LANDMARK UCLA STUDY OF MORE THAN 1,000 PATIENTS REVEALS THE "MISS RATE" OF STATIC MRI

TABLE SUMMARIZES "MISSED RATES"

% Spondylolistheses "Missed" by Static MRI					Overall "Miss Rate"
40° Flexion					40° Flexion
	L2-3	L3-4	L4-5	L5-S1	L1-2 to L5-S1
3mm	30.8%	**38.7%**	**35.1%**	4%	**18.1%**
4mm	33.3%	**53.8%**	17.9%	3.5%	12.3%
10° Extension					10° Extension
	L2-3	L3-4	L4-5	L5-S1	L1-2 to L5-S1
3mm	25%	20.8%	14%	3.2%	8.9%
4mm	33.3%	25%	4.2%	2.4%	5.0%

The study of 1,302 patients revealed that Static MRI missed 35.1% of the spondylolistheses at L4-5 – the vertebral segment responsible for the majority of back pain. The Fonar Upright® Multi-Position™ MRI was used in the study.

The highest "miss rate" by Static MRI was upon flexion and occurred at the key L3-4 vertebral segment. The "miss rate" at L3-4 was 38.7%.

Moreover, the "miss rate" at L3-4 increased to 53.8% when the minimum slip was 4mm. The L3-4 "missed" spondylolisthesis data suggest that the extent of the instabilities at L3-4 that result from disc degeneration and disc height loss at L4-5 may be underappreciated.

At L4-5, where the majority of clinical back pathology occurs, the "miss rate" was 35.1%. Consequently, there is a significant prospect of missing a symptom-generating spondylolisthesis at the segment most responsible for back pain and failing to do a fusion to eliminate the pain, because the spondylolisthesis was not visualized by conventional recumbent-only MRI.

The findings were presented in four papers delivered at the 22nd Annual Meeting of the North American Spine Society (NASS) and published in the Society's *The Spine Journal* 7(2007) 1S-163S, October 23-27, 2007.

The Fonar Upright® Multi-Position™ MRI is the only MRI that can perform Upright® Dynamic MRI™ imaging with the patient in multiple positions. The Upright® was used in conjunction with the software image analysis program developed for the Fonar Upright® by TrueMRI®*. The program enables comprehensive quantitative analysis of static and dynamic spine abnormalities.

The UCLA measurements establish that the method of choice for detecting the presence of lumbar spondylolistheses and establishing the degree of vertebral instability is Upright® Multi-Position™ MRI.

It's also important to appreciate that the "missed" spondylolisthesis rate in the UCLA study was determined by quantitative measurements of the lumbar vertebrae in the neutral sitting position, compared to the flexion and extension positions. Patients sitting upright in the flexion and extension positions were compared to themselves in the neutral sitting position.

It's likely that the spondylolisthesis "miss rates" reported in the study, comparing the seated upright patients in the neutral position with seated patients in flexion are likely to be much lower than the "miss rates" of conventional MRI, where the examination is not multi-positional but static only and performed with the patient in the non-weight-bearing horizontal position.

Conventional MRI is non-weight-bearing. The absence of the upright gravitational compressive forces from the recumbent spine causes the impact of body weight and position on vertebral pathology to be invisible in the conventional recumbent-only MRI.

In the Proceedings of NASS, another group of users of the Fonar Upright® MRI reported in their Special Internet Group Symposium (SIG 1) that "Spine surgery is changing from a discipline that uses primarily static imaging of the neuraxis to define pathology to one where dynamic studies are increasingly available."

As the studies indicate, Dynamic MRI™ is destined to replace the conventional lie-down Static MRI as the procedure of choice for diagnosing diseases of the spine and deciding on the optimal procedure for surgical correction.

A Leading Neurosurgeon Comments On The UCLA Studies

Michael Brisman, MD, F.A.C.S., Neurosurgeon, Chief of Neurosurgery, Winthrop University Hospital; Co-Medical Director, The Long Island Gamma Knife, South Nassau Hospital

"I and the ten other neurosurgeons in my practice have been using the Fonar Upright® Multi-Position™ MRI for a number of years. The UCLA study confirms our results. Dynamic imaging using the Fonar Upright® MRI can reveal significant pathology that is missed by static recumbent MRI.

"In our practice, we've noticed that, not only can a spondylolisthesis be appreciated on upright and flexion and extension MRI, but the degree of disc herniation, ligamentous compression, and spinal stenosis can also be appreciated by upright and flexion and extension imaging.

"Having a better understanding of the mobility of the spine and the cause and degree of compression on the spinal cord and nerves better enables us to select the proper surgical treatment for any patient.

"As we've appreciated the benefits of this technology, we have had a lower threshold for ordering the upright flexion and extension imaging tests earlier when there are questions about spinal pathology."

Positional Imaging; One Side of Upright Removed for Photography.

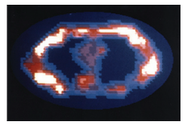
To receive a copy of the UCLA studies, purchase a Fonar Upright® MRI, or to learn more about it, call to speak to a sales representative at 1-888-NEEDMRI (1-888-633-3674). Or expedite your purchase by ordering directly online at www.fonar.com.

Fonar Heritage

The Inventor of MR Scanning Timeline, Inventor Contributions

The world's first MR scanner, (Downstate Medical Center, 1977) *Smithsonian Institution, Permanent Collection*

- **1969** Original Idea for MR Scanner (Grant Application to Health Research Council of the City of New York)[1*]
- **1969** Realizes Need for a Compelling Application to Justify Building Human Scanner. Decides on Cancer Detection[1,2]
- **1970** Key Discovery Makes the MRI Possible[3] Discovery of the marked T1 and T2 signal differences among the normal tissues and also between the normal tissue and cancer tissue. Discovery enables soft-tissue detail previously absent from medical imaging, and early cancer detection; used today to detect cancers worldwide. "NMR developed into a laboratory spectroscopic technique capable of examining the molecular structure of compounds, until Damadian's ground-breaking discovery in 1971." (*MRI From Picture to Proton*, Cambridge University Press, 2003)
- **March 1971** First Article Published (*Science*)[4]
- **Spring 1971** First Ever Scanning Method Proposed (*Downstate Reporter*)[5,6,7]
- **March 1972** First MR Patent Filed (3D Serial Voxel Scanning Method). Patent Issued 1974.[8]
- **1976** The Struggle Begins – Expert Declares, "Any further discussion of scanning the human body by MR (NMR) is visionary nonsense."
- **1976** Construction of First Human MR Scanner Commences
- **1977** Construction Completed; First Human Scan Achieved: Thoracic MRI Image at T-8[9,10,11,12]



- **1980** Fonar Installs First Commercial MRI; Initiates MRI Industry[13]
- **1997** Patent Upheld by High Court on U. S. Patents and the U. S. Supreme Court (1.1 Million Pages of Documentary Evidence Scrutinized and Argued; No Prior Art)[14]

*Documents at www.fonar.com

Special Offer for Physicians. Free book about the discovery of the MRI: *A Machine Called Indomitable* by Sonny Kleinfield, Reporter for The New York Times, Times Books. Call Fonar to order: 631-694-2929.

"This book is the account of the development of NMR technology and a profile of one man, Dr. Raymond Damadian, who dreamed of NMR as a weapon against cancer and struggled almost obsessively against great odds to build the first human scanner Indomitable." – *Library Journal*

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