

Food for thought - performance enhancing supplements - caffeine

If you've followed all the training plans and you're looking for that extra 'edge' it's tempting to seek out the 'magic bullet' that will take those last few seconds off your pace. There is a long list of substances that are, or have been, promoted as performance improvers; some are legal and others are not; some have scientific evidence of their benefit and others do not.

Caffeine has been used as a stimulant since Paleolithic times. It is a naturally occurring substance, found in coffee beans, tea leaves, cocoa beans and cola nuts and it is now the most widely consumed drug in Europe and America.

Caffeine in food and drink is rapidly absorbed by our digestive systems. Blood levels peak after an hour and reduce to 50% in 2 to 10 hours. This means that the stimulant effects are achieved quickly and may take quite a while to subside – think about how you feel if you're tired and you drink a cup of strong coffee, you feel brighter for a while and then the effect wears off gradually.

Caffeine has been used as a performance aid for a long time. Prior to 2004, it was on the International Olympic Committee list of banned substances. Caffeine was not banned entirely however there was a tolerance limit in place.

Some of the first indications of the potential benefits of caffeine in endurance exercise (running and cycling) were recorded in the late 1970's when improved performance followed when caffeine was taken an hour before the start of exercise.

A large number of studies have shown improved endurance (the ability to exercise for longer) after caffeine. The effects of caffeine do not seem to increase with high dosage; the effects were seen initially with doses of 3-9mg per kg body weight although more recent studies have seen positive effects with doses of 1-3.2mg per kg. It is generally accepted that the effective dose is 3mg per kg body weight, taken before exercise. That would be 240mg caffeine for an 80kg man or 200mg for a 65kg woman.

The amount of endurance performance improvement you can expect from caffeine is significant – typically 10-20% longer to exhaustion at around 85% VO_2max , which would correspond to race pace for many of us. In addition, the positive effect of caffeine seems to increase with longer periods of exercise. So there is considerable evidence for the role of caffeine as an aid to performance in running and cycling.

A number of different mechanisms have been put forward to explain the effects seen with caffeine, including glycogen sparing, increased fat utilisation and changes in muscle fibre responses, however the single overriding effect is that exercise feels easier or, perhaps one should say, less hard. Caffeine also has a positive effect on

cognitive function. It has been shown to improve concentration, response speed and the performance of complex tasks during and after exercise.

Some of us consume caffeine regularly in our diet while others take little. Regular caffeine users will have markedly different metabolic responses to caffeine however there is little evidence that the performance effects are different, compared to caffeine-free individuals.

The single largest source of caffeine is coffee however the quantity of caffeine in a cup of coffee varies with the strength, method of preparation and the type of bean. Filter coffee generally has a higher caffeine content than espresso and Robusta may have 40-50% more caffeine than Arabica. Studies comparing coffee and caffeine given in a capsule have suggested that the two forms may not be equivalent – caffeine capsules seem to be more effective in terms of performance. In addition, the amount of caffeine is far more readily calculated from caffeine tablets or capsules.

Despite caffeine being a component of most western diets, anyone who normally avoids it may experience side effects with the dosage recommended for performance improvement. These effects include gastrointestinal distress, headaches, tachycardia (heart racing), tremor, restlessness and irritability. Very high doses can lead to far more extreme side effects.

If you decide to use caffeine as a performance aid, as with any of your race strategies, don't forget to try it out before race day!

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