CONDITION

# Axillary nerve dysfunction

Learn how axillary nerve dysfunction can affect shoulder strength and sensation, how clinicians diagnose it, and what treatment and recovery may involve.

**WHAT IT IS**
Axillary nerve injury or compression

**BODY SYSTEM**
Nervous system

**MAIN SYMPTOMS**
Shoulder weakness, difficulty lifting the arm, outer shoulder numbness, shoulder pain

**WHAT CAUSES IT**
Shoulder injury, nerve compression or surgery

**HOW IT IS DIAGNOSED**
Examination, imaging, EMG and nerve conduction studies

**MAIN TREATMENT**
Rehabilitation, sometimes nerve surgery

**CAN IT BE CURED?**
Sometimes, mild injuries may recover

**IS IT AN EMERGENCY?**
Sometimes, a pale, cool or pulseless arm

**LONG-TERM OUTLOOK**
Recovery may take months, with lasting symptoms after severe injury

## Overview

Axillary nerve dysfunction occurs when the axillary nerve is injured, compressed, or otherwise unable to work normally. This nerve helps control the deltoid, the large muscle that gives the shoulder its rounded shape. The deltoid is especially important for lifting the arm away from the body.

The axillary nerve also supplies the teres minor, a small muscle that helps rotate the arm outward. In addition, it carries sensation from a patch of skin over the outer shoulder.

The nerve begins in a network of nerves near the neck called the brachial plexus. It travels behind the upper arm bone, close to the shoulder joint. This location makes it vulnerable to shoulder dislocation, fractures near the top of the upper arm, and some shoulder operations.

Damage may range from a temporary interruption in nerve signaling to a severe injury in which nerve fibers are torn. Mild injuries may improve as swelling settles and the nerve recovers. More serious injuries can cause lasting weakness, muscle shrinkage, or loss of sensation. Early assessment matters because treatment depends on the cause, severity, and signs of nerve recovery.

## Symptoms

Symptoms usually affect one shoulder and upper arm. They may begin immediately after an injury or become noticeable later, especially when pain and swelling start to improve.

Possible symptoms include:

The numb area may be small. Normal sensation does not rule out an axillary nerve injury because the skin can receive overlapping signals from nearby nerves.

Shoulder pain can also hide weakness. For example, a person with a recent dislocation may avoid moving the arm because movement hurts, even if the nerve is working. A clinician can help distinguish pain-limited movement from true muscle weakness.

Seek emergency care after a shoulder injury if the shoulder looks out of place, the arm or hand is pale or cool, there is no detectable wrist pulse, or there is severe swelling or uncontrolled pain. Do not try to push a dislocated shoulder back into place yourself.

Prompt medical assessment is also important for new or worsening weakness, spreading numbness, or symptoms that appear after shoulder surgery or a major injury. Gradually improving symptoms without these warning signs can usually be addressed through routine follow-up.

- Difficulty lifting the arm out to the side
- Shoulder weakness, particularly above the first part of arm elevation
- A flattened appearance at the outer shoulder from loss of deltoid muscle bulk
- Numbness, tingling, or reduced feeling over the outer shoulder
- Aching, burning, or sharp pain around the shoulder
- Weakness when rotating the arm outward
- A sense that the shoulder tires easily or is unstable

## Causes and risk factors

A shoulder dislocation is a well-recognized cause of axillary nerve dysfunction. When the upper arm bone moves out of the shoulder socket, the nerve may be stretched or compressed. A fracture near the upper end of the humerus, the upper arm bone, can injure the nerve in a similar way.

Other possible causes include:

Quadrilateral space syndrome is an uncommon form of compression around the back of the shoulder. It may cause poorly localized shoulder pain, weakness, or tingling during overhead activity. These symptoms can resemble rotator cuff problems and other shoulder conditions, so careful evaluation is needed.

The risk of severe injury may be higher with high-energy trauma, a fracture combined with dislocation, delayed treatment of a dislocated shoulder, or damage involving several nerves. Age, previous shoulder injuries, and other medical conditions can also influence recovery, but they do not determine the outcome by themselves.

- A direct blow to the outer shoulder
- Traction injuries that force the arm or shoulder beyond its normal range
- Shoulder replacement, fracture repair, or other procedures near the nerve
- Long-term pressure from crutches or positioning during an operation
- Scar tissue, a cyst, or another structure pressing on the nerve
- Repetitive overhead activity that irritates the nerve in the quadrilateral space, a narrow passage at the back of the shoulder
- Inflammation or disease affecting the brachial plexus or peripheral nerves

## Diagnosis

Diagnosis begins with a description of what happened and when symptoms started. The clinician may ask about a dislocation, fracture, operation, injection, repetitive activity, or pressure around the shoulder. It is also helpful to explain whether weakness is improving, stable, or worsening.

During the examination, the clinician may:

This wider examination helps distinguish an isolated axillary nerve problem from a brachial plexus injury, a pinched nerve in the neck, a rotator cuff tear, or another shoulder disorder.

X-rays may be used after trauma to look for a fracture or dislocation. Magnetic resonance imaging, or MRI, can show muscles, tendons, the shoulder joint, and some causes of nerve

compression. Ultrasound may help examine the nerve and surrounding soft tissues in selected cases.

Electromyography and nerve conduction studies are often called EMG and NCS. These tests measure electrical activity in muscles and the ability of nerves to carry signals. Results can help show where the injury is located and how severe it may be. Testing too soon after an injury may not reveal the full extent of damage, so a clinician may recommend testing at an appropriate interval and repeating it to look for recovery.

No single test answers every question. Diagnosis often depends on the injury history, repeated strength examinations, imaging findings, and changes on electrodiagnostic testing over time.

- Check the shoulder's shape, swelling, and muscle bulk
- Test deltoid strength while the arm moves in different directions
- Test outward rotation of the shoulder
- Compare sensation over both outer shoulders
- Check reflexes, hand strength, pulses, and skin temperature
- Examine the neck and other nerves in the arm

## Treatment and management

Treatment is based on the cause of the nerve problem and whether the nerve remains connected and shows signs of healing. Care may involve an orthopedic clinician, neurologist, physical medicine and rehabilitation specialist, peripheral nerve surgeon, or physical therapist.

When dysfunction follows a shoulder dislocation or fracture, the first priority is safe treatment of that injury. A dislocated shoulder should be put back into position by a trained clinician. Circulation and nerve function are usually checked before and after the procedure when circumstances allow.

Many nerve injuries caused by stretching or temporary compression are initially managed without nerve surgery. Management may include:

Therapy should be matched to the underlying shoulder injury. Moving too aggressively after a fracture or surgical repair may interfere with healing. On the other hand, keeping the shoulder still for too long can lead to stiffness. A rehabilitation professional can help balance protection with movement.

While the deltoid is weak, therapy may focus on maintaining joint flexibility and strengthening muscles that remain functional. Attention to shoulder-blade position can improve movement

and reduce strain. A home program may be helpful, but it should reflect the person's injury and stage of recovery.

Surgery may be considered when the nerve has been cut, is trapped by scar tissue or another structure, or does not show expected recovery. Depending on the problem, a surgeon may release pressure around the nerve, remove damaged tissue, repair the nerve, use a nerve graft, or perform a nerve transfer. A nerve transfer connects a working nerve branch to the injured nerve to help restore muscle control.

The timing and likely benefit of surgery depend on the type of injury, examination findings, test results, and time since the injury. These decisions require evaluation by a clinician with experience in peripheral nerve injuries.

- Short-term protection of an injured shoulder
- Appropriate pain control discussed with a clinician
- Physical or occupational therapy
- Exercises to maintain safe shoulder motion
- Gradual strengthening when healing allows
- Repeat examinations and, when useful, repeat EMG or imaging

## Complications

Some people recover useful strength and sensation, while others have persistent symptoms. Nerves heal slowly, and improvement may continue over many months. Recovery is less predictable when the nerve is severely disrupted or when other nerves, bones, tendons, or blood vessels are injured.

Possible complications include:

Weakness can change how the shoulder blade and upper arm move together. This may contribute to fatigue or pain in nearby muscles. Rehabilitation can help protect motion and function even when nerve recovery is incomplete.

- Ongoing difficulty lifting the arm
- Deltoid or teres minor muscle shrinkage
- Persistent numbness or altered sensation
- Chronic nerve-related pain
- Shoulder stiffness

- Reduced shoulder stability
- Difficulty with work, sports, dressing, or reaching overhead
- Injury to numb skin from heat, pressure, or friction

## Follow up

Routine follow-up is important because a single examination may not show whether the nerve is recovering. The clinician may track deltoid strength, muscle bulk, sensation, shoulder motion, and the return of small voluntary muscle contractions. Repeat EMG or nerve conduction studies may be used when the results could change management.

Keep follow-up appointments even if pain improves. Pain often settles before strength returns, and delayed recognition of persistent nerve dysfunction can limit treatment options.

Contact the treating clinician sooner if weakness is worsening, numbness is spreading, pain is becoming difficult to control, or therapy causes a clear loss of function. New symptoms in the hand or several muscle groups may suggest a broader nerve injury.

Seek urgent or emergency care for a new shoulder deformity, major reinjury, rapidly increasing swelling, or an arm or hand that becomes pale, blue, cool, or pulseless.

During recovery, protect areas with reduced sensation. Check the skin for irritation, avoid prolonged pressure, and use care with heating pads or ice because temperature injury may not be felt normally.

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