SERRATUS PLANE BLOCK

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St George's University Hospitals NHS
NHS Foundation Trust

Serratus Plane Block

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Original Article

Serratus plane block: a novel ultrasound-guided thoracic wall nerve block

R. Blanco,[1] T. Parras,[2] J. G. McDonnell[3] and A. Prats-Galino[4]

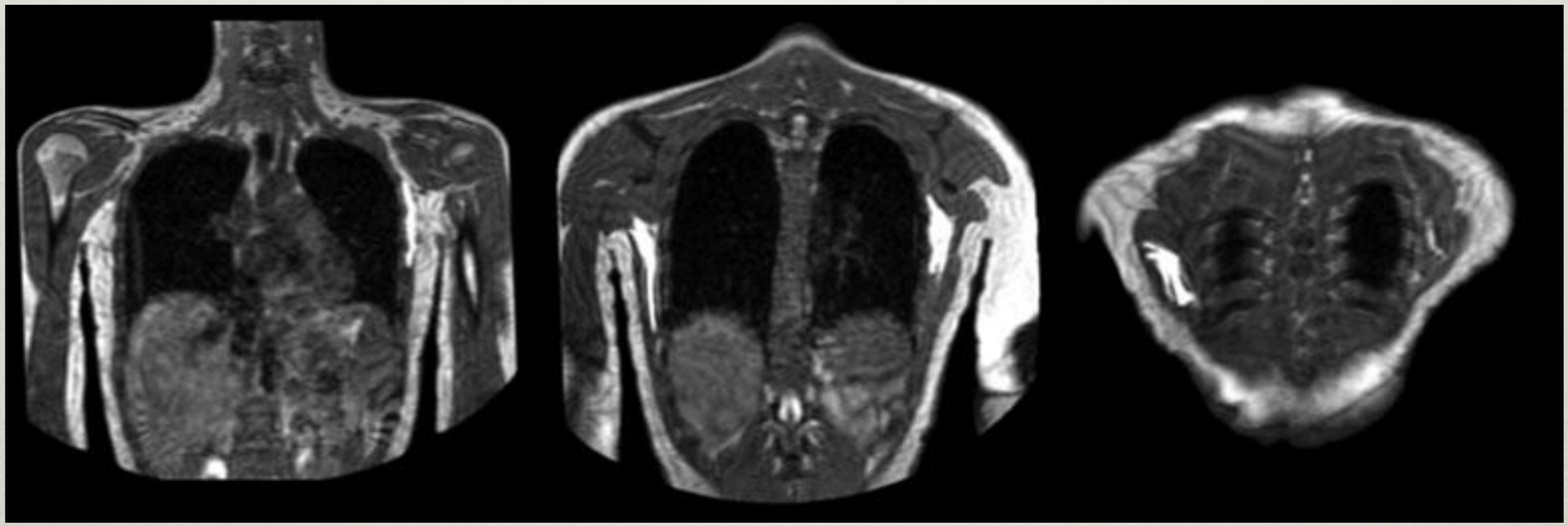
Serratus Plane Block

- Fascial block:
  - Between latissimus dorsae and serratus anterior muscles
- Target:
  - Long thoracic nerve
  - Thoracodorsal nerve
  - lateral intercostal nerves

Serratus Plane Block

- Indications:
  - Axillary clearance
  - lateral thoracotomies
  - Thoracoscopies
  - Rib fractures
  - lattisumus dorsae flap

MRI



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THORACIC WALL BLOCKS

Pecs I Block:

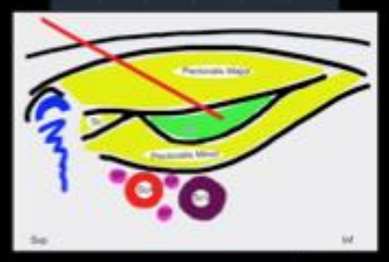
1. Indications: porthacaths & breast surgery (tumorectomies, expansors)
2. Supine position
3. Linear probe, 50-80 mm needle, in plane.
4. Between pectoralis major & minor muscles
5. 0.125-0.25% levobupivacaine, 10-20ml

Pecs II Block:

1. Indications: breast surgery (mastectomies, axillary clearance)
2. Supine position
3. Linear probe, 80-100 mm needle, in plane
4. 1st injection between pectoralis major & minor muscles (10 ml)
5. 2nd: between minor and serratus anterior (20 ml)

Serratus Plane Block:

1. Indications: breast & thoracic surgery, rib fractures, open nephrectomy
2. Supine position. Arm abduction
3. Linear probe, 80-100 mm needle, in plane
4. Between latissimus dorsae and serratus anterior muscles (30 ml)



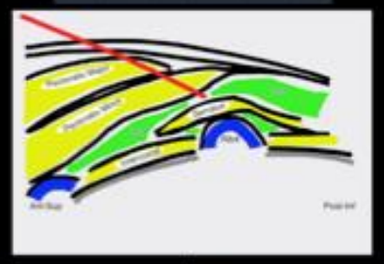


Figure 1: Block description	Figure 2: Patient & probe position	Figure 3: US image	Figure 4: Comic of sonoanatomy

THE LITTLE BOOK OF ULTRASOUND BLOCKS. LSORA BOOK

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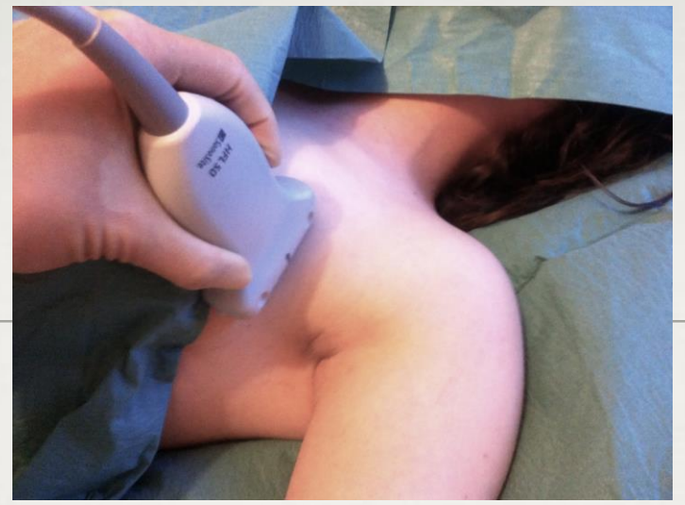
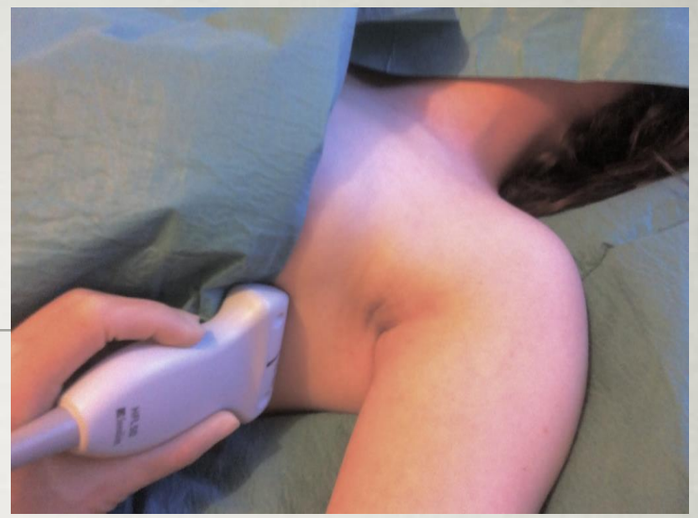
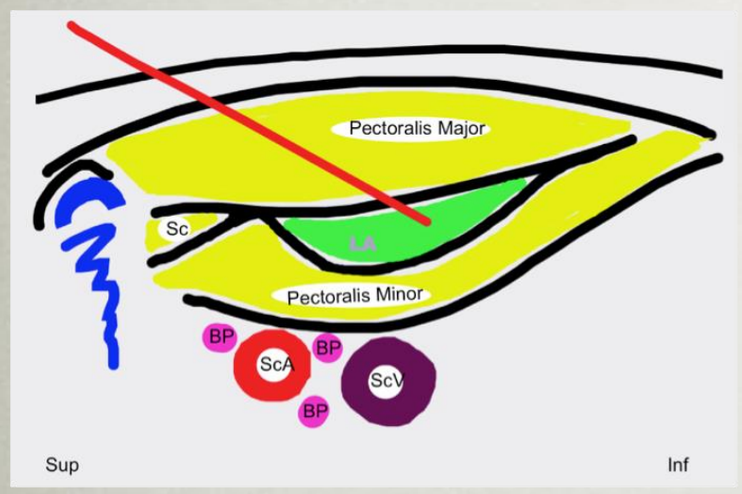
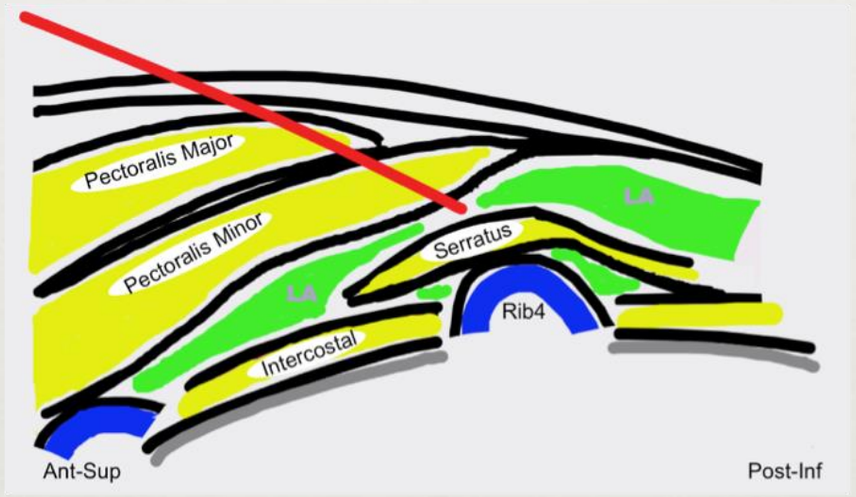


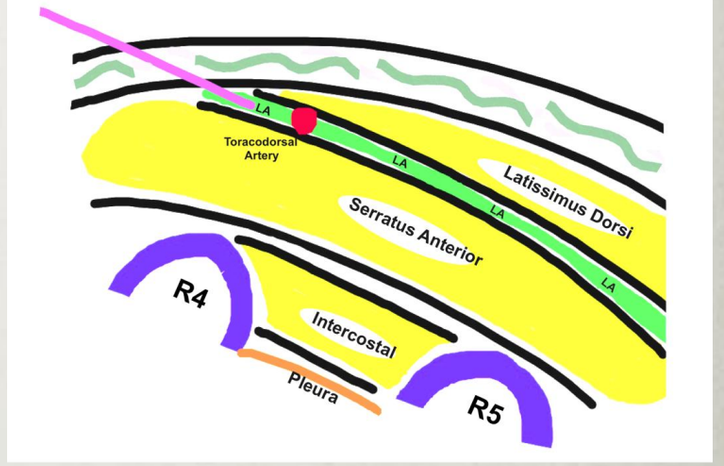


Ant-Med

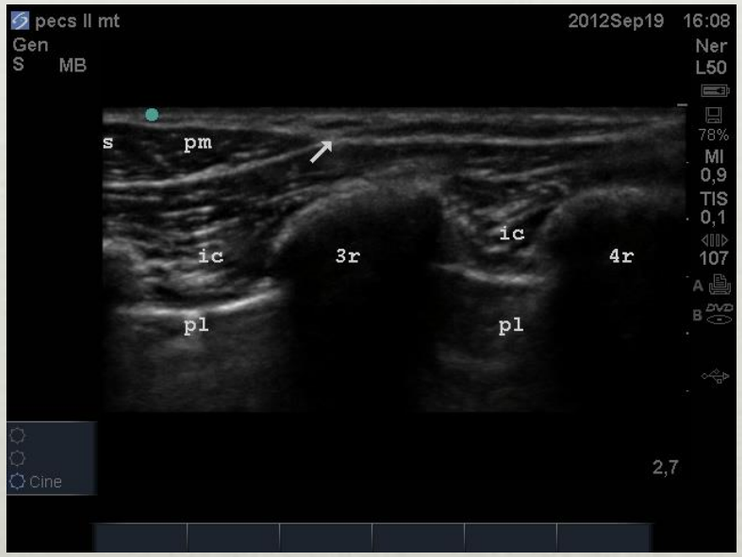
Post-Lat





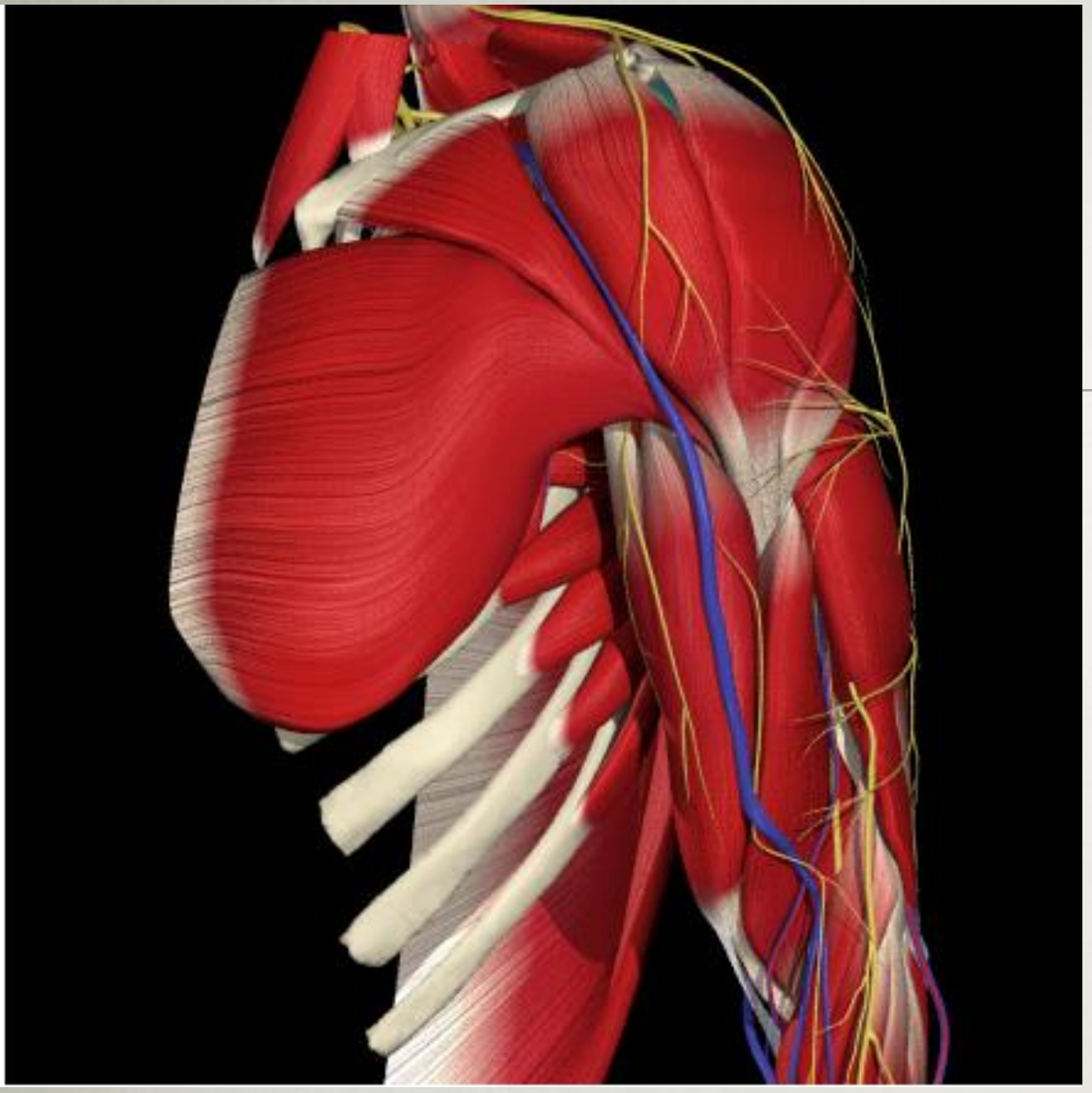


Pecs I



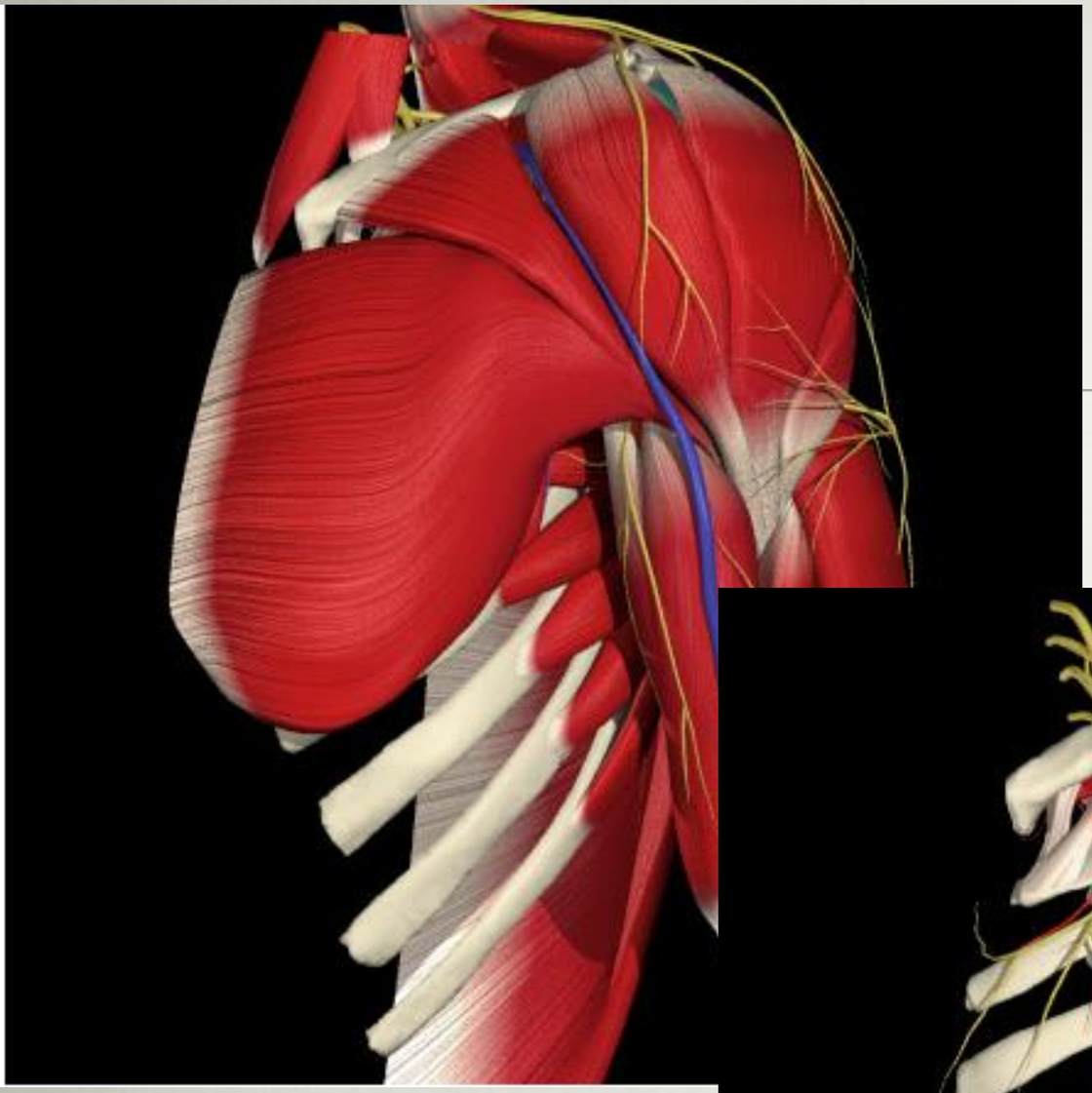
Pecs II

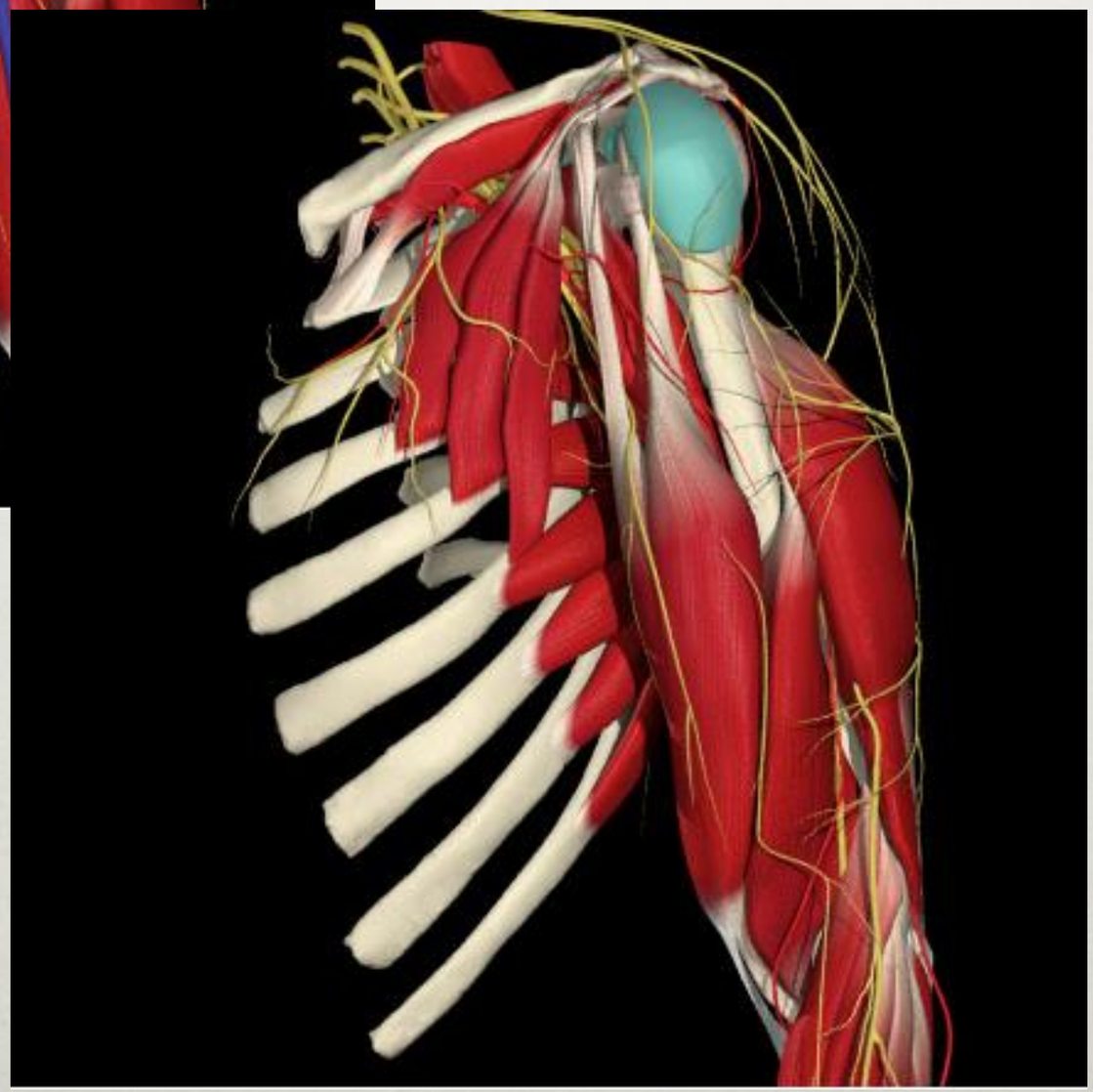
SPB



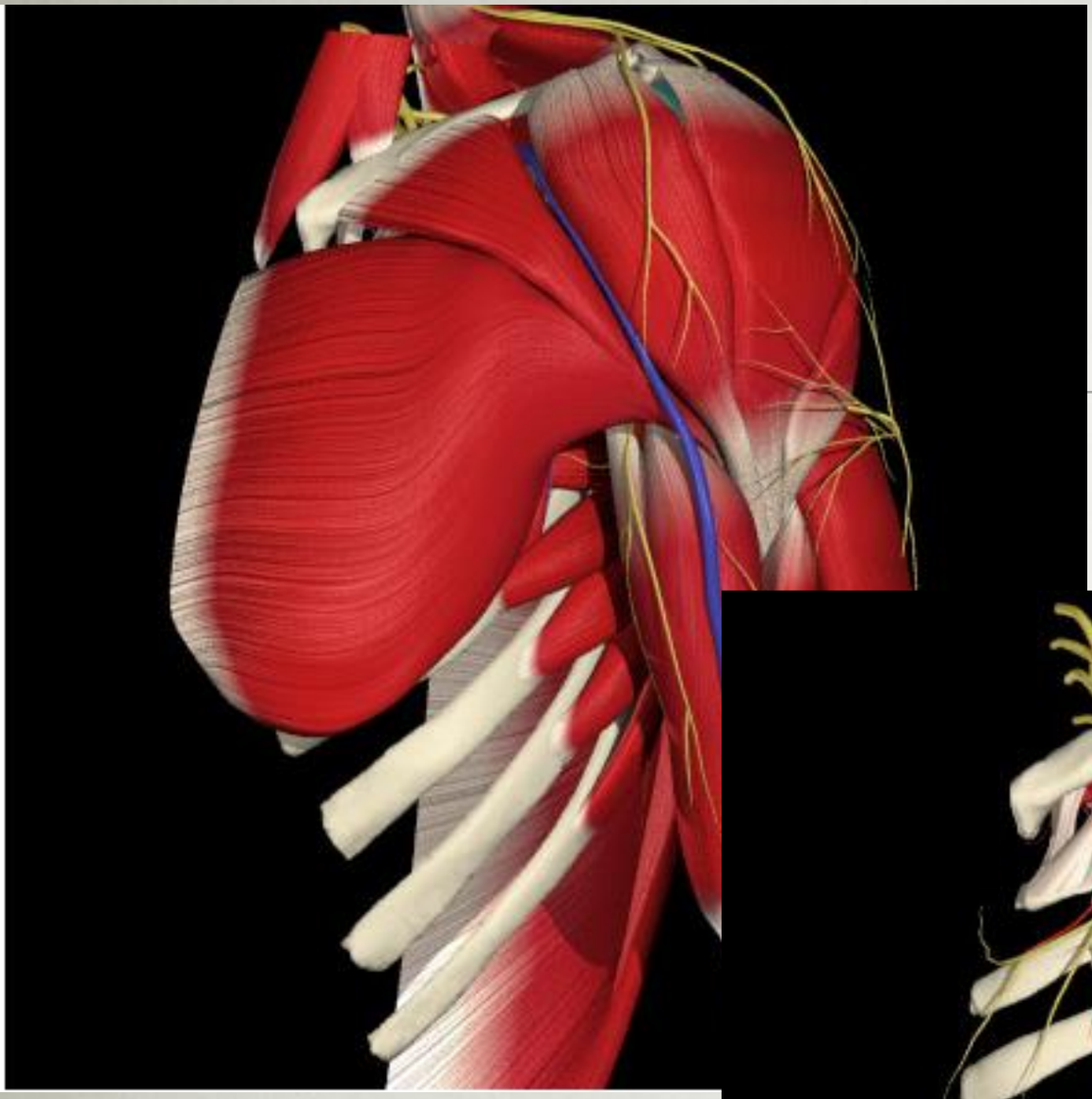
Pectoralis Major

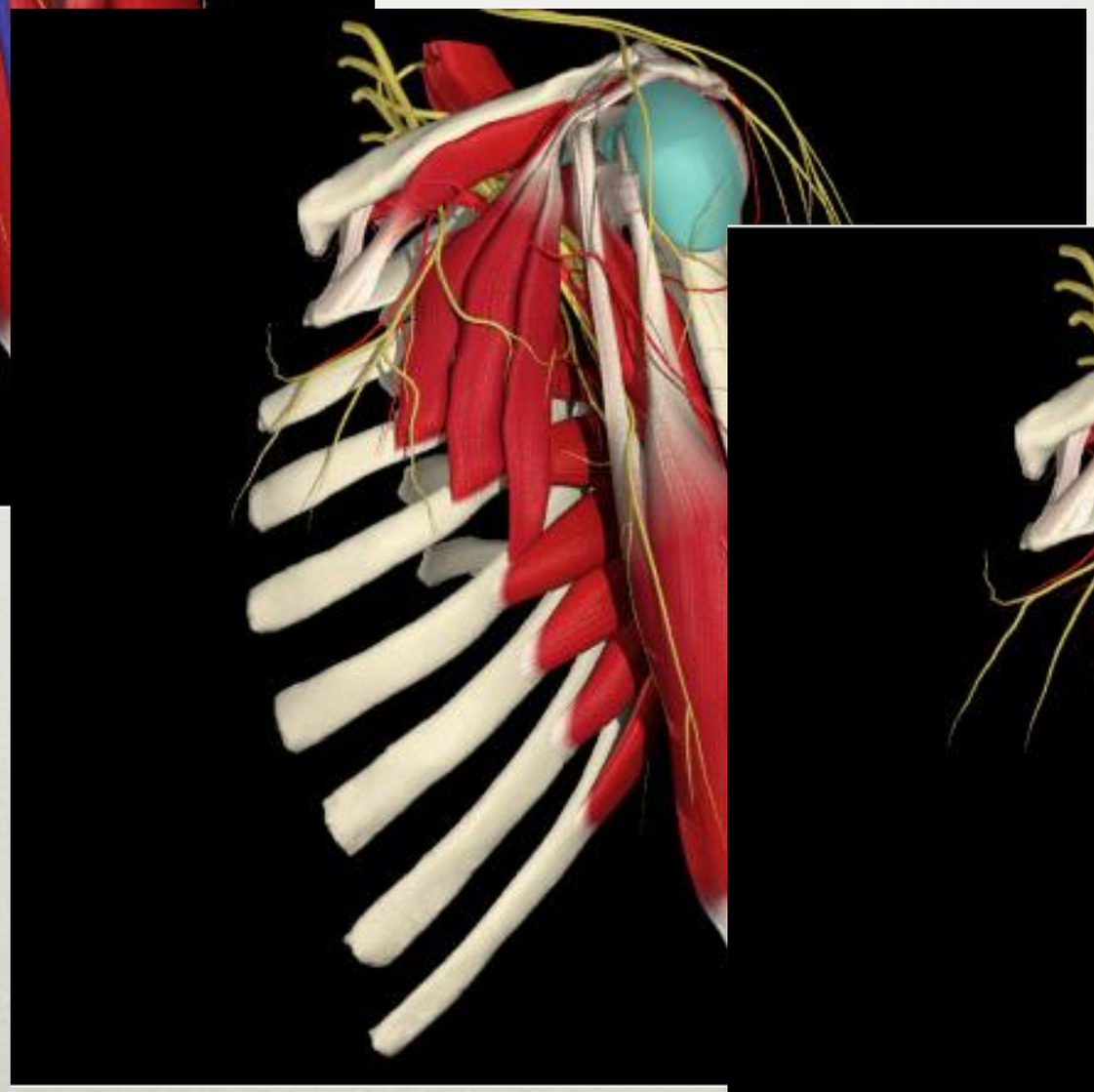
Pectoralis Minor





Serratus anterior

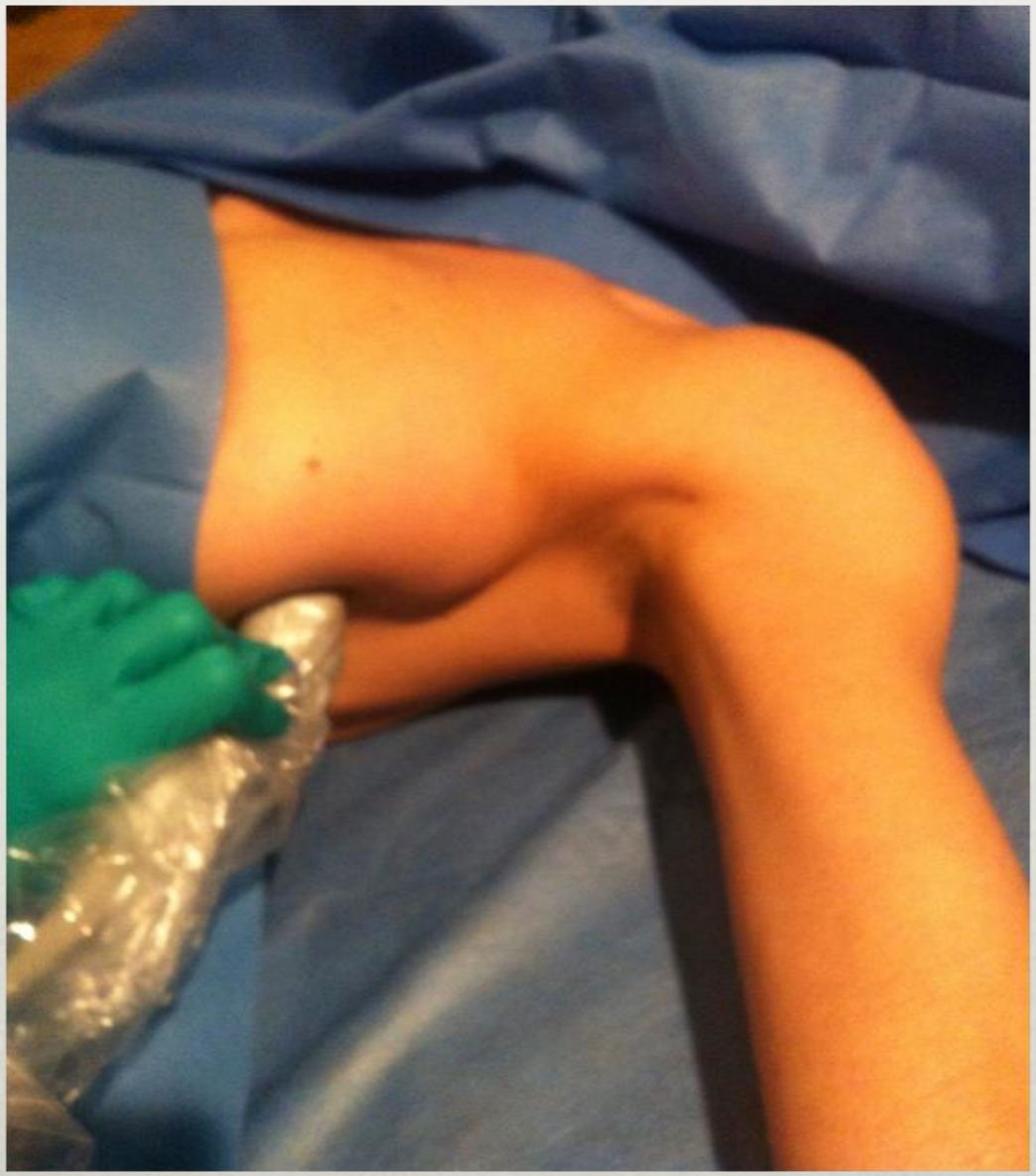




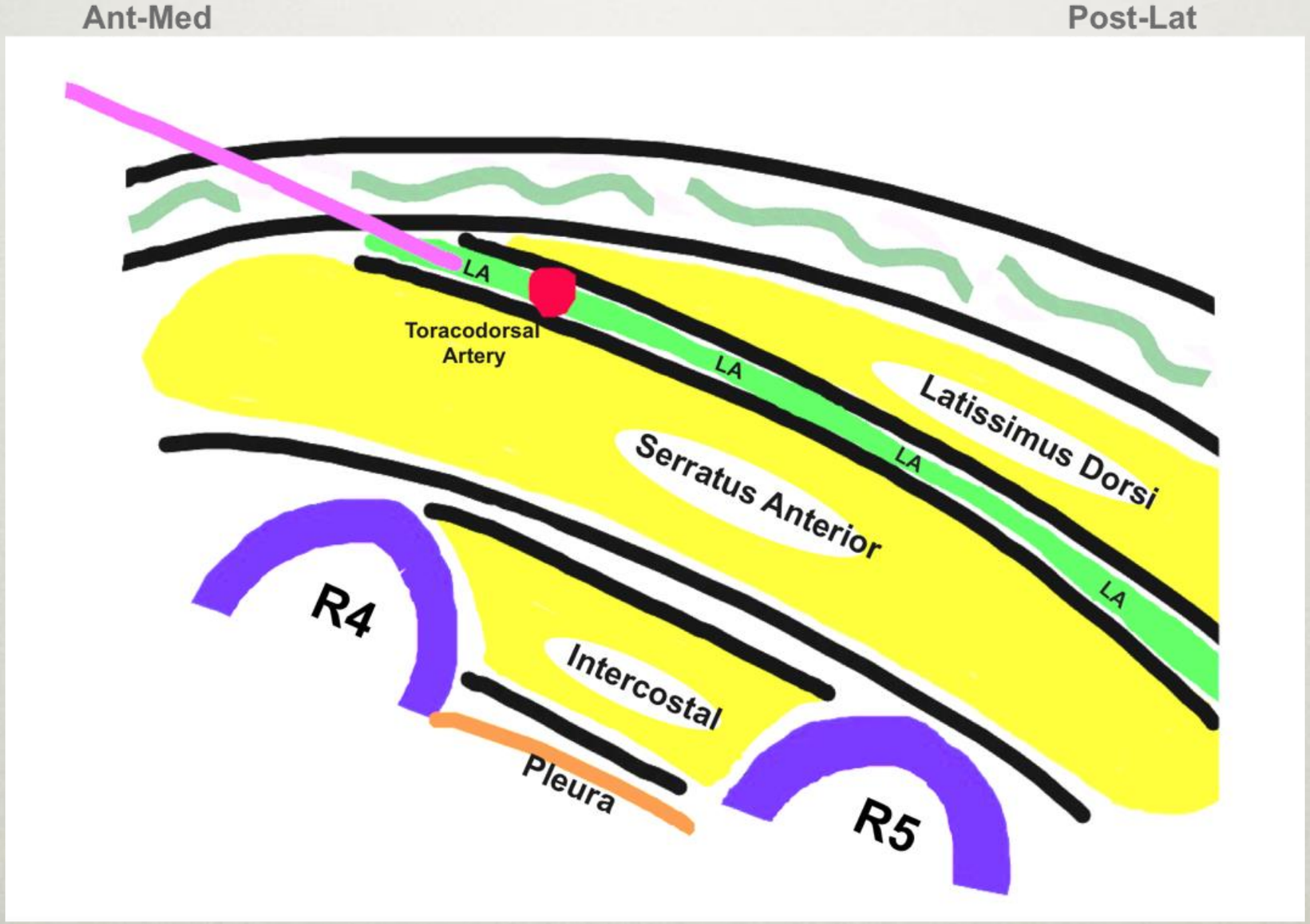
Serratus anterior

latissimus dorsae

Probe Position

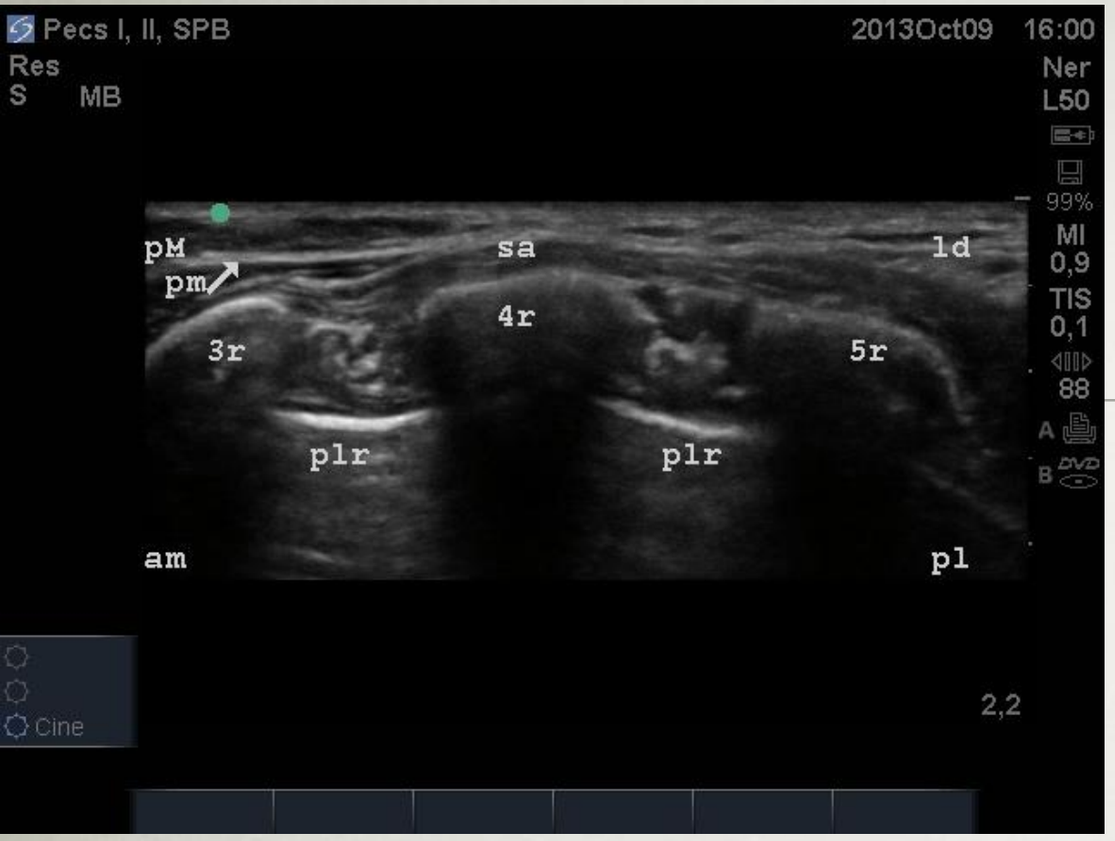


Serratus Plane Block



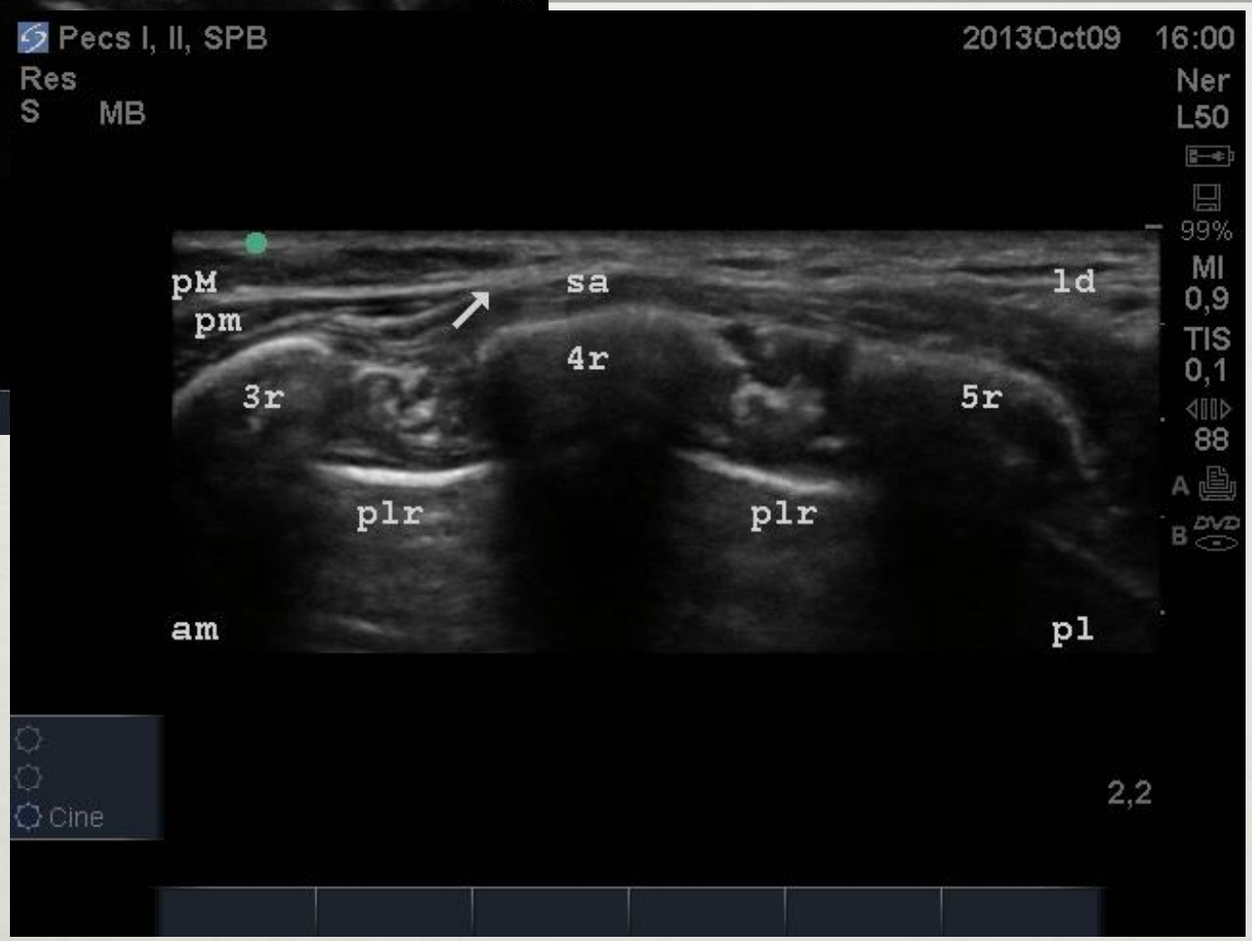
Serratus Plane Block

- ☐ ULTRASOUND IMAGE:
  - ☐ Skin, subcutatneous tissue
  - ☐ Latissimus dorsae
  - ☐ Serratus anterior muscle
  - ☐ 4th-5th-6th ribs

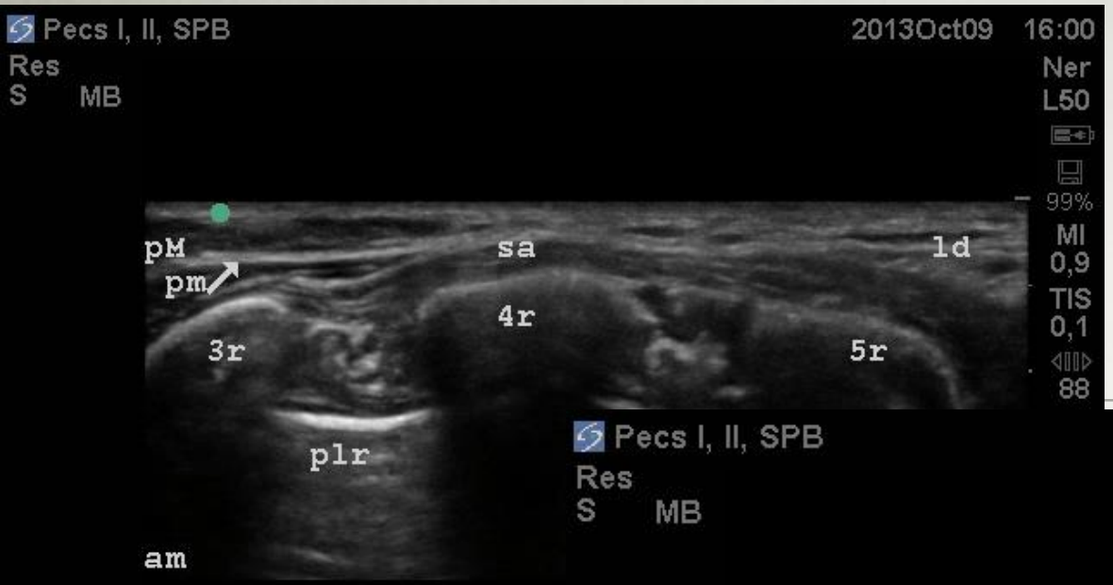

Pecs I, II, SPB
2013Oct09 16:00
Res
S MB
Ner
L50
99%
MI
0,9
TIS
0,1
88
A
B
pM
pm
sa
1d
4r
3r
5r
plr
plr
am
pl
Cine
2,2

PECS I

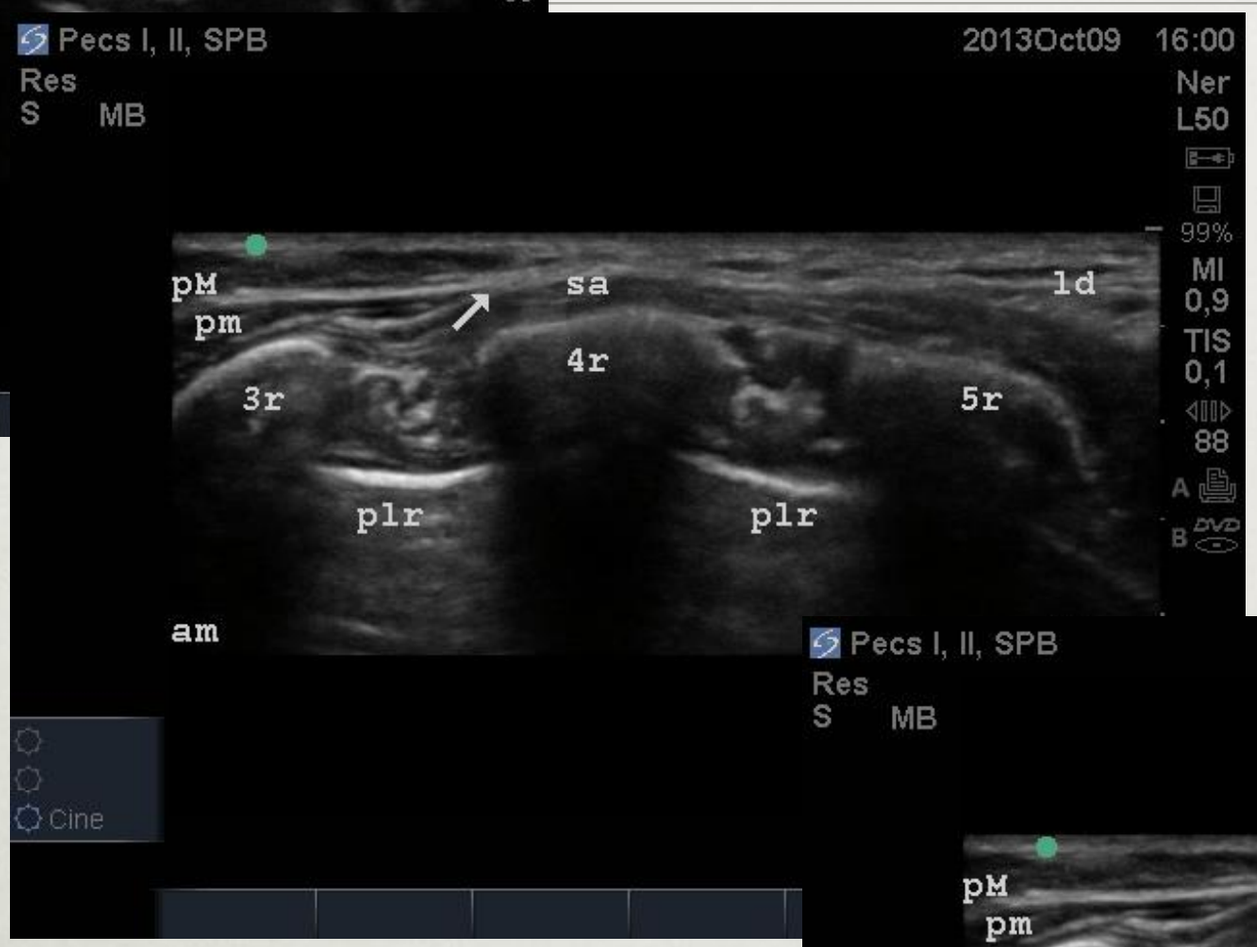
PECS I



PECS II



PECS I



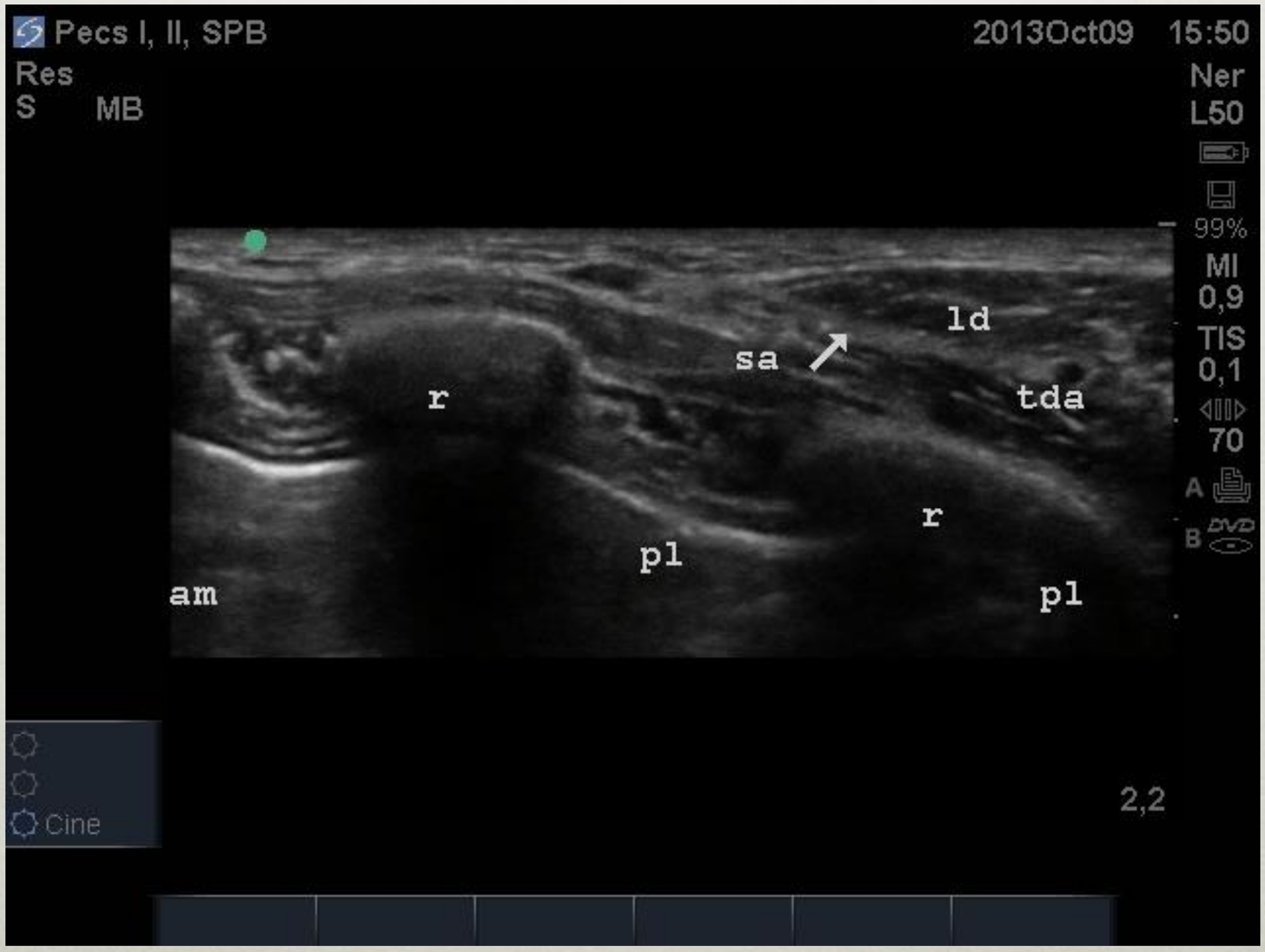
PECS II

SPB

Serratus Plane Block

- ☐ TECHNICHE
  - ☐ PROBE: LINEAR
  - ☐ PATIENT POSITION: SUPINE/sitting/lateral
  - ☐ NEEDLE: 80-100 MM
  - ☐ VOLUMEN:
    - ☐ First Bolus: 0.4 ml 0.25-% levobupivacaine
    - ☐ Boluses of 0.4 ml 0.125% levobupivacaine 8 hourly
    - ☐ or continuous infusion of 0.125% levobupivacaine at 8-15 ml/h

Serratus Plane Block



Sequence from Pecs I, pecs II and SPB

Injection

JEL ISB
Res MB
2014Apr16 09:12
Nrv
HFL
18%
MI
0.7
TIS
0.1
1
2
Patient
Auto Gain
Res
Clip
Page 1/3
Gain
Depth
Freeze
Save
Options
Color

Rib Fractures Protocol

INITIAL

Use a stepwise approach:

Paracetamol 1g QDS Po/IV

+

Ibubrofen 400mg TDS
(unless contraindicated)

+

Tramadol 50-100mg QDS
(Or Dihydrocodeine 30mg QDS)

+

PRN Oramorph 10mg 2hrly
(increase/decrease as appropriate)

Consider:

Gabapentin 300mg TDS
(opioid sparing or neuropathic pain)

and

Converting to MST if Oramorph use frequent AND effective

INTERMEDIATE

If pain remains >5/10 despite reasonable intervention

+/-

Unable to deep breathe/cough

+/-

Blunt Chest Trauma Risk Assessment score >21

Consider PCA

Refer to Inpatient Pain Service
(bleep 6477)

Out of hours contact On-Call Anaesthetist (bleep 6111)

ADVANCED

If pain remains >7/10 despite reasonable intervention

AND

Blunt Chest Trauma Rick Assessment score > 26

AND

Clinical signs of deterioration

Serratus Anterior Block

Contact Regional Fellow
(bleep 8508)

Ensure Inpatient Pain Service aware
(bleep 6477)

N.B: CURRENTLY NO SERVICE PROVISON IN PLACE. AD-HOC AVAILABILITY ONLY

SERRATUS PLANE BLOCK FOR RIB FRACTURES

ST GEORGE´S HOSPITAL. ANAESTHETIC DEPARTMENT. PARRAS T, KHALID S, PHYLACTIDES L.

INDICATIONS

Rib fractures

Thoracotomies

Thoracoscopies

Open nephrectomies

SONOANATOMY

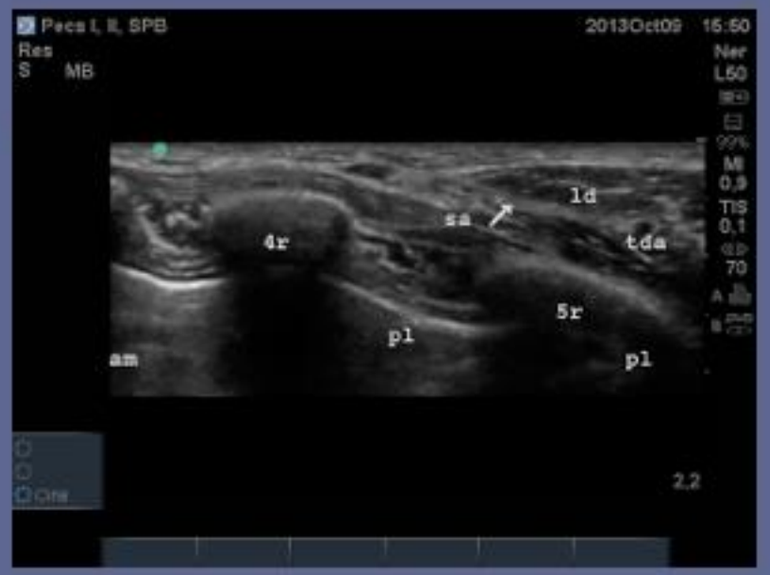
Subcutaneous tissue

Latissimus dorsae muscle

Serratus anterior muscle

4th and 5th ribs

Pleura



MATERIAL

Ultrasound scanner

Linear transducer

Sterile cover, globes, gel

Chlorhexidine

Catheter. 100 mm needle

Local anaesthetic:

1st bolus: 30 ml of 0.25% levobupivacaine. Bilateral block: 30 ml of 0.125% levobupivacaine.

Following boluses every 8 hours: 30 ml of 0.125% levobupivacaine

BLOCK

Patient supine

Arm in abduction

Probe in transverse position

In midaxillary line

Nipple level (4-5ribs)

In plane technique

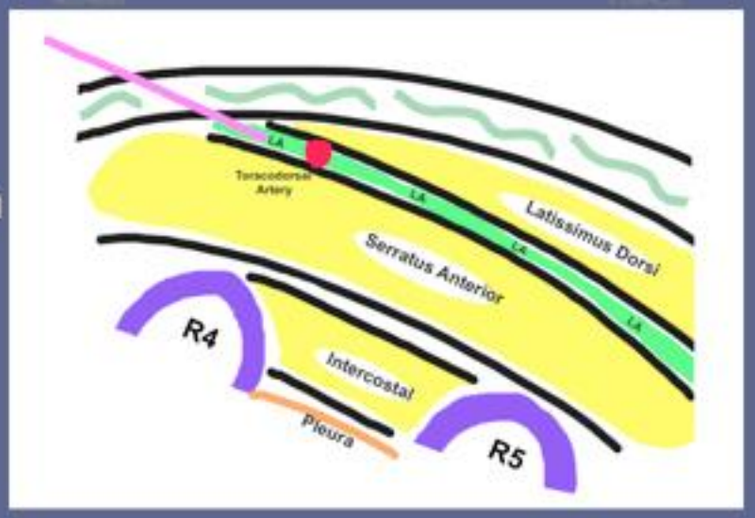
3-4 cm depth

Between serratus and latissimus dorsi muscles

Introduce needle from anterior to posterior

Inject local anaesthetic

Place the catheter. Leave 4 cm inside



REFERENCE: LITTLE BOOK OF ULTRASOUND BLOCKS. LSORA BOOK

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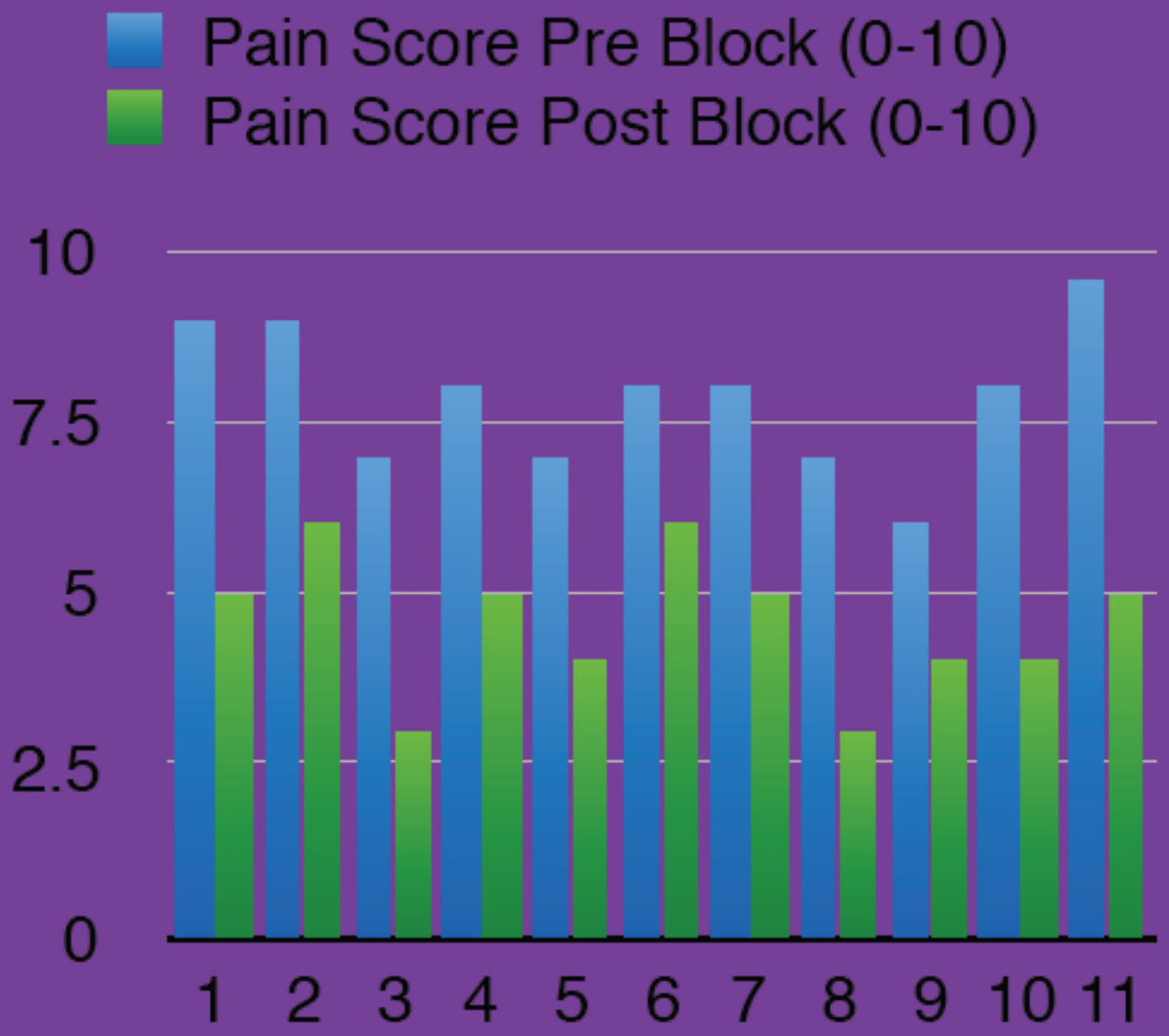
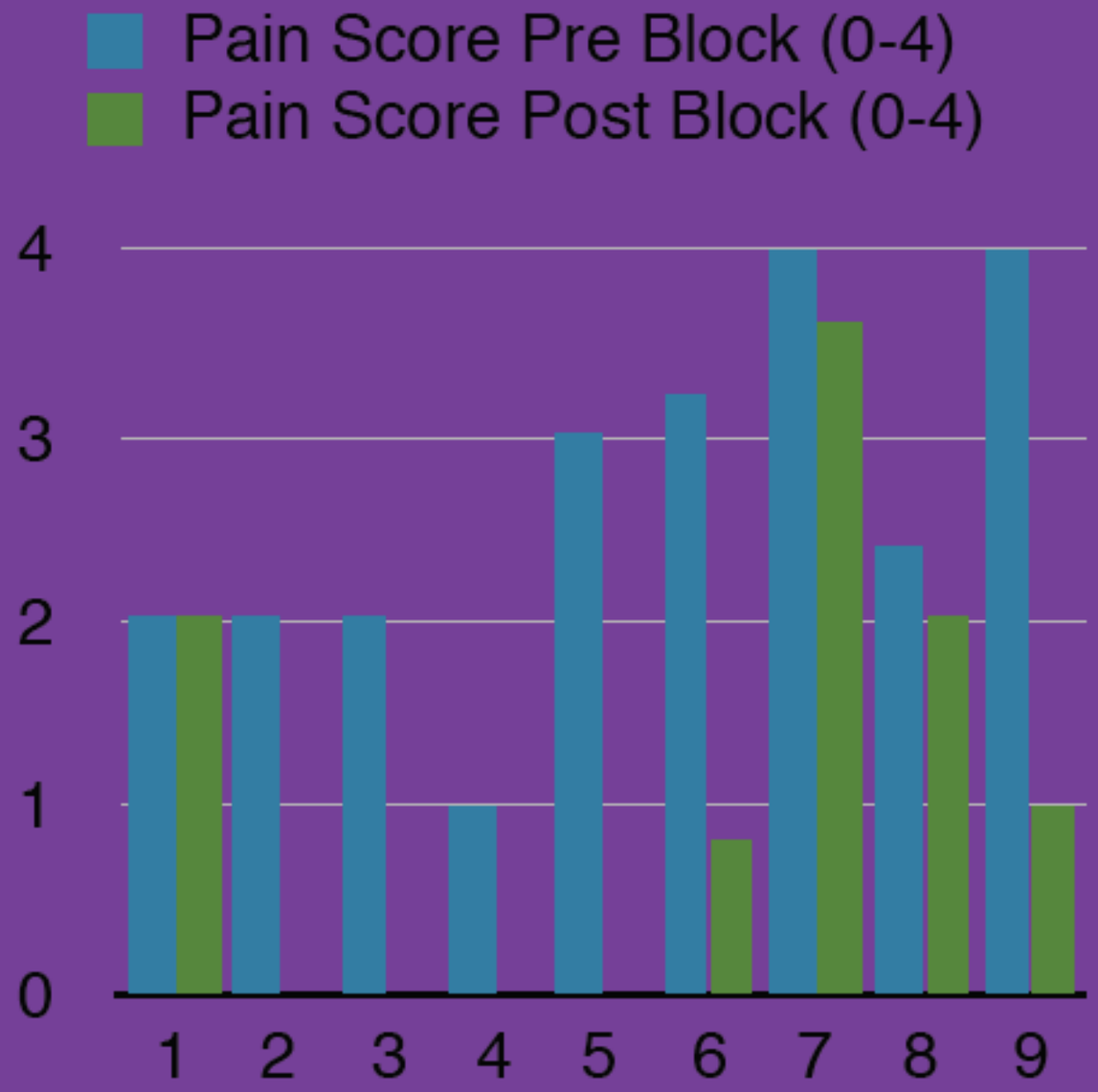
Initial Audit 2014



Re-Audit 2015



Audit 2014

- ☐ Every patient had reduction in their pain scores
- ☐ Pain score pre-block 7.86
- ☐ Pain score post-block 4.55
- ☐ None complications

Audit 2015

- 89% of the patients had reduction in their pain scores
- 11% of the patients refered same pain
- Pain score pre-block 2.6
- Pain score post-block 1.0
- None complications

CLINICAL TRIAL

- ☐ Prospective double blinded randomised controlled trial
- ☐ Inclusion criteria:
  - ☐ Rib fractures and any one or more:
    - ☐ Over 65 years old or frail
    - ☐ Pre-existing respiratory illness
    - ☐ Multiple rib fractures (>3)
    - ☐ Pneumo/haemothorax
    - ☐ High impact mechanism of trauma
    - ☐ Pain uncontrolled with analgesia

CLINICAL TRIAL

- ☐ Exclusion criteria:
  - ☐ Patient refusal
  - ☐ Allergy or contraindication to LA or opioids
  - ☐ Local infection
  - ☐ Psychiatric illness
  - ☐ End stage liver or renal failure
  - ☐ Current chronic pain therapy
  - ☐ Pregnancy / breast feeding
  - ☐ Bilateral rib fractures
  - ☐ Polytrauma patients

CLINICAL TRIAL

- Study group: Serratus plane block, 0.4% ml/kg of 0.25% levobupivacaine
- Control group: 0.4 ml/kg of Saline
- Catheter inserted to both
- Regular paracetamol 1g/6h and iv morphine PCA (1mg / 5 min).
- After 12 hours both groups: bolus of 0.4ml/kg of 0.25% levobupivacaine and continuous infusion of 0.125% levob. at 8 ml/h.

CLINICAL TRIAL

- Primary outcome:
  - VAS pre block and at 30 min, 3, 6, 9, 12, 24 hours. At rest and movement.
- Secondary outcomes:
  - Morphine comsuption at 3, 6, 9, 12, 24 hours.
  - Measurement and timeline of PCa attempts at 30 min, 3, 6, 9, 12 and 24 hours.
  - Physiotherapy assesment at 2 hours.
  - Pneumonia within one month.

Acknoledgment

- KIM FERNS, ALISON MOSS, ROZANNA KINMANS, LEANN CHAGANIS, STEPHANIE VIALVA. Nurses at St George´s Hospital
- Alex Eeles, Zain Malik, Sombith Maitra. Anaesthetic SPR. St George´s Hospital
- Lenny NG. Anaesthetic Consultant. St George´s Hospital
- Frederic Sage. Anaesthetic Consultant. East surrey Hospital

Questions...?

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Questions...?

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THANK YOU

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