CONDITION

Brachial plexopathy

Learn how brachial plexopathy can affect shoulder, arm, and hand movement or sensation, including its causes, diagnosis, treatment, and warning signs.

WHAT IT IS
Dysfunction of the brachial plexus nerves

BODY SYSTEM
Nervous system

MAIN SYMPTOMS
Arm pain, weakness, numbness, loss of movement

WHAT CAUSES IT
Trauma, pressure, immune inflammation, or other conditions

HOW IT IS DIAGNOSED
Nerve conduction studies and electromyography

MAIN TREATMENT
Cause-based care, rehabilitation, or nerve surgery

CAN IT BE CURED?
Sometimes - mild nerve stretching may recover

IS IT AN EMERGENCY?
Sometimes - sudden weakness with stroke signs

LONG-TERM OUTLOOK
Variable recovery, with possible permanent weakness

Overview

Brachial plexopathy is a problem affecting the brachial plexus, a network of nerves that carries signals between the spinal cord and the shoulder, arm, and hand. These nerves control movement and carry sensations such as touch, pain, and temperature.

The brachial plexus begins with nerve roots in the lower neck. The nerves then join, divide, and reorganize before becoming the major nerves of the arm. Damage at different points in this network can therefore produce different patterns of pain, weakness, numbness, or loss of movement.

"Plexopathy" describes nerve dysfunction. It does not identify the cause. The problem may result from a stretch injury, direct trauma, inflammation, pressure from a mass, cancer treatment, or another medical condition. Some brachial plexus injuries occur during birth.

The effects can range from a mild, temporary loss of sensation to major weakness or paralysis of part of the arm. Early medical assessment matters because some causes require prompt treatment. Rehabilitation can also help protect joints, maintain movement, and support recovery while nerves heal.

Symptoms

Symptoms depend on which nerves are affected and how severely they are damaged. They may involve the shoulder, upper arm, forearm, hand, or several of these areas.

Possible symptoms include:

Symptoms may begin suddenly after an injury. In inflammatory brachial plexopathy, also called neuralgic amyotrophy or Parsonage-Turner syndrome, severe shoulder or upper-arm pain often begins first. Weakness may appear days or weeks later as the pain starts to improve.

Symptoms from a slowly growing mass or from previous radiation treatment may develop gradually. Pain is not present in every case. Radiation-related plexopathy can occur months or years after treatment, so a history of radiation to the chest, shoulder, neck, or underarm is important.

Brachial plexopathy can resemble a pinched nerve in the neck, a spinal cord disorder, or damage to a single arm nerve. A clinical examination is needed to tell these problems apart.

Sudden arm weakness can also be a sign of stroke, especially when it occurs with facial drooping, speech difficulty, confusion, severe imbalance, or leg weakness. Call emergency services for these symptoms.

- Burning, aching, or electric-shock-like pain
- Tingling or reduced sensation
- Weakness in the shoulder, elbow, wrist, or hand
- Trouble lifting the arm, bending the elbow, gripping, or moving the fingers
- Reduced or absent reflexes
- Muscle wasting, meaning the affected muscles become smaller
- An arm that feels unusually heavy or difficult to control

Causes and risk factors

Trauma is a major cause. The nerves may be stretched when the shoulder is forced down while

the head moves in the opposite direction. Motorcycle crashes, falls, contact sports, penetrating wounds, and shoulder dislocations can produce this type of injury. A severe injury may tear a nerve or pull a nerve root away from the spinal cord. This is called root avulsion.

Pressure can also injure the plexus. Possible sources include a tumor, an enlarged lymph node, a blood collection, an aneurysm, or prolonged positioning during surgery or critical illness. A tight brace or another external source of pressure may occasionally contribute.

Neuralgic amyotrophy is thought to involve an abnormal immune response that causes inflammation of one or more nerves. It sometimes follows an infection, surgery, childbirth, or another stress on the body, but many people have no clear trigger. Rare inherited forms can cause repeated attacks.

Cancer may affect the brachial plexus by growing into or pressing on it. Tumors near the top of a lung can involve the lower part of the plexus. Breast cancer, lymphoma, and other cancers in the chest or neck may also affect these nerves.

Radiation therapy can cause delayed injury to the plexus. When a person with a history of cancer develops new arm symptoms, clinicians consider both radiation-related nerve damage and possible cancer recurrence. Testing is needed because symptoms alone may not distinguish them.

Other possible causes include diabetes, immune or inflammatory disorders, and certain infections. These are less common and are considered in the context of a person's symptoms and health history.

In newborns, the plexus may be stretched during a difficult delivery. This is usually called neonatal or birth-related brachial plexus palsy. Its evaluation and treatment differ from care for adults.

Diagnosis

Diagnosis starts with a detailed history. A clinician may ask when the symptoms began, whether there was an injury, where pain or numbness occurs, and which movements are difficult. Previous cancer, radiation, operations, infections, or similar episodes are also relevant.

The physical examination checks muscle strength, sensation, reflexes, and joint movement. The pattern helps identify whether the problem is in the brachial plexus, the neck, the spinal cord, or an individual peripheral nerve. The clinician may also examine pulses, skin temperature, swelling, and signs of shoulder injury.

Electrodiagnostic testing often helps confirm the location and severity of nerve damage. This testing usually includes:

These tests can show whether nerve fibers have been damaged and whether recovery has started. Changes may not appear immediately after an injury, so testing may be scheduled several weeks after symptoms begin or repeated later.

Magnetic resonance imaging, or MRI, can examine the brachial plexus and nearby soft tissues. It may help identify swelling, inflammation, a mass, or structural nerve damage. MRI of the cervical spine may be used when a neck nerve or spinal cord problem is possible.

Ultrasound can show certain nerves and surrounding structures. After major trauma, CT or CT myelography may be used to look for root avulsion or associated bone and chest injuries. Blood tests are selected according to the suspected cause rather than being required for everyone.

- Nerve conduction studies , which measure how electrical signals travel through nerves
- Electromyography, or EMG , which records electrical activity in selected muscles

Treatment and management

Treatment depends on the cause, severity, timing, and likelihood of nerve recovery. Care may involve neurology, physical medicine and rehabilitation, orthopedic or plastic surgery, neurosurgery, oncology, pain medicine, and physical or occupational therapy.

Some stretch injuries improve without nerve surgery. Clinicians may follow strength, sensation, and electrodiagnostic findings over time. During recovery, therapy helps maintain joint motion and reduce stiffness. Braces or splints may support a weak shoulder, wrist, or hand and make daily tasks safer.

Severe traumatic injuries require early specialist assessment. A nerve that has been cut, badly torn, or pulled away from the spinal cord may not recover on its own. Surgical options can include nerve repair, nerve grafting, or nerve transfer. A nerve transfer redirects a functioning, less essential nerve branch to help restore a more important movement. In selected cases, later tendon or muscle procedures may improve function.

Timing can affect surgical options, so people with major weakness after trauma should not wait for routine follow-up without being assessed. This is especially important when there is no early sign of recovery.

Pain treatment is tailored to the type and severity of pain. Nonprescription pain relievers may be appropriate for some people, but they are not safe for everyone. Prescription medicines used for nerve pain may be considered when pain feels burning, shooting, or electric. Severe short-term pain may require other approaches. A clinician or pharmacist can help account for kidney disease, liver disease, stomach bleeding risk, pregnancy, and interactions with other

medicines.

For neuralgic amyotrophy, management commonly includes pain control followed by carefully planned rehabilitation. Corticosteroids like prednisone or hydrocortisone are sometimes considered early, but evidence about their benefit is limited. Therapy should avoid overloading muscles that have lost much of their nerve supply. As nerve function returns, exercises can be adjusted to rebuild control and endurance.

When pressure from a mass, blood collection, or other structure is responsible, treatment focuses on relieving that pressure and managing the underlying cause. Cancer-related plexopathy may require oncology treatment, pain care, rehabilitation, or a combination of these. Radiation-related plexopathy is managed with symptom control, therapy, and evaluation to rule out cancer recurrence or another treatable cause.

Children with birth-related brachial plexus palsy need pediatric assessment. Many are monitored with therapy, while some benefit from specialized nerve or orthopedic surgery.

Recovery varies widely. Mild nerve stretching may improve substantially, while torn or avulsed nerves can cause lasting impairment. Nerves recover slowly, and meaningful change may continue over many months.

Complications

Weak muscles can allow a joint to become stiff or unstable. The shoulder is particularly vulnerable because its position depends on coordinated muscle activity. Regular guided movement can help reduce contractures, which are fixed shortening of muscles and other tissues.

Reduced sensation increases the risk of unnoticed burns, cuts, and pressure injuries. People with hand numbness may need to check the skin regularly and use care around hot surfaces or sharp tools.

Other possible complications include chronic nerve pain, muscle wasting, reduced grip, difficulty working or driving, sleep problems, and emotional strain. Severe injuries may leave permanent weakness even with treatment. Rehabilitation can focus on practical independence as well as nerve recovery.

Follow up

Follow-up may include repeated strength and sensation examinations, therapy assessments, and EMG or nerve conduction studies. These visits help show whether nerves are recovering

and whether the treatment plan should change.

Contact the treating clinician promptly if weakness is new or worsening, pain is difficult to control, or the arm is becoming increasingly stiff or swollen. New symptoms after previous cancer or radiation treatment also deserve timely assessment.

Seek urgent medical care after an injury if the arm becomes pale, blue, cold, very swollen, or pulseless, or if there is uncontrolled bleeding. These signs can indicate blood vessel damage. Major trauma with neck pain, breathing difficulty, or near-complete loss of arm movement also requires urgent evaluation.

Call emergency services for sudden arm weakness accompanied by facial drooping, speech trouble, confusion, severe dizziness, or leg weakness because these may be stroke symptoms.

Routine follow-up remains important even when pain improves. Pain may settle before strength returns, particularly in neuralgic amyotrophy. Continuing the agreed rehabilitation and monitoring plan can help protect the arm while recovery develops.

Sources

- Rubin DI. Brachial and lumbosacral plexopathies: A review. Clinical Neurophysiology Practice . 2020;5:173-193. doi:10.1016/j.cnp.2020.07.005.
- Ferrante MA. Brachial plexopathies: Classification, causes, and consequences. Muscle & Nerve . 2004;30(5):547-568. doi:10.1002/mus.20131.
- American College of Radiology. ACR Appropriateness Criteria: Plexopathy . American College of Radiology; 2021.
- National Institute of Neurological Disorders and Stroke. Brachial Plexus Injuries . National Institutes of Health.
- van Alfen N, van Engelen BGM. The clinical spectrum of neuralgic amyotrophy in 246 cases. Brain . 2006;129(2):438-450. doi:10.1093/brain/awh722.
- O'Berry P, Brown M, Phillips L, Evans SH. Surgical treatment and outcomes of adult brachial plexus injury. Missouri Medicine . 2017;114(4):316-321.