

# St. Francis Sports Medicine

## *The Female Athlete Triad*

### What is it?

- Term coined in 1992 that was defined as a syndrome of **disordered eating, Amenorrhoea, and premature osteoporosis** that has been observed in female athletes. The female athlete can have one or all the parts of the triad.
- The triad is understood to comprise **inter-related spectrums of energy availability, menstrual function, and bone strength.**

### Energy availability/Disordered eating:

- Energy restriction is common in sport primarily to achieve the sport-specific body weight and composition that results in improved or optimum performance.
- Because of the importance of fat loss, female athletes consume 30% less energy per unit of bodyweight than male athletes.
- Disordered eating ranges from dietary restriction (avoiding certain foods or food groups such as fat) to purgative behaviors (vomiting and misuse of laxatives)
- Eating disorders (anorexia nervosa or bulimia nervosa) are common in 15-62% of female athletes and most common in sports where bodyweight conveys a competitive advantage.
- Warning signs of eating disorders – continued dieting in spite of weight loss, pre-occupation with food and weight, compulsive exercise, frequent trips to the bathroom during and after meals, using laxatives, brittle hair or nails, dental cavities from frequent vomiting, fatigue or decreased ability to concentrate, sensitivity to cold, low heart rate and blood pressure, heart irregularities and chest pain.

### Menstrual function/Amenorrhoea:

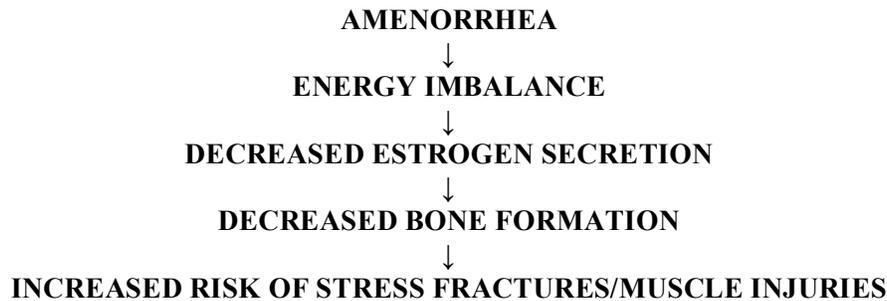
- Amenorrhoea (absence or cessation of menstrual cycles) is caused by a deficit in energy availability. When exercise energy expended exceeds dietary energy intake, there is a negative energy balance and inadequate energy for reproduction and basal metabolic functions. This deficit in energy availability decreases estrogen, the hormone that helps to regulate the menstrual cycle, which in turn will cause Amenorrhoea.
- Amenorrhoea is highest in aesthetic (gymnastics/cheerleading), endurance (running/cycling) and weight-class (rowing/wrestling/karate) sports.
- Athletes in aesthetic sports who restrict their diet and those in endurance sports who do not modify their diet to compensate for the increase in energy expenditure are all at raised risk of disrupted menstrual cycles.
- Primary Amenorrhoea is the absence of menses before the age of 15.
  - Normal population prevalence is <1%; aesthetic sports prevalence is 22%.
- Secondary Amenorrhoea is the cessation of menses after menarche
  - Normal population prevalence is 2-5%; endurance sports prevalence is as high as 66%.



- Less than 6 menstrual cycles per year is considered abnormal.
- Because Amenorrhoea is a symptom of many diseases, its diagnosis should include exclusion of pregnancy and organic diseases.

### **Bone Strength/Premature Osteoporosis:**

- Amenorrhoeic athletes have low rates of bone formation because of low estrogen levels and poor nutrition (especially low calcium intake).
- Osteoporosis is a decline in bone strength or low bone density caused when bone resorption exceeds bone formation and can lead to irreversible bone loss and can impair the growth of bone mass in female athletes increasing risk of fractures.
- Bone density declines in proportion to the number of menstrual cycles missed.
- Decreased bone density will increase the risk of stress fractures 2-4 times higher in athletes with menstrual disturbances than in those without.
- The relationship of amenorrhea to osteoporosis:



### **Treatment of Female Athlete Triad:**

- Should be treated by a physician (monitors medical status and ability to participate in sports), a nutritionist (appropriate nutritional guidance), and a mental health professional (addresses any psychological issues)
- Key individuals involved in treatment include athletic trainer, physical therapist, coach, parents and other family members
- **GOAL** - restore reproductive and metabolic hormones by increasing energy availability (either increasing energy intake or reducing energy expenditure according to the preference of the athlete)
- If athlete does not respond to this, low-dose oral contraceptives (birth control pills) should be initiated to raise estrogen concentration and prevent further bone loss along with calcium supplementation (1300mg/day for adolescents).

### **Recommendations:**

- Education and counseling should be provided to athletes, parents, and coaches regarding disordered eating, menstrual dysfunction, decreased bone mineralization, and adequate energy (calorie) and nutrient intake to meet energy expenditure and maintain normal growth and development.
- Dietary practices; exercise intensity, duration, and frequency; and menstrual history need to be reviewed during evaluations that precede participation in sports.
- Part of the nutritional challenge in preventing the triad is that the body possesses no mechanism for automatically accommodating energy intake to energy expenditure by working muscle. Athletes must learn to eat in accord with their energy needs, since intense exercise suppresses appetite.
- A dietician or nutritionist is necessary for all female athletes to help determine if the athlete is getting enough nutrients (calcium, iron, and protein) and if supplements are necessary.
- Athletes should keep track of menstrual cycles. Amenorrhea should not be considered a normal response to exercise.
- When athletes and coaches want to know what weight and amount of body fat are best for a given athlete, it is preferable to establish a range of values rather than specific values.
- Weight is not an accurate estimate of fitness or fatness, and when weight is lost, muscle and fat are lost!