

Muscle Cramps – Causes and Management

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Introduction

Cramps have always existed in human history. The literature does not report the exact moment in which the first cramp phenomenon is described in medicine, distinguishing it from a benign event with respect to a symptomatological event.

Muscle cramps result in continuous, involuntary, painful, and localized contraction of an entire muscle group, individual single muscle, or select muscle fibers. Generally, the cramp can last from minutes to a few seconds for idiopathic or known causes with healthy subjects or in the presence of diseases. Palpating the muscle area of the cramp will present a knot.

Exercise-associated muscle cramps are the most frequent condition requiring medical/therapeutic intervention during sports.^{1,2} The specific etiology is not well understood and possible causes depend on the physiological or pathological situation in which the cramps appear. It is important to note that a painful contraction that is limited to a specific area does not mean that the cause of the cramp is necessarily local.

A cramp is almost never a local effect but involves the whole body system, such as somatic and emotional.

The older you are, the more likely you are to have leg cramps. This is because your tendons (the tissues that connect your muscles to your bones) naturally shorten as you age. Women and people assigned female at birth (AFAB) are also more likely to get them. Up to 60% of adults get leg cramps at night, as do up to 40% of children and teenagers.

Etiology

The etiology of the cramp depends on the situation in which it occurs. It is not possible to draw up the causes, and the possible physiological or pathological differences in which the cramp occurs must be highlighted, as different scenarios give rise to cramps.

Heat-associated muscle cramping is often seen during sports and rigorous exercise or physical activity. In this situation, large losses of sweat and electrolytes are believed to be the underlying pathologic mechanism.³

Epidemiology

The literature does not clearly explain the epidemiology of cramps, as these muscular phenomena may appear differently depending on the context examined. Furthermore, there is no single text that takes into account the percentage of the cramps, without looking for different pathologies, the sports environment (hot or cold), the type of sport.^{4,5,6}

There is no relationship between sex and cramps. About 80% of the affected muscle area is the calf.

Pathophysiology

The pathophysiology of muscle cramps is not always clear and depends on the patient's pathological condition.

Histopathology

No biopsy studies evaluate the morphology and structure of the muscles of athletes in case of cramps. It is not possible to state that the muscle subject of cramps has specific particularities when compared to the same alterations of the muscle fibers in the presence of pathology.

Leg Cramps in Pregnant Women

Muscle cramps in women during pregnancy are very common, about 50%; particularly in the last 3 months and during the night.

The exact cause of this disorder is not completely clarified. It could be an alteration of neuromuscular function, excessive weight gain, peripheral nerve compressions, insufficient blood flow to the muscles, and increased work by the muscles of the lower limbs. It could increase the glomerular filtration and the need for the fetus to receive minerals, compared to the muscular need of the mother's legs, with a reduction of calcium and magnesium.

Exercise-Associated Muscle Cramp

Exercise-Associated Muscle Cramp (EAMC) is an event that frequently occurs during or after physical activity. Currently, two hypotheses exist.

The first is related to the concept of dehydration and electrolyte imbalance, while the second, most recent theory is linked to a transient peripheral neurological disorder. The major findings indicate peripheral fatigue of neurological origin as a cause for the appearance of cramps.

Writer Cramp

Writer cramp (WC) is specific dystonia of the hand used for writing; it is found in particular between 30 and 50 years of age. Recent studies demonstrate different abnormalities of the central neural network, both as activity and as altered volume involving some areas of the cortex, the cerebellum, and the basal ganglia. The differences in the results probably depend on the individuality of the subject and the tools used for the research.

Medical Reasons:

The following diseases and drugs may cause muscle cramps:

End-Stage Renal Disease

People with chronic renal failure undergoing dialysis often suffer from muscle cramps, up to 50%, especially involving the lower limbs. The advent of cramps can happen during dialysis or at home. The cramps in this

type of patient are linked to depression, a decline in quality of life, and sleep disorders. The etiology of cramps in hemodialysis patients is not clear.

One possible cause is the presence of polyneuropathy, typical in these situations, with morphological and functional alterations of the peripheral nerve fibers. Renal transplantation greatly reduces the presence of cramps.

ALS (amyotrophic lateral sclerosis/Lou Gehrig's disease): Progressive neuromuscular disease.

Congestive heart failure: When your heart can't pump blood well enough to give your body a normal supply.

Cirrhosis of the liver: Scarring of your liver.

Diabetes: A disease that prevents your body from properly using the energy from the food you eat.

Flat feet: The absence of a supportive arch in your foot.

Hypokalemia: Low potassium levels in your blood.

Kidney failure: A condition in which one or both of your kidneys no longer work correctly.

Osteoarthritis: The corrosion of the cartilage that protects your bones.

Parkinson's disease: A neurological movement disorder.

Peripheral artery disease: Narrowing of the arteries in your legs or arms.

Peripheral neuropathy: A group of nerve diseases that can cause a range of symptoms, including cramps and pain.

Addison disease, thyroid issues, sarcoidosis and vascular diseases, in addition to the above, birth control pills, diuretics, laproxin, asthma drugs, statins, cancer treatments like chemotherapy can cause nerve damage, which may also cause muscle cramps.

Management and Treatment

Currently, there is no adequate treatment to reduce the incidence of cramps.

You want to get rid of a leg cramp the moment it strikes. You might be finishing up an exercise routine, or a cramp might wake you up in the middle of the night. In moments like that, unfortunately, there aren't any magical injections that can instantly relieve your pain. However, there are eight steps to take to possibly get rid of a leg cramp:

Stretch: Straighten your leg and then flex it, pulling your toes toward your shin to stretch the muscles. Stretch the cramped muscle, and gently rub. For a thigh cramp, try pulling the foot on that leg up toward your buttock. Hold on to a chair to steady yourself.

Massage: Use your hands or a roller to massage the muscles.

Stand: Get up. Press your feet against the floor.

Walk: Wiggle your leg while you walk around.

Apply heat: Use a heating pad or take a warm bath.

Apply cold: Wrap a bag of ice in a towel and apply it to the area.

Take pain medications: Take ibuprofen or acetaminophen to help with the pain.

Elevate: Prop up your leg after the cramp starts to feel better.

There aren't any recommended medications that can prevent leg cramps 100% of the time. However, some prescription medications show a little evidence of preventing leg cramps. Under the direction of your healthcare provider, you might want to try the following:

Carisoprodol : A muscle relaxant.

Diltiazem : A calcium-channel blocker.

Orphenadrine : Treats muscle spasms and relieves pain and stiffness in muscles.

Verapamil: A calcium-channel blocker.

Magnesium.

Gabapentin: Anticonvulsant and nerve pain medication.

Vitamin B complex.

No vitamin is likely to help with a leg cramp 100% of the time. But some experts do recommend that you take a vitamin B complex or magnesium for leg cramps.

Muscle Cramp Relieving Foods

The best foods that help with cramps and explain the magical powers driving these pain-relief effects are:

Dark leafy greens

Mixing some dark leafy greens into your diet is an easy way to get your fill of magnesium.

Pumpkin Seeds

Pumpkin seeds are one of the best sources of magnesium, according to the National Institutes of Health.

Peppermint

This potent-smelling herb is packed with two of the aforementioned polyphenols: diosmin and hesperidin. When it comes to peppermint, often the easiest way to bring that into your diet is through peppermint tea, which is a really popular way to sip on it and consume it. Not a fan of the beverage? Get your fill of the food that helps with cramps by finely chopping the leaves and adding them to a salad or stirring them into Greek yogurt with berries.

Ginger

Ginger has a reputation for being an anti-inflammatory all-star, and one systematic review found that consuming the root orally (via capsules containing ginger powder) may be a potentially effective pain relief treatment for cramps. While there's no guarantee eating ginger straight-up will have the same effects as those found in studies, it's easy enough to incorporate into your diet and, thus, worth a shot. Consider brewing a cup of ginger tea or blending it into your green smoothie. A ginger-based smoothie with some berries would be a fabulous cramp drink in the morning.

Turmeric

A single golden spice can help you score that anti-inflammatory, prostaglandin-inhibiting curcumin. We really love adding turmeric into stews, or you can even use that as a seasoning onto the fish, like the salmon or mackerel. Turmeric lattes, as well, are excellent, like a

golden milk latte you can do before bed. That warm, soothing beverage can also help reduce some of that cramping and that pain, too.

Tofu

While dairy is typically what first comes to mind when you think of calcium, you can also get your fill from tofu, which provides 12.5 per cent of the RDA per three ounces. Transform the plant-based protein into a crispy taco filling, mix it into soups or curries, or use it to create an animal-free take on scrambled eggs.

Sweet potato

Sweet potatoes are amongst the healthiest vegetables you can eat due to the powerful combination of vitamins, minerals, and plant compounds found within their flesh and skin.

They're packed with potassium, calcium, and magnesium — minerals that are vital for muscle function.

Beet greens

Beet greens are the leafy, nutritious tops of the beet plant. They're amongst the most nutritious greens you can eat and packed with a number of nutrients that support muscle health and may reduce your risk of muscle cramps.

Smoothies

Smoothies are an excellent choice for people who experience muscle cramps. They're not only hydrating but also can be customized to contain a hearty dose of muscle-supporting nutrients.

For example, combining frozen berries, spinach, almond butter, and Greek yogurt in an easy-to-drink smoothie can help deliver the vitamins and minerals that your muscles need to function at an optimal level.

Fermented foods

Fermented foods, such as pickles and kimchi, are typically high in sodium and other nutrients that may help reduce muscle cramps. Interestingly, some research has shown that consuming pickle juice may help inhibit electrically induced muscle cramps in athletes.

Avocado

Avocados are creamy, delicious fruits that are packed with nutrients that may help prevent muscle cramps.

They're particularly rich in potassium and magnesium, two minerals that act as electrolytes in the body and play roles in muscle health.

Watermelon

One possible cause of muscle cramps is dehydration. Proper muscle function requires adequate hydration, and a lack of water can hinder muscle cells' ability to contract, which may cause or exacerbate cramping.

Watermelon is a fruit that has an exceptionally high water content. In fact, watermelon is nearly 92% water, making it an excellent choice for a hydrating snack.

Coconut water

Coconut water is a go-to choice for athletes looking to rehydrate and replenish electrolytes naturally — and for good reason.

It's an excellent source of electrolytes, providing calcium, potassium, sodium, magnesium, and phosphorus — all of which may help decrease muscle cramping.

Papaya

Papayas are tasty tropical fruits that are especially high in potassium and magnesium. In fact, one 11-ounce (310-gram) papaya delivers about 15% and 19% of the recommended intakes for potassium and magnesium, respectively.

Salmon

Salmon is an incredibly rich source of protein, healthy anti-inflammatory fats, and other nutrients that may help prevent muscle cramps, including B vitamins, potassium, magnesium, and phosphorus.

Salmon is also high in iron, a mineral that's essential for healthy blood cell production, the oxygenation of muscle tissue, and blood flow, which are important for muscle cramp prevention.

Additionally, salmon is a good source of vitamin D. Having healthy blood levels of vitamin D is vital for muscle function, and being deficient in this nutrient may lead to muscular symptoms, such as muscle pain, spasms, and weakness.

Sardines

Sardines may be tiny, but they pack a punch when it comes to nutrition.

These small fish are especially high in nutrients that may help prevent and relieve muscle cramps, including calcium, iron, phosphorus, potassium, sodium, vitamin D, and magnesium.

Dark chocolate

Just one ounce dark chocolate with 70 to 85 per cent cacao packs a whopping 21 per cent of the RDA for magnesium, and luckily it's pretty effortless to incorporate into your diet. Aside from eating a few chocolate squares straight-up, consider mixing cacao powder with some honey and pumpkin seed butter for a fudge-like treat.

Prevention

Ideas for prevention include several activities you may want to do every day:

Exercise: Do leg exercises during the day, and mild, brief walking or biking right before bed.

Hydration: Drink eight glasses of water each day and avoid alcohol and caffeinated beverages.

Medications and vitamins: Take all vitamins and medications (including muscle relaxants) exactly how your healthcare provider prescribes them.

Prepare your bed space: Keep a heating pad and massage roller next to your bed.

Shoes: Purchase supportive shoes.

Sleeping position: Experiment with different positions to see if one works better than another. Keep your toes up if you're on your back and hang your feet over the end of the bed if you lie on your front.

Stretch: Stretch your legs before and after exercising, and right before you go to sleep.

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