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**CRAMPS**

**What are muscle cramps?**

A muscle cramp is an involuntarily and forcibly contracted muscle that does not relax. When we use the muscles that can be controlled voluntarily, such as those of our arms and legs, they alternately contract and relax as we move our limbs. Muscles that support our head, neck, and trunk contract similarly in a synchronized fashion to maintain our posture. A muscle (or even a few fibers of a muscle) that involuntarily (without consciously willing it) contracts is in a "spasm." If the spasm is forceful and sustained, it becomes a cramp. Muscle cramps cause a visible or palpable hardening of the involved muscle.

Cramps are extremely common. Almost everyone (one estimate is about 95%) experiences a cramp at some time in their life. Cramps are common in adults and become increasingly frequent with aging. However, children also experience cramps.

Any of the muscles that are under our voluntary control (skeletal muscles) can cramp. Cramps of the extremities, especially the legs and feet, and most particularly the calf (the classic "charley horse"), are very common. Involuntary muscles of the various organs (uterus, blood vessel wall, intestinal tract, bile and urine passages, bronchial tree, etc.) are also subject to cramps. Cramps of the involuntary muscles will not be further considered in this review. This article focuses on cramps of skeletal muscle.

**What are the types and causes of muscle cramps?**

**True cramps**

True cramps involve part or all of a single muscle or a group of muscles that generally act together, such as the muscles that flex several adjacent fingers. Most authorities agree that true cramps are caused by hyperexcitability of the nerves that stimulate the muscles. They are overwhelmingly the most common type of skeletal muscle cramps. True cramps can occur in a variety of circumstances as follows.

**Injury**: Persistent [muscle spasm](http://www.medicinenet.com/script/main/art.asp?articlekey=101231) may occur as a protective mechanism following an injury, such as a broken bone. In this instance, the spasm tends to minimize movement and stabilize the area of injury. Injury of the muscle alone may cause the muscle to spasm.

**Vigorous activity**: True cramps are commonly associated with the vigorous use of muscles and muscle fatigue (in sports or with unaccustomed activities). Such cramps may come during the activity or later, sometimes many hours later. Likewise, muscle fatigue from sitting or lying for an extended period in an awkward position or any repetitive use can cause cramps. Older adults are at risk for cramps when performing vigorous or strenuous physical activities.

**Rest cramps**: Cramps at rest are very common, especially in older adults, but may be experienced at any age, including childhood. Rest cramps often occur during the night. While not life-threatening, night cramps (commonly known as nocturnal cramps) can be painful, disruptive of [sleep](http://www.medicinenet.com/script/main/art.asp?articlekey=6177), and they can recur frequently (that is, many times a night, and/or many nights each week). The actual cause of night cramps is unknown. Sometimes, such cramps are initiated by making a movement that shortens the muscle. An example is pointing the toe down while lying in bed, which shortens the calf muscle, a common site of cramps.

[**Dehydration**](http://www.medicinenet.com/script/main/art.asp?articlekey=339): Sports and other vigorous activities can cause excessive fluid loss from perspiration. This kind of dehydration increases the likelihood of true cramps. These cramps are more likely to occur in warm weather and can be an early sign of [heat stroke](http://www.medicinenet.com/script/main/art.asp?articlekey=10110). Chronic volume depletion of body fluids from diuretics (medicine that promote urination) and poor fluid intake may act similarly to predispose to cramps in seniors. Sodium depletion has also been associated with cramps. Loss of sodium, the most abundant chemical constituent of body fluids outside the cell, is usually a function of dehydration.

**Body fluid shifts**: True cramps also may be experienced in other conditions that feature an unusual distribution of body fluids. An example is [cirrhosis of the liver](http://www.medicinenet.com/script/main/art.asp?articlekey=322), which leads to the accumulation of fluid in the abdominal cavity ([ascites](http://www.medicinenet.com/script/main/art.asp?articlekey=103748)). Similarly, cramps are a relatively frequent complication of the rapid body fluid changes that occur during dialysis for kidney failure.

**Low blood calcium, magnesium**: Low blood levels of either calcium or magnesium directly increase the excitability of both the nerve endings and the muscles they stimulate. This may be a predisposing factor for the spontaneous true cramps experienced by many older patients.

**Low potassium**: Low potassium levels occasionally cause muscle cramps, although it is more common for low potassium to be associated with muscle weakness.

**Can medications cause muscle cramps?**

Numerous medicines can cause cramps. Potent diuretic medications, such as [furosemide](http://www.medicinenet.com/script/main/art.asp?articlekey=772) (Lasix), or the vigorous removal of body fluids, even with less potent diuretics, can induce cramps by depleting body fluid and sodium. Simultaneously, diuretics often cause the loss of potassium, calcium, and magnesium, which can also cause cramps.

Medications such as [donepezil](http://www.medicinenet.com/script/main/art.asp?articlekey=6244) (Aricept is used for [Alzheimer's disease](http://www.medicinenet.com/script/main/art.asp?articlekey=267)) and neostigmine (Prostigmine and others are used for [myasthenia gravis](http://www.medicinenet.com/script/main/art.asp?articlekey=425)) as well as [raloxifene](http://www.medicinenet.com/script/main/art.asp?articlekey=6778) (Evista is used to prevent [osteoporosis](http://www.medicinenet.com/script/main/art.asp?articlekey=434) in postmenopausal women) have caused cramps. [Tolcapone](http://www.medicinenet.com/script/main/art.asp?articlekey=44614) (Tasmar is used for [Parkinson's disease](http://www.medicinenet.com/script/main/art.asp?articlekey=442)) reportedly causes muscle cramps in at least 10% of patients. True cramps are reported with [nifedipine](http://www.medicinenet.com/script/main/art.asp?articlekey=815) (Procardia and others are used for [angina](http://www.medicinenet.com/script/main/art.asp?articlekey=262), [high blood pressure](http://www.medicinenet.com/script/main/art.asp?articlekey=378) and other conditions) and the [asthma](http://www.medicinenet.com/script/main/art.asp?articlekey=284) drugs [terbutaline](http://www.medicinenet.com/script/main/art.asp?articlekey=843) (Brethine) and [albuterol](http://www.medicinenet.com/script/main/art.asp?articlekey=855) (Proventil, Ventolin, and others). Some medicines used to lower [cholesterol](http://www.medicinenet.com/script/main/art.asp?articlekey=320), such as [lovastatin](http://www.medicinenet.com/script/main/art.asp?articlekey=789) (Mevacor), can also lead to cramps.

**Can vitamin deficiencies cause muscle cramps?**

Several vitamin deficiency states may directly or indirectly lead to muscle cramps. These include deficiencies of [thiamine](http://www.medicinenet.com/script/main/art.asp?articlekey=8694) (B1), [pantothenic acid](http://www.medicinenet.com/script/main/art.asp?articlekey=8679) (B5), and [pyridoxine](http://www.medicinenet.com/script/main/art.asp?articlekey=13085) (B6). The role of deficiency of these vitamins in causing cramps is unknown.

**Can poor circulation cause muscle cramps?**

Poor circulation to the legs, which results in inadequate oxygen to the muscle tissue, can cause severe pain in the muscle (sometimes known as [claudication](http://www.medicinenet.com/script/main/art.asp?articlekey=9297) pain). This commonly occurs in the calf muscles. While the pain feels virtually identical to that of a severely cramped muscle, the pain does not seem to be a result of the actual muscle cramping. This pain may be due to accumulation of lactic acid and other chemicals in the muscle tissues. It's important to see your doctor if you have pain like this.

**What is the treatment of skeletal muscle cramps?**

Most cramps can be stopped if the muscle can be stretched. For many cramps of the feet and legs, this stretching can often be accomplished by standing up and [walking](http://www.medicinenet.com/script/main/art.asp?articlekey=81245) around. For a calf muscle cramp, the person can stand about 2 to 2.5 feet from a wall (possibly farther for a tall person) and lean into the wall to place the forearms against the wall with the knees and back straight and the heels in contact with the floor. (Learn this maneuver at a time when you don't have the cramp!) Another technique involves flexing the ankle by pulling the toes up toward the head while still lying in bed with the leg as straight as possible.

Gently massaging the muscle will often help it to relax, as will applying warmth from a heating pad or hot soak. If the cramp is associated with fluid loss, as is often the case with vigorous physical activity, fluid and electrolyte (especially sodium and potassium) replacement is essential. Medicines are not generally needed to treat an ordinary cramp that is active since most cramps subside spontaneously before enough medicine would be absorbed to even have an effect.

Of course, if cramps are severe, frequent, persistent, respond poorly to simple treatments, or are not associated with an obvious cause, then the patient and the doctor need to consider the possibility that more intensive treatment is indicated or that the cramps are a manifestation of another disease. As described above, the possibilities are extremely varied and include problems with circulation, nerves, metabolism, hormones, medications, and [nutrition](http://www.medicinenet.com/script/main/art.asp?articlekey=10192). It is uncommon for muscle cramps to occur as the result of a medical condition without other obvious signs that the medical condition is present.

### Cramps are inevitable, but if possible, it would be best to prevent them. How can muscle cramps be prevented?

**Activity**: Authorities recommend stretching before and after exercise or sports, along with an adequate warm-up and cooldown, to prevent cramps that are caused by vigorous physical activity. Good hydration before, during, and after the activity is important, especially if the duration exceeds one hour, and replacement of lost [electrolytes](http://www.medicinenet.com/script/main/art.asp?articlekey=16387) (especially sodium and potassium, which are major components of perspiration) can also be helpful. [Excessive fatigue](http://www.medicinenet.com/script/main/art.asp?articlekey=120806), especially in warm weather, should be avoided.

**How much should I drink?**

Hydration guidelines should be individualized for each person. The goal is to prevent excessive [weight loss](http://www.medicinenet.com/script/main/art.asp?articlekey=18262) (>2% of body weight). You should weigh yourself before and after [exercise](http://www.medicinenet.com/script/main/art.asp?articlekey=56640) to see how much fluid you lose through sweat. One liter of water weighs 2.25 pounds. Depending on the amount of exercise, temperature and humidity, body weight, and other factors, you can lose anywhere from approximately .4 to 1.8 liters per hour.

**Rest cramps**: Night cramps and other rest cramps can often be prevented by regular stretching exercises, particularly if done before going to bed. Even the simple calf-stretching maneuver (described in the first paragraph of the section on treatment), if held for 10 to 15 seconds and repeated two or three times just before going to bed, can be a great help in preventing cramps. The maneuver can be repeated each time you get up to go to the bathroom during the night and also once or twice during the day. If nocturnal leg cramps are severe and recurrent, a foot board can be used to simulate walking even while recumbent and may prevent awkward positioning of the feet during sleep. Ask your doctor about this remedy.

Another important aspect of prevention of night cramps is adequate calcium and magnesium. Calcium intake of at least 1 gram daily is reasonable, and 1.5 grams may be appropriate, particularly for women with osteoporosis. An extra dose of calcium at bedtime may help prevent cramps.

Supplemental magnesium may be very beneficial for some, particularly if the person has a magnesium deficiency. However, added magnesium can be very hazardous for people who have difficulty eliminating magnesium, as happens with kidney insufficiency. The vigorous use of diuretics usually increases magnesium loss, and high levels of calcium intake (and therefore of calcium excretion) tend to increase magnesium excretion. Magnesium is present in many foods (greens, grains, meat and fish, bananas, apricots, nuts, and soybeans) and some laxatives and antacids, but a supplemental dose of 50-100 milligrams of magnesium daily may be appropriate. Splitting the dose and taking a portion several times during the day minimizes the tendency to [diarrhea](http://www.medicinenet.com/script/main/art.asp?articlekey=1900) that magnesium can cause.

Vitamin E has also been said to help minimize cramp occurrence. Scientific studies documenting this effect are lacking, but anecdotal reports are common and sometimes quite enthusiastic. Since vitamin E is thought to have other beneficial health effects and is not toxic in usual doses, taking 400 units of vitamin E daily is approved, recognizing that documentation on its effect on cramps is lacking.

**Are there particular concerns for older adults?**

Older adults should have periodic magnesium blood levels taken if they use supplemental magnesium. Even a mild and otherwise not apparent degree of kidney dysfunction, which is often seen in this age group, may lead to toxic levels of magnesium with modest doses.

Recent studies have indicated that vitamin D (a vitamin required for the normal absorption of calcium from food) deficiency is common in some elderly individuals. Consequently, vitamin D replacement is important for these people, taking appropriate care to avoid excessive vitamin D levels, as these are toxic. An intake of 800 units of vitamin D daily is likely to be fully adequate; at least 400 units daily is generally recommended. Some experts have questioned whether these dosages of vitamin D are sufficient, especially for people with little or no sun exposure (sunlight promotes the formation of vitamin D in the body). However, excessive doses of vitamin D are known to be toxic. The upper limit of dosing for vitamin D supplementation has been recommended as 2,000 IU daily. Your health-care professional can help you decide how much vitamin D you should take, taking your individual situation and medical history into account.

While the more potent diuretics are associated with an increased loss of calcium and magnesium, [hydrochlorothiazide](http://www.medicinenet.com/script/main/art.asp?articlekey=757) (Hydrodiuril and others) and related diuretics are associated with calcium and magnesium retention.

Diuretics also cause sodium depletion and most also cause potassium depletion. Many patients who use diuretics are also on sodium restricted diets. Careful attention to the effects of diuretics on sodium and potassium, and replacement of these elements as needed, is always appropriate, even more so if cramps are a problem.

Older adults often do not hydrate themselves adequately, partly because the sense of thirst diminishes with age. This situation is exaggerated in those who are treated with diuretics. For some, simply increasing fluid intake to the generally recommended six to eight glasses a day will improve the cramps. However, drinks with [caffeine](http://www.medicinenet.com/script/main/art.asp?articlekey=82141) should not be counted since they act on the kidneys to increase fluid loss. Individuals who are on restricted fluid intake should consult their doctor on this issue and must not ignore their recommended fluid intake limits.

As for night cramps, the exact cause is often difficult to determine. The best prevention involves stretching regularly, adequate fluid intake, appropriate calcium and vitamin D intake, supplemental vitamin E, and possibly -- with physician consultation -- supplemental magnesium intake.

**Are there medications to prevent muscle cramps?**

In recent times, the only medication that has been widely used to prevent, and sometimes also to treat, cramps is [quinine](http://www.medicinenet.com/script/main/art.asp?articlekey=44657). Quinine acts by decreasing the excitability of the muscles. It has also been shown to be effective in many, but not all, scientific studies. However, quinine also causes [birth defects](http://www.medicinenet.com/script/main/art.asp?articlekey=2007) and miscarriages. It has also occasionally caused hypersensitivity reactions and a deficiency of platelets, which are the blood components responsible for clotting. Either of these reactions can be fatal. Quinine is also associated with a cluster of symptoms called cinchonism ([nausea, vomiting](http://www.medicinenet.com/script/main/art.asp?articlekey=41943), [headaches](http://www.medicinenet.com/script/main/art.asp?articlekey=20628), and [deafness](http://www.medicinenet.com/script/main/art.asp?articlekey=2011)). Additionally, vision and heart irregularities can occur. Consequently, quinine tablets are not available in the United States. Quinine is available in grocery stores in tonic water. Consult your physician before taking quinine for cramps.

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