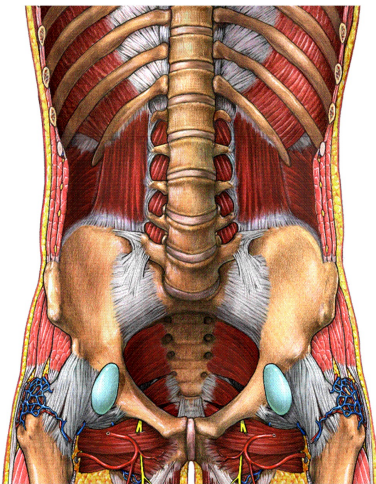




Anterior Approaches T10-S1

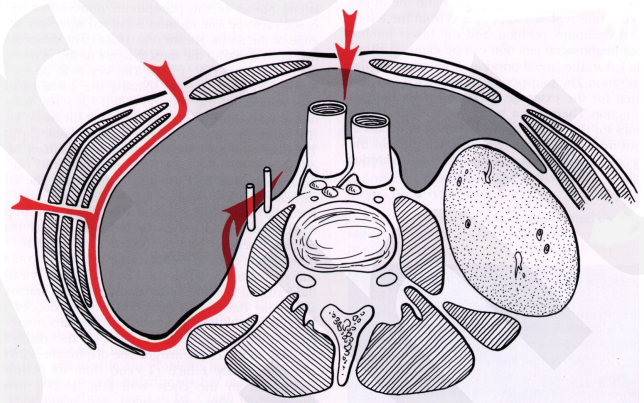
MJH McCarthy

Must Know Anatomy

- Thoracic Cavity
- Diaphragm
- Anterior Abdominal Wall
- Posterior Abdominal Wall
- Vascular Structures

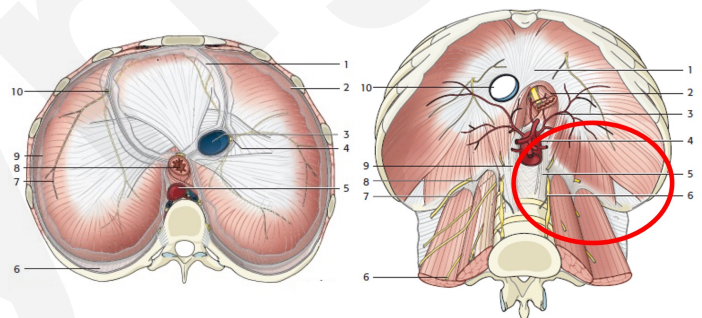
Anterior Approaches T10-S1

- Lateral
 - Thoracotomy
 - Transpleural T3/4-12 / L1
 - Thoracolaparotomy
 - Transpleural / extraperitoneal T6-L4(-S1)
 - Extrapleural / extraperitoneal (extracoelomic) T11-L4(-S1)
 - Lumbotomy L2 – L4(-S1)
- Anterior
 - Retroperitoneal L2/3-S1
 - Transperitoneal L2/3-S1



Preoperative Planning

- Which approach?
- Is access possible?
 - Obese patients
 - Previous surgeries
- Vascular anatomy
 - Use the images available – CT / MRI
 - Consider additional vascular imaging
- Watch out for normal variability
- Special problems - Urological
 - Duplex Ureter / Horse Shoe Kidney



- Crus anatomy is crucial to the exposure
- Vessel always next to crus insertion

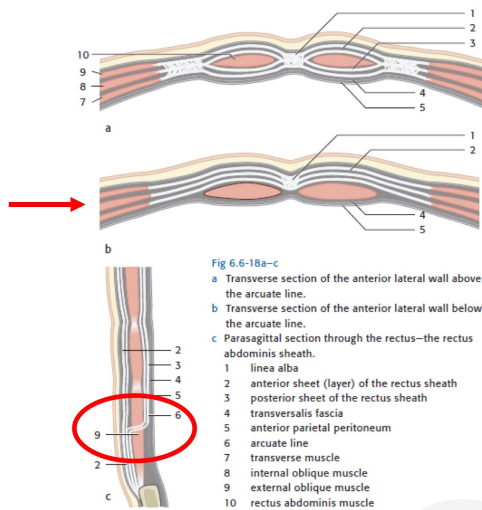


Fig 6.6-18a-c
a Transverse section of the anterior lateral wall above the arcuate line.
b Transverse section of the anterior lateral wall below the arcuate line.
c Parasagittal section through the rectus—the rectus abdominis sheath.

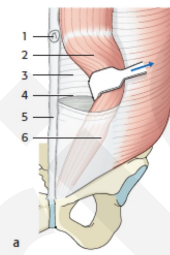


Fig 6.6-19a-b
a Anterior view of the abdominal wall (left side). The left rectus is retracted laterally, disclosing the posterior layer of the rectus abdominis sheath and its inferior limit, the arcuate line.
b Anterior view of the arcuate line after lateral retraction of the rectus abdominis muscle in a cadaveric specimen (left) and in a patient operated retroperitoneally for disc replacement (right).

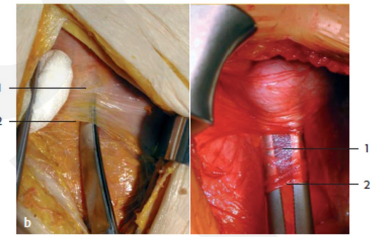
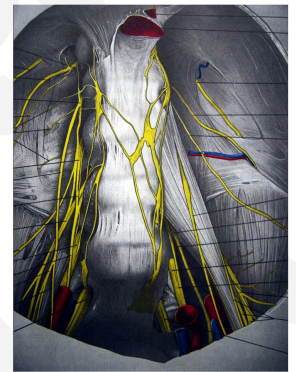
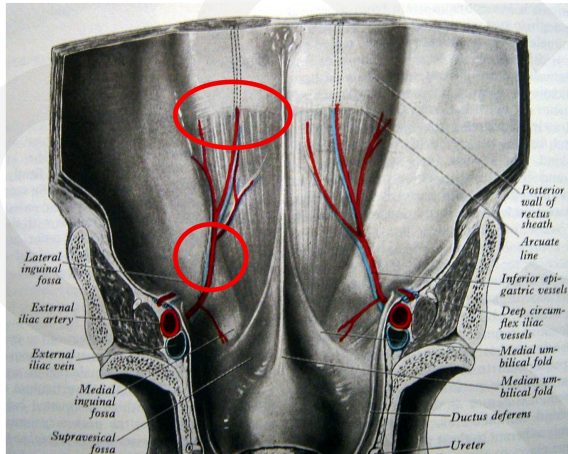


Fig 6.6-19a-b
b Anterior view of the arcuate line after lateral retraction of the rectus abdominis muscle in a cadaveric specimen (left) and in a patient operated retroperitoneally for disc replacement (right).



Psoas, genitofemoral nerve, ureter, vessels, sympathetics

Thoracolaparotomy

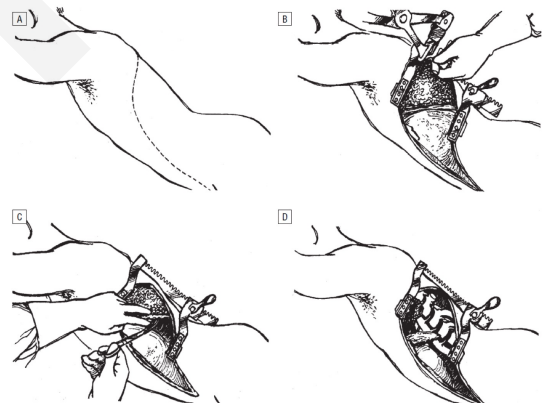


Table 1. Complications of Anterior Spine Exposure

Spine Anatomical Region	Complications
Thoracic	Pulmonary (atelectasis, pneumonia, respiratory insufficiency) Technical (hemothorax, pneumothorax, pleural effusion, infection, wound disruption) Chyllothorax Spinal cord ischemia Miscellaneous (cardiopulmonary, stroke, ileus, urinary tract infection, renal failure)
Lumbar	Vascular Arterial injury (thrombosis, hemorrhage) Venous injury (hemorrhage, thrombosis) Neurogenic (retrograde ejaculation, groin nerve injury, warm leg) Wound problems (infection, disruption, hernia, muscle denervation) Ureteral injury Miscellaneous (cardiopulmonary, stroke, ileus, urinary tract infection, renal failure)

Anatomical!

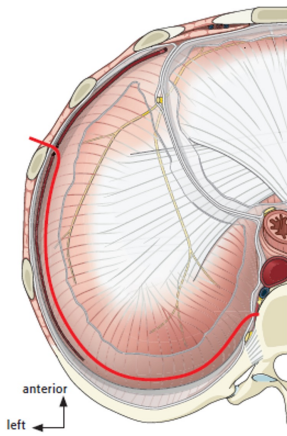


Fig 6.5-5
Surgical anatomy of the thoracoabdominal approach. The diaphragm is detached 10–15 mm from its costal insertion (superior view).

Sacrifice diaphragm if need to go above T11

Positioning



Mark 11th rib



Skin incision



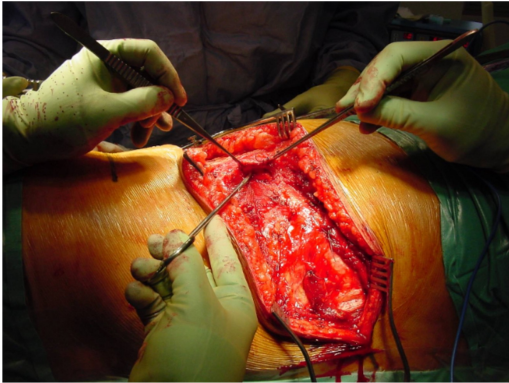
Latissimus dorsi



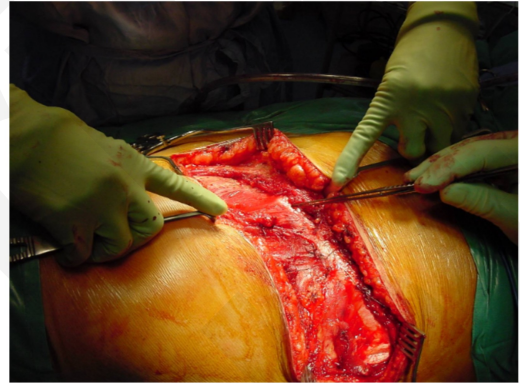
Serratus posterior inferior



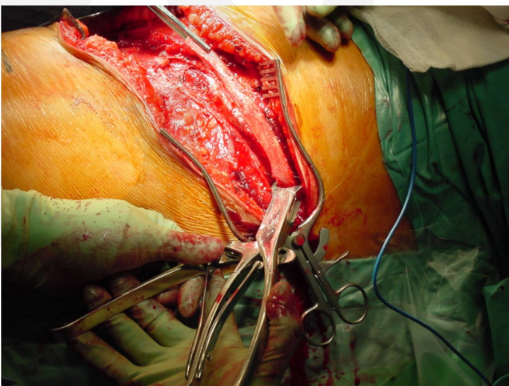
External oblique



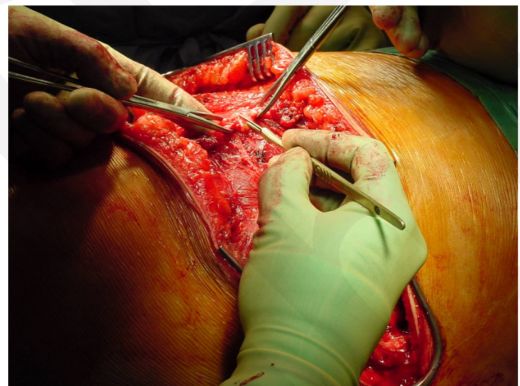
Tip of costal cartilage
key to retroperitoneal space



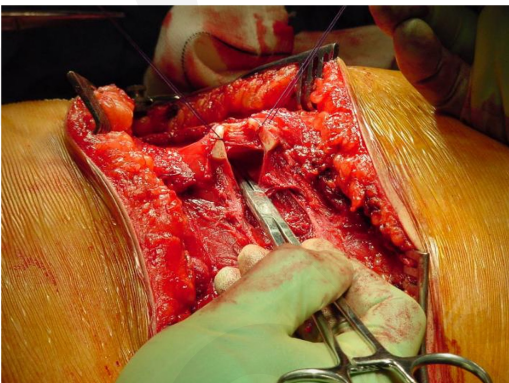
Subperiosteal rib excision



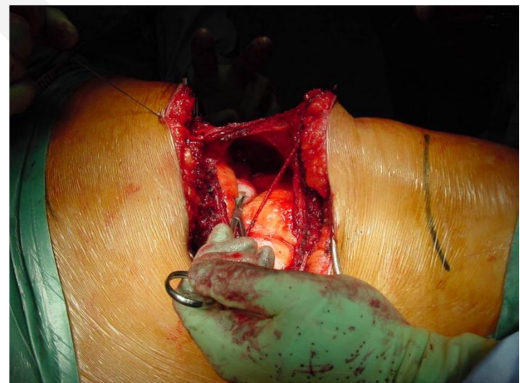
Split costal cartilage



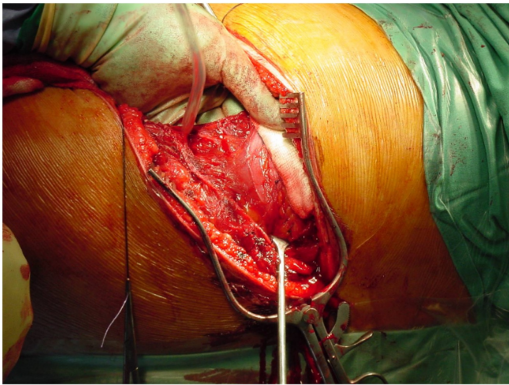
Enter retroperitoneal space



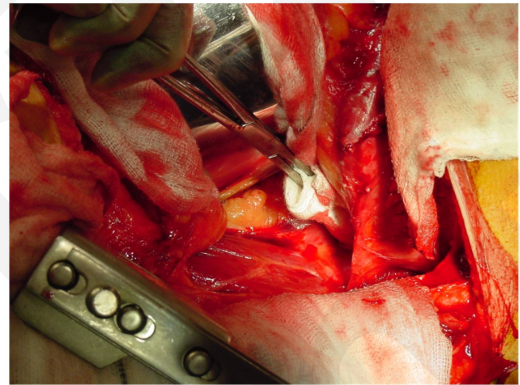
Expose diaphragm



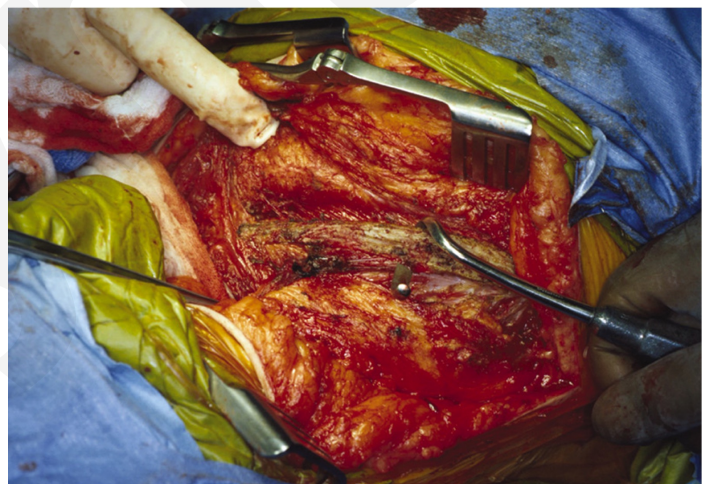
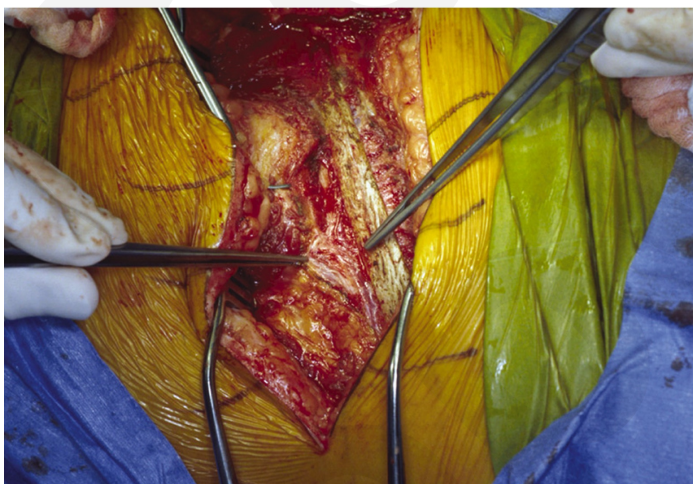
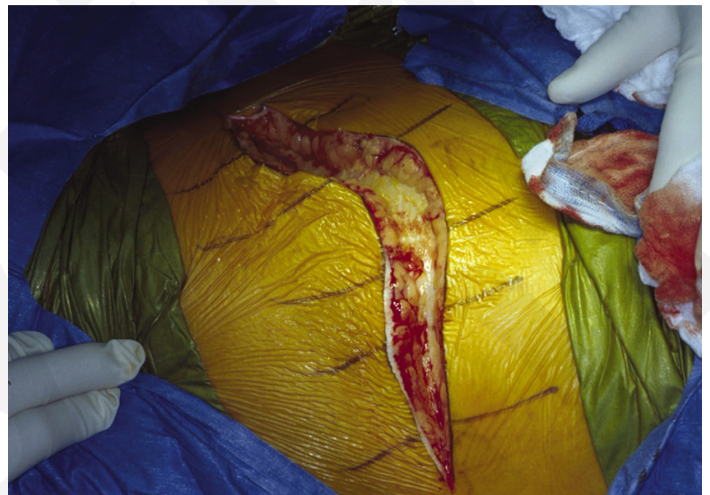
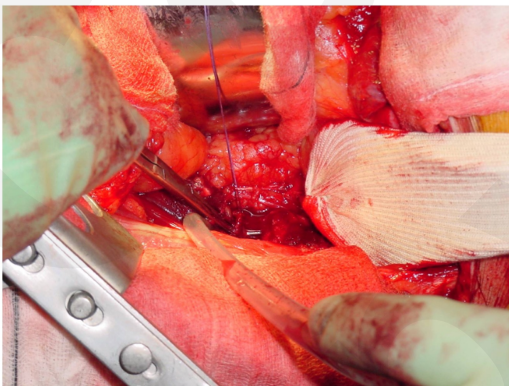
Expose edge of pleura in costal phrenic recess

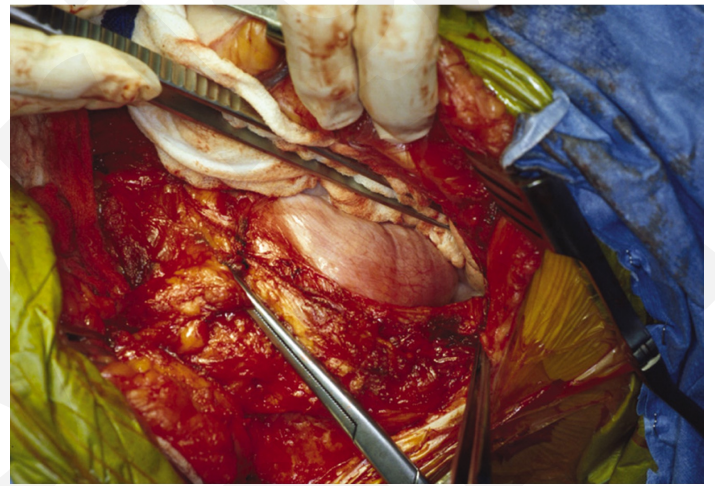
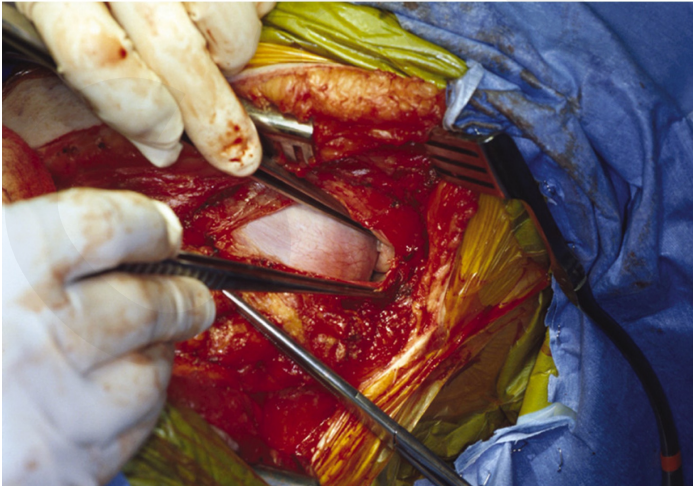
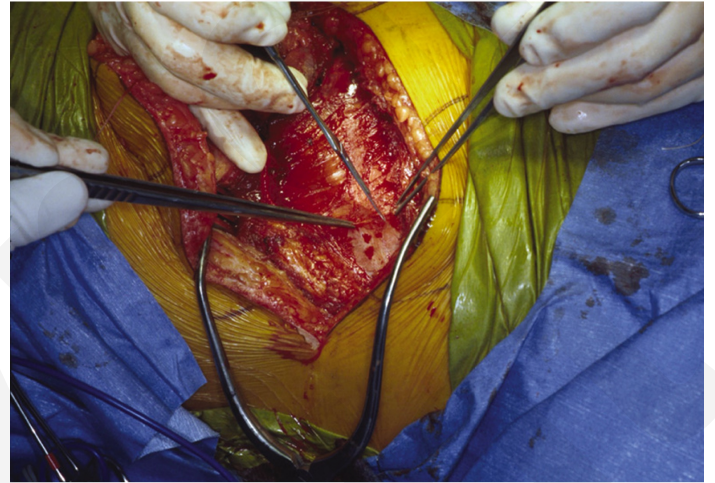


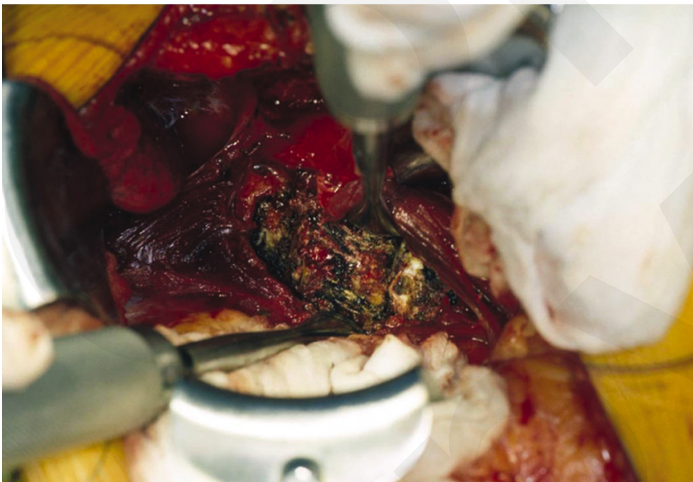
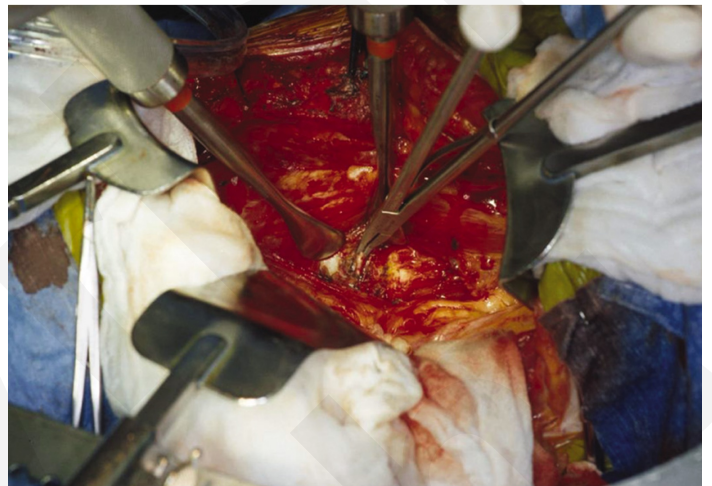
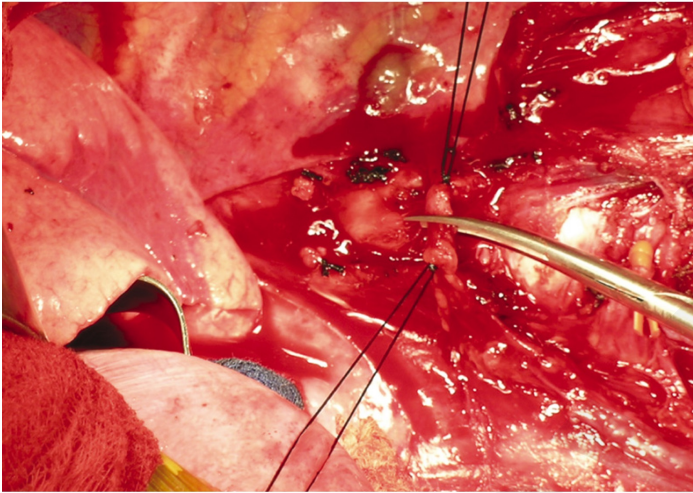
Psoas and medial arcuate ligament



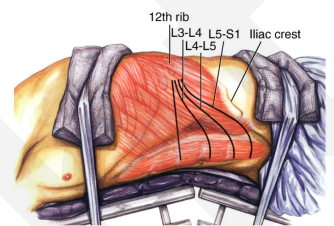
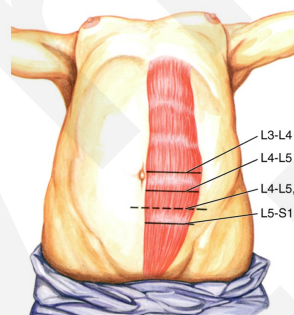
Negotiate segmental vessels



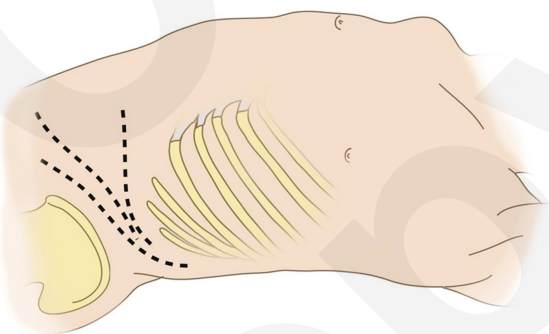




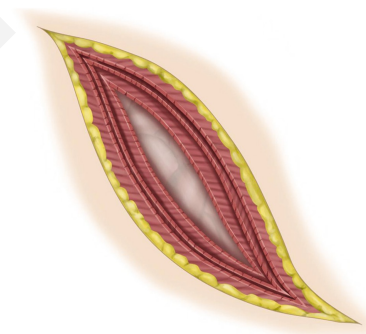
Abdominal Approaches



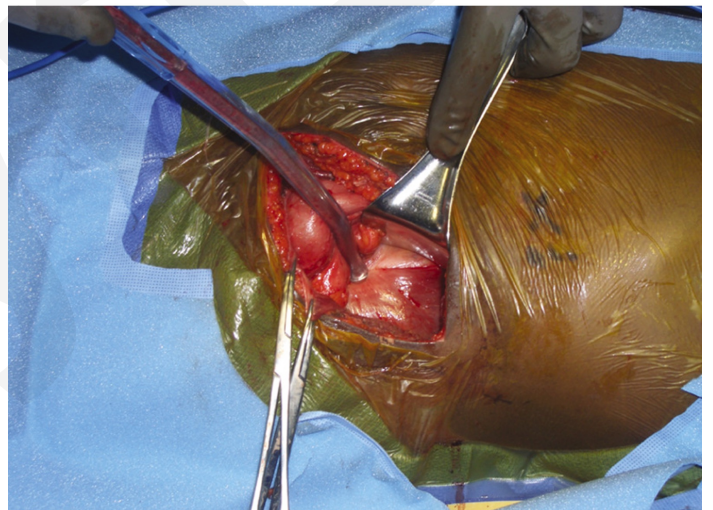
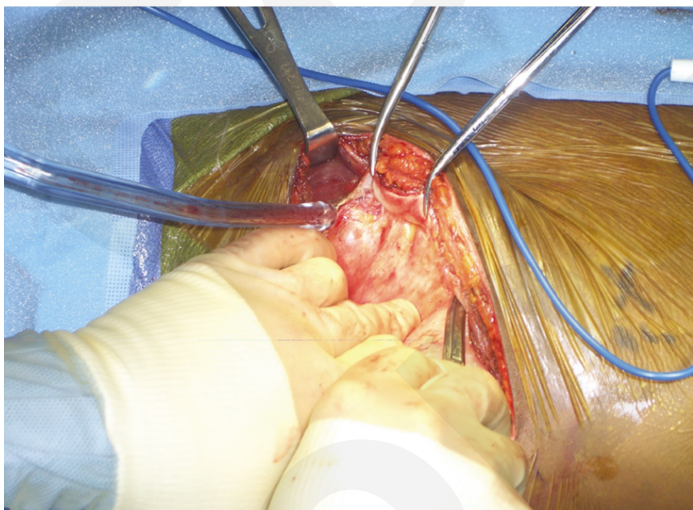
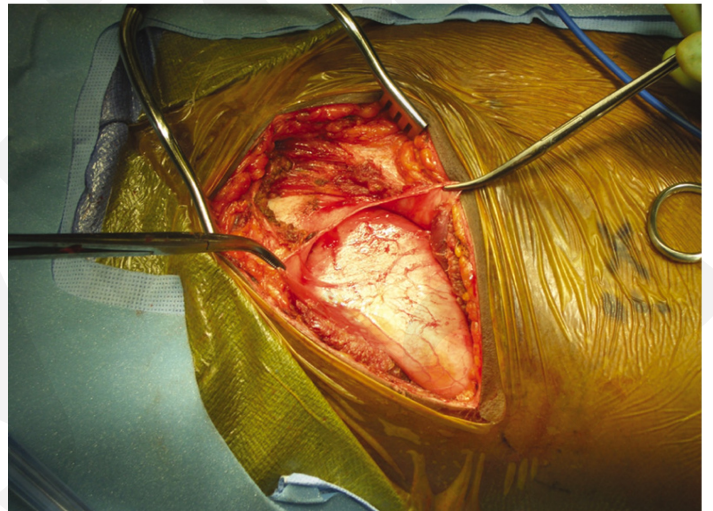
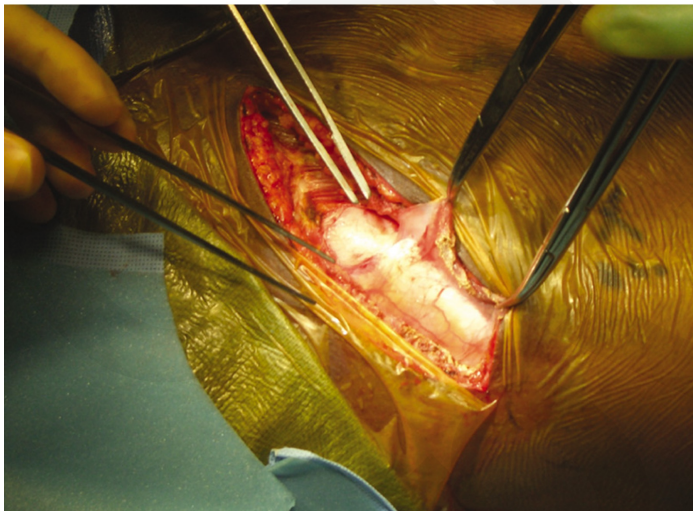
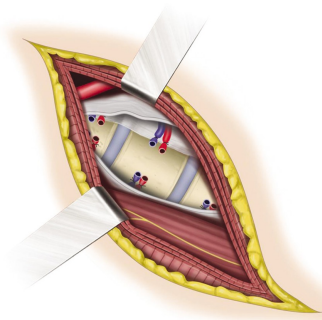
Lumbotomy



Abdominal Muscles



Psoas and Segmentals



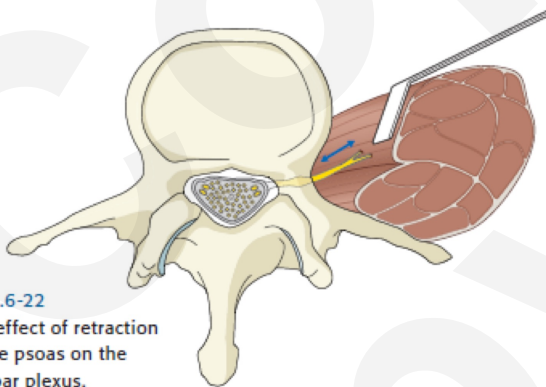
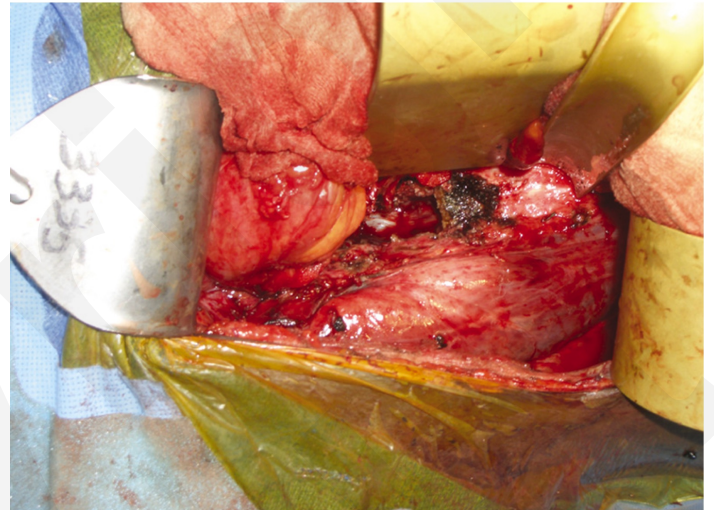
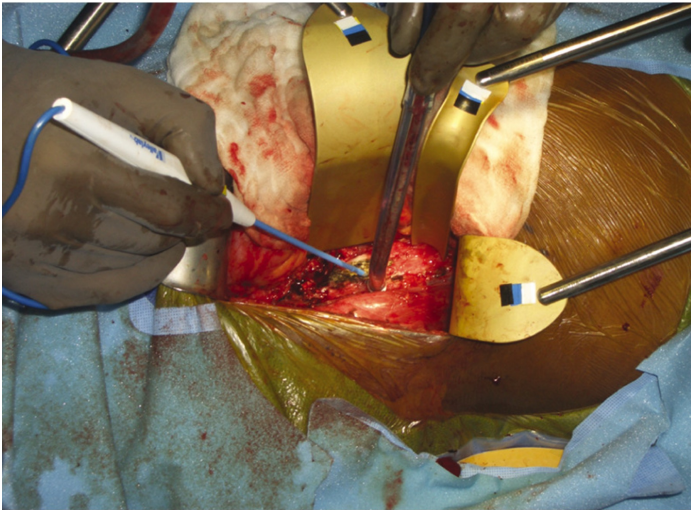
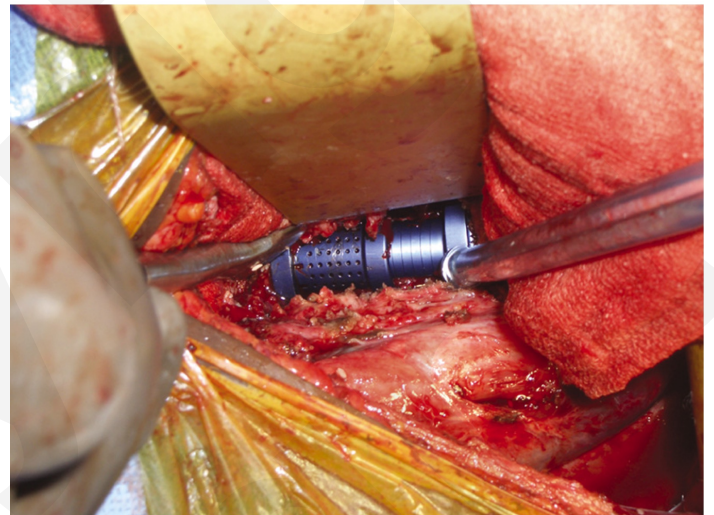
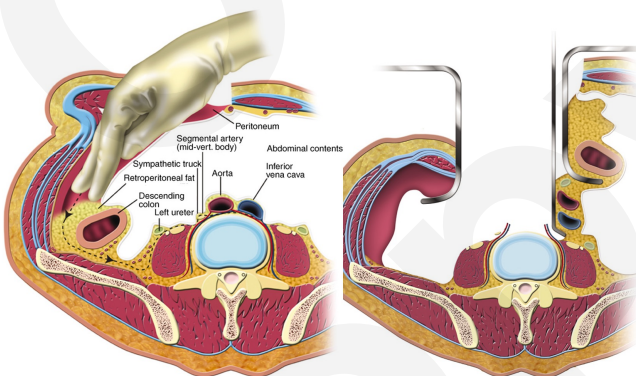


Fig 6.6-22
The effect of retraction
of the psoas on the
lumbar plexus.



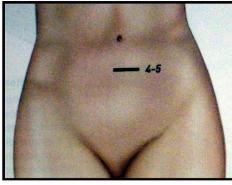
Anterior Approaches



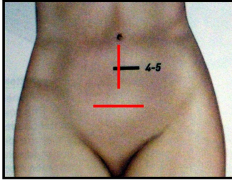
Incisions

- Midline longitudinal
 - Can be extended
 - Difficult retroperitoneal retraction
- Paramedian (longitudinal)
 - Can be extended
 - Easier retroperitoneal access
 - Denervation
- Paramedian (transverse)
 - Cannot be easily extended
 - Easier retroperitoneal access

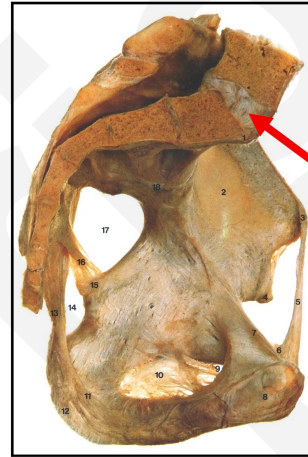
Transperitoneal
Retroperitoneal



Male or female ?



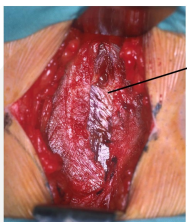
Single / multilevel ?



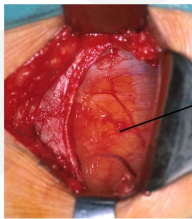
symphysis

Surgical Technique

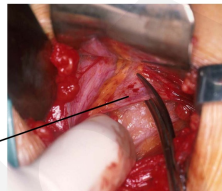
[anterior dissection](#)



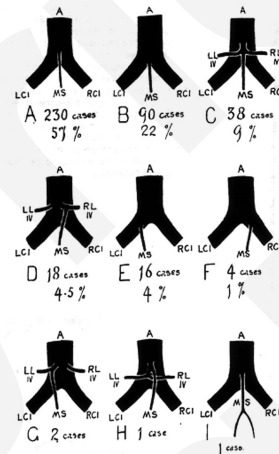
Para median incision through rectus sheath



Rectus retracted laterally to reveal posterior sheath



Arcuate ligament will usually require division



Middle Sacral Artery

Anatomical Variability

Venous Surgery Principles

- Consider Lahey clip and Lahey dabs [peanuts]
- Tie in continuity
- Use double ties
- Consider transfixion
- Think ahead – would the exposure allow recovery from large bleed?
- Initial control by direct pressure
- Isolate with “swabs on sticks”
- Pressure against vertebral body
- Repair with vascular suture 5/0 prolene



Message of the Day

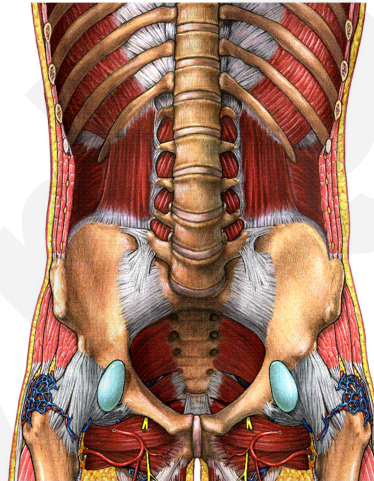
VEINS ARE TREACHEROUS

traitorous, perfidious, disloyal, faithless, unfaithful, false, untrue, deceitful, dishonest, untrustworthy, unreliable, treasonable, dangerous, perilous, risky, hazardous, unsafe, precarious, deceptive.

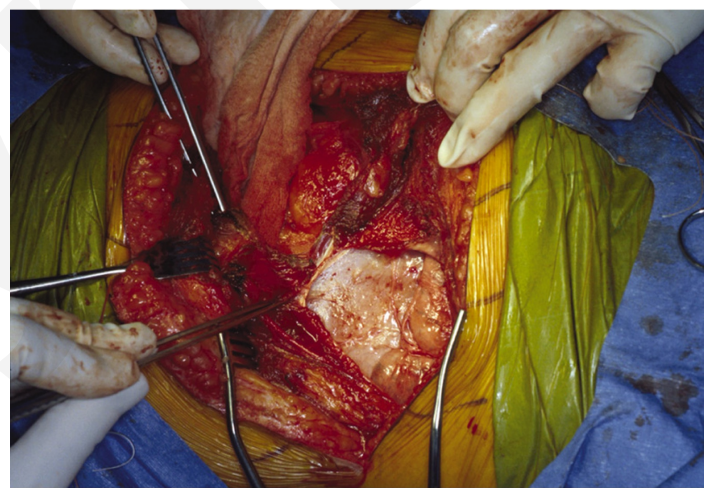
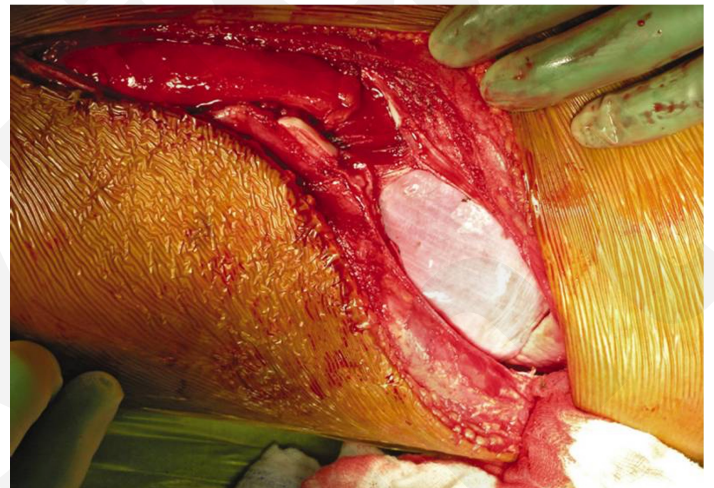
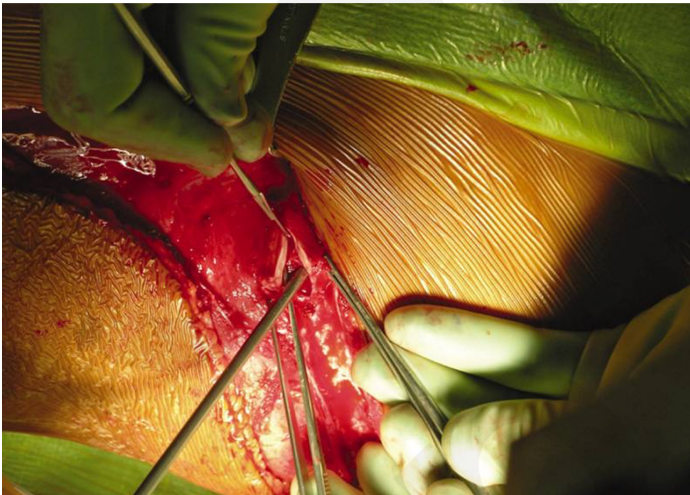
BEWARE THE IVC, ILIACS AND ILIOLUMBAR VEIN!

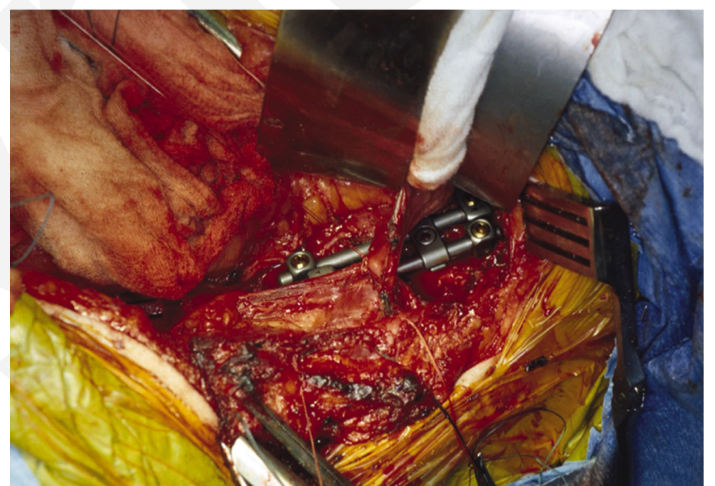
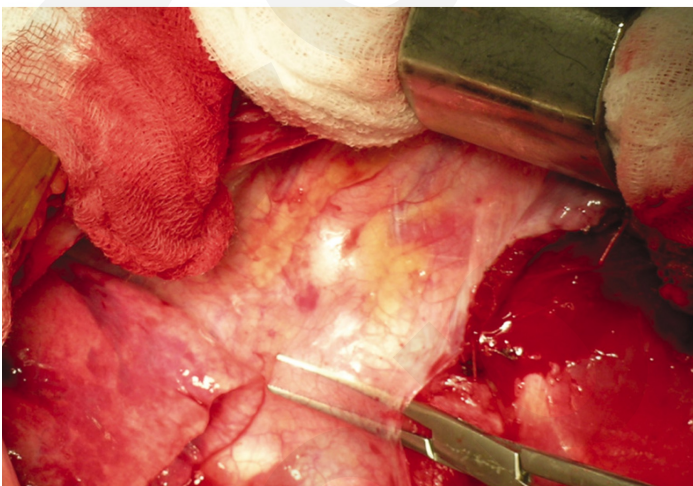
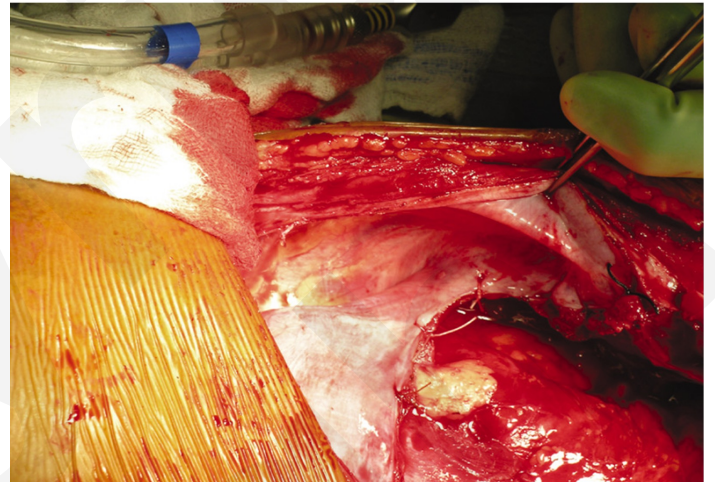
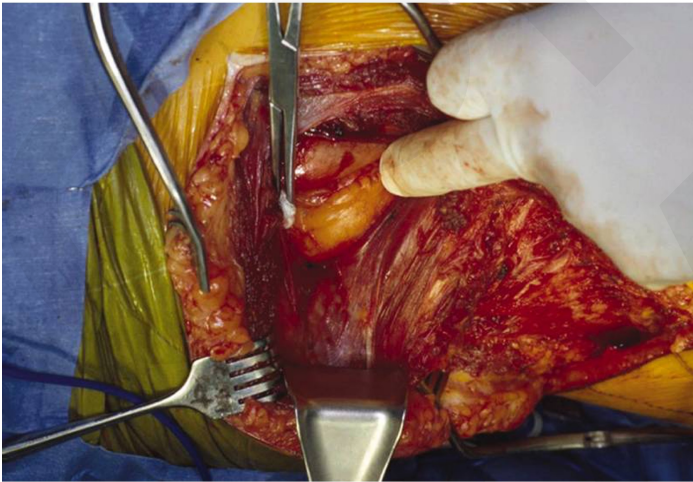
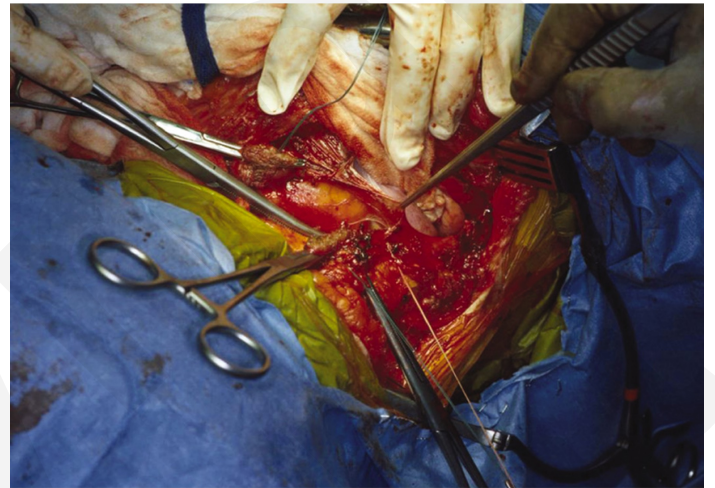
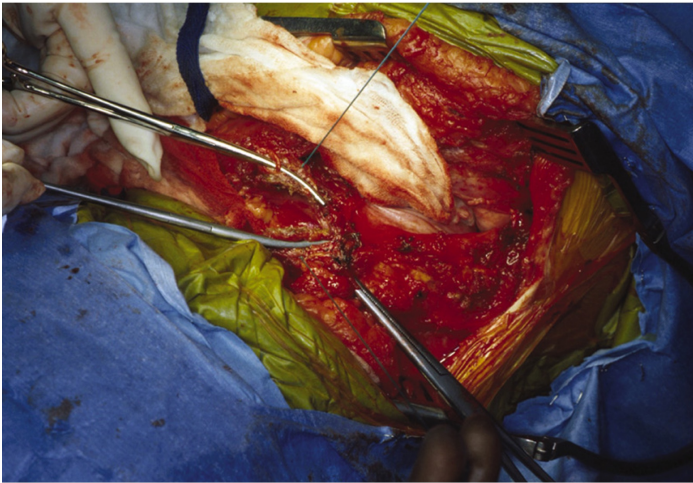
Summary

- Lateral
 - Thoracotomy
 - Transpleural T3/4-12 / L1
 - Thoracolaparotomy
 - Transpleural / extraperitoneal T6-L4(-S1)
 - Extrapleural / extraperitoneal (extracoelomic) T11-L4(-S1)
 - Lumbotomy L2 – L4(-S1)
- Anterior
 - Retroperitoneal L2/3-S1
 - Transperitoneal L2/3-S1



Anterior Approaches T10-S1

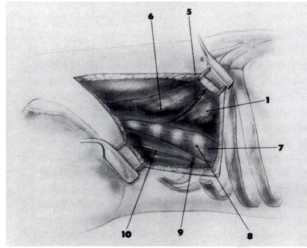
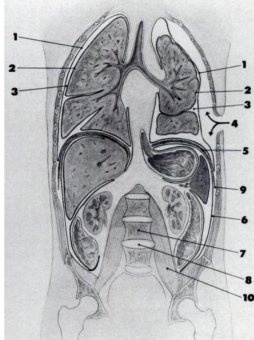




EXTRACOELOMIC APPROACH TO THE SPINE

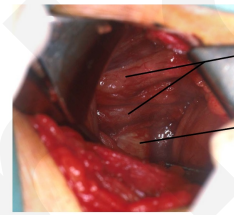
RONALD MOSKOVICH, DANIEL BENSON, ZHI-HU ZHANG, MARK KABINS

From the Hospital for Joint Diseases, New York, and the University of California Davis, Sacramento, USA



Difficult to get above T10/11 level

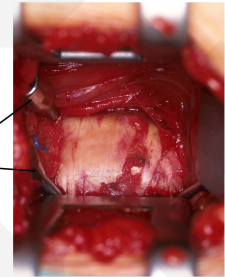
Surgical Technique



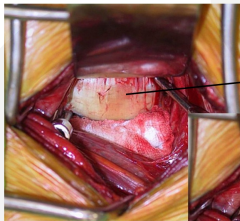
Iliac vessels

L5/S1 disc

The use of short pins improves access to the disc



Surgical Technique



L5-S1 Disc



L4-5 Disc

Common Iliac Vessels

