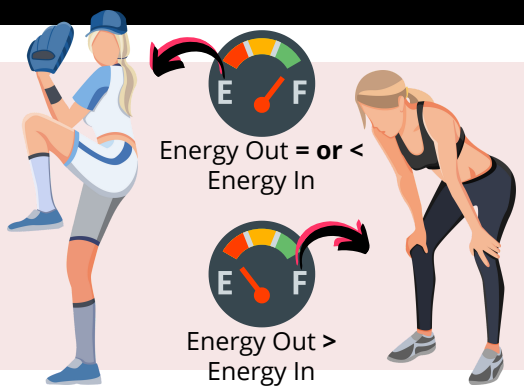
LOW ENERGY AVAILABILITY

SPRING FORWARD FOR GIRLS



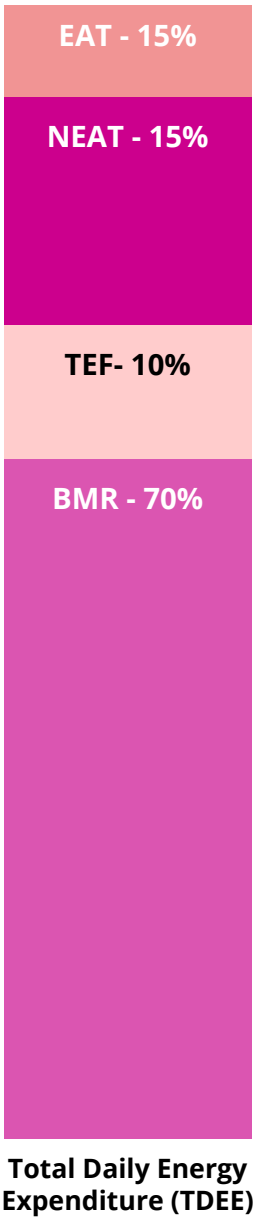
What is Low Energy Availability (LEA)?

Low energy availability (LEA) is a condition in which an individual expends more energy (calories) than they have available. This leads to an energy deficit and subsequent inability to appropriately maintain physiological functions (Logue, 2020).

How do we expend energy?

Individuals use energy in multiple ways. When we do not consume enough energy (via the food we eat) to support daily energy expenditure, we put ourselves at risk for LEA. Below are the different ways in which we "spend" our energy stores throughout the day:

- **Basal metabolic rate (BMR):** Our body requires energy simply to support daily functioning. This includes functions such as pumping the heart, supplying energy to the brain and breathing. BMR is the energy required just to keep our body alive and functioning regardless of engaging in any additional activity. Even if you were to lay down and rest all day, your body still requires energy to support daily physiological function. Numerous factors, which are often beyond individual control, can influence BMR such as age, genetics and hormonal factors.
- **Thermic effect of food (TEF):** When we eat food, our body must undergo the process of breaking down and absorbing nutrients from the food we consume. This process of digestion takes a certain amount of energy. You may hear individuals claim that certain food items are "metabolism boosting". In reality, it is often that these food items take longer to be digested by the body increasing TEF.
- **Non-exercise activity thermogenesis (NEAT):** In the case of NEAT, non-exercise refers to activity or movement that is not formally planned as part of exercise. This could include walking to class, taking the stairs, getting out of and into bed and all other movement in between. NEAT can be influenced by the amount of non-exercise movement you engage in on a daily basis.
- **Exercise activity thermogenesis (EAT):** EAT refers to any type of physical activity that is planned. EAT could include doing yoga, going on a walk/run or lifting weights (Wasserfurth, 2020).



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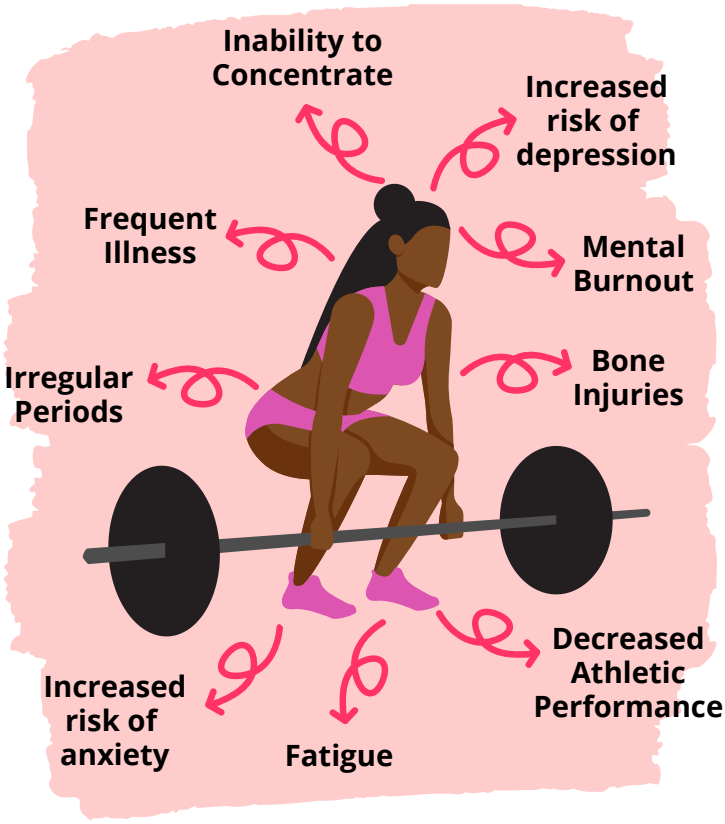
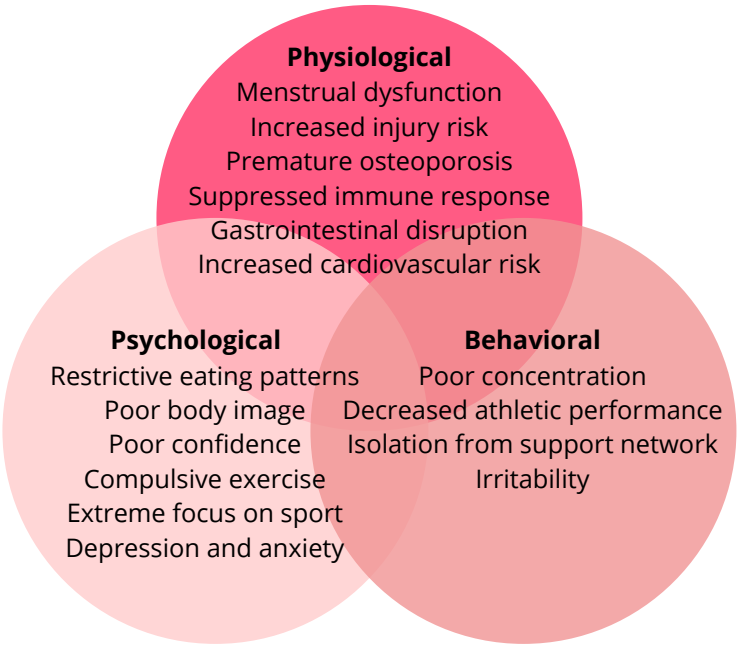
Why should athletes worry about LEA?

High exercise levels (or EAT) and inadequate fueling (food intake) may lead to an imbalance of energy causing LEA. It is important to note that if an individual has a significantly restricted diet whether due to an eating disorder, inability to access appropriate amounts of food for sport or inadequate knowledge on fueling for sport, they may not be meeting energy requirements for BMR, TEF or NEAT as well. When energy levels become limited, certain aspects of health become dysregulated in response to poor nutrient intake and/or as a means to conserve energy for the most important body functions.





Symptoms of LEA

LEA can impact both athletic performance and general health. Symptoms include but are not limited to:

- Fatigue
- Irregular periods
- Bone injuries (e.g. stress fractures)
- Decreased sport performance
- Mental burnout
- Inability to concentrate
- Frequent illness
- Increased risk of depression and anxiety

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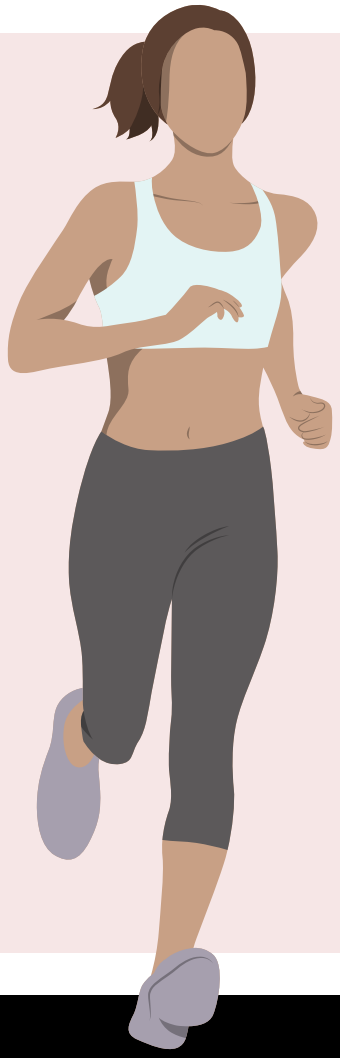

The Connection Between LEA and RED-S

Relative energy deficiency in sport (RED-S) is a health condition that arises from LEA. Whereas LEA is the state of being in an energy deficit, RED-S is the manifestation of LEA through multiple poor health outcomes.

Athletes are prone to developing RED-S as they have higher energy demands than their non-athletic peers due to sport. If an athlete does not consume enough food to support their elevated energy demands, they may enter a state of LEA and subsequently develop RED-S. Certain sports are at an elevated risk of developing LEA and RED-S due to false perceptions of weight and appearance being linked to success in sport. At-risk sports include, but are not limited to, endurance sports (e.g. distance running, cycling, rowing), aesthetic sports (gymnastics, dance, figure skating) and weight-classification sports (e.g. wrestling).

RED-S carries systemic health risks ranging from poor bone health, disruption of hormone release, impaired cardiovascular health, negative gastrointestinal manifestations and more. For further information on the health consequences associated with RED-S, reference our “Relative Energy Deficiency in Sport” fact sheet (Montjoy, 2018).

Treatment of LEA

Treatment of LEA involves addressing the root issues associated with energy imbalance. This means looking at eating behaviors as well as exercise patterns. Because LEA develops from burning more energy than one consumes, energy intake needs to be increased by eating more, eating consistently, and for athletes, by practicing basic sports nutrition habits (e.g. pre- and post-workout snacks and matching nutrient intake to exercise levels). In certain cases, energy output will also need to be decreased by backing off one’s exercise routine or prioritizing rest/recovery until LEA resolves (Melin, 2018). Identifying LEA and understanding the best manner to approach treatment can be challenging. For this reason, it is always recommended to consult a trusted and knowledgeable healthcare professional to get connected with the correct resources (e.g. a registered dietitian, psychologist, eating disorder specialist, etc.).

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Citations

Logue DM, Madigan SM, Melin A, Delahunt E, Heinen M, Donnell SM, Corish CA. Low Energy Availability in Athletes 2020: An Updated Narrative Review of Prevalence, Risk, Within-Day Energy Balance, Knowledge, and Impact on Sports Performance. Nutrients. 2020 Mar 20;12(3):835. doi: 10.3390/nu12030835. PMID: 32245088; PMCID: PMC7146210.

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