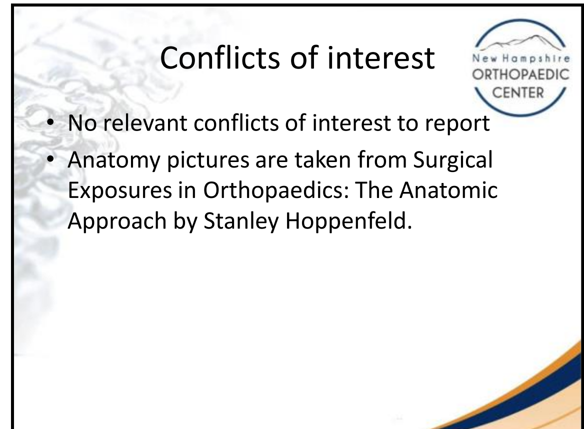
New Hampshire
ORTHOPAEDIC
CENTER
Approaches to Lumbar Spine
NHMI 21st Annual Symposium
Vladimir Sinkov MD


Conflicts of interest
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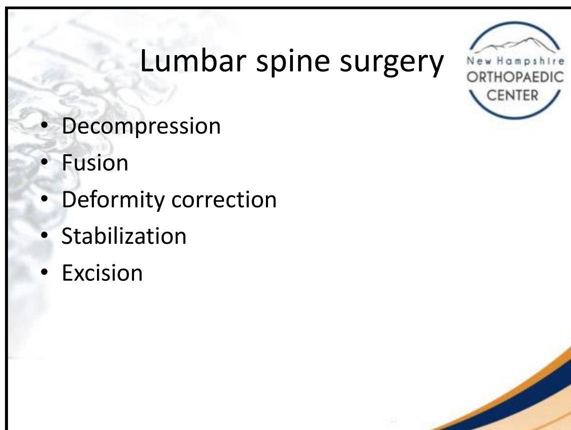
• No relevant conflicts of interest to report
• Anatomy pictures are taken from Surgical Exposures in Orthopaedics: The Anatomic Approach by Stanley Hoppenfeld.


Lumbar spine surgery
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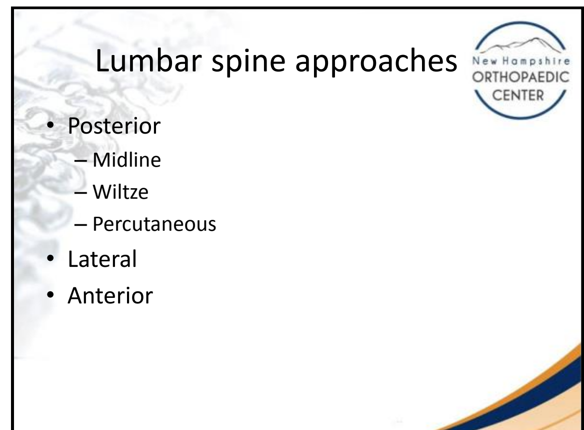
• Decompression
• Fusion
• Deformity correction
• Stabilization
• Excision


Lumbar spine approaches
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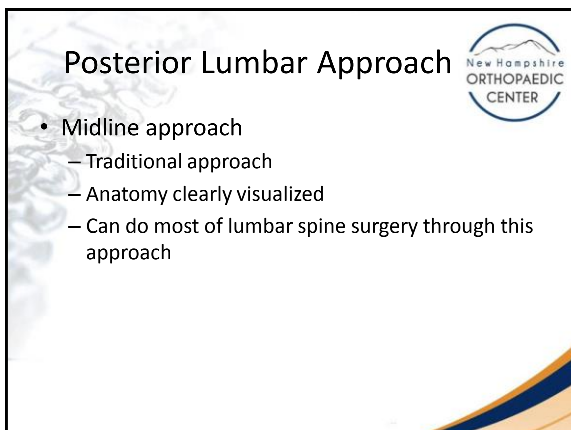
• Posterior
– Midline
– Wiltze
– Percutaneous
• Lateral
• Anterior


Posterior Lumbar Approach
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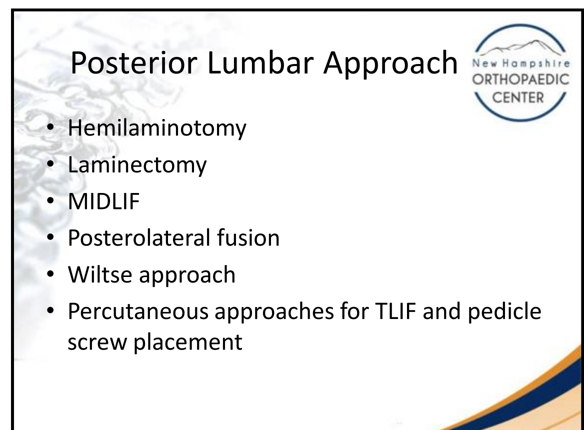
• Midline approach
– Traditional approach
– Anatomy clearly visualized
– Can do most of lumbar spine surgery through this approach


Posterior Lumbar Approach
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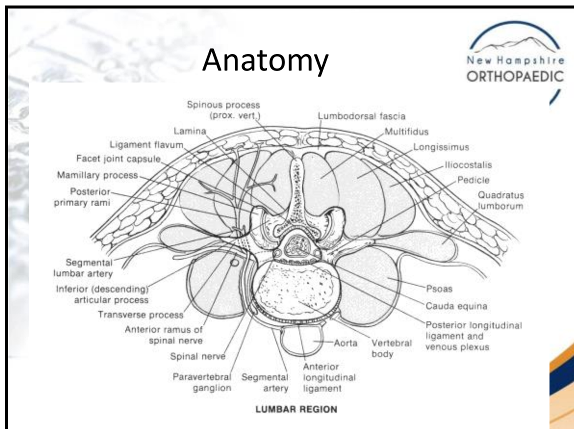
• Hemilaminotomy
• Laminectomy
• MIDLIF
• Posterolateral fusion
• Wiltse approach
• Percutaneous approaches for TLIF and pedicle screw placement


Anatomy
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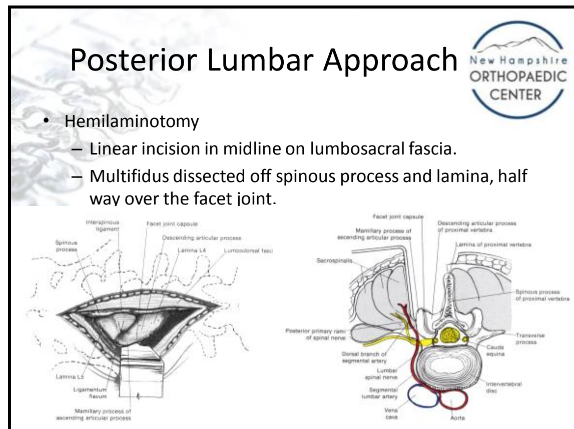
Spinous process
(prox. vert.)
Lumbodorsal fascia
Lamina
Multifidus
Ligament flavum
Longissimus
Facet joint capsule
Iliocostalis
Mamillary process
Pedicle
Posterior primary rami
Quadratus lumborum
Segmental lumbar artery
Inferior (descending) articular process
Psoas
Transverse process
Cauda equina
Anterior ramus of spinal nerve
Posterior longitudinal ligament and venous plexus
Aorta
Vertebral body
Spinal nerve
Paravertebral ganglion
Segmental artery
Anterior longitudinal ligament
LUMBAR REGION


Posterior Lumbar Approach
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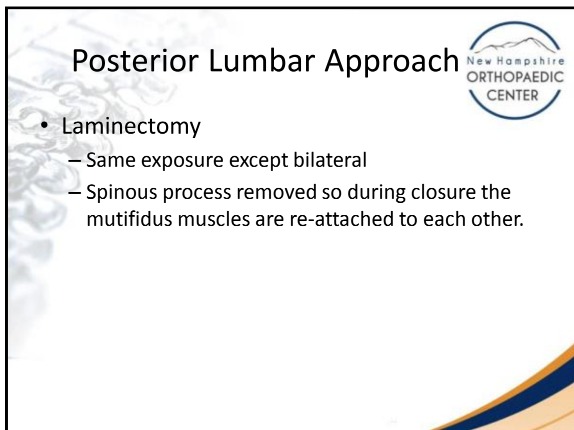
• Hemilaminotomy
– Linear incision in midline on lumbosacral fascia.
– Multifidus dissected off spinous process and lamina, half way over the facet joint.


Posterior Lumbar Approach
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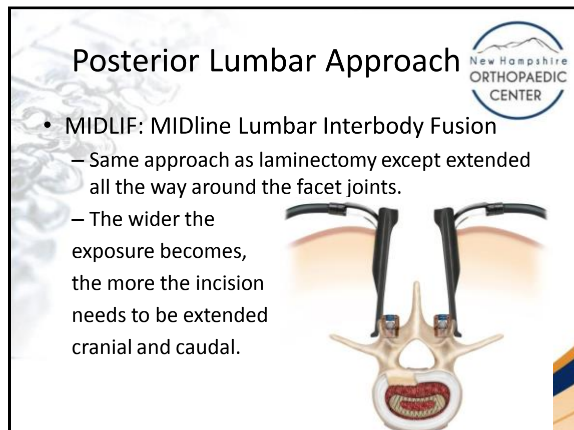
• Laminectomy
– Same exposure except bilateral
– Spinous process removed so during closure the mutifidus muscles are re-attached to each other.


Posterior Lumbar Approach
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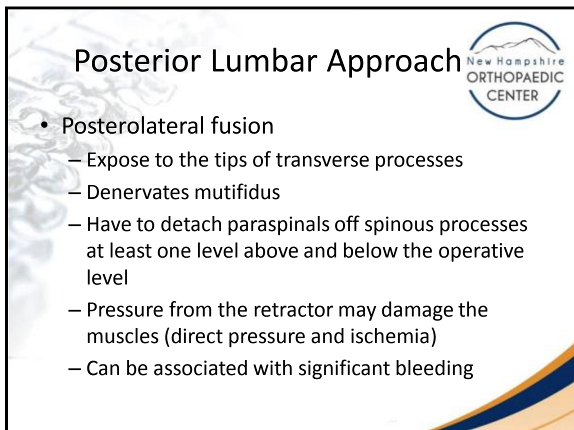
• MIDLIF: MIDline Lumbar Interbody Fusion
– Same approach as laminectomy except extended all the way around the facet joints.
– The wider the exposure becomes, the more the incision needs to be extended cranial and caudal.


Posterior Lumbar Approach
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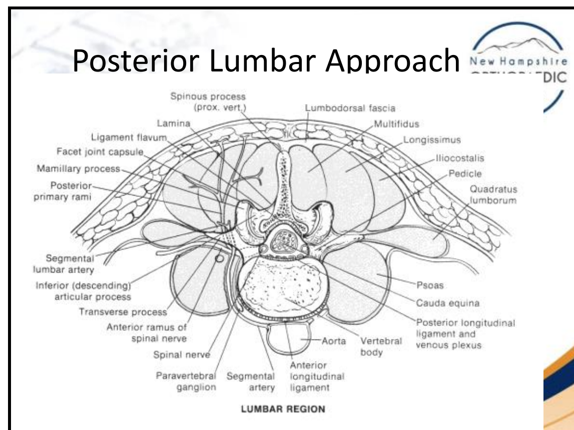
• Posterolateral fusion
– Expose to the tips of transverse processes
– Denervates mutifidus
– Have to detach paraspinals off spinous processes at least one level above and below the operative level
– Pressure from the retractor may damage the muscles (direct pressure and ischemia)
– Can be associated with significant bleeding


Posterior Lumbar Approach
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Spinous process
(prox. vert.)
Lumbodorsal fascia
Lamina
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Ligament flavum
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Facet joint capsule
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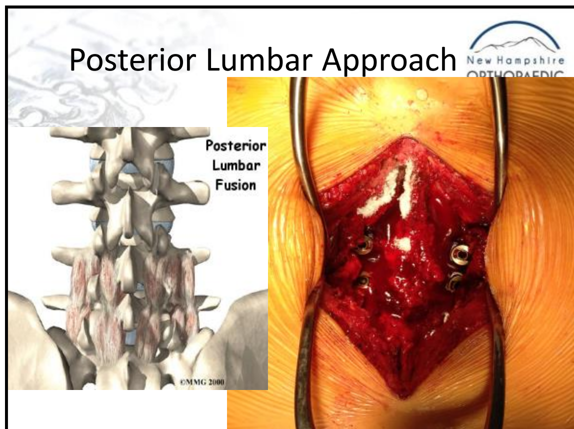
Posterior Lumbar Approach
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Posterior
Lumbar
Fusion
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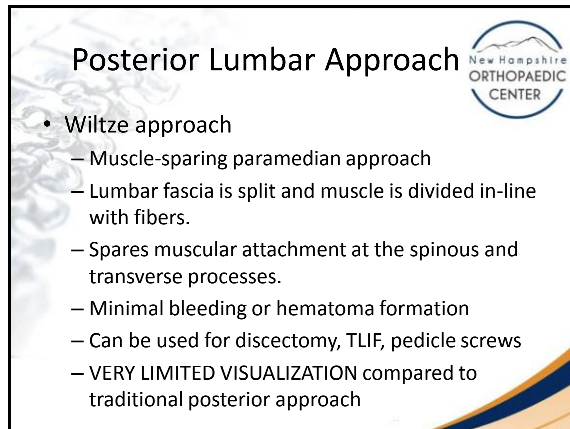
Posterior Lumbar Approach
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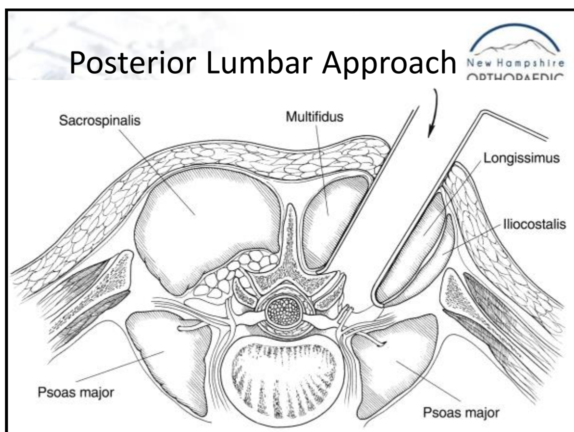
• Wiltze approach
– Muscle-sparing paramedian approach
– Lumbar fascia is split and muscle is divided in-line with fibers.
– Spares muscular attachment at the spinous and transverse processes.
– Minimal bleeding or hematoma formation
– Can be used for discectomy, TLIF, pedicle screws
– VERY LIMITED VISUALIZATION compared to traditional posterior approach


Posterior Lumbar Approach
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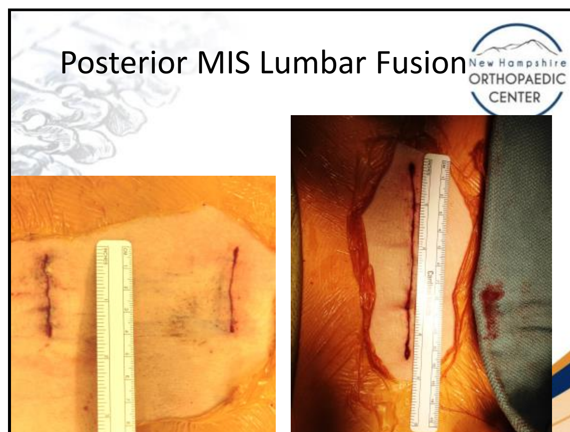
Sacrospinalis
Multifidus
Longissimus
Iliocostalis
Psoas major
Psoas major


Posterior MIS Lumbar Fusion
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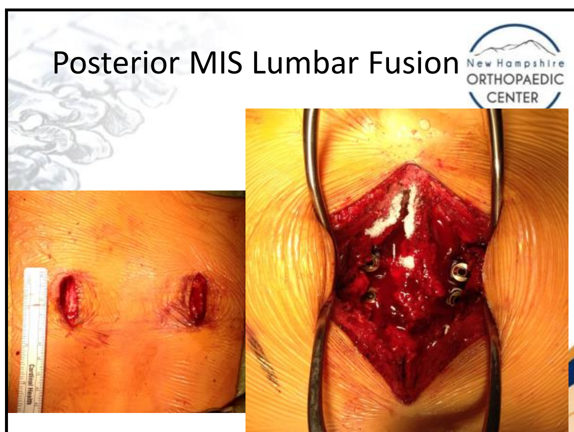
Posterior MIS Lumbar Fusion
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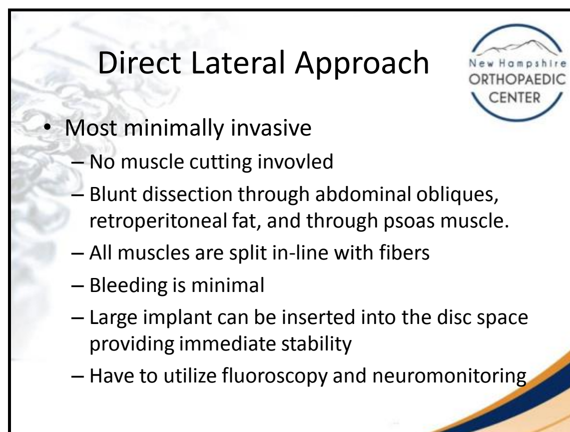
Direct Lateral Approach
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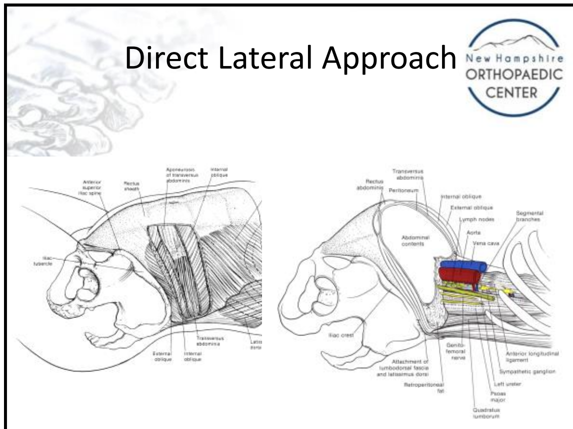
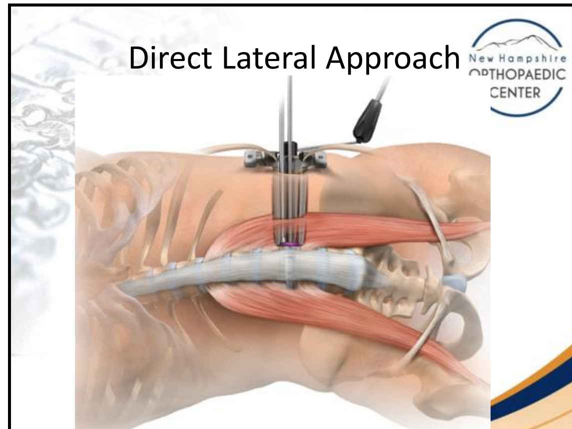
• Most minimally invasive
– No muscle cutting invovled
– Blunt dissection through abdominal obliques, retroperitoneal fat, and through psoas muscle.
– All muscles are split in-line with fibers
– Bleeding is minimal
– Large implant can be inserted into the disc space providing immediate stability
– Have to utilize fluoroscopy and neuromonitoring





Direct Lateral Approach

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- Limitations
  - Cannot approach L5-S1 and sometimes L4-5
  - Very limited visualization
  - If abdominal fascia is not repaired, may get hernia
  - Psoas weakness is common but transient
  - May develop contralateral greater trochanteric bursitis from positioning.
  - Potential for injury to great vessels and femoral nerve!

Anterior Approach

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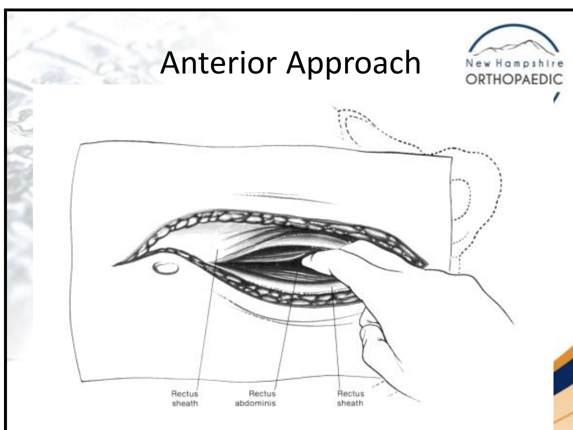
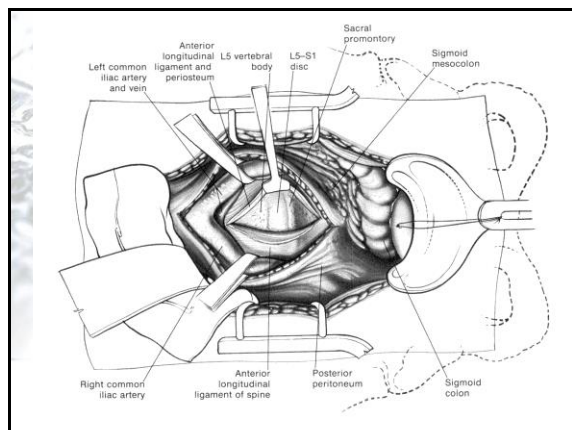
- Rectus fascia is cut
- Blunt dissection after that
- Can be transperitoneal or retroperitoneal (more common)
- Pain in rectus abdominis may limit initial postoperative mobilization
- Potential for injury to great vessels and sympathetic chain (retrograde ejaculation)





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QUESTIONS?