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Muscle Cramps in Athletes and Exercisers

This month a study from the University of Cape Town, South Africa showed that the athlete who is most likely to suffer muscle cramps is the one who runs the fastest and the one who has had previous muscle cramps (British Journal of Sports Medicine, June 2011). Of 210 triathletes competing in an Ironman triathlon, 43 developed severe muscle cramps, while 166 did not.

There were no significant differences between groups in any pre-race or post-race blood mineral levels or body weight changes (a measure of dehydration).

This supports many other studies that show that the most likely cause of muscle cramps in conditioned athletes is muscle damage. The most likely causes of muscle cramps in out-of-shape exercisers are lack of salt or water (1).

CRAMPS IN ATHLETES OCCUR MOST COMMONLY DURING INTENSE EXERCISE. Cramps occur far less often during less-intense training, because the most common cause of muscle cramps in exercisers is muscle damage from all-out pressure on the muscles.

MUSCLE DAMAGE: Most muscle cramps in serious exercisers and athletes are caused by an exaggerated "stretch reflex" triggered by muscle damage.

When you stretch a muscle, it pulls on its tendon. Stretch reflex nerves in that tendon send a message back to the spinal cord (not the brain), and then the "stretch reflex" in the spinal cord sends a message along nerves from the spine to cause the muscle to contract. During extreme pressure on the muscles, muscles are damaged causing sustained contractions. A study from South Africa showed that the most likely causes of cramps are muscle fatigue or tearing of the muscle itself (2). Electromyograph (EMG) studies measure increased electrical activity from damaged muscles. EMGs show markedly elevated electrical activity of the nerves controlling cramped muscles.

Furthermore, a review of the scientific literature shows the most common cause of muscle cramps appears to be muscle damage (3).

WARNING SIGNS: Before athletic cramps come on full force, you will usually feel the muscle pulling and tightening. If you slow down, the pulling lessens, but if you continue to push the pace, the muscle goes into a sustained cramp and you have to stop exercising to work the cramp out.

Further evidence that muscle damage is the cause of the cramp is that the muscle often hurts for hours or days afterwards.

WHEN A CRAMP STRIKES: Muscle cramps during endurance events can be prevented by slowing down when you feel excessive soreness in one muscle group or straining in a muscle. You do this by switching pressure from the cramped leg to the uncramped one. A bicycle racer moves most of his pressure to the pedal of the uncramped leg. A runner shortens the stride of the cramped leg. Continuing to put pressure on the cramped muscle can rupture the muscle.

PREVENTION: You may be able to prevent cramps by exercising more frequently but less intensely and for shorter periods of time, but most racers do not want to do this.

OTHER CAUSES IN NON-ATHLETES: Known medical causes of muscle cramps are extremely rare. If you suffer from recurrent muscle cramps, you may need special tests for pinched nerves, Parkinson's disease, low thyroid, diabetes, narrowed arteries from arteriosclerosis, low blood mineral levels, metabolic diseases that cause muscle damage, or side effects of drugs used for high cholesterol, high blood pressure or diabetes, diuretics, oral contraceptives or alcohol (4).

DEHYDRATION OR LACK OF MINERALS LESS COMMON. Some cramps are caused by low mineral or fluid levels (5). However, for the vast majority of trained athletes who suffer exercise-associated muscle cramps, blood levels of sodium, potassium, calcium and magnesium are normal. Research in athletes after they ran in 52-mile races showed that the runners who suffered cramps had the same level of dehydration and blood minerals as those who did not get muscle cramps.

ATHLETES SHOULD TAKE EXTRA SALT ANYWAY. Athletes need more salt than people who do not exercise. They lose a lot of salt through sweat. The most common mineral cause of muscle cramps in untrained people who exercise is lack of salt, according to a report from the University of Oklahoma (6). The authors found that intravenous saline can reverse cramping in exercisers, and that more salt in the diet or in sports drinks can help to prevent heat-associated cramping.

If you are concerned about excess salt raising your blood pressure, get a wrist cuff monitor and check your blood pressure every night before you go to bed. If your blood pressure rises above 120, you may need to restrict salt. (Excess salt can raise systolic blood pressure. Excess body fat, not salt, raises diastolic pressure,

TREATMENTS THAT USUALLY DO NOT WORK: Nobody has shown consistent benefit for trained athletes from any of the most common treatments:

multivitamin pills; mineral pills with calcium, zinc, magnesium, salt and/or potassium; massage or chiropractic manipulation; drinking large amounts of water; dietary manipulations; or bio-mechanical stretching and strengthening.

MEDICATIONS: Quinine has been reported to help relieve muscle cramps in non athletes, but it can burst red blood cells. Some studies show that gabapentin (an anticonvulsant), diltiazem (a blood pressure medication), or B-complex vitamins may help to relieve muscle cramps in some people (7).

SUGAR: There is some evidence that taking sugared drinks or foods during prolonged exercise helps to maintain endurance and muscle integrity which helps to prevent cramps. Take a source of sugar frequently during vigorous workouts or races, and back off if you feel a group of muscles pulling or tightening during exercise.

LACK OF VITAMIN D: A leading cause of muscle damage, soreness and slow-healing injuries in athletes is lack of vitamin D. If you suffer frequent cramping and your muscles feel sore or you keep on being injured when you exercise, get a blood test called D3. If it is below 75 nmol/L, your problems may be caused by lack of vitamin D and be cured by getting some sunshine or taking at least 2000 IU each day of the very inexpensive vitamin D3.

OCCASIONAL CRAMPS ARE NOT HARMFUL: Most racers and serious exercisers accept that occasional cramps will occur, and rarely cause serious injuries.

References:

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