

# A Tale of Two Runners: A Case Report of Athletes' Experiences with Eating Disorders in College

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## ABSTRACT

Athletes are at higher risk than the general population for eating disorders, and risk is heightened for athletes in thin-build sports, including track. Collegiate athletes are particularly vulnerable to disordered eating when the transition from home to the college environment adds to the stress of performance pressures and the high demands of the sport environment. Male and female athletes who develop eating disorders share some common characteristics, yet their experiences can be quite different, in part as a consequence of their sex and how eating disorders develop, and are recognized, acknowledged, and treated, within the culture of sports. This case report describes the experiences of two track athletes, one male and one female, who were recruited to the same Division 1 collegiate track program. Both were elite athletes, freshmen in the same year, experiencing the same urban college environment, and experiencing an eating disorder characterized by restrictive eating, significant weight loss, injury, and compromised performance in sport. Both received treatment from a multidisciplinary team of professionals. Both athletes achieved weight restoration, recovery from the disorder, and success in their sport. In spite of the similarities, striking differences were apparent in clinical presentation, predisposing features, onset of symptoms, entry points to treatment, interventions received, and clinical courses through treatment that depict sex differences in how eating disorders present in athletes and are addressed in the sport environment. Findings endorse the need for research and inform prevention strategies, risk assessment, and intervention approaches for nutrition and sports medicine professionals and collegiate athletic departments.

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EATING DISORDERS ARE LIFE-THREATENING PSYCHIATRIC conditions with conspicuously high mortality rates.<sup>1,2</sup> Estimates of up to 11 million Americans suffering from clinically significant eating disorders in their lifetime grossly underrepresent the total disease burden in the population<sup>3</sup> and do not accurately represent the emotional turmoil that accompanies subclinical eating disorders. According to recent statistics, the epidemiology of eating disorders is shifting worldwide.<sup>3</sup> Rates are increasing in the general population, particularly among teens between the ages of 15 and 19 years.<sup>1</sup> Notably, this at-risk population includes high school and college-age students in whom the prevalence of eating disordered behaviors is higher, even in the absence of a formal eating disorder diagnosis.<sup>4</sup> Because athletes are at greater risk than nonathletes,<sup>5,6</sup> collegiate athletes are particularly vulnerable to eating disorders and disordered eating behaviors given their life stage combined with sport-specific risks.<sup>7-9</sup>

Collegiate athletes are particularly vulnerable to disordered eating when the transition from home to the college environment adds to the stress of performance pressures and the high demands of the sport environment.<sup>10</sup> Young adults who

have underlying psychosocial or genetic vulnerabilities and limited coping skills are perhaps most at risk. Yet identification, assessment, and treatment of eating disorders in the college athlete population is challenged by several realities. First, estimating the true prevalence of eating disorders among athletes is obscured by the secretive nature of the disorders and the inherent denial of the problem.<sup>3,11</sup> Second, most studies on eating disorders in athletes involve female athletes, whereas male athletes have been largely understudied yet recognized as similarly vulnerable.<sup>3,12,13</sup> Third, even among female athletes, rates of eating disorders vary by sport and by position. Aesthetic sports and sports in which a low body mass is perceived as offering a competitive advantage are associated with comparably higher rates.<sup>3,5</sup> Finally, factors in both the collegiate environment and the sport environment introduce barriers to treatment or barriers to athletes coming forward for treatment<sup>7,10</sup> that may be particularly salient for males, introducing a sex bias.<sup>11,13,14</sup> Best practices in the care of athletes with eating disorders call for screening of all athletes, with evaluation and treatment delivered by an experienced multidisciplinary team whose providers have expertise and specialized training in

sports and eating disorders.<sup>3,7</sup> The use of clinical assessment tools to inform decisions about treatment contracts, participation in sport, and return-to-play guidelines is also recommended.<sup>3,15-18</sup> Yet across universities, the attention, concern, intervention activity, and resources devoted to assembling qualified treatment teams and addressing eating disorders within college athletic departments are highly variable. If lack of a coordinated system for appropriately identifying and addressing eating disorders on campus precludes timely intervention, medical and psychological complications of these disorders can have devastating effects on student-athletes' health and performance in sport.<sup>7</sup>

Male and female athletes who develop eating disorders share some common characteristics.<sup>3,11,19</sup> At the same time, their experiences can be quite different,<sup>20,21</sup> in part as a consequence of their sex and how eating disorders develop and are recognized, acknowledged, and treated in society at large and within the culture of sport.<sup>11,13,14</sup> To elucidate some of the practical issues surrounding identification and treatment of eating disorders in sports, this case report provides a side-by-side detailed account of a male and a female collegiate athlete who gave permission for their cases to be published. Both were Division 1 (D1) track athletes who attended the same university. Both were exposed to the same collegiate sports environment, the same set of coaches and teammates, and access to the same sports medicine resources on campus. This paper chronicles similarities and differences in their clinical presentations, entry to treatment, and experiences in eating disorder recovery alongside the challenges and successes in their collegiate athletic careers.

## CASE PRESENTATIONS

Both athletes were track athletes recruited to the same large, urban university in the same incoming freshman class in 2004. A multidisciplinary sports medicine program was newly formed on campus that September. This initiative added a part-time registered dietitian (RD) to the sports medicine team and prioritized assessment and intervention for student athletes at risk for eating disorders. The program consisted of an internal referral service in which sports medicine, sports psychology, and sports nutrition professionals provided confidential on-campus treatment services to student athletes.<sup>10</sup> Both of these athletes received eating disorder treatment services from multiple members of the interdisciplinary sports medicine team, including an RD (the author). They each worked with the sports dietitian for approximately 5 years' duration, starting in their freshman fall semester through their postgraduate year, ending in 2009.

The course of each athlete's clinical assessment, eating disorder diagnosis, treatment, and recovery experience was detailed in clinical records maintained by the RD per standard clinical care guidelines. Nutrition diagnoses were made based on anthropometric, clinical, and dietary assessment data. Biochemical evidence of malnutrition is not considered here, because laboratory data were not available to the RD in this setting. Weight restoration was based on measured weights, using the scale in the athletic training room, in accordance with recommended procedures that evaluated weight in relation to ideal body weight (IBW) and body mass index (BMI) criteria.<sup>3,15,22,23</sup> Both athletes gave signed

permission for their case reports to be shared in this publication. This report constitutes clinical care and did not involve human subject research; it was determined exempt from review by the university's Institutional Review Board.

## The Female Athlete

The female athlete (FA) was a long-distance runner referred to the sports dietitian by the athletic trainer, endorsed by the sports medicine physician, because she was identified as being at-risk for an eating disorder. She was already working with the sports psychologist and came to nutrition "because my coach wanted me to see a nutritionist." She reported on her initial assessment form that she wanted "advice on athletic nutrition" and wondered if she should change what she ate, perhaps "eat more or eat less?" She stated that she was "open to ideas to improve performance." FA presented weighing 45.9 kg (101 lb) at a height of 1.68 meters (5'6"), representing 78% of IBW<sup>23</sup> and a BMI of 16.4. She had been amenorrheic for more than a year and weighed as little as 43.2 kg (95 lb; 74% IBW) in high school. She had a hospitalization and a diagnosis of anorexia nervosa (AN) during her senior year, before coming to college. FA's score on the Female Athlete Screening Tool<sup>24</sup> was 81, placing her in the range of a subclinical eating disorder; however, she denied any disordered eating concerns and likely underreported her behaviors on the assessment, as is common among elite athletes.<sup>11</sup>

According to diagnostic criteria,<sup>25</sup> FA met the criteria for AN and the female athlete triad<sup>26</sup> on presentation. She was training intensely, with two training sessions per day. In addition to training for her sport, she was working out regularly in the campus fitness center. She was not well connected socially, even with her teammates, and she was hours away from her family. She was training solo, and before long, she was living alone off campus. FA was struggling academically. She would not take a rest day, even when she experienced injury. People inside and external to the sports environment expressed concern over FA's low-weight status and observed eating behaviors. Based on dietary recall data, she had a highly restrictive diet that was inadequate in protein and calorie intake, consisting primarily of small portions of fruits and vegetables with no added fats.

FA's nutrition diagnosis was malnutrition related to AN as evidenced by significant underweight and inadequate macronutrient and micronutrient intake in the setting of high-energy expenditure due to sport, creating low energy availability and a relative energy deficiency.<sup>15,16</sup> The diagnosis of malnutrition was made based on anthropometry (weight, weight history, magnitude of recent weight loss, % IBW, and BMI criteria); clinical assessment (emaciated appearance with extremely low body fat that was visibly observable, amenorrhea, and other clinically reported pieces of information, including constipation, inadequate hydration, hair loss, anemia, cold intolerance, and the presence of stress fractures, indicating compromised bone health); and dietary assessment based on 24-hour dietary recalls, food records, and a diet history interview revealing inadequate protein/calorie intake, low dietary quality causing concern for essential fatty acid and micronutrient adequacy, and deeply entrenched disordered eating behaviors, restrictive eating, and disordered thoughts preventing adequate fueling for

sport or for health promotion in general. The nutrition intervention plan centered on outpatient nutrition counseling and education provided on campus with coordination of care by the sports medicine physician and monitoring of weight by the athletic trainer. Weekly sports psychology sessions provided cognitive behavioral therapy (CBT) and dialectical behavioral therapy (DBT).

FA was resistant to most suggestions to reintroduce specific foods that would provide essential nutrients and energy. To the few she agreed to try, rarely did she follow through. She was, however, vulnerable to functional foods and supplements marketed to athletes. She demonstrated substantial ambivalence and low readiness to change. In spite of fairly regular sessions focused on building a trusting therapeutic relationship, nutrition education, and small, specific behavioral goal setting, FA made no progress restoring weight that first semester. By December, her weight dipped below 45.4 kg (100 lb). In response, the sports medicine team declared her medically ineligible to train and compete, and a treatment contract was put in place. The contract outlined a weekly schedule of appointments with each team member, a weekly weigh-in in the training room, and specific return-to-play criteria that were tied to compliance with appointments and weight restoration to 90% IBW, corresponding to a BMI target of 19.<sup>27</sup> FA remained on contract in her sophomore year and gradually began to reintroduce protein and grains into her diet with meal-planning guidance. By winter, she had restored enough weight to compete. In February, she won conference and regional titles, shattering records on the track while weighing in at 50 kg (110 pounds; 85% IBW). She went on to set a personal record in the NCAA outdoor championships. The achievements continued sophomore year, when FA's record-breaking performances captured several conference titles.

In the fall of her junior year, FA suffered fractured bones in her foot, requiring surgery. She was ineligible to train and compete the entire year, taking a medical redshirt. She remained committed to nutrition and psychology interventions, making good progress increasing dietary intake and decreasing disordered eating behaviors. By January, she achieved her goal weight of 53.2 kg (117 pounds, 90% of IBW, BMI of 19). As training resumed, she worked with the RD to increase her food and nutrient intake to meet the demands of sport. With ongoing nutrition and psychology services, she successfully maintained goal weight through her senior year. She won conference and regional championships, became a two-time All-American, and set a national record. FA finished her eligibility by competing as a graduate student and continuing to win races. Her sustained commitment to working with nutrition and psychology providers facilitated her recovery, including remission of disordered thoughts and behaviors. To date, she has maintained recovery for 7 years, still trains, and competes as a marathon athlete with Olympic potential.

### The Male Athlete

The male athlete (MA) was a middle-distance track athlete who also competed on relay teams and in cross-country. He attended a team-based nutrition education workshop in October of his freshman year. After the presentation, he approached the RD for a private conversation. Appearing pale

and gaunt, he asked to schedule an individual appointment, stating, "I need your help. I need to lose weight." On initial assessment, he stated that he wanted "information and help with weight loss and information on replacing fat with muscle." He cited "determination to achieve and willpower to drive towards a goal" as personal strengths he would draw on.

For MA, nutrition was his entry point to assessment and intervention. At 1.8 m in height (5'11"), he weighed 67.7 kg (149 lb), representing 87% of his IBW.<sup>23</sup> In spite of his weight being markedly below IBW, his BMI of 20.8 appeared in the healthy range,<sup>28</sup> artificially inflated by the degree of muscle mass on his extremely lean frame. He reported that this was close to his usual weight in high school, where he "never worried about food or weight." An international student, he experienced a dramatic change in eating habits once exposed to the US food environment. He was also training more intensely than ever before. His weight rose to 72.7 kg (160 lb; 94% IBW) in his first 3 months in the United States. He was teased by his teammates in the locker room and in front of his teammates by his coach, who commented on his noticeable weight gain and affinity for American food. Feeling humiliated, he believed he was "failing at my job" as a scholarship athlete. MA immediately stopped eating. He dropped weight within a few weeks, but wanted to weigh less. His stated goal weight was to be under 63.6 kg (140 lb, which would represent 82% IBW and a BMI of 19.6). He was training intensely and was restricting his daily intake to between 500 and 1,200 calories. He was self-weighing several times daily, notably distressed by the weights and harshly self-critical. Important people in his life who were inside the sport environment encouraged and praised his weight loss, whereas family and friends perceived his restrictive eating and consequent weight loss to be a sign of his commitment to sport and the rigors of training. Over holiday break, he collapsed while out on a long run after 3 days of not eating.

MA had body image dysmorphia and fat phobia. He complained, "fat is hanging over my jeans" when he sat. The RD sent MA to the strength coach to have his body fat evaluated. His body fat measured 3.1% using skinfold calipers, at the low end of the range of essential fat for a male (3%-5%).<sup>29</sup> MA's response was to ask whether he should lose the 0.1%. MA articulated a very external focus, constantly comparing himself with his teammates and complaining, "Everyone else is smaller than me. I'd be faster if I were smaller." He would blame bad race experiences on what he ate.

MA's nutrition diagnosis was malnutrition related to EDNOS (eating disorder, not otherwise specified)<sup>25</sup> as evidenced by significant weight loss and low energy availability in the setting of high-energy expenditure due to sport, creating relative energy deficiency.<sup>15,16</sup> The diagnosis of malnutrition was made based on anthropometry (weight, weight history, magnitude of recent weight loss, and extremely low body fat); clinical assessment (emaciated appearance and anemia); and dietary assessment based on 24-hour dietary recalls, food records, and a diet history interview revealing inadequate protein/calorie intake and disordered eating behaviors, restrictive eating, and disordered thoughts preventing adequate fueling for sport or for health promotion in general. The nutrition intervention plan centered on outpatient nutrition counseling and education provided on campus, with coordination of care with members of the multidisciplinary sports medicine team.

As a freshman, MA was devoted to weekly sessions with the sports dietitian in which they worked on building trust, re-introducing lunch as a daily occurrence, and broadening the range of foods allowed in his daily diet to achieve an adequate intake. He regained 4.5 kg (10 lb), his performance on the track improved, and his confidence grew. MA refused several referrals to sports psychology, stating, "I'm not *that* sick!" After 5 months of work on nutrition and small, steady improvements in his eating behaviors, he finally agreed to start therapy at the persistent urging of the RD. The only reason he agreed to go was because the RD offered to go with him. The RD and sports psychologist began weekly joint consultations with MA that continued for three months. Major progress was made using CBT and DBT strategies to diminish eating-disordered thoughts and behaviors, including decreased self-weighing and food restriction.

Sophomore year, MA was plagued by anemia and injuries. His coach attributed several races that were below expectations to weight gain and told MA to reconnect with the sports dietitian, contributing to a major relapse in restrictive eating behaviors, psychological distress, and weight loss. MA worked with the RD to manage the relapse by using motivational interviewing, behavioral counseling, and goal setting appropriate to his readiness to change. MA achieved a restored level of healthy eating, and by junior year he had many positive experiences in which nutrition appeared to be his ally with regard to improved performance on the track. At his athletic peak, weighing 70 kg (154 lb, 90% IBW), he set a facility record on the university's track by running a sub-4-minute mile. Senior year, he experienced another relapse. After his junior year success, he had liberalized his diet so much that his weight rose as high as 75 kg (165 lb; 96% of IBW); again, his coach told him to drop weight. He began restricting his diet, his weight dipped as low as 62.3 kg (137 lb; 80% of IBW), and his performance suffered. During the course of his collegiate career, MA cycled several times between feeling "invincible" on the track, where he experienced success, and periods of relapse in which he perceived himself as failing. He continued working with the sports dietitian through his postgrad seasons of eligibility, eventually restored to 70.5 kg (155 lb; 91% IBW), and experienced remission of disordered thoughts and behaviors.

MA was never put on a treatment contract by the sports medicine team. Because of his reluctance to engage in therapy beyond the 3 months of joint sessions he had with the RD and sports psychologist, his care was managed almost exclusively by the sports dietitian. He was never determined medically ineligible to train or compete with his team. In fact, he was pushed harder and expected to perform better in spite of the stress his mind and body were under. The only time he missed a season was because of a physical injury. He was not removed from training or participation because of his disordered eating or nutritional risk.

MA restored his weight, regained his health, achieved success in sport, and recovered from his eating disorder. During his collegiate career, he achieved three individual and two relay team school records. He set multiple conference records and earned several conference titles including Rookie of the Year and Conference MVP. He was nationally ranked in the NCAA rankings each year, with a peak ranking of #2 in the nation junior year. He was the first collegiate athlete in New England to run a sub-4-minute mile, and he

competed in the NCAA championships that same year, earning the NCAA Eastern Division Athlete of the Year accolade. MA has maintained recovery for 7 years, still trains, and competes with his country's national track team as an Olympic hopeful.

## DISCUSSION

The literature on eating disorders in athletes has grown extensively in the past decade. However, most studies report on prevalence rates, risk factors for onset, and negative consequences of eating disorders on health and sport performance.<sup>1,5,6,8,9,11,12,30-37</sup> Males with eating disorders, and male athletes specifically, have been understudied.<sup>3,11-13,15,20,21,32,35,36,38</sup> The literature on eating disorder recovery in athletes is quite small, limited to two online surveys,<sup>39,40</sup> one life history case report,<sup>19</sup> and two qualitative analyses of self-reported recovery stories.<sup>41,42</sup> These prior reports, although informative, are limited by self-reported information and retrospective narratives conducted almost exclusively using female study samples, with no objective assessments or recovery information provided by treating clinicians. This report is unique in that it provides a detailed account of a male athlete's experience alongside a female athlete case; objective assessment, diagnosis, treatment, and recovery data documented by a treating clinician; and information on recovery journeys that span more than 5 years in treatment. As such, these case studies provide a rare and valuable opportunity to learn about athlete experiences and treatment strategies to guide clinical practice through to recovery.

These two case studies of eating disorders in sport share many commonalities in terms of clinical presentation and course of treatment (Figure 1). Both FA and MA experienced an eating disorder characterized by restrictive eating, significant weight loss, injury, and compromised performance in sport. Both received on-campus treatment services, restored weight, and experienced success in sport. In spite of the similarities, striking differences were apparent in their cases that suggest sex differences in how eating disorders present in athletes and are addressed in the collegiate sports environment.

First and foremost, these cases illustrate that recovery from eating disorders is possible. So, too, are performance achievements possible once the athlete restores health, regains weight, and rebalances emotional well-being. Eating disorders claim lives<sup>1,2</sup> and sabotage athletic careers by compromising health, impairing performance, and contributing to injuries.<sup>3,12,15</sup> These cases document that with early intervention and treatment by licensed professionals with expertise treating eating disorders in the sport environment, recovery is possible and athletic goals can be achieved. The 5-year journey to recovery, exemplified by each of these athletes, demonstrates the commitment to sustained therapy that is often required to recover from such an unyielding illness. A major contributor to the recovery experienced by these athletes was consistent, convenient, affordable, and confidential access to a multidisciplinary team of expert providers on campus. However, not all collegiate athletic departments have multidisciplinary teams or sports dietitians on campus, in spite of the evidence that the collegiate sport environment exposes athletes to unique risks for eating disorders.<sup>10,30,39,41</sup>

	Characteristics unique to the female athlete	Characteristics unique to the male athlete	Characteristics common to both athletes
<b>Demographics</b>	<ul style="list-style-type: none"> <li>• Domestic student</li> <li>• Long-distance track athlete</li> </ul>	<ul style="list-style-type: none"> <li>• International student</li> <li>• Middle-distance track athlete</li> </ul>	<ul style="list-style-type: none"> <li>• Ran track and cross-country</li> <li>• Division 1 elite scholarship athlete</li> </ul>
<b>ED<sup>a</sup> onset</b>	<ul style="list-style-type: none"> <li>• ED developed before college</li> <li>• Onset primarily related to internal factors</li> </ul>	<ul style="list-style-type: none"> <li>• ED developed in college</li> <li>• Onset primarily related to external factors</li> </ul>	<ul style="list-style-type: none"> <li>• Denial of ED symptoms</li> <li>• Lack of concern that behaviors were problematic</li> <li>• Lack of awareness that health was in jeopardy</li> </ul>
<b>Clinical and behavioral presentation</b>	<ul style="list-style-type: none"> <li>• Lost weight when came to college</li> <li>• Met AN<sup>b</sup> diagnostic criteria</li> <li>• Weight at 78% of ideal</li> <li>• BMI<sup>c</sup> 16.4 (below healthy range)</li> <li>• Perceived self at an appropriate weight</li> </ul>	<ul style="list-style-type: none"> <li>• Gained weight when came to United States</li> <li>• Met EDNOS<sup>d</sup> diagnostic criteria</li> <li>• Weight at 87% of ideal</li> <li>• BMI 20.8 (in healthy range)</li> <li>• Perceived self as fat</li> <li>• Body fat measured at 3.1%</li> </ul>	<ul style="list-style-type: none"> <li>• Recent significant weight loss</li> <li>• Met criteria for relative energy deficiency in sport (RED-S)</li> <li>• Training intensely</li> <li>• Restrictive eating patterns</li> <li>• Low energy availability</li> <li>• Very narrow range of allowed foods</li> <li>• Fat phobia and fear of weight gain</li> <li>• Multiple ED behaviors being used</li> <li>• Low level of knowledge about nutritional needs as an athlete</li> </ul>
<b>Psycho-social presentation</b>	<ul style="list-style-type: none"> <li>• Socially withdrawn</li> <li>• Individuals inside and outside of the sport environment expressed concern over her low-weight status and observed inadequate food intake</li> </ul>	<ul style="list-style-type: none"> <li>• Socially connected</li> <li>• Individuals inside the sport environment encouraged and praised his weight loss, and those outside the sport environment perceived his restrictive eating to be a sign of commitment to sport and rigor of training</li> </ul>	<ul style="list-style-type: none"> <li>• Low self-confidence</li> <li>• ED fueled by factors in the sport environment</li> <li>• ED fueled by transition to college environment</li> <li>• Wanted to be physically smaller</li> <li>• Believed thinner equaled faster</li> <li>• Distorted thoughts and beliefs</li> </ul>
<b>Entry into ED treatment</b>	<ul style="list-style-type: none"> <li>• Referred by sports medicine</li> <li>• Entry point: medicine/psychology</li> <li>• Came because she was sent</li> </ul>	<ul style="list-style-type: none"> <li>• Self-referred</li> <li>• Entry point: nutrition</li> <li>• Came because he wanted help</li> </ul>	<ul style="list-style-type: none"> <li>• Initiated treatment freshman year</li> <li>• Seeking advice on how to control diet to improve sports performance</li> </ul>
<p><sup>a</sup>ED=eating disorder.  <sup>b</sup>AN=anorexia nervosa.  <sup>c</sup>BMI=body mass index.  <sup>d</sup>EDNOS=eating disorder not otherwise specified.</p>			

**Figure 1.** Similarities and differences in the presentation of eating disorder symptoms in two collegiate athletes, by sex.

Clinical practice in the sport environment is moving forward with the release of updated guidelines that detail protocols for the clinical assessment and management of eating disorders in sport.<sup>3</sup> This 2016 report articulates the evidence behind the devastating impact of eating disorders on athletes' health and performance in sport, the need for early detection and intervention, and the requirements for effective treatment. The evidence supports the following recommendations for best practices: 1) screening for disordered eating behaviors, eating disorders and related health consequences should be a standard component of pre-participation evaluations for both male and female athletes; 2) team physicians should be knowledgeable of the updated diagnostic criteria for eating disorders; 3) athletes with eating disorders should undergo thorough evaluation and treatment by an experienced multidisciplinary team; 4) evidence-based guidelines should be used to clear athletes for return to play; and 5) efforts to prevent eating disorders should be targeted at athletes, coaches, parents, and athletic administrators to expand knowledge of healthy nutrition in support of sport performance and health.

Both athletes in this case report received intervention services long before these best practices were defined, yet beginning as early as fall semester of freshman year. Early intervention is probably one of several essential components to their recovery. Both FA and MA were in denial about the depth of their eating disorders. Both were ambivalent about change, were resistant to specific therapeutic interventions, lacked knowledge about their nutritional needs as competitive track athletes, were restricting food intake and under-fueling their training, and were vulnerable to misinformation that abounds in the sport culture. Both experienced pressures from the sport environment that drove their eating-disordered behaviors. Both believed that starving themselves to thinness was essential to be elite in sport. Both were additionally stressed by the transition to life on a college campus, separated from family, with tremendous demands academically, athletically, and socially. Both were struggling to cope at the age of 18, suffered from low self-confidence, and believed that controlling their diet was required to excel in sport. Both feared fat, in their diets and on their bodies, and both lost significant amounts of weight that sabotaged their sport, compromised their mental and physical health, and contributed to injuries. Both experienced what we now know as RED-S, relative energy deficiency in sports,<sup>15</sup> but they were training hard, even overtraining, in spite of it. And yet, both recovered. Both worked with a sports dietitian for 5 years' duration and engaged in counseling with sports psychologists. Both restored weight, normalized their eating habits, learned to meet their nutritional needs as elite athletes, developed emotional coping skills, and achieved excellence in sport when they restored and recovered. Both have maintained recovery for 7 years.

In spite of these similarities, marked differences in these cases prompt us to consider to what extent these differences are tied to the sex of the athlete. FA came to college with her eating disorder, and MA developed his in college. FA quickly lost weight at college, whereas MA gained and then crash dieted to lose what he'd gained. FA's eating disorder onset was largely related to internal factors<sup>30,41</sup> and personal vulnerabilities tied to her self-image, sport identity, and exceedingly high expectations in sport. Although MA had a

similarly strong sport identity, the onset of his disorder was heavily influenced by external factors<sup>30,41</sup> of being judged and teased by important people in his sport community, causing him to feel like a failure. Failure as a trigger for eating disorder onset in athletes has been described previously.<sup>11</sup> FA met clinical diagnostic criteria for AN and the female athlete triad,<sup>25,26</sup> two visible and clearly established diagnoses well known by the sport community to affect female athletes. In contrast, far less understanding exists of the risks or the clinical presentation of eating disorders in men,<sup>11</sup> and so MA's presentation went relatively undetected in the sport community.

A variety of coach attitudes and behaviors toward athlete weight have been identified as potential triggers for disordered eating,<sup>43</sup> as have hurtful comments from important others in athletes' lives.<sup>30</sup> Coaches play an important role in eating disorder prevention and early identification of risk. Recently, a specialized education and training program for coaches was tested in Norway, showing positive preliminary effects on increasing coaches' knowledge of eating disorder risks in sports.<sup>44</sup> The commentary that MA experienced from coaches and teammates about his performance in relation to weight is commentary that those in sport are advised to refrain from, given heightened sensitivity and awareness of the eating disorder vulnerabilities in sport.<sup>7</sup> In fact, the same coach who was aware and supportive of FA's therapeutic treatment contract was the coach who made comments to MA about his weight in public. This occurred in spite of the coach's attendance at educational programming delivered by the RD to raise awareness of eating disorder risk for athletes and promote strategies for coaches to minimize behaviors that could be triggering for athletes. As well, MA reported that friends and family noticed his weight loss but perceived it not as a cause for concern, but rather as a sign of his commitment to sport. In contrast, people within and outside of the sport community expressed concern over FAs visibly low weight. FA was socially withdrawn, whereas MA had a social network to sustain him.

Perhaps the most striking differences between these cases are related to treatment (Figure 2). The entry point for FA was through sports medicine. She was readily identified by the athletic training staff as in need of intervention. FA was referred to sports psychology first and then to nutrition, with the endorsement of her coach. She did not come willingly for treatment and she did not commit readily to nutrition counseling, likely because her food fears were so deeply entrenched. In contrast, MA self-referred to nutrition. He came enthusiastically for nutrition counseling, albeit to learn how to control his diet to lose more weight. Although MA was more receptive to nutrition education, he was reluctant to accept mental health services, which he needed to effectively address the body image dysmorphia and negative mood states he experienced. MA's weight loss was not considered problematic by his coach, and his pattern of cyclical weight fluctuation was not of concern to the sports medicine staff. His eating disorder went relatively unnoticed except by the sports dietitian in whom he confided about his restrictive eating behaviors. MA was not engaged with sports psychology until the RD was able to break down the barrier to mental health services that kept MA from going. This took more than 5 months of building a trusted working relationship to accomplish.

	Characteristics unique to the female athlete	Characteristics unique to the male athlete	Characteristics common to both athletes
<b>Interventions</b>	<ul style="list-style-type: none"> <li>Put on a treatment contract by the sports medicine physician</li> <li>Weighed weekly in AT<sup>a</sup> room</li> <li>Was banned from training and competition because of ED<sup>b</sup> diagnosis until weight restored</li> <li>Coach was aware of treatment contract and weight restoration goal</li> </ul>	<ul style="list-style-type: none"> <li>No treatment contract put in place by sports medicine physician</li> <li>Body fat measured by strength coach</li> <li>Was not restricted from training or competition at any time because of ED diagnosis</li> <li>Coach was unaware of ED diagnosis</li> </ul>	<ul style="list-style-type: none"> <li>Worked with RD<sup>c</sup> 5+ years</li> <li>Worked with sports psychologist</li> <li>Treated for sport-related injuries</li> <li>Had one or more ineligible seasons (unable to train or compete because of ED or injury)</li> </ul>
<b>Receptiveness at entry to treatment</b>	<ul style="list-style-type: none"> <li>Athlete more receptive to sports psychology intervention than to nutrition</li> </ul>	<ul style="list-style-type: none"> <li>Athlete more receptive to nutrition intervention than to sports psychology</li> </ul>	<ul style="list-style-type: none"> <li>Ambivalence</li> </ul>
<b>Readiness to change</b>	<ul style="list-style-type: none"> <li>Low readiness to change</li> </ul>	<ul style="list-style-type: none"> <li>Notably higher readiness to change</li> </ul>	<ul style="list-style-type: none"> <li>Shifted toward increased readiness to change as treatment progressed</li> </ul>
<b>Accountability</b>	<ul style="list-style-type: none"> <li>Low accountability to RD appointments until put on contract</li> </ul>	<ul style="list-style-type: none"> <li>High accountability to RD appointments</li> </ul>	<ul style="list-style-type: none"> <li>Accountability increased as trust in the treatment team was established</li> </ul>
<b>Behaviors</b>	<ul style="list-style-type: none"> <li>Overtraining until on contract</li> <li>Would not take a rest day</li> <li>Stands; would not sit in meetings or class</li> </ul>	<ul style="list-style-type: none"> <li>Weighed self several times daily</li> <li>Harshly self-critical</li> </ul>	<ul style="list-style-type: none"> <li>Trained in spite of injuries</li> <li>Vulnerable to sports nutrition products marketed to athletes</li> </ul>
<b>Beliefs</b>	<ul style="list-style-type: none"> <li>Entrenched food fears</li> </ul>	<ul style="list-style-type: none"> <li>Entrenched body image dysmorphia</li> </ul>	<ul style="list-style-type: none"> <li>Faulty beliefs about nutritional needs for sport</li> </ul>
<b>Recovery progress</b>	<ul style="list-style-type: none"> <li>Slow but steady progress toward weight restoration, nutritional rehabilitation, and recovery from ED behaviors and thoughts</li> </ul>	<ul style="list-style-type: none"> <li>Cyclical and recurring pattern of weight restoration and weight loss, progress on ED behaviors and relapse, until restoration and recovery were finally achieved</li> </ul>	<ul style="list-style-type: none"> <li>Restored weight</li> <li>Achieved recovery</li> <li>Achieved sport/performance goals at restored weight</li> <li>Once recovered, publicly acknowledged their ED and how it negatively impacted their sport</li> <li>Still maintaining recovery, seven years later</li> <li>Still competing at an elite level, including Olympic Trials</li> </ul>
<p><sup>a</sup>AT=athletic training.  <sup>b</sup>ED=eating disorder.  <sup>c</sup>RD=registered dietitian.</p>			

**Figure 2.** Similarities and differences in the course of eating disorder treatment in two collegiate athletes, by sex.

As displayed by MA, nutrition may be a safer entry portal for some athletes with disordered eating. An athlete's desire to control his or her diet to improve performance in sport may bring them through the door long before they realize or acknowledge that they are in a troubled place and need mental health counseling. Research suggests that this may be particularly characteristic of male athletes, who perceive eating disorders as "a female issue," causing shame, embarrassment, or a threat to one's masculinity that serves as an obstacle to entering therapy or treatment altogether.<sup>11,13,19</sup> If no RD is present on campus, athletes who are averse to therapy may go without services and the eating disorder may go undetected and untreated. MA's case illustrates the importance of having an RD accessible on campus, all members of the sports medicine team being aware of eating disorder signs to facilitate entry into treatment, and addressing possible resistance to other members of the treatment team. Research that evaluates differences in nutritional risk, health outcomes and eating disorder identification, referral, and treatment services between campuses with and without an RD on the team would inform best practices.

Once assessed by nutrition, other members of the sports medicine team were made aware of each athlete's vulnerabilities, eating disorder diagnoses, nutritional status, and engagement with nutrition and mental health services for treatment plans. Although FA was put on a therapeutic treatment contract that specified frequency, scope, goals, and targets of treatment with specific guidelines defined for return-to-sport, MA was not put on contract, did not have treatment mandated, and was never declared medically ineligible to train or compete. As such, MA's training was never curtailed during treatment for his eating disorder. The coach was informed only about FA, who was banned from athletic participation under the conditions of the therapeutic contract, whereas MA's diagnosis remained confidential outside of the treatment team. MA chose not to share his diagnosis with his coach. From his current perspective of

recovery, he talks about how challenging that would have been for him to disclose in the "macho male sports environment." This reality is echoed in other literature describing the bias against males in the eating disorder world that serves as a barrier to seeking treatment.<sup>11,13,19</sup>

The athletes' patterns of weight restoration over the next 5 years were also different (Figure 3). FA made slow but steady progress toward weight restoration, nutritional rehabilitation, improved athletic performance, and remission of eating disorder thoughts and behaviors. In contrast, MA's trajectory was more cyclical, characterized by recurring patterns of weight restoration and weight loss, progress on normalizing eating disorder behaviors followed by relapse, improved performance, and setbacks until restoration and remission were finally achieved.

It is possible that the different patterns of recovery experienced by these two athletes were driven by differences in their clinical presentation, further influenced by interpersonal characteristics and vulnerability to relapse. However, the two also shared many similarities when they presented for treatment. The differences in their recovery trajectories were, to some extent, possibly related to the differences in their sex. The level of attention paid to FA's clinical presentation was appropriate for a female athlete; swift and authoritative action was taken with the collective backing of the sports medicine team. The well-recognized female athlete triad<sup>18</sup> likely facilitated that action; however, the triad paradigm is not readily applied to identify risk in male athletes.<sup>12,15</sup>

When considering the details of their cases, many potential factors contribute to both the disorders and recovery. It is difficult to determine what role sex played in the onset, experience, treatment, or recovery from descriptive case reports. These are merely observations that give rise to new hypotheses that require research to test. Nonetheless, the under-attention paid to male eating disorders in sport<sup>13</sup> and the dismissive attitudes toward men's weight, training patterns, and eating behaviors<sup>11</sup> may change now that RED-S has

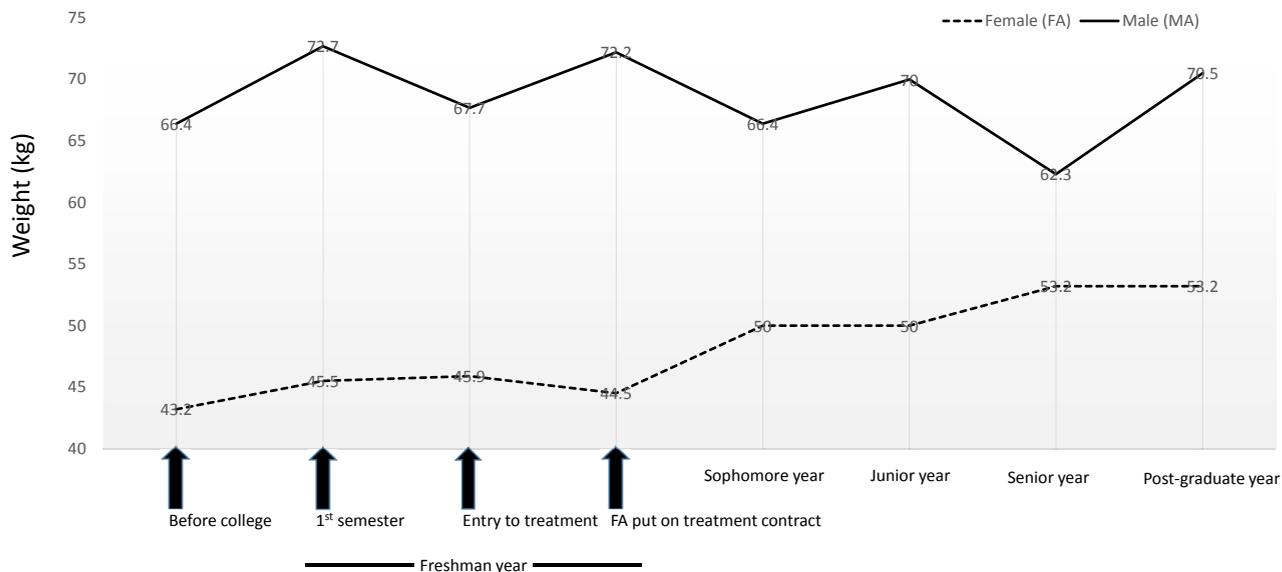


Figure 3. Five-year weight trajectories of two athletes receiving nutrition services for eating disorders.

more fully described the extent of the health and nutritional risks associated with eating disorders by defining a clinical syndrome that now includes males.<sup>15</sup> As well, the recent revisions to the diagnostic criteria for eating disorders<sup>25</sup> facilitate the diagnosis of anorexia in men (by removing the criteria for amenorrhea) and improve the diagnosis of disorders that were previously indistinguishable in the EDNOS category.<sup>45</sup>

## LIMITATIONS

This report is a historical account of nutrition interventions for eating disorders in sport provided on a university campus 7 to 12 years ago. It is important to consider these cases and how they were managed with an understanding of how the research, professional practice guidelines, resources in college athletics, and recommendations for screening, assessment, and treatment of eating disorders in sport have evolved since that time. For example, registered dietitian nutritionists working in eating disorder treatment are now guided by standards of professional practice and performance set forth by the Academy of Nutrition and Dietetics in 2011.<sup>46,47</sup> Although the team that cared for these athletes had multidisciplinary providers in place, there were limitations in how fully integrated the team functioned. Both the RD and the sports psychologist were funded part-time and were external to the department of athletics. Although they were qualified, accessible, and conveniently located on campus, they were consultants to the program and not fully assimilated as members of the daily athlete care team. This loosely coordinated model is arguably not conducive to the most comprehensive treatment; however, it was ahead of its time compared with what most university athletic programs had on campus a decade ago. A preferred approach would involve more tightly coordinated services with better communication between team members to share medical monitoring indicators more effectively across providers. Likely those who stand to benefit the most from these best practices are athletes who are entrenched in the denial that is characteristic of eating disorder diagnoses and those who are resistant to treatment yet receptive to on-campus interventions provided by trusted members of the sports medicine team. Campus entry portals to eating disorder treatment may facilitate early intervention by effectively overcoming the stigma and traditional barriers to treatment. Research has yet to demonstrate whether this practice would result in better outcomes.

## CONCLUSION

Recovery from an eating disorder is not the norm, nor is 5 years of treatment duration provided on a college campus without interrupting the student's college career a usual occurrence in cases as significant as FA and MA. Arguably, being able to stay in college and to remain part of their team likely motivated and facilitated recovery for both of these athletes. Recent research identified the desire to be healthy enough to participate in sport as a treatment motivator for athletes in recovery.<sup>41</sup>

Infrastructures that provide expert professional resources within the athletics department may be far better equipped to recognize risk, intervene sooner, and help athletes get treatment and remain in school. Higher levels of treatment, including intensive outpatient, partial hospitalization, or

residential programs, require more hours of weekly treatment, may not be located in close proximity, and may not have providers who understand the unique needs of elite athletes, introducing additional barriers to treatment. The NCAA's new initiative on mind, body, and sport<sup>7</sup> recognizes the mental health needs of student athletes, including the distinct risks for eating disorders in sport and the urgency to break down barriers to mental health services on campus. Within medicine, psychology, and dietetics, specialized training programs and professional credentials exist for experts proficient in the care of athletes and in the treatment of eating disorders. Registered dietitians can earn the Certified Specialist in Sports Dietetics (CSSD) and Certified Eating Disorder Registered Dietitian (CEDRD) credentials, requiring supervision by senior clinicians. The growth in this niche of each field creates opportunity to demonstrate the positive outcomes of multidisciplinary interventions. Research in this area will help to advance clinical practice and eating disorder prevention efforts.

The literature is emerging yet still lacking a solid evidence base of best practices with outcomes research identifying effective models for assessment, treatment, referral, and relapse prevention to achieve recovery from eating disorders in sport.<sup>13</sup> A newly proposed set of practical guidelines for the clinical management and therapeutic use of exercise in eating disorder treatment was published earlier this year,<sup>48</sup> intended to appropriately incorporate exercise as a health-promoting tool into treatment. These guidelines are particularly relevant to treatment strategies for competitive athletes planning to continue or return to sport. Qualitative studies that describe the eating disorder experiences of male athletes are desperately needed to confront the stigma that this is "a disease of women" and to break down barriers to treatment services for all athletes, including males. Reframing eating disorders in sport as injuries with physiologic, psychological, and performance consequences, as the RED-S model does,<sup>15-17</sup> puts eating disorders on par with physical injuries like ligament tears and concussions that require medical attention, treatment plans, and return-to-play guidelines. This reframing may help to remove the stigma of eating disorders in sport and could facilitate early and full engagement with treatment services by both male and female athletes. Intervention studies and outcomes research are needed to document the effectiveness of multidisciplinary treatment programs and referral systems. Career opportunities for qualified RDs will follow as more colleges, universities, and professional sports organizations make the commitment to hire experts in sports nutrition onto sports medicine teams. This common goal offers the potential for substantial return on investment by protecting the health and maximizing the performance of athletes.

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**STATEMENT OF POTENTIAL CONFLICT OF INTEREST**

Paula A. Quatromoni is currently a paid consultant for Walden Behavioral Care (Waltham, MA), an eating disorder treatment organization. She was not affiliated with Walden or any other organization or institution outside of Boston University when she treated the athletes described in this case report.

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