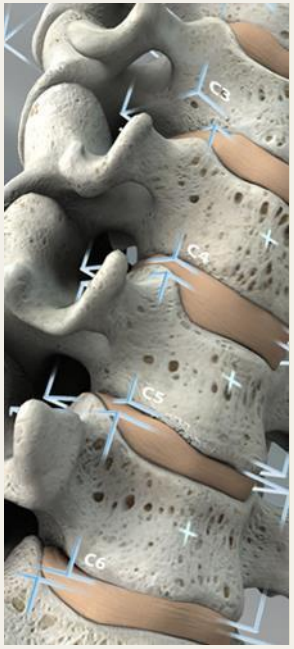

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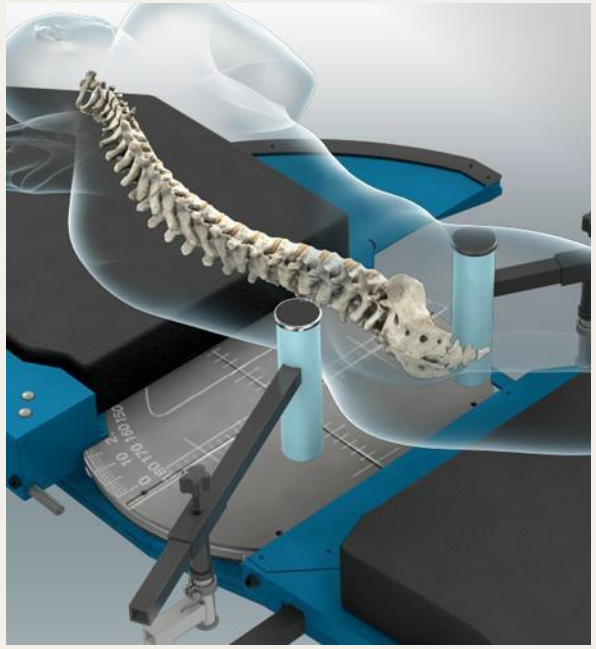
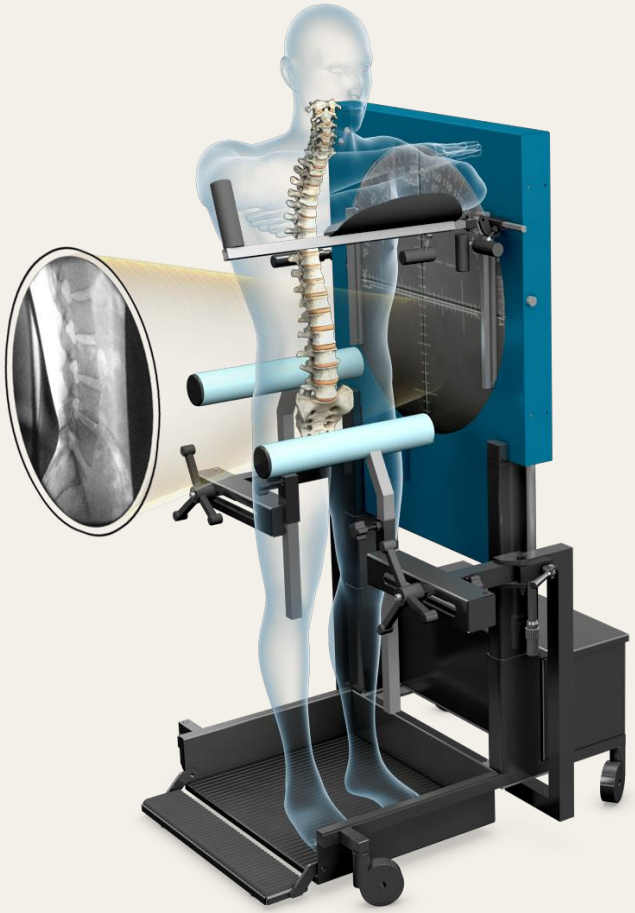
VMA:

Spine's New Standard for Instability Testing



Rev. 1095-1.0 (9/2016)

Game-Changing Technology:
VMA Advanced Functional Imaging



VMA

Vertebral Motion Analysis

- Detects instability at higher rates
- Helps surgeons reverse denials
- Easy to integrate into clinical workflow
- Stronger science than today's test
- Lower radiation exposure to patient

The Flex/ex has Significant Limitations

The flex/ex **is prescribed 5 million times per year** (US)

- Higher volume than spine MRI + CT combined

The flex/ex **impacts decisions for 1.9 million surgeries / year**

- A positive test *indicate* a patient for fusion surgery (500K/year, US)
- A negative test *qualify* a patient to potentially receive decompression surgery (600K/year) or spine pain injections (800K/year)

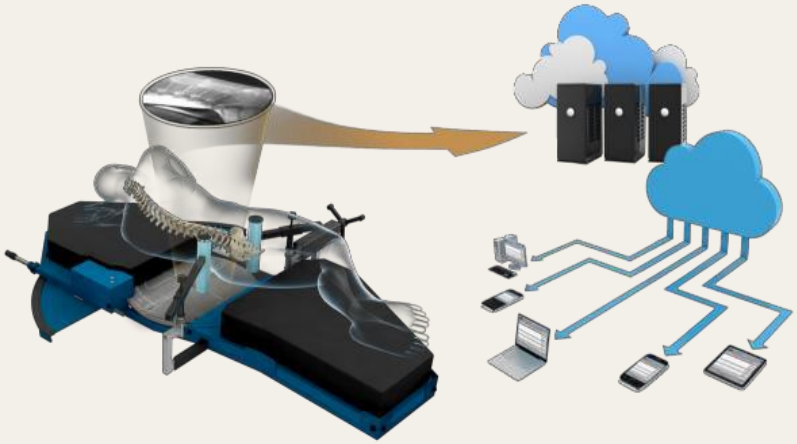
However, there are **significant issues with the 1940s-era flex/ex**

- Highly variable and subjective results
- *"We believe that **no useful information can be derived from [the flex/ex]** procedure, especially in relation to the need for surgical fusion."*

– Dvorak & Panjabi, 1991

The continued use of flex/ex demonstrates how important functional testing is in the workup of patients for spine surgery

VMA is an Attractive Alternative to the Flex/Ex



Device-Assisted Bending During Imaging + **Enterprise Software and Big Data** =

Helps identify more patients with lumbar radiographic instability

More informed decision making & patient selection

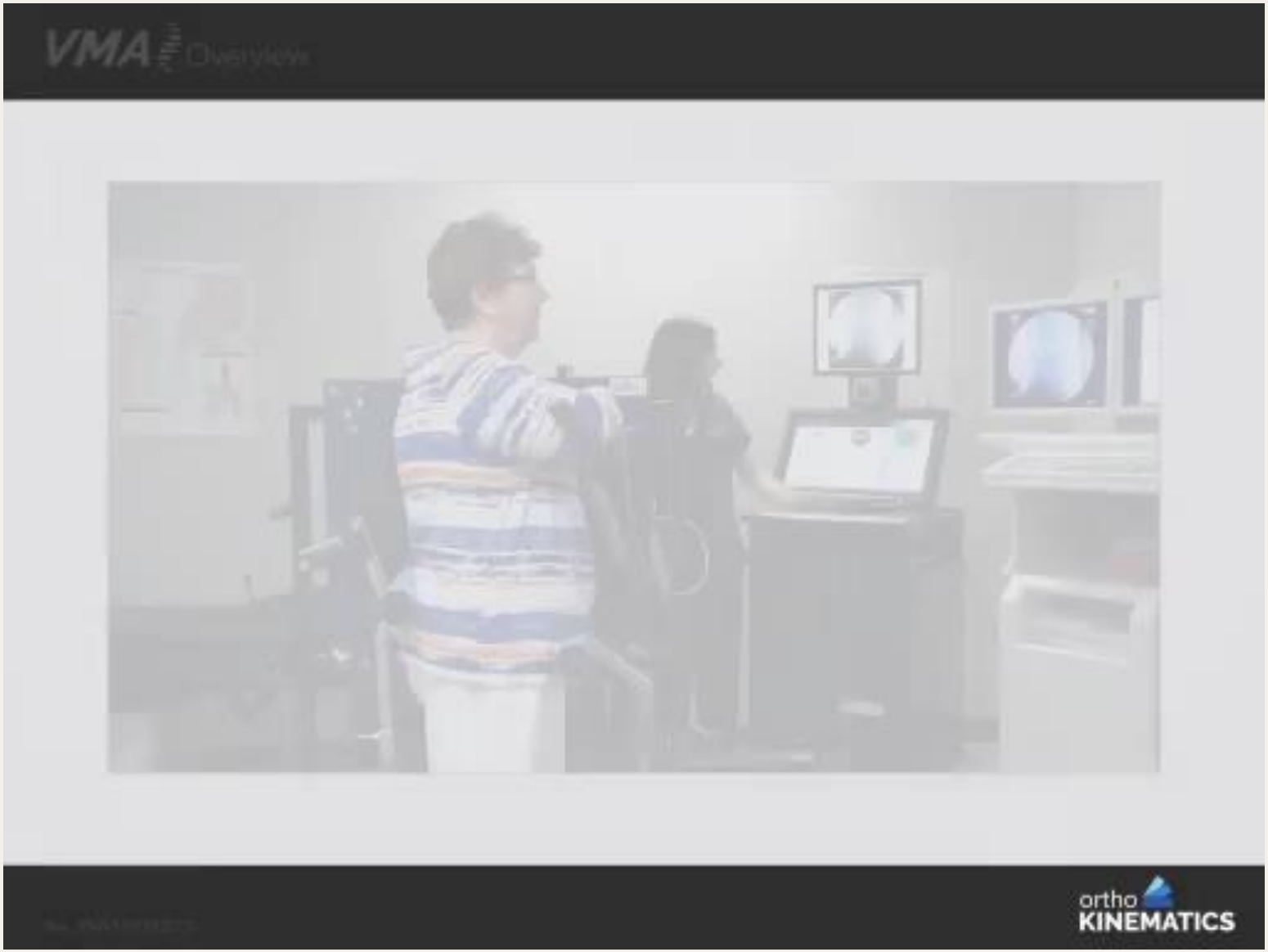
Online tools that make a surgeon's job easier

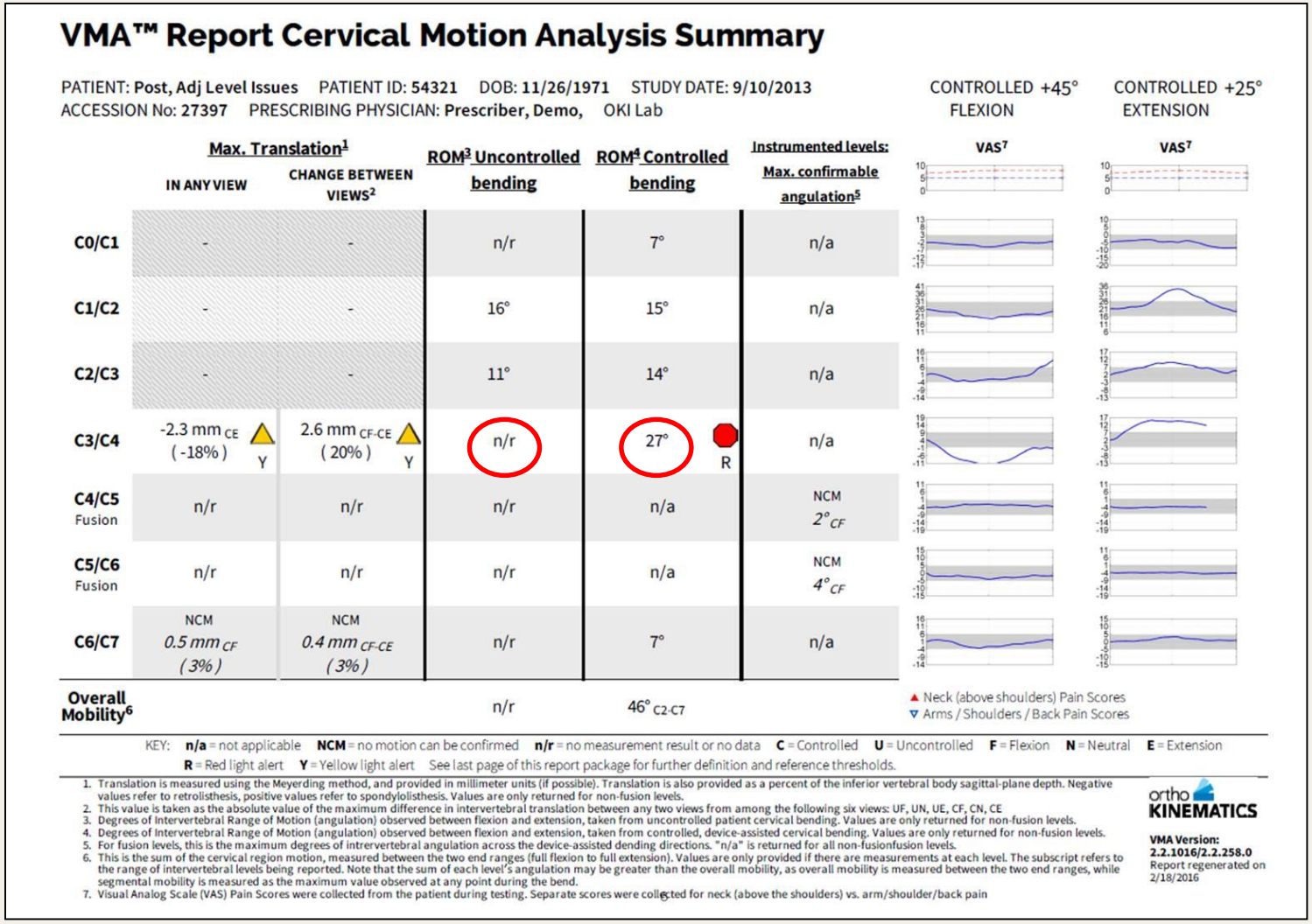
- ✓ See FDA-cleared lumbar and cervical indications for use
- ✓ Uses standard C-arms (fluoroscopes) to generate images
- ✓ Covered under existing category I CPT codes*

** Ortho Kinematics, Inc. does not provide coding advice, however customers have reported receiving reimbursement for VMA testing under current Category I CPT codes.*

Rev. 1038-1.0 (10/2014)

How VMA Works





VMA™ Report Cervical Motion Analysis Summary

PATIENT: **Post, Adj Level Issues** PATIENT ID: **54321** DOB: **11/26/1971** STUDY DATE: **9/10/2013**
ACCESSION No: **27397** PRESCRIBING PHYSICIAN: **Prescriber, Demo,** OKI Lab

CONTROLLED +45° FLEXION

CONTROLLED +25° EXTENSION

	Max. Translation[1] IN ANY VIEW	Max. Translation[1] CHANGE BETWEEN VIEWS[2]	ROM[3] Uncontrolled bending	ROM[4] Controlled bending	Instrumented levels: Max. confirmable angulation[5]
C0/C1	-	-	n/r	7°	n/a
C1/C2	-	-	16°	15°	n/a
C2/C3	-	-	11°	14°	n/a
C3/C4	-2.3 mm CE (-18%) Y	2.6 mm CF-CE (20%) Y	n/r	27° R	n/a
C4/C5 Fusion	n/r	n/r	n/r	n/a	NCM 2° CF
C5/C6 Fusion	n/r	n/r	n/r	n/a	NCM 4° CF
C6/C7	NCM 0.5 mm CF (3%)	NCM 0.4 mm CF-CE (3%)	n/r	7°	n/a
Overall Mobility[6]			n/r	46° C2-C7	

VAS[7]

▲ Neck (above shoulders) Pain Scores
▽ Arms / Shoulders / Back Pain Scores

KEY: **n/a** = not applicable **NCM** = no motion can be confirmed **n/r** = no measurement result or no data **C** = Controlled **U** = Uncontrolled **F** = Flexion **N** = Neutral **E** = Extension
R = Red light alert **Y** = Yellow light alert See last page of this report package for further definition and reference thresholds.

1. Translation is measured using the Meyerding method, and provided in millimeter units (if possible). Translation is also provided as a percent of the inferior vertebral body sagittal-plane depth. Negative values refer to retrolisthesis, positive values refer to spondylolisthesis. Values are only returned for non-fusion levels.
2. This value is taken as the absolute value of the maximum difference in intervertebral translation between any two views from among the following six views: UF, UN, UE, CF, CN, CE
3. Degrees of Intervertebral Range of Motion (angulation) observed between flexion and extension, taken from uncontrolled patient cervical bending. Values are only returned for non-fusion levels.
4. Degrees of Intervertebral Range of Motion (angulation) observed between flexion and extension, taken from controlled, device-assisted cervical bending. Values are only returned for non-fusion levels.
5. For fusion levels, this is the maximum degrees of intervertebral angulation across the device-assisted bending directions. "n/a" is returned for all non-fusionfusion levels.
6. This is the sum of the cervical region motion, measured between the two end ranges (full flexion to full extension). Values are only provided if there are measurements at each level. The subscript refers to the range of intervertebral levels being reported. Note that the sum of each level's angulation may be greater than the overall mobility, as overall mobility is measured between the two end ranges, while segmental mobility is measured as the maximum value observed at any point during the bend.
7. Visual Analog Scale (VAS) Pain Scores were collected from the patient during testing. Separate scores were collected for neck (above the shoulders) vs. arm/shoulder/back pain

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VMA Version: 2.2.1016/2.2.258.0
Report regenerated on 2/18/2016

- Motion summary clearly shows at C3/C4 the patient had no measurement result (nr) in a voluntary bend.
- Controlled bend using the VMA, motion increased up to 27degrees.
- Had the patient just received a standard Flex/Ex, no trigger would be alerted for meeting minimum threshold.

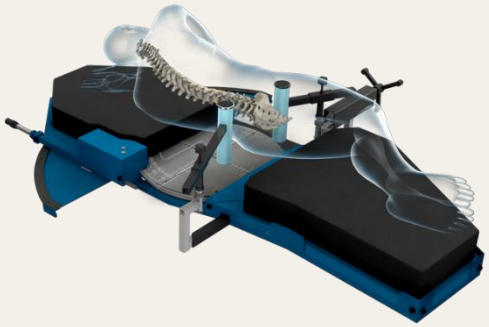
Flex/Ex vs. VMA for Detecting Radiographic Instability

Flex/ex:
X-rays of **Uncontrolled Bending**

Easy for patients to avoid painful positions, and therefore **avoid provoking instability**.

5.5%
prevalence of lumbar radiographic instability [1].

VMA:
Devices Control Bending During X-rays

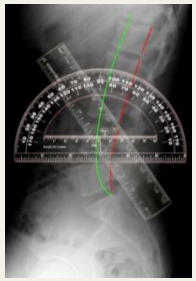
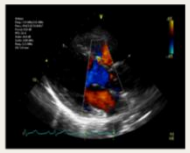


Devices assure sufficient bending in both standing and lying postures to maximize the chance that **existing instability is provoked**.

11.5%
prevalence of lumbar radiographic instability [1].

(1) Lumbar radiographic instability is defined as 5.3 millimeters or more of translation on flexion/extension radiographs.

Spine Surgeons Lack Reliable Function Tests Critical to Other Surgeons

	Non-Specific **Spine** Pain	Non-Specific **Chest** Pain
Functional Tests Used to Select Surgery Patients	**ONE** option: the 1940s-era **flex/ex** 	**MULTIPLE** advanced technologies  Stress EKG  Echocardiogram  Angiography
Related Surgeries	**1.1 million** *Fusion surgery, decompression surgery*	**1.1 million** *Stent, Coronary Artery Bypass Graft (CABG)*

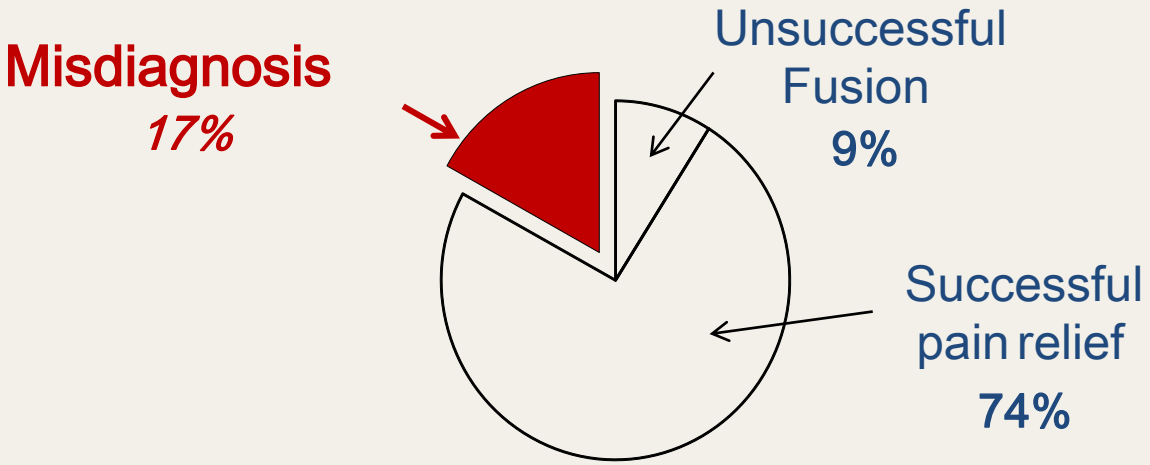
Surgical Success Rate

74%

95%+

Misdiagnosis in Spine

Lumbar Fusion Outcomes (1)

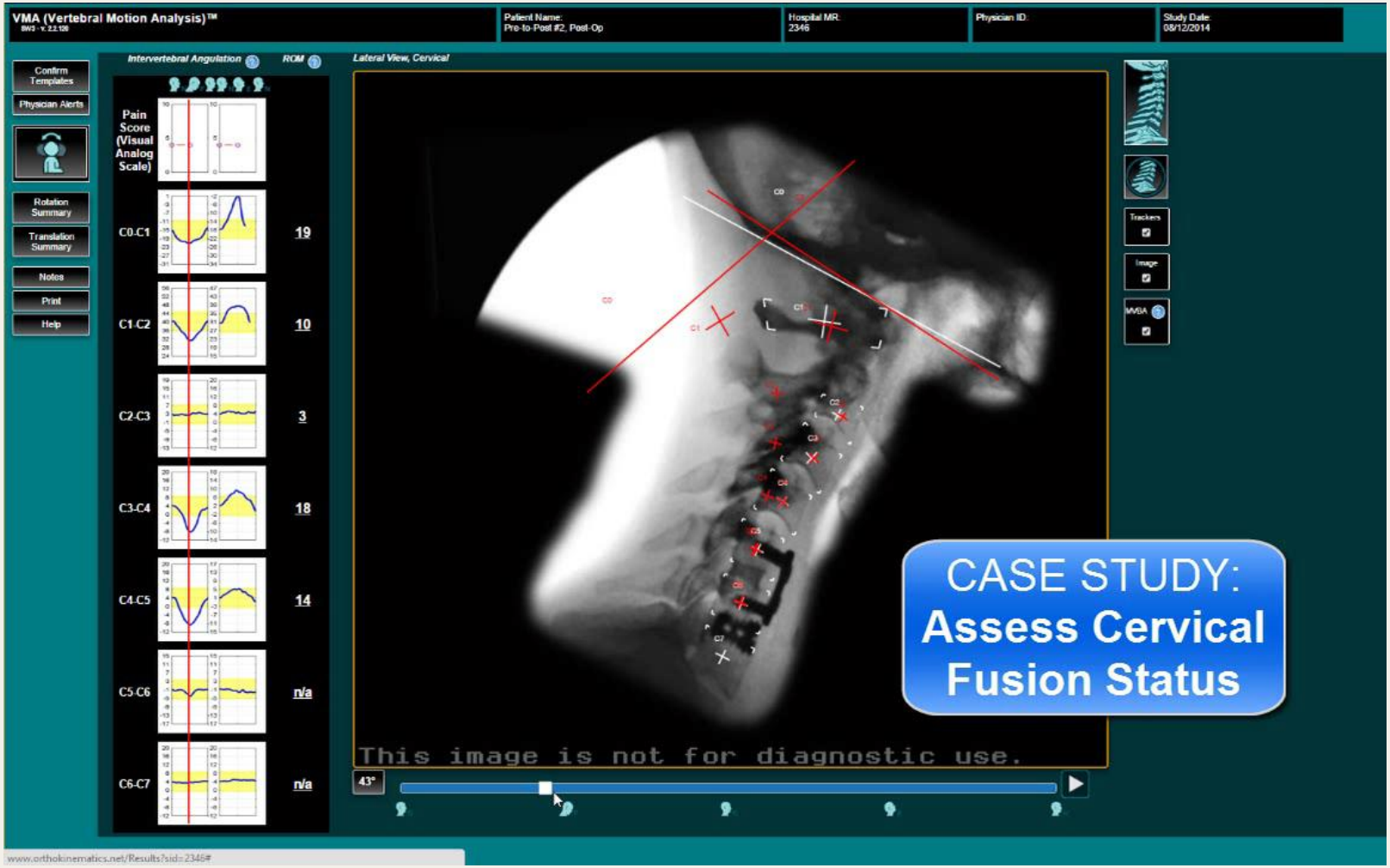


Biggest need is better diagnostics, not improved fusion technology

<5 companies focused on developing next-gen diagnostics

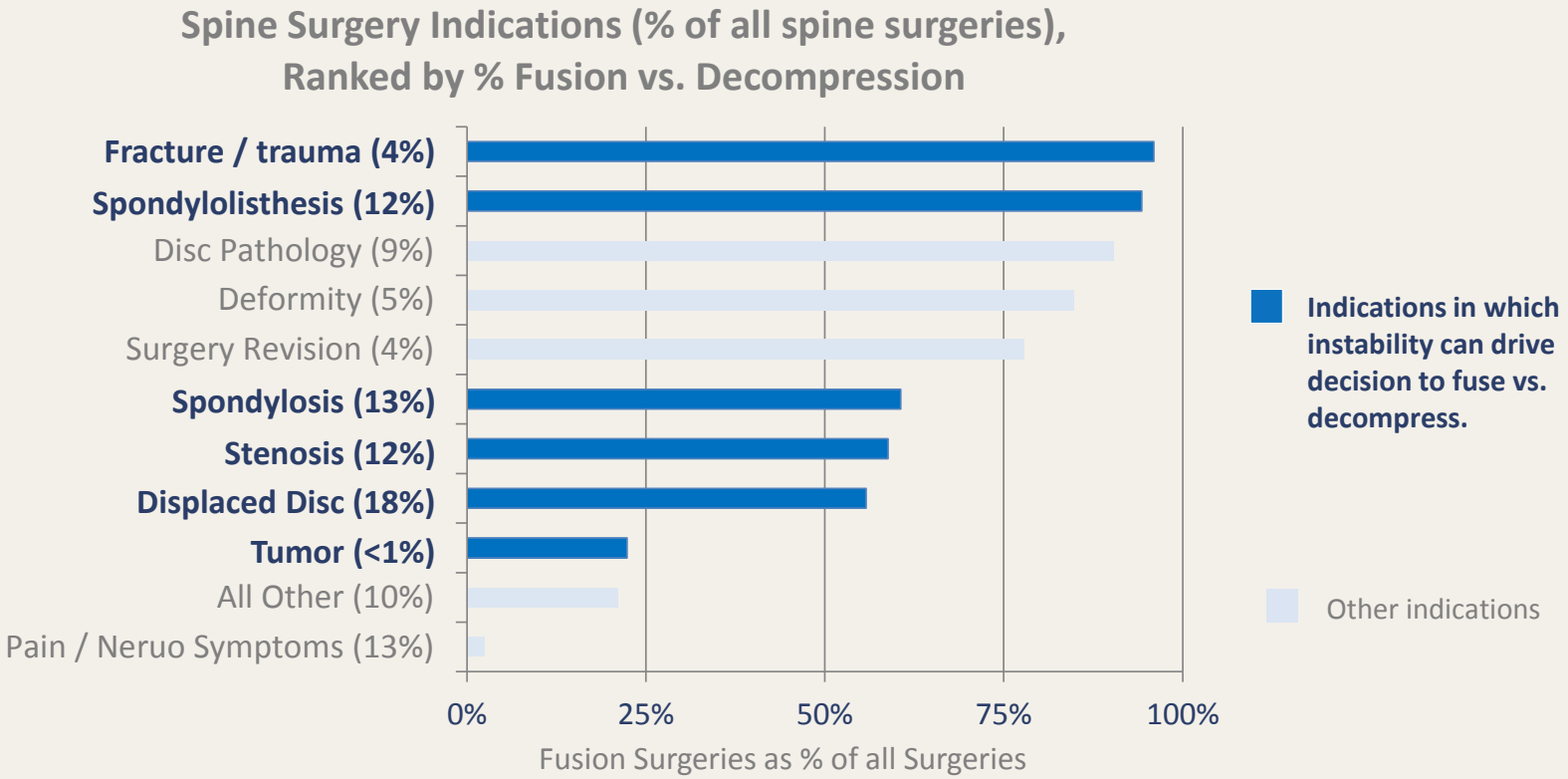
(1) From Meta-analysis of Medical Literature. Data on file at OKI.

Case Study: Fusion Assessment



Role of Instability in Spine Surgery

For more than 50% of spine surgeries, pre-existing instability at a target or adjacent level can directly drive the decision to fuse vs. decompress.



Source: National Hospital Discharge Survey, National Ambulatory Medical Care Survey, National Hospital Ambulatory Care Survey. All published by US Centers for Disease Control & Population, 2010

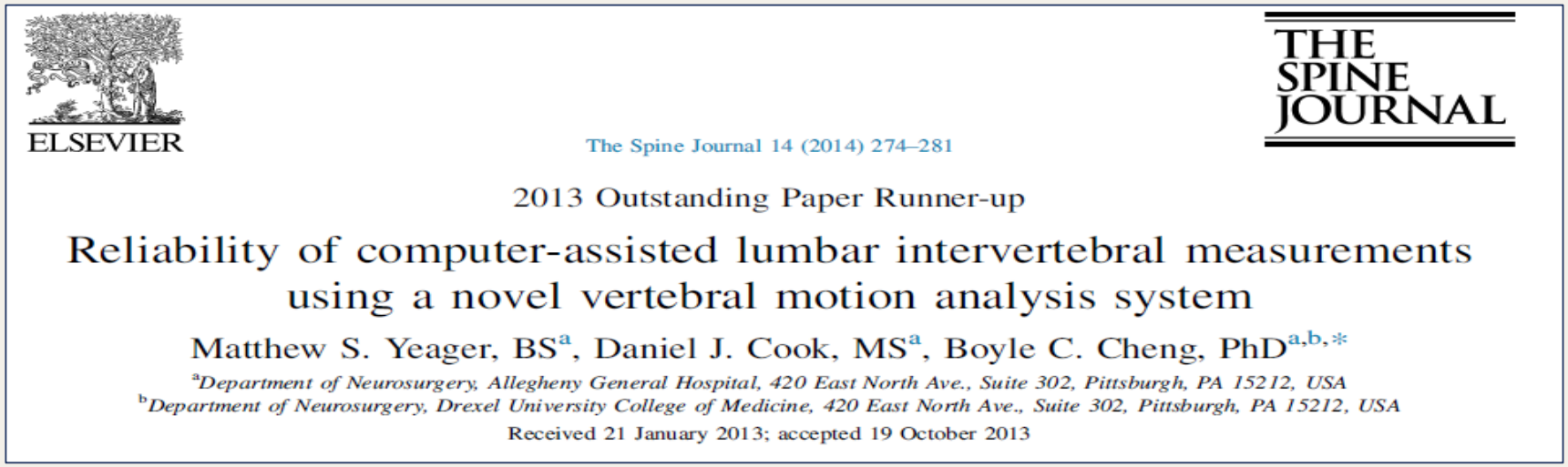
Scientific Support

Topic	Summary	References
Sensitivity & Specificity	A Level I evidence study of 509 patients and 73 asymptomatic controls. VMA demonstrated no less than a 41% increase in the sensitivity of detecting lumbar radiographic instability, with the same 98%+ specificity. This study used a .3 mm threshold for instability.	Davis, RJ, et. al. "Measurement Performance of a Computer Assisted Vertebral Motion Analysis System." *International Journal of Spine Surgery* (2015). Vol. 9. Article 36.
Radiation dose	The radiation exposure from 74 VMA studies was directly compared to the radiation exposure from 27 flex/ex* studies. After accounting for differences between the two groups with respect to age, weight, and height, VMA resulted in a 17% reduced radiation exposure (Dose Area Product) as compared to flex/ex*.	Mellor, F, et.al. "Moving back: The radiation dose received from lumbar spine quantitative fluoroscopy compared to lumbar spine radiographs with suggestions for dose reduction." *Radiography*. Vol. 20, Issue 3, pp. 251-257, Aug. 2014.
Measurement repeatability	VMA markedly reduced variability of lumbar intervertebral measurements compared with a digitized manual analysis. VMA demonstrated precision in the range of computer-assisted X-ray analysis techniques.	Yeager, MS, et. al. "Reliability of computer-assisted lumbar intervertebral measurements using a novel vertebral motion analysis system." *The Spine Journal*. 14 (2014) 274-281. [2013 Outstanding paper Runner Up]
Measurement accuracy	In studies submitted to the FDA, VMA measurements were demonstrated to be accurate to within 0.2-0.4° (angulation) and 0.5-0.7 mm (translation). This is comparable to what was reported a prior peer-reviewed accuracy study of the VMA software.	See www.orthokinematics.com/pubs/vmaindications-for-use.html. Also see Breen, AC, et. al. "An objective spinal motion imaging assessment: reliability, accuracy, and exposure data." *BMC Musculoskeletal Disorders*. 7:1 (2006).
Decompression vs. fusion for "stable spondy"	Decompression has better results than decompression + fusion for stable spondy and unilateral side leg pain.	Rampersaud, YR, et. al. "Health-related quality of life following decompression compared to decompression and fusion for degenerative lumbar spondylolisthesis." The Journal of the Canadian Chiropractic Association, 57(4), 2014.
Performance of the flex/ex* (for comparison)	The definitive study cited by virtually all US payers regarding the use of a 4.5 mm threshold for lumbar instability was a Level III study involving 142 patients. This study found the test was not diagnostically useful in the selection of patients for fusion surgery, however this finding has been largely overlooked.	Dvorak, J., et. al. "Clinical validation of functional flexion-extension roentgenograms of the lumbar spine". *Spine* (1991), 16:8, 943-950.

** Plain x-rays with flexion and extension views..*

Clinical Validation (1 of 5)

VMA vs. Flex/ex: "Markedly reduced variability"



ELSEVIER

The Spine Journal 14 (2014) 274–281

THE SPINE JOURNAL

2013 Outstanding Paper Runner-up

Reliability of computer-assisted lumbar intervertebral measurements using a novel vertebral motion analysis system

Matthew S. Yeager, BS[a], Daniel J. Cook, MS[a], Boyle C. Cheng, PhD[a,b,*]

[a]*Department of Neurosurgery, Allegheny General Hospital, 420 East North Ave., Suite 302, Pittsburgh, PA 15212, USA*

[b]*Department of Neurosurgery, Drexel University College of Medicine, 420 East North Ave., Suite 302, Pittsburgh, PA 15212, USA*

Received 21 January 2013; accepted 19 October 2013

Details:

- 84 patients
- Coefficient of repeatability (CR), limits of agreement (LOA), intraclass correlation coefficient
- Measured twice by three physicians using the KineGraph vertebral motion analysis (VMA) system and twice by three different physicians using a digitized manual technique.
- VMA measurements demonstrated substantially more precision compared with the manual technique

Clinical Validation (2 of 5)

VMA vs. Flex/ex: 44% increase in sensitivity, same high 98%+ specificity. NPV increase of 33-47%.

Measurement Performance of a Computer Assisted Vertebral Motion Analysis System

Reginald J. Davis, MD,[1] David C.Lee, MD,[2] Chip Wade, PhD,[3] Boyle Cheng, PhD[4]

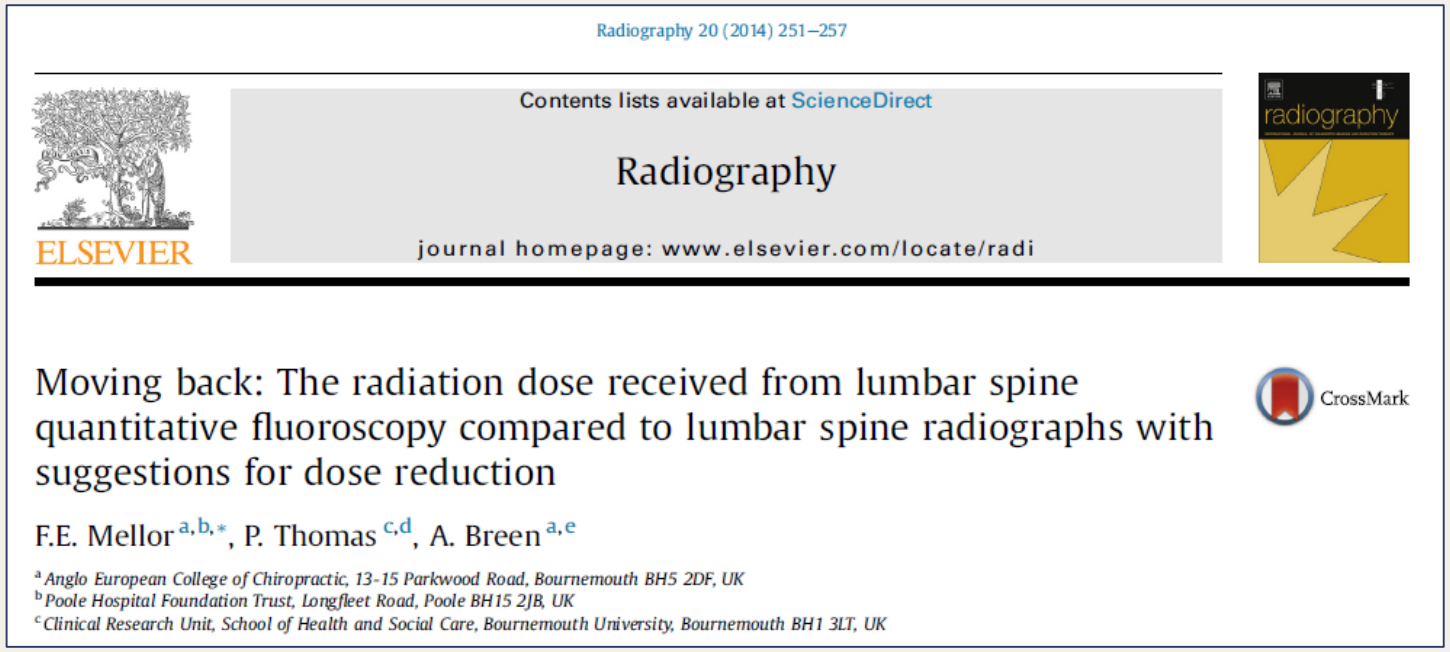
[1]Department of Neurosurgery, Greater Baltimore Medical Center, Baltimore, MD, [2]Southern Neurologic and Spinal Institute, Hattiesburg MS, [3]Department of Industrial and Systems Engineering, Auburn University, Auburn, AL, [4]Department of Neurosurgery, Drexel University College of Medicine, Pittsburgh, PA

Details:

- 582 patient study
- Level 1 evidence
- Direct comparison vs. flex/ex
- Sensitivity, Specificity, Negative Predictive Value

Clinical Validation (3 of 5)

VMA vs. Flex/ex: Reduced radiation dose.



Radiography 20 (2014) 251–257

Contents lists available at ScienceDirect

Radiography

journal homepage: www.elsevier.com/locate/radi

Moving back: The radiation dose received from lumbar spine quantitative fluoroscopy compared to lumbar spine radiographs with suggestions for dose reduction

F.E. Mellor [a,b,*], P. Thomas [c,d], A. Breen [a,e]

[a] Anglo European College of Chiropractic, 13-15 Parkwood Road, Bournemouth BH5 2DF, UK
[b] Poole Hospital Foundation Trust, Longfleet Road, Poole BH15 2JB, UK
[c] Clinical Research Unit, School of Health and Social Care, Bournemouth University, Bournemouth BH1 3LT, UK

Details:

- 101 patients
- Level 3 evidence
- Direct comparison vs. flex/ex

Clinical Validation (4 of 5)

VMA : Cage Placement (July 2015)

Effect of TLIF Cage Placement on In Vivo Kinematics

Alejandro D. Castellvi, MD, Shankar K. Thampi, BS, Daniel J. Cook, MS, Matthew S. Yeager, BS, Yuan Yao, MD, Qing Zou, MD, Donald M. Whiting, MD, Michael Y. Oh, MD, Edward R. Prostko, MD, and Boyle C. Cheng, PhD

Details:

- 13 patients
- Capstone (Medtronic, Memphis, TN) polyetheretherketone (PEEK) TLIF straight cages
- Statistically significant correlations were noted between sagittal cage position and lying LB
- Statistically significant correlations were noted between coronal cage positioning with both and lying LB

Clinical Validation (5 of 5)

VMA : Cage Placement (July 2015)

Variability in Flexion Extension Radiographs of the Lumbar Spine: A Comparison of Uncontrolled and Controlled Bending

Boyle Cheng , Ph.D.,1 Anthony E. Castellvi, MD,2 Reginald J. Davis, MD,3 David C. Lee, MD,4 Morgan P. Lorio, MD,5 Richard E. Prostko, MD,6 Chip Wade, Ph.D.6

Details:

- 109 patients
- (57 asymptomatic, 52 symptomatic)
- Measurement variability was determined by the mean and standard deviation of intervertebral rotation when evaluated by 5 independent observers
- 26% to 46% decrease in measurement variability under VMA compared to FE

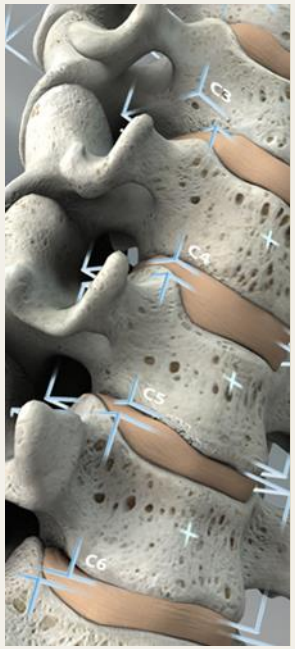
Static versus dynamic bending flexion extension radiographs: The influence on reduction in patient reported pain post lumbar fusion.

- 414 Patients (138 per group)
- Compared standing VMA to standing FE
- Known thresholds of 15% intervertebral translation (IVT, equivalent to 5.3mm assuming a 35mm vertebral body
- Group 1-the VMA was positive while the FE were negative
- Group 2- the VMA was positive and the FE was positive
- Group 3-the VMA was negative while the FE were positive.
- Visual Analog Scale (VAS) and Oswestry Disability Index (ODI) pre and post 12-months.

- Group 1- 52% improvement in the VAS and a 43% improvement in the ODI
- Group 2- 35% improvement in the VAS and a 34% improvement in the ODI
- Group 3 showed insignificant improvements of 11% and 18% in VAS and ODI scores, respectively.

VMA Align™

Vertebral Motion Analysis



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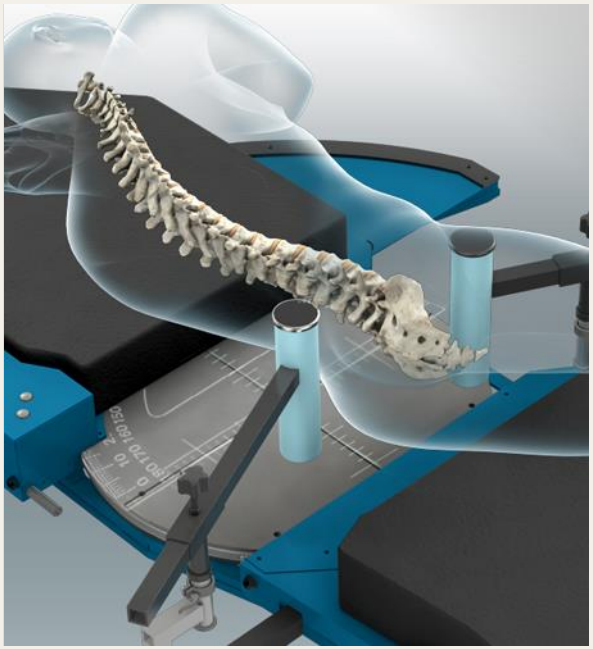
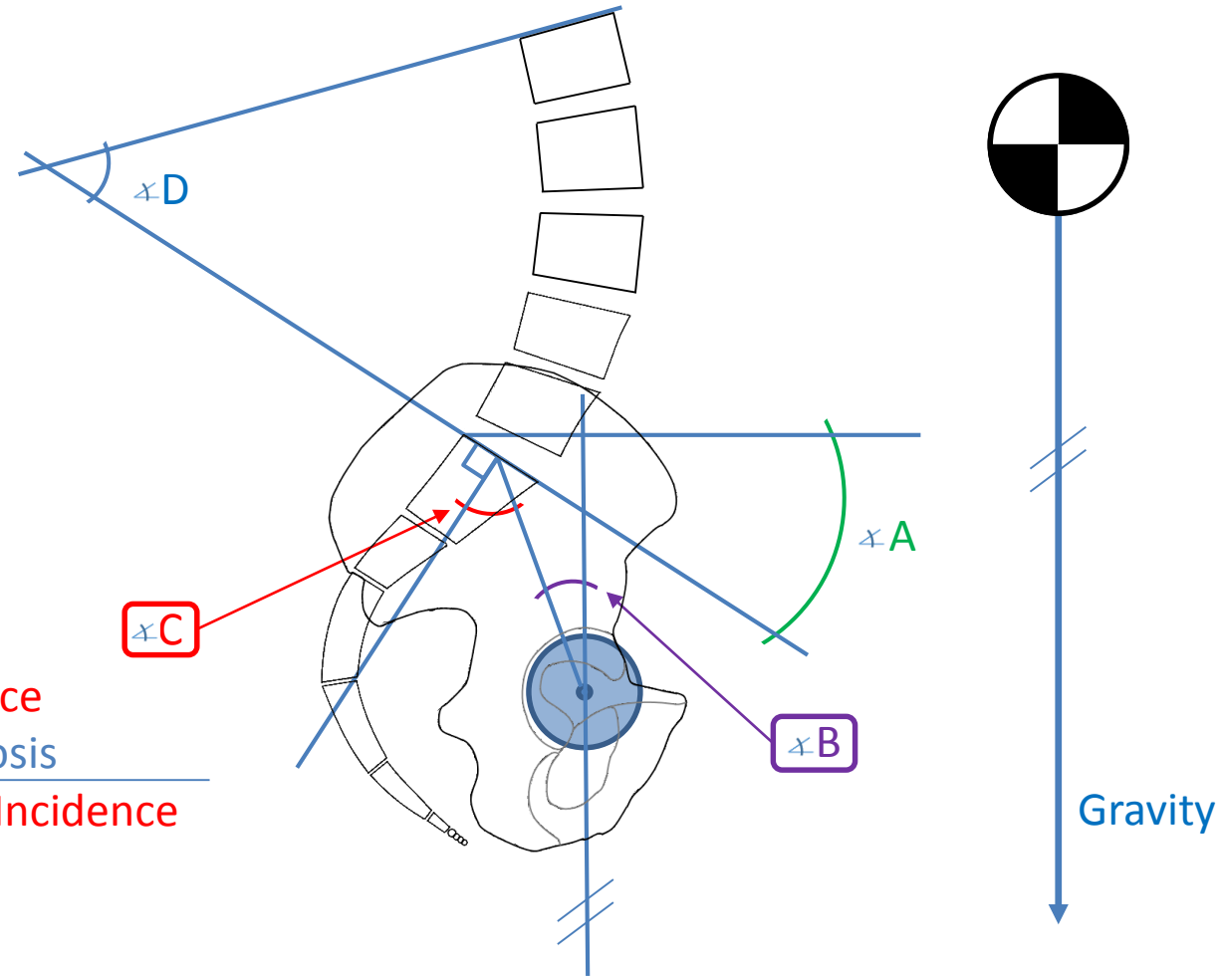


Rev 1077 – 1.3 (07/2016)

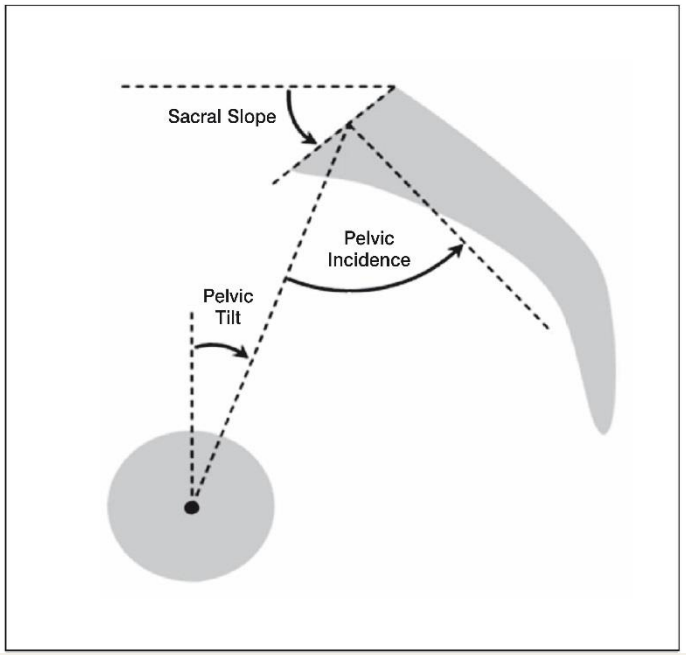
All Measurements & Equations



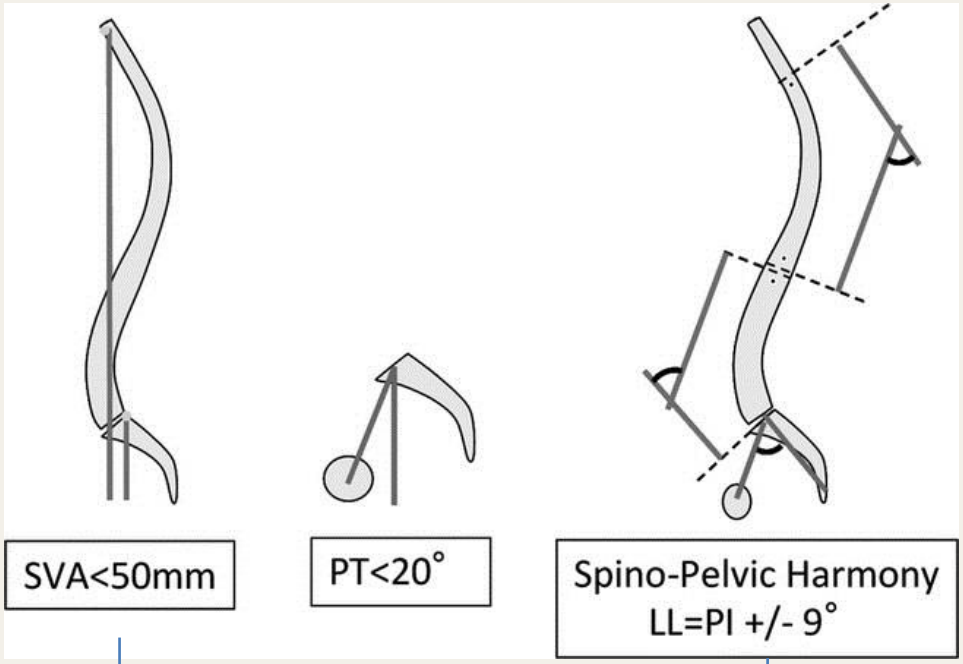
(∠A) = Sacral Slope
(∠B) = Pelvic Tilt
(∠C) = Pelvic Incidence
(∠D) = Lumbar Lordosis

(∠A) + (∠B) = Pelvic Incidence
(∠C) – (∠D) = Target

Lumbar Sagittal Alignment Parameters



PI = SS + PT



Any Retroversion?

These two track the same issue—The correlate very closely with each other

Significance of PI-LL Mismatch

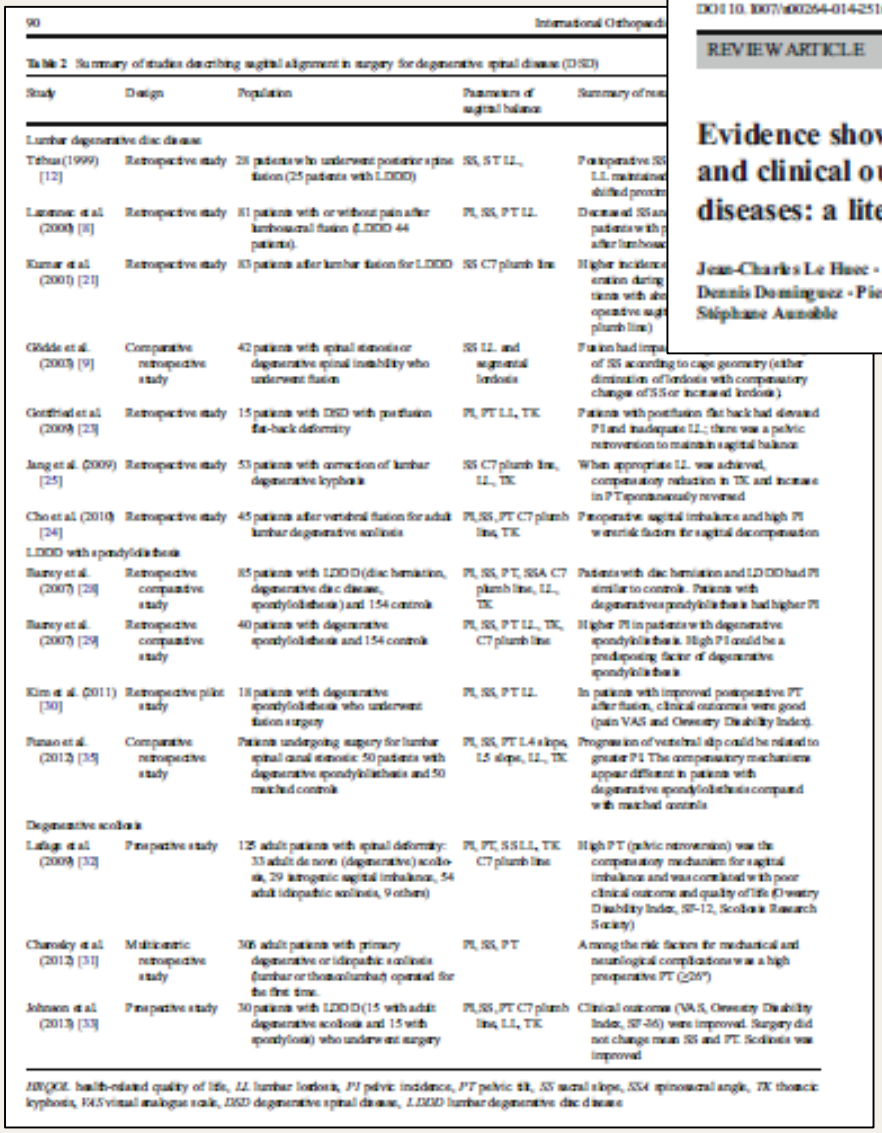
This study is the first to find that PI-LL mismatch influences post-operative residual symptoms**, such as LBP, lower extremity pain and numbness. The importance of maintaining spinopelvic alignment is Emphasized… surgeons should pay attention to sagittal spinopelvic alignment and **avoid post-operative PI-LL mismatch even when treating patients with short-segment lumbar interbody fusion

– Akoi, et al, 2015

***Patients with [PI-LL > 10 degree or more] mismatch exhibit a 10-times higher risk for undergoing revision surgery** than controls if sagittal malalignment is maintained after lumbar fusion surgery.*

– Rothenfluh, et al, 2014

New Literature: Deformity → Degenerative



90 International Orthopaedi

Table 2 Summary of studies describing sagittal alignment in surgery for degenerative spinal disease (DSD)

Study	Design	Population	Parameters of sagittal balance	Summary of res
Lumbar degenerative disc disease				
Tribus (1999) [12]	Retrospective study	28 patients who underwent posterior spine fusion (25 patients with LDDD)	SS, ST LL,	Postoperative SS LL maintained shifted proxim
Lawrence et al. (2000) [8]	Retrospective study	81 patients with or without pain after lumbosacral fusion (LDDD 44 patients).	PI, SS, PT LL	Decreased SS an patients with p after lumbosac
Kumar et al. (2001) [21]	Retrospective study	83 patients after lumbar fusion for LDDD	SS C7 plumb line	Higher incidence eration during tions with abn operative sagi plumb line)
Glödde et al. (2003) [9]	Comparative retrospective study	42 patients with spinal stenosis or degenerative spinal instability who underwent fusion	SS LL and segmental lordosis	Fusion had impa of SS according to cage geometry (either diminution of lordosis with compensatory change of SS or increase of lordosis)
Gottfried et al. (2009) [23]	Retrospective study	15 patients with DSD with postfusion flat-back deformity	PI, PT LL, TK	Patients with postfusion flat back had elevated PI and inadequate LL; there was a pelvic retroversion to maintain sagittal balance
Jang et al. (2009) [25]	Retrospective study	53 patients with correction of lumbar degenerative kyphosis	SS C7 plumb line, LL, TK	When appropriate LL was achieved, compensatory reduction in TK and increase in PT spontaneously reversed
Cho et al. (2010) [24]	Retrospective study	45 patients after vertebral fusion for adult lumbar degenerative scoliosis	PI, SS, PT C7 plumb line, TK	Preoperative sagittal imbalance and high PI were risk factors for sagittal decompensation
LDDD with spondylolisthesis				
Barrey et al. (2007) [28]	Retrospective comparative study	85 patients with LDDD (disc herniation, degenerative disc disease, spondylolisthesis) and 154 controls	PI, SS, PT, SSA C7 plumb line, LL, TK	Patients with disc herniation and LDDD had PI similar to controls. Patients with degenerative spondylolisthesis had higher PI
Barrey et al. (2007) [29]	Retrospective comparative study	40 patients with degenerative spondylolisthesis and 154 controls	PI, SS, PT LL, TK, C7 plumb line	Higher PI in patients with degenerative spondylolisthesis. High PI could be a predisposing factor of degenerative spondylolisthesis
Kim et al. (2011) [30]	Retrospective pilot study	18 patients with degenerative spondylolisthesis who underwent fusion surgery	PI, SS, PT LL	In patients with improved postoperative PT after fusion, clinical outcomes were good (pain VAS and Oswestry Disability Index).
Funao et al. (2012) [35]	Comparative retrospective study	Patients undergoing surgery for lumbar spinal canal stenosis: 50 patients with degenerative spondylolisthesis and 50 matched controls	PI, SS, PT L4 slope, L5 slope, LL, TK	Progression of vertebral slip could be related to greater PI. The compensatory mechanisms appear different in patients with degenerative spondylolisthesis compared with matched controls
Degenerative scoliosis				
Lafage et al. (2009) [32]	Prospective study	125 adult patients with spinal deformity: 33 adult de novo (degenerative) scoliosis, 29 iatrogenic sagittal imbalance, 54 adult idiopathic scoliosis, 9 others)	PI, PT, SS LL, TK C7 plumb line	High PT (pelvic retroversion) was the compensatory mechanism for sagittal imbalance and was correlated with poor clinical outcome and quality of life (Oswestry Disability Index, SF-12, Scoliosis Research Society)
Charosky et al. (2012) [31]	Multicentric retrospective study	306 adult patients with primary degenerative or idiopathic scoliosis (lumbar or thoracolumbar) operated for the first time.	PI, SS, PT	Among the risk factors for mechanical and neurological complications was a high preoperative PT (≥26°)
Johnson et al. (2013) [33]	Prospective study	30 patients with LDDD (15 with adult degenerative scoliosis and 15 with spondylosis) who underwent surgery	PI, SS, PT C7 plumb line, LL, TK	Clinical outcome (VAS, Oswestry Disability Index, SF-36) were improved. Surgery did not change mean SS and PT. Scoliosis was improved

HRQOL health-related quality of life, *LL* lumbar lordosis, *PI* pelvic incidence, *PT* pelvic tilt, *SS* sacral slope, *SSA* spinosacral angle, *TK* thoracic kyphosis, *VAS* visual analogue scale, *DSD* degenerative spinal disease, *LDDD* lumbar degenerative disc disease

International Orthopaedics (SICOT) (2015) 39:87–95
DOI 10.1007/s00264-014-2516-6

REVIEW ARTICLE

Evidence showing the relationship between sagittal balance and clinical outcomes in surgical treatment of degenerative spinal diseases: a literature review

Jean-Charles Le Huec · Antonio Faundez · Dennis Dominguez · Pierre Hoffmeyer · Stéphane Aunoble

"[Using] PI-LL mismatch brings the deformity world into the degenerative lumbar spine…"

– Rothenfluh, et al, 2014

Sagittal Alignment Measurements from VMA

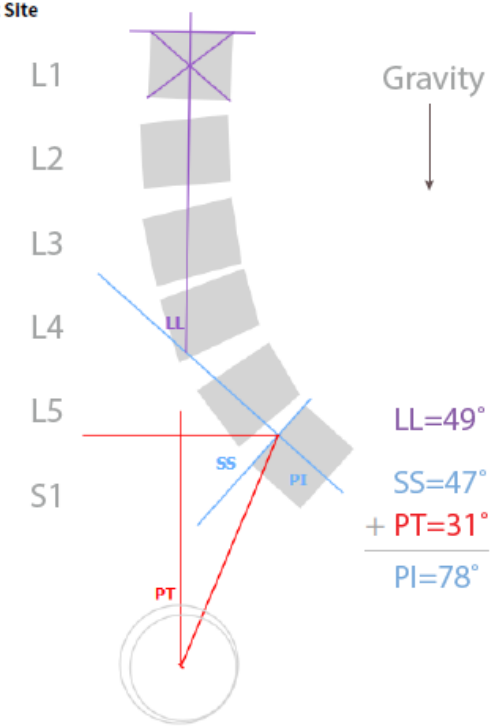
VMA™ Report **Lumbar Sagittal Alignment**

PATIENT: **Chara, Zdeno A.** PATIENT ID: **123456789** DOB: **01/01/1953** STUDY DATE: **02/29/2016**
ACCESSION No: **1092348** PRESCRIBING PHYSICIAN: **VmV DemoDoc15** TEST CENTER: **VnV Test Site**

	LORDOSIS ANGLE			DISC HEIGHT (STANDING NEUTRAL)		
	MIN.*	STANDING NEUTRAL	MAX.*	ANTERIOR	MIDLINE	POSTERIOR
L1/L2	6° CLE	9°	14° CLF	10.1mm	7.7mm	5.3mm
L2/L3	5° USN	9°	17° CSF	11.5mm	8.8mm	6.1mm
L3/L4	4° USE	5°	6° USF	5.2mm	3.6mm	2.1mm
L4/L5	7° USE	9°	15° CSF	13.0mm	13.0mm	7.8mm
L5/S1 FUSION	8° CSE	8°	8° USF	8.4mm	6.3mm	4.3mm

SAGITTAL ALIGNMENT DATA[13]

PI 78° - LL 49° = 29°



KEY: Potential reduced disc height; Potential sagittal alignment issue. **PI**=pelvic incidence. **PT**=pelvic tilt. **SS**=sacral slope. **LL**=lumbar lordosis.

n/a = not applicable **n/r** = no measurement result or no data. See *Quantitative Definitions* page of this report package for further definition and reference thresholds. See Endnotes on last page for all footnotes.

*FIRST LETTER: Controlled (**C**) vs. Uncontrolled (**U**) bending. SECOND LETTER: Standing (**S**) vs. Lying (**L**) bending. THIRD LETTER: Flexion (**F**), Extension (**E**), Patient Left (**L**), Patient Right (**R**), or Neutral (**N**) view. **XTP** = Cross table prone. **XTS** = Cross table supine. **LTH** = Less than minimum motion threshold. See *Quantitative Definitions* page of this report package for further definition and reference thresholds. See *Endnotes* page for all footnotes.

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Use of PI-LL Mismatch in Clinical Decision Making

Provide PI-LL mismatch data to support more nuanced surgical decision making.

A surgeon can decide between standard treatment options, including:

1. Proceed with **planned surgery**, but with extra patient education.
2. Proceed with a **different surgery**:
    - Try to correct imbalance by adding lordosis
    - Extend the fusion construct to incorporate adjacent levels
    - Change from fusion to decompression
3. Decide **against surgery**.

Different Surgical Approaches Based on PI-LL Mismatch

- OKI has detected a **prevalence of 37**% of PI-LL > 10 degrees
- **If Decompression candidate:**
  - PI-LL > 10: avoid 10x chance of adjacent level disease.
  - PI-LL < 10: no change
- **If Fusion candidate:**
  - If PI-LL > 10: Consider
    - MIS TLIF: Expandable cages
    - Lateral approaches: Hyperlordotic cages
    - 2 level fusion vs. 1 level (to get additional lordosis)
    - Smith Pete Osteotomy + fusion
  - If PI-LL < 10: No Change

VMA-Align™: Sagittal Alignment Measurements from VMA*

Key Features & Benefits

Automated	VMA* automates the process for obtaining established spinopelvic alignment parameters from fluoroscopic images collected during VMA testing.
Complete	Pelvic incidence, lumbar lordosis, pelvic tilt, and sacral slope are included in the VMA report, along with assessments of spinal motion and instability.
Easy to Use	VMA provides a “red-light” alert when PI-LL mismatch exceeds the physician-set threshold (e.g. 10°).
Lower Dose	Fluoroscopic imaging is lower dose for the patient.

* *The PI, LL, SS, and PT measurements included in VMA reports are generated via the Ortho Kinematics, Inc. image processing service using FDA-cleared, off the shelf software (OrthoView, K063327).*

VMA Align™

Vertebral Motion Analysis

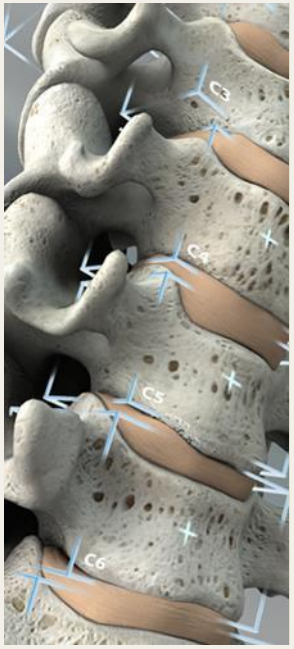
Assess **spinal motion** and **sagittal alignment** with one straightforward test.

Vertebral Motion Analysis (VMA) reports now include sagittal alignment measurements.

Entirely **no-touch**. No long-film x-rays. **No manual mark-ups**.

Fluoroscopic imaging means **reduced radiation exposure**.

Thank you!



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VMA:
Spine's New Standard for Instability Testing