



Eating disorders

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Key points

- Eating disorders are prevalent across all sports but especially those where weight and/or body shape has a direct impact on performance. These are aesthetic sports (e.g. gymnastics), endurance sports (e.g. distance running), weight category sports (e.g. judo), and antigravity sports (e.g. high jumping).
- Eating disorders negatively impact on athletes' health and performance.
- The sports environment contains additional risk factors for those vulnerable to eating disorders.
- The risks can be managed by adopting appropriate nutritional and coaching practices.
- Although early identification of disorders can be difficult, there are considerable benefits from prompt identification, assessment, and treatment.
- The sports coach can have an important role in the identification and management of eating disorders.
- Recovery and rehabilitation require collaboration between the athlete, his/her support team, and the treating clinical team.

4.1 Introduction

Increasingly refined cross-sectional surveys have established an excess of eating disorder morbidity in sporting populations. Examination and description of the sports environment has helped to explain why sportspeople may be exposed to additional risks. This helps to explain the excess prevalence and informs preventative and risk management strategies. Many large sports organizations have adopted guidelines and/or published position statements on eating disorders. These include the International Olympic Committee, the National Collegiate Athletic Association in the United States, and UK Sport in the United Kingdom.



4.2 Diagnosis

In severe cases, the diagnostic label is seldom in doubt but even here migration from one category to another over time is not uncommon. Away from the extremes, the diagnostic separation is less clear and it has become common for some practitioners to think of a spectrum or continuum of eating disorders. The key features of all the categories described in the following sections are summarized in Table 4.1.

4.2.1 Anorexia nervosa

This condition is characterized by a restriction of energy intake (relative to requirement) leading to weight loss, which is considered significant for the age, gender, development, and physical health of the individual. In adolescents, this may present as failure to grow as expected rather than as absolute weight loss. Food restriction is accompanied by intense fear of gaining weight or becoming fat, disturbance of self-perception of weight or shape, and lack of recognition of seriously low body weight. In addition, body weight and shape have undue and excessive influence on how the individual evaluates him/herself. It is common to see widespread endocrine disturbance secondary to weight loss and especially in the hypothalamic–pituitary–gonadal (HPG) axis. HPG axis dysfunction leads to amenorrhoea in female sufferers and loss of sexual interest and potency in males but is no longer considered to be part of the diagnostic criteria listed in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5).

4.2.2 Bulimia nervosa

In this disorder, overeating binges are frequent (which DSM-5 defines as at least once per week on average, for a minimum of 3 months). Binges involve rapid consumption of large quantities (larger than what most individuals would eat in a similar period of time and under similar circumstances). The individual describes lack of control when consuming these large quantities. Considerable preoccupation with food and food cravings are reported. There is a persistent dread of fatness and a shared characteristic with anorexia nervosa is that self-evaluation is unduly influenced by body shape and weight. Low weight, however, is not a feature of bulimia nervosa. Binges are typically followed by behaviour to counteract the fattening effects of food such as self-induced vomiting, the use of purgatives, fasting, or excessive exercise. Individuals without these compensatory behaviours are diagnosed as suffering from binge-eating disorder.

4.2.3 Other specified feeding or eating disorders

A large majority of individuals with abnormal eating behaviours do not meet the full diagnostic criteria for an eating disorder. In these circumstances, the terms ‘atypical anorexia/bulimia nervosa’ or purging disorder may be used depending on the predominant symptoms. Atypical disorders may not be less serious and features such as extreme purging behaviours may result in considerable harm.

Sport-specific eating disorder syndromes have been described within the field of sport and sports medicine. Although they have not been adopted within the mainstream classification systems, it is important to consider them (see Sections 4.2.4 and 4.2.5).

4.2.4 Female athlete triad

The three elements required for this triad are (1) low energy availability, (2) menstrual dysfunction, and (3) low bone mineral density (BMD). Low energy availability occurs either via increased expenditure (training) or reduced intake. As a consequence there will be a HPG axis disruption that will result in osteopenia or osteoporosis (low BMD).

Occasionally, the triad may arise inadvertently and without the presence of the psychological components of an eating disorder such as disturbed body image or morbid dread of fatness. This could occur when a planned increase in training volume is not accompanied by a corresponding adjustment in calorie intake and energy availability either through misunderstanding or ignorance.

4.2.5 Relative energy deficiency in sport

Low energy availability (or relative energy deficiency) is both central and primary to the female athlete triad. However, energy deficiency is not exclusive to sportswomen and it is also known that the physiological effects of energy deficiency extend beyond disturbance of menstrual function and compromised bone health. Therefore the term 'female athlete triad' does not fully or accurately describe the condition. Relative energy deficiency in sport (RED-S) has been proposed instead as the preferred term and describes a condition where there is inadequate energy to support the body functions involved in health and performance.

Energy availability is deficient when intake is insufficient to meet the demands of homeostasis, growth, normal daily activities, and exercise. In a sporting context it can be described as the energy that remains to support these physiological functions after exercise/training. It is calculated relative to fat-free mass (FFM) reflecting the higher energy demands to support normal physiology with a larger FFM:

$$\text{Energy availability (EA)} = \frac{\text{energy intake (EI)} - \text{energy expenditure (EE)}}{\text{Fat free mass (FFM)}}$$

An approximate EA value of 45 kcal/kg/day is needed for energy balance in healthy adults and physiological functioning is likely to be significantly compromised at EA values of less than 30 kcal/kg/day.

There are three main routes to low energy availability in sport. It may arise inadvertently, for example, when training load has been increased (higher EE) without a necessary adjustment in dietary intake (EI is unchanged), or it may result from mismanaged or inadequately supervised dietary restrictions (reduced EI). Finally, it may arise out of disordered eating or an eating disorder.

4.2.6 Disordered eating

Problematic eating behaviours, unhealthy attitudes to weight and shape, and significant concerns about body image are not only common within the population but have a significant association with the development of eating disorders. Unless a clinical syndrome is present, these attitudes, behaviours, and concerns are usually described in the broad term 'disordered eating'. Common examples of disordered eating could include fasting and other types of food restriction such as skipping meals, extreme faddy diets, the non-therapeutic use of diet pills, diuretics and enemas, vomiting and other forms of

purging, and excessive exercise. Disordered eating is frequently co-morbid with other psychiatric conditions such as depression.

4.2.7 Athletic eating

Sportspeople striving for excellence will do out-of-the-ordinary things such as training to near exhaustion repeatedly. An athlete may also pay meticulous attention to his or her diet (because it fuels performance) and to his or her weight (because excess will hinder performance). This may bear a resemblance to the thinking and behaviour of the eating disorder sufferer. In the healthy athlete, these attitudes and behaviours are directed towards enhancing sporting achievement, not an end in themselves, an activity undertaken compulsively nor with weight loss as the primary objective. Associated features that would raise concern about the presence of an eating disorder are fear of fatness, self-evaluation unduly influenced by body shape or weight, and significant physiological disturbance secondary to energy deficiency.

Table 4.1 Eating disorder spectrum in sport

Anorexia nervosa	Bulimia nervosa	Female athlete triad (FAT)	Relative energy deficiency in sport (RED-S)	Disordered eating	Athletic eating
Food/energy restriction Weight loss or growth delay Self-evaluation by weight/shape Fear of weight gain Distorted perception of weight shape Secondary endocrine disturbance ^a	Frequent food binges with loss of control Compensatory behaviours (e.g. vomiting, purging, exercise) Self-evaluation by weight/shape Food craving and preoccupation	Low energy availability (EA) Menstrual dysfunction Low bone mineral density	Low energy availability (EA <30 kcal/kg/day) Widespread physiological disturbance May be secondary to increased training, inadequate diet or disordered eating/eating disorder	Problematic but subclinical disturbances of: Eating attitudes and behaviours (e.g. missed meals, diet pills, purges, excessive exercise) Body image	Detailed attention to diet Weight concerns Both motivated primarily by athletic performance
Atypical if not all criteria present	Atypical if not all criteria present			Strongly predictive of future eating disorder	Disordered eating attitudes and behaviours not present
	Binge eating disorder (BED) if no compensatory behaviours				

^a Not part of DSM-5 criteria.

4.3 Prevalence

Estimating the prevalence of eating disorders in sport can be problematic. Examining heterogeneous populations (from many sports and/or across a wide range of abilities and level of participation) may fail to detect pockets of high prevalence in high-risk sports. Using screening instruments that are not validated for sporting populations can produce both over- and underestimated prevalence rates. Screening tests may overestimate prevalence by ascribing pathology or caseness to 'athletic eating' because of its similarity to the thinking and behaviour found in eating disorders. Alternatively, the need for athletes to keep their problems secret or risk sanctions can result in underestimation.

Whilst it is usual to think primarily of weight loss when considering eating disorders, the commonest disorders are bulimic in nature where weight is frequently within the normal range. In sport, an emphasis on weight can be especially unhelpful and objective measures of weight are unreliable indicators of eating disorders for two important reasons.

Firstly, body mass index (BMI) is not necessarily an indicator of abnormality in sports that attract individuals with an unusually lean body composition. There is a risk of incorrectly identifying a disorder in those who are simply constitutionally unusual and at, or just beyond, the extremes of normal.

Secondly, in many power and strength sports there will be very muscular individuals with an unusually high body weight or BMI. Individuals with this body type may need to lose a great deal of weight to 'qualify' for a diagnosis according to strict eating disorder criteria. This can mask the descent into an eating disorder even in the presence of other clear eating disorder signs and symptoms.

Issues of misestimation of prevalence were addressed in the large 2004 study by Sundgot-Borgen and Torstveit (see Table 4.2). Subjects were a homogeneous group of elite performers large enough to include significant numbers in each sport studied. Screening questionnaires were supplemented by detailed clinical interviews and the study also included male subjects and a control population.

The overall prevalence of eating disorders in female athletes was found to be 20% in the elite sports group and 9% in the control group; 8% of males in elite sports were identified as having an eating disorder, which represents a 16-fold increase compared to the control group prevalence of 0.5%. This suggests that the sports environment may make a proportionally larger contribution to risk for sportsmen than for sports-women. Several sports emerge with especially high prevalence rates. For females, these are aesthetic, weight category, and endurance sports and for males, antigavity, weight category, and endurance sports (Figure 4.1).

4.4 Aetiological factors

Eating disorders are usually seen as having multifactorial origins with complex interactions between environmental, biological, psychological, and genetic factors and personality traits. Some factors, such as personality, are considered to be vulnerability factors, predisposing to the development of disorders whilst others can precipitate or maintain the condition.

Table 4.2 Eating disorder (ED) prevalence by sports type (males and females)

Sports	Examples	Female		Male	
		ED rate	%	ED rate	%
Aesthetic	Gymnastics, diving	22/52	42	0/13	0
Weight class	Judo, wrestling	16/53	30	14/79	18
Endurance	Running, orienteering	24/104	24	14/149	9
Technical	Golf	12/72	17	4/97	4
Ball game	Football, handball	39/252	16	14/277	5
Antigravitation	High-jump, ski jumping	1/10	< 1	8/37	22
Power	Sprints, weight-lifting	1/31	< 1	1/18	< 1
Motor	Karting	0/0	–	0/17	0
<i>Total</i>		115/572	20	55/687	8
Controls		52/574	9	3/629	< 1

Adapted from *Clin. J. Sports Med.*, 14, Sundgot-Borgen, J and Torstveit MK, Prevalence of eating disorders in elite athletes is higher than in the general population, p. 24–32, Copyright (2004), with permission from Wolters Kluwer Health, Inc.

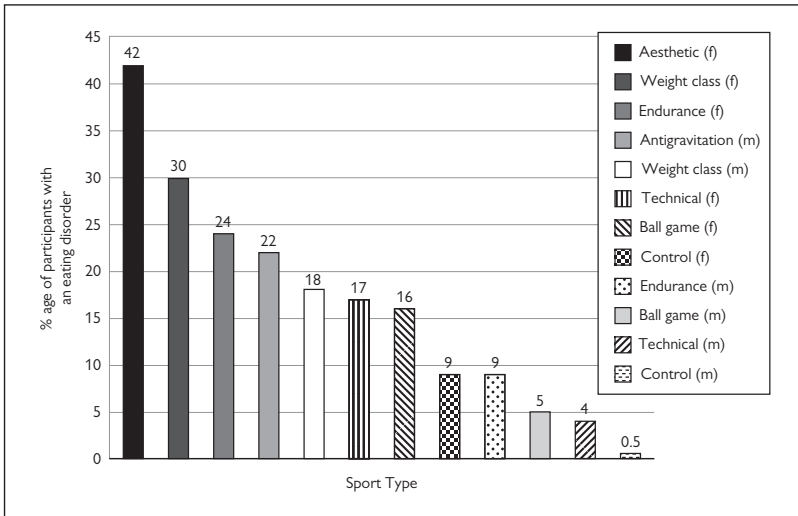


Figure 4.1 Prevalence by type of sport.

Source data from *Clinical Journal of Sport Medicine*, 14(1), Sundgot-Borgen, J and Torstveit MK, Prevalence of eating disorders in elite athletes is higher than in the general population, p. 24–32, Copyright (2004) Wolters Kluwer Health.

Athletes are vulnerable to eating disorders for the same reasons as anyone else and sport in isolation does not 'cause' eating disorders. However, there are sport-specific factors that have been shown, for example, to precipitate and maintain body dissatisfaction known to be a risk for an eating disorder. Awareness of the many aetiological factors in sport is helpful in understanding the excess prevalence found in sport. Collectively, knowledge of these factors will inform the preventative and risk management strategies that are necessary within sport. The following section will discuss in detail the sport-related aetiological factors that have been linked to eating disorders.

4.4.1 Vulnerability factors

Personality traits—many personality traits that are functional for the aspiring athlete (functional in the sense that they are associated with achievement and success) bear a similarity to attributes found in the eating disorders sufferer. These include perfectionism, mental toughness, and commitment (to training/exercise). Perfectionism can include both high standard-setting and critical self-evaluation. Setting high standards does not appear to be associated with negative outcomes but when accompanied by excessive self-criticism can be problematic.

Compulsive and excessive exercise—exercise can help mood regulation. An unhealthy relationship with exercise can develop when this is the only way of coping with stress. Mood regulation can become the primary aim of exercise and the individual becomes anxious if unable to exercise. Exercise is not enjoyable, becomes a chore, and can be said to be compulsive. In addition, if exercise is curtailed (e.g. by injury), the athlete is not only stressed and anxious but has had the primary means of dealing with this removed. In these circumstances, a lack of other coping skills can lead to more unhealthy attempts to regain a degree of control, such as dietary restrictions.

'Excessive' exercise is a qualitative rather than a quantitative evaluation and is best determined by the motivation that drives exercise rather than volume or intensity. For example, exercise with a primary purpose of weight control, exercise undertaken compulsively (perhaps even in secret), or an unhealthy dependence on exercise to regulate mood may be features of excessive exercise even when the absolute volume of exercise is relatively modest.

Aesthetics—in some sports the judgement of performance is associated with a particular and desirable body shape. These aesthetic evaluations will promote that body composition in competitors.

Competitive thinness—sporting achievement is driven by a competitive desire and this can generalize to a drive to be not just faster/higher/stronger but also leaner. Developing athletes may strive for the body weight of those they desire to emulate.

Early sport-specific training—increases vulnerability perhaps because younger athletes in an early stage of their sporting development may select a sport less suited to their eventual body type or because early specialization is associated with competing at a higher competitive level than is appropriate for their stage of psychological maturation.

Sport as an identity—if an athlete's life is filled only with sport and lacking other activities then their sense of identity is so closely linked to sports participation that any event threatening this identity will have a significant impact on self-esteem. Injury, retirement, or not being selected for competition is then a more significant loss. A loss such as this removes many key features of the athlete's identity including a sense of achievement,

their most significant role in life, a sense of belonging, and a way of dealing with stress and controlling weight. An eating disorder can substitute for some aspects of this lost identity.

4.4.2 Precipitating and maintaining factors

Making weight—this is a necessity in weight category sports such as judo, boxing, or Olympic wrestling and failure to make weight will lead to exclusion. This can promote rapid and extreme weight-loss measures similar to those seen in bulimia nervosa. In some sports, these measures are seen as almost a cultural norm and present from a young age.

Dieting—weight loss is especially risky if unsupervised, rapid, and without a clear target or end point. Most athletes who have suffered from an eating disorder report that a period of dieting preceded the onset of the condition.

Body weight and performance—body weight is closely linked to endurance performance and weight loss may still be associated with a temporary improvement in performance even if the athlete is already very lean.

Sports clothing—revealing attire is an additional risk factor especially in an environment of competitive thinness and aesthetic evaluations. This is compounded when critical self-evaluation (one feature of perfectionism) is also present.

Negative life events—athletes are especially vulnerable to the negative life events that result in loss of their sporting identity. These will include events such as retirement or injuries which interrupt training and competition. When the sporting identity is threatened, this impacts in a number of ways to increase the risk of developing an eating disorder (see Section 4.4.1).

The body as an object/machine—the pursuit of excellence may lead an athlete to become preoccupied by physiological parameters and their measurement (and often these are measured by sophisticated technological means). The athlete can then come to see his/her body as an object which is detached from his/her internal experiences. This problem is magnified if the body/object is seen as imperfect and in need of modification.

Critical or derogatory comments—about shape, weight, and body composition from peers, family members, or a coach have been found to be associated with the development of an eating disorder. This is especially the case when critical self-evaluations are also a feature of the athlete's psychopathology.

Organizational culture—in some sports, pathological weight control measures are encouraged and reinforced. In addition there are many sports where it can be hard to access psychiatric expertise and where there is considerable stigma attached to showing apparent psychological 'frailty'.

Timely access to treatment—denial is prominent in many eating disorders and may delay presentation. In addition, many athletes have lifestyles that make it harder to access mainstream healthcare and are subject to stigma when disclosing psychological problems. Delays in assessment may allow a problem to become entrenched and delays in treatment may lead to physical complications that are harder to reverse.

4.5 Prevention

Having an eating disorder such as anorexia nervosa is associated with significant morbidity and mortality. The seriousness of these conditions once established is a powerful argument for extensive efforts at prevention.

Coaches and other members of the support team need information on the health risks of restricted eating and the importance of ensuring adequate energy availability especially in athletes who are still growing. If it is necessary to set a weight-loss objective with an athlete then this should be done by medical and nutritionally qualified staff rather than a coach, and not in an athlete who is still growing. Strict policies may be necessary in sports where unhealthy weight-loss strategies are common, for example, in some weight category sports. Critical or derogatory comments about shape, weight, and body composition may also require policing and public weighing should be actively discouraged.

The arguments for developing preventative practices can be extended to the need for screening and early detection. There are essentially two approaches to screening. The first is to educate those who work with athletes on the likely presenting symptoms of eating disorders and how to distinguish these from normal 'athletic' concerns about shape and weight (see Section 4.2.7). Early detection means not only knowing what to look for but also looking hard and often. Special attention should be given to those athletes from 'at-risk' groups (due to their type of sport and personality factors) and to injured athletes.

The second approach (and they are by no means mutually exclusive) is to introduce formal screening instruments into regular medical examinations. For example, a preseason medical could include the five-item SCOFF questionnaire (Table 4.3) as part of general health assessment. The SCOFF questionnaire has a reported sensitivity of 85% and specificity of 90% in primary care settings. It is a screening instrument that raises suspicion about a possible disorder and is not a diagnostic tool. However, self-completed questionnaires of this type have not been specifically developed for athletes and depend on athletes giving honest answers. This may be hard to rely on as individuals with eating disorders frequently show high levels of ambivalence and athletes may fear the consequences of disclosing eating disorders symptoms.

Table 4.3 SCOFF questionnaire

1. Do you make yourself S ick because you feel uncomfortably full?	Yes <input type="checkbox"/> No <input type="checkbox"/>
2. Do you worry you have lost C ontrol over how much you eat?	Yes <input type="checkbox"/> No <input type="checkbox"/>
3. Have you lost more than O ne stone (7Kgs/14lbs) in a three month period?	Yes <input type="checkbox"/> No <input type="checkbox"/>
4. Do you believe yourself to be F at when others say you are too thin?	Yes <input type="checkbox"/> No <input type="checkbox"/>
5. Would you say that F ood dominates your life?	Yes <input type="checkbox"/> No <input type="checkbox"/>
<p><i>A score of 2 or more indicates the need for a more detailed assessment.</i></p> <p>Reproduced from <i>The BMJ</i>, 319, Morgan, J, et al, The SCOFF questionnaire: assessment of a new screening tool for eating disorders, Copyright (1999), with permission from BMJ Publishing Group Ltd.</p>	

A high index of suspicion is recommended and it is especially important to be vigilant with adolescent female athletes where 90% of peak bone mass is attained by the age of 18. Energy deficiency in the mid-teenage years will have long-term consequences for health and for sustaining a sporting career into adulthood.

When one element of disorder is present (e.g. menstrual irregularity, weight loss, or failure to grow), this should prompt inquiry and further exploration. Deteriorating performances, recurrent illness, and recurrent or non-healing injuries may also be warning signs of energy deficiency and a sustained catabolic state. Mood changes and especially symptoms of low mood and irritability can also be early signs.

4.6 Assessment, treatment, and recovery

As with eating disorders in other contexts, considerable resistance or at best ambivalence is common and this complicates and delays the assessment process. The first step towards recovery is motivating the individual to accept help and to make changes. About one-third of athletes with eating disorders voluntarily disclose their disorder while approximately two-thirds are approached by others in the first instance. Athletes who disclose usually do so to their teammates or coach. When disclosure is initiated by others, the experience is often reported in a negative light by the athlete.

4.6.1 Motivation and readiness to accept help

Members of the support team may often find themselves in a position to motivate an athlete to accept help and support. For this reason, coaches and others in the athlete's support team need to understand the process of disclosure and motivation for change.

The first step is to discuss any concerns openly with the athlete. Good advice is to make an approach directly, early, supportively, and confidentially. Directness is a sign of honesty and will reduce the risk of unhelpful collusion with any secrecy and denial on the part of the athlete. An early approach is necessary to prevent further deterioration in physical health, mental health, and performance. An ambivalent athlete will need support and encouragement to make the step to further assessment and possible treatment and a critical or blaming attitude may exaggerate the athlete's resistance. Confidentiality in respect of other team members must be respected as in all other medical matters.

This first discussion can be used to assess the stage of the athlete's readiness to change. Several stages of motivation for change have been described (Figure 4.2).

Those who are close to individuals such as parents, partners, or coaches can help the move from one stage to the next. If a person is not in the 'action stage', talking to them about change may not be helpful. It may be more fruitful at that point to take an approach of weighing up the pros and cons of change. Pushing someone to change before they have the opportunity to contemplate this and develop determination may generate resistance and move them back to a less motivated stage.

4.6.2 Contracts

Contracts are by definition two-way agreements and they allow all parties to be explicit in advance about what will be offered and what will be expected in return. The contract of a professional athlete can be used to describe what medical support will be

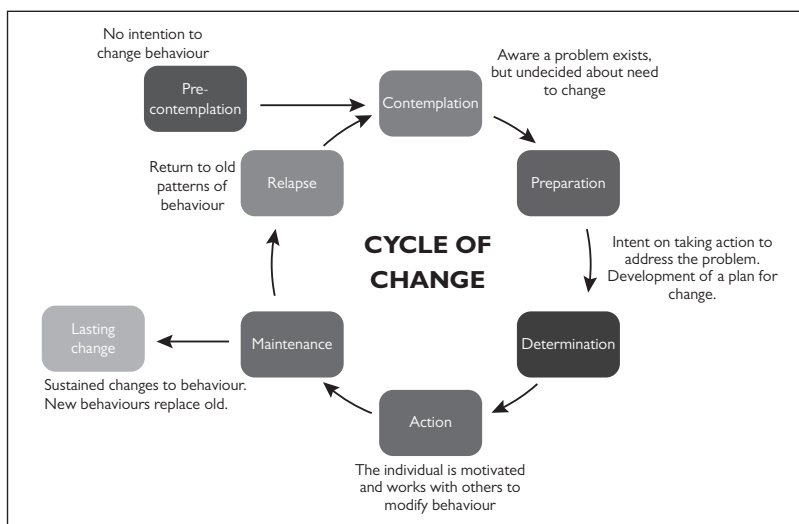


Figure 4.2 Stages of motivation for change.

Source data from *Journal of Consulting and Clinical Psychology*, 5, Prochaska, J. and DiClemente, C., Stages and processes of self-change in smoking: toward an integrative model of change, p. 390–395, Copyright (1983) American Psychological Association.

provided, in what circumstances, and how the athlete would be expected to use this support—for example, being expected to participate in screening and to take advantage of assessment and treatment when offered. Contracts may also explicitly state the criteria to judge an athlete's fitness to train or compete. However, this is often not absolute and requires clinical judgement in the athlete's best interests (see Section 4.6.4). Finally, contracts can describe the circumstances that will lead to exclusion or contract termination—usually deteriorating performances, whether or not the result of ill health or injury. Athletes, coaches, and sports organizations should expect contracts to apply the same principles for both physical and mental disorders.

These elements of a contract can also form the basis of the more informal relationship that exists between an athlete competing at a lower or more recreational level and his/her coach.

4.6.3 Access to assessment

When an eating disorder is diagnosed and an athlete is motivated to get help it is important to be clear about how further assessment and treatment will be accessed. Both a medical and psychiatric evaluation will be necessary. Professional athletes with an extensive support team may have ready access to this kind of evaluation (although in most areas a 'team psychiatrist' is a rarity), others will need to know how to make best use of whatever healthcare system is available to them. Access to assessment and treatment for injuries and physical complaints may be funded by sports bodies but in many cases equivalent mental health expertise is less readily available.

Primary care medical services (e.g. the team doctor or athlete's general practitioner) can have an important role in beginning the medical evaluation (see Box 4.1). In cases of RED-S that have arisen inadvertently through failure to match energy requirements to training load, dietary advice and nutritional support may be the only interventions needed. In milder and subclinical conditions, sound nutritional advice and psychological support may be sufficient to effect the necessary changes. A monitoring arrangement is needed in these cases to ensure that problems are genuinely resolving.

In most other circumstances more specialist help will be required. There can be difficulties accessing specialist eating disorders services and long waiting lists are a common complaint of athletes. Many specialist services have strict entry criteria such as a low BMI of 15 or are 'anorexia nervosa only' services. When a disorder is so closely linked to ambivalence then difficulties in accessing services can collude with the patient's stance and reinforce the belief that there is nothing wrong or that there is only a minor problem.

In high-risk or high-prevalence sports it can be helpful to be clear in advance about the pathway to assessment and treatment. This can be done, for example, by forming links with local treatment centres, supporting athletes to consult their personal doctor, and having explicit referral criteria and pathways. Clear policies and pathways will help to remove anxieties from sport bodies, coaches, sports medicine staff, and other members of the support team, as well as to encourage early intervention when an eating problem is suspected.

4.6.4 Medical evaluation

The initial medical evaluation will provide the information that may help to decide about the safety of continued participation or to inform the modifications of training/exercise that will be necessary. The medical evaluation should be undertaken by a physician who has experience in the field. Occasionally a sufficiently experienced eating disorders psychiatrist may feel able to undertake the medical evaluation.

Bone scans are usually interpreted with reference to population normative data for age and sex. Athletes in weight-bearing sports will have BMD that is on average 5–15% greater than non-athletes. This influences the interpretation of bone scan data and a BMD Z score of between -1.0 and -2.0 should be considered abnormal in such an

Box 4.1 The initial medical evaluation

- Full blood count
- Urea and electrolytes
- Magnesium, phosphate, zinc, and ionized calcium
- Glucose
- Liver function tests
- Thyroid function tests
- Oestrogen, progesterone, luteinizing hormone and follicle-stimulating hormone (in bulimia only if menstrual irregularity)
- ECG
- Dual-energy X-ray absorptiometry (DXA) bone scan if amenorrhoea of more than 1 year.

athlete. In non-athletic populations, only Z scores of less than -2.0 are considered to represent significant lowering of BMD (osteoporosis).

The results of the initial medical evaluation will be the primary determinants in deciding how much or how little participation is advisable. It is regrettably rare for this to be a simple decision and there is no single measure that can guide. The medical evaluation determines health status which is used to evaluate participation risk but this risk is in turn modified by factors specific to the sporting environment.

At one end of the spectrum there will be serious medical complications of energy deficiency that are absolute contraindications to any exercise participation and at the other end of the spectrum the results will provide sufficient reassurance to allow the training and competitive programme to continue unaltered. Most athletes will lie somewhere between extremes. In these circumstances, the training and competition programme can be modified to take account of medical complications, to help restore energy balance, and to promote recovery.

Absolute contraindications include serious electrolyte imbalance, severe musculoskeletal injury, and haemodynamic instability. The athlete would only be cleared to resume training when the relevant physical parameters had stabilized. If the outcome of the medical examination is a situation of low risk with appropriate energy availability, normal hormonal and metabolic function, and healthy BMD and musculoskeletal system then few if any modifications will be needed.

For most athletes the decision on how much participation to permit will need a judgement on the severity and importance of several factors. These include abnormal but not acutely dangerous physiological profile (e.g. hormonal abnormalities), energy balance, weight loss/restricted growth, and BMD. Progression is a second important consideration. The initial aim of modifications to training or exercise is to arrest any deterioration and begin the process of physical rehabilitation. If parameters are worsening or failing to progress then more stringent modifications may be needed. Lack of progression in psychological therapy may be another consideration.

Finally, the sports environment itself will act as an important 'decision modifier'. If the athlete is in the off-season then perhaps rest can be more readily advised to restore energy balance; musculoskeletal considerations may need more emphasis in contact and impact sports, and there may be a very psychologically unhealthy team environment that would merit more prolonged non-participation.

In all cases it is the medical rather than the coaching team that should drive participation decisions. In this way conflicts of interest between athlete and coach can be avoided. In any case, the risks are in large part the result of medical complications necessitating medically led decision-making.

4.6.5 Psychiatric evaluation

A psychiatric assessment will not only confirm the diagnosis through careful history taking and examination of the athlete's mental state but will formulate the problem in terms of underlying vulnerability, relevant triggers, and maintenance factors. This requires the same competencies as any other psychiatric diagnostic formulation. The assessment consultation begins with a willingness to engage the individual by understanding the context in which they have become ill and includes consideration of additional 'sport-specific' risk factors in predisposition, precipitating, and perpetuating factors.

The athlete's predisposing vulnerability will need to be explored including factors such as perfectionism especially where this coincides with low self-esteem and critical or negative self-evaluation. Important triggers for disordered eating include critical comments and evaluations from significant others, life events (and in a sporting context even minor injuries can be major events), and life changes such as leaving home or relationship difficulties. As well as exploring the athlete's internal world, questions should also be asked about the athlete's external environment and in particular attitude to weight, eating, dieting, and body shape within that environment.

It is important to take an adequate exercise history. Clinicians should understand the athlete's current attitude to exercise. In particular they should note any recent shifts in attitudes and behaviours from training that is directed by a performance programme and motivated by achieving sporting goals, towards compulsive, additional, or secretive exercise. The use of exercise as the primary means of controlling unpleasant mood states such as anxiety and depression should raise particular concern. The chronology of the athlete's exercising behaviour is also important. This will include determining the onset of excessive exercise as this may predate the onset of disordered eating. Other factors to consider are the impact of puberty on performance, evidence of a performance decrement (or a plateau in attainment), and if the athlete has found him/herself at an early age competing at too high a level for his/her emotional maturity.

The psychiatric evaluation will also clarify and quantify psychiatric risk factors and protective factors. Psychiatric risk includes the risk of suicide and self-harm and the possibility of co-morbid conditions such as depression, anxiety disorders, obsessive-compulsive disorder, and substance misuse.

4.7 Treatment

Psychotherapy, in one of its many forms, is the mainstay of eating disorders treatment with medication usually reserved for the treatment of comorbid conditions. The major difficulty when working with an individual with an eating disorder is that treatment requires active participation in psychotherapy. Attending appointments is not enough.

In anorexia nervosa, there is a growing evidence base for a range of psychotherapeutic approaches including cognitive behavioural therapy (CBT), cognitive analytical therapy (CAT), psychodynamically informed therapy, and interpersonal psychotherapy (IPT). In CBT, the patient is supported to challenge and rebuild maladaptive thinking and behaviour. A modified form of CBT specifically for use in eating disorders (CBT-E) has been developed and focuses on core problems of perfectionism, low self-esteem, managing interpersonal problems, and difficulties coping with unpleasant mood states. Psychodynamic approaches recognize that early experiences and in some cases family dynamics can contribute to eating disorder psychopathology. These approaches support the patient to attend to unpleasant early experiences and to resolve psychological conflicts. Family-based therapy is the treatment of choice for adolescents and actively involves parents/carers in treatment. IPT seems particularly effective when bingeing and compensatory behaviours such as purging are prominent.

Therapy is usually weekly and for 20–40 weeks depending on diagnosis, severity, and the mode of therapy. Research has demonstrated that bulimic-like disorders, such as bulimia nervosa or binge eating disorders, respond to 20 sessions of CBT or

16–20 sessions of IPT and both therapies are recommended in UK national guidelines. The treatment of anorexia nervosa is more complex and currently there is limited evidence on the most effective treatment. Many clinical services offer 40 sessions of CBT-E. Psychodynamic therapy is also used in many clinical services for the treatment of anorexia nervosa and anorexia nervosa-like disorders and usually for about 1 year of weekly sessions.

For mild disorders a graded approach of offering self-help and guided self-help may be useful.

Therapy should be delivered by a suitably trained and qualified therapist or therapy team. Experience of sport can be helpful but is not essential. An ability to understand the context in which an individual has become ill (in this case sport) is common to all therapies and is a mandatory competency for any therapist.

Recent research has identified that the involvement of the coach in the treatment can aid recovery and progress back to sports activities. A sports coach can bring helpful insights into the formulation of the disorder. Furthermore, his/her collaboration will be necessary in managing any restrictions on exercise and in supporting a gradual resumption of sports activities on recovery.

Medication should be used cautiously as cardiac side effects are reported for many psychotropic drugs. This is especially important in those who may have other cardiac vulnerability (e.g. via electrolyte and especially potassium disturbance) and are continuing to exercise. Selective serotonin reuptake inhibiting antidepressants such as fluoxetine can help reduce the frequency of binge episodes and low-dose antipsychotic medications may help reduce anxiety and compulsive behaviours in anorexia nervosa. Otherwise medication is primarily used in the treatment of comorbid conditions such as depressive and anxiety disorders and obsessive–compulsive disorder.

4.8 Recovery

There are four major sport-specific considerations that come into play as the athlete/patient progresses from assessment through treatment to recovery and each requires collaboration between the clinical world and the world of sport.

The first consideration is medical stability. Is there a medical contraindication to training/competition such as an electrolyte imbalance, electrocardiogram (ECG) abnormality, or stress fracture? Are these medical concerns of a severity and urgency that immediate action is necessary? These considerations are essentially the same as those which may have led to restrictions on training and competing following the initial medical evaluation.

If there is no immediate medical contraindication to continuing or resuming exercise then the second consideration is the athlete's nutritional status and the key question is whether or not calorie intake is adequate to meet the demands of exercise (see Section 4.2.5).

If nutrition and energy availability are sufficient then a graded return to exercise may be considered although this will be dependent on the third consideration—an observed reduction in disordered eating behaviours and progress in therapy. Progress in therapy is then rewarded by resumption of activity that acts as an incentive for further progress in therapy, creating a virtuous spiral.

The fourth aspect to consider is the risk that returning to training and competition will exacerbate the illness. In many cases, a return to training and competition will be viewed positively. For others, the sports arena may prove sufficiently toxic for the condition to resurface, necessitating a review of the process of return. This will include reviewing the nature and timing of return—was it too early, was progress in therapy overestimated, was there sufficient attention to modifying the relevant risk factors for that athlete? For a few, returning to a lower competitive level or even an exit strategy will be the best option. Clearly at each stage a high level of collaboration between the coach/support team and the clinical team is necessary and should always have the athlete/patient at the centre of any decision and consenting to information being shared.

Further reading

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