FONAR UPRIGHT® MULTI-POSITION™ WEIGHT-BEARING MRI (THE STAND-UP® MRI)
Which MRI Do You Think Patients Prefer?

A Typical High-Field “Closed” MRI

OR

FONAR UPRIGHT® Multi-Position™ MRI (The Stand-Up® MRI)

• The “Non-Claustrophobic MRI”
• No “Tube,” No “Tunnel”
• Nothing in Front of the Patient’s Face
• Accommodates Very Large Patients
• Scans Patients Who Can’t Lie Down
But This MRI is Not Just About Patient Preference

Here are the facts:

- There is considerable evidence that UPRIGHT®, Weight-Bearing MRI provides important medical benefits.

- Patient positioning plays a critical role in detecting clinically significant pathology.

- Recumbent-only MRI can underestimate the maximum degree of pathology.

- It is the only Multi-Position™ MRI.

- It is the only MRI scanner that can provide comparisons based upon patient positioning: flexion, extension, sitting, standing, lateral bending AND recumbent.

This MRI offers significant clinical value that cannot be duplicated on a High-Field MRI.
The patient bed can rotate from recumbent to upright. (cutaway view)
The Only Multi-Position™ MRI
A. Nachemson, M.D., made measurements of lumbar disc pressure in various positions. Note the significant increase in disc pressure when the patient is not lying down.

The UPRIGHT® MRI can acquire images in all of the positions shown, leading to more accurate diagnoses and better treatment plans.

Nachemson Alf L.: The lumbar spine an orthopaedic challenge. Spine 1976; Volume 1, Number 1: 59-71. [Department of Orthopaedic Surgery, Sahlgren Hospital, Gothenburg, Sweden]
When the spine is not supporting the weight of the body, can you see all the pathology?

When the tires are not supporting the weight of the car, can you tell which tire is “flat”?

The right position gives you the right diagnosis.
Patient Positioning plays a critical role in detecting clinically significant pathology.
Upright Weight-Bearing Visualization of Postoperative Surgery

Case Courtesy of M. Rose, M.D., Rose Radiology Centers, Florida

Same Patient... Same Scanner... Same Day
Position-Dependent Disc Herniation Not Visible by Recumbent MRI or by Upright X-Ray

Case Courtesy of Stand-Up MRI of Orlando, Orlando, Florida
Unsuspected Disc Herniation on Extension

Case Courtesy of Richard Marks, M.D., Board-Certified Orthopedic Surgeon, Up and Open Imaging, Dallas, Texas
A Note to Attorneys: As you know, if the full extent of an injury cannot be established, accident victims may be denied appropriate settlement amounts and necessary medical care as well. The UPRIGHT® MRI can see position-dependent pathology that would be underestimated or even missed if the patient were scanned on any other MRI system. Our MRI scanner enables you to achieve the very best medical-legal outcomes for your clients.

Case Courtesy of J.P. Elsig, M.D., Orthopedic Surgeon, fmri Zentrum-Zurich, Switzerland
Recumbent-Only (Single Position) Imaging Underestimates the Maximum Degree of Pathology and Misses its Dynamic Nature

CaseCourtesy of Stand-Up MRI of Melville, P.C., Melville, NY
Upright Weight-Bearing Visualization of Nuclear Extrusion

Case Courtesy of F.W. Smith, M.D., University of Aberdeen, Scotland
Recumbent-Only (Single Position) Imaging Underestimates the Maximum Degree of Pathology and Misses its Dynamic Nature
Dynamic Fluctuation of Neural Foramen Stenosis

Case Courtesy of Stand-Up MRI of Melville, P.C., Melville, NY
Interspinous Ligament Rupture Visualized in Upright Flexion

Case Courtesy of F.W. Smith, M.D., University of Aberdeen, Scotland
A fundamental principle of MRI:
The RF receiver coil achieves maximum sensitivity when its axis of symmetry (yellow arrow) is perpendicular (90°) to the direction of the magnetic field (green arrows).

The UPRIGHT® MRI has a unique magnet design, which allows it to employ this principle in more than one way. The patient is positioned between two vertical poles so that the magnetic field traverses the body in the left-right direction (green arrows). This unique design allows both flat planar and solenoid ("wrap-around") coils to be used separately or in combination (in quadrature).

A flat planar coil is used for a lumbar spine scan.
A solenoid ("wrap-around") coil is used for a cervical spine scan.

Which RF Receiver Coils are Compatible with Which MRI Scanners?

<table>
<thead>
<tr>
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<th>High-Field MRI</th>
<th>Open MRI</th>
<th>UPRIGHT® MRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat Planar Coils</td>
<td>✔️</td>
<td>NO</td>
<td>✔️</td>
</tr>
<tr>
<td>Solenoid (&quot;Wrap-Around&quot;) Coils</td>
<td>NO</td>
<td>✔️</td>
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Magnetic field strength is not the sole determinant of image quality. The ability to utilize both solenoid and planar RF receiver coils gives the UPRIGHT® MRI a significant advantage over all other types of MRIs, and accounts to a large degree for the fact that 0.6 Tesla UPRIGHT® MRI images are very competitive with 1.5 Tesla High-Field MRI images.
Advanced RF Receiver Coil Technology
Can you tell which image was acquired on a High-Field MRI (1.5 Tesla) and which was acquired on the UPRIGHT® MRI (0.6 Tesla)?

(Assertion on next page)

The images above were obtained using similar acquisition parameters and scan times.
Answer to Question on Page 25:
A: UPRIGHT® MRI (0.6 Tesla)
B: High-Field MRI (1.5 Tesla)
Clinical MRI

“Positional Upright Imaging of the Lumbar Spine Modifies the Management of Low Back Pain and Sciatica”

F.W. Smith, M.D. et al., University of Aberdeen, U.K.

In a study of 25 patients with low back pain and sciatica referred to the Upright MRI for lumbar spine MRIs following at least one prior “normal” recumbent MRI within six months of referral:

Thirteen patients [52%] demonstrated “abnormalities in one or more of the seated postures that were not evident in the conventional spinal examination.”

“Each of the thirteen patients has undergone appropriate surgery and six months after surgery remain symptom free.”
“Missed Spondylolisthesis in Static MRIs But Found in Dynamic MRIs in Patients with Low Back Pain”

S.W. Hong, M.D., et al., UCLA School of Medicine, Albert Einstein College of Medicine & Hacettepe University

“In the 510 patients with back pain, missed spondylolisthesis in neutral MRIs but found in flexion MRIs is 18% for all levels in the condition that spondylolisthesis is considered as more than 3 mm translation.”

“Positional MRI: A Valuable Tool in the Assessment of Cervical Disc Bulge”

P. Moazzaz, M.D., et al., UCLA School of Medicine

In a study of 163 patients with radicular cervical spine symptoms: “Using 2.0 mm of disc bulge as a cutoff value, the false negative ratio for the neutral position alone compared to flexion and extension was 25.08%.”
In a study of 553 patients with symptomatic back pain: “A significant increase in the degree of lumbar disc herniation was found by examining flexion and extension views when compared with neutral views alone.”

“For patients with normal or <3 mm bulge in neutral, 19.46% demonstrated an increase in herniation to >3 mm in extension.” Further, 15.29% demonstrated an increase in herniation to greater than 3 mm in flexion.
Clinical Radiology (2008) 63, 1035-1048

“Upright Positional MRI of the Lumbar Spine”

F. Alyas, D. Connell, A. Siafuddin, London Upright MRI Centre, London, UK
Department of Radiology, The Royal National Orthopaedic Hospital NHS Trust,
Stanmore, Middlesex, UK

“There is no doubt that clinically relevant spinal canal stenosis can be uncovered by imaging in the erect position.”

“In cases where conventional MRI shows no evidence of cauda equina or lumbar nerve root compression in the setting of convincing clinical symptoms that warrant surgical intervention, re-imaging in the upright position, with the addition of flexion and extension, is recommended.”
ECR 2009 Vienna, Austria, March 6-10

“Upright Positional MRI Improves Diagnosis and Treatment of Patients with Back Pain and Sciatica, When Compared to Conventional Supine MRI Examination”

F.W. Smith, M.D., Department of Radiology, University of Aberdeen, Woodend Hospital Aberdeen, Scotland, UK

In a study of 63 patients with back pain or sciatica, “Thirty-Four (54%) demonstrated abnormalities in one or more of the erect or seated positions, which correlated with their symptoms and were not evident in the conventional supine scan.”

“Dynamic Weight-Bearing Cervical Magnetic Resonance Imaging: Technical Review and Preliminary Results”

Vitaz, M.D. et al., Department of Neurological Surgery
University of Louisville School of Medicine

Twenty patients with neck pain and symptoms consistent with radiculopathy or myelopathy were scanned upright on a GE 0.5T Signa SP vertical gap MRI.

“When only static supine MRI scanning is performed on these patients, the true abnormality may be overlooked and inappropriate surgical plans instituted because of a lack of illustration of the changes that occur with movement.”


D. Weishaupt, M.D. et al., Institute of Diagnostic Radiology, University Hospital, Zurich

Thirty patients with chronic low back pain who were unresponsive to non-surgical treatment were scanned on a GE 0.5T Signa SP vertical gap MRI. The study showed that positional MRI more frequently demonstrates neural compromise than does conventional MRI. Further, the study showed that "positionai pain differences are related to position-dependent changes in foraminal size."
“The role of imaging is to help explain the anatomic basis for the patient’s symptoms… The main drawback of MRI is supine imaging that can limit the dynamic component of the examination …[Upright MRI imaging] may ultimately lead to MRI being the one imaging test for PFD.”