

Indications for lumbosacral spine MRI

- > Localized back pain and radiculopathy with 6-week course of conservative care and inadequate response to treatment.
- > Infectious or inflammatory processes (eg. spinal cord Abscess or spinal osteomyelitis)
- > Myelopathies, Multiple Sclerosis and other demyelinating diseases
- > Possible spinal cord injury and post-traumatic neurologic deficit
- > Cauda equina syndrome, (e.g. sudden bowel/bladder disturbance).
- > Evaluation or monitoring of congenital malformations of the spinal cord
- > Evaluation or monitoring of inflammation of the CNS or meninges
- > Evaluation or monitoring of tumour of the CNS or meninges
- > Investigation of any cause of spinal disease in pregnancy
- > Evaluation or monitoring of spinal cord compression
- > Evaluation or monitoring of demyelinating disease
- > Non-traumatic vascular injuries of the spine
- > Reduced power on physical examination
- > Monitoring of previous spinal surgery
- > Evaluation or monitoring of trauma
- > Spinal cord tumour
- > Spine TB

Contraindications

- > Any electrically, magnetically or mechanically activated implant (e.g. cardiac pacemaker, insulin pump
- > biostimulator, neurostimulator, cochlear implant, and
- > hearing aids)
- > Intracranial aneurysm clips (unless made of titanium)
- > Pregnancy (risk vs benefit ratio to be assessed)
- > Ferromagnetic surgical clips or staples
- Metallic foreign body in the eye
- Metal shrapnel or bullet

Patient preparation

- > A satisfactory written consent form must be taken from the patient before entering the scanner room
- > Ask the patient to remove all metal object including keys, coins, wallet, any cards with magnetic strips, jewellery, hearing aid and hairpins
- > Ask the patient to undress and change into a hospital gown
- > **Contrast injection risk and benefits must be explained to the patient before the scan**
- > **Gadolinium should only be given to the patient if GFR is > 30**
- > If possible, provide a chaperone for claustrophobic patients (e.g. relative or staff)
- > Offer earplugs or headphones, possibly with music for extra comfort
- Explain the procedure to the patient
- Instruct the patient to keep still
- Note the weight of the patient

Positioning

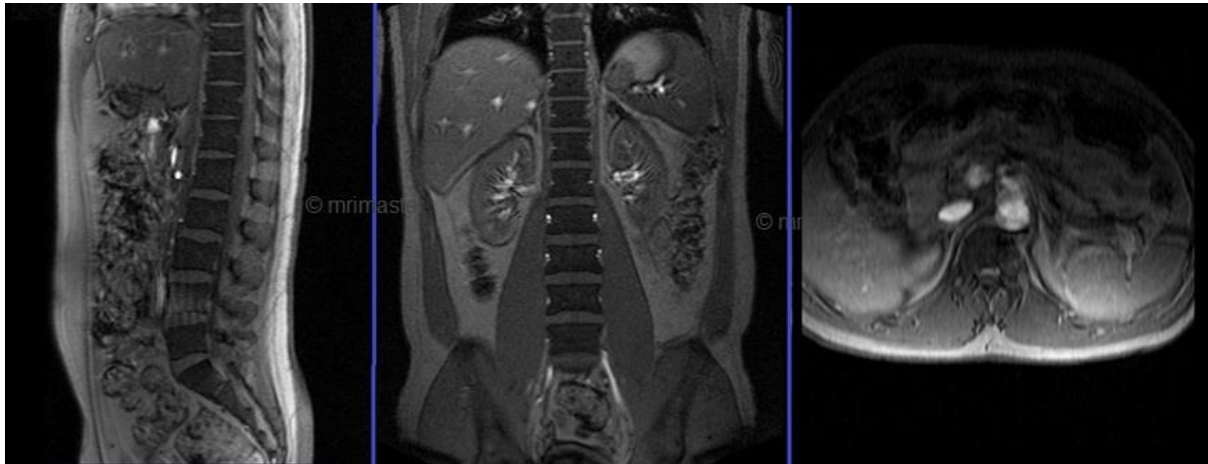
- > Head first supine
- > Position the patient in the spine coil and immobilise with cushions
- > Give cushions under the legs for extra comfort
- Centre the laser beam localiser over the mid abdomen (4 inches above the iliac crest)



Suggested protocols , parameters and planning

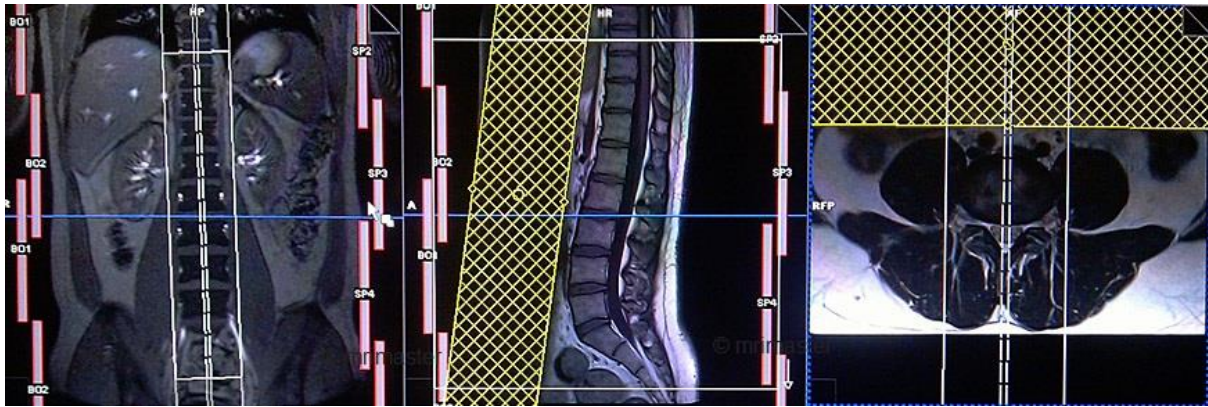
Localiser

A three plane localiser must be taken in the beginning to localise and plan the sequences. Localisers are usually less than 25sec. T1 weighted low resolution scans.



T2 tse sagittal

Plan the sagittal slices on the coronal plane; angle the position block parallel to spinal cord. Check the positioning block in the other two planes. An appropriate angle must be given in the axial plane on a tilted patient (Parallel to the line along the centre of the vertebral body and the spinous process). Check the position block in the sagittal plan; FOV must be big enough to cover the whole lumbar and sacral spine from T11 down to coccyx (normally 350mm). Slices must be sufficient to cover the spine from the lateral border of RT transverse process up to the lateral border of LT transverse process. **A saturation band must be placed over the abdomen (in front of the aorta) in the sagittal plane. This is to avoid the peristalsis and breathing artefacts over the spinal area. Phase direction should be head to feet to avoid further motion artefacts form abdomen.**

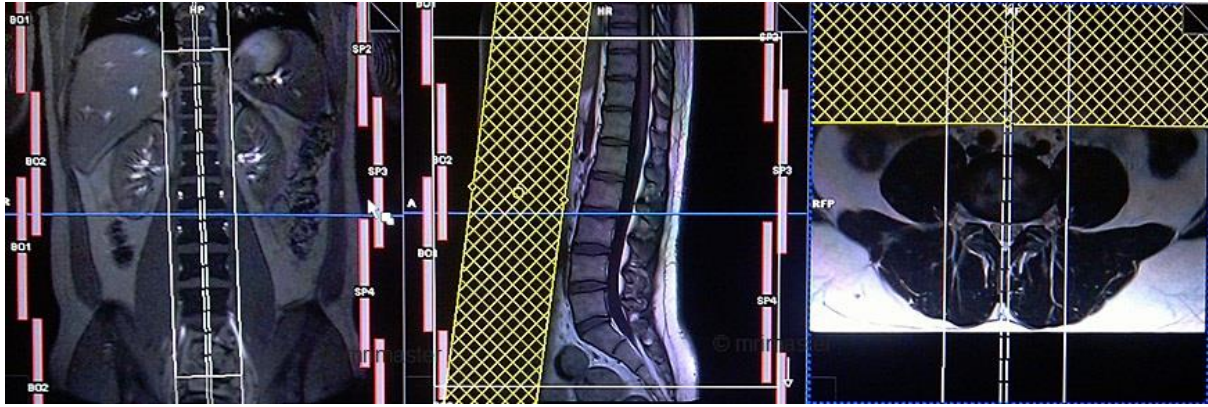


Parameters

TR	TE	SLICE	FLIP	PHASE	MATRIX	FOV	GAP	NEX(AVRAGE)
3000-4000	100-120	4MM	130-150	H>F	320X320	350-350	10%	2

T1 tse sagittal

Plan the sagittal slices on the coronal plane; angle the position block parallel to spinal cord. Check the positioning block in the other two planes. An appropriate angle must be given in the axial plane on a tilted patient (Parallel to the line along the centre of the vertebral body and the spinous process). Check the position block in the sagittal plan; FOV must be big enough to cover the whole lumbar and sacral spine from T11 down to coccyx (normally 350mm). Slices must be sufficient to cover the spine from the lateral border of RT transverse process up to the lateral border of LT transverse process. **A saturation band must be placed over the abdomen (in front of the aorta) in the sagittal plane. This is to avoid the peristalsis and breathing artefacts over the spinal area. Phase direction should be head to feet to avoid further motion artefacts form abdomen.**

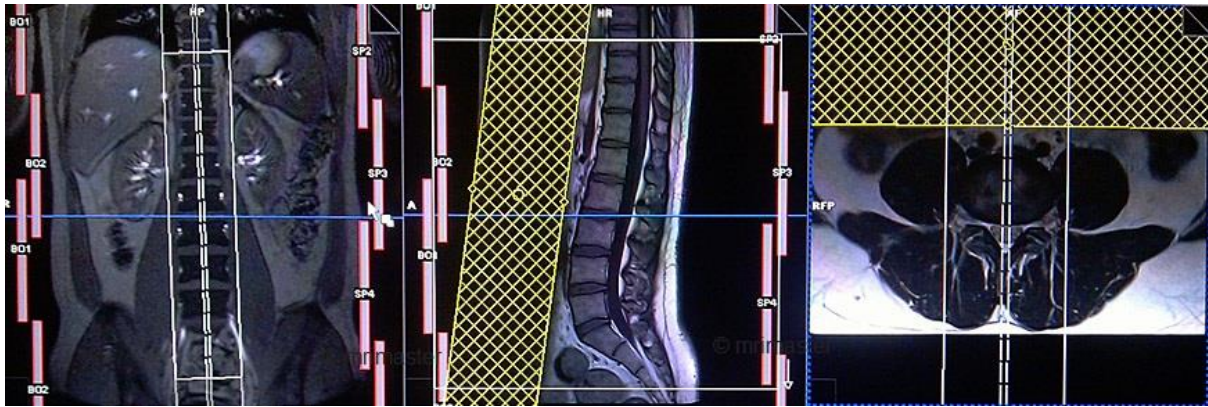


Parameters

TR	TE	SLICE	FLIP	PHASE	MATRIX	FOV	GAP	NEX(AVRAGE)
400-600	15-25	4 MM	90	H>F	320X320	350-350	10%	2

T2 TSE STIR sagittal

Plan the sagittal slices on the coronal plane; angle the position block parallel to spinal cord. Check the positioning block in the other two planes. An appropriate angle must be given in the axial plane on a tilted patient (Parallel to the line along the centre of the vertebral body and the spinous process). Check the position block in the sagittal plan; FOV must be big enough to cover the whole lumbar and sacral spine from T11 down to coccyx (normally 350mm). Slices must be sufficient to cover the spine from the lateral border of RT transverse process up to the lateral border of LT transverse process. **A saturation band must be placed over the abdomen (in front of the aorta) in the sagittal plane. This is to avoid the peristalsis and breathing artefacts over the spinal area. Phase direction should be head to feet to avoid further motion artefacts form abdomen.**

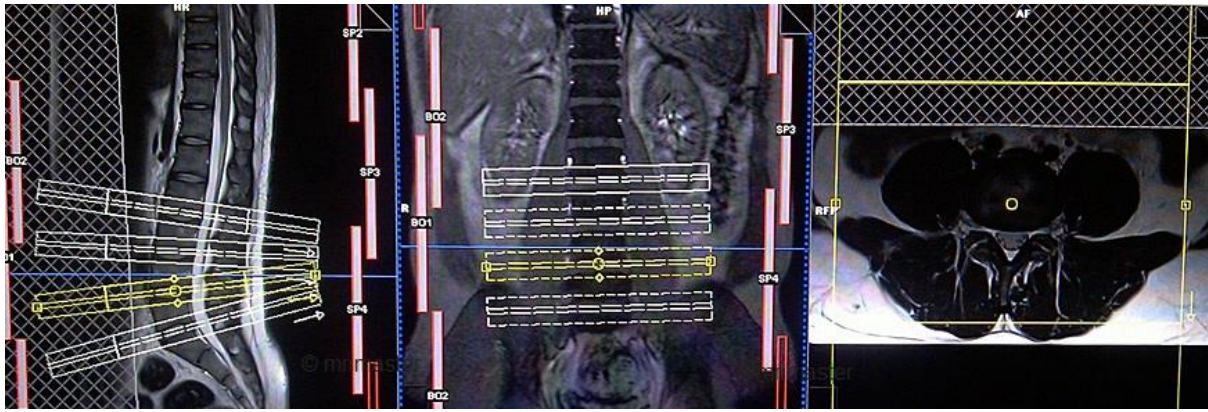


Parameters

TR	TE	FLIP	NEX	SLICE	MATRIX	FOV	PHASE	GAP	TI
4000-5000	110	130	2	4MM	320X320	350-350	H>F	10%	130

T2 TSE Axial multi block and multi angle

Plan the axial slices on the sagittal plane; angle the first position block parallel to L5- S1 intervertebral disc, second position block parallel to L4- L5 intervertebral disc, third position block parallel to L3- L4 intervertebral disc and fourth position block parallel to L2- L3 intervertebral disc (only four blocks are needed in a normal spine). *Additional blocks must be taken in the presence of prolapsed disc in any other levels.* An appropriate angle must be given in the coronal plane on a tilted or scoliotic spine (Parallel to the intervertebral disc space). Slices must be sufficient to cover the intervertebral discs (normally 5 slices for each disc space). A saturation band must be placed over the abdomen (in front of the aorta) in the sagittal plane. This is to avoid the peristalsis and breathing artefacts over the spinal area.

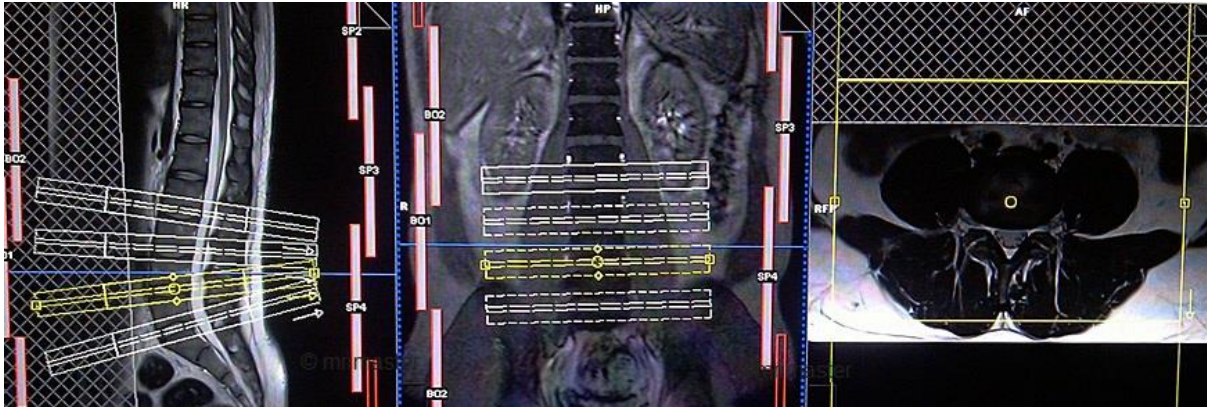


Parameters

TR	TE	SLICE	FLIP	PHASE	MATRIX	FOV	GAP	NEX(AVG)
3000	100							
-	-	4	130	A>P	256X25	250	10	2
4000	120	MM	-		6	-	%	
			150			290		

T1 TSE Axial multi block and multi angle

Plan the axial slices on the sagittal plane; angle the first position block parallel to L5- S1 intervertebral disc, second position block parallel to L4- L5 intervertebral disc, third position block parallel to L3- L4 intervertebral disc and fourth position block parallel to L2- L3 intervertebral disc (only four blocks are needed in a normal spine). *Additional blocks must be taken in the presence of prolapsed disc in any other levels.* An appropriate angle must be given in the coronal plane on a tilted or scoliotic spine (Parallel to the intervertebral disc space). Slices must be sufficient to cover the intervertebral discs (normally 5 slices for each disc space). A saturation band must be placed over the abdomen (in front of the aorta) in the sagittal plane. This is to avoid the peristalsis and breathing artefacts over the spinal area.



Parameters

TR	TE	SLICE	FLIP	PHASE	MATRIX	FOV	GA	NEX(AVRAGE)
400	15	E	P	E	X	V	P	E)
-	-	4 MM	90	A>P	256X25	250-	10%	2
600	25				6	290		

Indications for contrast enhancement spine scans

- > Evaluation or monitoring of tumour of the CNS or meninges
- > Monitoring of previous spinal surgery
- > MS, hemiplegia/paresthesia and Infection
- > Suspected spine lesions (e.g. bone Mets)
- > Spinal cord tumour
- > Syringomyelia