



## MRI for cervical radiculopathy

### MBS item description

Referral by a medical practitioner (excluding a specialist or consultant physician) for a scan of spine for a patient 16 years or older for suspected:

- **cervical radiculopathy (R) (K) (Contrast) (Anaes.)**

There is insufficient evidence to suggest imaging for cervical radiculopathy improves outcomes.

Most cases will settle over time without specific treatment.

MRI is suggested for patients who have failed a course of conservative therapy and who may be candidates for interventional or surgical treatment.

### About cervical radiculopathy

Radiculopathy refers to signs and symptoms, not just pain.

Most patients also experience radicular pain, which is sharp and shooting and travels from the neck down the upper limb. In contrast, pain referred from the musculoskeletal structures in the neck is often an aching, and is worse in the neck than the arm.

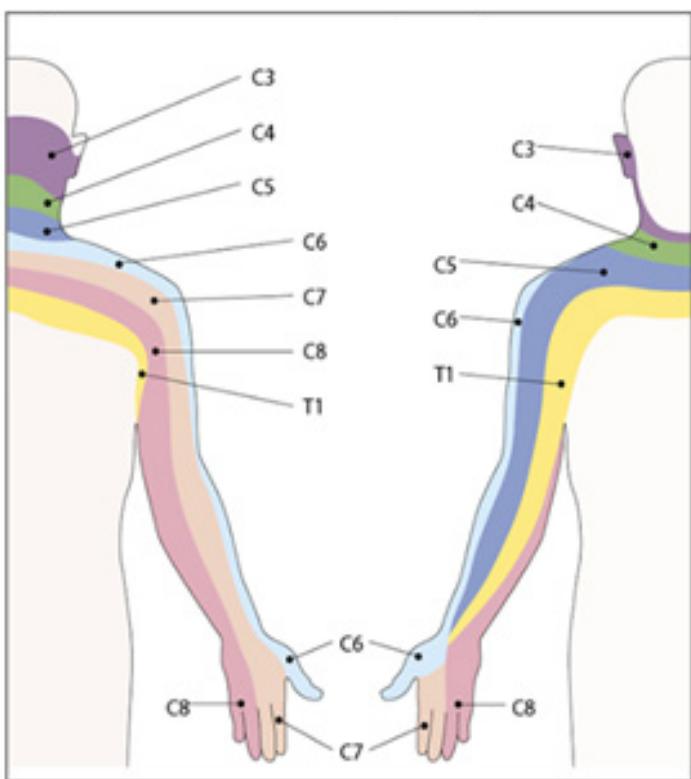


Figure 1. Upper limb dermatomes

### Cervical radiculopathy and MRI

Imaging is not required for the diagnosis of cervical radiculopathy.

Neuroimaging is considered where conservative therapy has failed and surgery is being considered.

In these patients, MRI is preferred. MRI has advantages over CT in that it can demonstrate the nerve root and disc herniation without myelography.

Any cervical imaging commonly detects degenerative changes. These may have little to do with neck pain as 30–40% of asymptomatic young and middle-aged patients have such changes. Abnormal MRI findings also increase with age.

The reliability of MRI readings is highly dependent on careful interpretation in the context of the patient's clinical presentation.

Not all MRI findings correlate well with surgical findings or symptoms.

Figure 1 reproduced with permission from Continuing Medical Education (CME) from Mogere E, Morgado T, Welsh D. An approach to the painful upper limb. Continuing Medical Education 2013;31(3). Available at [www.cmej.org.za/index.php/cmej/rt/printerFriendly/2708/2829](http://www.cmej.org.za/index.php/cmej/rt/printerFriendly/2708/2829)



## MRI of the spine for cervical trauma

### MBS item description

Referral by a medical practitioner (excluding a specialist or consultant physician) for a scan of spine for a patient 16 years or older for suspected:

- **cervical spinal trauma (R) (K)**

There is insufficient evidence to suggest MRI for cervical trauma improves health outcomes.

If bony injury of the cervical spine is suspected, CT is the preferred imaging. It is superior to both MRI and X-ray in identifying cervical spine fractures, and is generally quicker.

MRI is superior in identifying soft tissue abnormalities such as spinal cord and ligamentous injuries. However, not all abnormalities identified may be clinically significant.

### About cervical trauma

Fracture is the major concern with cervical spine trauma and may not be clinically obvious.

Imaging to exclude fracture is often a routine part of investigation of the trauma patient.

In the primary care setting, history and physical examination guide imaging decisions (as opposed to using emergency setting tools such as the Canadian C-spine rule or NEXUS criteria).

Imaging is not required if the patient is awake, alert, without neurological deficit and has no neck pain or tenderness with full range of motion of the cervical spine.[1]

It is safe to assess for range of neck movement if the patient:

- does not have midline cervical tenderness (which suggests a fracture or dislocation) or other serious injuries
- was involved in a simple rear-end collision
- is in a sitting position in the waiting room
- can walk at any time after the injury
- has delayed onset of neck pain.

### Cervical trauma and MRI

MRI is not required to clear the spine if a radiologist has reported a negative CT.

MRI's role in evaluating ligamentous injuries (i.e. whiplash injuries) is controversial. MRI may not demonstrate acute ligamentous injuries and the changes it does reveal in late stage whiplash injury may not be clinically significant.

MRI has a role where other imaging is contraindicated or inconclusive, or where clinical or imaging findings suggest ligamentous, spinal cord and/or arterial injury

MRI suffers from poor specificity in determining clinically-relevant information such as instability.



# MRI of the head for unexplained chronic headache

## MBS item description

Referral by a medical practitioner (excluding a specialist or consultant physician) for a scan of head for a patient 16 years or older for:

- **unexplained chronic headache with suspected intracranial pathology (R) (K) (Contrast) (Anaes.)**

There is a lack of evidence that neuroimaging improves health outcomes in most headache syndromes.

Serious intracranial pathology is a rare cause of chronic headache.

Abnormalities detected on neuroimaging may not be clinically significant but may lead to further unnecessary investigations or interventions.

## About chronic headache

Migraine, tension-type and medication overuse account for the vast majority of chronic headache. Investigations, including neuroimaging, do not contribute to the diagnosis of most primary headaches.

Serious causes of secondary headache are rare; they include tumour (<1%), infection (<1%), idiopathic intracranial hypertension (<1%) and arteritis (<1%) [2]. These conditions usually have typical history and/or clinical signs.

It is uncommon for secondary causes to present as headache alone. For example, intracranial tumour presents solely as headache in only 3-4% of cases.

Consider imaging in patients with chronic headache and an abnormal neurological exam or in those reporting symptoms suggestive of increased intracranial pressure, e.g. a frontal headache that is worse on lying down, or associated with vomiting, blurred vision or personality changes.

## Headache and MRI

The benefit of neuroimaging is in detecting significant and treatable lesions with impact on quality of life. People presenting with headache alone are unlikely to have such lesions.

When intracranial pathology is suspected, MRI is the preferred imaging modality. MRI has greater sensitivity and yield than CT. However CT is usually quicker if urgent assessment is needed.

MRI cannot detect all serious causes of secondary headache, e.g. giant cell arteritis.

Neuroimaging for reassurance is not supported by evidence. Normal results tend to provide only temporary reassurance at the risk of finding incidental abnormalities.



# MRI of the head for unexplained seizure(s)

## MBS item description

Referral by a medical practitioner (excluding a specialist or consultant physician) for a scan of head for a patient 16 years or older for:

- **unexplained seizure(s)** (R) (K) (Contrast) (Anaes.)

Although neuroimaging is indicated for most new onset seizures in adults, there is insufficient evidence to suggest imaging improves health outcomes.

MRI is the preferred imaging modality unless urgent assessment is required, when CT is recommended due to its speed and accessibility.

MRI is highly sensitive for detecting structural brain abnormalities, including incidental lesions, which may result in further unnecessary anxiety and investigations.

## About seizures

Here we are assuming differentiation has already been made between seizure and non-seizure events such as syncope, although this can be a challenge.

There are two main seizure types: generalised; and focal. The type of seizure influences investigations, prognosis and treatment choices.

Determining seizure type is best done by close patient-attention and eyewitness descriptions of the event, and with the findings of an EEG done soon after the seizure.

More than 50% of individuals who experience a seizure will not have a second occurrence. However, patients with epileptic discharges on EEG have up to a 90% risk of recurrence.

## Seizures and MRI

Neuroimaging should be considered as part of the routine neurodiagnostic evaluation of adults presenting with an apparently unprovoked first seizure.

MRI has a higher yield than CT and is the preferred imaging modality in non-emergency situations.

However, an MRI is not always required. Idiopathic generalised epilepsy is not associated with an increased prevalence of brain lesions. If this can be confidently diagnosed on history, examination and with generalised epileptic discharges on EEG, the patient does not require imaging.

Neuroimaging has been shown to detect lesions in 21–37% of patients presenting with seizures. Not all of these abnormalities are epileptogenic, and only a minority of these lesions require treatment.

Before referring a patient for MR imaging, it is important to discuss the possible outcomes and impacts of the scan: a causative lesion could be identified; no lesions may be detected; or incidental abnormalities could be found.



# MRI of the knee for meniscal and anterior cruciate ligament tears

## MBS item description

Referral by a medical practitioner (excluding a specialist or consultant physician) for a scan of knee following acute knee trauma for a patient 16 years or older with:

- **inability to extend the knee suggesting the possibility of acute meniscal tear** (R) (K) (Contrast) (Anaes.); or
- **clinical findings suggesting acute anterior cruciate ligament tear** (R) (K) (Contrast) (Anaes.)

MRI of the knee joint can lead to improved health outcomes by reducing (or eliminating) the need for diagnostic arthroscopy.

In the majority of cases, clinical examination is as good as MRI for diagnosis and management planning.

MRI plays a role when the diagnosis is unclear and the level of patient disability or pain is such that surgery is being considered.

## About acute knee presentations

Acute knee presentations are diagnosed by history, physical examination and plain X-ray (where indicated for suspected bony injury). Urgent further imaging is rarely indicated.

Re-examination after a period of conservative management is recommended and imaging may then be considered if it is likely to alter ongoing management.

The Lachman test is effective for assessing anterior cruciate ligament (ACL) integrity. The Thessaly test at 20° of knee flexion is an effective first-line screening for meniscal tears.

Careful evaluation by an experienced examiner not only diagnoses ACL and meniscal tears as well as MRI does. It also identifies patients with surgically-treatable meniscal and ACL tears with equal (of better) reliability than MRI.

It is important to note that not all meniscal and ACL tears require surgery. Rehabilitation is suggested as the primary treatment option for young adults following an acute ACL tear. more than half of meniscal tears will settle with conservative management.

## Acute knee presentations and MRI

MRI should be confined to more doubtful, difficult and complex knee injuries.

For these sorts of presentations, MRI is an alternative to diagnostic arthroscopy and allows better treatment planning.

MR imaging of the knee can give both false positive and false negative results, especially with meniscal injuries.

Incidental findings, especially of the meniscus, are common and increase with age. Up to 90% of middle-aged and older people with no X-ray evidence of osteoarthritis have been shown to have knee abnormalities on MRI.

As many acute knee injuries settle over time, imaging may only reveal self-limiting injuries in some cases. MRI cannot determine the natural course of each injury.