, weight fluctuations, early sport-specific training, traumatic events (including injuries), and participating in sports that emphasize leanness (either for esthetic or performance reasons or to “make weight” in weight-category sports) [12,19]. In sports in which aesthetic adjudication

prevails, there is an identified need to reflect on setting standards that “compromise the health and well-being of all but the small minority who are constitutionally gaunt” [20]. Beginning early sports-specific training may be a particular vulnerability factor, because participants may select a sport that is inappropriate to their body type [21]. Male gymnasts, in contrast to their female counterparts, are older, more experienced, and more aware of the need for adequate nutrition to fuel sporting performance. They also have a lower incidence of eating disorders [6]. A further factor may be that the hormonal changes of puberty have different impacts on male and female gymnasts. Increased muscle development in males may have a positive effect on performance. Conversely, pubertal changes in fat deposition in females may have a negative impact on performance for reasons that are at least partly esthetic and arbitrary. In weight-category sports, there is also often a culture of extreme weight loss measures from an early age that is likely to substantially increase subsequent risk [6]. Some athletes learn disordered eating behaviors from their peers. Weight loss may be encouraged or reinforced by teammates, coaches, weigh-ins, (especially group weigh-ins) and percentage body fat analysis.

Compared with their nonsporting counterparts, elite athletes are unusual individuals, subject to unusual pressures, who may therefore adopt unusual dietary practices. At times this will be goal-directed and associated with sporting excellence; however, in the presence of overwhelming pressures, general vulnerability factors, or both, weight-control measures can become pathogenic (disordered eating)—an especially high-risk situation for the subsequent development of an eating disorder.

A consideration of all etiological factors is useful for number of reasons. It illustrates how factors that promote sporting excellence can overlap with those that increase the risk of developing an eating disorder. The concept of a drive being rechanneled is a very useful one in this context. An understanding of which factors are operating in which sports will inform which preventive steps might be useful, the content of coach and athlete educational programs, and ultimately which issues are to be addressed in the therapeutic process for an individual athlete.

TREATMENT

The ideal way of treating of eating disorders in athletes should involve a team approach that includes coordination and support among sports medicine physicians, athletic trainers, nutritionists, counselors, psychiatrists, coaches, family, and teammates. When the diagnosis of an eating disorder is made, a medical evaluation for safety to continue to play is necessary. Exclusion or deselection from the training group or from competition is only necessary if health or performance is compromised [20]. If participation is considered unsafe, the athlete should be evaluated by a mental health professional immediately, because this news could cause emotional decompensation. The athlete should be referred to a nutritionist to develop a dietary plan and to assist with nutritional assessments and education. Making the athlete’s compliance with

assessments compulsory for return to competition can assist in engaging the athlete into treatment.

Some basic principles of how an athlete who has an eating disorder should be approached have been described [12,20]. Addressing problems early and directly, but in a supportive and confidential environment, is central. By approaching the athlete as if he or she were injured, the athlete's performance expectations can be lowered in a manner that mitigates against the guilt and disappointment of apparent underperformance [20].

The key competencies of an athlete's therapist have been described as expertise in eating disorders combined with an understanding of sport (importantly, not vice versa) [12]. Sport psychiatrists match multiple types of therapies and sometimes medication to the athlete's symptomatology and personal preferences. For some athletes whose disordered eating habits are new and less frequent, education, hope instillation, encouragement, and continued follow-up might be all the treatment that is required. When symptoms are more severe or long-standing, individual, group, and family therapy are helpful in treating eating disorders [22]. The first step of therapy is establishing a good therapeutic alliance. This involves active listening, taking a good history, expressing empathy, and being supportive. The main goal of the first session is to get the athlete to continue treatment.

Cognitive behavioral therapy (CBT) is effective in treating eating disorders [23]. CBT can be used individually or in groups. The possibility of using athletes-only therapy groups has been suggested [12]. CBT is based on the idea that feelings and behaviors can be changed based on evaluating and challenging cognitive distortions and core beliefs [24]. By identifying what triggers disordered eating behaviors and learning new coping mechanisms and ways to work through difficult feelings, athletes are taught new skills that they can continue to use (sometimes in other aspects of their lives). Athletes have to keep mental logs and do homework with this type of therapy, so their level of motivation for treatment needs to be relatively high.

Ambivalence or resistance to change should be expected, and may be more pronounced if the athlete's disordered eating habits have coincided with weight loss and an initial improvement in performance. Motivational interviewing can be a helpful therapy in trying to move an athlete from precontemplation (when the athlete does not consider his/her disordered eating a problem), to contemplation (when the athlete is considering it to be a problem), to preparation (when the athlete is preparing to change the behavior), to action (trying to change the behavior) and eventually to maintenance (when the athlete is actively working on preventing relapse into disordered eating) [25]. This is the same approach that some sport psychiatrists use to treat addictions in athletes.

Psychodynamic psychotherapy may help the athlete deal with difficult feelings, including the loss of control that can stem from separating from parental figures. The parental figure may be the coach, and this role can eventually transfer to the therapist. This is why involving the family or coach in the therapy sessions can be fruitful.

Because the illness of an eating disorder is usually kept secret, encouraging the athlete to be open and to ask for support from family, friends, coaches, and teammates is an important step in the recovery process. When athletes share their experiences of disordered eating with their teammates, they get not only support but also advice from other athletes who are in recovery. Teammates and coaches can impact athletes getting into and staying in treatment. Intervening with teams by providing education can help to change the climate toward eating disorders.

Sport psychiatrists also prescribe medications to treat eating disorders. Selective serotonin reuptake inhibitors (SSRIs) and atypical antipsychotics (such as olanzapine, risperidone, or quetiapine) have been shown to be effective in the general population [26]. SSRIs may be particularly helpful in treating eating disorders in athletes when there is a large obsessional component. When the obsessional component is clearly limiting the athlete's level of functioning, asking the athlete for the percentage of waking hours spent worrying about weight, body image, diet, or exercise, and if the athlete would like to try to decrease that percentage with an SSRI can be an effective way to encourage a needed medication trial. Medication management should involve discussions about side effects, especially sexual side effects, because they are common reasons for discontinuation and relapse of symptoms.

Several areas of treatment need to be addressed to manage the female athlete triad effectively. Any underlying eating disorder must be identified and treated. If a full eating disorder syndrome is not present, pathogenic weight-control measures still need to be identified and modified. In milder or uncomplicated cases, a small reduction in training load accompanied by a small increase in nutritional intake with calcium and vitamin D supplementation may be sufficient. Occasionally it is necessary to provide estrogen replacement with an oral contraceptive pill [27].

COMORBIDITIES

The evaluation and treatment of eating disorders requires screening and treatment of comorbid mental illnesses. Excessive exercise is an expected component of eating disorders. Exercise dependence or addiction goes beyond excessive exercise. Despite efforts and instruction not to exercise, athletes who suffer from exercise dependence cannot stop, even in the face of injury. Obsessions about food, body image, or weight are common symptoms of eating disorders, but when they extend to other aspects of life or if there are compulsions unrelated to disordered eating behaviors, then the athlete may be suffering from obsessive-compulsive disorder (OCD). The triad of eating disorders, exercise dependence, and OCD ("the over-doer triad") has been observed by Morse [28] to co-occur, and often requires an SSRI as part of the treatment plan.

Mood disorders are common comorbid mental illnesses of eating disorders. Hormonal and electrolyte abnormalities can contribute to mood fluctuations. Guilt, loss of self-esteem, and feeling out of control are common feelings when

disordered eating behaviors worsen; however, when those feelings persist every day, all the time, the athlete may be suffering from depression. The DSM-IV criteria for a major depressive episode require that five of the nine symptoms are met for longer than 2 weeks. A history or current symptoms of mania (bipolar disorder) would change treatment significantly. A low-grade depression for more than 2 years in adults or 1 year in adolescents, called dysthymia (formerly named “minor depression”), can limit functioning and performance. Some athletes who suffer from dysthymia will also suffer from a major depressive episode, a so-called “double depression.”

Although some body image distortion is expected with eating disorders, when an athlete complains that a body part is “ugly” or requires cosmetic surgery, the diagnosis of body dysmorphic disorder has to be considered.

Although misusing substances such as diet pills, stimulants, or laxatives is expected with eating disorders, when an athlete is unable to cut down on use, has withdrawal symptoms when not using, develops tolerance, continues to use despite knowledge of the dangers, spends more time focused on using or finding drugs, uses drugs to escape responsibilities, or increases the amounts used over time, then the diagnosis of substance dependence has to be considered. To meet DSM-IV criteria for substance dependence, three or more of these symptoms need to be present for more than 6 months. Other substance use disorders should be ruled out, because athletes may use “downers” such as alcohol or benzodiazepines to counteract the effects of stimulants.

ORGANIZATION RESPONSE AND CULTURAL CHANGE

Although sports cannot truly be said to cause eating disorders, a sports environment may nonetheless be the context in which an eating disorder develops and becomes established. What then should be the response of those who work in sport?

Preventive steps in gymnastics that have been advocated include increasing the age minimum for competitive participation, training and education for athletes and coaches [29], and the abandonment of routine body composition assessments [30]. Educational programs have been promoted by several authors [6,12,13]. Sundgot-Borgen and Torstveit [6] have suggested that for some low-weight athletes, nutritional education may be all that is required, especially in view of the high prevalence of misinformation regarding diet in athlete populations—so-called “food myths” [21]. Others have stressed the need for screening programs for eating disorders [6,9,12,31] and importantly, the necessary diagnostic evaluation in response to a positive screen [12].

How have sports organizations responded to the increased awareness of eating disorders among their athletes and to these suggestions and recommendations? There are many examples of good practice, and what follows is an illustrative list only.

Sundgot-Borgen and Klungland [32] have described how a program of working with coaches and athletes over an 8-year period was able to reduce the prevalence of eating disorders in cross country skiers from 33% to 15%.

Largely in response to the work of Hulley and Hill [33], the Track and Field Authority in the United Kingdom has developed a comprehensive coach education program in collaboration with an eating disorder charity (The Eating Disorders Association). The program is designed for coaches of endurance runners, is delivered by experienced clinicians, and has been used in other high-risk sports.

The National Collegiate Athletic Association (NCAA) has a range of material available via their website (www.ncaa.org), including guidelines on good coaching practice, how to approach an athlete who has an eating problem, and nutritional guidelines and appropriate weight loss strategies. There is also a specific downloadable reference guide on disordered eating in the high-risk sport of Olympic wrestling, “Wrestling with Weight Loss” (www.ncaa.org/library/sports_sciences/wrestling_with_weight_loss.pdf). Most sports nutrition textbooks now include a section on eating disorders and help to dispel food myths. As an example of this, Jeukendrup [34] has written on weight loss strategies for athletes in a balanced way that minimizes risks, yet acknowledges the link between weight, nutrition, and elite performance, and therefore retains credibility with skeptical athletes and coaches.

Thompson and Sherman [35] have been powerful advocates for eating-disordered athletes to be considered as individuals, and for their eating disorders to be incorporated into a sporting context by therapists. This might even include helping an athlete to return to the sport in which the problem developed. Some treatment facilities have suggested ways to tackle this difficult problem [36]. It is likely to be important, for example, to consider whether an eating disorder is a secondary complication of sports participation or whether sports participation is a component of a primary eating disorder. A return to sport is much more likely to be recommended in the former scenario. A work-up that includes rating scales of eating attitudes (The Eating Disorders Inventory-2 [37]) and personality (the Minnesota Multiphasic Personality Inventory-2 [38]) and assessment of exercise attitudes, depressive symptoms, self-harm, and diagnostic comorbidity will help to indicate whether an athlete falls into a high- or low-risk group for return to exercise.

A return-to-exercise flowchart has been developed that can be incorporated into the treatment contract [35]. In order of priority, the chart covers medical stability, nutritional stability, abstinence from eating disorder behaviors, and finally whether sport is likely to exacerbate psychosocial stressors and therefore increase the probability of relapse.

There are now a range of recommendations and practical steps that can be taken by sports organizations, sports coaches, sports medical professionals, and eating disorder therapists to assist the individual athlete, and potentially to reduce the overall prevalence in high-risk sports.

SUMMARY

Sport is not to blame for eating disorders. An underlying, general, and non-sports-related vulnerability is necessary for the development of such a

multifaceted and multifactorial disorder in an athlete. To blame sports organizations and especially sports coaches may lead to marginalizing the illness, scapegoating, and missing an important preventive opportunity.

Nonetheless, the contribution of the sporting environment needs to be understood in order that organizations and individuals can appreciate their roles and responsibilities. These include adopting practices that reduce risk, identifying problems at an early stage, and facilitating appropriate therapy. In this way, there is a realistic prospect that risks that cannot be eliminated can at least be minimized, contained, and managed.

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