

Pickle juice in muscle cramps prevention and treatment?

Remo P. Jutzeler van Wijlen, Head R&D SPONSER Sports Food
Ing. Appl Food Sciences, MAS Nutrition & Health ETHZ

Exercise-associated muscle cramps (EAMC)

Muscle cramping during exercise is common in endurance and team sports as well. EAMC often even lead to abortion of exercise. About 73% of dropouts in American Football are said to be due to muscle cramps (Cooper *et al*, 2006). Also in triathlon 67% of athletes have been identified previously to be prone to EAMC (Kantarowski *et al*, 1990). The triggering causes of EAMC have not yet been identified, but the hypothesis goes towards a local electrolyte dysbalance in the affected muscle. However, the primary cause is considered to be mechanical overloading, promoted by cold temperatures, dehydration, energy and electrolytes losses.

Proven means to prevent EAMC are not really available. In praxis, stretching and massage are the most common treatments. Sodium may play a role in the predisposition of cramps. Furthermore, magnesium is often recommended in relation with muscle cramps. However, magnesium has no direct influence on EAMC and its intake, therefore, is rather recommended chronically in the forefront of competitions. Magnesium intake during exercise bears also the risk of gastrointestinal problems like diarrhoea.

Bitter-acid drinking solutions

Several recent studies demonstrated a cramp-relieving effect by the ingestion of pickle juice solutions. Hitherto, the exact physiological mechanism is unknown. But the electrolytes and the liquid itself of these solutions cannot be causative, since the time period for a physiological reaction is too short, i.e. no relevant change in electrolyte balance could be registered within minutes after intake, nor in the longer term. Consequently, no causality could be found (Allen *et al*, 2013; Miller *et al*, 2010a and 2014) and it is assumed that neurological mechanisms must be involved. Present explanations postulate a neurological stimulus caused by a high acid and/or bitter content of pickle juice or similar drinking solutions, which make the brain "forget" about the cramp incidence. Muscles can thereby reduce its tonicity and relax, the cramp is vanishing (Miller *et al*, 2010b). Interestingly, pickle juice ingestion prior to exercise not only resulted into acute cramp relieve, but also showed a preventive effect, i.e. a reduced number of cramp incidences (Miller *et al*, 2010b).

Not just cramp relieve, but also performance enhancing?

Besides the cramp-relieving effect, a recent study focussed on performance. Mouth rinsing during 10 seconds with a bitter tasting quinine solution and concomitant ingestion resulted in a 3.7% increase in peak power during 30 second sprints (Gam *et al*, 2014). The hypothesised mechanism is similar to mouth rinsing with a glucose solution: neurological activation of sensitive receptors in the mouth cavity, signalling to brain regions responsible for motor control. This leads to an attenuated perception of effort and, ultimately, increased performance. Apparently, a bitter quinine solution activates the same brain regions like a sweet-tasting glucose solution.

SPONSER® Muscle Relax Sour Shot

We developed our bitter-sour tasting 30 ml shot based on this evidence. Prior to market launch we made cramp-sensitive volunteering mountain bikers testing it, extensively and successfully, during the Swiss Epic MTB race.

Sources

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