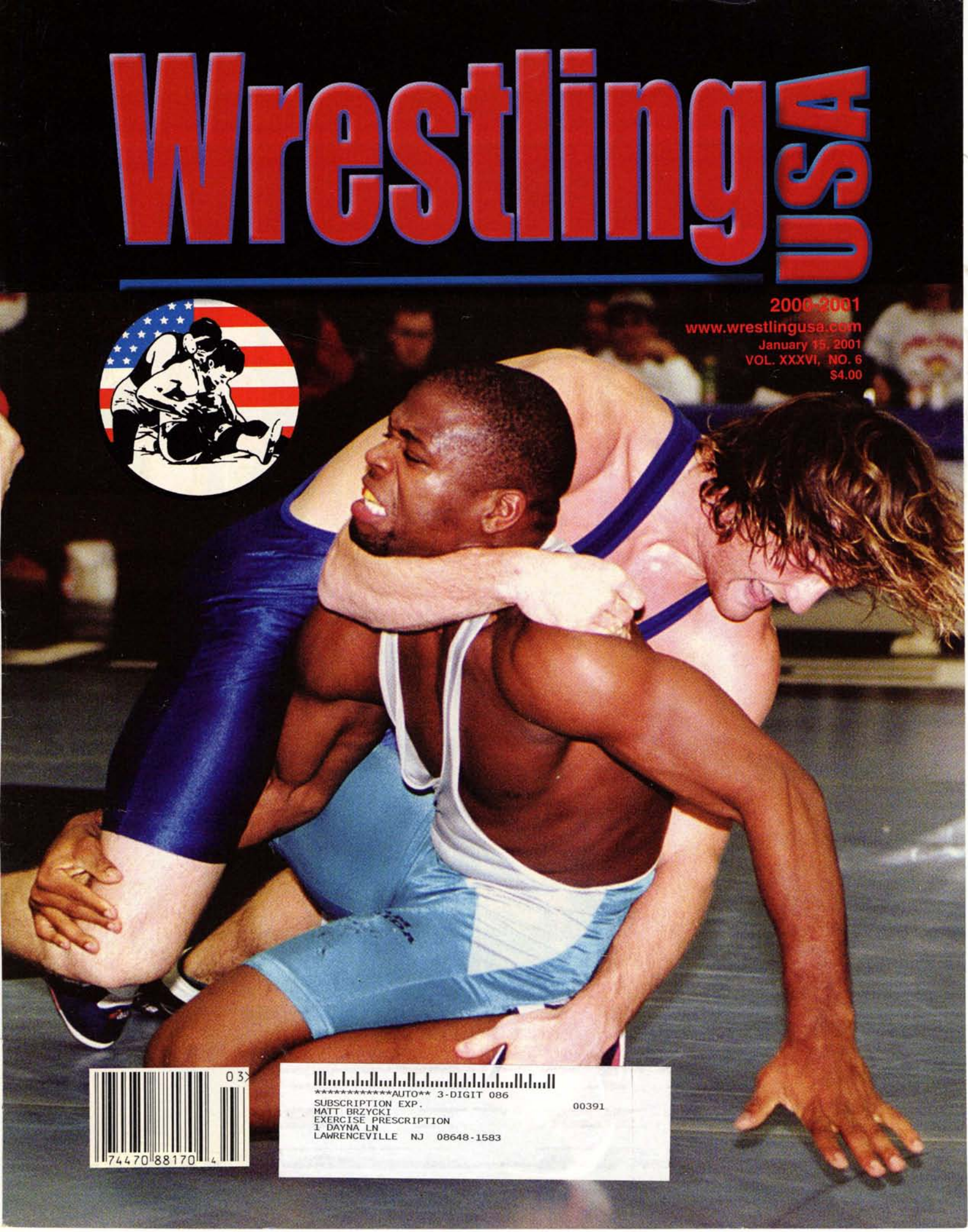
Wrestling USA

2000-2001
www.wrestlingusa.com
January 15, 2001
VOL. XXXVI, NO. 6
$4.00



The Creatine Myth: A Rebuttal

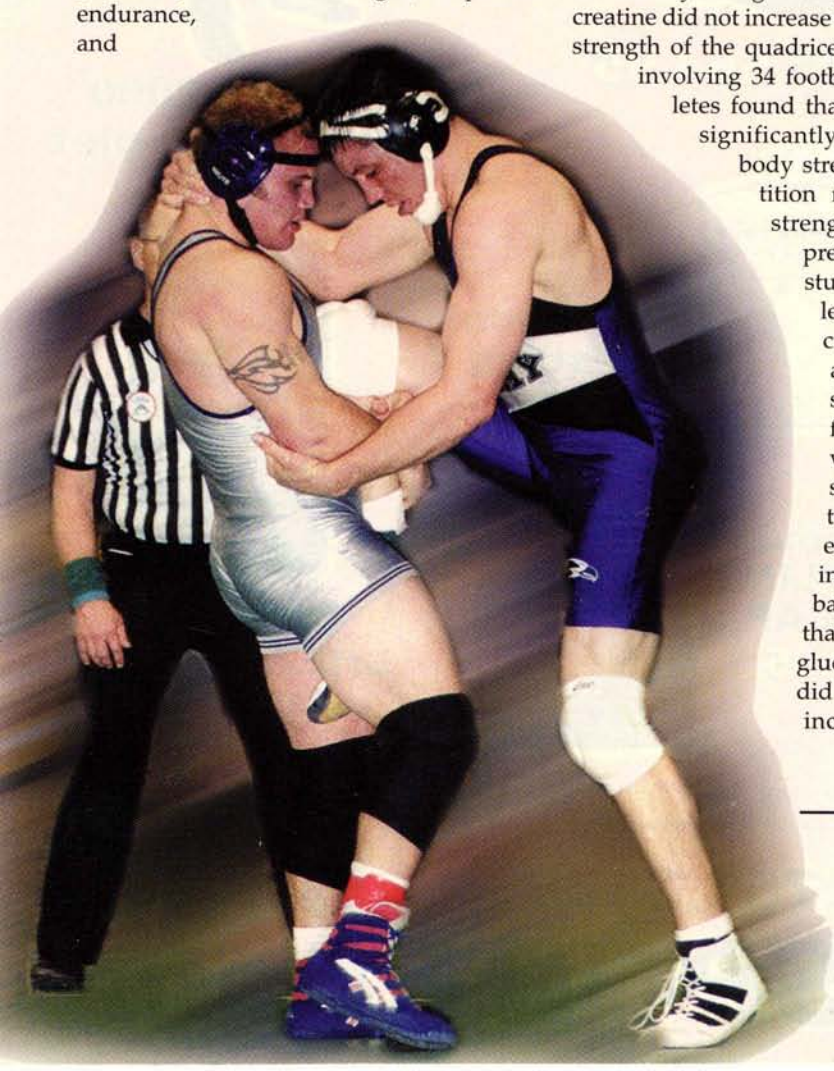
Part 1

By Matt Brzycki
Coordinator of Health Fitness, Strength and Conditioning
Princeton University

The April 15, 2000 issue of Wrestling USA Magazine featured an article entitled "The Creatine Myth" which was written by Steven Plisk. Early in his article, Mr. Plisk stated that "coaches, parents and athletes need to have accurate information about creatine." While there is total agreement with this specific statement, there is considerable disagreement with much of the "information about creatine" that Mr. Plisk presented as "accurate."

IS CREATINE EFFECTIVE?

Mr. Plisk noted that "[wrestlers] are aware of the solid research showing that [creatine] increases strength, improves endurance, and builds lean muscle mass." What does the "solid research" really say about the effects of creatine on these three variables? But perhaps more importantly for coaches and wrestlers, what does the "solid research" say about the effects of creatine during the performance of actual sports, realistic events or competitive situations?



Does It Increase Strength?

While it is true that there is "solid research" showing that creatine "increases strength," Mr. Plisk failed to mention that there is roughly an equal amount of "solid research" showing that it does not produce significant increases in strength or other strength-related measures. For example, a 1996 study using 9 subjects showed that creatine did not increase maximal isometric strength of the quadriceps. A 1997 study involving 34 football and track athletes found that creatine did not significantly improve low-body strength or one-repetition maximum (1-RM) strength in the bench press. Another 1997 study using 20 athletes revealed that creatine did not affect 1-RM strength in elbow flexion, peak velocity (of the shoulder) or torque. Yet another 1997 study involving 24 football players showed that creatine (and a glucose supplement) did not significantly increase 1-RM strength in the bench press or performance in the vertical jump. A fourth 1997 study using 36 track athletes found that creatine did not significantly improve performance in the vertical jump. A 1998 study involving 44 subjects revealed that creatine did not improve 1-RM strength in the bench press. Another 1998 study using 14 athletes showed that creatine did not significantly improve performance in the vertical jump. A third 1998 study involving 25 football players found that creatine did not significantly improve squat or power clean lifting volume. A 1999 study using 16 physical-education students showed that creatine did not alter the rate of maximal force production. A 2000 study involving 23 subjects determined that creatine did not improve peak torque of the quadriceps. Another 2000 study using 30 subjects found that creatine did not significantly improve handgrip strength.

Taking into account this and other "solid research," the effect of creatine on strength and other strength-related measures is inconclusive.

Does It Improve Endurance?

Considering the fact that creatine is an energy substrate used during maximal, short-term efforts with essentially no role during long-term efforts, it would not be expected that it "improves endurance." And, in fact, there is very little "solid research" showing that creatine has any positive effect on endurance other than during activities that involve repeated maximal, short-term efforts. Even Dr. Richard Kreider — a well-known proponent of creatine supplementation and an associate of Mr. Plisk — admits that "creatine supplementation does not appear to enhance endurance exercise."

Rocky Mountain Nationals. 215 lbs. 18 under, Jeff Rusher, Wray, Colorado, a three-time Colorado 3A State Champion (189), faced off against Dusty Hoffschneider, Columbine, a two-time Colorado 5A State Champion (215). Rusher used conditioning and speed to control the match. Composure kept Rusher one step ahead of the attempts by Hoffschneider, when time ran out Rusher was the victor of the big school small school battle 7-4. Photo by Dean Vandeberg.

Does It Build Lean-Muscle Mass?

What many studies have shown is that creatine can increase body mass, not lean-body mass (LBM) or lean-muscle mass. And the most likely reason for the increased body mass is primarily due to water retention (within skeletal muscle cells) that — needless to say — isn't necessarily desirable.

The truth of the matter is that there is no pill, powder or potion currently in existence that, by itself, "builds lean-muscle mass" in healthy individuals. None. There is only one thing that "builds lean-muscle mass": exercise. When combined with exercise — particularly progressive-resistance exercise — some studies found that creatine increased LBM. In all cases, the subjects in those studies were engaged in some type of strength-training activity. Interestingly, a 1997 study showed that a group who used creatine increased their LBM by 4.8 kilograms while a group who took a placebo increased their LBM by 3.5 kilograms. Moreover, it is important to note that the LBM of the subjects in this study was estimated by skinfold measurements — an assessment that can be greatly influenced by varying degrees of human error.

Finally, numerous studies have shown that creatine — even when used in conjunction with progressive-resistance exercise — failed to significantly increase LBM. Therefore, the "solid research" examining the effect of creatine on LBM is inconclusive.

Does It Improve Athletic Performance?

Much of the research investigating creatine — including that which has been mentioned earlier — has been done in an extremely well-controlled environment, namely a laboratory. In a controlled laboratory setting, the best evidence for performance enhancement from the use of creatine is in repeated maximal, short-term sprints on a stationary bicycle (and even then, some studies have shown no improvements). Unfortunately, there are no competitions for repeated maximal, short-term sprints on a stationary bicycle. Of the research that has been done outside a laboratory — or "in the field" — very few studies have shown that creatine had any beneficial effects during the performance of actual sports, realistic events or competitive situations. Simply consider the following studies — many of which used highly trained athletes:

As of 1998, a total of five studies had investigated the effects of creatine on actual sports performance done outside a laboratory in high-intensity efforts lasting 30 seconds or less. All five studies found no significant improvements in performance from creatine supplementation. For example, a 1996 study involving 32 elite male and female swimmers from the Australian National Team showed that creatine did not enhance performance in swim sprints of 25 and 50 meters. Another 1996 study using 20 male and female swimmers found that creatine actually worsened performance in swim sprints of 25 and 50 meters. Yet another 1996 study involving 24 highly trained athletes revealed that creatine did not enhance running velocity in a 60-meter sprint. A 1997 study using 34 football and track athletes showed that creatine did not significantly improve performance in a 40-yard dash. Another 1997 study involving 24 football players found that creatine did not significantly improve performance in a 100-yard dash.

As of 1998, a total of seven studies (including two that were also mentioned in the previous paragraph) had investigated the effects of creatine on actual sports performance done outside a laboratory in efforts lasting 30 – 150 seconds. Six of the seven studies found no significant improvements in performance from creatine supplementation. For instance, two 1996 studies using a total of 52 elite male and female swimmers found that creatine did not improve performance in a 100-meter swim. A 1997 study involving 12 trained female runners showed that creatine did not improve performance in a 700-meter run. A 1998 study using 24 U. S. Navy Special Warfare personnel (SEALs) determined that creatine did not significantly improve the time taken to complete an obstacle course (which took roughly two minutes).

As of 1998, a total of four studies had investigated the effects of creatine on actual sports performance done outside a laboratory in long-term efforts lasting more than 150 seconds. Three of the four studies found no significant improvements in performance from creatine supplementation. Actually, a 1993 study using 18 well-trained male runners showed that creatine produced significantly slower times in a 6,000-meter run. Additionally, a 1996 study involving 13 cyclists found that creatine did not increase the distance cycled in one hour.

To summarize: As of 1998, a total of 14 different studies had investigated the effects of creatine on actual sports performance done outside a laboratory in efforts ranging from a handful of seconds to more than 150 seconds. In 12 of the 14 studies, creatine supplementation did not produce significant improvements in performance. Collectively, this "solid research" shows that any improved performance that may occur in laboratory settings does not translate into improved performance in realistic situations. This is especially true of highly trained or elite athletes.

Note: The second part of this rebuttal will examine issues relating to the safety of creatine.