**Cognitive performance**

Depressive disorders and clinical eating disorders

**Low energy availability disruption**



**Physiological**

* ↑ Cholesterols
* ↓ Glucose
* ↓ Blood pressure
* ↓ Resting metabolic rate
* Hormonal disruption (triiodothyronine, cortisol, insulin-like growth factor 1, ghrelin, leptin, insulin)

**Cardiovascular health**

Unfavourable lipid profile

**Bone health**

Low bone mineral density/stress fractures/ osteoporosis

**Psychological**

* Restrictive eating, binging and purging
* ↓ Body satisfaction
* Poor self-esteem
* Compulsive and excessive training
* Extreme performance orientation
* ↓ Judgement

**Gastrointestinal disturbances and decreased immune response**

**Behavioural**

* ↓ Concentration and training response
* ↑ Injury risk
* ↓ Performance and muscle strength
* Depression and irritability

**Reproductive health**

Menstrual dysfunction/functional hypothalamic amenorrhea

**High performance environment exposure**

Fig. 1. Low energy availability disruption and high performance environment exposure – the potential pathways to unfavourable health and performance outcomes

**Energy availability thresholds:**

An energy availability of **at least 188 kJ (45 kcal)/kg fat-free mass/day** is recommended to maintain adequate energy for all physiological functions.

Reduced or subclinical energy availability ranges from **125-188 kJ (30-45 kcal)/kg fat-free mass/day**. This is suggested as a tolerable range for athletes aiming for weight-loss as part of a well-constructed dietary and exercise regimen over a short time scale.

Low energy availability is defined as l**ess than 125 kJ (30 kcal)/kg fat-free mass/day** and suggests an unsafe energy level for optimal bodily function; this, in turn, may lead to unfavorable health outcomes and sports performance.

**Energy availability**

**Calculate by:**

Subtracting energy expenditure during exercise from energy intake adjusted for fat-free mass

**Energy availability =**

**Energy intake – Exercise energy expenditure)/fat-free mass (kg)**

Fig. 2. Energy availability formula and current energy availability thresholds for physically active females [3, 6].