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5 December 2023

Physiology

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Effects of creatine

With the emergence of workout culture over the past five years creatine monohydrate has become a very popular supplement to take. Creatine monohydrate is a nutritional supplement that increases the amount of ATP, which is the fuel for the cells, especially the muscles. It claims to help boost muscle growth, strength, and power by pulling water into the muscles, signaling cell swelling, and forming new muscle fibers. Creatine kinase (CK) is an enzyme that naturally exists in your body, it is predominantly found in your heart and skeletal muscles, with small amounts in your brain. When cells are damaged, Creatine kinase is sent into the bloodstream to help repair those cells. In the study "Effects of creatine supplementation on muscle power, endurance, and sprint performance" They investigated the effects of oral creatine supplementation on the performance of high intensity weightlifting and sprinting.

This study was done on 19 trained professional handball players in 2001. Handball players were chosen for this study because handball training and competition involve frequent and strenuous activities, including repeated sprints, throws, and jumping. By using the double-blind method, meaning neither the participants nor the researchers know which group has taken the creatine or taken the placebo, they kept it unbiased. To make sure that there were no previous physiological changes, the researchers only allowed participants that had not taken creatine the supplement or had at any time taken any sort of anabolic steroids. Prior to the participants taking the supplement, there was baseline testing. Body weight and body fat were measured, they performed a one-rep max in the bench press and half squat, and a sprint test. They then performed a one rep max in the bench press and half squat, vertical jump test, maximal strength output, a 15-meter sprint, and maximal output of repetitions in each of the one rep max exercises. To ensure consistency, they kept performing the tests at the same time of day every day while also being in the same location. The researchers took urine samples to see the changes in urinary creatine excretion. This indicates various physiological processes such as muscle metabolism and kidney function.

Directly after the supplementing period there was a measure of significant change, it showed no changes in the one rep max bench press in either group. However, during the one rep max half squat there was an increase of 14.7 kilograms, from 133 kg to 147.7 kg. This shows that throughout the early stages of creatine supplementation there were positive impacts on the lower body. With the weight of the one rep max, the average muscle power was also tested. Directly post-supplement there were no significant changes between either group in both half squat and bench press. The creatine group five days after creatine supplementation showed changes in repeated sprints, vertical, muscle mass, urinary creatine excretion, and the one rep max half squat; there were no changes in the bench press. The placebo group showed no changes in any of the tests and even showed slower times in the sprints. Even with the extra weight gain due to increasing muscle mass, the creatine group gained 3 cm on their vertical jump and speed (in the first 5 meters) in the sprint. At the end of the study, it showed many

positive changes in the creatine group. While not showing much progress with power output in the bench press, there were significant changes in lower body maximal strength, repetitive high-power exercises, repetitions till failure, sprint performance, and jumping ability. The results showed that in high intensity activities the creatine group had conclusive changes compared to the placebo group.

While this study showed no negative effects of creatine supplementation, there are some potential drawbacks. Creatine pulls water into the muscles and can cause water retention leading to weight gain during the loading phase. Be that as it may, with proper dosage and a shorter loading phase (taking higher dosage at first to saturate the muscle) there is little bloating and water weight. This majorly affects athletes who are in weight focused sports, such as wrestling, boxing, and mixed martial arts. There are also cases of cramping and bloating but this is linked to high doses of creatine and little water consumption. One of the biggest concerns of taking creatine is its impact on kidney function. With healthy users, general research shows that the use of the supplement is safe. On users with preexisting kidney conditions healthcare professionals say to proceed with caution and should talk to medical professionals before the use of this supplement. The quality and purity of the product is something to also look out for. Without third party testing, there are concerns with effectiveness, safety, digestibility and absorption, side effects, and compliance with regulations. To ensure that you are maximizing the positive effects of the product you are using, the quality of the product needs to be reputable and meets the quality standards that make it less likely to encounter health risks.

In conclusion, “Effects of creatine supplementation on muscle power, endurance, and sprint performance” showed mostly positive outcomes with the creatine group specifically in lower body strength, sprint performance, jumping ability, and repetitive high-power exercises, contrasting with little to no progress in the placebo group. This double-blind experiment provided important insights into the possible benefits of the supplement creatine monohydrate. While this study found no adverse effects associated with creatine, it is essential to be aware of the potential drawbacks. Furthermore, concerns about kidney function and the quality of product call attention to the importance of cautious and knowledgeable use, without caution you could be exposing yourself to unnecessary health risks. Taking everything into account, when managed responsibly, creatine holds true to its claims in enhancing high-intensity activities in trained athletes. However, with the study’s small sample size and duration of the experiment, further research needs to be held to fully understand the complex qualities of diverse populations and athletes.