88 - USE OF PROTEIN SUPPLEMENTS BY PEOPLE ENGAGED IN PHYSICAL EXERCISE: THE RISKS AND BENEFITS

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INTRODUCTION

Proteins and amino acids are among the most popular performance-enhancing supplements (NEMET, et. al., 2005). It is becoming more and more common for customers at gyms to seek these supplements, primarily motivated by a desire for muscle hypertrophy.

Dietary supplements are ergogenic aids that can be employed to improve performance and results in sports and fitness programs, in particular in weight training/bodybuilding – many people wish to see fast results in a short time. However, these supplements should not be considered a conventional dietary food item (LOLLO, et.al., 2009). Ergogenic aids is the term used to describe those substances or phenomena that improve an athlete's performance (WILMORE & COSTILL, 1999). Reasons given for using protein and amino acid supplements include stimulation and maintenance of muscle strength and growth, increased energy utilization, and stimulation of growth hormone secretion (WOLFE, 2000).

A study undertaken by Jesus & Silva (2008) found that Branched Chained Amino Acids (BCAAs) were the supplements most often taken by people engaged in bodybuilding, followed by whey protein supplements. Several different studies have shown a preference for amino acid and protein based supplements (ARAÚJO, et. al., 2002).

Nevertheless, there is still much debate on the effectiveness and safety of these supplements and for the great majority of the products available there is no evidence in the literature elucidating their effects or their long-term implications for health (NAVES, 2006).

USE OF AND RECOMMENDATIONS ON PROTEINS IN PHYSICAL EXERCISE

In human beings a small fraction of oxidative energy comes from the catabolism of amino acids (LEHNINGER, et. al., 2006). During physical activity, there are three possible sources of amino acids that should be considered: protein from the diet, from the circulating pool of amino acids and protein in the body's tissues. The most likely of these three sources to be used as an energy source is tissue protein, which provides amino acids for oxidation and conversion into glucose (ARAÚJO, et. al., 2002).

Protein ingested with the diet is broken down by digestive enzymes and absorbed as amino acids. There are 20 common amino acids, nine of which are considered essential amino acids. The term essential refers to the fact that these amino acids cannot be produced in the body in sufficient quantities and must be sourced from the diet. Notwithstanding, all 20 amino acids are important for maintaining protein tissue (NEMET, et. al., 2005; TIRAPEGUI & ROGERO, 2008).

Proteins are reduced to amino acids for use by the body and are essential for the synthesis of structural proteins and are involved in countless metabolic processes associated with physical exercise, so it has been suggested that athletes require additional proteins, whether within the diet or in the form of supplements (MAESTÁ, et. al., 2008). There is no doubt that the feature of muscle weight gain that arouses the most heated debate is the quantity of protein that should be ingested.

According to the Brazilian Society for Sports Medicine (SBME - Sociedade Brasileira de Medicina do Esporte), 2009, it is recommended that people taking part in physical activity increase their protein intake in order to meet the increased demand for protein, used as an energy source during exercise and to repair damage to muscle fibers. They recommend a daily maximum of 1.8g of protein per kg of body weight and state that protein supplementation, such as with whey protein or egg white albumin, must be within the total protein intake (NEMET, et. al., 2005).

When combined with carbohydrate intake, ingesting protein after hypertrophy-oriented physical exercise promotes increase in muscle mass, increasing the rate of muscle glycogen synthesis, probably because of a response to the increase in insulin, with a consequent reduction in protein break down. The increase in muscle mass takes place as a consequence of training, as does the increased protein demand, but the reverse is not true (SBME, 2009). Additional ingestion of these protein supplements above the daily requirements (1.8g/kg/day) does not result in additional muscle weight gain and neither does it lead to increased performance. There is no scientific evidence that increasing protein intake will increase exercise capacity and increase muscle mass. It is probable that the excess protein will simply be used as energy or stored as fat (NEMET et. al., 2005; GOMES, et. al., 2008).

Some studies have suggested that supplementation with BCAAs minimizes protein break down and increases recovery after exercise (NEMET, et. al., 2005). Whey protein provides amino acids quickly, in common with BCAAs, leading to rapid muscle recovery. Furthermore, these supplements are an alternative choice for people who wish to increase lean mass, but are unable to achieve the recommended protein levels in their diets because of the high levels of cholesterol in these types of foods.

THE RISKS OF EXCESSIVE PROTEIN CONSUMPTION

Protein requirements appear to increase depending on the type of sport and its intensity and duration (WOLFE, 2000). According to Williams (2004), the majority of supplements used in sports are considered safe. However, many of the people who take them believe that increasing the quantity they consume will improve their results and take excessive quantities of these products, which may damage their health. There is no consensus in the literature on the safety of ergogenic dietary supplements, since, according to a study carried out by Lugarezze (2009), they can cause undesirable adverse effects such as increasing the workload on the liver and kidneys. Also cited are dehydration secondary to elevated urea output, gout, liver and kidney damage, calcium loss, abdominal distension and diarrhea (WOLFE, 2000).

Amino acids are not stored; they are used for synthesis and any excess is broken down (LEHNINGER, et. al., 2006) into urea in the urine. Increased protein intake from the diet is directly related to increased urea production, and it is known that urea excretion is controlled by the kidneys. These processes impose a significant energy cost on the kidneys and represent renal physiological work (MARTIN, et. al., 2005). If they take place while the body is dehydrated, such as during particularly intense exercise in hot and humid environments, there is a risk of acute renal insufficiency (GREGORY & FITCH, 2007). Hypohydration is

associated with a reduction in plasma volume, which leads to reduced cardiac output. This provokes an increase in the heart rate, to compensate for the reduced output. However, this compensation mechanism is normally inadequate, and the result is reduced plasma volume (TAVARES, et. al., 2008).

Nevertheless, there is not yet sufficient scientific evidence to confirm this renal overload. There is only a report of a possible toxic effect on the renal function of rats from excessive protein intake, but the results of this study are limited by the fact that this damage was induced by a specific bacterial cell protein (prutten) (STONARD, et. al., 1984).

FINAL COMMENTS

The use of protein supplements, particularly at gyms by people engaged in weight training/bodybuilding, is already a reality. Easy access to these products means that a growing number of people seek to benefit from them when taking part in sports, irrespective of whether they know about their possible side effects or even whether they are effective.

Supplements should be used when nutrient requirements are not being met by the diet, as is the case with professional athletes, who are subjected to the stress of exercise, greatly increasing their metabolisms and their nutritional requirements. (OLIVEIRA & ANDRADE, 2007). The best option for athletes and sportspeople with regard to nutrition is to eat a balanced diet that provides sufficient quantities of energy and micronutrients to guarantee a healthy body (SARTORI, et. al., 2007).

One observation is that there is a major failure to provide the information that, with the exception of certain special circumstances, an appropriate, balanced and good quality diet is sufficient to meet nutritional requirements and to allow good physical performance, without the need for supplementation. The World Anti-Doping Agency (WADA, 2009) recommends avoiding supplementation as much as possible.

Further research is needed to identify the true benefits and risks for human health of this practice.

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USE OF PROTEIN SUPPLEMENTS BY PEOPLE ENGAGED IN PHYSICAL EXERCISE: THE RISKS AND BENEFITS

ABSTRACT

Dietary supplements are ergogenic aids that can be used to improve performance and results in sporting activities and fitness programs, particularly bodybuilding. Protein and amino-acid based dietary supplements are among the most popular. Adequate availability of amino acids is not only crucial for increasing muscle fiber synthesis, but also in order to promote repair of damaged muscle tissue. However, additional consumption of these protein supplements beyond daily requirements does not result in additional muscle tissue being gained and neither does it lead to increased performance, but may in fact cause renal overload.

KEY WORDS: Supplementation, protein, physical exercise.

CONSOMMATION DE SUPPLÉMENTS PROTÉIQUES PAR DES SUJETS PRATIQUANT UNE ACTIVITÉ SPORTIVE : RISQUES ET BÉNÉFICES

RÉSUMÉ

Les compléments alimentaires sont des ressources ergogéniques pouvant être utilisées pour améliorer la performance dans les activités sportives et la pratique du fitness, en particulier la musculation. Parmi les compléments alimentaires disponibles, les suppléments protéiques et ceux à base d'amino-acides sont les plus consommés. Disposer d'amino-acides en quantité suffisante est essentielle pour une plus grande synthèse fibrillaire, ainsi que pour promouvoir la réparation de la masse musculaire lésée. Néanmoins, une consommation de ces suppléments protéiques supérieure aux besoins quotidiens n'entraîne pas de gain de la masse musculaire ni n'augmente la performance, mais peut provoquer une surcharge rénale.

MOTS-CLÉS : complémentation ; protéine ; activité physique.

CONSUMO DE SUPLEMENTOS PROTEICOS POR PRACTICANTES DE EJERCICIO FÍSICO: RIESGOS Y BENEFICIOS

RESUMEN

Los suplementos alimentares son recursos ergogénicos que se puede utilizar para la mejoría de la actuación y del desempeño en las actividades deportivas y buena forma, en especial la musculación. Entre los suplementos alimentarios disponibles, los proteicos y los con base en aminoácidos son los más utilizados. Es crucial la disponibilidad suficiente de aminoácidos no sólo para la mayor síntesis fibrilar, sino para promover la reparación de la masa muscular lesionada. Sin embargo, el consumo adicional de esos suplementos proteicos por encima de las necesidades diarias no determina ganancia de masa muscular adicional, y tampoco promueve aumento del desempeño. Además, puede provocar una sobrecarga renal.

PALABRAS-CLAVE: Suplementación, proteína, ejercicio físico.

CONSUMO DE SUPLEMENTOS PROTÉICOS POR PRATICANTES DE EXERCÍCIO FÍSICO: RISCOS E BENEFÍCIOS

RESUMO

Os suplementos alimentares são recursos ergogênicos que podem ser utilizados para a melhoria da performance e desempenho nas atividades esportivas e fitness, em especial a musculação. Dentre os suplementos alimentares disponíveis, os protéicos e os a base de aminoácidos são um dos mais utilizados. É crucial a disponibilidade suficiente de aminoácidos não apenas para a maior síntese fibrilar, mas também, para promover o reparo da massa muscular lesada. Porém, o consumo adicional desses suplementos protéicos acima das necessidades diárias não determina ganho de massa muscular adicional, nem promove aumento do desempenho, além disso, pode provocar uma sobrecarga renal.

PALAVRAS- CHAVE: Suplementação, proteína, exercício físico.

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