



# COMMITTEE OPINION

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## Committee on Adolescent Health Care

*This Committee Opinion was developed by the American College of Obstetricians and Gynecologists' Committee on Adolescent Health Care in collaboration with committee members Meredith Loveless, MD and Geri Hewitt, MD.*

*This document reflects emerging clinical and scientific advances as of the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed.*

## Female Athlete Triad

**ABSTRACT:** The female athlete triad is a medical condition observed in physically active females involving three components: 1) low energy availability with or without disordered eating, 2) menstrual dysfunction, and 3) low bone density. An individual does not need to show clinical manifestations of all three components of the female athlete triad simultaneously to be affected by the condition. Consequences of these clinical conditions may not be completely reversible, so prevention, early diagnosis, and intervention are critical. All athletes are at risk of the female athlete triad, regardless of body build or sport. All active females should be assessed for components of the triad and further evaluation should be performed if one or more components are identified. The obstetrician–gynecologist has the opportunity to screen athletes for components of the female athlete triad at comprehensive visits for preventive care. Using the menstrual cycle as a vital sign is a useful tool for identifying athletes at risk of female athlete triad and should be an integral part of the preparticipatory sports physical. The goal of treatment for those diagnosed with female athlete triad is restoration of regular menses as a clinical marker of reestablishment of energy balance and enhancement of bone mineral density. The female athlete triad is a result of energy imbalance; thus, adjusting the energy expenditure and energy availability is the main intervention. Pharmacologic treatment may be considered when nonpharmacologic treatment has failed. A team approach involving the patient, obstetrician–gynecologist, sports nutritionist, coaches, parents, and mental health care provider, if indicated, is optimal.

## Recommendations and Conclusions

The American College of Obstetricians and Gynecologists makes the following recommendations and conclusions:

- The female athlete triad is a medical condition observed in physically active females involving three components: 1) low energy availability with or without disordered eating, 2) menstrual dysfunction, and 3) low bone density.
- All active females should be assessed for components of the triad and further evaluation should be performed if one or more components are identified.
- The female athlete triad is a result of energy imbalance; thus, adjusting energy expenditure and energy availability is the main intervention.
- Pharmacologic treatment may be considered when nonpharmacologic treatment has failed.

- Low energy availability is associated with hypothalamic dysfunction and, subsequently, will negatively affect menstrual function and bone health. Consequences of these clinical conditions may not be completely reversible, so prevention, early diagnosis, and intervention are critical.
- A team approach involving the patient, obstetrician–gynecologist, sports nutritionist, coaches, parents, and mental health care provider, if indicated, is optimal.

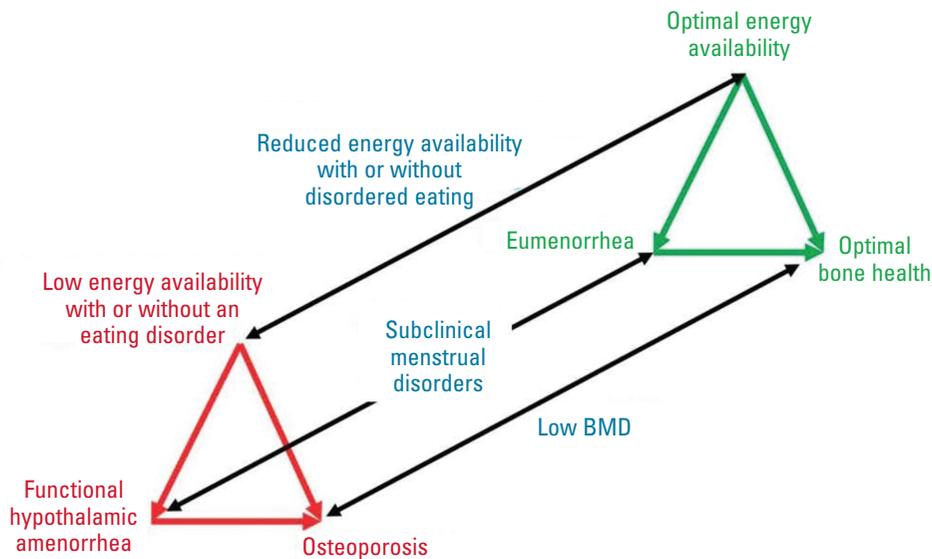
The obstetrician–gynecologist will encounter female athletes who present for preventive care at comprehensive visits or for evaluation of abnormal menstrual patterns. Using the menstrual cycle as a vital sign is a useful tool for identifying athletes at risk of female athlete triad and should be an integral part of the preparticipatory sports physical (1). Menstrual dysfunction, including amenorrhea, in a female athlete can be the initial presentation

of female athlete triad. Long-term risks can include osteoporosis and fracture, psychologic effect if an eating disorder is present, and diminished athletic performance. The main treatment goal is restoration of menses by restoring energy balance, maintaining and restoring bone density, and treating any psychologic comorbidities. Pharmacologic intervention may play a role in certain cases, but data on the ideal treatment and long-term outcomes are lacking. A team approach involving the patient, obstetrician–gynecologist, sports nutritionist, coaches, parents, and mental health care provider, if indicated, is optimal.

The female athlete triad is a medical condition observed in physically active females involving three components: 1) low energy availability with or without disordered eating, 2) menstrual dysfunction, and 3) low bone density (2). Female athlete triad is a spectrum of disorders (Fig. 1). In the healthy athlete, an optimal balance between energy availability, bone health, and menstrual function exists. Optimal energy availability results when dietary energy intake minus exercise energy expenditure leaves adequate energy for remaining body functions. Low energy availability is associated with hypothalamic dysfunction and, subsequently, will negatively affect menstrual function and bone health. (3). These components are interrelated. Low energy availability is associated with hypothalamic dysfunction and,

subsequently, will negatively affect menstrual function and bone health. Consequences of these clinical conditions may not be reversible, so prevention, early diagnosis, and intervention are critical. The athletes who engage in sports in which a low body weight and lean physique are desired (eg, dancers, gymnasts, and runners) are at the greatest risk of female athlete triad. The International Olympic Committee proposed changing the name from female athlete triad to Relative Energy Deficiency in Sports (RED-S) because of the complex interrelations of these components and in view of the fact that male athletes also may be affected (4). This model also addresses a wider range of outcomes, including endocrine, metabolic, hematologic, growth and development, cardiovascular, gastrointestinal, and immunologic effects of energy deficiencies.

Low energy availability may or may not include disordered eating. Disordered eating includes a full spectrum of abnormal eating behaviors ranging from dieting to clinical eating disorders. The prevalence of clinical disordered eating has been reported as 16–47% in slender build female athletes compared with 0.5–10% in the general population (male and female) (5). The restrictive eating pattern of athletes may be related to lack of knowledge of proper nutrition, not making time to eat adequately, or appetite not sufficient for energy expenditure. Disordered eating in this population also



**Figure 1.** Spectra of the female athlete triad. The three interrelated components of the female athlete triad are energy availability, menstrual status, and bone health. Energy availability directly affects menstrual status, and in turn, energy availability and menstrual status directly influence bone health. Optimal health is indicated by optimal energy availability, eumenorrhea, and optimal bone health; whereas, at the other end of the spectrum, the most severe presentation of the female athlete triad is characterized by low energy availability with or without an eating disorder, functional hypothalamic amenorrhoea, and osteoporosis. An athlete’s condition moves along each spectrum at different rates depending on her diet and exercise behaviors. Abbreviation: BMD, bone mineral density. (Reproduced from De Souza MJ, Nattiv A, Joy E, Misra M, Williams NI, Mallinson RJ, et al. 2014 Female Athlete Triad Coalition consensus statement on treatment and return to play of the female athlete triad: 1st international conference held in San Francisco, California, May 2012 and 2nd international conference held in Indianapolis, Indiana, May 2013. *Br J Sports Med* 2014;48:289, with permission from BMJ publishing Group Ltd.) [[PubMed](#)] [[Full Text](#)] ⇐

may involve the deliberate restriction of caloric intake for the purpose of being leaner, which can lead to or indicate eating disorders such as anorexia nervosa, bulimia, and binge eating. These eating disorders are categorized as clinical mental health disorders and can be accompanied by other psychiatric illness. In these cases, involvement of a mental health care provider with experience in eating disorders is recommended.

Menstrual dysfunction ranges from infrequent cycles to primary or secondary amenorrhea. Primary amenorrhea should be considered for any adolescent who has not reached menarche by age 15 years or has not done so within 3 years of thelarche. Lack of breast development by age 13 years also should be evaluated. Additionally, an evaluation may be required when a menstrual period has not started in an individual by age 14 years with a history or examination suggestive of excessive exercise or an eating disorder. *Secondary amenorrhea* is defined as a lack of menses exceeding 90 days. Menstrual dysfunction warrants a complete assessment to evaluate for hormonal pathology, structural anomaly, medications, pregnancy, and other etiologies. The prevalence of secondary amenorrhea in elite female athletes is not clearly defined, but is reported to be as high as 65% in long-distance runners and 69% in dancers (4) compared with 2–5% in the general population (5). Anovulatory bleeding patterns, ranging from irregular, infrequent, to absent bleeding, are an important component of the disorder.

One of the effects of hypothalamic amenorrhea, as seen in the female athlete triad, is a decrease in systemic estrogen levels, resulting in a negative effect on bone density. Low bone density is reported in 22–50% of elite female athletes compared with 12% of the general population (5). Estrogen plays a role in osteoclast and osteoblast activity in maintaining a balance between bone formation and resorption, and inhibiting bone turnover. This is especially important if the estrogen

effect is altered during the adolescent peak bone mass accrual. Young healthy females achieve 92% of their total body bone mineral content by age 18 years, with peak bone accrual between age 11 years and 14 years (5). Osteoporosis later in life is not always caused by accelerated bone mineral loss in adulthood; it also can be caused by the failure to obtain optimal bone mineral density (BMD) during childhood and adolescence (2). Athletes who participate in weight-bearing sports have a 5–15% higher BMD than nonathletes. Because of the differences between athletes and nonathletes, the American College of Sports Medicine and the International Society for Clinical Densitometry have different criteria for BMD screening (see Table 1 for more information). It is important that when BMD is measured, the Z-score is obtained. The Z-score compares BMD for age with sex-matched controls, whereas the T-score compares BMD with that of a 30-year-old woman and, thus, is not applicable for an adolescent population. Z-scores less than 1.0 in an athlete warrant further investigation (3, 6, 7). The term osteoporosis in adolescents and young adults is reserved only for those with low bone density (Z-score equal to or less than -2.0) plus secondary risk factors that reflect a short-term risk of bone mineral loss and fracture; it is not based on BMD alone (3). The term low bone density is used in this population rather than osteopenia.

Helping the athlete and her coaches understand the long-term effect on low bone density is of paramount importance because BMD may stabilize and improve after nutritional needs are restored; however, it still may not return to normal age-appropriate levels. For example, in adulthood, a 10% decrease in BMD is associated with a 2–3-fold increase in risk of fracture (5). Importantly, amenorrheic athletes have a 2–4-fold increased risk of stress fracture compared with eumenorrheic athletes (8). Amenorrheic athletes also have 10–20% less lumbar spine BMD compared with eumenorrheic athletes (9).

**Table 1.** Definition of Bone Mineral Density Criteria in Adolescents ⇐

	ISCD Official Position for Children and Adolescents	ACSM Guidelines for Athletes
Osteoporosis	Vertebral compression fracture or Z-score $\leq -2$ and clinically significant fracture history*	Z-Score $\leq 2$ and clinical risk factors <sup>†</sup>
Low BMD	—	Z-Score $-1.0$ to $-1.9$ and clinical risk factors
Lower BMD than expected	—	Z-Score $\leq -1.0$

Abbreviations: ACSM, American College of Sports Medicine; BMD, bone mineral density; ISCD, International Society for Clinical Densitometry.

\*Two or more long bone fractures by age 10 years or more than or equal to three long bone fractures at any age up to 19 years.

<sup>†</sup>Nutritional deficiencies, hypoestrogenism, or stress fracture.

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Importantly, studies of gymnasts undergoing intense training also have shown reduced linear height velocity and delay in skeletal maturation, demonstrating that bone effects may go beyond decreased BMD (10). In addition to the negative health outcome of fracture, athletes should be reminded that these injuries also can affect their ability to participate in their desired sport.

## Screening for the Female Athlete Triad

An individual does not need to show clinical manifestations of all three components of the female athlete triad simultaneously to be affected by the condition. All athletes are at risk of the female athlete triad, regardless of body build or sport. All active females should be assessed for components of the triad and further evaluation should be performed if one or more components are identified. An athlete may move along each spectrum of the disorder at a different rate depending on her diet and exercise behavior during that time (Fig. 1). Obstetrician-gynecologists should recognize that athletes may not present as amenorrheic but still may have low energy availability and suboptimal bone health. A careful history and high index of suspicion may be necessary to identify the at-risk female athlete.

The obstetrician-gynecologist has the opportunity to screen athletes for components of the female athlete triad at comprehensive visits for preventive care. Screening also should be done at the time of preparticipation sports physicals for all female athletes (Table 2). The American College of Sports Medicine and the American Medical

Society for Sports Medicine recommend that clinicians screen for a history of critical comments about eating or weight from parents, coaches, or teammates (2). The athlete should be questioned about her weight (maximum, minimum, and ideal), menstrual history and pattern, satisfaction with how she looks (body image), exercise regime, current and past medications, eating habits, diet history, history of eating disorders, laxative or diet pill use, sexual history, substance abuse, and symptoms of depression. Age of secondary sexual characteristic development and onset of menarche also should be obtained. A physical examination should include height and weight measurement (including body mass index percentile adjusted for age and gender), vital signs, and a review of the patient's growth chart. Physical examination findings may vary from normal to symptoms associated with anorexia nervosa, such as low body temperature, dry skin with lanugo hair, hair loss, acrocyanosis, mitral valve prolapse, constipation, and ankle and leg edema. *Bradycardia* (defined as a resting heart rate less than 50 beats per minute during the day) can be seen in anorexia nervosa, but also may occur in elite athletes. Additional assessment for orthostatic hypotension is helpful as it is common in women with anorexia nervosa and also may be present with the female athlete triad (11). Although the gynecologic examination may be normal, it also may elicit signs of hypoenstrophenemia, including pubertal delay, breast atrophy, and atrophic vaginitis. An external genitalia examination is adequate to obtain this information. Bimanual and speculum examination should be performed only if indicated by additional gynecologic concerns.

**Table 2.** The Female Athlete Triad Coalition's Recommended Screening Questions for the Female Athlete Triad ↔

Question	Included on the Fourth-Edition PPE Form
1. Do you worry about your weight or body composition?	✓
2. Do you limit or carefully control the foods that you eat?	✓
3. Do you try to lose weight to meet weight or image/appearance requirements in your sport?	✓
4. Does your weight affect the way you feel about yourself?	-
5. Do you worry that you have lost control over how much you eat?	-
6. Do you make yourself vomit or use diuretics or laxatives after you eat?	-
7. Do you currently or have you ever suffered from an eating disorder?	✓
8. Do you ever eat in secret?	✓
9. What age was your first menstrual period?	✓
10. Do you have monthly menstrual cycles?	✓
11. How many menstrual cycles have you had in the last year?	✓
12. Have you ever had a stress fracture?	✓

Abbreviation: PPE, preparticipation physical examination.

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A basic laboratory evaluation of the amenorrheic athlete will include a pregnancy test, follicle-stimulating hormone, thyroid-stimulating hormone, and prolactin levels. Estradiol level may be helpful for patient counseling. A sexually active patient should be screened for sexually transmitted infections. Additional laboratory evaluation may be indicated based on history and physical examination. If a restrictive eating disorder or bradycardia is suspected, a complete blood count, electrolyte (including calcium, magnesium, and phosphorus) and glucose testing, urinalysis, and electrocardiogram should be considered.

Screening for disordered eating is an important aspect of treatment of female athlete triad. Information regarding dietary practices, exercise type and amount, weight fluctuations, restriction or purging food, overall body image satisfaction, fear of weight gain or fat consumption should be obtained. Athletes with disordered eating are at risk of other psychological problems that can include low self-esteem, depression, and anxiety disorders (12). Athletes with disordered eating should be referred to a mental health care provider with experience treating eating disorders and female athlete triad.

Disordered eating may lead to additional adverse effects. Undernutrition can result in deficiencies in essential macronutrients, negatively affecting multiple organ systems, including cardiovascular, endocrine, renal, gastrointestinal, immune, and central nervous systems. Hypoestrogenic women can develop endothelial dysfunction and elevated low-density lipoprotein cholesterol levels resulting in cardiovascular disease (5). Low energy availability, with or without an eating disorder, can affect psychological health with an increased risk of depression, low self-esteem, and anxiety (12). Infertility may result because of anovulation during times of menstrual dysfunction; this dysfunction may persist even after weight restoration (13).

## Management of the Female Athlete Triad

The goal of treatment for those diagnosed with female athlete triad is restoration of regular menses as a clinical marker of reestablishment of energy balance and enhancement of bone mineral density. The female athlete triad is a result of energy imbalance; thus, adjusting the energy expenditure and energy availability is the main intervention. Nonpharmacologic interventions, including family-based therapy and cognitive behavioral therapy, also have been shown to be effective interventions for disordered eating (12, 14). Not all athletes with female athlete triad have disordered eating. Some athletes are not aware of their energy needs or do not have the appetite to drive adequate consumption. A sports nutritionist can help the athlete and her family determine the quantity and quality of food consumption and dietary supplementation required to meet her bodily functions, replace energy output due to athletic training,

and enhance bone health. Daily intake of 1000–1300 mg of calcium and 600 units of Vitamin D is recommended; however, evidence is lacking regarding whether vitamin supplementation improves BMD (15). In some cases, in addition to increasing quality and quantity of energy consumption, working with coaches to decrease athletic activity level may be required to regain a positive energy balance. Additionally, weight gain may be necessary to increase BMD. The strongest predictor of recovery to normal menstrual function in collegiate athletes is weight gain (4).

Treatment can be challenging if the athlete, her family, or coaches feel that weight gain, increased consumption, or decreased activity may compromise sports performance. Setting realistic goals with the athlete, her family, coaches, and health care team to stratify risk and return to play may be necessary. Coaches often are not aware of the symptoms of the female athlete triad or the health implications of the disorder, so education of coaches may be warranted. A worksheet to help the obstetrician–gynecologist determine an athlete’s cumulative risk has been developed to help the health care provider determine risk using evidence-based criteria and risk stratification (16). Cumulative risk assessment (see Table 3) is first used to determine overall risk by assigning points based on low-risk, moderate-risk, and high-risk factors. These points determine a cumulative risk score that can aid in determining if the athlete should get full sports clearance, provisional or limited clearance, or be restricted from training or competition (Table 4). Communication with families and coaches regarding the patient’s ineligibility to participate in sports until treatment goals are reached is encouraged. Best practice for outpatient management is accomplished under a multidisciplinary team composed of the physician, dietitian, mental health care provider, coach, trainer, and family members. A written contract with agreed upon goals in order to play can be a useful tool (2).

Pharmacologic therapy in the management of the female athlete triad remains controversial. Pharmacologic treatment may be considered when nonpharmacologic treatment has failed. In patients with anxiety or depression, antidepressant therapy may be helpful. No pharmaceutical agents are approved for this condition and none have been shown to fully restore BMD. Systemic review and meta-analysis of randomized control trials as well as cohort studies show a trend toward greater reduction in bone loss and improved BMD in athletes on oral contraceptive pills (OCPs) (17, 18). Cyclically or continuously administered combined OCPs with 20–35 micrograms of ethinyl estradiol may maintain BMD in those with very low BMD (2); however, methodological flaws, high dropout rates, and few adolescent-aged participants in these trials make the data hard to interpret. It is important that the patient understands that oral estrogen products alone do not increase BMD for female athletes and they do not take the place of the dietary and activity modifications

**Table 3.** Cumulative Risk Assessment of Female Athlete Triad\* ↵

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 <sup>†</sup> ; current or past history of DE	Meets DSM-V for ED <sup>‡</sup>
Low BMI	BMI $\geq 18.5$ or $\geq 90\%$ EW <sup>§</sup> or weight stable	BMI 17.5 <18.5, or <90% EW, or 5% to <10% weight loss/month	BMI $\leq 17.5$ , or <85% EW, or $\geq 10\%$ weight loss/month
Delayed menarche	Menarche <15 years	Menarche 15 years to <16 years	Menarche $\geq 16$ years
Oligomenorrhea and/or amenorrhea	>9 menses in 12 months <sup>‡</sup>	6–9 menses in 12 months <sup>‡</sup>	<6 menses in 12 months <sup>‡</sup>
Low BMD	Z-score $\geq -1.0$	Z-score $-1.0^{\text{  }}$ <–2.0	Z-score $\leq -2.0$
Stress reaction/fracture	None	1	$\geq 2$ ; $\geq 1$ high risk or of trabecular bone sites <sup>¶</sup>
Cumulative risk (total each column, then add for total score)	_____ points +	_____ points +	_____ points = Total Score

Abbreviations: EA, energy availability; DE, disordered eating; ED, eating disorder; BMI, body mass index; BMD, bone mineral density; EW, expected weight.

\*The cumulative risk assessment provides an objective method of determining an athlete's risk using risk stratification and evidence-based risk factors for the female athlete triad. This assessment is then used to determine an athlete's clearance for sport participation.

<sup>†</sup>Some dietary restriction as evidenced by self-report or low/inadequate energy intake on diet logs.

<sup>‡</sup>Current or past history.

<sup>§</sup>90% EW or greater; absolute BMI cut-offs should not be used for adolescents.

<sup>||</sup>Weight-bearing sport.

<sup>¶</sup>High-risk skeletal sites associated with low BMD and delay in return to play in athletes with one or more components of the triad include stress reaction or fracture of trabecular sites (femoral neck, sacrum, pelvis).

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**Table 4.** Female Athlete Triad: Clearance and Return-to-Play Guidelines by Medical Risk Stratification ↵

	Cumulative Risk Score*	Low Risk	Moderate Risk	High Risk
Full clearance	0–1 point	<input type="checkbox"/>		
Provisional/limited clearance	2–5 points		<input type="checkbox"/> Provisional clearance <input type="checkbox"/> Limited clearance	
Restricted from training/competition	$\geq 6$ points			<input type="checkbox"/> Restricted from training/competition—provisional <input type="checkbox"/> Disqualified

\*Cumulative Risk Score determined by summing the score of each risk factor (low, moderate, high risk) from the Cumulative Risk Assessment of Female Athlete Triad (see Table 3). Clearance/return to play (RTP) status for athletes who are at moderate-to-high risk of the Triad: provisional clearance/RTP—clearance determined from risk stratification at time of evaluation (with possibility for status to change over time depending on athlete's clinical progress); limited clearance/RTP—clearance/RTP granted, but with modification in training as specified by physician (with possibility for status to change depending on clinical progress and new information gathered); restricted from training/competition (provisional)—athlete not cleared or able to RTP at present time, with clearance status re-evaluated by physician and multidisciplinary team with clinical progress; disqualified—not safe to participate at present time. Clearance status to be determined at future date depending on clinical progress, if appropriate. Athletes diagnosed with anorexia nervosa who have a body mass index (BMI) (kg/m<sup>2</sup>) less than 16 or with moderate-to-severe bulimia nervosa (purging more than 4 times/week) should be categorically restricted from training and competition. Future participation is dependent on treatment of their eating disorder, including ascertainment of BMI greater than 18.5, cessation of bingeing and purging and close interval follow-up with the multidisciplinary team.

Reprinted from De Souza MJ, Nattiv A, Joy E, Misra M, Williams NI, Mallinson RJ, et al. 2014 Female Athlete Triad Coalition consensus statement on treatment and return to play of the female athlete triad: 1st international conference held in San Francisco, California, May 2012 and 2nd international conference held in Indianapolis, Indiana, May 2013. *Br J Sports Med* 2014;48:289. [[PubMed](#)] [[Full Text](#)]

that are the mainstay of treatment. Importantly, because menses typically is present during use of OCPs, the ability to use spontaneous menses as a sign of reestablishment of energy imbalance may provide a false sense of security. Only restoration of spontaneous menses through restoring energy balance offers the full reversal of low BMD in this population. However, combined OCPs may be used in the female athlete who desires cycle regulation or contraception. The data are not clear that combined OCPs provide a benefit to bone density; however, there are not data to suggest they are harmful in this group, so use should not be restricted. The optimal dose of ethinyl estradiol for this purpose has not been determined, but a decrease in BMD in nonathlete adolescents taking a 20-microgram combined OCP compared with adolescent controls has been reported (19).

For female athletes with prolonged menstrual abnormalities who have failed nonpharmacologic management, estrogen therapy with cyclic progesterone may be considered (2). Transdermal estradiol (100 micrograms of 17 $\beta$ -estradiol) with cyclic progesterone may be considered for low-weight amenorrheic athletes who meet criteria for pharmacologic intervention. Notably, for sexually active adolescents, the combination of transdermal estradiol and cyclic oral progesterone in the recommended doses to treat the female athlete triad is not effective to prevent pregnancy (2).

Research on additional pharmacologic agents to help restore BMD in this population are ongoing and have demonstrated mixed results. Bisphosphates for treatment of osteoporosis in postmenopausal women have not been shown to be efficacious in women of child bearing age and the long-term effect on the developing fetus in future pregnancy is unknown. Therefore, the use of bisphosphates is not recommended in this population. The combination of estrogen and subcutaneous insulin-like growth factor and estrogen combined with oral micronized dehydroepiandrosterone have demonstrated promise in small studies (20–22). The use of 17 $\beta$  transdermal estradiol patch with medroxyprogesterone has shown promise in maintaining BMD in adolescents with anorexia and may be considered in some cases (23).

The sexually active amenorrheic athlete poses additional challenges. With restoration of a positive energy balance, ovulation will likely occur before spontaneous menses, increasing a female's risk of unintended pregnancy. Most contraceptive choices will mask the resumption of spontaneous menses, thus, losing it as a marker of improved energy balance. Long-acting contraceptive options, including the implant and progesterone intrauterine device, should still be offered, despite risk of menstrual suppression, if highly reliable birth control is desired. In these cases, monitoring BMD with serial dual-energy X-ray absorptiometry scans may be necessary. In most cases, the risk of unintended pregnancy will outweigh the benefit of using the menstrual cycle

as a marker of energy balance restoration. Alternatively, the copper intrauterine device provides contraception without masking the resumption of spontaneous menses.

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