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ULTRASOUND ASSISTED LUMBAR PUNCTURE

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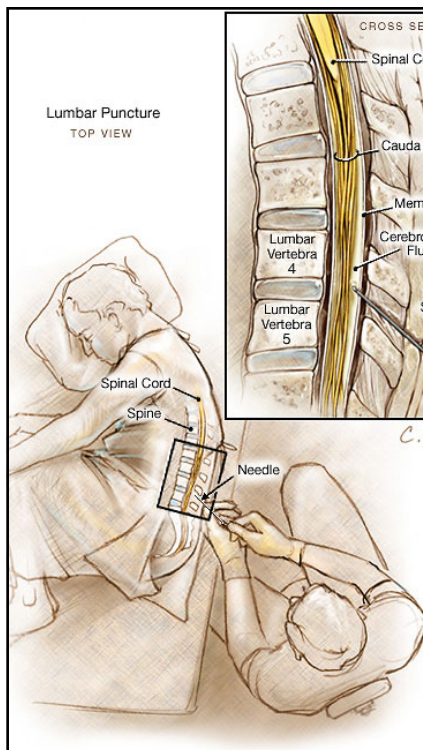
DISCLOSURES

- ▶ None

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BASIC PRINCIPLES

- ▶ Usually done as “mark and go”
- ▶ POCUS helps with:
 - ▶ Locating intervertebral spaces
 - ▶ Estimating depth of needle insertion



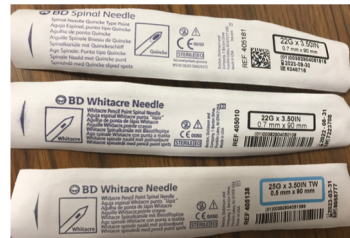
Lumbar Puncture

EQUIPMENT CHECKLIST

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Equipment checklist:

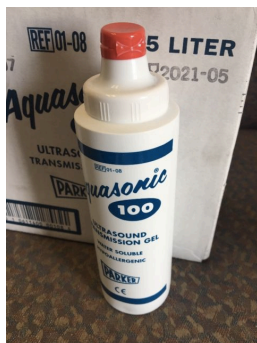
- ✓ **LUMBAR PUNCTURE KIT**
- ✓ **EXTRA SPINAL NEEDLES**
- ✓ **STERILE CLEANING SOLUTION**
- ✓ **LIDOCAINE**
- ✓ **PPE**



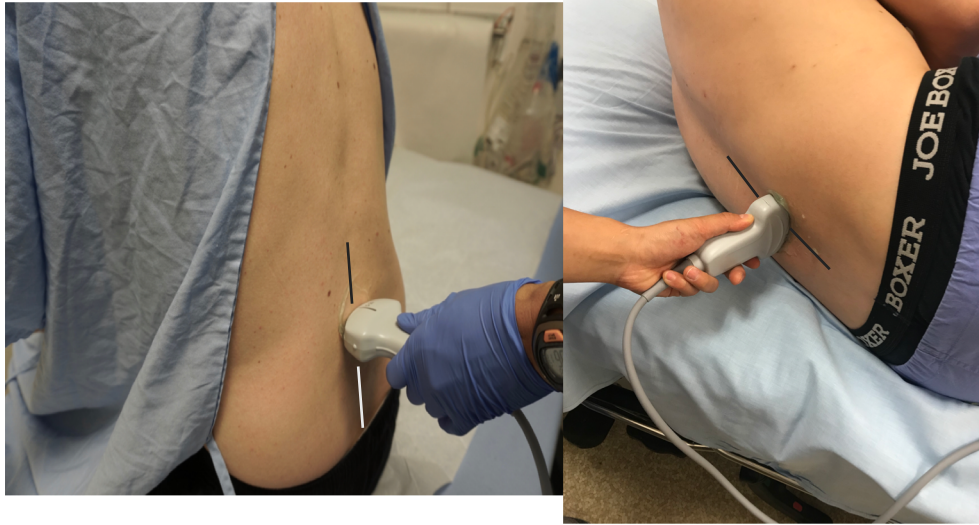
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Equipment checklist:

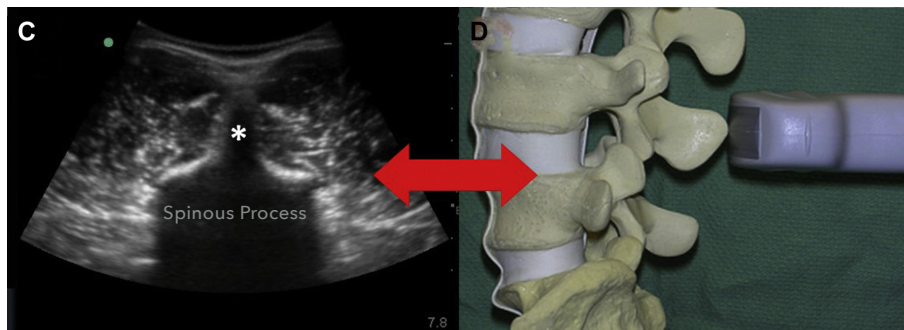
- ✓ **ULTRASOUND WITH CURVILINEAR PROBE**
- ✓ **GEL**
- ✓ **PEN / MARKER / SYRINGE**



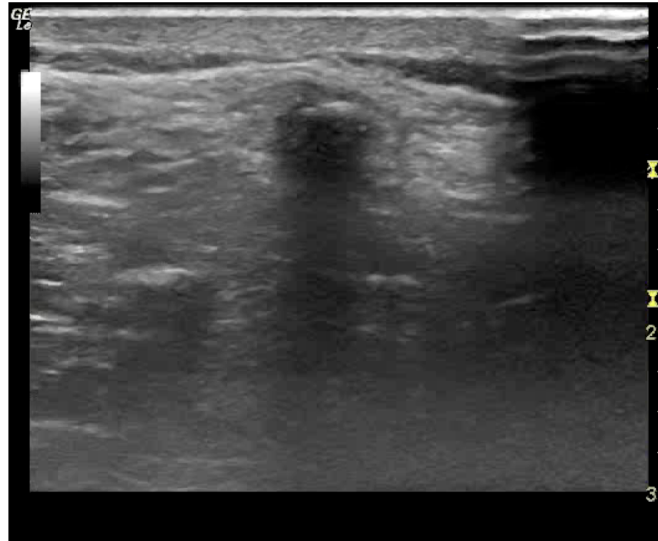
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TRANSVERSE – IDENTIFY MIDLINE

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TRANSVERSE – IDENTIFY MIDLINE

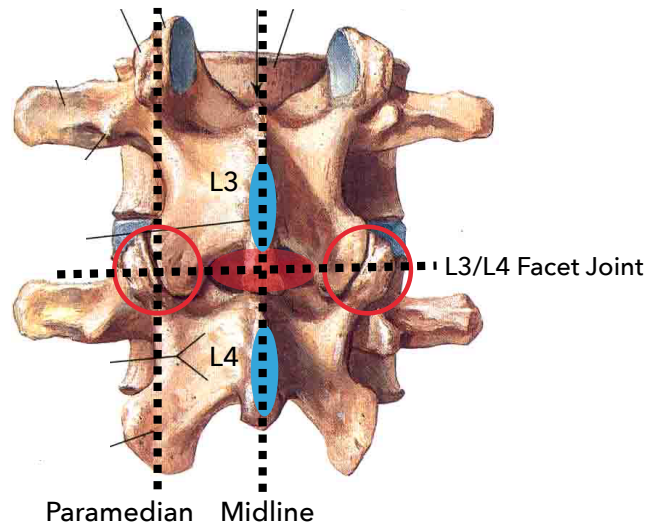
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TRANSVERSE – IDENTIFY MIDLINE

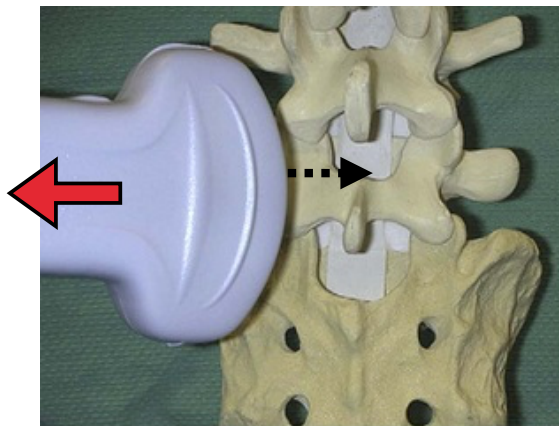
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SAGITTAL – IDENTIFY INTERVERTEBRAL SPACE

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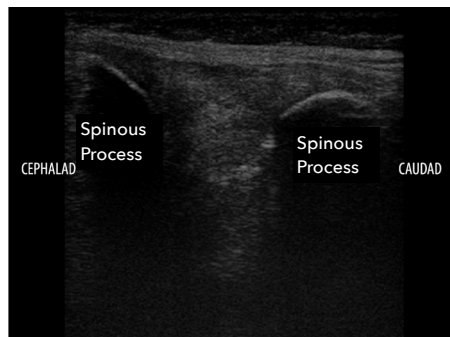
SAGITTAL PARAMEDIAN APPROACH

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SAGITTAL PARAMEDIAN APPROACH



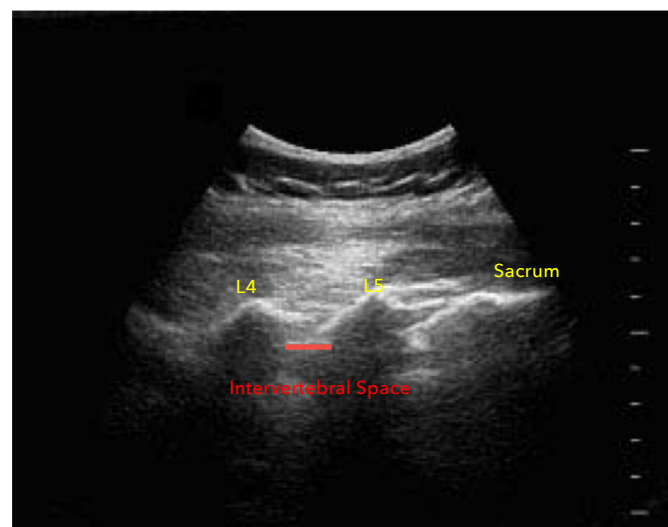
Spinous Process



Facet Joint or Articular Process

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SAGITTAL – IDENTIFY INTERVERTEBRAL SPACE



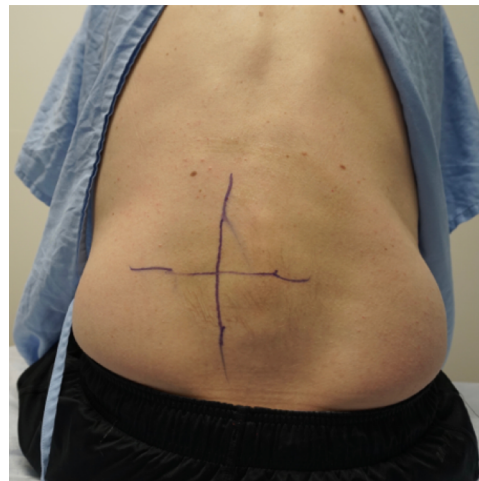
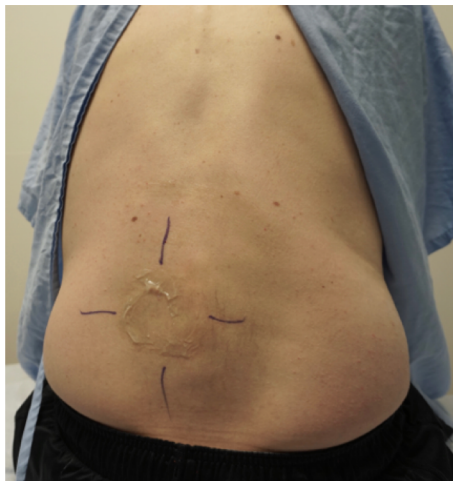
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SAGITTAL – IDENTIFY INTERVERTEBRAL SPACE



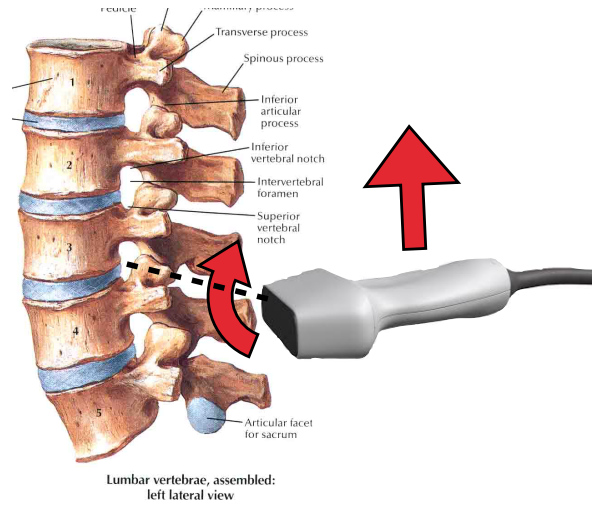
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LANDMARKING



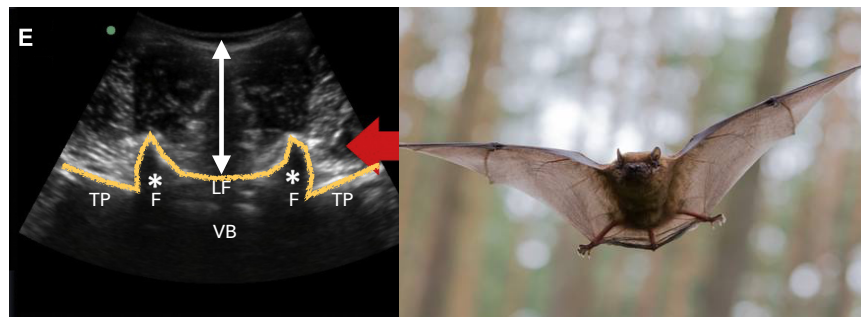
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TRANSVERSE - MEASURING DEPTH AND ANGLE



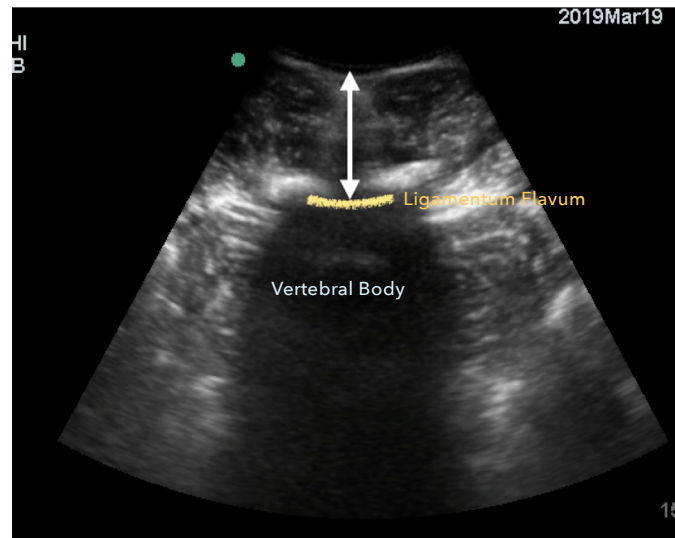
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TRANSVERSE - MEASURING DEPTH AND ANGLE



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TRANSVERSE — MEASURING DEPTH AND ANGLE

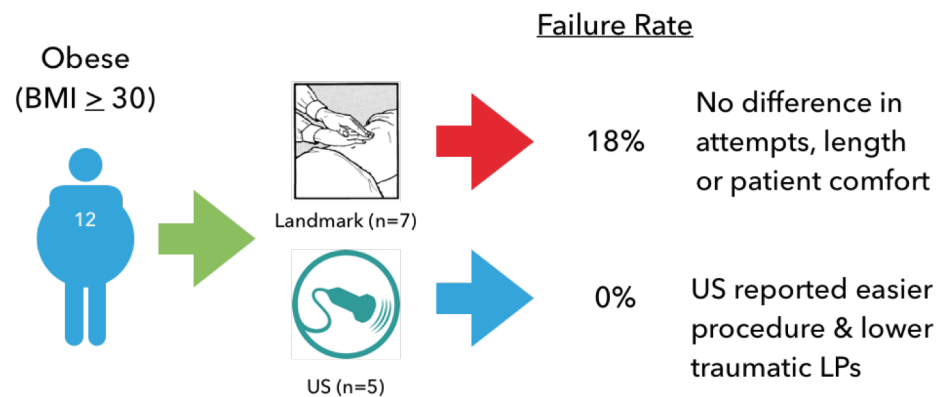
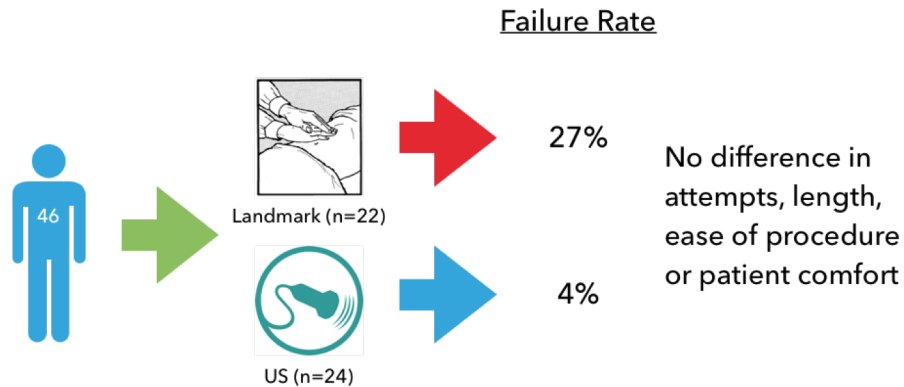


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**ENSURE THE PATIENT
REMAINS IN THE SAME
POSITION**

WHAT IS THE EVIDENCE?

*A RANDOMIZED CONTROLLED TRIAL OF ULTRASOUND-ASSISTED LUMBAR PUNCTURE,
NOMURA J ET AL, J ULTRASOUND MED 2007*



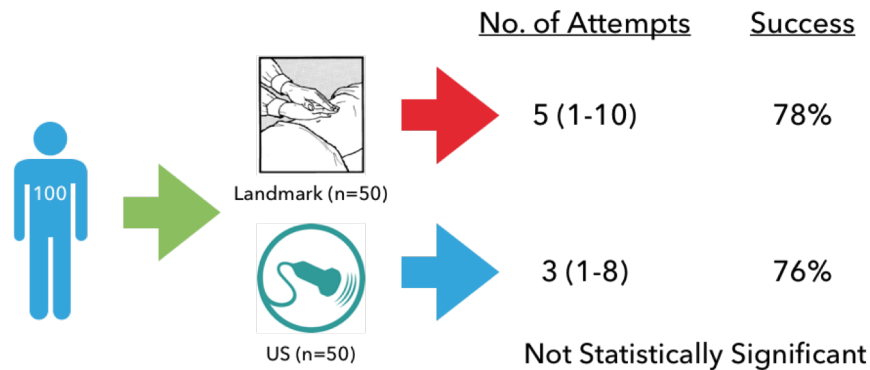
CONCLUSION:

*"THE USE OF ULTRASOUND FOR LP SIGNIFICANTLY REDUCED THE NUMBER OF FAILURES
IN ALL PATIENTS AND IMPROVED THE EASE OF THE PROCEDURE IN OBESE PATIENTS"*

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WHAT IS THE EVIDENCE?

ULTRASOUND FOR ROUTINE LUMBAR PUNCTURE, PETERSON M ET AL, ACAD EMERG MED 2014



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Difficult or Impossible Landmark



Landmark (n=29)



No. of Attempts

6 (2-14)

Success

62%



US (n=22)



4 (2-6)

77%

Not Statistically Significant

CONCLUSION:

"THESE DATA DO NOT SUGGEST ANY ADVANTAGE TO ROUTINE USE OF US LOCALIZATION FOR LP INSERTION, THOUGH FURTHER STUDY MAY BE WARRANTED TO LOOK FOR BENEFIT IN THE DIFFICULT TO PALPATE OR OBESE PATIENTS"

WHY IS THERE CONTRADICTION?

Nomura (2007) Peterson (2014)		
US Training	"Trained"	None
LP Experience	Experienced	Variable
Sample Size	46	100
Blinding	Yes	No
Powered for Obese Subgroup	No	No

WHAT IS THE EVIDENCE?

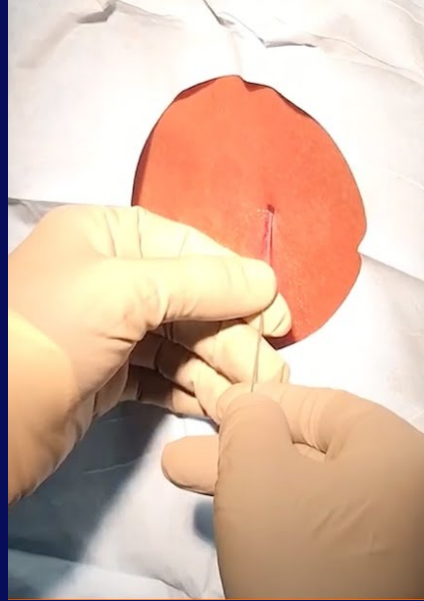
ULTRASOUND-ASSISTED LUMBAR PUNCTURE: A SYSTEMATIC REVIEW AND META-ANALYSIS, GOTTLIEB M ET AL, ACAD EMERG MED 2018

- 12 STUDIES (TOTAL N = 957)
- BETTER SUCCESS RATE (90% VS 81%)
- FEWER TRAUMATIC LPS (10.7% VS 26.5%)
- SHORTER TIME TO SUCCESS (6.87 MIN VS 7.97 MIN)
- FEWER ATTEMPTS (2.07 VS 2.66)
- LOWER PATIENT PAIN SCORES (3.75 VS. 6.31)

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BOTTOM LINE

- ▶ Operator dependent
- ▶ Provides visualization of spinal structures
- ▶ Benefit likely higher in patients with difficult body habitus
- ▶ Helpful adjunct to a common EM procedure



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