HEALTH BASICS

Brachial plexus

The brachial plexus is the nerve network carrying signals between the spinal cord and the shoulder, arm, and hand.

WHAT IT IS
A network of nerves supplying the shoulder, arm, and hand

WHERE IT COMES UP
Arm nerve tests, birth injuries, and neck or shoulder trauma

WHY IT MATTERS
It carries movement and feeling signals for the upper limb

WHAT IT IS NOT
Not a disease or diagnosis

WHO TO ASK
Primary care, neurology, orthopaedics, or rehabilitation services

HOW IT IS CHECKED
Neurologic examination, nerve conduction studies, electromyography, and imaging

Overview

The brachial plexus is a network of nerves on each side of your body. It begins in the lower neck, passes behind the collarbone, and travels into the armpit. Its branches continue into the shoulder, arm, forearm, and hand.

It is not a disease or a diagnosis. You may see the term in an examination report, imaging result, nerve test, or diagnosis describing an injury or another condition affecting these nerves.

The network is formed mainly from five spinal nerve roots: C5, C6, C7, C8, and T1. These labels refer to levels in the neck and upper back. The fibers mix and rearrange within the plexus before becoming the major nerves of the arm.

This arrangement allows nerve fibers from several spinal levels to travel together. It also means that a problem affecting one part of the plexus may influence more than one muscle, skin area, or named nerve.

How it works

Nerves carry electrical signals. Motor signals travel from the spinal cord to muscles, allowing movement. Sensory signals travel back toward the spinal cord, carrying information such as touch, temperature, pain, and the position of your joints.

The brachial plexus is often described in five connected parts:

The major final branches include the musculocutaneous, axillary, radial, median, and ulnar nerves. Together, these and smaller branches help control shoulder stability, elbow movement, wrist and finger movement, grip, and sensation across much of the arm and hand.

The pattern is complex. For example, the median nerve contains fibers that began at several spinal levels. A hand problem involving this nerve may therefore arise in the wrist, farther up the arm, within the brachial plexus, or near the spine. The examination and testing help locate the affected area.

- Roots: nerve fibers leaving the spinal cord, mainly C5 through T1
- Trunks: upper, middle, and lower bundles formed from the roots
- Divisions: each trunk separates into a front and back division
- Cords: bundles named by their position around an artery in the armpit
- Branches: the individual nerves that continue into the upper limb

Why it matters for your health

Clinicians use the brachial plexus pattern to understand where arm weakness, altered sensation, or pain may be coming from. The distribution can help distinguish a plexus problem from a pinched nerve root in the neck, a spinal cord condition, or damage to one nerve farther down the arm.

Location matters because different problems need different follow-up. A brief sports-related nerve stretch may be managed differently from a major traumatic injury, inflammation of the plexus, or pressure caused by another medical condition.

A physical examination may compare both arms. It can include muscle strength, reflexes, sensation, shoulder movement, and the pulse and temperature of the arm. No single movement or patch of numb skin can confirm the location on its own.

Tests are chosen according to the history and examination. Nerve conduction studies measure how signals travel along selected nerves. Electromyography, often called EMG, uses a fine needle to record electrical activity in muscles. These tests can help identify which nerves are affected and whether there are signs of recovery. Their timing matters because some nerve changes do not appear immediately after an injury.

MRI can show the plexus and nearby soft tissues. Ultrasound may assess certain accessible nerves. After major trauma, MRI or CT myelography may be used to look for damage close to the spinal cord. Imaging is not needed for every episode of arm tingling or shoulder pain.

What can go wrong

The brachial plexus itself is not an illness. Several named conditions and situations can affect it.

Traumatic brachial plexus injury can happen when the neck and shoulder are forced apart, the arm is pulled strongly, or the area is directly injured. Nerves may be stretched, torn, or separated from their connection near the spinal cord. Fractures and blood vessel injuries can occur at the same time.

A burner or stinger is a temporary nerve injury often associated with contact sports. It can cause a sudden burning or electric feeling with short-lived weakness or numbness in one arm. Repeated episodes or symptoms that do not settle need medical assessment rather than an assumed sports diagnosis.

Neonatal brachial plexus palsy , also called a birth-related brachial plexus injury, affects a newborn's arm movement after nerves are stretched or injured around birth. A child with reduced arm movement should be assessed by a pediatric service experienced in these injuries.

Neuralgic amyotrophy , also called Parsonage-Turner syndrome, is a condition involving sudden inflammation of nerves in the plexus. It commonly begins with severe shoulder or upper-arm pain, followed by weakness in particular muscles. Other shoulder and neck conditions can look similar, so testing may be needed.

The plexus can also be affected by pressure or tissue changes. Examples include a tumor near the upper lung or neck, enlarged lymph nodes, scar tissue after radiation treatment, or some forms of neurogenic thoracic outlet syndrome , in which nerves are compressed near the lower neck and upper chest.

These conditions are different from common problems such as carpal tunnel syndrome, which affects the median nerve at the wrist, or cervical radiculopathy, which affects a nerve root near the spine.

What you can do

You do not need to monitor or treat a normal brachial plexus. If the term appears in a report, ask which part of the network is involved and what finding supports that conclusion.

If you have an arm problem being assessed, keep a brief record of:

Ask whether testing is needed now or later. Useful questions include whether the suspected problem is in a nerve root, the plexus, or an individual arm nerve, and whether EMG, nerve conduction studies, or imaging would change the next step.

Arrange routine follow-up for persistent tingling, weakness, reduced hand control, or pain that is not improving. Visible muscle loss, repeated stingers, or difficulty using the arm also deserves assessment. Some traumatic injuries need prompt specialist review because decisions about repair or rehabilitation may be time-sensitive.

Seek urgent medical assessment for new arm weakness or loss of sensation after a neck, shoulder, or chest injury, especially if it is worsening.

Call emergency services after major trauma, or if an arm becomes cold, pale, blue, or pulseless. Breathing difficulty, severe bleeding, loss of consciousness, or weakness involving both arms or the legs may point to blood vessel, spinal cord, or other serious injuries rather than an isolated plexus problem.

- When it began and whether an injury occurred
- Which movements feel weak or difficult
- Where sensation has changed
- Whether the pattern is improving, stable, or worsening
- Previous neck, shoulder, chest, or arm surgery and radiation treatment

Common questions

Is the brachial plexus part of the brain or spinal cord?

No. It is part of the peripheral nervous system, meaning the nerves outside the brain and spinal cord. It begins where spinal nerve fibers leave the lower neck and upper back.

Does shoulder pain mean the brachial plexus is damaged?

Not usually. Shoulder pain has many possible causes, including muscles, tendons, joints, the neck, and individual nerves. The pattern of weakness, sensation changes, examination findings, and any injury history helps narrow the location.

Can an X-ray show the brachial plexus?

A standard X-ray does not show the nerve network itself. It may reveal fractures or other bone changes nearby. MRI, ultrasound, nerve conduction studies, and EMG provide different kinds of information about nerves and surrounding tissues.

Can brachial plexus nerves recover after injury?

Recovery relates to the type, location, and severity of the nerve damage. A mild stretch injury is different from a torn nerve or a nerve separated near the spinal cord. Examination over time and electrical testing can provide evidence of recovery, but the term "brachial plexus" alone cannot predict an outcome.

Sources

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