

Methods

- From January 2012 to January 2017, 3,000 MIS surgical cases were evaluated.
 - Surgical breakdown
 - Lumbar decompressions (n=1977)
 - Lumbar fusions (n=439)
 - Thoracic decompressions (n=113)
 - Cervical decompressions (n=295)
 - Cervical fusions (n=176)
- The data collected consist of preoperative and postoperative patient-reported outcomes (PRO) surveys and operative variables
 - Visual analog scale (VAS)
 - Oswestry Disability Index (ODI) or Neck Disability Index (NDI)
 - Return to work (RTW)
 - Operative variables include estimated blood loss (EBL), length of surgery (LOS) and intraoperative complications

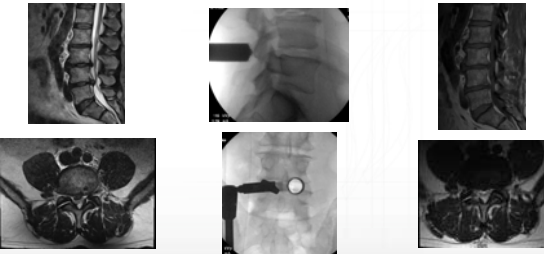
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Results

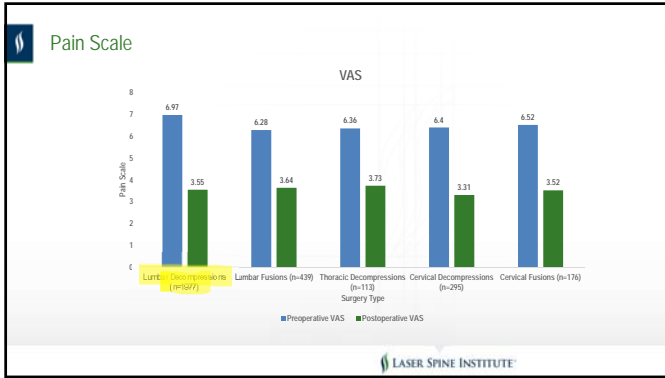
- Postoperative intervals ranged from 3 months to 52 months with a mean of 8 months
- Significant improvements ($p < .05$) in both pain and disability was seen in all patients
- An overall RTW rate of 85.6 percent was observed at the postoperative interval
- Operative results for the entire sample include mean EBL and LOS values of 65.67 mL and 81.2 minutes, respectively, and a **1.2% complication rate**

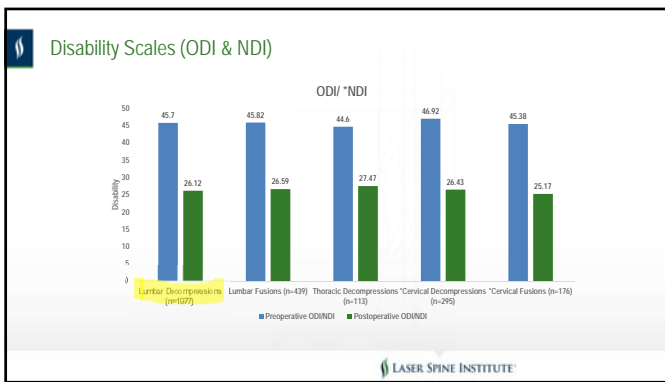
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Lumbar Decompressions



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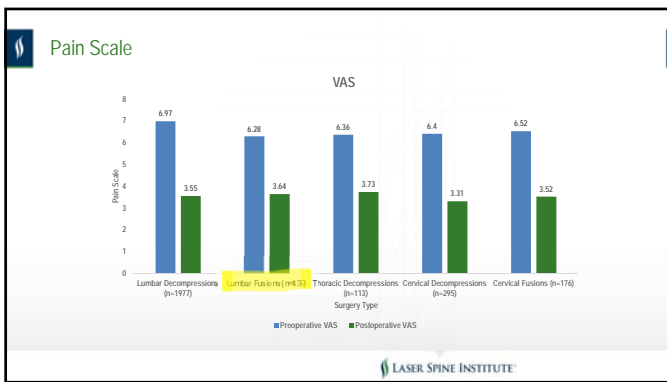
Surgical Variables

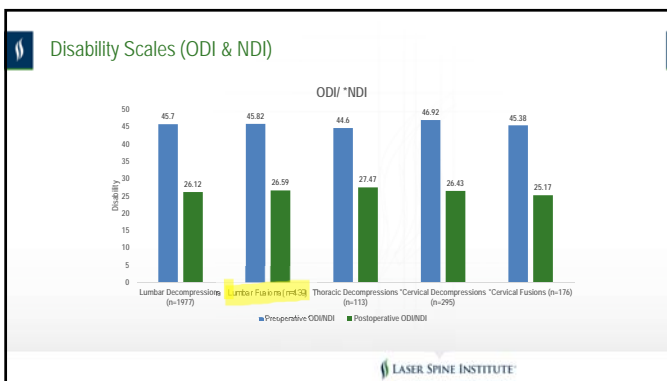
Body Part & Surgery Type	n	Gender (Males, %)	Mean Age (years)	Mean BMI	Mean EBL (mL)	Mean LOS (minutes)	Complications (n, %)
Lumbar Decompressions	1977	1173 (59.33%)	53.33	30.53	70.06	58.21	26 (1.32%)
Lumbar Fusions	439	214 (48.75%)	53.56	31.47	44.97	174	5 (1.14%)
Thoracic Decompressions	113	66 (58.4%)	50.72	30.53	48.64	47.79	0 (0%)
Cervical Decompressions	295	159 (53.9%)	51.12	29.1	77.54	66.77	5 (1.69%)
Cervical Fusions	176	88 (50%)	54.29	29.76	58.82	121	0 (0%)

- The 26 lumbar decompression complications consisted of 23 dura leaks, 1 hematoma evacuation, 1 excessive bleeding case and 1 fragmentation of the guidewire anchors
- All 5 lumbar fusion complications were dura leaks
- The 5 cervical decompression complications consisted of 4 dura leaks and 1 case of excessive bleeding

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Thoracic Decompressions

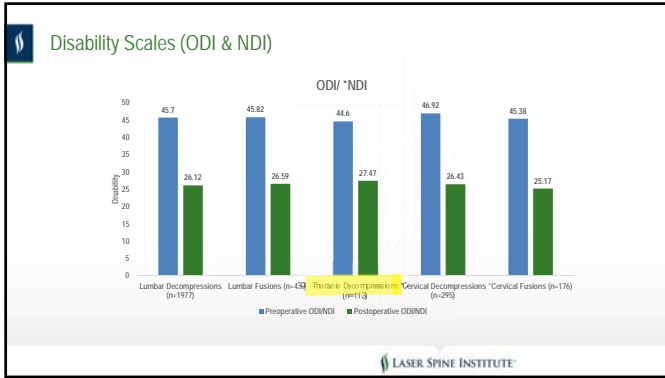
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Pain Scale

VAS

Surgery Type	Preoperative VAS	Postoperative VAS
Lumbar Decompressions (n=1977)	6.97	3.55
Lumbar Fusions (n=439)	6.28	3.44
Thoracic Decompressions (n=113)	6.36	3.73
Cervical Decompressions (n=295)	6.4	3.31
Cervical Fusions (n=176)	6.52	3.52

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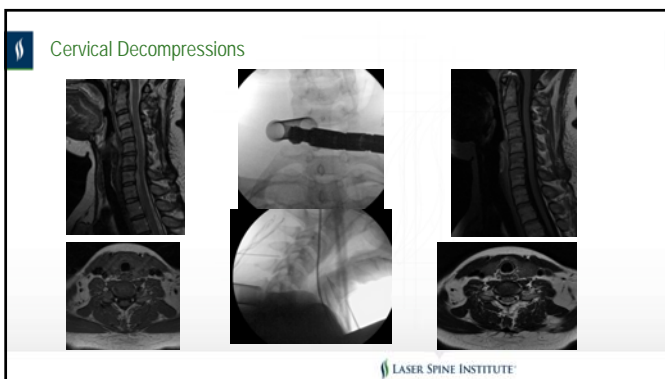


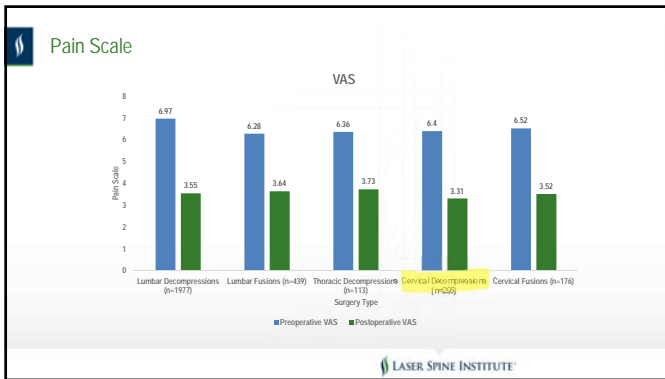
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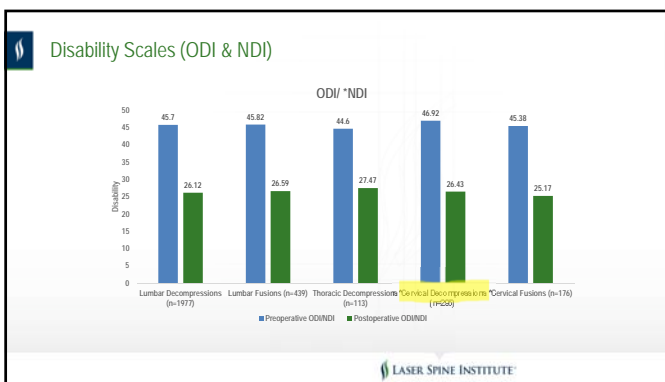
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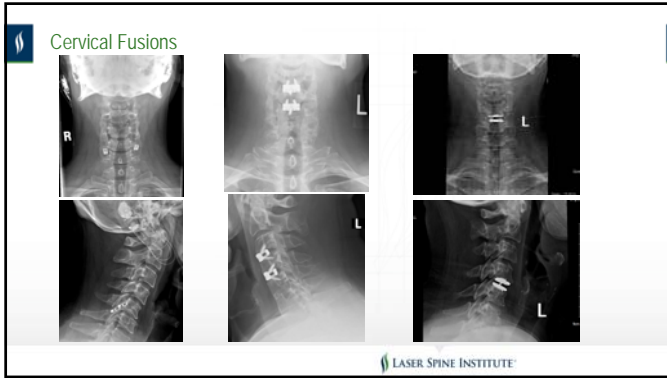


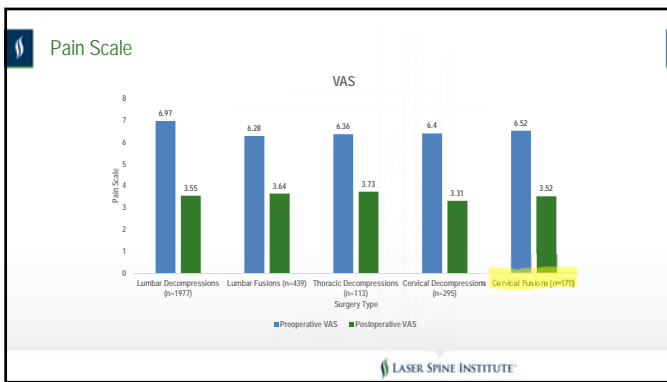
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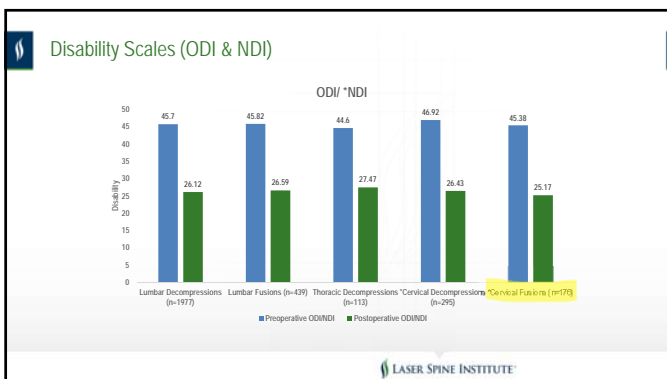
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CSF Leak Treatment: A Case Study

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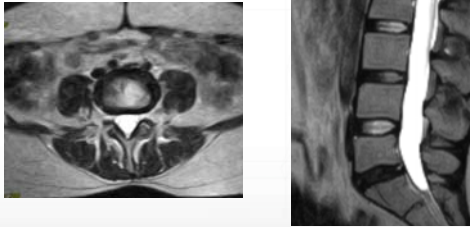
Lumbar Decompression with CSF Leak

- A 41-year-old patient with a BMI of 19.3 was diagnosed with spinal stenosis at L4/5
 - Patient has a two-year history of pain
 - Pain is 60% axial exclusively on the left which radiates down the left leg to her foot
- The patient underwent a left L4/5 selective nerve root block (see below) which resulted in 85% relief



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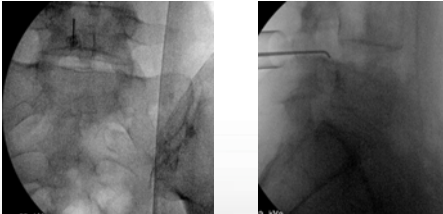
Preoperative Imaging



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Intraoperative Imaging

- The patient underwent a left L4/5 laminotomy foraminotomy decompression which took 1 hour and 18 minutes to complete and resulted in 10 mL of blood loss



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Lumbar Decompression with CSF Leak (Continued)

- As the surgeon was removing ligamentum flavum an incidental durotomy occurred over the L5 nerve root
- It had some cerebrospinal fluid leak so the surgeon extended the medial facetectomy somewhat further to decompress the L5 nerve root to the level of the mid-pedicle of L5 and from above the disc space
- Three 6-0 Prolene sutures were used to reapproximate this linear dural defect
 - Great care was taken to ensure that no rootlets were involved in the suture line
 - No nerve rootlets were herniating through the dural defect

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Lumbar Decompression with CSF Leak (Continued)

- The three interrupted sutures suggested a watertight closure which was confirmed when the patient was placed in reverse Trendelenburg position and Valsalva maneuvers applied
- Nevertheless, the surgeon did a further inspection of the area
- The surgeon placed DuraSeal over the durotomy area and the wound was irrigated and closed in layers
- The patient was monitored closely and released from the facility 2 hours and 33 minutes after surgery
- No additional complications occurred and the patient did not suffer from any postoperative headaches

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Basic Tenets of Incidental Durotomy Management

Increase surgical exposure/magnification
larger tubular retractor or convert to open
larger laminotomy to insure complete exposure of durotomy

Decompress dura as needed
allow egress of fluid
do not allow nerve roots to herniate (gel foam)

Primary closure, patch, seal

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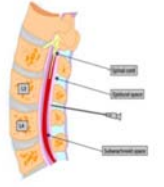
Additional CSF Leak Treatments

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Blood Patch

□ Sterily injecting a small amount of patient's blood into the epidural space

- Clot will occur over hole
- Usually will stop headache immediately
- 1st patch is 70% effective
- 2nd patch is 95% effective



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DuraSeal

Evidence-based medicine

Does the use of DuraSeal in head and spinal surgeries reduce the risk of cerebrospinal fluid leaks and complications when compared to conventional methods of dura mater closure?

Luca Bazzucchi¹, Wenzhuo Ma², Maura Bonanni³, Ezze Bin Sini Sini⁴, Luca Maria de Riu⁵, Crispin Chiriac de Alencar⁶, Bráulio Assunção de Menezes⁷, Estelita Gastine Figueiredo⁸, Felipe Maia Sanches⁹, Hugo Strassman Neto¹⁰, Marcos Jacobine Trindade¹¹

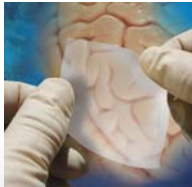
¹Medica School, Universidade Lúlio de São Paulo, São Paulo, SP, Brazil
²Medica School, Universidade Lúlio de São Paulo, São Paulo, SP, Brazil
³Neurological Service, Hospital das Clínicas de Ribeirão Preto, Ribeirão Preto, SP, Brazil
⁴Correspondence to: Wenzhuo Ma, Rua Desastros Cruz, 1.798, Biquinhas, 13045-055, Santos, SP, Brazil - wenzhuo@lucsp.com.br

• The above study concludes that undergoing spinal surgery using DuraSeal, when compared to suturing with or without fibrin sealant, showed a decrease in the absolute risk of CSF fistula (ARR: 35.6% and NNT: 3), with no increased risk of complications

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Durepair™ Regeneration Matrix

- Non-synthetic dura substitute used to repair defects in the dura
- Suturable or onlay collagen matrix designed to conform to a patient's anatomy and remodel into native tissue over time



<http://www.medtronic.com/luc/en/healthcare-professionals/products/neurological/cranial-repair.html>

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EVALUATION OF DURAL GRAFTS

Short-Term Evaluation of Medtronic Durepair[®], DuraGen Plus[™], and Duraform[™] as Onlay Dural Grafts

Michael Pollay, M.D.
Linnea Lentz, D.V.M.

- INTRODUCTION The introduction of collagen matrix products has changed the approach to dural repair and substitution in clinical neurosurgical practice

Figure 4: Craniotomy in Canine 2 (Durepair)



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Table 2: Valsalva Procedure for Raising ICP (Canine 1 – Durepair vs. DuraGen Plus)

Time Period ¹	Min-Max Pressure	Pressure Intervals	Holding Time ²
10 minutes	15-30 cm H ₂ O	5 cm H ₂ O	10 – 20 seconds*
20 minutes	15-40 cm H ₂ O	5 cm H ₂ O	10 seconds
60 minutes	15-40 cm H ₂ O	5 cm H ₂ O	10 seconds
24 hours	15-40 cm H ₂ O	5 cm H ₂ O	10 seconds

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- The DuraGen Plus graft appeared to be resistant to displacement and CSF leakage both in the acute and 24 hour studies. The material itself became convex with increasing pressure.

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Conclusions

- Significant improvements in PROs demonstrate efficacy
- It is feasible to perform MIS surgeries both safely and effectively in a free-standing ASC
- These surgeries result in acceptable rates of complications, blood loss, and operative times
- Being able to manage a CSF leak in a free-standing ASC becomes paramount

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