



ISSN: 2456-0057
IJPNPE 2022; 7(1): 371-373
© 2022 IJPNPE
www.journalofsports.com
Received: 22-10-2021
Accepted: 31-12-2021

Anju Bala
Research Scholar, Doctor of
Philosophy in the Faculty of
Sports, Indira Gandhi TMS
University, Ziro, Arunachal
Pradesh, India

Dr. Sandeep Bhalla
Director, Department of Sports
and Physical Education, Indira
Gandhi TMS University, Ziro,
Arunachal Pradesh, India

Ergogenic aids for improving athletes' performance: An overview

Anju Bala and Dr. Sandeep Bhalla

Abstract

Nutritional ergogenic aids are aimed primarily at enhancing performance (either by affecting energy metabolism or by an effect on the central nervous system), at increasing lean body mass or muscle mass by stimulation of protein synthesis and at reducing body fat content.

Methodology: Survey of secondary literature is the prime methodology for preparing this research article.

Research Findings: There is a significant gap in research evaluating various aspects of ergogenic aids and their impacts on Indian athletes. There is a need for multicentric, longitudinal studies evaluating various aspects of effects of ergonomic aids. All such substances need to be approved by the Sports Authority of India (SAI) and should be given to the athletes under the supervision of SAI Certified Specialist Dietitian.

Conclusion: Because regulations specific to nutritional ergogenic aids are poorly enforced, they should be used with caution and only after careful product evaluation for safety, efficacy, potency, and legality.

Keywords: Ergogenic aid, nutritional ergogenic aid, athletic performance, improving training adjustment, international Olympic committee

Introduction

An ergogenic aid is a physical, mechanical, nutritional, psychological, or pharmacological substance or treatment that either directly improves physiological variables associated with exercise performance or removes subjective restraints which may limit physiological capacity. A nutritional ergogenic aid is a substance found in the diet that is ingested to produce improved or enhanced sport, exercise, and physical performance. For example, enriched foods with supplements such as caffeine or creatine are popular dietary ergogenic aids. Some indication of the extent of its use is gained from the fact that the estimated sales of creatine to athletes in the US alone in 1997 amounted to over 300 000 kg. This represents a remarkable growth, as its use first became popular in sport after the 1992 Olympic Games in Barcelona. What distinguishes creatine from other ergogenic aids is that it seems to be effective in improving performance. More significantly, perhaps, its use is not prohibited by the governing bodies of sport and there appear to be no harmful side effects even when very large doses are taken, at least in the quantities that are necessary to produce an ergogenic effect. There are many anecdotal reports of elite athletes successfully using creatine supplementation in preparation for competition, but as with all other ergogenic aids, there can be no certainty as to the truth of these reports. Many athletes also claim to have experimented with creatine supplementation but to have experienced no benefit. In this latter case, at least in the UK, most have been taking a creatine dose of about 4 g/d for prolonged periods, according to the recommendations of some suppliers. The scientific studies that have shown beneficial effects have generally involved the use of much higher doses (20 – 30 g/d) for short periods of time, and there is currently no evidence to support the idea that performance benefits will result from the dosage regimen recommended by the suppliers [1].

At one end of the spectrum of ergogenic aids are normal foods and at the other are substances that are clearly drugs. In between, however, are a few compounds that are more difficult to classify. The term includes a number of foods, including for example those high in carbohydrate [2], and carbohydrate–electrolyte sports drinks, whose effectiveness in improving

Corresponding Author:
Anju Bala
Research Scholar, Doctor of
Philosophy in the Faculty of
Sports, Indira Gandhi TMS
University, Ziro, Arunachal
Pradesh, India

exercise capacity is beyond doubt [3]. It is, however, usually a term applied to specific nutrients or compounds rather than to whole foods. It is on this latter category of supplements that this review will focus. Nutritional ergogenic aids are aimed primarily at enhancing performance (either by affecting energy metabolism or by an effect on the central nervous system), at increasing lean body mass or muscle mass by stimulation of protein synthesis and at reducing body fat content. Although not strictly ergogenic (i.e. capable of enhancing work performance), supplements aimed at increasing resistance to infection and improving general health are seen by athletes as important in reducing the interruptions to training that minor illness and infection can cause [4].

In other words, an ergogenic aid is any training techniques, mechanical devices, nutritional practice, pharmacological method, or psychological techniques that can improve exercise performance capacity or enhance training adaptations. It helps in individual to tolerate heavy training to a greater degree by helping them recover, faster or help them stay injury free and healthy during intense training. Some studies show that supplement significantly enhances exercise performance e.g. helps athletes run faster, lift more weight, or carry out more work during a given exercise task. On other hand it prepares an athlete to perform or enhance recovery from exercise. It has the potential to improve training adjustment and therefore must be considered ergogenic.

Elements & Dimensions

There are many effective dietary ergogenic aids; the most obvious examples are carbohydrate supplements and sports drinks. All essential dietary components, including protein, essential fatty acids, vitamins, and minerals, might be considered to come into this category. These components, however, are essential for the maintenance of health and normal physiological function, and supplementation above the level required for maintenance of health is not likely to improve exercise performance. The ergogenic aids discussed here are only a few of those used by athletes but represent those for which there is evidence of efficacy, or where there is much topical interest.

Table 1: Ergogenic aids [5]

Ergogenic aid	Ergogenic aid
Antioxidants	Perhaps
Bicarbonate	Yes, in some cases
Branched-chain amino acids	Probably not
Caffeine	Sometimes
Carnitine	No
Creatine	Yes
Glutamine	Possibly
All sorts of other things	Probably not

Methods & Scope: Pros & Cons

The quickest method of increasing muscle creatine stores is by consuming 0.3 grams/kg/day of creatine monohydrate for at least three days followed by 3-5 gram/day thereafter to maintain elevated stores. Also, testosterone and growth hormone are two primary hormones in the body that serve to promote gains in muscle mass (i.e., anabolism) and strength while reducing muscle breakdown (catabolism) and body fat mass. Testosterone also elevates male sex characteristics (e.g., hair, deep voice, etc.). Low level anabolic steroids are often prescribed by doctors to prevent loss of lean weight for people

with various diseases and illnesses.

It is widely known that athletes have tested large doses of anabolic steroids to enhance training adjustments, increase muscle mass and/or promote recovery during intense training. Research has generally shown that use of anabolic steroids and growth hormone during training can promote increase in strength and lean weight. However, several potentially life-threatening contrary effects of steroid abuse have been reported including liver and hormonal dysfunction, hyperlipidemic (high cholesterol), increased risk to cardiovascular disease and behavioural changes (i.e., steroid rage) and mood swings. For this cause, anabolic steroids have been banned by most sport organizations and should be avoided unless prescribed by a physician to treat an illness.

However, it is simplistic and misleading to suggest that there are no data supporting contentions that athletes need more protein in their diet and there is no possible ergogenic value of incorporating various types of protein into the daily diet. Protein supplements or ergogenic aids offer a convenient way to ensure that athletes take quality protein in the diet and complete their protein needs. However, ingesting additional protein beyond the daily requirement does not help in additional gain in strength and muscle mass. The research focus over recent years has been to influence whether different types of protein (e.g. whey, casein, soy, milk proteins, colostrum, etc.) and various biologically active protein subtypes and peptides (e.g. α -lactalbumin, β -lactoglobulin, glycol macro peptides, immunoglobulin's, lacto per oxidizes and lacto ferrin, etc.) have varying effects on the physiological, hormonal and immunological responses to training. Athletes should be counselled regarding the appropriate use of sports foods and nutritional ergogenic aids. Such products should only be used after careful evaluation for safety, efficacy, potency and compliance with relevant anti-doping codes and legal requirements.

Regulatory Mechanism

The use of any nutritional supplement which is effective in improving performance inevitably raises ethical issues. Ergogenic aids are banned by the governing bodies of sport for one of two reasons: on the grounds that they pose a threat to the health of the individual, or because they confer what is seen to be an 'unfair' advantage. Although there is no reason to suppose that there are any risks to health associated with long-term use of high doses of creatine, the studies quoted above which have used high doses, in the order of 20 – 30 g/d, have been of relatively short duration (3 – 14 d). The normal daily diet of non-vegetarians contains less than 1 g creatine [6], but in populations with a high meat intake this will be substantially higher. There is, however, no reason to believe that those diseases, primarily cancer of the colon, which are more common in populations with a high meat intake are in any way associated with the dietary creatine intake. Studies are currently underway to investigate some of the effects of long-term creatine supplementation, and this information will become available in due course. This leaves the ethical question of whether the use of creatine should be disallowed on the grounds of its ergogenic effect, as is the case with other normal dietary components such as caffeine. There seems to be no logic to the argument for the acceptance of the use of creatine in any dose, but restriction of the amount of caffeine that may be used. There may, however, be an intuitive opposition to the use of substances which

influence the central nervous system, as caffeine does in high doses, which does not apply to substances whose effects are purely peripheral. As more information emerges, this issue will be resolved, and the governing bodies of sport will decide.

Because regulations specific to nutritional ergogenic aids are poorly enforced, they should be used with caution and only after careful product evaluation for safety, efficacy, potency, and legality. A qualified sports dietitian and, in particular, the Sports Authority of India Certified Specialist, should provide individualized nutrition direction and advice after a comprehensive nutrition assessment. In USA, the creatine products are readily available as a dietary supplement and are regulated by the US Food and Drug Administration.

There is not universal agreement on the acceptability of some of the nutritional supplements used in sport. Creatine is a normal component of foods and is not banned by any of the international sports organizations, but its use has been prohibited by the French Football Federation. The International Olympic Committee has a carefully defined list of drugs, categories of drugs and physical manipulations that are deemed unacceptable. The issue has not, however, been helped by the 4 February 1999, Laurant Declaration on Doping in Sport published by the International Olympic Committee. This includes the following definition: '... doping, which is defined as the use of an artifice, whether substance or method, potentially dangerous to athletes' health and/or capable of enhancing their performance'. This all-embracing definition includes not only all the supplements discussed above, but all foods. As well as substances and methods that are clearly dangerous, it also includes training!

Conclusion

Athletes should be wary of ergogenic aids, which claim to enhance athletic performance. Many of these claims are unsubstantiated, and some aids may be dangerous or hinder performance. In other words, athletes should be counselled regarding the appropriate use of ergogenic aids. Such products should only be used after careful evaluation for safety, efficacy, potency, and legality.

References

1. Maughan RJ. Nutritional ergogenic aids and exercise performance, *Nutrition Research Reviewer*. 1999;12:233-280.
2. Williams C. Diet and sports performance. In *Oxford Textbook of Sport Medicine*, 2nd ed., [M Harries, C Williams, WD Stanish and LL Micheli, editors]. New York: Oxford University Press, 1998, pp. 77-97.
3. Maughan RJ, Shirreffs SM. Fluid and electrolyte loss and replacement in exercise. In *Oxford Textbook of Sports Medicine*, 2nd Edition, [M Harries, C Williams, WD Stanish and LL Micheli, editors]. New York: Oxford University Press, 1998, pp. 97-113.
4. *Ibid* 1
5. *Ibid* 1
6. Heymsfield SB, Arteaga C, McManus C, Smith J, Moffitt S. Measurement of muscle mass in humans, *American Journal of Clinical Nutrition*. 1983;37:478-494.