The seat is attached to an MRI-compatible motorized bed that will translate in and out of the magnet, and move up and down
Your patient can flex, bend, extend …
Variable Positioning: The bed also rotates from *Upright* to *Recumbent*, stopping at any angle in between.
Lying Down

Patient with Low Back Pain After Surgery

L4 to S1 fusion

Does a Lie-Down-Only Scanner see the patient’s problem?

Case courtesy of M. Rose, MD, Rose Radiology Centers
Patient with Low Back Pain After Surgery

Does a Lie-Down-Only Scanner see the patient’s problem?

NO!
Patient with Low Back Pain *After* Surgery

Does a Lie-Down-Only Scanner see the patient’s problem?

NO!

Case courtesy of M. Rose, MD, Rose Radiology Centers
The anterolisthesis at L3/4, the associated spinal stenosis and the excessive mobility above the level of the fusion are visible only with the patient Upright.

Case courtesy of M. Rose, MD, Rose Radiology Centers
If this patient were scanned at 1.5 $T$, 3.0 $T$ or any other field strength, his pathology would have been missed.

The Recumbent-Only MRI MISSES the Pathology

Patient with Low Back Pain After Surgery

Lying Down  Upright, Weight-Bearing

Case courtesy of M. Rose, MD, Rose Radiology Centers
Scan patients in their position of symptoms

**Position Imaging™** (pMRI™)

Lying Down  |  Upright, Weight-Bearing

The Recumbent-Only MRI MISSES the Pathology

*Same Patient*  |  *Same Day*  |  *Same Scanner*

Case courtesy of M. Rose, MD, Rose Radiology Centers
Position-Dependent Disc Herniation & Spinal Instability

A focal posterior disc herniation at L5/S1 (arrow) and associated spinal instability (retrolisthesis) is visible only with the patient upright.

The Recumbent-Only MRI MISSES the Pathology
Recumbent

Case courtesy of F. W. Smith, MD University of Aberdeen, Scotland
Ligamentous Rupture Associated With Spinal Instability

The interspinous ligamentous rupture at the L4/5 level (arrow) is visible only with the patient in Upright-Flexion.

Recumbent-Only MRI MISSES the Pathology

Case courtesy of F. W. Smith, MD University of Aberdeen, Scotland
The best image is the one that doesn’t *miss* the pathology
Recumbent
The recumbent-only MRI *underestimates* the pathology and *misses* its dynamic nature.

Same Patient  Same Day  Same Scanner
Fluctuating Spinal Stenosis

The stenosis of the central spinal canal, compression of the underlying spinal cord and posterior focal ligamentous infolding are visible *only* with the patient in Upright-Extension.
Does the Recumbent-Only MRI see the patient’s problem?

NO!
The position-dependent C4/5 focal posterior disc herniation (arrow) is visible only with the patient in Upright-Extension. This is not unexpected …

The Recumbent-Only MRI MISSES the Pathology

Position-Dependent Disc Herniation

The position-dependent C4/5 focal posterior disc herniation (arrow) is visible only with the patient in Upright-Extension.
**Ligamentotactic Effects**

When you extend, the **anterior longitudinal ligament** becomes taut, and the **posterior longitudinal ligament** becomes lax.
Based on this image, a surgeon would perform an anterior cervical decompression and fusion at C5/6, but the likelihood of success would be zero. WHY?

Because the Upright-Extension scan shows an additional disc herniation at C4/5. Any sound surgical treatment would have to include both levels.

Case courtesy of R. Marks, MD, Up & Open Imaging, Richardson, Texas
Scientific Data:

Diagnosis
89% of the patients in a study of 63 patients with unexplained low back pain showed an “obvious prolapse of an intervertebral disc, whose degree of prolapse changed between the neutral position and either flexion or extension.”

For 18% of the patients in a study of 116 patients suffering from low back pain, “the presence of a Grade I spondylolisthesis, not evident in the supine examination, was demonstrated in the seated position.”
Scientific Data:
Patient Outcome
In a study of 25 patients with low back pain and sciatica referred for Lumbar Spine MRIs following at least one prior “normal” recumbent MRI within 6 months of referral:

- 3 cases with lateral disc herniation
- 6 cases with hypermobile disc at one or more levels
- 2 cases with previously unsuspected Grade I spondylolisthesis
- 2 cases with significant spinal canal stenosis

13 patients (52%) demonstrated abnormalities “in one or more of the seated postures that were not evident in the …supine examination”
In a study of 25 patients with low back pain and sciatica referred for Lumbar Spine MRIs following at least one prior “normal” recumbent MRI within 6 months of referral:

13 patients (52%) demonstrated abnormalities “in one or more of the seated postures that were not evident in the …supine examination”

“Each of the 13 patients has undergone appropriate surgery and 6 months post-surgery they remain symptom free.”
What else is special about the Upright™ MRI?
Large Patient Scanning Capability

This Patient’s Scan
ETL=13  140 / 4000
5.0 mm  11 slices
5:05   FOV=32 cm

350 lbs
(160 kg)

65-inch (165 cm)
circumference
RF receiver coil
Severe Kyphosis Rendering Recumbent Imaging Impossible

Sagittal images in the *upright-seated position* show compression of two thoracic vertebral bodies.

Case courtesy of M. Rose, MD, Rose Radiology Centers
What about patient comfort?
It’s Not Just For The Spine…
How do we eliminate patient motion?
The bed’s upright position is a tilt backwards at 7° which reduces patient motion.
One of 3 slices acquired in **38 seconds** *(Nex=2)*
Driven-Equilibrium Fast Spin Echo

One of 3 slices acquired in 38 seconds ($Nex=2$)
The Impact of RF Receiver Coils
The patient sits upright between two vertical magnetic poles so there is a horizontal transaxial magnetic field in the magnet.

This is significant because of the rule in MRI that the axis of symmetry of the RF Receiver Coil should be perpendicular to the direction of the main magnetic field.
The Upright™ MRI can use solenoidal “wrap-around” RF Coils because when the patient is upright, the axis of the coil is perpendicular to the horizontal magnetic field.
The Upright has a unique inherent design advantage
Planar RF Coils can be used because the axis of the coil is perpendicular to the horizontal magnetic field.

The Upright has a unique inherent design advantage.
Planar RF Receiver Coil

The unique *transaxial horizontal magnetic field* of the Upright™ MRI means it is the **ONLY** Open MRI system that can use planar (flat) receiver coils for spine imaging.
Unique Medical Value: The Dynamic Nature of the Spine

- Weight-bearing
- Flexion
- Extension
- Rotation
- Lateral Bending

Patient positioning plays a critical role in detecting clinically significant pathology
The best image is the one that doesn’t miss the pathology.

Call us today at 818 986-8215.