



PÉCSI TUDOMÁNYEGYETEM
ÁLTALÁNOS ORVOSTUDOMÁNYI KAR

Mental and nutritional issues

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General Personality Characteristics of Athletes



Positive Personality Characteristics:

- Motivation
- Self-awareness and self-confidence
- Willpower and intelligence

(Willpower is often associated with aggression → prosocial aggression.)

General Personality Characteristics of Athletes



Negative Personality Characteristics (Pathological Manifestations):

- Despondency and depression → the “iceberg profile” (or “iceberg effect”)
- Feelings of superiority, self-satisfaction, exhibitionism, and vanity → tendency toward narcissistic traits
- Marked fluctuations in self-esteem and high emotional instability → borderline syndrome

Competition-related anxiety states may lead to compulsive behaviors.

Mental Disorders and Sport Psychology



- Anxiety
 - Anxiety management techniques (autogenic training, progressive muscle relaxation, breathing techniques, imagery)
 - Stress management training programs
- Attention
 - Mental training
 - Concentration-enhancing exercises
- Self-confidence
 - Sport psychologist

Nutrition

- Qualitative and quantitative factors
- Habits and social pressure
- Time management and daily routine
- Lack of realistic self-assessment



Realistic concerns

- Skipping breakfast
- Shifting food intake from daytime to the evening
- Fears and habits
- Conscious planning and implementation



Optimal Nutrition for Athletic Performance

- Energy and nutrients
- Appropriate body composition
- Optimal recovery
- Hydration status
- Growth and development (youth athletes)



Individual requirements

- Sport-specific characteristics
- Genetic background
- Gender
- Age
- Nutritional status
- Physical characteristics

Body Weight and Body Composition Monitoring



Optimal Body Fat Percentage

Male athletes:
5% to 18% body fat

Female athletes:
17% to 28% body fat



Carbohydrate

- Optimal source of energy
 - 5–10 g/kg body weight (depending on exercise intensity and duration)
- Glycemic index: blood glucose response
- Glycogen stores: liver and muscles
- Compared with the general population, an increased carbohydrate intake is recommended; carbohydrates should provide at least 55% of total energy intake, optimally 60–70%.
- With every meal

Carbohydrate



Before Training

- < 30 min before exercise: relatively slow absorption
- < 60 min before exercise: increase in insulin levels, risk of hypoglycemia
- Fructose: slower absorption, but may cause gastrointestinal discomfort

During Training

- Fluid replacement: 4-8% carbohydrate solution
- 150-300 mL every 15-20 minutes
- 30-60 g carbohydrate per hour

After Training

- Glycogen replenishment: 1.0-1.5 g carbohydrate/kg body weight within 30 minutes after exercise, preferably with a high glycemic index (GI) source, and again after 2 hours
- Glycogen stores recover at approximately 5% per hour and may require up to 20 hours for complete restoration

Insufficient carbohydrate intake

- Reduced performance
- Muscle loss
- Fatigue
- Irritability



Carbohydrate Loading



- Combined with a reduction in training volume and intensity
- Recommended for endurance activities lasting longer than 60-90 minutes
- 70% of total energy intake from carbohydrates to maximize glycogen stores
- Weight gain due to increased fluid retention
- Sex- and age-related differences: women (hormonal cycle), children and adolescents

Carbohydrate Loading

Classical Method

Phase 1: Depletion

- Day 1: depletion of glycogen stores through exhaustive exercise
- Days 2-4: low carbohydrate (CHO) intake

Phase 2: Loading

- Days 5-7: high carbohydrate intake
- Phase 3: Competition

Modified Method

- Days 1-3: exercise at 75% VO_2max for 1.5 hours, with 50% of energy intake from carbohydrates
- Days 4-6: reduced training load, with 70% of energy intake from carbohydrates

Protein

- Muscle recovery and muscle growth
- Least efficient energy source
- Average adult: 0.8 g/kg body weight
- Athletes: 1.2-1.7 g/kg body weight (1.2-1.4 and 1.6-1.7 g/kg, respectively), accounting for 15-20% of total energy intake
- Dietary sources: meat, dairy products, legumes, eggs, and nuts
- Supports glycogen replenishment after exercise
- Potential adverse effects of excessive protein intake

Fats

- Maintain appropriate proportions and intake levels (<30% of total energy intake)
- Important source of energy
- Monounsaturated and polyunsaturated fatty acids
- Avoid saturated fats and trans fatty acids
- Timing: reduce fat intake before and during exercise

Female Athlete Triad



Relative Energy Deficiency in Sport (RED-S)

- Female athlete
- Eating disorders
- Stress fractures

Fruits and vegetables



- Vitamins, minerals, dietary fiber, and phytochemicals (antioxidants, anti-inflammatory compounds, etc.)
- Fat-soluble vitamins: A, D, E, K
- Water-soluble vitamins: B-complex vitamins and vitamin C
- Vitamin requirements are similar to those of the general population; however, the need for antioxidants is slightly increased, particularly for vitamins A, C, and E.

Minerals, phytochemicals

- **Calcium:** bone health and muscle function (especially important for female athletes)
- **Iron:** oxygen transport capacity
- Sodium and potassium: fluid and electrolyte balance
- Phosphorus: bones and teeth
- Magnesium
- Zinc



Fluid balance

- Water: for exercise sessions lasting less than 60 minutes
- Isotonic drinks: provide electrolytes (Na, K, P, Cl)
- Hypotonic drinks
- Hypertonic drinks: for post-exercise carbohydrate (CHO) and glycogen replenishment
- Fluid requirements depend on exercise intensity, duration, and environmental conditions
- Hydration status indicator: urine (urine color and volume)

Signs of dehydration

- Thirst
- Dark-colored urine
- Headache
- Muscle cramps
- Reduced performance
- Feeling of weakness
- Dizziness
- Irritability
- Difficulty concentrating / Impaired concentration (more formal scientific wording)



Fluid intake

- Before going to bed
- After waking up in the morning
- 2 hours before exercise: 400-500 mL
- 15 minutes before exercise: 150-250 mL
- Avoid carbonated beverages, caffeinated drinks, and fruit juices
- During exercise: 100-200 mL every 15-20 minutes, alternating between water and an isotonic sports drink (containing carbohydrates and sodium: 0.5-0.7 g/L Na)
- After exercise: replace fluid losses within 2 hours (1.0-1.5 L of fluid per kg of body mass lost)

Regeneration

- Nutrition
- Rest
- Sleep



Dietary supplements

- Used by 30–70% of athletes
- Prohibited substances: intentional use or inadvertent contamination
- Geyer et al. (2004): 14.8% of the dietary supplements tested contained hormones (testosterone and nandrolone)
- Krug et al. (2014): 14.5% of products available on the black market contained prohibited substances



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Thank you for your attention!