

Arm Pain and Cervical Radiculopathy

A patient guide

In brief: Cervical radiculopathy is the medical term for the cluster of symptoms that arise when one of the nerve roots in the neck becomes compressed or irritated where it leaves the spine. Although the trouble starts in the neck, its most striking feature is often felt some distance away, as pain, pins and needles, numbness or weakness travelling down the arm into a particular part of the hand. This happens because each nerve root carries signals to and from a defined territory of the upper limb, so a problem at its origin is felt along the length of the nerve. The two commonest underlying causes are a slipped, or herniated, cervical disc and a gradual narrowing of the bony channel through which the nerve exits, the result of age-related wear known as spondylosis. The single most reassuring fact about the condition is its natural history: the large majority of people improve substantially with time and simple measures, and only a minority come to need an operation.

What cervical radiculopathy is

The neck, or cervical spine, is built from seven vertebrae stacked one upon another, cushioned by intervertebral discs and joined at the back by small facet joints. Between each pair of vertebrae, on either side, lies a small bony tunnel called the intervertebral foramen, and through each of these tunnels a spinal nerve root passes as it leaves the spinal cord and sets off towards the arm. These nerve roots are the wiring of the upper limb: they carry the messages that move the muscles and the sensations that return from the skin.

Cervical radiculopathy is the term for what happens when one of these nerve roots becomes pinched or inflamed at the point where it exits. The word itself is descriptive, with radicula meaning a small root and the suffix denoting a disorder of it. When a root is compressed or chemically irritated, it can no longer conduct its signals cleanly, and the consequence is felt not at the neck but along the whole pathway the nerve serves. This is why the dominant complaint is so often pain shooting down the arm rather than pain in the neck itself, and why the precise pattern of the symptoms points to which root is involved.

It is worth drawing a clear line between radiculopathy and a related but more serious condition called myelopathy. Radiculopathy is a problem of a single nerve root after it has left the cord, producing symptoms in one arm. Myelopathy is compression of the spinal cord itself, and it tends to produce a different and more widespread picture. The two are distinct entities, and most arm pain arising from the neck is radicular rather than myelopathic.

Why it happens: the slipped disc and the worn channel

Two mechanisms account for the overwhelming majority of cases, and they tend to affect different age groups.

The first is a **herniated, or prolapsed, cervical disc**. Each disc has a tough outer ring surrounding a softer gel-like centre. If the outer ring weakens or tears, some of the inner material can bulge or extrude backwards and sideways, directly into the path of a nerve root in its foramen. A herniated disc tends to occur in younger and middle-aged adults and can come on relatively suddenly. As well as the physical pressure, the displaced disc material releases inflammatory chemicals that irritate the nerve, and this chemical component is part of why a herniation can be so painful even when the compression is modest.

The second, and overall the more common, is **foraminal narrowing from cervical spondylosis**. Spondylosis is simply the cumulative wear and tear that accompanies ageing of the spine. Over the years the discs lose height, the bones respond by forming small spurs called osteophytes at the disc margins and at the uncovertebral and facet joints, and the joints themselves thicken. Any of these changes can encroach on the foramen and gradually squeeze the nerve root passing through it. Because this process is slow, spondylotic radiculopathy tends to come on more

gradually and affects an older age group. In published series, narrowing from spondylosis accounts for roughly two-thirds of cases and disc herniation for around a fifth, with the remainder due to less common causes.

Cervical radiculopathy is not rare. Population studies put the annual incidence at roughly eighty-three cases per hundred thousand people, with most presenting between the ages of forty and sixty, and a slight preponderance in men. The level most often affected is the seventh cervical nerve root, followed by the sixth.

The pattern of symptoms: how the root reveals itself

The defining feature of cervical radiculopathy is that its symptoms follow a map. Each nerve root supplies a particular strip of skin, known as its dermatome, and a particular set of muscles, known as its myotome, together with a characteristic reflex. The combination of where the pain and numbness are felt, which movements are weak and which reflexes are altered allows the involved root to be identified, although in practice the patterns overlap and are not perfectly reliable in every person.

In broad terms, the common patterns are as follows. ****Involvement of the fifth cervical root (C5)**** tends to produce pain over the shoulder and outer upper arm, with weakness of the deltoid and of bending the elbow, and an altered biceps reflex. ****The sixth root (C6)**** sends symptoms down the outer forearm into the thumb and index finger, with weakness of elbow bending and wrist extension and changes in the biceps and brachioradialis reflexes. ****The seventh root (C7)****, the most frequently affected, refers pain down the back of the arm into the middle finger, with weakness of straightening the elbow and of the wrist, and a reduced triceps reflex. ****The eighth root (C8)**** affects the inner forearm and the little and ring fingers, with weakness of the small muscles of the hand and of gripping. Alongside the radiating pain, people commonly describe pins and needles, a numb patch, or a heavy, weak feeling in the limb, and the discomfort is frequently worse with certain neck positions and eased by resting the hand on top of the head.

It is the dermatomal and myotomal pattern, more than the severity of the pain, that marks the symptoms out as radicular rather than as a local neck or shoulder problem. Studies that have compared the clinical pattern with the level confirmed at surgery find that the standard maps hold true in around two-thirds of people, which is why assessment looks at the whole picture rather than relying on any single sign.

Natural history: why time is on the patient's side

Perhaps the most important thing to understand about cervical radiculopathy is how favourable its natural course usually is. Although the pain can be severe and alarming, the condition has a strong tendency to settle of its own accord.

The evidence here is consistent and encouraging. Natural history studies have found that the great majority of people improve, with many showing meaningful recovery within the first few weeks and the substantial majority recovering over a period of months. Reviews describe most people with symptomatic radiculopathy improving within around two to three years, with the bulk of the improvement occurring in the first several months. The underlying reasons are understood: a herniated disc fragment tends to shrink and be reabsorbed by the body over time, and the inflammation around the nerve subsides, so that the pressure and irritation diminish even without any intervention.

This benign tendency is the foundation on which the whole approach to the condition rests. It explains why an initial period of non-surgical management is so widely favoured, and why surgery, although highly effective for the right person, is generally held in reserve. It is, of course, a description of what happens across groups of people rather than a promise for any one individual, and the pace and completeness of recovery vary.

How it is assessed

Assessment begins with the story of the symptoms and a physical examination, and imaging is used selectively to confirm and localise the problem rather than as a first step.

The history establishes the distribution of the pain, the presence of pins and needles, numbness or weakness, the speed of onset and the factors that worsen or relieve it. Examination then tests the muscles, sensation and reflexes of the arm to map the findings onto a particular root, and looks for any signs that point instead towards cord involvement or towards a shoulder problem masquerading as referred pain. A widely used provocation manoeuvre is the Spurling test, in which the neck is extended and turned towards the painful side while gentle downward pressure is applied; reproduction of the arm symptoms supports the diagnosis. This test is highly specific but not very sensitive, meaning that a positive result is informative while a negative one does not rule the condition out.

Where imaging is indicated, **magnetic resonance imaging (MRI)** is the principal investigation, because it shows the discs, the nerve roots and the soft tissues in detail and can demonstrate a herniation or foraminal narrowing. An important caveat runs through the literature: changes are frequently seen on the scans of people who have no symptoms at all, so the images must always be interpreted alongside the clinical picture rather than in isolation. **Plain X-rays and CT** can add information about the bones and the bony channels, and **electrodiagnostic studies (nerve conduction studies and EMG)** are sometimes used to confirm nerve root dysfunction or to distinguish radiculopathy from other nerve problems when the picture is unclear; these tests are specific but of modest sensitivity.

Conservative management

Because the natural history is so favourable, the initial management of cervical radiculopathy is, in most situations, non-surgical, and a period of such treatment lasting several weeks to a few months is the usual starting point described in the literature.

Conservative management is not a single treatment but a combination of measures. **Simple analgesia and anti-inflammatory medication** are commonly used to control pain and dampen the inflammation around the nerve, with other classes of medication sometimes added for nerve-related pain. **Physiotherapy** plays a central role, encompassing exercises to maintain and restore movement and strength, manual therapy and mobilisation, postural advice and, in some programmes, mechanical or manual traction intended to open the foramen and relieve pressure on the root. Randomised trials of physiotherapy that combine exercise, manual therapy and traction report improvements in pain, movement and function, though the evidence does not single out one regimen as clearly superior to the others. A short period of relative rest and activity modification may help in the acute phase, and the overall aim is to support the body through the period during which the natural recovery is taking place.

Injections

Where pain remains troublesome despite these measures, an image-guided injection of steroid around the affected nerve root is one of the options that sits between conservative care and surgery.

A **cervical epidural steroid injection**, often delivered by a transforaminal route directed at the specific nerve root, aims to bathe the inflamed nerve in anti-inflammatory medication and so reduce the radicular pain. Studies report meaningful reductions in arm pain and improvements in function lasting up to a year or more in a good proportion of people, and the injection can serve both to relieve symptoms and, by confirming which root is responsible, to inform planning. The evidence base is described in the literature as positive but not uniform, with some recurrence of symptoms over time and a recognised, if uncommon, risk profile that means the transforaminal approach in particular is undertaken with careful technique and patient selection. An injection is best thought of as a means of buying time and comfort while the natural history runs its course, rather than as a definitive cure.

Surgical options, in principle

Surgery is considered for the minority of people whose symptoms do not settle with adequate conservative treatment, whose pain is severe and persistent, or who have significant or progressive weakness in the arm. The purpose of an operation is to take the pressure off the trapped nerve root, and there are several established ways of achieving this. The descriptions below are of the principles of these operations rather than recommendations.

****Anterior cervical discectomy and fusion (ACDF)**** approaches the spine from the front of the neck. The offending disc is removed entirely, which decompresses the nerve, and the gap is filled with a spacer or graft so that the two vertebrae fuse into a single block of bone. ACDF is a long-established and reliable operation that addresses both disc herniation and the bony narrowing in front of the nerve, and because removing the disc and restoring its height reopens the foramen, it is particularly suited to situations where the channel is narrowed vertically.

****Cervical disc replacement, or arthroplasty,**** is also performed from the front and likewise removes the disc to decompress the nerve, but instead of fusing the segment it inserts an artificial disc designed to preserve movement at that level. The rationale is to maintain motion and potentially to reduce the extra strain placed on neighbouring levels by a fusion. Randomised trials comparing arthroplasty with fusion report at least equivalent and, in pooled analyses, often favourable outcomes for arthroplasty over the medium to long term, with lower rates of subsequent surgery at adjacent levels, in suitably selected people.

****Posterior cervical foraminotomy**** approaches from the back of the neck and enlarges the bony foramen, trimming away the bone and any disc fragment pressing on the root, without removing the whole disc or fusing the segment. It preserves the disc and the movement of the level and avoids the structures at the front of the neck. Comparative studies find broadly similar relief of arm symptoms to ACDF in appropriately chosen cases, with the choice between the approaches influenced by the precise anatomy, such as whether the narrowing is principally to the side or involves loss of height at the front.

The selection among these options depends on the cause, the level and side involved, the precise anatomy of the narrowing and a range of individual factors, and is a matter for assessment and discussion with the treating surgeon rather than something that can be settled in the abstract.

Outlook

The outlook in cervical radiculopathy is, for most people, genuinely reassuring, and it follows directly from the natural history. The condition has a strong tendency to improve, the great majority recover well with non-surgical measures over a period of weeks to months, and the painful disc fragment and the inflammation around the nerve tend to resolve over time.

For the minority who do not settle, or who have significant nerve weakness, the surgical options to decompress the root are well established and report high rates of relief of the arm symptoms. The choice of operation is tailored to the underlying cause and anatomy. Across the whole condition, the consistent themes are that the symptoms map the involved root, that a slipped disc or a worn bony channel is almost always behind it, that time and simple measures resolve most cases, and that any individual outlook is best understood through assessment by the treating team rather than read from a category alone.