Anterior Lumbar Spine Exposure: Tips and Tricks

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Disclosures

Timothy K. Liem, MD, MBA: None

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Nationwide Inpatient Sample (2001-2010)

- 923,038 lumbar interbody fusions
  - Posterior/transforaminal LIF — 79% to 86% of total LIFs
  - **Anterior LIF** — **10% to 15%**
  - **Anterior-Posterior LIFs** — **10% in 2002 to <1% in 2010**
- Advantages of ALIF
  - Restoration of disc/foraminal height
  - Minimal epidural scarring
  - Sparing of paraspinal musculature/ posterior ligaments

Clinical Study

Comparison of complications, costs, and length of stay of three different lumbar interbody fusion techniques: an analysis of the Nationwide Inpatient Sample database

Vadim Goz, BA, Jeffrey H. Weinreb, BS, Frank Schwab, MD, Virginie Lafage, PhD, Thomas J. Errico, MD

Goz, The Spine Journal 2014

Trends in Anterior Lumbar Interbody Fusion in the United States

A MarketScan Study From 2007 to 2014

Varshneya, Clin Spine Surg 2020

Trends in ALIF Surgery 2007-2014 (National MarketScan database)

- **49,945 ALIFs** in the United States
  - 42.1% underwent stand-alone ALIF
  - 44.6% underwent Anterior + Posterior LIF (same day)
  - 14.5% underwent staged Anterior + Posterior LIF
- **24.07% average annual increase** in ALIFs

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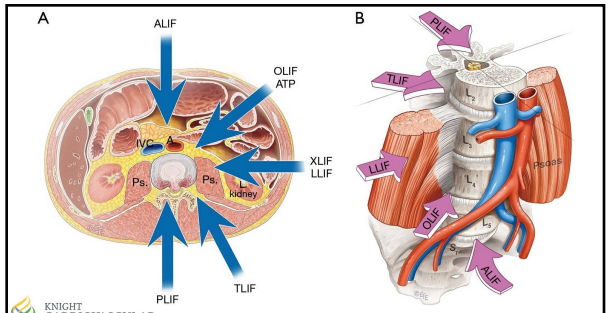

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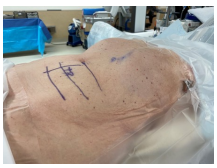
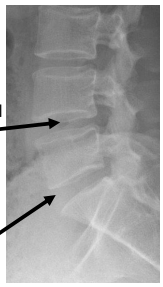
Mobbs, J Spine Surg 2015

Practical Considerations

- Be in the OR early
- Patient positioning
- Bed clamp positioning (right axilla, left hip)
- Marking the spine level on the anterior abdominal wall





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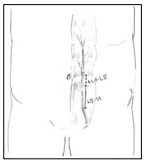
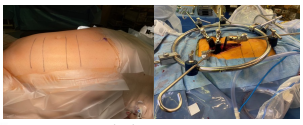
ALIF Sequence of Events

- Paralytic agent for entire anterior portion
- Left paramedian incision (my preference)
- Typically stay at/ below umbilicus (even for L2-L3)
- Reflect left rectus m. and inf. epigastric vessels medially
- Mobilize peritoneum/left ureter medially.



Left paramedian incision



4-level ALIF exposure

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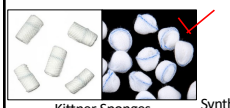
Different Tool Set

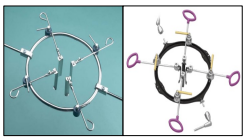


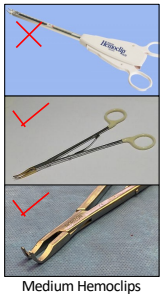
Kittner Sponges

Synthes DePuy

NuVasive Retractors

Retractors inserted when common iliac artery visualized





Medium Hemoclips

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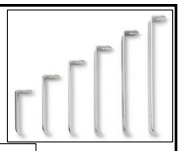
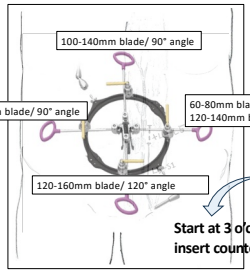
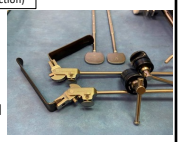
Retractor Blade Placement





Start at 3 o'clock retractor and insert counter-clockwise



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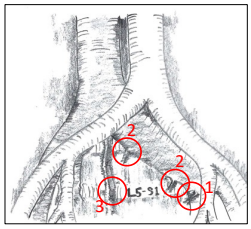
Mobilizing the Left CIV for L5-S1 Exposure

- Bridging venules 1
- Medial CIV tributaries 2
- Median sacral vessels 3

- 12 o'clock and 3 o'clock blades switched out. Longer lengths to retract the iliac vessels superiorly and left laterally.



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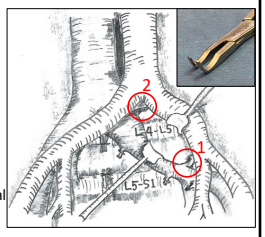
Mobilizing the Left CIV/ CIA for L4-L5 Exposure

- For a 2-level ALIF, circumferential/ lateral mobilization of the left CIV is required
- Left iliolumbar vein (!!!) 1
- Smaller left lumbar veins 2

- Left common iliac artery (medial or lateral)?
  - **High bifurcation/ straight CIA – Retract Lateral**
  - Low bifurcation/ redundant CIA – Retract Medial



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- Left iliolumbar vein (!!!) 1
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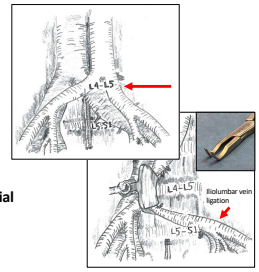
- Left common iliac artery (medial or lateral)?
  - High bifurcation/ straight CIA – Retract Lateral
  - **Low bifurcation/ redundant CIA – Retract Medial**
  - **Left iliolumbar vein still needs ligating**



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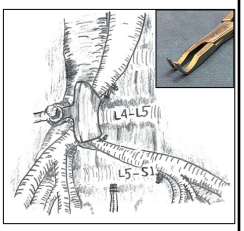
Mobilizing the Left CIV/ CIA for L3 and Above

- 9 o'clock retractor on aorta/ bifurcation
  - Check for external iliac pulse
  - If absent, relax retractors every ~20 min
- Segmental lumbar vessel ligation allows for higher-level access (beware retro-aortic renal vein!)
- Expose all levels in one sitting
  - Spine surgeon then works proximal → distal
  - **Access surgeon** readjusts retractors as needed
- Access surgeon completes terminal portion of surgery
  - Removing retractors/ inspect for bleeding/thrombosis
  - 2-view x-rays for RSIs
  - Closes/ checks pedal pulses



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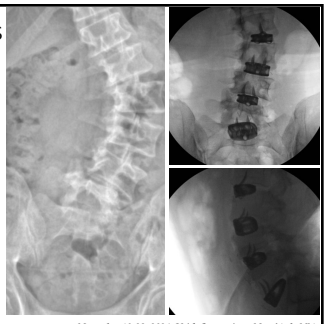
Activity and Outcomes

- > 450 ALIF procedures (2-5/ wk)
- Mortality 0%
- Morbidity
  - Symptomatic VTE 1 pt
  - Vein injury > 500ml EBL 4 pts
  - Artery injury 0 pts
  - Unplanned ROR 1 pt



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