Eating Disorders in Female Athletes

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TPC Course
February 7, 2016
Goals and Objectives

• Describe common eating disorders seen in female athletes
• Describe the female athlete triad
• Describe potential interventions for athletes with eating disorders
Anorexia Nervosa

• Occurs in females 90-95% of time
• Between early teens and mid thirties
• Caucasian, middle-upper class families
• Up to 9% mortality rate
  – Cardiac arrhythmias due to electrolyte imbalances
• 2-5% rate of suicide
Anorexia Nervosa

• Refusal to maintain body weight at or above a minimally normal weight for age and height (15% or more below the normal weight)
• Intense fear of becoming fat or gaining weight
• Disturbance in the way in which one’s body weight or shape is perceived
• Absence of at least 3 consecutive menstrual cycles in post-menarcheal females
Anorexia Nervosa

• Bradycardia
• Hypotension
• Lanugo
• Hypothermia
• Cold intolerance
• Dry hair and skin
• Arrhythmias
Bulimia Nervosa

- Recurrent episode of binge eating (larger amount in a discrete period than most would eat)
- Inappropriate compensatory behaviors to prevent weight
  - Induced vomiting
  - Misuse of laxatives, diuretics or other meds
  - Fasting
  - Excessive exercise
- Behavior occurs at least twice weekly for 3 months
- Self evaluation influenced by body shape and weight
Bulimia Nervosa

- Fatigue
- Abdominal Pain
- Swollen parotid glands
- Sore throat/esophagitis
- Erosion of tooth enamel
- Knuckle scars/callus
- Constipation
- Bloodshot eyes
- Petechia of sclera
Eating Disorder Not Otherwise Specified (EDNOS)

• For disordered eating that does not meet criteria for other eating disorders:
  – Criteria for anorexia nervosa except individual has regular menses
  – Criteria for anorexia nervosa except current weight is in normal range, despite significant weight loss
  – Criteria for bulimia nervosa except binge eating and inappropriate compensatory mechanisms occur at a frequency less than twice a week or for less than 3 months
Eating Disorder Not Otherwise Specified (EDNOS)

- For disordered eating that does not meet criteria for other eating disorders:
  - Regular use of inappropriate compensatory behavior by an individual of normal body weight after eating small amounts of food
  - Repeatedly chewing and spitting out, but not swallowing, large amounts of food
  - Binge-eating disorder: recurrent episodes of binge eating in the absence of the regular use of inappropriate compensatory behaviors characteristic of bulimia nervosa
Female Athlete Triad

• Syndrome of three interrelated conditions that occur due to chronically low/inadequate energy intake.
  – Low energy availability (EA)
    • Body has to adapt to conserve energy
  – Menstrual cycle disturbances
    • Decrease estrogen concentration
  – Low bone mineral density (BMD)
    • Decreased bone mass and microarchitecture
Female Athlete Triad

• Negative Health Consequences
  – Stress fractures/delayed bone healing
  – GI disorders
  – Nutrient deficiencies
  – Increased recovery time
  – Decreased training response/performance
  – Increased risk of osteoporosis
  – Cardiac arrhythmias
Female Athlete Triad

• How to screen for the female athlete triad?
  – Recommended to occur at preparticipation physical exam (PPE)
  – Consider at any time for “high risk” athletes
  – Existence of any one component of the triad should prompt thorough investigation for the other two components
Female Athlete Triad

Have you ever had a menstrual period?
How old were you when you had your first menstrual period?
When was your most recent menstrual period?
How many periods have you had in the past 12 months?
Are you presently taking any female hormones (estrogen, progesterone, birth control pills)?
Do you worry about your weight?
Are you trying to or has anyone recommended that you gain or lose weight?
Are you on a special diet or do you avoid certain types of foods or food groups?
Have you ever had an eating disorder?
Have you ever had a stress fracture?
Have you ever been told you have low bone density (osteopenia or osteoporosis)?
Low Energy Availability

• Dietary energy intake minus exercise energy expenditure/lean body weight (kg)
  – Low EA = <45 kcal/kg of lean body mass per day
  – Negative effects typically < 30 kcal/kg lean body mass per day

• Amount of dietary energy for other body functions after exercise training

• If BMI < 17.5 kg/m2... low energy availability should be suspected

• Energy availability is the cornerstone of the triad

• Full recovery of the triad NOT POSSIBLE without correction of this component
Menstrual Cycle Disturbances

- Spectrum from eumenorrhea to functional hypothalamic amenorrhea (FHA)
- Absence of menstrual cycles lasting more than 3 months
- Diagnosis of exclusion
- Rule out pregnancy/endocrine dysfunction
- Inadequate nutrition
- Fall in adipose tissue reduced leptin secretion $\rightarrow$ decreased GnRH from hypothalamus
- Decreased LH and FSH from anterior pituitary
- Fall in estrogen levels $\rightarrow$ bone mineral loss
Low Bone Mineral Density (BMD)

- 90% of peak BMD is reached by 18 years of age and greatest accrual level between 11-14
- DEXA is preferred modality for BMD evaluation
  - Z score (compare subjects of similar age and sex) should be used instead of T score (average adult peak BMD used for postmenopausal adult)
- Low BMD - Z score between -1 and -2 SD
- Osteoporosis – Z score of < -2 SD
Female Athlete Triad

• Treatment
  – LOW ENERGY AVAILABILITY MUST BE NORMALIZED through diet/exercise changes
  – Weight gain of 2-10 pounds/5 -10% of body weight shown to resume menses
  – Target weight gain of 1 pound per 7-10 days
  – Include nutritionally dense food:
    • Healthy fats, protein, milk, nuts
  – Decrease energy expenditure
    • Rest days, decreased activity, etc
Female Athlete Triad

• Treatment
  – Calcium intake of 1,000 to 1,300 mg/day
  – Vitamin D intake of at least 600 to 800 IU/day
  – Weight bearing exercise and resistance training
Treatment of Female Athlete Triad

Recovery of Bone Mineral Density

Recovery of Menstrual Status

Recovery of Energy Status

PROCESS: Days or Weeks

OUTCOMES:

↑ Energy status will stimulate anabolic hormones (IGF-1) and bone formation
↑ Energy status will reverse energy conservation adaptations

PROCESS: Months

OUTCOMES:

↑ Reproductive hormones
↑ Estrogen exerts an anti-resorptive effect on bone

PROCESS: Years

OUTCOMES:

↑ Estrogen continues to inhibit bone resorption
↑ Energy status will stimulate anabolic hormones (IGF-1) and bone formation

Female Athlete Triad

• Return to Play Considerations:
  – Decision made by multidisciplinary team...team physician, sports dietician, mental health provider
  – Low Risk – cleared fully
  – Moderate Risk – provisional/limited clearance
    • Limitations based on athlete’s health status
  – High Risk – provisional clearance or disqualification
References


Questions?