



Providing Timely Nutrition to remove Doping

Dr Tanuj Kumar
Associate professor
Department of physical education
Krishak PG College Mawana Meerut

Abstract:

"Proper nutrition plays a crucial role in enhancing the athletic performance of young individuals, supporting optimal growth and development. It is imperative to ensure the right balance of macronutrients, micronutrients, and fluids, as they contribute significantly to providing the necessary energy for both growth and physical activity. To maximize performance, it is essential for young athletes to acquire knowledge about the appropriate timing and composition of their pre-activity, during-activity, and post-activity nutrition." Unfortunately when some sports person does not find them enough powerful to compete in their sports they go towards doping. Despite efforts through educational programs, testing, and medical support, the global issue of doping in international sports persists. The challenge remains for sports organizations, particularly the International Olympic Committee, to effectively curb this behavior.

Keywords:

Steroids, EPO, hGH, adolescents, performance enhancement and Athletes.

Introduction:

Indeed, the pursuit of performance enhancement in sports has raised complex issues, intertwining medical, ethical, and legal considerations. The substantial financial stakes in the modern sports industry contribute to the ongoing challenges faced by athletes and organizations in navigating these multifaceted concerns.

Improving athletic performance involves adopting diverse diets, training regimens, and dedicated effort to enhance overall capabilities.

Ensuring the nutritional needs of child and adolescent athletes are met is crucial for optimal growth and performance in sports. It is imperative for young athletes to understand the importance of proper food choices, timing of meals, nutrition during events, and post-activity replenishment. A balanced diet, incorporating suitable levels of macronutrients (protein, carbohydrates, and fat) and micronutrients (vitamins and minerals), is vital for sustaining energy levels. Adequate fluid intake is equally essential to support hydration for both growth and athletic achievements.

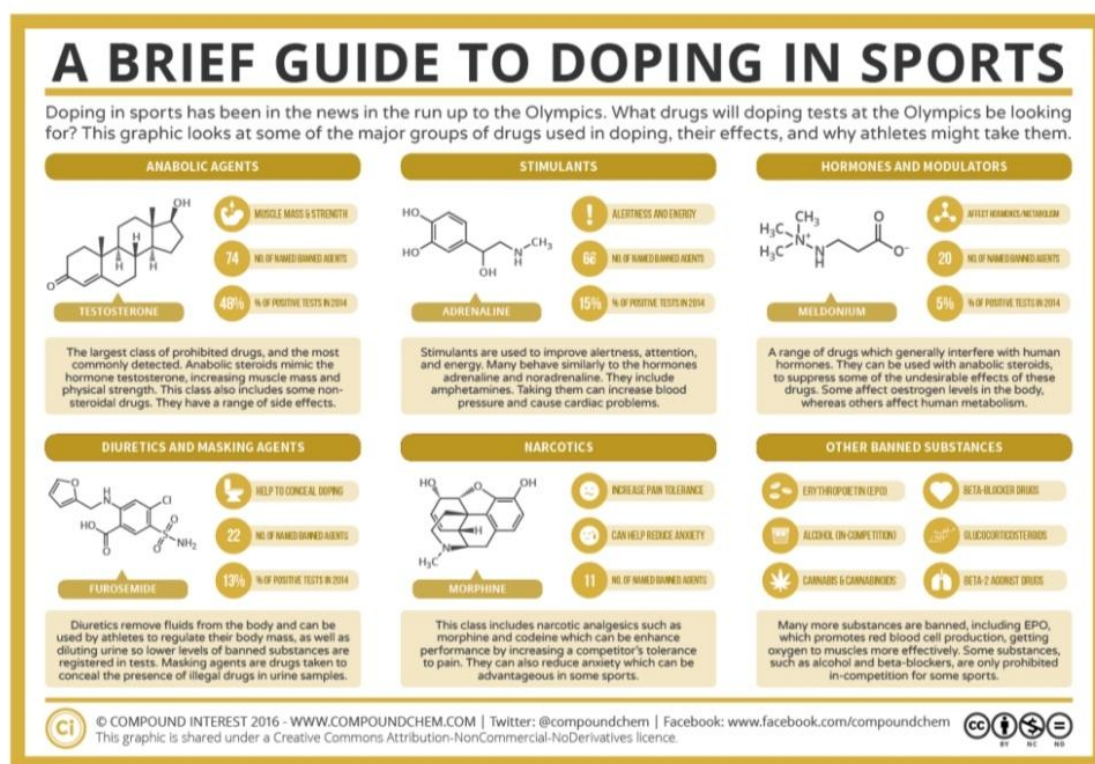
As the lure of prize money and endorsements grows, so does the prevalence of performance-enhancing techniques. The shadow of cheating through illegal enhancements looms over every sport, with unethical

practitioners extending their influence from professionals to youth and other vulnerable populations, risking health in the pursuit of optimized performance.

Doping's background

The historical use of performance-enhancing substances in sports, from ancient times to modern-day, reveals a persistent challenge. The evolution of doping methods, such as the transition from stimulants like strychnine to amphetamines and hormonal doping, highlights the ongoing cat-and-mouse game between athletes and anti-doping measures. The establishment of the World Anti-Doping Agency (WADA) in 1999 reflects a collective effort to address this issue globally and maintain the integrity of sports competitions.

Sorry to hear about the extensive doping issues in professional sports. It's evident that despite anti-doping efforts, challenges persist, requiring ongoing vigilance and adaptation of testing programs. The case of Mark McGuire and the BALCO pharmacy highlights the evolving nature of performance-enhancing substances and



the constant need for updated detection methods. The involvement of top athletes in such scandals underscores the importance of maintaining the integrity of sports through rigorous testing and enforcement measures.



Substances used for doping

Numerous doping substances, spanning an extensive range from anabolic agents to hormones and masking agents, are prevalent in today's sports. The 2006 WADA list of prohibited substances covers categories such as anabolic agents, hormones, beta-2 agonists, anti-estrogenic agents, diuretics, stimulants, narcotics, cannabinoids, and glucocorticosteroids. WADA also prohibits methods like blood doping, chemical manipulation, and gene doping. Detecting these compounds poses technical and financial challenges, with around 35 WADA-accredited labs globally undertaking the complex testing. Despite steroids being the most frequently identified performance-enhancing drugs, the limitations of lab technology and athletes' adeptness at evading detection might mean they are not necessarily the most abused.

Anabolic Androgenic Steroids

Anabolic androgenic steroids, known as "steroids," encompass both endogenous (e.g., testosterone) and exogenous or synthetic (e.g., danazol) forms. The pursuit of synthetic testosterone began in 1954 after Bob Hoffman learned of its development by the Nazis, eventually leading to the creation of danazol, a substance widely abused by weightlifters (9).

While steroid abuse surfaced in Olympic sports in the 1950s, reports of its use in young non-Olympic athletes only emerged in the 1980s (10). The illicit steroid market, exceeding \$100 million in the US alone, poses serious health risks, including liver abnormalities, tumors, reproductive dysfunctions, and psychiatric symptoms (12). Counterfeit drugs further complicate the landscape, raising concerns about impurities and unknown substances.

Human Growth Hormone (hGH and rhGH)

Initially rare in sports due to the ban on cadaver-derived growth hormone, hGH abuse surged with the advent of recombinant DNA technology. Despite its costly pharmaceutical versions (e.g., Nutropin, Genotropin), counterfeit rhGH floods the market, risking adverse health effects. Athletes misuse hGH for its perceived benefits over steroids, despite scientific studies disputing its muscle-strengthening effects. Life-threatening conditions, including abnormal bone growth and cardiovascular issues, are associated with hGH abuse .

Testing for rhGH doping presents challenges due to its similarity to naturally-produced hGH. The prevalent internet market for hGH, in various forms like pills and drops, heightens health risks, including infections from non-sterile drugs and transmission of HIV or hepatitis through shared needles.



Erythropoietin (EPO)

EPO, a hormone stimulating red blood cell production, gained prominence in sports as a safer alternative to "blood doping." Its abuse, often in supernormal doses, poses severe health risks, contributing to the deaths of numerous cyclists. Testing for EPO abuse became possible in 2000 but faced initial uncertainties.

Other At-Risk Populations for Doping

Steroid abuse extends beyond professional athletes, affecting over a million youths in the US alone. Studies indicate that steroid abusers often start in adolescence, with health professionals as common sources. Contrary to assumptions, steroid abuse is not exclusive to performance enhancement; it is linked to broader issues such as substance abuse, fighting, and high-risk behaviors.

Somehow we should have to direct these drug abusers towards natural nutrition.

Energy nutritional Requirements

Fundamental to growth, overall health, and academic success is basic nutrition (11). Sports nutrition plays a pivotal role in improving athletic performance, reducing fatigue, and mitigating the risk of disease and injury, enabling athletes to optimize training and expedite recovery (11). Maintaining a balance between energy intake and expenditure is crucial to prevent both energy deficits and excess. Energy deficits can lead to issues such as short stature, delayed puberty, and increased susceptibility to fatigue, injury, or illness (2,3), while energy excess may result in overweight and obesity (4).

TABLE 1

Recommended energy requirements, Kcal/day

Age, years	Male	Female
4–6	1800	1800
7–10	2000	2000
11–14	2500	2200
15–18	3000	2200



Dietary Supplements

Ergogenic supplements matching performance goals and micronutrients or essential fatty acids when the basic diet is lacking these nutrients.

Sport specific nutrition

If the basic diet is not compensating the need for specific macronutrients, athletes are advised to add specific sport nutrition products to their diet.

Basal diet

All athletes are advised to consume their diet as recommended by the Netherlands Nutrition Centre.



Macronutrients, including carbohydrates, proteins, and fats, supply the energy required for physical activity and engagement in sports.

Carbohydrates

Athletes rely on carbohydrates as a primary fuel source, providing glucose for energy. Each gram of carbohydrate yields approximately four kilocalories. Glucose is stored as glycogen in muscles and the liver, serving as a readily available energy source for working muscles, released more rapidly than other sources (11). Carbohydrates should constitute 45% to 65% of total caloric intake for individuals aged four to 18 (11,17). Excellent carbohydrate sources encompass whole grains, vegetables, fruits, milk, and yogurt.

Protein

Proteins play a crucial role in building and repairing muscle, hair, nails, and skin. While proteins aren't the primary energy source for mild or short-duration exercise, their importance increases with prolonged activity, helping maintain blood glucose through liver gluconeogenesis (12). Each gram of protein contributes four kilocalories. Protein should make up around 10% to 30% of total energy intake for individuals aged four to 18 (17). Quality protein sources include lean meat, poultry, fish, eggs, dairy products, beans, and nuts, including peanuts.

Fats

Fat is essential for absorbing fat-soluble vitamins (A, D, E, K), providing essential fatty acids, protecting vital organs, and offering insulation. Besides contributing to satiety, fat is a calorie-dense energy source (providing nine kilocalories per gram) but is less readily utilized. Fats should constitute 25% to 35% of total energy intake for individuals aged four to 18 (17). Saturated fats should not exceed 10% of total energy intake (11,13). Healthy fat sources encompass lean meat, poultry, fish, nuts, seeds, dairy products, as well as olive and canola oils. Minimizing fat intake from chips, candy, fried foods, and baked goods is advisable.

MICRONUTRIENTS

Ensuring the optimal intake of key micronutrients is crucial for the well-being of athletes. Among the various vitamins and minerals, special attention should be given to calcium, vitamin D, and iron.

Calcium

Vital for bone health, enzyme activity, and muscle contraction, the recommended daily intake is 1000 mg/day for four- to eight-year-olds and 1300 mg/day for nine- to 18-year-olds. Food sources include milk, yogurt, cheese, broccoli, spinach, and fortified grain products.

Vitamin D

Necessary for bone health and calcium regulation, the recommended daily intake is 600 IU/day for four- to 18-year-olds. Athletes in northern latitudes or those who train indoors might be prone to vitamin D deficiency. Sources include fortified foods like milk and exposure to sunlight. Dairy products other than milk lack vitamin D.



Iron

Essential for oxygen delivery to body tissues, adolescents, especially those engaged in sports, require increased iron intake. Boys and girls aged nine to 13 should ingest 8 mg/day to prevent iron depletion. Adolescents aged 14 to 18 need more iron, up to 11 mg/day for males and 15 mg/day for females. Athletes, especially females, vegetarians, and distance runners, should be periodically screened for iron status due to potential deficiencies. Iron-rich foods include eggs, leafy green vegetables, fortified whole grains, and lean meat.

FLUIDS

Fluids, especially water, play a crucial role in supporting athletes' performance. The impact of what, how much, and when athletes drink is significant. Fluids assist in regulating body temperature and compensating for sweat losses during exercise (18,19). Environmental conditions, such as temperature and humidity, influence sweat rates and impact the required fluid intake (11,19,20). Higher temperatures and humidity increase sweating, necessitating more fluid to maintain hydration. Dehydration can impair performance and expose athletes to the risks of heat-related issues

Effective hydration involves consuming fluids before, during, and after exercise. The quantity depends on various factors, including age and body size (19,20) Before activity, athletes should drink 400 mL to 600 mL of cold water 2 to 3 hours prior to their event (11,12,20). During sports, a consumption of 150 mL to 300 mL of fluid every 15 to 20 minutes is recommended (11,12,20). Water suffices for events lasting less than 1 hour, while sports drinks with 6% carbohydrates and 20 mEq/L to 30 mEq/L of sodium chloride are advised for longer or hot and humid events to replenish energy and fluid/electrolyte losses (13,14,15,19). Post-activity, athletes should replace sweat losses, typically requiring around 1.5 L of fluid/kg of body weight lost (11,20). The intake of sodium-containing fluids and snacks aids rehydration by stimulating thirst and fluid retention . However, for non-athletes, regular consumption of carbohydrate-containing sports drinks may lead to excess calorie intake, increasing the risks of overweight, obesity, and dental issues, and should be avoided (14).

Promoting Post-Exercise Recovery

It is crucial to intake recovery nutrition within the first 30 minutes after exercising and again within 1 to 2 hours to replenish glycogen stores and facilitate optimal recovery. Ensure a balance of protein and carbohydrates in these meals (12,16). Suggested options encompass graham crackers paired with peanut butter and juice, yogurt with fruit, or a sports drink combined with fruit and cheese (16).



Result and discussion

Athletes face the challenge of strategically planning meals around events to enhance performance. Tailoring meal timings is crucial, with a focus on discovering preferred foods that boost performance. It's advised not to experiment with new foods or routines on competition days.

General guidelines suggest consuming meals at least 3 hours before an event for proper digestion and to minimize gastrointestinal upset during exercise. These meals should encompass carbohydrates, protein, and fat, with limited fiber. Avoiding high-fat meals before exercise is crucial, as they can impede gastric emptying and hinder performance.

For early morning practices or events, having a snack or liquid meal 1 to 2 hours before exercise, followed by a full breakfast post-event, ensures ample energy for optimal performance. Pre-game snacks or liquid meals should be ingested 1 to 2 hours before an event, incorporating options like fresh fruit, dried fruit, cereal with milk, juice, or fruit-based smoothies. During an event, sports drinks, fruit, or granola bars can be consumed to refuel and maintain energy levels.

A well-balanced diet is vital for growing athletes to support proper growth and optimize athletic performance, comprising 45% to 65% carbohydrates, 10% to 30% protein, and 25% to 35% fat. Hydration is critical, with fluids consumed before, during, and after athletic events. Timing food consumption is key for performance optimization, emphasizing meals at least 3 hours before exercise, and snacks 1 to 2 hours before activity. Recovery foods should be consumed within 30 minutes of exercise and again within 1 to 2 hours for muscle recovery.

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