

## Wired to Win? - Use of Caffeinated Drinks

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Many athletes use caffeine before and during competition with the goal to boost physical performance. Energy Drinks, coffee and other products claiming to pack a punch are heavily marketed toward athletes and non-athletes as performance enhancers. Often these ads and promotions are linked to athletics and extreme sports. As mentioned previously, many of these products are advertised as able to increase endurance, reaction time and concentration. Although energy drinks claim the benefit is due to various herbs and substances, any physical or mental effects are most likely due to the caffeine content. Which begs the question, does caffeine promote athletic performance, particularly endurance athletics?

First off it should be mentioned that caffeine is a drug, not unlike many other controlled substances, and there is potential for serious health consequences with abuse. Significant sources of caffeine include coffee (12-25mg/oz), tea (0-5mg/oz), cola drinks (4-8mg/oz), energy drinks (12-26mg/oz) and chocolate (variable levels). The most notable behavioral effects of caffeine occur after consumption of low to moderate doses (50-300 mg) and include increased alertness, energy, and ability to concentrate. Moderate caffeine consumption rarely leads to health risks. In contrast, higher doses of caffeine induce negative effects such as anxiety, restlessness, insomnia, and tachycardia. These effects are seen primarily in a small group of individuals who are caffeine sensitive. On the other hand, caffeine was considered in one study as a potential drug of abuse and more recently was described as a "model drug of abuse."

Research has found that consumption of moderate levels of caffeine prior to and during exercise is safe and effective. Most studies have found that consuming 3-6 mg of caffeine per kg of body mass has the optimal effect to enhance athletic performance. Consuming more than this level does not seem to result in greater benefit, and may in fact increase the risk of negative side effects. Caffeine's exact effect on the physiologic machinery is not exactly known, however, it is believed to act in the brain and possibly on muscles at a cellular level.

There are potential negative effects of caffeine consumption on athletic performance. Caffeine can result in side effects such as heart-burn, gastric reflux, or simply an upset stomach. Caffeine, especially if consumed in the late afternoon or evening can result in sleep disturbance and insufficient recovery. Lastly, caffeine and other substances in coffee, chocolate and tea can interact with other dietary supplements and inhibit the body's ability to absorb certain vitamins and minerals, so vitamins and caffeine should not be consumed together.

Regular caffeine consumption may cause tolerance or dependence, and abrupt discontinuation may cause irritability, mood shifts, headache, drowsiness, or fatigue. Often these symptoms are not prolonged and diminish or resolve after a relatively short period of time. However, this can have an affect on the amount of caffeine required to produce benefit during athletics. As the body is more accustomed to the presence of caffeine, a higher level is required to produce a physiologic benefit. As a result, many studies suggest a caffeine taper, of 3-7 days, prior to an athletic event. As a result the caffeine consumption on race day will probably have a greater impact.

There have been limited studies to examine the effect of hydration and electrolytes with respect to caffeine, which can play a critical factor in endurance and ultra-endurance events. The results of this research are mixed with little evidence to support that caffeine results in dehydration. However, caffeine has been shown to have a diuretic effect (increase loss of body water through increased urination). However, the addition of moderate levels of caffeine to a standard sports drink or while consumed with other forms of electrolytes does not seem to have a negative impact on hydration and athletic performance. However, the hydration effects of larger quantities of caffeine, such as that found in energy drinks, are not known and should be avoided during athletics. Additionally, the high sugar content in energy drinks may cause GI problems. Caffeine is a powerful stimulant and can boost athletic performance when consumed in low to moderate levels. I find a mug of 53x11 coffee (<http://www.53x11coffee.com/?Click=988>), or caffeinated PowerGels (<http://www.powerbar.com/>) will give many athletes the boost they need before a workout, race or as a pick me up during the day.