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Creatine Does Not Promote Dehydration or Rhabdomyolysis in Athletes

WOODLAND PARK, CO, AUGUST 25, 2010 - Recent media reports have suggested that ingestion of the dietary supplement creatine may have contributed to the hospitalization of several athletes from McMinnville High School in Oregon for rhabdomyolysis (i.e., a rapid breakdown of skeletal muscle due to injury that typically presents with marked elevations in the enzyme creatine kinase [CK] in the blood) and/or anterior compartment syndrome (ACS). This is despite reports from the athletes and their parents that they had not been taking creatine or any other dietary supplement or drug. It is well known that excessive exercise in hot and humid environments can promote dehydration, muscle breakdown, and result in marked elevations in muscle CK levels. In severe instances, this may lead to exertional rhabdomyolysis particularly in athletes who have been engaged in intense exercise in hot and humid environments for several days and who become chronically dehydrated. Additionally, excessive exercise in individuals unaccustomed to heavy training bouts can promote anterior compartment swelling, pain, and pressure. It is well known that dehydration and/or heat illness can exacerbate this clinical course.

According to press reports, the athletes in this case were engaged in a several day “immersion” camp. The athletes began to complain about swelling in their arms after performing a series of push-up and chair dip exercises in 30-second alternating bouts of repetitions for over 20 minutes until exhaustion in a hot and humid wrestling room. Temperatures in the room were reported as high as 115-120°F. Moreover, the athletes were reported to have to start a repetition scheme over again if all of the athletes did not complete their repetition goals. Further, the athletes were not allowed to drink water during the training session. None of the athletes indicated they took creatine (or any other supplement or drug). Nevertheless, media reports indicated officials are investigating whether creatine may have been linked to this incident.

The International Society of Sports Nutrition (ISSN) is the 'leading' professional "organization" in the field of sports nutrition. The ISSN is dedicated to promoting and supporting the science and application of sports nutrition. In 2007, the Research Committee of the ISSN formed a team of sport nutrition researchers, dietitians, and physician's to extensively review the available scientific literature on creatine supplementation and exercise and to develop a Position Stand for the Society which was published in the Journal of the International Society of Sport Nutrition (see: <http://www.jissn.com/content/4/1/6>). After extensive review of the literature, the ISSN adopted the following positions relative to this issue:

- 1. Creatine monohydrate is the most effective ergogenic nutritional supplement currently available to athletes in terms of increasing high-intensity exercise capacity and lean body mass during training.*
- 2. Creatine monohydrate supplementation is not only safe, but possibly beneficial in regard to preventing injury and/or management of select medical conditions when taken within recommended guidelines.*
- 3. There is no scientific evidence that the short- or long-term use of creatine monohydrate has any detrimental effects on otherwise healthy individuals.*
- 4. If proper precautions and supervision are provided, supplementation in young athletes is acceptable and may provide a nutritional alternative to potentially dangerous anabolic drugs.*
- 5. At present, creatine monohydrate is the most extensively studied and clinically effective form of creatine for use in nutritional supplements in terms of muscle uptake and ability to increase high-intensity exercise capacity.*
- 6. Creatine monohydrate has been reported to have a number of potentially beneficial uses in several clinical populations, and further research is warranted in these areas.*

Specific to the alleged association of creatine to development of rhabdomyolysis and ACS; a number of studies have evaluated the effects of creatine supplementation on dehydration, cramping, fluid retention, muscle injury, CK levels, and health status in athletes engaged in intense exercise (including football players engaged in intense training in hot and humid environments). These studies have consistently indicated that creatine supplementation does not promote cramping, muscle injury, elevations in CK, and/or heat related injuries. Conversely, studies report that creatine may improve the athlete's ability to tolerate intense exercise in hot and humid environments and lessen the incidence of injury. Athletes have been using creatine on a widespread basis as a dietary supplement since the early 1990's. No clinically significant side effects have been reported and a number of potentially beneficial medical uses are being studied. It is the opinion of the ISSN that suggestions that creatine caused this incident is inconsistent with the scientific literature and implausible.

Media Quote:

"Many studies have been done (since the early 1990's) that show creatine does not cause dehydration, muscle damage, or increase susceptibility to heat-related illness in athletes involved in intense training in hot and humid environments. If anything, research shows that creatine promotes hyperhydration (i.e., whole body fluid retention) leading to less thermoregulatory stress during intense exercise in the heat. It is unfortunate that individuals unfamiliar with the creatine literature are speculating that creatine caused this problem when the athletes indicated they did not take creatine and they ignore the obvious precursors: excessive and inappropriate training in a hot and humid environment."

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