

Where is My Menstrual Period?

The Female Athlete Triad
Akilah F. Weber, MD



Disclosures

- None



Case Presentation

- 16 yo presents to you with pain in her left ankle
- National competitive dancer- trains 5 hours qd
 - Limited caloric intake
- History of minor injuries
- No menses and no secondary sexual characteristics
- Exam remarkable for weight of 80 lbs (height 5 feet)
 - BMI 15.6

FEMALE ATHLETE TRIAD



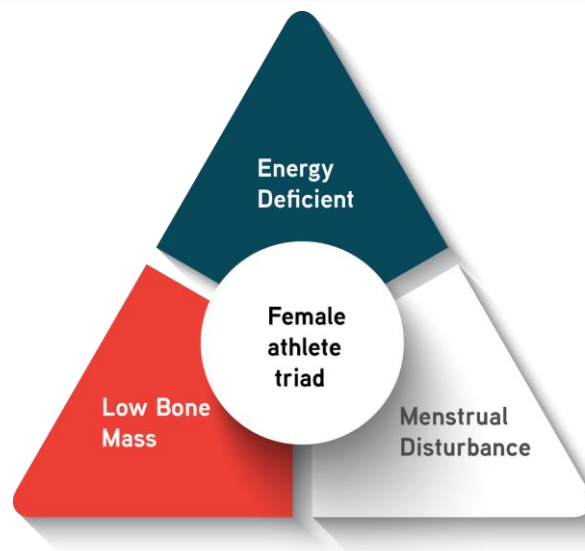
...and i should care,
why?



Question:

What 3 clinical entities make up the female athlete triad?

- A. Eating Disorders, Osteoporosis, Amenorrhea
- B. Low BMI, history of fracture, menstrual dysfunction
- C. Low Energy availability, menstrual dysfunction, decreased BMD
- D. Unsure



Female Athlete Triad

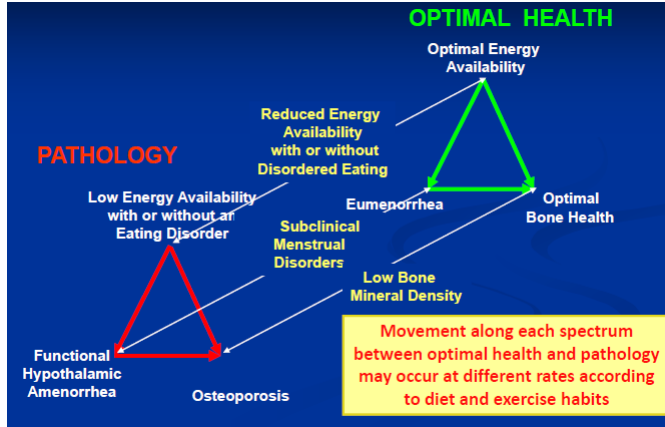


Image sourced from American College of Sports Medicine 2011



ENERGY DEFICIT



Energy Deficit



- Energy Balance & Body Weight
- Energy Availability = Energy Intake – Exercise Energy Expenditure
- Low energy availability leads to:
 - Reduced metabolic rate/energy conservation
 - Menstrual disturbances
 - Disrupted bone metabolism



Question:

Which represents secondary Amenorrhea?

- A. No menses by age 16
- B. No menses for 6 months
- C. Menses every 4 months
- D. Unsure

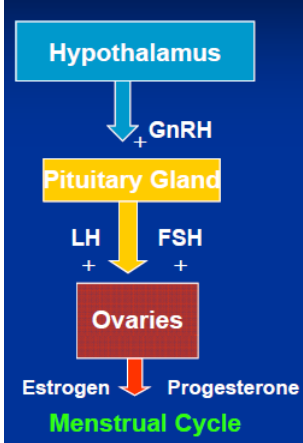




MENSTRUAL DISTURBANCE

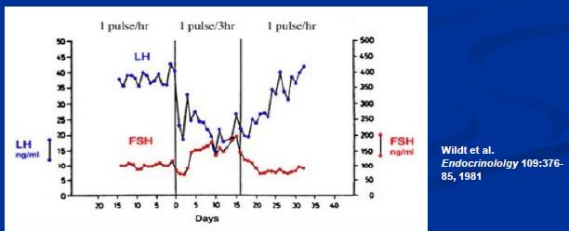



Menstrual Disturbance





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graph TD
    Hypo[Hypothalamus] -- "GnRH (+)" --> Pit[Pituitary Gland]
    Pit -- "LH (+)" --> Ovaries[Ovaries]
    Pit -- "FSH (+)" --> Ovaries
    Ovaries -- "Estrogen, Progesterone" --> MC[Menstrual Cycle]
    
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Wildt et al. *Endocrinology* 109:376-85, 1981

Image sourced from American College of Sports Medicine 2011

Menstrual Disturbance

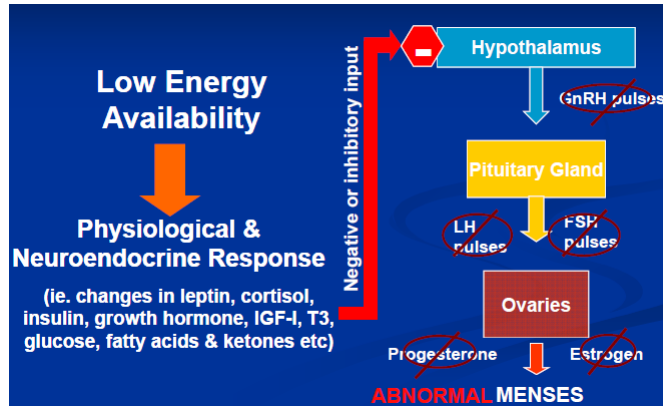


Image sourced from American College of Sports Medicine
2011

Menstrual Disturbance

- Primary Amenorrhea
- Secondary Amenorrhea
- Oligomenorrhea



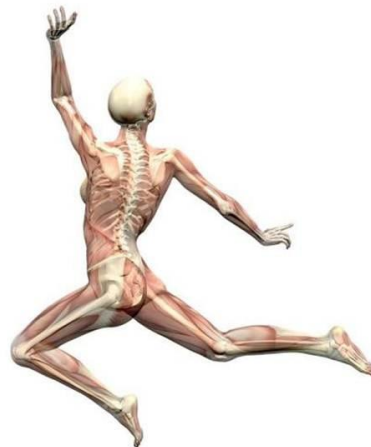
Question:

How do you define Osteoporosis in a pre menopausal female athlete according to ACSM?

- A. Z-score \leq -2 with secondary clinical risk factors for fractures
- B. Z-score \leq -2 with history of fracture
- C. Z-score -1 to -2 with secondary clinical risk factors for fractures
- D. Unsure

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LOW BONE MASS

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Low Bone Mass

- Osteoblasts vs. Osteoclasts
- Stages of Bone Growth

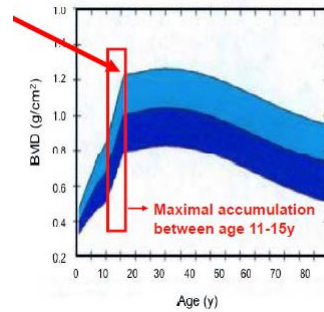


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Low Bone Mass

- Low Bone Density – a history of nutritional deficiencies, hypoestrogenism, stress fractures, and/or other secondary clinical risk factors for fracture together with a BMD Z-score between -1.0 and -2.0

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Low Bone Mass

- Osteoporosis – a history of nutritional deficiencies, hypoestrogenism, stress fractures, and/or other secondary clinical risk factors for fracture together with a BMD Z-score of ≤ -2.0



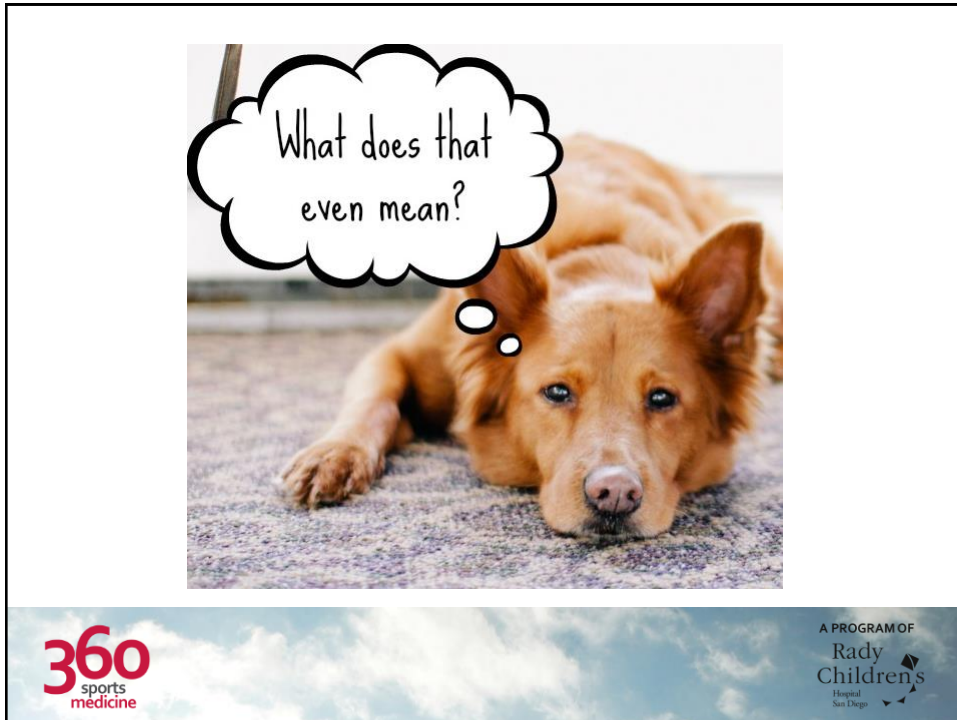
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Low Bone Mass

- Increased risks of musculoskeletal injury
 - Thein-Nissenbaum J et al. Menstrual Irregularity and Musculoskeletal Injury in Female High School Athletes. *J of Athletic Training*. 2012;47(1):74-82.
 - Rauh M, Barrack M, Nichols J. Associations Between The Female Athlete Triad And Injury Among High School Runners. *The Int J of Sports Physical Therapy*. 2012;9(7):948-958





Health Consequences



- Current and future bone health
- Fractures
- Reproductive dysfunction
- Impaired vascular endothelial function
- Psychological
- Nutrient deficiencies
- Gastrointestinal disorders



Performance Consequences

- Excessive fatigue
- Increased recovery time
- Impaired performance
- Decreased training response



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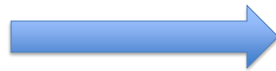
Education

- Physician Education
 - Curry et al. Female Athlete Triad Awareness Among Multispecialty Physicians. *Sports Medicine*. 2015;1:38-44
- Family Education
- Community Education



Education

- Patient perceived risks
 - Nguyen V, Wang Z, Okamura S. Osteoporosis Health Beliefs of Women with Increased Risk of the Female Athlete Triad. *Journal of Osteoporosis*. 2014



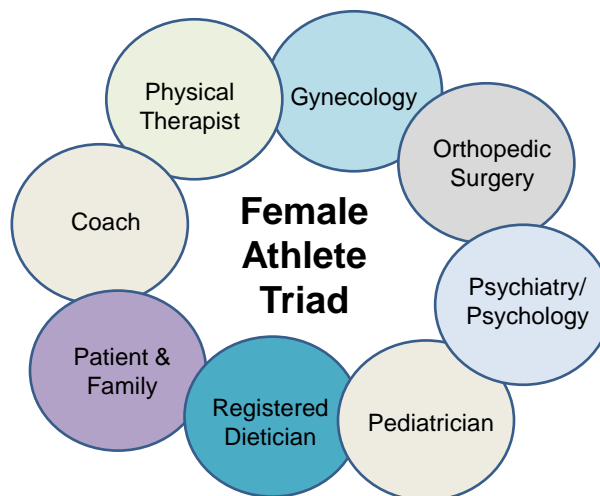
Prevention



- Screening
 - Low Energy Availability
 - Disordered eating – Screening Tools: EAT-26, EDI, EDE-Q
 - 3 or 7 day food record
 - Menstrual Dysfunction
 - Low Bone Mass
 - History of stress or low impact fracture
 - History of amenorrhea or oligomenorrhea > 6 months
 - Look for risk factors



Treatment



Treatment

- Energy Deficient
 - Food is Fuel
- Menstrual Disturbance
 - Hormonal therapy
- Low Bone Mass
 - Calcium (1200-1500 mg/day)
 - Vitamin D (400-800 IU/day)



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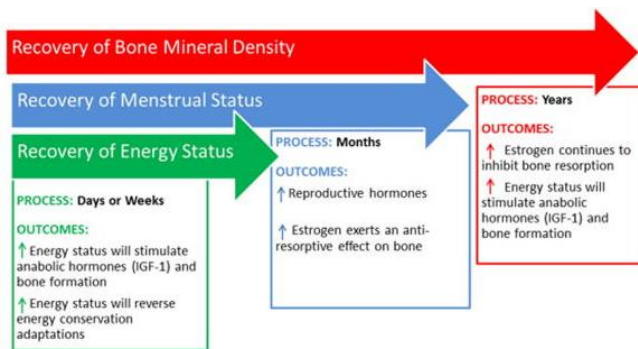


Image sourced from: 2014 Female Athlete Triad Coalition Consensus Statement on Treatment and Return to Play of the Female Athlete Triad [1]

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Conclusion



- Short term and long term consequences
- NOT an inevitable consequence
- Increased education and awareness
- Multidisciplinary approach to recognition & treatment
- Optimize health and optimize performance



Thank You!!



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