FEMALE ATHLETE TRIAD

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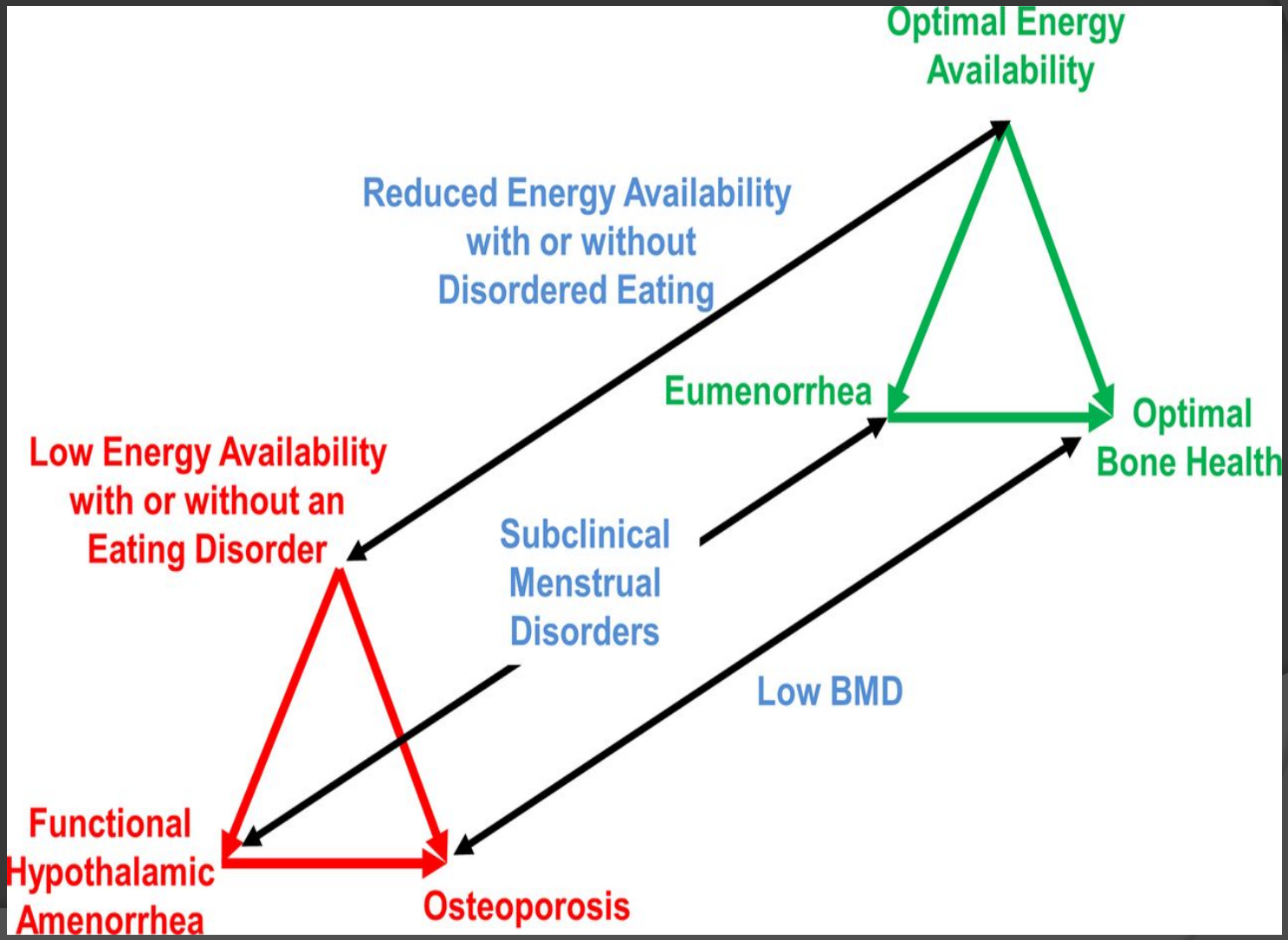
Female Athlete Triad

- Low Energy availability (EA) with or w/o eating disorder
- Menstrual Dysfunction
- Low Bone Mineral Density (BMD)
- May present early with one or more

Female Athlete Triad



Risk Factors & Screening

- Gymnastics, Skating, Distance Running, Swimming, Diving, All Sports
- Why Screen?
  - 90% of Bone Mass attained by age 18
  - Risk of Stress FX
  - Poor Sport Performance
  - Eating Disorders can lead to medical complications: Renal, CV, GI, Neuro

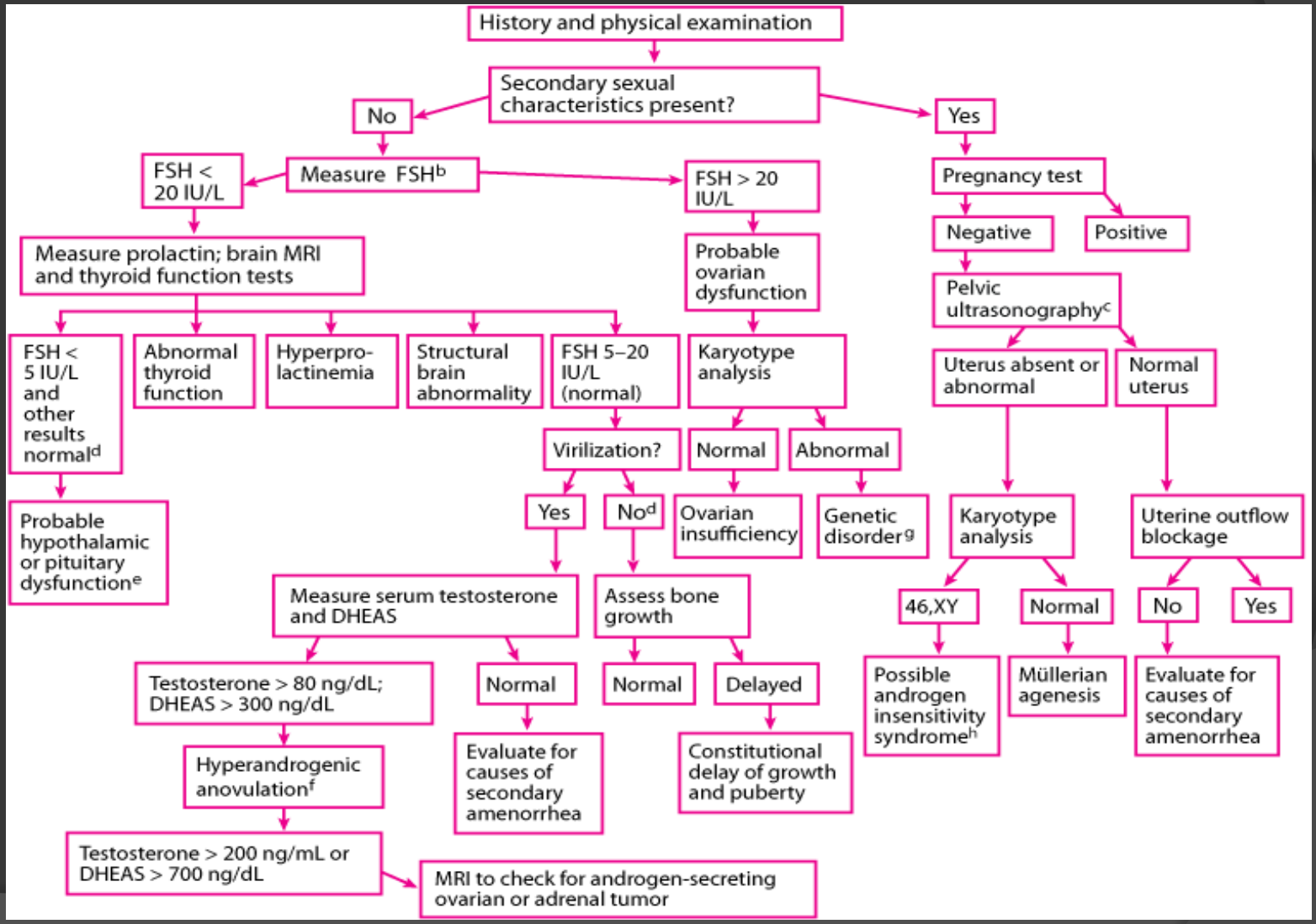
Risk Factors & Screening

- Menstrual History
- Hx of Stress Fx
- Hx of Dieting
- Vegetarian
- Hx of Eating Disorder
- Overtraining
- Perfectionist Personality
- Hx of Depression
- Coaching Hx of inappropriate behavior

Low Energy Availability (EA) Diagnosis

- Stable body weight should not be used to judge EA
- Body Mass Index (BMI) May be used (17.5kg/m2)
- Intake – Expenditure/
  Kg fat free mass
- Minimum should 30kcal/kg FFM/day
  45kcal is optimum
- Accurate assessments of EA are difficult at best

Amenorrhea Diagnosis



Amenorrhea Diagnosis

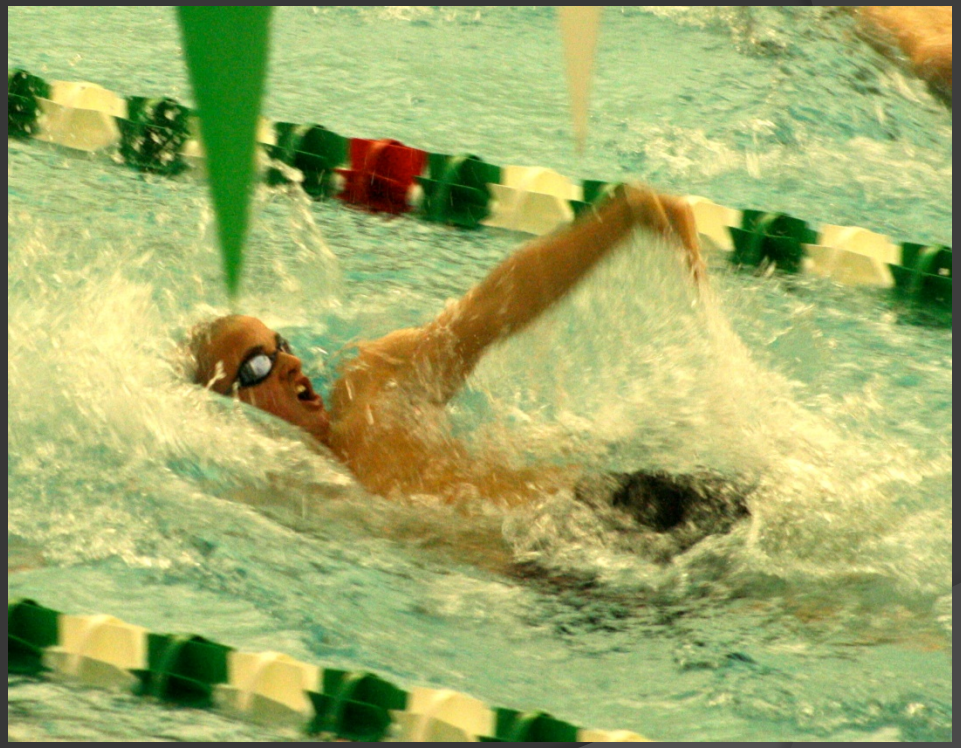
- Primary Amenorrhea- No onset of menses by 16
- Secondary Amenorrhea
  - Low Energy Availability– Diagnosis of exclusion
  - OB/GYN Referral
  - Endocrinology Referral
    - Thyroid Disorders
    - Pituitary Abnormalities
    - Ovarian Insufficiency
    - Multiple other Hormonal Abnormalities

Low BMD Diagnosis

- DXA scans (dual energy x-ray absorptiometry) are the gold standard for BMD testing
- Uses small doses of radiation
- Measures density in the hip and spine
- Takes 20 – 30 minutes to complete

Low BMD Diagnosis--Who should get a DXA Scan

- Those with high risk triad risk factors
  - Hx of eating disorder
  - BMI<17.5, or recent weight loss> 10%
  - Menarche> 16 years old
  - Hx of < 6 menses in the last 12 month
  - Hx of 2 prior stress Fx
  - Prior Hx of osteoporosis on previous DXA scan



DSM-5 and ICD-10 Criteria for Anorexia Nervosa

SM-5

Restriction of energy intake relative to requirements, leading to a significantly low body weight in the context of age, sex, developmental trajectory, and physical health.

ntense **fear of gaining weight or becoming fat** ,or persistent behaviour that interferes with weight gain, even though at significantly low weight.

Disturbance in the way one's body shape or weight is experienced, undue influence of body weight and shape on self evaluation. **(Body Image disturbance)**

CD-10

Body weight is maintained at least 15% below that expected or Quetelet's body mass index is 17.5 or less

The weight loss is self-induced by **avoidance of "fattening foods"** and one or more of the following: self-induced vomiting; self-induced purging; excessive exercise; use of appetite suppressants and/or diuretics

There is **body-image distortion** whereby a dread of fatness persists as an intrusive, overvalued idea and the patient imposes a low weight threshold on himself or herself

A widespread **endocrine disorder involving the hypothalamic-pituitary-gonadal axis** is manifest in women as amenorrhoea and in men as a loss of sexual interest and potency

DSM - V and ICD -10 Criteria for Bulimia Nervosa

SM-V

Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:

Eating, in a discrete period of time (e.g. within any 2-hour period), an amount of food that is definitely larger than most people would eat during a similar period of time and under similar circumstances
A sense of lack of control over eating during the episode (e.g. a feeling that one cannot stop eating or control what or how much one is eating)

Recurrent **inappropriate compensatory behaviour** such as self-induced vomiting, misuse of laxatives, diuretics, enemas, or other medications; fasting or excessive exercise

The binge eating and inappropriate compensatory behaviours occur, on average, at least twice a week for three months

Self-evaluation is unduly influenced by body shape and weight

CD-10

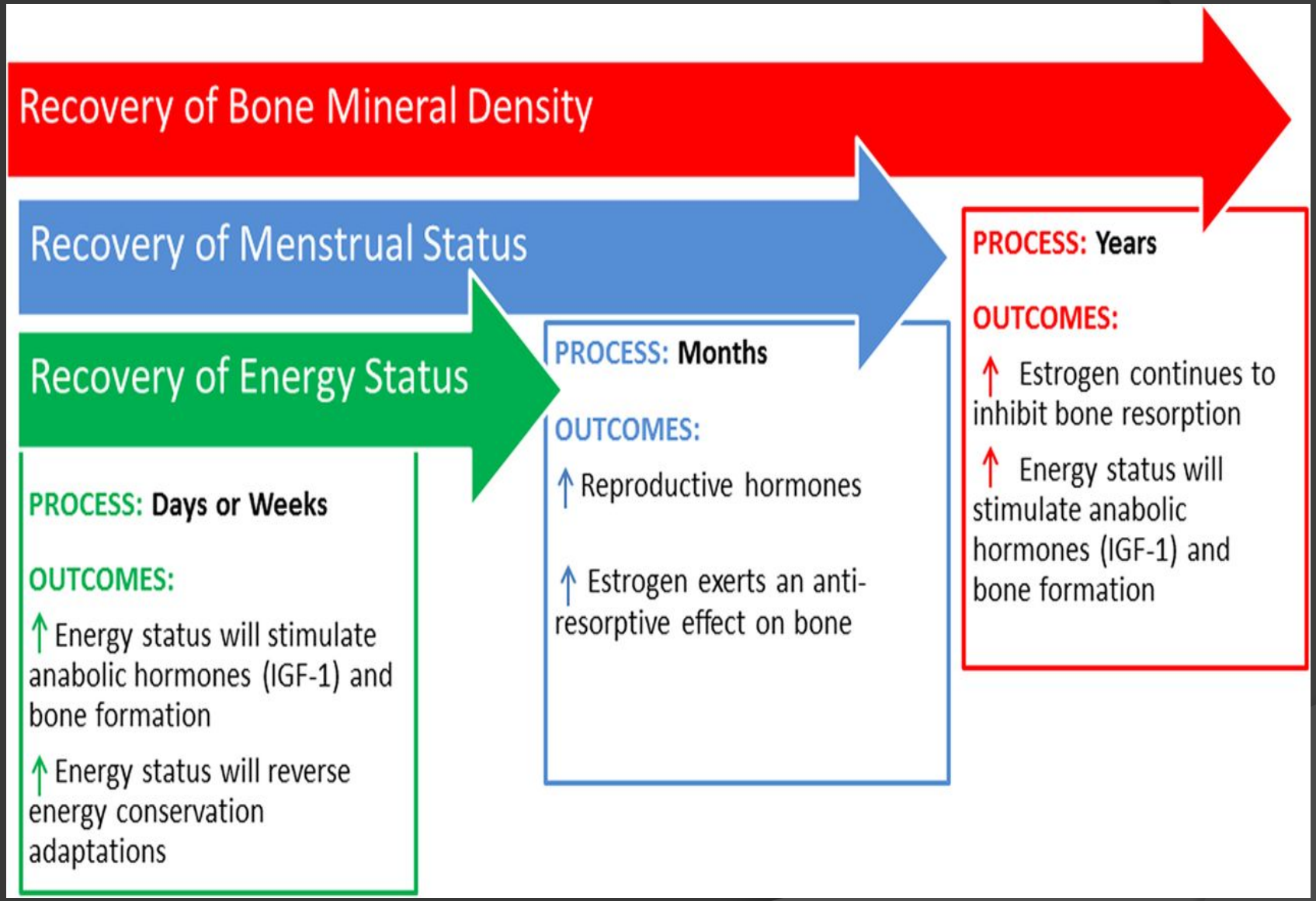
There is a **persistent preoccupation with eating**, and an irresistible craving for food which leads to binge eating episodes

The patient attempts to **counteract the "fattening" effects of food** by self-induced vomiting, purgative abuse, alternating periods of starvation, use of drugs such as appetite suppressants, thyroid preparations or diuretics

The psychopathology consists of a **morbid dread of fatness** and the patient sets herself or himself a sharply

Disordered Eating

- Same Behaviors, but less severe
- Self –esteem based on weight or body shape
- Fear of gaining weight
- Anxiety about certain food groups
- Excessive exercise
- Obsessive calorie counting


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

Triad Treatment Goals

- Restoration of normal body weight
- Resumption of regular menses
- Improvement in bone health
- Treatment of specific eating disorder if present

Triad Treatment

- Energy Availability
  - Disordered Eating—Physician Eval, and nutritional counseling with a Sports Dietitian
  - Clinical Eating Disorder—Physician, Sports Dietitian, and referral to Mental Health practitioner for cognitive behavioral therapy
  - Unhealthy attitudes and behaviors toward food must change for recovery to occur

Triad Treatment-EA

- Minimum of 2000 kcal/day
- Meal plans developed
- Ca, Vit.D, iron, zinc, Vit.K, intake is important
- Try and use real food v. supplements
- Variety important
- Monitoring of body weight at least weekly on same scale with same clothing
- Individualized based on training and competition schedules

Triad Treatment

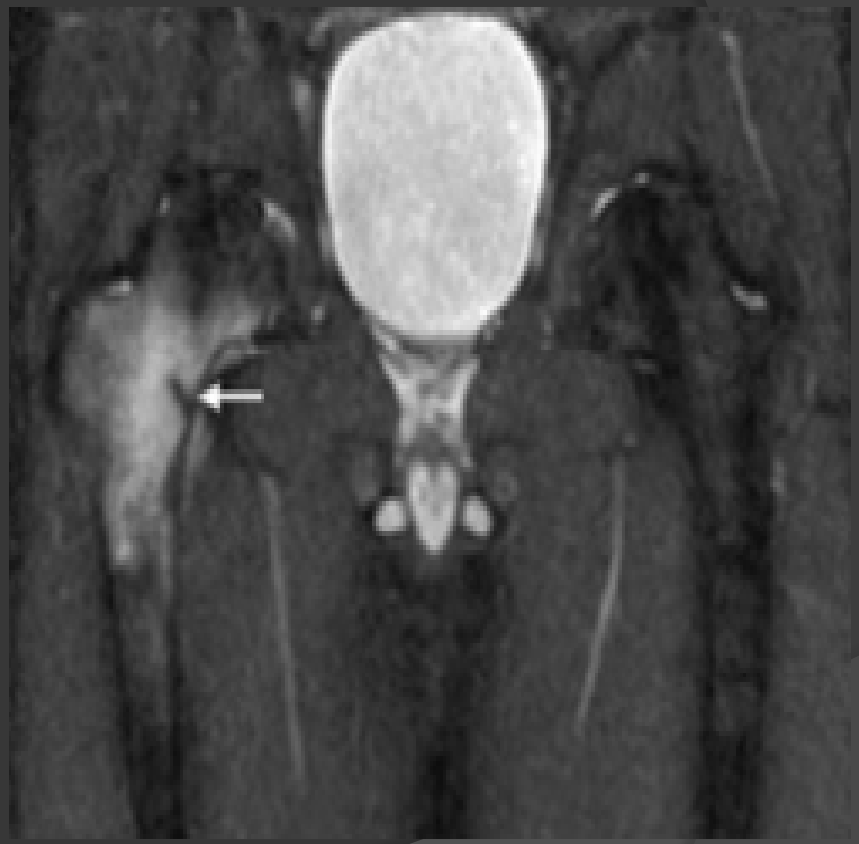
- Low BMD
  - Weight gain with resumption of menses is critical
  - Ca, and Vit. D status must be addressed
  - Weight bearing exercise is important
  - Resistance training is also important in increasing bone density
  - Hormonal treatments are experimental
  - Reversal of bone loss can take years

Triad Risk Assessment

Risk Factors	Magnitude of Risk		
	Low Risk = 0 points each	**Moderate Risk = 1 point each**	**High Risk = 2 points each**
Low EA with or without DE/ED	☐ No dietary restriction	☐ Some dietary restriction‡; current/past history of DE;	☐ Meets DSM-V criteria for ED*
Low BMI	☐ BMI ≥ 18.5 **or** ≥ 90% EW** or weight stable	☐ BMI 17.5 < 18.5 **or** < 90% EW **or** 5 to < 10% weight loss/month	☐ BMI ≤17.5 **or** < 85% EW **or** ≥ 10% weight loss/month
Delayed Menarche	☐ Menarche < 15 years	☐ Menarche 15 to < 16 years	☐ Menarche ≥16 years
Oligomenorrhea and/or Amenorrhea	☐ > 9 menses in 12 months*	☐ 6-9 menses in 12 months*	☐ < 6 menses in 12 months*
Low BMD	☐ Z-score ≥ -1.0	☐ Z-score -1.0*** < - 2.0	☐ Z-score ≤ -2.0
Stress Reaction/Fracture	☐ None	☐ 1	☐ ≥ 2; ≥ 1 high risk or of trabecular bone sites†
Cumulative Risk (total each column, then add for total score)	**____ points +**	**____ points +**	**____ points = ____Total Score**

Risk and Return to Play

	Cumulative Risk Score*	Low Risk	Moderate Risk	High Risk
Full Clearance	0 – 1 point	☐		
Provisional/Limited Clearance	2 – 5 points		☐ Provisional Clearance ☐ Limited Clearance	
Restricted from Training and Competition	≥ 6 points			☐ Restricted from Training/ Competition-Provisional ☐ Disqualified



Treatment Contracts

- Athletes in Moderate-High Risk categories should receive a written contract
- Treatment goals, including weight goals and frequency of weighing
- Schedule of visits to MD, Nutritionist, Counselor
- Consequences for breaching the contract including limited training/competition

A Brief History of Health-Care

The House Call

The Office Call

The 1-800 Call

The Conference Call

Questions?