

MIS Lateral
Approaches for Adult Spinal
Deformity: *A Novel Classification*
Scheme



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Disclosures

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-None

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- None

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-None

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-NuVasive



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Introduction



- Curvature $>10^\circ$ w/ derangement of spinopelvic alignment
- Deformity of coronal & sagittal plane
- Sagittal balance is more directly correlated with outcomes (**HRQOL**)

Objective

1. To present and attempt to validate our surgical method for **utilization of L-MIS approach for ASD**
 - Institutional classification a 5 yr experience
 - **Allow all surgeons to address adult spinal deformity**
2. Analyze construct-specific clinical outcomes and complications
3. Determine the limitation of L-MIS for ASD.

Early outcomes and safety of the minimally invasive, lateral retroperitoneal transpsoas approach for adult degenerative scoliosis

Neurosurg Focus 28 (3):E8, 2010

ELIAS DAKWAR, M.D., RAFAEL F. CARDONA, M.D., DONALD A. SMITH, M.D.,
AND JUAN S. URIBE, M.D.

- Retrospective study
- 25 patients (2-8 levels)
- f/
- 2
- Cobb angle:
 - Preop 24.1° (10-40°)
- Showed inadequately restored sagittal balance on 1/3 of cases.
- MIS techniques:
 - Lateral (XLIF™)
 - Presacral (AxiaLIF™)
 - Mini-open TLIF
 - Perc. pedicle screw
 - Lat plate
- ODI impr 23.7%
- No pseudoarthrosis
- Sagittal balance
 - Preop 8.1
 - Post op 2.4



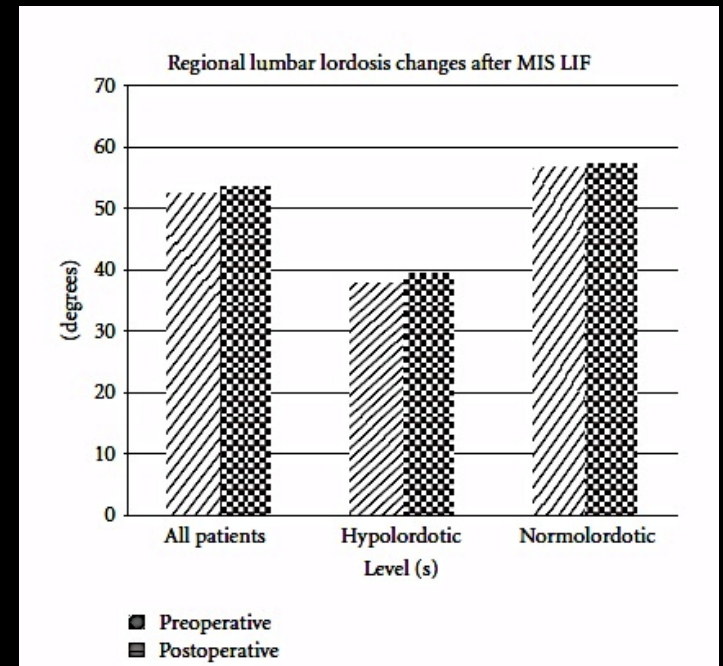
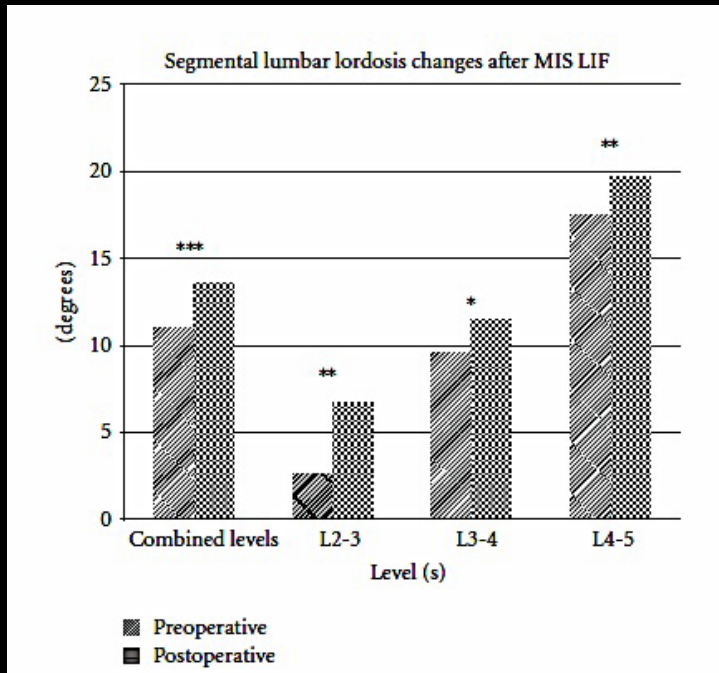


Clinical Study

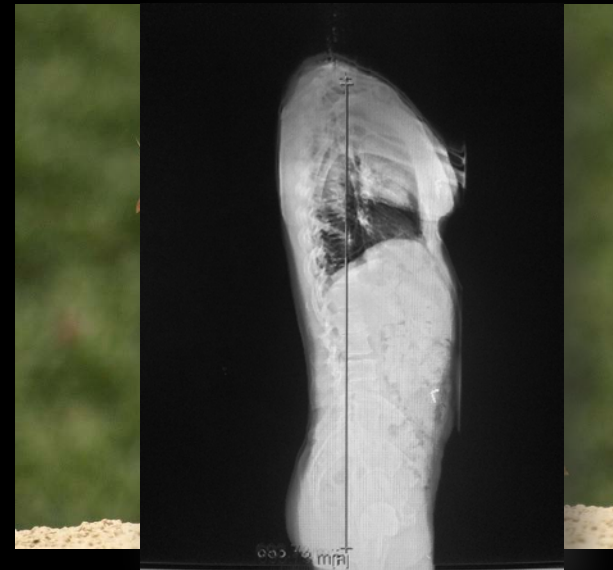
The Effect of the Retroperitoneal Transposas Minimally Invasive Lateral Interbody Fusion on Segmental and Regional Lumbar Lordosis

The Scientific World Journal
Volume 2012, Article ID 516706, 7 pages
doi:10.1100/2012/516706

Tien V. Le, Andrew C. Vivas, Elias Dakwar, Ali A. Baaj, and Juan S. Uribe



Key to success is patient selection

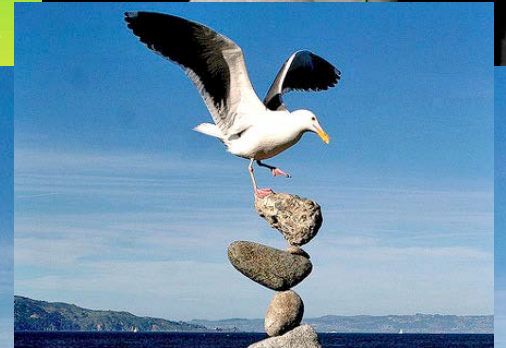


Methods

1. Retrospective review of patients undergoing L-MIS correction of ASD at a single institution (2007 - 2012)
1. Pre & post **Spino-pelvic parameters** were defined
1. Patients were classified based on degree on deformity and type of surgery (red/yellow/green)
1. Outcomes : **ODI & VAS**
1. Follow-up: 4 weeks, 3 months, 6 months, 1 year & 2 years



- **Mild (Balanced)**
 - Neurogenic claudication/ Radiculopathy
 - Coronal Cobb 10 - 30°
 - Global balance (SVA < 5cm)
- **Moderate (Compensated)**
 - Coronal Cobb +/-
 - Global imbalance (SVA > 5-9cm)
 - PT >25
- **Severe (Unbalanced)**
 - Global imbalance (SVA >10)
 - Fixed curves



Institutional Classification **Red** / **Yellow** / **Green**

	Mild	Moderate	Severe
CCA	<30°	>30	>30
PI-LL	<20°	20° - 30°	>30°
SVA	<5cm	5 - 9cm	>10cm
PT	<25°	25-30°	>30°
Anterior arthrodesis	Limited MIS-LIF consider standalone if PT<20°	MIS-LIF to neutral vertebrae + ALLR	MIS-LIF to neutral vertebrae ± ALLR
Posterior fixation	Percutaneous fixation	Percutaneous fixation ± facetectomy	Pedicle screw fixation + osteotomy

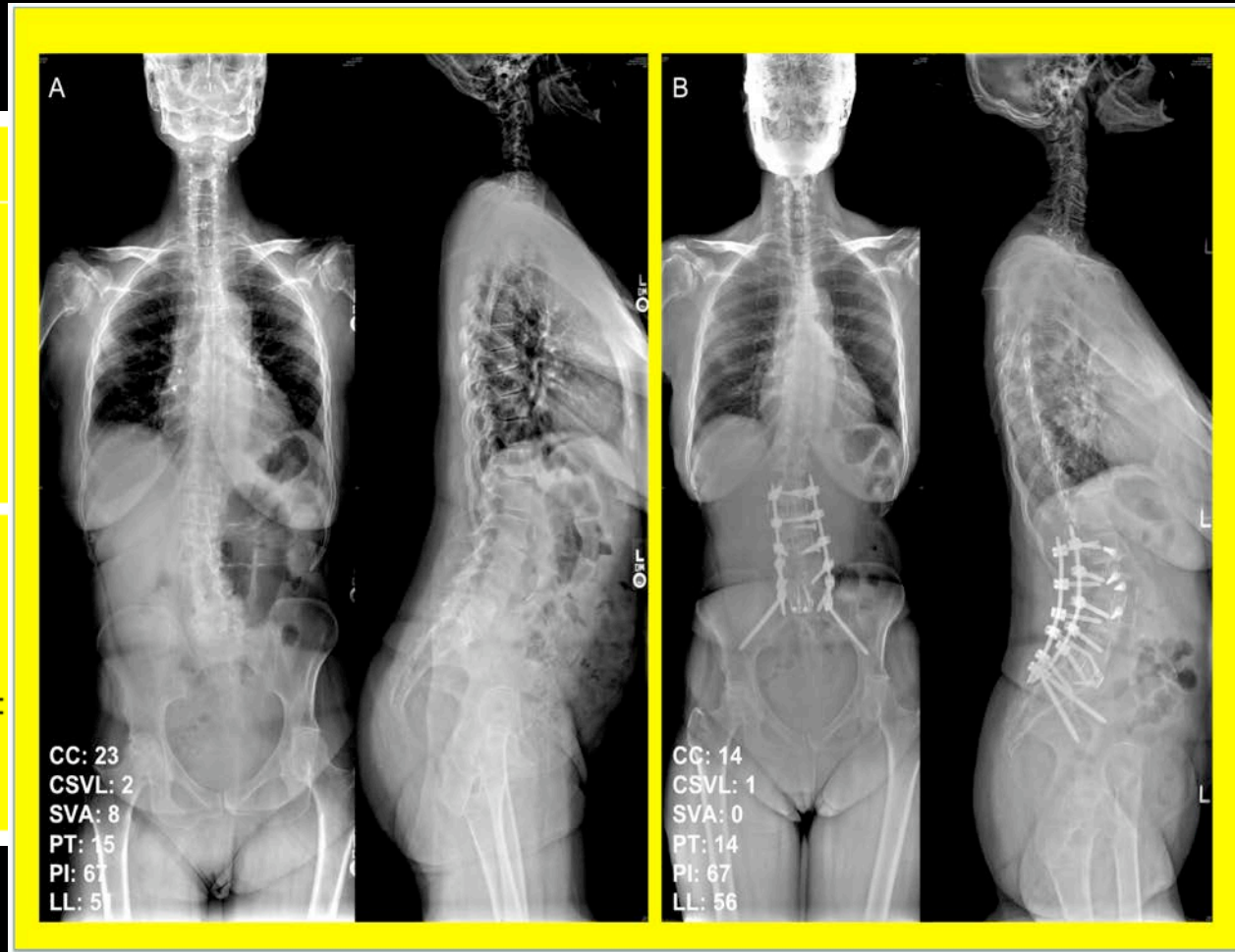
Example Green

CCA	Mild
PI-LL	<30°
SVA	<20°
PT	<5cm
Anterior arthrodesis	Limited MIS-LIF consider standalone if PT<20°
Posterior fixation	Percutaneous fixation



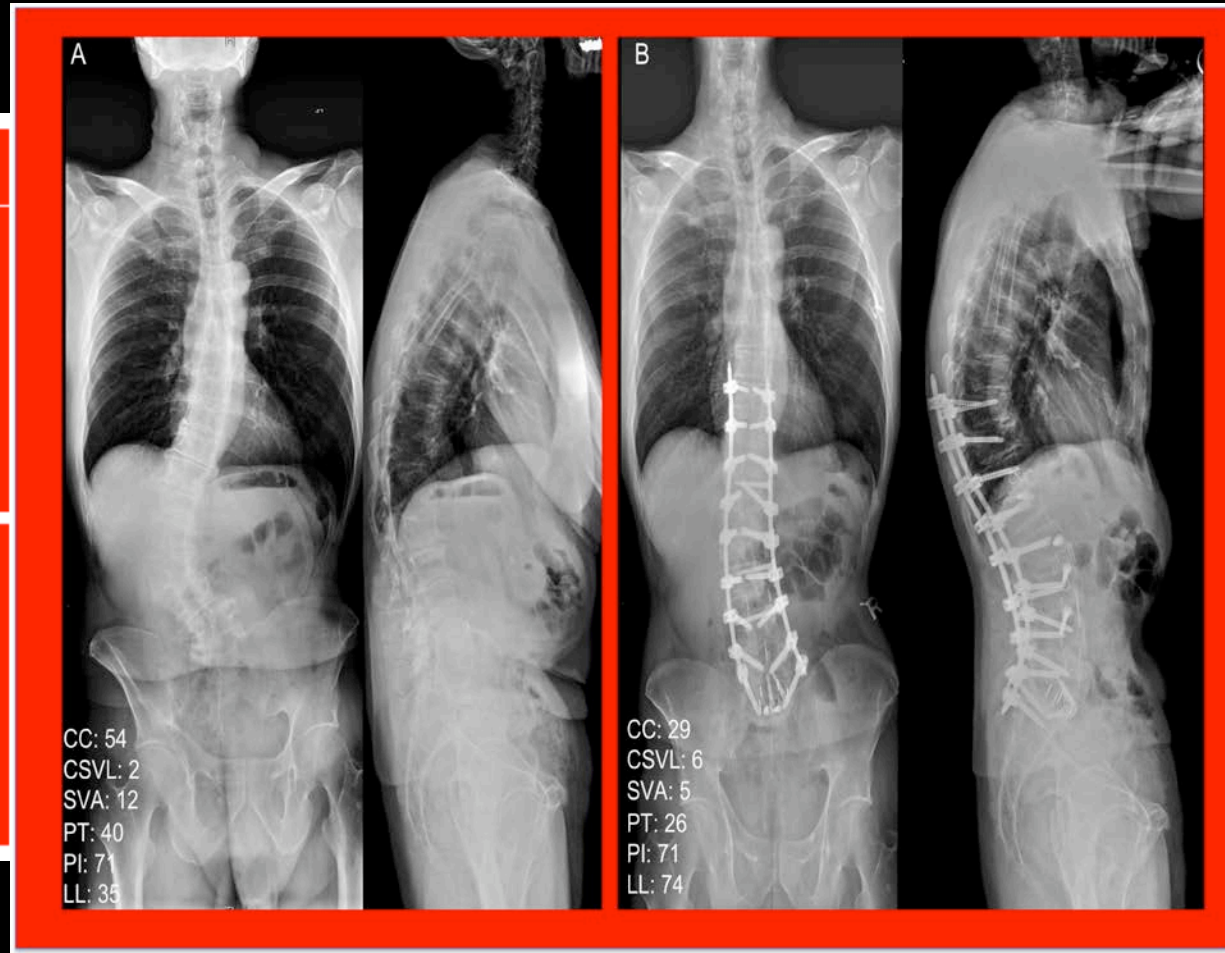
Example Yellow

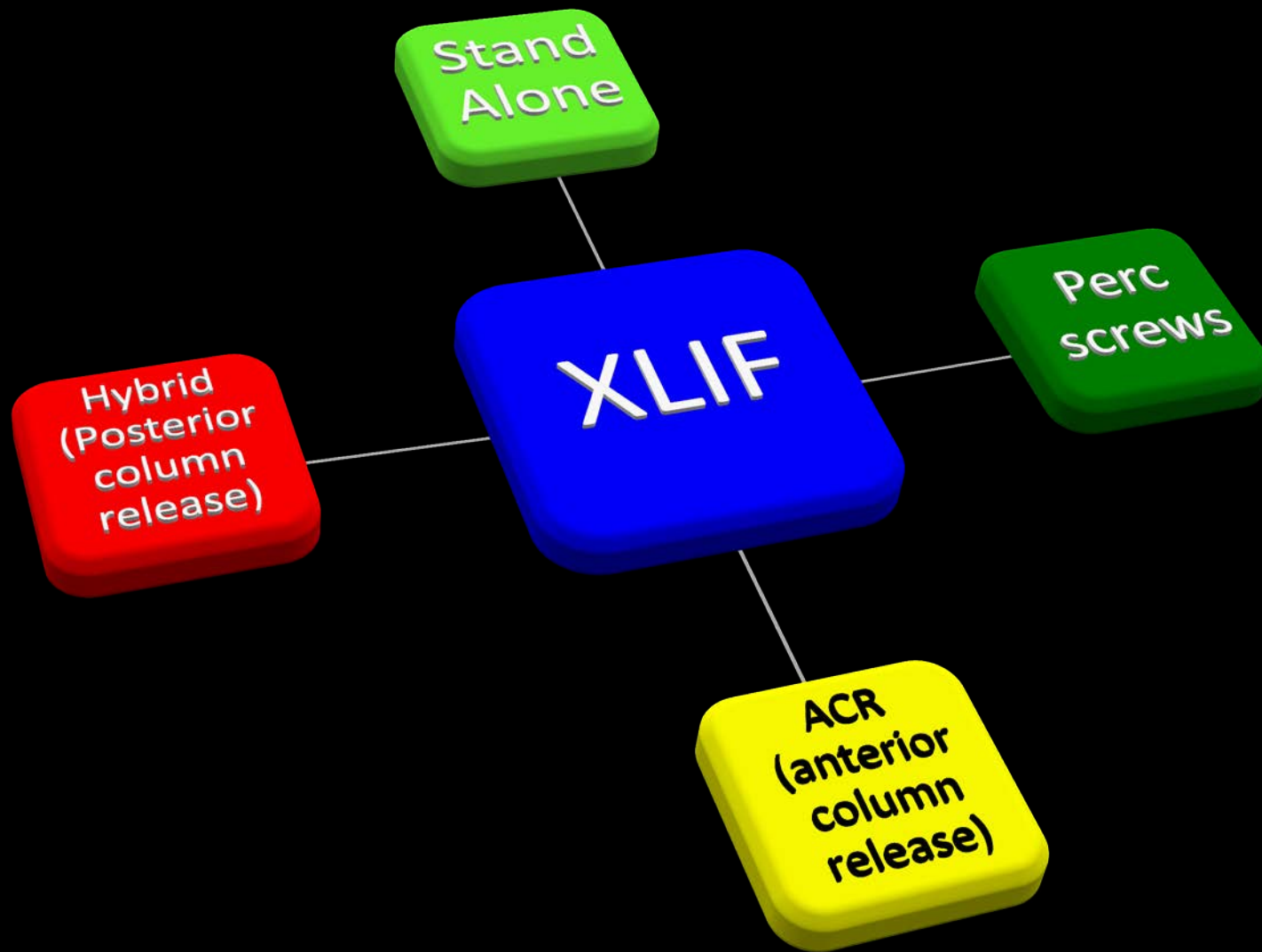
	Moderate
CCA	>30
PI-LL	20° - 30°
SVA	5 - 9cm
PT	25-30°
Anterior arthrodesis	MIS-LIF to neutral vertebrae + ALLR
Posterior fixation	Percutaneous fixation ± facetectomy



Example Red

	Severe
CCA	>30
PI-LL	>30°
SVA	>10cm
PT	>30°
Anterior arthrodesis	MIS-LIF to neutral vertebrae ± ALLR
Posterior fixation	Pedicle screw fixation + osteotomy





Results

- 256 patients with ASD, 174 underwent surgical intervention. 27 patients fit the inclusion/exclusion criteria.
- There were no statistically significant differences in the age or follow up times between the groups.
- All patients achieved adequate fusion (CT)
- Complications
 - 1 patient (4%) with a deep wound infection
 - 2 patients (8%) experienced transient postoperative anterior thigh (Zone 2)
 - 1 patient (4%) had transient groin pain (Zone 1).

Results

<i>Group</i>	<i>Number of Patients (M/F)</i>	<i>Age Range (Avg)</i>	<i>Average Follow-Up (Months)</i>
Green	9 (4/5)	61-71 (67)	15.2
Yellow	6 (3/3)	53-66 (59)	18
Yellow Undertreated	3 (0/3)	54-74 (62)	16
Red	2 (0/2)	59-69 (65)	19
Red Undertreated	7 (4/3)	32-73 (53)	18

Results

	Δ CCA (°)	Δ CSVL (cm)	Δ SVA (cm)	Δ PT (°)	Δ LL (°)	Δ VAS	Δ ODI
Green	-12 (<0.001)	0.2 (0.717)	0.6 (0.9)	1 (0.52)	1 (0.665)	-35 (0.004)	-17 (0.006)
Yellow	-11 (0.001)	-0.7 (0.58)	-1.4 (0.52)	-1 (0.4)	7 (0.02)	-36 (0.03)	-33 (0.002)
Yellow Undertreated	-17 (0.19)	0.3 (0.29)	1.3 (0.6)	5 (0.26)	-10 (0.18)	-30 (0.26)	-17 (0.2)
Red	-23 (0.48)	1.5 (0.009)	-0.1 (0.94)	-1 (0.76)	15 (0.32)	-15 (0.21)	-10 (0.65)
Red Undertreated	-16 (0.003)	-0.1 (0.94)	-2.8 (0.26)	-4 (0.24)	15 (0.04)	-28 (0.21)	-12 (0.65)

Conclusion

- Patient selection is crucial
- Our institutional classification can serve as a roadmap L-MIS approach to ASD
 - Red/Yellow/Green – can help surgeons address ASD
- Realignment objectives should be patient specific and involve attention to the following 3 parameters:
 - SVA less than 5 cm
 - PT less than 25°
 - LL proportional to the PI.





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