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**Thoracic Paravertebral** – surgery involving the breast, thorax and chest wall

** Identify:** A paraspinous plane identified on the skin at the level you want to block. When looking or palpating for the paraspinal muscle, the muscle belly is usually palpable with a handheld ultrasound probe.

**Target:** The small transverse paravertebral space lies between the superior costo-transverse ligament and the pleura.

**Tips:** While maintaining the same probe orientation, angle the caudal end of the probe away from the midline to improve needle access past the rib and transverse process below.

**Avoid:** Keep the needle tip in view at all times to avoid pneumothorax, never advance the needle if you cannot see its tip.

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**Blow Sprain Plane** – thoracic and upper abdominal surgery, posterior rib fracture

**Identify:** Count the spinous processes to identify the correct spinal level. In the paraspinous plane, identify the corresponding transverse process. Running muscle layers and underlying pleura

**Target:** Using an in-plane approach from the cephalic end of the probe, the target is the fascial plane deep to the erector spinae muscle

**Tips:** Choose a side where the needle will cross the transverse process, if it was inserted too far, this is a safety net. Look for free spread of local anesthetic in the fascial plane and use ultrasound to assess the segmental spread up and down the spine.

**Avoid:** Lateral injection. Be sure to identify transverse processes not ribs. Calculate the maximum local anesthetic dose based on body size.

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**PECS - breast surgery**

**Identify:** Staring in the infraclavicular brachial plexus position in the deltopectoral groove, count the ribs down from the clavicle to identify the 3rd and 4th ribs, then place the probe parallel to the ribs. There are 3 muscle layers and 3 fascial planes in the PECS approach, as the intercostal spaces are deepened, running between the ribs. Serratus anterior lies between the lateral border of pec major and pec minor.

**Target:** The PECS 1 injection is between pec major and pec minor, the PECS II injects a second injection between pec minor and the transversus abdominis. A single needle path in plane from the medial end of the probe allows both balines to be reached through one injection point. This block relies on adequate volume of local anesthetic for spread.

**Avoid:** Keep the 4th ribs deep in the needle path to set a safety measure against pneumothorax, ensure the safety dose of local anesthetic is not exceeded. Avoid this approach in the presence of breast implants.

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**Serratus anterior plane – rib fractures, breast surgery, salley surgery**

**Identify:** Starting with the probe in a transverse plane in the midaxillary line, scan posteriorly until the cutaneous nerve lies superficially. There is usually an entry in the serratus anterior plane (a branch of the thoracodorsal artery)

**Target:** The aim is to inject in the fascial plane between lateral border of pec minor and serratus anterior

**Tips:** This approach is also very suitable for injection in a venous catheter. This block relies on adequate volume for spread (30ml of local anesthetic dose)

**Avoid:** Vascular puncture, intravascular injection, pneumothorax

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**Quadratus lumbarum/transversus** – abdominal surgery

**Identify:** Starting in the infraclavicular brachial plexus position in the deltopectoral groove, count the ribs down from the clavicle to identify the 3rd and 4th ribs. Then place the probe parallel to the ribs. There are 3 muscle layers and 3 fascial planes. The intercostal spaces are deepened, running between the ribs. Serratus anterior lies between the lateral border of pec major and pec minor.

**Target:** The quadratus lumbarum is a muscle situated between the transverse process of the lumbar vertebrae and the iliac crest.

**Tips:** A linear probe is required and the NSL preset may be best. Use an adequate depth to identify the quadratus lumbarum. The caudal musculature may be evident with a long needle.

**Avoid:** Intravascular injection. Look for fascial planes and spread and adjust the needle probe if necessary. Avoid the lateral posterior aspect of the transversus abdominis. Adequate spread depends on volume of injectate, typically 20ml each side. Note: advancing the maximum dose for the individual patient

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**Transversus abdominis plane – abdominal surgery**

**Identify:** The 3 muscle layers of the abdominal wall (external oblique, internal oblique, transversus abdominis) and their fascial plane boundaries. Below termination of transversus abdominis

**Target:** Beneath the fascial layer between the internal oblique and transversus abdominis muscles near the posterior limit of the transversus muscle

**Tips:** The posterior target site is generally the most effective and because of the tangential approach through the abdominal wall a 10cm needle is appropriate. The skin can be perforated anteriorly or superiorly, depending on the patient, laterally to avoid the lateral cutaneous branches of the ilioinguinal nerve

**Avoid:** Intravascular injection. Check for small vessels with Doppler prior to injection, avoid intravascular injection. Be aware of local anesthetic dose

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**TAP**

**Lumbar plexus** – surgery involving the breast, ribs and chest wall

**Target:** L5 S1 segmental nerves

**Identify:** The L5 S1 segmental nerves arise from the lumbar plexus and exit the intervertebral foramen at the L5 S1 level.

**Tips:** Be aware of the cutaneous nerves, nerve distribution may differ with each patient.

**Avoid:** Pneumothorax, ensure the safe dose of local anaesthetic is not exceeded.