Disordered Eating in Adolescent Athletes: Prevalence and Risk Factors

by Lauren Gasparo Anton, MS Candidate

Drive, perfection, attention to detail—these are the some of the hallmarks of a talented athlete. They are also some of the personality traits associated with the development of eating disorders.[1] Eating disorders (ED) typically do not develop overnight; often they are cultivated over time and may start with behaviors that can be collectively termed "disordered eating."[2,3] Although disordered eating (DE) behaviors do not necessarily develop into full-blown ED, they can lead to permanent damage in bone formation and possibly infertility,[4] not to mention negative psychological consequences.

Disordered eating behavior among athletes can be difficult to pinpoint, given the tendencies of athletes to maintain rigid nutritional requirements,[5,6] follow intense training schedules, and push through fatigue and pain. The increased incidence of ED/DE at the onset of emerging adulthood (ages 18-25 y)[7] leads one to hypothesize that prevention strategies would be useful during the early years of adolescence, and many researchers do advocate this strategy.[8,9,10] Moreover, because adolescence is a time of rapid bone development, it is especially imperative to recognize DE behaviors in adolescent athletes. If peak bone mass is not achieved during this time period, the risk for osteoporosis increases.[11]

Disordered Eating Versus Eating Disorders

According to the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition—Text Revision (DSM-IV-TR),[1] clinical ED can be diagnosed as either anorexia nervosa (AN) or bulimia nervosa (BN).

Anorexia nervosa is defined by the following DSM-IV-TR criteria:

- Failure to maintain 85% of ideal body weight
- Intense fear of becoming fat/ gaining weight
- Distorted body image
- Amenorrhea (absence of menses for at least three menstrual cycles)

There are two types of AN: restricting (refusal to eat) and purging (i.e., vomiting, laxatives use, excessive exercise).

Bulimia nervosa is defined by the following DSM-IV-TR criteria:

- Engaging in binge eating (eating more than what would be considered normal, often thousands of calories, in the span of two hours or less; accompanied by a sense of lack of control)
- After the binge-eating episode, engaging in compensatory purging methods
- The binge/purge episodes occur at least two times per week for three months
- Preoccupation with body shape and weight which, in turn, defines self-worth

Two major types of BN have been identified: purging and non-purging. Purging types of BN employ vomiting or laxatives, whereas nonpurging types are characterized by caloric intake restriction and/or excessive exercise.

Eating disorder - not otherwise specified (ED-NOS) refers to the presence of ED symptoms without meeting all the criteria necessary to diagnose as a full-blown ED. Examples include a patient who meets all AN criteria but still has regular menses or a patient who engages in bingeing/purging but does it less than the two times a week for three or more months, as is specified in the BN diagnostic criteria. One condition categorized under ED-NOS is binge-eating disorder (BED), which is characterized by the same bingeing seen in BN but without compensatory purging. Many of these subclinical behaviors fall under the category of DE.

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The term disordered eating is used to describe behaviors that indicate an unhealthful relationship with food. Researchers have described several unhealthful weight-control methods that can lead to ED, as follows: skipping meals, fasting, restricting kilocalories/frequent dieting, restricting certain types of foods, purging (vomiting, use of laxatives), excessive exercise, and overuse of food substitutes.[9-12] Other DE behaviors include bingeing or "out of control eating." Simply putting foods into "good and bad" or "healthy or unhealthy" categories can be indicative of unhealthful eating patterns and, thus, could correlate with DE.[13] While DE behaviors are commonly associated with ED, DE can affect those who do not have ED. These behaviors, combined with poor body image, can

increase the likelihood of future development of clinical ED.[2,3,9,12,14]

Disordered Eating in Athletes: Anorexia Athletica and the Female Athlete Triad

Disordered eating behavior specific to athletes has been termed anorexia athletica (AA).[15] For an athlete, the drive to succeed can take the form of DE behaviors. The desire to perform at one's best is the ultimate goal, as opposed to thinness in and of itself as being the goal.[15] Athletes may think they need to be at a certain weight or body type to be competitive in their sport.[10] Restriction of foods or certain types of foods, subclinical bingeing and purging, and excessive exercise are all methods that could be employed by athletes to attain the goal of better performance, especially among those in "lean-build" sports.[8,16] Cross country running, track (runners only), swimming, gymnastics, cheerleading, yoga, wrestling, and dancing have all been characterized as "lean-build" or "weight-related" sports; "nonlean-build" or "power" sports include softball, baseball, ice hockey, field hockey, volleyball, basketball, tennis, soccer, football, track (field events only), and lacrosse.[8,10,12,16]

> "Disordered eating behavior specific to athletes has been termed anorexia athletica (AA)."[15]

The female athlete triad consists of three interrelated health disorders: low-energy availability (with or without an eating disorder), osteoporosis, and amenorrhea (defined as the absence of a menstrual cycle for more than 90 days).[18] Inadequate energy intake can lead to menstrual irregularity (MI) and a lack of hormones that promote bone formation. If MI continues, inadequate levels of estrogen prevail. Since estrogen plays a role in controlling bone resorption, low bone mineral density (BMD) can develop and can lead to osteoporosis.[18,19] The three components of the triad occur on a spectrum, indicating that early screening and intervention should be a priority.[18]

Prevalence of Disordered Eating Among Adolescent Athletes

Many studies and meta-analyses have shown that ED/DE affects females more than males.[7,15,15,20] In addition, several studies indicate that athletes are more susceptible to ED/DE than non-athletes.[5,15,20] Generally, the findings document that female athletes—especially those in endurance, lean-build, or weight-related sports—have an increased tendency toward ED compared with their non-athlete peers. However, much of the past research on athletes and ED/DE has focused on collegiate or elite athletes.[5,7,12,15,16] Comparatively fewer studies have been conducted on adolescent athletes and DE behaviors. Nevertheless, DE has been reported in adolescent athletes for quite some time.

In a 1992 study comparing female high school athletes (n=571) with non-athletes (n=463), researchers found that while scores for ED tendencies were almost the same for both groups, athletes scored higher for traits considered to be risk factors for the development of ED: perfectionism, subclinical bingeing/purging, and body dissatisfaction.[21] A more recent study looking at the prevalence of the female athlete triad in adolescent athletes found that although very few met the criteria for all aspects of the triad, approximately 20% of the athletes surveyed (n=170) met the criteria for at least one of the components.[22] This corresponds with the results of another study on DE behavior and MI that was conducted by the same researchers.[8] The study revealed that of the high school athletes surveyed (n=423), about 20% exhibited either DE behavior or MI. The authors noted that while the scores were below that of full-blown ED and even below the scores of collegiate athletes, the existence of pathological eating behaviors on two or more days over the past month warrants concern, especially in light of the amount of exercise the subjects engaged in due to sport participation. DE behavior during high school years could result in suboptimal peak bone mass in adulthood.[8]

Other research stemming from the Nurses' Health Study II (Growing Up Today Study [GUTS]) that involved athletes and non-athletes found that among girls aged 11 to 17 years (n=7,864), higher incidences in DE behaviors and stress fractures occurred among those who participated in more than 16 hours per week of activity.[23] Although the study did not find an independent correlation between DE and stress fractures, it does point to the importance of screening athletes for aspects of the triad before the situation becomes problematic.

Adolescent Male Athletes and Disordered Eating

Notoriously understudied, male athletes have been found to engage in DE behavior. Results from a population-based, descriptive study pulling data from Project EAT (Eating Among Teens) revealed that more males who considered themselves to be in a weight-related sport category engaged in unhealthful weight-control behaviors compared with females in the same category.[10] The study allowed for self-identification of whether the athlete was in a weight-related sport by asking, "Are you in a sport or activity where it's important to stay a certain weight (wrestling, gymnastics, ballet, etc)?" Even though

the question was somewhat leading due to the parenthetical phrase at the end of the question, and even though it focused on weight alone without giving consideration to body shape, the study nevertheless calls attention to male athletes engaging in DE behavior.[10] Other studies have shown that wrestlers and cross country runners are affected by DE.[24,25] Moreover, the issue of overweight has become a concern for male athletes, particularly for those participating in football, with one study reporting that 45% of 3,686 linemen were overweight.[26] Overeating/bingeing could be a factor in instances where a higher weight is needed for effective competition.

Ethnic Considerations

Although research has typically focused primarily on Caucasian athletes[6,8] and has not focused on ethnicity,[12,16] recent studies have revealed a risk among Latina female high school athletes for DE, particularly for bingeing/purging.[27] These findings suggest a need to include data regarding ethnicity in future studies on DE in athletes.

Conclusion

Overall, current research indicates that adolescent athletes exhibit signs of one or more aspects of the female athlete triad, but not necessarily the full triad.[6,8,19,21-23] However, studies of collegiate and elite athletes have found a much higher incidence of the full triad or of ED.[12,15,16] The mental and physical "groundwork" for AA, female athlete triad, and ED seems to be laid during adolescence, particularly during the high school years. In light of these findings, it seems apparent that programs aimed at early prevention and detection are key and must start in high school, if not earlier. Education of parents and coaches is a must, given that high school athletes often look to these authority figures for approval and nutrition guidance.[9] Future research should make note of race/ethnicity, and males should be included in future studies.

Disordered eating can be difficult to spot in adolescent athletes. What may look like a dedication to their particular sport may in fact be detrimental to their future health. With early-prevention programs, DE/ED behavior can be prevented in later years.

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Food Pyramids in Sports Nutrition

by Samuel Mettler, PhD and Nanna L. Meyer, PhD, RD, CSSD

Food pyramids are pictorial representations of dietary goals that translate scientific reference data into easily understandable nutrition recommendations. In general, there are two approaches to designing food pyramids. In the nutritive approach, food recommendations are calculated to fulfill dietary reference values for energy, macronutrients, and micronutrients.[1] Consequently, serving sizes for different food groups and corresponding numbers of servings are calculated to meet the energy and nutrient requirements of the target population. Most pictorial food guide systems follow this strategy. In the second approach, the metabolic approach, eating guidelines are linked to the metabolic effect a particular food may exert on physiologic parameters. For example, the low glycemic index pyramid[2] focuses on the effect of food on blood glucose.

Many pyramids today also highlight the quality of food in their pictorial representations (e.g., The Healthy Eating Pyramid[3] and the German three-dimensional Food Guide Pyramid, 2005[4]). Several pyramids from around the world emphasize cultural influences and traditional cuisine,[5] and some of these (e.g., Mediterranean Food Guide Pyramid) have been used in both research and clinical settings for the purpose of health promotion and disease prevention.[6-9]

Comparatively, food guide pyramids do not differ substantially from each other with respect to their food and nutrient recommendations. In fact, Painter and colleagues[5] demonstrated that although food guide systems varied in shapes (e.g., pyramid, wheel, pagoda, rainbow), their basic food group classifications were similar. Only recently have food guide systems included fluids, and only a few have incorporated more novel approaches (e.g., vegetables and fruit as the base before grains; more protein).[10,11] Most pictorial representations include daily physical activity.[12,13]

> "Only recently have food guide systems included fluids."

The majority of food pyramids and other pictorial food guide systems provide a range of serving sizes and/or number of servings per food group[5] to allow individualization for differences in body masses, physical activity levels, and different energy needs. The U.S. Food Guidance System (MyPyramid) provides a range of suggested number of servings for each food group, which is dependent on an individual's energy requirements ranging from 1,600 to 3,000 kcal/day. Consequently, men and women of different ages with three different physical activity levels are