



# GUIDELINES FOR PEDIATRICIANS

## FEMALE ATHLETE TRIAD

American Academy  
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN™

Issue 8

**DEFINITION:** The combination of 3 interrelated conditions — disordered eating, amenorrhea, and osteoporosis — has been termed the female athlete triad. It is important for pediatricians to be aware of the cause of this interrelationship, to recognize the clinical presentation, and to be comfortable with the treatment. Athletes at highest risk include those in sports that emphasize leanness (eg, gymnastics, ballet, diving, figure skating) or endurance sports (eg, distance running, swimming, cross-country skiing).

### DISORDERED EATING

- Some active adolescent females develop an energy deficit when energy (calorie) expenditure exceeds energy (calorie) intake.
- This may be unintentional or intentional (in an attempt to lose weight) and may include the problematic use of bingeing and purging techniques, laxatives, diuretics, and diet pills.
- The severity can be mild to severe (at times life-threatening).
- Because of the body's ability to adapt to this deficit, it may take some time before performance is affected.

### MENSTRUAL DYSFUNCTION

- This may include primary amenorrhea (delayed puberty with complete absence of menses by 16 years of age), secondary amenorrhea (absence of periods for 3-6 months), or oligomenorrhea (interval between periods greater than 35 days).
- The prevalence of amenorrhea in athletes ranges from 3.4% to 66%, depending on the sport, compared with 2% to 5% in the general population.
- Amenorrhea is **NOT** a normal response to exercise.

### OSTEOPOROSIS OR DECREASED BONE MINERAL DENSITY

- More than half of adult bone calcium is deposited during the teenage years.
- Inadequate body fat leads to a hypoestrogenemic state, which can result in menstrual dysfunction and may predispose to osteopenia or osteoporosis with inadequate bone formation.
- Low bone mineral density may place athletes at increased risk of stress fracture.
- The recovery from bone health problems (osteopenia or osteoporosis) is slow, and recent studies suggest it may not be totally reversible. The stakes are high for **EARLY** recognition and treatment of this condition by pediatricians.

### CLINICAL PRESENTATION

- The sports preparticipation evaluation (PPE) is the ideal time to review diet, exercise, and menstrual history.
- The presence of amenorrhea requires an evaluation to rule out other medical conditions, including pregnancy and thyroid disease.
- Athletes with a stress fracture must be questioned for possible triad components.
- High-level, high-endurance, high-volume athletes are especially prone to triad issues.
- In an amenorrheic athlete with other triad issues, a bone densitometry (eg, DEXA) scan to evaluate bone mineral density can be very helpful in diagnosis, treatment, prognosis, and follow-up.

### TREATMENT

- Treatment of this condition requires a team approach, including physician, nutritionist, mental health professional, athletic trainers, parents, and athlete, as well as aggressive follow-up.
- Meeting energy needs by increasing energy (calorie) intake, decreasing energy expenditure (by resting), or both is necessary to reverse hormonal imbalance.
- Calcium intake should be increased to at least 1300 mg per day by diet, supplementation, or both (vitamin D supplementation is also useful).
- If menstrual dysfunction has been prolonged and increasing energy intake is difficult, consideration could be given to estrogen/progesterone replacement therapy.

### SUMMARY

- Amenorrhea is **NOT** a normal response to exercise.
- Diet, exercise, and menstrual history should be reviewed at the time of the sports preparticipation evaluation.
- The general appearance of girls with female athlete triad symptoms is usually **NORMAL**.
- Education, discussion, and understanding of triad issues are essential elements of **PREVENTION**.

Doctor: This side of "Sports Shorts" is for your use; flip side is for photocopying and giving to your patient

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# GUIDELINES FOR PARENTS, COACHES, AND ATHLETES FEMALE ATHLETE TRIAD

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The combination of 3 medical conditions — eating problems, menstrual problems, and weak bones — can cause female athletes to lose strength and endurance and develop season-ending injuries (such as stress fractures). It may even force young athletes to quit their sport. More importantly, these conditions can put young women at risk for lifelong problems with weak bones.

## EATING PROBLEMS

- Taking in fewer calories than your body requires

This can lead to:

## MENSTRUAL (PERIOD) PROBLEMS

- Periods that:
  1. Start at a late age or do not start by 16 years of age;
  2. Start, then stop for longer than 3 to 6 months; or
  3. Occur irregularly—longer than 35 days without periods or fewer than 9 per year.

This can lead to:

## PROBLEMS WITH WEAK BONES

1. Moderately weakened bone (osteopenia) can affect young women and can cause them to have the bone strength of a 50- to 60-year-old woman! This weakness may **NOT** be completely reversible.
2. Severely weakened bone (osteoporosis) causes increased risk of stress fractures (breaks in bones from playing sports or performing arts) and trauma fractures (from falls or collisions).

## GUIDELINES FOR PREVENTION

### DIET

- Fad diets and food supplementation do not help you perform better and do not replace good balanced eating habits.
- It is important to eat enough food (calories) to build bone strength and muscle mass that will help you to perform your best.

### CALCIUM

- Young female athletes need calcium for bone strength. About 1300 mg per day is needed and is best obtained through diet:

(1 cup) skim milk	300 mg
(1 oz) Swiss cheese	270 mg
(8 oz) yogurt	410 mg
(1 cup) broccoli	150 mg
(1 glass) calcium fortified orange juice	200-250 mg
(1 cup) cottage cheese	200 mg
- Excess intake of carbonated or caffeinated drinks (soda/pop or coffee) can lead to calcium loss and weaken bones. Instead, drink milk or calcium-fortified orange juice.

### MENSTRUAL PERIODS

- Skipping periods is **NOT NORMAL** and is **NOT** a sign of good or advanced sports training.
- Tell your doctor or trainer about missed periods as soon as it occurs or at the time of your preseason physical.
- Skipping periods **DOES NOT** mean that you are not fertile or cannot get pregnant. In fact, it could be a sign that you **ARE** pregnant.
- Keep a calendar of your menstrual periods (**LISTEN** to your body).

### STRESS FRACTURES

- Nagging, aching pain that occurs with activity and doesn't improve over time may signal a broken bone or crack known as a stress fracture.
- Stress fractures heal slowly with rest. They heal even more slowly when bones are weak, and you may need to stay away from your sport for a long time.

### PREVENTION

- Athletes need to follow a healthy diet with adequate intake of calories and calcium to maintain and improve performance.
- Female athletes need to be aware of changes in their menstrual periods and report these to their physician.
- Worsening or persistent bone or joint pain that affects athletes in daily activities needs to be evaluated for the possibility of stress fractures.

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