



Nutritional Requirements or The Sport of Brazilian Jiu-Jitsu

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Introduction

The sport of Brazilian Jiu-Jitsu (BJJ) is unique in its physical nature and athlete's needs. Much like wrestling, Brazilian Jiu-Jitsu is an explosive endurance sport requiring high output levels and the ability to remain competitive over a more extended period. Beginner matches start at a length of 5 minutes, where high-level competition can go up to 20 minutes in a single round. These time limits, the need to go multiple rounds, and the need to make weight divisions add to the metabolic uniqueness of the sport. The sport of Brazilian Jiu-Jitsu requires high levels of aerobic conditioning, anaerobic power, strength, flexibility. The average Vo₂ Max amongst these athletes is typically between 42 and 52 mL/kg/min meaning a variety of macronutrient levels are needed to support performance. The athlete must eat to fuel explosive strength and speed and demonstrate a solid foundation of endurance to continue for five or more straight minutes of grappling. Proper nutrition is, therefore, a foundational tool for ensuring athletes can keep up with the demands of their sport.

Macronutrients

Protein

Protein intake serves as one of the main components in muscle building and recovery. An aspiring BJJ athlete must be sure to consume adequate protein not only to maintain a healthy athletic physique but also to recover from the grueling hours of training needed to compete at any reasonable level. Aragon and [1] suggest protein intakes in the 1-2.2 grams per kg body weight to support muscle mass and recovery. This means a quality protein range for a 200lbs athlete would be in the range of 90-200 grams a day to support their needs. The addition of protein also improves the replenishment of muscle glycogen stores when taken with proper carbohydrate doses [2].

Carbohydrate

Containing four calories per gram, carbohydrate intake is

essential for those competing at or above 75% Vo₂ max [3]. These athletes rely almost entirely on glycogen for fuel. Surprisingly, previous studies on the nutritional quality of the competitive Brazilian Jiu-Jitsu athlete demonstrate that many are relatively poor. Athletes historically suffer inadequate intakes of carbohydrates, putting their ability to produce sustained energy at risk [4]. These athletes will benefit significantly from the glycogen replenishing sugars found in various forms of carbohydrates. Carbohydrate serves as a primary energy source for the active muscles and body [5] recommend 10-12 grams /kg bodyweight for performance. For a 200lbs athlete, this intake would be in the range of 900-1080 grams per day. These numbers seem like a lot; however, for competitive athletes training many times a day, the ability to keep muscle glycogen high means keeping performance energy high. Athletes must be sure to take in enough carbohydrates to fuel and recover from their training and performance.

Fats

Fat is one of the most overlooked parts of macronutrient dosage. Containing nine calories per gram, fat is the most energy-dense macronutrient by nearly two times. Proper fat intake ensures proper cellular and central nervous system health [6] suggest that fat is needed to supply ATP energy at low-intensity exercise lasting over 2 hours at 60% Vo₂ max. Fat fills the endurance aspect of the sport of Brazilian Jiu-Jitsu. Such endurance requirements mean athletes need approximately 2 grams of fat/kg body weight per day to replenish intramuscular triglycerides [7]. Doing so will ensure proper endurance capability and recovery in tough training.

Supplements

Supplementation is mostly unregulated by the FDA, yet many over the counter supplements can cause an athlete trouble with their governing organizations like the NCAA and Olympic committee. The supplements listed below are deemed safe and

legal by all governing bodies when taken in the appropriate dosage.

Sodium Bicarbonate

Our firsts supplement a household staple. Hiding in plain sight under the name baking soda, sodium bicarbonate has been used for decades by endurance athletes as a physiological buffer for high-intensity exercise. Not only can bicarbonate serve to buffer acidosis, it has also demonstrated the ability to increase the contribution of glycolysis to high-intensity exercise, thereby promoting efficient high-intensity energy system usage [8]. The high intensity demands of anaerobic activity cause increased production of not only H^+ ion but also lactate accumulation. The accumulation of these metabolites in both muscle and blood driving pH towards the of acidity. This can cause both pain and fatigue during exercise. Bicarbonate helps to rid H^+ ion and lactate accumulation in the tissues, thereby shifting the tissues' pH back towards the side of basic instead of negatively towards acidosis and has been demonstrated to do so effectively in as little as six weeks intervals [9]. Sodium bicarbonate's ability to reduce physiological stresses associated with high-intensity exercise between 1 and 10 minutes can be critical to a Brazilian Jiu-Jitsu athlete as this is the average time they will be competing. Athletes whose pH remains lower during exertion can theoretically train harder and longer. It is reasonable to assume that athletes who are in less pain and under less bodily stress when competing will perform better. Ingestion of .3g/ kg BW 1-2 hours before intense exercise has shown positive outcomes for the performance athlete [10].

Unfortunately, bicarbonate supplementation does not come without consequences. Many athletes experience mild to moderate gastrointestinal side effects from heavy use. These side effects can range from mild bloating and delayed gastric emptying to cramping and diarrhea [11]. This typically happens due to the sodium component of the solution, which is known to cause diarrhea, and the bicarbonates reaction with stomach gases that causes a large production of CO_2 [12]. suggest that athletes may reduce some of the adverse side effects by consuming higher amounts of water in the preloading phase to dilute the bicarbonate.

Beta-Alanine

Beta-alanine is another product that has withstood the scrutiny of science. Beta-alanine, like bicarbonate, is a pH buffer for high-intensity exercise and has proven effective in trained and untrained individuals making it a powerful performance aid. Many studies have demonstrated the positive effect of beta-alanine on performance [13] Demonstrated beta-alanine's ability to improve Judo performance after just four weeks at 6.4 g/day. While others demonstrated that beta-alanine could improve outcome measures of exercise compared to those without [14]. Beta-alanine serves as a precursor to carnosine. Carnosine serves many roles, as a powerful intracellular muscle pH buffer but also as a brain neurotransmitter. Beta-alanine has been shown to improve carnosine muscle content by up to 80% [15]. Its ability to do so is important because supplementation with carnosine alone has proven ineffective

as it cannot pass the gastrointestinal barrier effectively without being broken down. However, beta-alanine supplementation has demonstrated the ability to pass the GI tract and make it to the muscular level where it can be responsible for as much as 10% muscular buffering capacity [16]. Beta-alanine serves us not only as an effective precursor to carnosine but an intracellular buffer that also regulates intracellular calcium usage a process that influences muscle contraction capability. Side effects of this supplement in high doses can experience a skin flush, itchiness, and tingling. While these side effects can be very uncomfortable, there appear to be no adverse health consequences to long term use [17] suggest smaller doses and more water throughout the day to limit the effects.

Creatine

Creatine is one of the most studied supplements on earth. Creatine is known for its ability to improve water retention, maintain ATP homeostasis, and support muscle power during all beneficial to the sport of Brazilian Jiu-Jitsu. In training, creatine helps athletes perform more sets and reps throughout a workout. More sets and reps equate to more volume; more volume means more strength, power, and hypertrophy. Even more impressive is how creatine can serve as a potent CNS anti-inflammatory and even a protectant to cytotoxicity, thereby improving cognition and protecting against mental decline and cognitive fog in sport. This can help the competitive athlete stay focused as the duration and intensity of competition accumulate. Creatine has consistently demonstrated the capability of improving explosive energy both on and off the playing field Creatine's ability to improve power output leads to some of its only known side effects, mainly muscle hypertrophy. However, the ability to improve explosive capacity, specifically under stress can be one of its most significant benefits to the Brazilian Jiu-Jitsu athlete. The ability to remain explosive in the last minutes and rounds of competition can be the difference between winning and losing.

Conclusion

Brazilian Jiu-Jitsu is a complex sport requiring many different attributes, from aerobic and anaerobic power to strength and flexibility. Athletes who do not adequately hydrate and fuel for the matches can be left tired and exhausted by the demands of competition. Supplements like bicarbonate, beta-alanine, and creatine serve as buffering agents against acidosis and H^+ ion accumulation. These supplements are cost-effective and, when taken appropriately and to dosage, come with manageable side effects. Even though such supplements should be part of any athlete involved in a high-intensity exercise to improve performance, one cannot forget the necessity of a proper diet. Athletes must be sure about the proper use of protein carbs and fats for recovery and performance.

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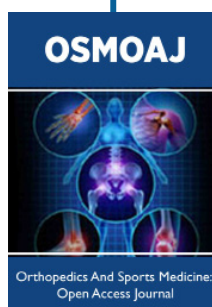


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