



Supplement shakes for sports and exercise

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Introduction

Proper nutrition can help us maintain a healthy and active lifestyle. When we exercise for long periods or at a high intensity, the way we eat has a significant influence on our athletic abilities.¹ Sports supplements and foods have become increasingly popular over the years, and are easily accessible to the general public. They provide a convenient and practical way of providing the nutrients required to optimise exercise training and performance. Although supplements can be beneficial, it is important to understand in which circumstances they should be used, as well as any potential risks they may pose.^{1,2}

Nutrition and exercise

Exercise performance is determined by a combination of genetics, training, nutrition, hydration status, motivation and rest.¹ A healthy diet consisting of enough fluid and nutrients is needed in order to train effectively, reach performance goals and reduce the risk of injury and illness.¹ During exercise, our muscles need to generate more force or perform additional work. To supply the muscles with enough blood and oxygen to do this, the heart needs to beat harder and air needs to be moved in and out of the lungs at a faster rate.² Every cell in the body requires a constant supply of energy. This energy comes from the metabolism of carbohydrates, protein and fat. Proper nutrition is needed to supply energy for muscle contraction, build new tissue, maintain muscle mass and bones, repair damaged cells, maximise fitness and maintain a healthy fluid and electrolyte balance in the body.^{1,2}

Supplements

Supplements can be defined as a source of vitamins, minerals or other ingredients that are used to correct deficiencies, optimise health and prevent illness.³ Supplements are generally taken by mouth and are available in pills, capsules, powders, shakes and other forms.^{2,3} Sports or exercise supplements provide a convenient way of supplying nutrients to maximise training or enhance performance. Examples of sports supplements include liquid meal replacements, sports drinks, gels and energy bars. These products may contain nutrients or other ingredients that claim to enhance exercise performance, benefit health and maintain immune function.

Sports shakes can help to meet the high energy and nutrient demands of intense exercise. A good supplement shake should help an athlete meet their nutritional goals, enhance recovery and maximise exercise performance. In addition to macronutrients (carbohydrates, protein and fat) and micronutrients (vitamins and minerals), these products may contain other ingredients that may benefit training or performance. It is important to note that not all substances are safe to use. Indeed, some substances may not even be permitted by sporting regulatory bodies. It is advised to consult a sports doctor or a dietitian before considering the use of sports supplements.²

Energy

The most important ingredient to a successful exercise session is energy. It is essential that the body is supplied with enough calories to provide enough energy to the muscles in order to maintain strength, endurance and muscle mass. Energy needs differ widely amongst individuals and are dependent on age, body size as well as the type, duration and intensity of exercise being performed. People that maintain a generally active lifestyle (30–40 minutes of activity per day, three times a week) can meet their nutrient requirements by following a healthy, balanced diet containing between 25–35 calories per kilogram body weight per day (kcal/kg/day). When training is longer, more intense and more frequent, a calorie intake of between 45–50 kcal/kg/day may be required. For example, a 50 kg person exercising for three hours per day, five to six times per week may

require up to 4 000 calories daily. An elite athlete, however, may require up to 10 000 calories per day.^{1,2} It can be difficult to meet the high energy demands of exercise through diet alone. This is especially true when an athlete must consume a significant amount of calories before exercise. Eating a large quantity of food before a training session can cause indigestion and discomfort. Easily digestible, high-energy sports supplement shakes may be valuable in helping to meet the energy needs of exercise, whilst maintaining digestive comfort.²

Macronutrients

Macronutrients include carbohydrates, protein and fat. Carbohydrates are one of the main energy sources used for exercise. It has been shown that a high carbohydrate intake before exercise, as well as carbohydrate supplementation during exercise can help to slow down muscle fatigue and maximise performance of endurance sports.¹ The recommended daily intake of carbohydrates for athletes will differ from person to person. For example, 5–7 g of carbohydrates per kilogram body weight per day should meet the needs of most general training. Endurance and elite athletes may need up to 7–10 g/kg/day and 12 g/kg/day respectively.¹ Supplement shakes or drinks that supply carbohydrates and fluids are beneficial to athletes when consumed during exercise.² Another noteworthy macronutrient is protein. Protein is essential for the maintenance of muscles, as well as recovery after exercise. Pre-workout consumption of protein has been shown to encourage muscle protein synthesis (MPS). Furthermore, evidence shows that consuming between 20–25 g of high quality protein after resistance exercise enhances MPS. Although this protein can just as easily come from dietary sources (e.g. a chicken breast), it may be more practical to make use of sports supplements or shakes to meet these demands. The role of fat in sports nutrition has become a hot topic. Fat is a major fuel source for light to moderate exercise and is crucial for overall health. However, fat requirements for athletes do not differ vastly compared to non-athletes. In fact, high fat diets have been shown to hinder the performance of high intensity exercise. A supplement shake containing all essential macronutrients would be most beneficial to athletes.¹

Micronutrients

Vitamins and minerals are micronutrients needed by the body in small amounts.² Micronutrients are important to maintain health. Most vitamins and minerals are involved in energy production and muscle contraction. They are also needed to maintain blood and bone health and can elicit antioxidant effects.² Athletes do not generally require more micronutrients than the general population. This being said, deficiencies in certain micronutrients may negatively

affect exercise ability. Although it is advised to obtain these nutrients through diet alone, supplement shakes may help to meet micronutrient requirements.^{1,2}

Fluid and electrolytes

It is essential to drink enough fluid during exercise as dehydration can have negative effects on performance and general health. The amount of fluid required by an athlete will depend on numerous factors (including duration and intensity of exercise, as well as environmental conditions). It is more beneficial to replace fluid losses with a carbohydrate and electrolyte containing drink, than to do so with plain water. For this reason, a supplement shake containing fluid, carbohydrates and electrolytes would be valuable.^{1,2}

Other ingredients

Other substances have been shown to directly improve exercise ability, and may be beneficial for sports supplementation. These include caffeine, creatine, nitrate, beta-alanine and sodium bicarbonate.⁴ Caffeine is a stimulant known for its ability to enhance performance and increase time to fatigue during endurance exercise. Creatine loading can promote growth of lean muscle, as well as encourage greater muscle strength and power. Nitrate (naturally found in leafy green and root vegetables) and beta-alanine (an amino acid) may also enhance endurance. Similarly, sodium bicarbonate may elicit positive effects in sustained high-intensity exercise performance.⁴ A sports supplement shake containing any of these components may be valuable for physical training and competition. Although these substances may be beneficial to the athlete, they should be used with caution. It is advised to first speak with a sports doctor or dietitian before making use of these ingredients.¹

Conclusion

Supplement shakes may be beneficial to athletes as they provide a convenient way to consume the nutrients and fluids needed to optimise exercise training and performance. In addition to macronutrients, micronutrients and fluid, other substances such as caffeine may also be useful. It is important to use supplement shakes correctly and safely to avoid any adverse effects.^{2,3,4}

References

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