CONDITION

Muscle atrophy

Muscle atrophy is a loss of muscle size that can reduce strength and movement.

WHAT IT IS
Loss of muscle size and tissue

BODY SYSTEM
Muscles and nervous system

MAIN SYMPTOMS
Smaller muscles, weakness, fatigue, reduced movement

WHAT CAUSES IT
Inactivity, nerve damage, illness, aging, or poor nutrition

HOW IT IS DIAGNOSED
Examination, strength testing, imaging, and sometimes EMG

MAIN TREATMENT
Rehabilitation, nutrition support, and treatment of the cause

CAN IT BE CURED?
Sometimes - reversible causes may improve

IS IT AN EMERGENCY?
Sometimes - sudden weakness or breathing trouble

LONG-TERM OUTLOOK
Improvement possible, but permanent nerve damage limits recovery

Overview

Muscle atrophy means that a muscle has become smaller because muscle tissue has been lost. It may affect one muscle, one limb, or muscles throughout the body. The change can be mild or severe.

Atrophy often develops when a muscle is not used. This can happen during bed rest, after an injury, or when a cast limits movement. It can also result from damage to the nerves that control muscles, long-term illness, poor nutrition, or age-related changes.

Muscle size and muscle strength are related, but they are not the same. A smaller muscle is often weaker, yet weakness can develop without obvious atrophy. A limb may also look smaller because of weight loss or differences in body shape rather than true muscle loss.

Muscle atrophy matters because it can affect walking, balance, hand use, breathing, and other

daily activities. Finding the cause is important. Atrophy from inactivity may improve substantially, while atrophy caused by permanent nerve damage may be harder to reverse.

Symptoms

The most visible sign is a muscle or limb that looks smaller than before. If only one side is affected, you may notice a difference between your arms, legs, hands, or shoulders.

Other symptoms can include:

Atrophy that affects breathing or swallowing muscles may cause shortness of breath, a weak cough, choking, or difficulty swallowing. These symptoms need prompt assessment.

Age-related muscle loss is often gradual. It may first appear as trouble getting out of a chair, carrying groceries, or recovering from a minor illness. This broader age-related loss of muscle strength and function is called sarcopenia .

- Reduced strength or grip
- Difficulty standing, climbing stairs, lifting, or reaching
- Faster muscle fatigue during normal activities
- Poor balance, slower walking, or more frequent falls
- Muscle twitching, cramps, numbness, or tingling when nerves are involved
- Stiff joints or reduced movement after long periods of inactivity

Causes and risk factors

A common cause is disuse , meaning that a muscle is not doing its usual work. Muscle tissue can be lost during prolonged bed rest, reduced mobility, limb immobilization, or recovery from surgery. People who are less active because of pain, heart or lung disease, or severe fatigue may also develop disuse atrophy.

Nerve-related atrophy occurs when the nerve controlling a muscle is damaged or diseased. Possible causes include a trapped or injured nerve, spinal cord damage, peripheral neuropathy, motor neuron disease, and some inherited neuromuscular conditions. Nerve-related atrophy may be accompanied by numbness, twitching, altered reflexes, or marked weakness.

Other causes and risk factors include:

Muscle loss during illness is not always caused by eating too little. Inflammation and changes in metabolism can cause the body to break down muscle even when nutritional support is being

provided.

Some people have more than one cause. For example, an older adult may lose muscle because of hospitalization, reduced food intake, inflammation, and difficulty becoming active again.

- Long-term inflammatory or infectious illness
- Cancer and other conditions that cause cachexia , a complex loss of weight and muscle
- Not consuming or absorbing enough energy and protein
- Conditions affecting the thyroid, muscles, or hormone balance
- Long-term use of certain medicines, including corticosteroids like prednisone or hydrocortisone
- Heavy alcohol use
- Aging, especially when combined with illness or low activity

Diagnosis

There is no single test used in every case. Assessment usually begins with your medical history and a physical examination. A healthcare professional may ask when the change began, whether it affects one or both sides, and whether you have pain, numbness, swallowing problems, weight loss, or a recent illness or injury.

The examination may compare muscle size, strength, reflexes, sensation, walking, balance, and joint movement. Measuring the circumference of a limb can help track change, although swelling and body fat can make this measurement less precise.

Tests are chosen according to the suspected cause. They may include:

Testing is not always extensive. Clear disuse after a known injury may need a different assessment from unexplained, rapidly worsening, or widespread muscle loss.

- Blood tests for inflammation, nutrition, thyroid problems, electrolyte changes, or muscle injury
- Ultrasound, MRI, or CT imaging to assess muscle size and structure
- Nerve conduction studies and electromyography, or EMG , to test nerve and muscle activity
- Bone density or body-composition testing in selected cases
- Genetic testing when an inherited condition is suspected

- A muscle biopsy, in which a small tissue sample is examined, when other tests do not explain a possible muscle disorder

Treatment and management

Treatment focuses on the cause, restoring safe movement, and supporting adequate nutrition. The best approach depends on which muscles are affected and whether nerves can still activate them.

A physiotherapist may design a gradual program using resistance, balance, flexibility, and functional exercises. Resistance exercise means making muscles work against a load, such as body weight, bands, machines, or weights. The level is increased gradually to avoid injury.

Occupational therapy can help with dressing, bathing, cooking, work, and hand function. Braces, walking aids, adapted utensils, or changes at home may make daily activities safer while strength is recovering.

Nutrition support may be useful when you are losing weight, eating poorly, or recovering from serious illness. This may involve improving total food intake and getting enough protein. A dietitian can account for kidney disease, swallowing problems, food access, or other needs. Supplements do not rebuild muscle on their own and may not be suitable for everyone.

Treatment of the underlying cause may include managing inflammation, hormone disorders, infection, nerve compression, or another medical condition. If a medicine may be contributing, it should be reviewed rather than stopped suddenly.

Electrical stimulation is sometimes used to make selected muscles contract when normal movement is limited. It is not appropriate for every cause and does not replace active rehabilitation when exercise is possible.

Recovery should be paced. Trying to return immediately to a previous level of exercise can cause pain or injury, especially after prolonged inactivity. In some neuromuscular conditions, excessive exercise may worsen fatigue without restoring damaged nerves.

Complications

Weak muscles can make falls and injuries more likely. Reduced movement may also lead to joint stiffness, fixed shortening of muscles called contractures , pressure injuries, blood clots, or further loss of fitness.

Severe or widespread atrophy can reduce independence with bathing, dressing, eating, and

mobility. If swallowing muscles are affected, food or liquid can enter the airway. Weak breathing muscles can make it harder to clear mucus or recover from a chest infection.

These complications are not inevitable. Rehabilitation, mobility support, skin care, and treatment of swallowing or breathing problems can reduce risk.

Prevention

Muscle atrophy cannot always be prevented. Atrophy caused by an inherited condition, permanent nerve injury, or some progressive illnesses may occur despite appropriate care.

Disuse-related muscle loss can sometimes be reduced by maintaining safe activity. After surgery, injury, or hospitalization, early movement and rehabilitation may help when medically appropriate. If a limb must remain immobilized, exercises for unaffected muscles may still be possible.

Regular muscle-strengthening activity, adequate food intake, and management of long-term conditions help support muscle health. The type and amount of activity should match your health, mobility, and current strength.

Unplanned weight loss, persistent poor appetite, and new difficulty chewing or swallowing deserve attention. Addressing these problems early may limit further muscle loss.

Living with it and what to expect

The course depends mainly on the cause. Atrophy from short-term inactivity can begin to improve after regular muscle use returns. Rebuilding strength usually takes time, and progress may occur over weeks or months rather than days.

Recovery can be slower after a long hospitalization, major illness, or prolonged weight loss. Muscle size may improve before daily activities feel easy again, or strength may improve without the muscle returning to its former appearance.

When a damaged nerve recovers, muscle function may return gradually as nerve signals reach the muscle again. If nerve damage is permanent, some weakness and loss of muscle bulk may remain. Rehabilitation then focuses on preserving available strength, preventing complications, and finding practical ways to stay active.

Progressive neurological or muscle conditions may cause continuing loss over time. Equipment and support needs can change, but many people continue valued activities by adapting how they move, work, exercise, or manage tasks.

Routine follow-up may include checking strength, walking, weight, nutrition, falls, and the ability to manage everyday activities. Report a steady decline or loss of a skill rather than waiting for the next planned appointment.

When to get medical help

Arrange a routine medical appointment if you notice unexplained muscle shrinking, continuing weakness, repeated falls, or difficulty with activities that used to be manageable. Assessment is also important for ongoing weight loss, poor appetite, numbness, muscle twitching, or symptoms affecting only one side.

Seek prompt medical advice if weakness is worsening over days, you are choking during meals, or you have new trouble walking or using a hand.

Call emergency services for:

Sudden one-sided weakness and speech or facial changes can be signs of a stroke. Breathing and swallowing problems may mean that important muscles are not working safely.

- Sudden weakness or numbness, especially on one side
- Facial drooping, speech difficulty, confusion, or sudden loss of balance
- New severe difficulty breathing
- Inability to swallow saliva or repeated choking
- Rapidly spreading weakness

Common questions

Can muscle atrophy be reversed?

Sometimes. Disuse atrophy often improves with gradual activity, resistance exercise, and adequate nutrition. Recovery is less complete when muscle loss is caused by permanent nerve damage or a progressive condition.

How quickly do muscles waste away?

Muscle loss can begin during a period of marked inactivity, but the speed differs with age, health, nutrition, illness, and how completely the muscle is unused. A visible change usually develops over time rather than after one inactive day.

Is muscle atrophy the same as muscle weakness?

No. Atrophy describes loss of muscle size. Weakness means reduced ability to produce force.

They often occur together, but nerve, joint, pain, or other medical problems can cause weakness without visible muscle loss.

Does muscle atrophy hurt?

Atrophy itself is not always painful. Pain may come from the injury, joint condition, nerve problem, or illness that led to reduced muscle use. Nerve damage may also cause burning, tingling, or shooting pain.

Can walking rebuild atrophied leg muscles?

Walking can improve mobility and endurance, particularly after inactivity. It may not provide enough resistance to rebuild all lost strength. A rehabilitation program may add sit-to-stand practice, balance work, or resistance exercise.

Do protein shakes cure muscle atrophy?

No. Protein can support muscle repair when combined with enough total food and appropriate muscle use, but it does not correct nerve damage or other underlying causes. Protein products may also be unsuitable for some people with kidney disease or swallowing problems.

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