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THE IMPORTANCE OF VITAMINS AND MINERALS FOR ATHLETES

Annotation: This article provides information on the role of vitamins and minerals in athletes' nutrition, as well as the functions of each vitamin and mineral in the body, their recommended intake, and sources.

Key words: vitamins, minerals, iron, selenium, calcium, B vitamins, vitamin C, vitamin D, vitamin E.

INTRODUCTION

Vitamins and minerals perform hundreds of functions in the human body. We cannot live without them. Fortunately, they are present in various foods that we consume. Can athletes with high physical activity get all the necessary vitamins and minerals from food in sufficient amounts? The answer: Yes! The truth is that to avoid the need for additional vitamins from external sources, one only needs to maintain a balanced diet.

According to Canada's Food Guide, a person must consume food from each of the following five groups daily:

Bread, grains, and pasta products – These provide essential carbohydrates, the body's primary energy source, along with fiber for healthy digestion and sustained energy levels.

Vegetables and fruits – Packed with vitamins, minerals, antioxidants, and fiber, these support immune function, reduce inflammation, and promote overall well-being.

Animal products (meat, eggs, fish) – Serve as excellent sources of high-quality protein, iron, and essential amino acids, which are vital for muscle growth, recovery, and oxygen transport.

Dairy products – Supply calcium, vitamin D, and protein, which are crucial for strong bones, muscle contractions, and nerve function.

Fats, oils, and sweets – While fats are essential for hormone production, brain function, and joint health, they should be consumed in moderation, focusing on healthy sources like nuts, seeds, and olive oil. This balanced diet is essential for supporting vital bodily processes, maintaining optimal muscle function, endurance, and recovery, and ensuring sufficient energy, vitamins, and minerals for peak sports performance. Athletes, in particular, should prioritize nutrient-dense options within each food group, stay properly hydrated, and tailor their diets to their specific training needs. Consuming a diverse range of whole foods helps prevent nutrient deficiencies and promotes long-term health and athletic success.

So, which nutrients are especially important for athletes?

Iron is crucial for athletes because it plays a key role in delivering oxygen to active muscles and supporting energy production. It is an essential component of hemoglobin, the protein in red blood cells that carries oxygen throughout the body, and myoglobin, which helps supply oxygen to muscles. Without sufficient iron, the body's ability to generate energy efficiently is compromised, leading to fatigue and reduced performance.

If physical activity is focused on aerobic metabolism, meaning long-duration exercises such as long-distance running, cycling, or swimming, iron intake needs to be increased. This is because endurance sports place higher demands on oxygen transport and red blood cell production. Additionally, athletes—especially female athletes, adolescents, vegetarians, and long-distance runners—are at a greater risk of iron deficiency due to factors like iron loss through sweat, foot-strike hemolysis (breakdown of red blood cells from repetitive impact), and inadequate dietary intake.

Iron deficiency can lead to anemia, which results in fatigue, reduced endurance, shortness of breath, dizziness, decreased motivation, and weakened immunity. Even a mild deficiency can negatively affect strength, speed, coordination, and overall performance. Therefore, maintaining adequate iron levels is essential for optimal athletic performance, recovery, and overall well-being. Athletes should ensure they consume iron-rich foods such as lean meats, fish, beans, lentils, fortified grains, and leafy greens, and pair them with vitamin C-rich foods to enhance absorption. Regular blood tests and monitoring are also recommended for those at higher risk of deficiency.

To maintain normal iron levels, it is important to regularly monitor iron levels, especially for female athletes, teenagers, long-distance runners, and vegetarians. Taking iron supplements without proper testing is not a good idea because excess iron in the blood can have toxic effects on the body. Therefore, iron intake should be carefully managed based on medical evaluations.

It is essential to consume enough iron-rich foods daily. Iron is found in meat, fish, beans, lentils, grains, bread, and pasta. However, it's important to note that iron absorption in the body is quite challenging. Vitamin C helps improve iron absorption, so athletes should include citrus fruits, strawberries, bell peppers, or broccoli in their diet to maximize iron uptake.

B vitamins are essential for the proper functioning of the nervous system, tissue repair and synthesis, and red blood cell production.

Some studies suggest that athletes may require higher-than-average amounts of B vitamins. However, a 2017 study by the U.S. Institute of Nutrition found that excess intake of B vitamins does not significantly enhance athletic performance.

Therefore, maintaining a balanced diet with sufficient nutrients is considered enough to meet the body's needs.

Special attention should be given to vitamin B12 (cyanocobalamin) because it is found only in animal products, such as beef, pork, poultry, fish, dairy products, and eggs. For this reason, vegetarian athletes must carefully monitor their diet to ensure they get enough B12. They should also regularly check their blood levels of this vitamin to prevent deficiencies.

When discussing the role of antioxidants—such as vitamin C, vitamin E, beta-carotene, and selenium—in an athlete's health, the most important point is that supplementing with antioxidants may be harmful for athletes.

According to research by the Norwegian Institute of Medical and Biological Problems, excessive antioxidant intake led to a significant decrease in strength across all age groups of athletes. This suggests that getting antioxidants naturally from food rather than supplements is the best approach for maintaining athletic performance and overall health.

It is important to note that when consumed within recommended levels from food sources, antioxidants help protect cells from damage.

We can obtain antioxidants naturally from plant-based foods such as vegetables, fruits, nuts, grains, and legumes. This ensures a healthy balance without the risks associated with excessive supplementation. Beta-carotene is found in brightly colored vegetables and fruits, such as carrots, apricots, pumpkin, and others.

Here's a summary of key vitamins and minerals essential for athletes:

Vitamin E: Found in vegetable oils, avocados, wheat, nuts, and seeds.

Vitamin C: Present in citrus fruits, strawberries, peppers, tomatoes, and broccoli. Consuming vitamin C-rich foods is crucial, as intense physical exercise can lead to deficiencies.

Selenium: Found in meat, fish, poultry, dairy products, mushrooms, nuts, seeds, and legumes.

Calcium & Vitamin D

Calcium is essential for strong bones and teeth, as well as proper muscle, hormonal, and nervous system function. It is found in cottage cheese, cheese, yogurt, cabbage, and canned fish.

Vitamin D supports bone health and immune function. It is mainly found in egg yolks and fatty fish (such as salmon, mackerel, and tuna). Small amounts are present in fortified foods like orange juice, certain cheeses, and yogurt.

Additionally, vitamin D is produced in the skin when exposed to sunlight. If you live in a region with limited sunlight, you should include more vitamin D-rich foods in your diet.

Conclusion:

Athletes often have increased nutritional needs due to the high physical demands placed on their bodies. However, with a well-balanced diet that includes sufficient calories and a variety of foods from all five major food groups—grains, fruits and vegetables, protein sources, dairy, and healthy fats—they can typically obtain all the essential vitamins and minerals needed for optimal performance and recovery.

Among these nutrients, iron stands out as a key exception, as its required intake varies depending on the type, intensity, and duration of physical activity. Endurance athletes, such as long-distance runners, female athletes, vegetarians, and adolescent athletes, are particularly at risk of iron deficiency, which can lead to fatigue, reduced endurance, and weakened immunity. Maintaining adequate iron levels is essential to ensure proper oxygen transport, muscle function, and overall well-being.

To support peak athletic performance, athletes should prioritize nutrient-dense foods, monitor their iron levels regularly, and consult a sports nutritionist or healthcare professional if they suspect a deficiency. By focusing on a balanced diet and proper hydration, athletes can maximize their strength, endurance, recovery, and overall health, reducing the need for unnecessary supplementation. If an

athlete is restricting calorie intake or eliminating one or more food groups from their diet, they may need to take multivitamins to prevent nutrient deficiencies. However, before taking any supplements, it is essential to consult a doctor, sports nutritionist, or dietitian to assess individual needs and avoid potential health risks.

Taking multivitamins without professional guidance can lead to overconsumption of certain vitamins and minerals, which may cause imbalances or even harm the body. For example:

- Excessive iron intake can be toxic, potentially leading to organ damage and digestive issues.
- Too much vitamin A can cause liver problems, dizziness, nausea, and weakened bones, increasing the risk of fractures.
- High doses of vitamin C or magnesium may result in digestive discomfort, such as diarrhea or stomach cramps.
- An overload of certain antioxidants, like vitamin E and selenium, could reduce muscle strength and negatively impact performance.

Furthermore, not all supplements are regulated or high-quality, meaning some products may contain contaminants or inaccurate dosages. Athletes should be especially cautious, as some supplements may include banned substances that could lead to disqualification from competitions.

Instead of relying on supplements, the primary focus should be on a well-balanced diet that includes a variety of whole foods to naturally provide essential nutrients. Supplements should only be used if medically necessary and under professional supervision to ensure safety and effectiveness.

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