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Nocturnal leg cramps

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INTRODUCTION

Nocturnal leg cramps, also termed sleep-related leg cramps, are a common lower-extremity condition that produces pain and can disrupt sleep. Symptoms result from involuntary muscle contractions, which are sudden in onset, usually affecting the calf or foot.

Nocturnal leg cramps are reviewed here. Other nighttime disorders of leg discomfort or movement, including restless legs syndrome (RLS) and periodic limb movements of sleep (PLMS), are discussed separately. (See "[Clinical features and diagnosis of restless legs syndrome and periodic limb movement disorder in adults](#)".)

EPIDEMIOLOGY

Nocturnal leg cramps are common and frequently unreported to clinicians [1,2]. In the general population, they are present in 40 percent of those over the age of 50, have an increased frequency with age, show no gender preference, and are associated with sleep disturbance and overall poor health [3].

Nocturnal leg cramps have been reported in about 7 percent of children and adolescents [4]. Peak occurrence in this population was at 16 to 18 years of age, with no cases reported less than eight years of age. Pediatric nocturnal leg cramps are typically benign, self-limited, and infrequent [4,5].

CAUSES AND PATHOGENESIS

Leg cramps can be idiopathic, which is most common, or secondary to other medical conditions. Secondary causes include structural disorders or leg positioning; neurologic disorders; metabolic disorders, including extracellular fluid volume depletion and electrolyte disturbances; and medications [6-17]. Patients with the most common form of leg cramps have no fluid or electrolyte imbalance.

Observed electrophysiologic changes include an increased frequency of muscle action potentials due to motor neuron hyperactivity [8]. This results in depletion of muscle adenosine triphosphate; cytosolic accumulation of calcium then prevents muscle relaxation. During polysomnographic studies, patients with chronic nocturnal leg cramps exhibit nonperiodic bursts of gastrocnemius electromyographic activity. Episodes occur during sleep without preceding physiologic changes. On electromyography (EMG), the involuntary contraction of the muscle is associated with repetitive firing of motor unit action potentials at much higher rates than those seen with voluntary muscle contraction [17]. There is a gradual increase during the cramp in the number of motor units activated and their discharge frequency, which is followed by a gradual decrease and a pattern of irregular firing as the cramp resolves.

The secondary causes of leg cramps include:

- Structural/mechanical causes
 - Structural disorders such as flat feet, genu recurvatum, and the hypermobility syndrome may predispose to leg cramps. A family history is common in these circumstances.
 - Prolonged sitting, inappropriate leg position during sedentary activity, or living or working on concrete flooring may be correlated with an increased occurrence of leg cramps.
- Neurologic disorders – Neurologic disorders often accompanied by leg cramps include Parkinson's disease, myopathies, neuropathies, radiculopathies, and motor neuron diseases [6,18].
- Metabolic/fluid and electrolyte disorders
 - Leg cramps may result from extracellular volume depletion (eg, due to diuretics, excessive sweating without sufficient salt replacement, or fluid removal during hemodialysis) and the dialysis disequilibrium syndrome. (See "[Dialysis disequilibrium syndrome](#)".)

- Pregnancy-related leg cramps may be due, in part, to low serum magnesium, which may respond to magnesium supplementation, although results of trials using such therapy are mixed [19-21].
- Other metabolic disorders associated with leg cramps include diabetes, hypoglycemia, alcoholism, hypothyroidism, and metabolic myopathies [7].
- Medications for which the evidence of an association with leg cramps is the strongest, although still unproven, include inhaled long-acting beta agonists (LABA), potassium-sparing diuretics, and thiazide-like diuretics. Analysis of a population-derived pharmacy database involving 24,417 individuals found that patients were more likely to receive a [quinine](#) prescription for nocturnal leg cramps during the year after starting a drug from one of these classes, compared with the preceding year (sequence ratios for LABA, potassium-sparing and thiazide diuretics of 2.42 [95% CI 2.02-2.89], 2.12 [95% CI 1.61-2.78], and 1.48 [95% CI 1.29-1.68], respectively) [15]. Only small increased risks were seen for loop diuretics and statins.

Other medications that may cause cramps include other beta agonists, beta blockers with intrinsic sympathomimetic activity, angiotensin II receptor antagonists, benzodiazepines, [teriparatide](#), [pyrazinamide](#), [raloxifene](#), [donepezil](#), [neostigmine](#), [tolcapone](#), clofibrate, [cisplatin](#), [vincristine](#), oral contraceptives, and intravenous [iron sucrose](#) [7,9,11,13-16].

- Other conditions
 - Exercise-associated muscle cramping (EAMC) is defined as an involuntary, painful contraction of skeletal muscle during or after exercise [22]. EAMC is thought to be associated with muscle fatigue.
 - Peripheral vascular disease, venous insufficiency, and less common causes have been associated with nocturnal leg cramps, including anemia, Raynaud syndrome, opioid withdrawal, nonalcoholic cirrhosis, and bariatric surgery [2,10,12,16].

CLINICAL MANIFESTATIONS

Nocturnal leg cramps are characterized by sudden muscle tightness, most commonly in the calf, foot, or thigh [16,17,23]. The cramps typically last from seconds to many minutes, and are relieved by forceful stretching of the affected muscles. Calf cramping may be associated with extreme plantar flexion of the foot and toes [23]. Following resolution of the acute cramp, there may be persistent soreness for up to several hours; discomfort for up to 48 to 72 hours has

been described and may be more prolonged in the thigh compared with the calf and foot [\[17,23\]](#).

The leg cramps typically occur while in bed, but patients may be awake or asleep; the vast majority of individuals have such cramps only at night. In one study, cramps occurred exclusively at night in the majority (73 percent), but occurred both during the day and night in 20 percent of patients, and only during the daytime in 7 percent [\[2\]](#). The average duration of the cramps was reported as nine minutes.

The primary morbidity of the cramping is pain and sleep disturbance, and patients may present to their clinician with a complaint of insomnia. Daytime fatigue is sometimes reported [\[24\]](#). Roughly 40 percent of those with nocturnal leg cramps report having such symptoms at least three times per week, and 5 to 10 percent report nightly cramping.

Striking seasonal variation in the occurrence of nocturnal leg cramps has been suggested by an analysis of the frequencies of new [quinine](#) prescriptions and of internet searches related to leg cramps, which both roughly doubled from their lows during the winter to highs during the summer over a six- and eight-year period, respectively [\[25\]](#). The basis for these observations is not known.

The clinical features of leg cramps are generally indistinguishable regardless of the cause or whether they are idiopathic or related to another illness [\[23,24\]](#).

DIAGNOSIS

Diagnostic evaluation — Patients should undergo a history and examination focused on the symptoms experienced by the patient and features that may identify an underlying cause or alternative diagnosis. Laboratory testing and other studies are usually not required [\[16\]](#).

- History – The evaluation should include a focused history to confirm the presence of symptoms that are typical or diagnostic of nocturnal leg cramps (see '[Diagnostic criteria](#)' below) and to identify predisposing factors or particular medications that may be associated with the condition (see '[Causes and pathogenesis](#)' above). Patients should be asked about symptoms that may suggest another cause of leg pain or similar symptoms, such as restless legs syndrome (RLS), dystonias, or peripheral vascular disease. (See '[Differential diagnosis](#)' below.)
- Physical examination – The physical examination should be directed towards identifying findings that may suggest an underlying cause or alternative diagnosis (see '[Causes and pathogenesis](#)' above and '[Differential diagnosis](#)' below); cramps themselves will usually not

be present at the time of the visit. The legs and feet should be examined by inspection and palpation of the affected areas, and peripheral pulses should be evaluated. A neurologic examination should be performed, including an assessment of strength, deep tendon reflexes, sensation (light touch and pinprick), gait, and the presence of a tremor.

- Laboratory evaluation is generally not needed to make the diagnosis of nocturnal leg cramps. However, laboratory testing may be indicated in selected patients, such as those in whom the medical history and physical examination suggests an underlying disorder or alternative diagnosis associated with cramps, patients with new onset of cramps, and those experiencing a significant or abrupt unexplained change in the pattern of cramps. (See ['Causes and pathogenesis'](#) above and ['Differential diagnosis'](#) below.)

The specific testing that should be obtained depends upon the suspected underlying or associated disorder; examples include potassium and sodium in patients receiving diuretics, serum iron and related testing in patients suspected of RLS or periodic limb movement disorder (PLMD), electrolytes in patients on dialysis, and magnesium in pregnant women. Diffuse, recurrent, or severe muscle cramping should prompt an evaluation for hypocalcemia, although the plasma calcium concentration is normal in patients with idiopathic cramps. (See ["Clinical manifestations of hypocalcemia"](#).)

Diagnostic criteria — The diagnosis of nocturnal leg cramps is made based upon a characteristic history of leg cramps and a history and physical examination that clinically excludes another cause of muscle cramping (see ['Clinical manifestations'](#) above and ['Diagnostic evaluation'](#) above and ['Differential diagnosis'](#) below). The essential elements of the history for making the diagnosis are described in the diagnostic criteria of the American Academy of Sleep Medicine, as detailed in the International Classification of Sleep Disorders [24]. Patients must meet all three of the following criteria:

- A painful sensation in the leg or foot associated with sudden, involuntary muscle hardness or tightness, indicating a strong muscle contraction.
- The painful muscle contractions occur during the time in bed, although they may arise from either wakefulness or sleep.
- The pain is relieved by forceful stretching of the affected muscles, thus releasing the contraction.

Typically, the muscle contractions occur in the calf, foot, or thigh, lasting from seconds to many minutes. Usually one muscle or part of one muscle is involved. Following the leg cramps, some

patients have soreness and findings of tenderness in the affected muscle, which gradually resolve.

DIFFERENTIAL DIAGNOSIS

Patients may describe numerous types of leg pain as cramps. The physical examination may be helpful only in that it is usually normal with idiopathic leg cramps. A careful history and physical examination can exclude the majority of disorders in the differential diagnosis, including the following [8,9,26]:

- **Restless legs syndrome** – Restless legs syndrome (RLS) also occurs at rest, predominantly in the evening or at night, and is sometimes painful. Patients sometimes complain of a cramping sensation. Unlike nocturnal leg cramps, it is characterized by more continuous discomfort, a need to move the affected limb, and at times by involuntary brief movements. An important distinguishing feature is that RLS does not involve sustained contraction of muscles. (See ["Clinical features and diagnosis of restless legs syndrome and periodic limb movement disorder in adults"](#).)
- **Periodic limb movements** – Periodic limb movements of sleep (PLMS), also termed nocturnal myoclonus, are involuntary, jerking (lasting 0.5 to 10 seconds) movements of the legs during sleep that also occur at night but are not associated with the muscle tightening, pain, or necessity for stretching associated with leg cramps. Patients have stereotyped dorsiflexion of the toes and feet, sometimes with flexion of the knees and hips, occurring roughly every 10 to 30 seconds. When PLMS are associated with sleep fragmentation and excessive daytime sleepiness, they constitute periodic limb movement disorder (PLMD). A formal diagnosis of PLMD can be made by polysomnography. Individuals with RLS may also have periodic limb movements while awake, which are identical to those observed during sleep (and therefore quite distinct from leg cramps), but occur during periods of immobility. (See ["Clinical features and diagnosis of restless legs syndrome and periodic limb movement disorder in adults"](#), [section on 'Periodic limb movements of sleep'](#) and ["Clinical features and diagnosis of restless legs syndrome and periodic limb movement disorder in adults"](#), [section on 'Diagnosis'](#).)
- **Sleep starts and myoclonic jerks** – Hypnic jerks, also termed benign hypnic myoclonus, are common sudden jerking contractures of the limbs that occur during the transition to, or very shortly after, falling asleep [27]. These sleep starts may awaken the patient, and the severity of the movement can occasionally be frightening, but they are not associated with painful muscle cramps and seldom recur after falling back to sleep. No definite cause is

known. Occasionally, sleep starts and RLS coexist. The condition is self-limited; treatment includes reassurance and avoidance of caffeinated beverages. Partial myoclonic jerks, which are usually multifocal and occur in distal muscles, may also occur during sleep or the sleep transition. (See ["Classification and evaluation of myoclonus", section on 'Jerks associated with sleep'](#) and ["Nonepileptic paroxysmal disorders in adolescents and adults", section on 'Hypnic jerks'](#).)

- **Peripheral vascular disease** – Peripheral vascular disease may result in cramp-like leg pain in a pattern of intermittent claudication, which occurs during limb use and is relieved by rest, unlike leg cramps. Decreased pulses and other signs of arteriosclerotic vascular disease may be present. (See ["Clinical features and diagnosis of lower extremity peripheral artery disease"](#).)
- **Peripheral neuropathy and other neurologic disorders** – Peripheral neuropathy is also associated with lower-extremity pain in some patients; it is usually characterized by dysesthesias and/or muscle weakness but not sustained muscle contractions. Neurologic examination that demonstrates abnormal sensory and/or motor findings can distinguish these patients, who may occasionally experience cramps because of nerve injury or muscle pathology, from patients with nocturnal leg cramps without neuropathy.

Other neurologic disorders, including multiple sclerosis, Parkinson disease, amyotrophic lateral sclerosis (ALS), and stroke, often have muscle cramps as symptoms at some point in their course. Clinical course and associated neurologic findings are diagnostic. (See ["Overview of lower extremity peripheral nerve syndromes"](#) and ["Clinical presentation, course, and prognosis of multiple sclerosis in adults"](#) and ["Evaluation and diagnosis of multiple sclerosis in adults"](#) and ["Clinical manifestations of Parkinson disease"](#) and ["Diagnosis and differential diagnosis of Parkinson disease"](#) and ["Clinical features of amyotrophic lateral sclerosis and other forms of motor neuron disease"](#) and ["Diagnosis of amyotrophic lateral sclerosis and other forms of motor neuron disease"](#) and ["Initial assessment and management of acute stroke"](#) and ["Overview of the evaluation of stroke"](#).)

- **Dystonias** – Dystonias, particularly focal dystonias affecting the feet, may resemble nocturnal leg cramps. Dystonias include occupational cramps, which may be thought of as focal dystonias (eg, cramps associated with playing of a musical instrument or writer's cramp) and dystonia of the muscles related to dopamine antagonists (eg, antipsychotic medications or antiemetics) or Parkinson's disease. Dystonias involve agonist and antagonist muscle co-contraction, unlike nocturnal leg cramps that are relieved by stretching, and can be distinguished from leg cramps electrophysiologically. (See ["Etiology, clinical features, and diagnostic evaluation of dystonia"](#).)

- **Other** – Other entities associated with lower-extremity pain or muscle dysfunction that can usually be readily distinguished clinically from nocturnal leg cramps include muscle contractures associated with metabolic myopathies or thyroid disease; tetany (eg, due to hypocalcemia, hypomagnesemia, and metabolic acidosis); drug-related myalgia (eg, from statins, [cimetidine](#), or [cholestyramine](#)); and compartment syndromes in the lower extremity, which may very infrequently occur after excessive running. (See ["Approach to the metabolic myopathies"](#) and ["Hypothyroid myopathy"](#) and ["Myopathies of systemic disease"](#) and ["Clinical manifestations of hypocalcemia", section on 'Tetany'](#) and ["Hypomagnesemia: Clinical manifestations of magnesium depletion", section on 'Neuromuscular'](#) and ["Statin muscle-related adverse events"](#) and ["Approach to the patient with myalgia"](#) and ["Acute compartment syndrome of the extremities"](#).)

MANAGEMENT

Treatment of acute leg cramps — Patients with an acute leg cramp should forcefully stretch the affected muscle, as an example by active dorsiflexion of the foot with the knee extended, when the cramp is in the calf. This widely recommended approach typically provides rapid relief of the acute cramp [16,17,24]. Some patients may also find relief from passive stretching by getting out of bed and standing with the foot flat on the floor then pressing downward firmly, although active dorsiflexion of the foot may be more effective [28]. In our experience, stretching of the affected muscle reduces the duration and severity of the cramping and subsequent discomfort.

Other measures that may offer relief from the acute cramp include:

- Walking or leg jiggling followed by leg elevation
- A hot shower with the stream directed at the cramp area of the body, usually for five minutes, or a warm tub bath
- Ice massage

Patients with known abnormalities in fluid and electrolyte balance should undergo appropriate treatment for the correction of those abnormalities. (See ["Etiology, clinical manifestations, and diagnosis of volume depletion in adults"](#).)

Prevention of recurrent leg cramps — Initial efforts at prevention of recurrent nocturnal leg cramps should focus on nonpharmacologic interventions, such as daily stretching exercises. In patients in whom nonpharmacologic measures prove inadequate, pharmacotherapy may be tried with any of several different agents, but the data supporting the use of any one agent are very limited and inconclusive. We strongly prefer nonpharmacologic and alternative

pharmacologic measures over the use of [quinine](#), despite its potential efficacy and historical use for leg cramps, because of the risks associated with its use.

Initial preventive therapies — In patients who wish to prevent recurrent attacks, we suggest the initial use of daily stretching exercises or other nonpharmacologic, noninvasive interventions rather than pharmacotherapy. This approach is based upon the safety of these approaches despite limited evidence of the efficacy of these strategies, in face of the potential risks and/or similarly limited evidence for use of pharmacotherapeutic interventions [29]. (See ['Resistant to initial preventive therapies'](#) below.)

- Stretching exercises – Posterior leg muscle stretching exercises are usually performed in the weightbearing position. The posterior leg muscles are stretched by leaning forward with the legs kept straight and the feet kept flat on the floor; the position is held for 10 to 20 seconds and stretches are repeated three to five times in succession, four times daily for the first week, then twice daily in the evening, and again before retiring thereafter ([picture 1](#)) [30]. Stretching before going to bed at night may be sufficient for some patients.

Evidence supporting the efficacy of stretching was provided by a randomized trial, involving 80 patients over 55 years of age with a mean of 3.2 to 3.4 cramps nightly [31]. In the trial, a six-week program of calf and hamstring muscle stretching before sleep significantly decreased the frequency of nocturnal leg cramps compared with not stretching (mean difference of -1.2 cramps nightly, 95% CI -0.6 to -1.8). Additionally, cramp severity was decreased in the treatment group but not in the controls. Another clinical trial failed to confirm the benefit of this approach, although all of the trial patients were on [quinine](#) at baseline, and many continued the drug during the trial [30,32].

- Other preventive measures that may be beneficial include nonpharmacologic physical measures and avoidance of potential triggers:
 - In generally sedentary patients, riding a stationary bicycle for a few minutes before retiring.
 - Using long-countered shoes and other proper foot gear. (See ["Joint protection program for the lower limb"](#).)
 - Keeping the bed covers at the foot of the bed loose and not tucked in.
 - Patients may benefit from avoiding dehydration, particularly older adults and patients on diuretics; avoidance of drugs known to cause cramping (see ['Causes and](#)

[pathogenesis](#)' above) and of alcohol and caffeine; and should avoid exercising in extreme heat.

Resistant to initial preventive therapies — In patients with an inadequate response to initial preventive therapies, such as nonpharmacologic physical measures, we recommend the use of pharmacotherapeutic agents other than [quinine](#). These include medications such as [vitamin B complex](#) and [vitamin E](#), [diphenhydramine](#), [diltiazem](#), [verapamil](#), or [gabapentin](#), for which there are some data for efficacy. We limit the use of quinine to patients with severe cramping resistant to other measures, given the risk of serious adverse effects of quinine. For most agents other than quinine, benefit has been demonstrated in a single, usually small, case series or randomized trial [[23,30,33-41](#)].

Initial drug therapies — The length of a trial to determine benefit will depend upon the frequency of attacks, although typically a trial for one month is sufficient to determine if there is a reduction in the frequency or severity of attacks. We take the following approach to the use of such agents:

- We use mineral and vitamin supplementation, including [vitamin B complex](#) (three times daily, containing 30 mg of [vitamin B6](#)) or [vitamin E](#) (800 international units before bed), before using prescription medications. Vitamin B complex (containing fursultiamine 50 mg, [hydroxocobalamin](#) 250 micrograms, pyridoxal phosphate 30 mg, and [riboflavin](#) 5 mg) showed benefit in one randomized trial [[42](#)]; and vitamin E was beneficial in some small studies but not others [[37,43](#)].

Iron may be helpful in patients who have iron-deficient anemia; and magnesium supplementation may be of benefit in patients with pregnancy-related cramps [[21,44](#)]. However, a systematic review of randomized trials comparing magnesium supplementation with placebo identified four trials involving 322 patients with idiopathic (primarily nocturnal) leg cramps; meta-analysis of the trials found no evidence of significant benefit in the frequency or severity of cramping with magnesium therapy, and this was subsequently reconfirmed in another randomized trial [[44,45](#)]. Three trials involving a total of 202 women with pregnancy-associated leg cramps were identified in the systematic review; only one found benefit.

- In patients in whom vitamin and mineral supplements are ineffective, we try [diphenhydramine](#) (12.5 to 50 mg nightly) at bedtime.
- In patients in whom the measures above are ineffective, we prescribe a calcium channel blocker, either [diltiazem](#) (30 mg) or [verapamil](#) (120 to 180 mg), each evening. Limited

evidence from randomized trials with each agent supports their use [35,36]. We do not use [nifedipine](#), which may cause muscle cramps as a side effect.

- We use [gabapentin](#) (600 to 900 mg daily, with the dose divided between dinnertime and before bed) if the above measures have failed, with particular care in older patients because of the increased risk of side effects in such patients, particularly in those with impaired renal function. Limited data support the use of gabapentin, which has been helpful especially in patients with leg cramps associated with neurologic disease [46].
- Other measures that have been tried, with variable success, include: naftidrofuryl, which is unavailable in the United States, but was effective in a small randomized trial [34]; muscle relaxants, including [carisoprodol](#) and [orphenadrine](#) [39]; [quinidine](#) (200 mg twice daily), which is a stereoisomer of [quinine](#) and was effective in a small randomized trial in patients with muscle cramping associated with hepatic cirrhosis [47]; [chloroquine](#) phosphate (250 mg daily for two to three weeks, followed by 250 to 500 mg once per week) [38,41], or [hydroxychloroquine](#) sulfate (200 mg daily for two weeks, then once per week); and shakuyaku-kanzo-to granule, which was used in a series of hemodialysis patients [40].
- One trial found that botulinum toxin injection into the medial and lateral gastrocnemius was superior to [gabapentin](#) (approximately 600 mg) in patients with lumbar spinal stenosis and nocturnal leg cramps [48].
- Combinations of therapies might be beneficial in patients in whom pharmacologic monotherapy is ineffective, but such measures have not been formally studied. Particular care should be taken regarding potential adverse effects of combinations, such as concomitant use of [diphenhydramine](#) and [gabapentin](#), which may result in excessive daytime sedation.

Resistant to initial drug therapies — In patients resistant to initial pharmacotherapies (see '[Initial drug therapies](#)' above) who have severe nocturnal leg cramps, the use of [quinine](#) may be an alternative to safer agents. Because of safety concerns, quinine is generally not available for prescription or over-the-counter use for leg cramps in the US; thus, the author prefers the use of 6 ounces (180 mL) of tonic water, rather than prescription quinine, and only if cramps have persisted or are severe and disabling. We use such treatment rarely and do not use it on a daily basis. In patients in whom the use of quinine or tonic water-containing quinine is under consideration, the patient should be informed of the potential adverse events and understand the level of risk relative to the relatively benign (although painful) nature of leg cramps.

[Quinine](#) has been the best-studied drug for nocturnal leg cramps and has been found effective in some well-designed randomized trials [49,50]. The most common dose in the trials was 300 mg daily (range 200 to 500 mg daily). Minor adverse effects, mainly gastrointestinal symptoms, were more common with quinine, compared with placebo, in the clinical trials included in the 2015 report [50]. No increase in major adverse events was seen in the trials, although they were all less than 60 days in duration [50]. However, quinine is no longer routinely recommended for the treatment of nocturnal leg cramps due to the potential for serious and/or life-threatening side effects (eg, cardiac arrhythmias, thrombocytopenia, hemolytic uremic syndrome [HUS]-thrombotic thrombocytopenic purpura [TTP], and severe hypersensitivity reactions) that occur in 2 to 4 percent of patients, important drug interactions, and evidence for only modest benefit [33]. An FDA warning issued in December 2006 and reaffirmed in 2010 stated that, due to these potential serious events, the risks associated with quinine use do not justify its use in the unapproved/unlabeled prevention and treatment of leg cramps [51,52]. (See "[Drug-induced thrombotic microangiopathy](#)", [section on 'Quinine'](#).)

The FDA specifically recommends that healthcare professionals should discuss with patients the warning signs of thrombocytopenia and that patients should be encouraged to read the [Medication Guide](#) given to them at the pharmacy before starting [quinine](#) sulfate and each time they get a refill [52]. Patients should be cautioned to promptly report potentially drug-related adverse effects, such as bleeding, bruising, skin rash, itching, palpitations, difficulty breathing, flushing, weakness, sweating, or nervousness. (See "[Approach to the adult with unexplained thrombocytopenia](#)", [section on 'History'](#) and "[Drug-induced immune thrombocytopenia](#)", [section on 'Clinical presentation'](#).)

When to refer — Patients in whom pharmacotherapy is ineffective, and who experience distress associated with nocturnal leg cramps, should be referred to a sleep specialist to determine if there are underlying sleep disorders that may be responsible, such as restless legs syndrome, periodic limb movements of sleep, or obstructive sleep apnea [53]. (See "[Clinical features and diagnosis of restless legs syndrome and periodic limb movement disorder in adults](#)" and "[Clinical features and diagnosis of restless legs syndrome and periodic limb movement disorder in adults](#)", [section on 'Periodic limb movements of sleep'](#) and "[Clinical presentation and diagnosis of obstructive sleep apnea in adults](#)".)

PROGNOSIS

The prognosis of idiopathic nocturnal leg cramps has not been formally studied. In patients with an underlying medical or neurologic condition, the prognosis depends upon the associated underlying disorder.

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See ["Society guideline links: Treatment of muscle cramps"](#).)

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see ["Patient education: Nocturnal \(nighttime\) leg cramps \(The Basics\)"](#))

SUMMARY AND RECOMMENDATIONS

- Nocturnal leg cramps are common, are frequently unreported to clinicians, and occur in all decades of life. The most important morbidity of benign nocturnal leg and foot cramps is that they produce pain and often disturb sleep. (See ['Epidemiology'](#) above and ['Clinical manifestations'](#) above.)
- Leg cramps are most commonly idiopathic but may also be associated with structural disorders or leg positioning, fluid or electrolyte disturbances, and the use of certain medications. Other causes include neurologic and metabolic disorders and pregnancy. (See ['Causes and pathogenesis'](#) above.)
- Patients may describe numerous types of leg pain as cramps. The physical examination may be helpful only in that it is usually normal with idiopathic leg cramps. A careful history and physical examination can exclude the majority of disorders in the differential diagnosis,

including restless legs syndrome (RLS) and other neurologic disorders, pain due to vascular insufficiency, and myalgia from various causes. (See '[Diagnosis](#)' above and '[Differential diagnosis](#)' above.)

- Diffuse, recurrent, or severe muscle cramping should prompt an evaluation for hypocalcemia, although the plasma calcium concentration is normal in patients with idiopathic cramps. (See '[Diagnostic evaluation](#)' above.)
- Patients with an acute leg cramp should forcefully stretch the affected muscle, as an example by active dorsiflexion of the foot with the knee extended, when the cramp is in the calf. This widely recommended approach typically provides rapid relief of the acute cramp. Some patients may also find relief from other strategies, including passive stretching by getting out of bed and standing with the foot flat on the floor then pressing downward firmly, although active dorsiflexion of the foot may be more effective. (See '[Treatment of acute leg cramps](#)' above.)
- In patients who wish to prevent recurrent attacks, we suggest the initial use of daily stretching exercises or other nonpharmacologic, noninvasive interventions rather than pharmacotherapy (**Grade 2C**). (See '[Initial preventive therapies](#)' above.).
- In patients with an inadequate response to initial preventive therapies, such as nonpharmacologic physical measures, we suggest a sequential trial of selected medical therapies other than [quinine](#) ([vitamin B complex](#), [vitamin E](#), [diphenhydramine](#), [diltiazem](#) or [verapamil](#), and [gabapentin](#)) (**Grade 2C**). There is only modest evidence of benefit for each of these alternative agents, but they have much better safety profiles than quinine; we limit the use of quinine, whether in the form of tonic water or a pill, to patients with severe cramping resistant to other measures, given the risk of serious adverse effects associated with its use. (See '[Resistant to initial preventive therapies](#)' above and '[Initial drug therapies](#)' above and '[Resistant to initial drug therapies](#)' above.)

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GRAPHICS

Posterior leg stretch, wall



Stand facing the wall, feet together, about 24 inches from the wall. With the heels firmly on the floor and the body aligned straight at the hips and knees, lean forward to the wall, stretching the posterior leg tissues. Hold this position for 10 to 30 seconds. Repeat five times per session, at least two sessions daily.

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Graphic 70744 Version 2.0

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