Case Study: Female Athlete Triad

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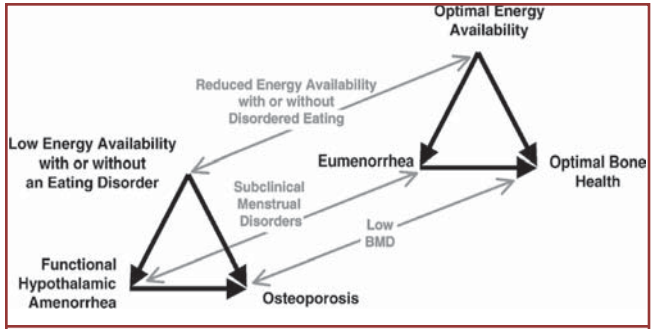
Purpose:

To review and the causes of impacts of the female athletic triad and to understand the role of nutrition intervention in treating the symptoms.

Female Athletic Triad:

The inter-relationship between energy availability, menstrual function, and bone mineral density (BMD)



An athlete's condition moves along each spectrum at a different rate according to her diet and exercise habits.

Energy Availability

- When energy is low, physiological mechanisms reduce energy used for cellular maintenance, thermoregulation, growth, and reproduction
- Energy availability may be negatively impacted by:
  - ❑ Increasing exercise energy expenditure
  - ❑ Reducing energy intake
  - ❑ Abnormal eating behaviors including fasting, binge-eating and purging, diet pills, laxatives, diuretics

Menstrual Function

- Amenorrhea is the absence of menstrual cycles lasting more than three months, following menarche
- Amenorrhea can be caused by low energy availability, and can have the following physiologic consequences:
  - ❑ Impaired arterial vasodilation
  - ❑ Reduced perfusion of working muscle
  - ❑ Impaired muscle metabolism
  - ❑ Elevated LDL
  - ❑ Vaginal dryness
  - ❑ Decline in BMD

BMD

- Bone strength is a factor of BMD, Internal structure of bone minerals, and the quality of bone protein
- Low BMD increases risk for osteoporosis and bone fractures
- Risk factors for low BMD include the following:
  - ❑ Eating disorders
  - ❑ Hypogonadism
  - ❑ Late menarche
  - ❑ Glucocorticoid exposure
  - ❑ Bone geometry
  - ❑ Chronic malnutrition

References

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Case Assessment

- 19-year old F
- Track & Field competitor, hammer throw
- Current Wt: 160 lbs, UBW: 153 – 157 lbs

Patient reports an avoidance of carbohydrate in her diet as a means of realizing weight loss. She has achieved only nominal weight loss during the prior 6 months; however, she has noted a continuous decline in her energy and performance, as well as missed and irregular menstruations for 4 months.

Estimated Energy Requirement = 3015 kcal
Estimated Energy Intake = **1400 kcal**

PES

- Inadequate energy intake related to desire to lose weight as evidenced by intake ~ 50% needs

Interventions

- Provide CHO and fat education, emphasizing the importance of these nutrients to the athletic population
- Recommend *incremental* changes to diet
  - ❑ Increase intake from grains
    - o Full sandwich at lunch
    - o Add quinoa or rice with dinner

Prognosis

CHO and fat educations proved to be very motivating. Over the course of 4 weeks, the patient gradually increased her energy intake to 2100 kcal, particularly with sources of these nutrients. This increase resulted in improved energy and performance.

Patient also resumed menstruation during this period, although further monitoring is necessary to determine regularity.

The final element of the Female Athlete Triad, BMD, was not assessed in this case study, unfortunately. Prolonged exposure to inadequate energy intake would likely result in low BMD and ensuing consequences. However, patient bone health should stabilize with adequate energy intake.