

A Cost for Success: The Female Athlete Triad

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For thousands of years women have been struggling to obtain equal opportunities and acknowledgement in the sports world. The first Olympics were held in ancient Greece in 776 B.C. in which women were excluded (5). In 1972, Title IX was passed which made it illegal to exclude anyone from participation, on the basis of sex, under any education program or activity receiving Federal financial assistance (4). In 1990, the number of women playing college sports was approximately 160,000 and in 1996 it was reported that 2.4 million girls play high school sports (5). Although these milestones represent the empowerment of the female athlete, they may have come at a cost. Today, millions of young women struggle with a health syndrome known as the Female Athlete Triad (FAT).

FAT consists of three separate but interrelated disorders: osteoporosis, disordered eating, and a menstrual dysfunction known as amenorrhea (1). It is usually brought on by extreme psychological pressures to perform at an optimal level which provokes the female to believe she must maintain a very low body mass in order to be a strong competitor. In order to obtain this “ideal” body mass, there is a high volume of training and low energy intake (1). This dangerous combination increases potential unfavorable health consequences and can be extremely detrimental to sport performance. FAT increases the risk of stress fractures, infertility, eating disorders, and even permanent bones loss (1).

FAT is most often seen in sports where an athlete is judged on appearance or low body fat is an advantage. Some of these sports include but are not limited to: gymnastics, ballet, and long-distance running (3). Unfortunately, most cases of FAT go unnoticed and some components are often undetected because of the secretive nature of disordered eating behaviors. Also, there is a common misconception that amenorrhea is a normal consequence of competitive training for a female (2). Because of these features, risk factor assessment and screening questions are very important in women's sports. The following sections define and describe each three components included in the Female Athlete Triad.

Osteoporosis

Osteoporosis is defined as a bone mineral density more than 2.5 standard deviations below the average for the appropriate age group. It is associated with a reduction in bone mass and the inadequate formation of bone, both of which can lead to increased bone fragility and risk of fracture (2). The inadequate nutritional intake of an athlete suffering from FAT can cause calcium and vitamin D deficiencies which lead to increased bone resorption. However, the hormone estrogen protects the skeleton from bone resorption. Therefore, lifelong exposure to estrogen and attaining a good peak bone mineral density early in life can reduce long term risk of osteoporosis (1). It has been reported that the average peak bone mass is closer to 18 to 25 years rather than the currently accepted age of 30 years which makes it evident that young women with delayed or interrupted menses should not hesitate to get treatment (2).

Disordered Eating

When disordered eating or eating disorders are mentioned, the most common instances seem to be anorexia or bulimia. However, not all athletes satisfy the criteria that indicate these two disorders. The term “anorexia athletica” describes eating disorders associated with training and sports performance. Characteristics of this disorder include: compulsiveness, competitiveness, high self motivation, perfectionism, and at least one unhealthy method of weight control (1). The use of diet pills or laxatives and fasting, vomiting, or bingeing all fit into this category. Some symptoms of disordered eating include fatigue, constipation, bloating, and dry skin.

Amenorrhea

A normal menstrual cycle is about 26-35 days. However, stress hormones triggered by psychological stress can cause changes in the endocrinological control of the menstrual cycle and often complete loss of cycle, called amenorrhea. This condition is the direct result of a dysfunction of the hypothalamus and pituitary glands, leading to a decrease in the production of estrogen (1).

Not only does amenorrhea effect a female’s regular cycle but it alters hormonal balances that are related to nutritional and metabolic status. For example, women with amenorrhoea have higher concentrations of growth hormone and cortisol and lower levels of leptin, insulin and triiodothyronine. If available energy is low over a period of time, as indicated by these hormones, the menstrual cycle is temporarily suppressed to conserve energy (1).

Treatment

Because FAT is multifaceted, treatment of the disorder can be extremely complicated. The separate components require special individual attention but the triad itself needs a synchronization of the combined efforts. Consultation is suggested with various specialists including a psychologist, dietician, athletic trainer, coaches and parents (2).

Specific treatment of bone loss due to osteoporosis includes estrogen receptor modulators, intranasal calcitonin, and biphosphonates. Daily calcium intake should be increased along with vitamin D. Although this does not increase bone mineral density but may aid in preventing further decreases (1).

Treatment for eating disorders will vary for each individual based on specific needs. The main focus of this component is to increase the overall nutritional status of the female athlete. A goal weight should be determined and an effort to reach that weight with a gain of 0.5 to 1.0 lb per week is acceptable. It is suggested that exercise be decreased by 10-20% as weight is closely monitored for two to three months (2).

Lastly, treatment for menstrual disturbances can also be tricky because although it might help regulate the cycle, it does not correct the underlying problem. Estrogen replacement through the contraceptive pill and cyclic estrogen/progesterone is common. Hormone Replacement Therapy is based on the results that support its use in postmenopausal women, who show a striking resemblance to the females suffering from FAT (2). Although these techniques may be successful, returning to a regular cycle through proper nutrition, revised training programs, and maintenance of a reasonable body weight is the ultimate goal.

Prevention

When dealing with FAT, it is believed that prevention can be better than treatment. Most female athletes will resist increasing their body weight and decreasing training loads or even admitting they have a problem in the first place. The primary way to prevent FAT is through education. Not only does the athlete need to be educated but also coaches, athletic trainers, and parents. It is important that the athlete have a strong support system and is surrounded by people who understand the specifics of the condition. It is more common than not that female athletes receive remarks or instructions that seem to encourage or demand maladaptive patterns of diet and exercise (2). Physicians should also be involved in the prevention and treatment of the Female Athlete Triad. Screening and questioning is appropriate during preparticipation sports physical examination, or during acute visits for fractures, weight change, disordered eating, amenorrhea, bradycardia, arrhythmia, and depression (2). Female athletes found to at risk for the triad are denied participation until further evaluation and treatment are initiated and results show improvement (3).

References

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