

TOPOGRAPHIC ANATOMICAL LANDMARKS FOR PERFORMING BLOCKS OF THE PLEXUS BRACHIALIS ET LUMBARIS

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Background and Objective:

Successful regional anesthesia of the upper and lower extremities relies heavily on a precise understanding of peripheral nervous system architecture and surface landmarks. While ultrasound guidance is widely used for performing peripheral nerve blocks, the identification of surface topographic and deeper osteomuscular landmarks remains vital for safe needle positioning, block success, preventing neurovascular complications, and executing successful rescue blocks. This abstract synthesizes the definitive topographic anatomical landmarks required to perform blocks of the *plexus brachialis* (brachial plexus) and *plexus lumbalis* (lumbar plexus).

Anatomical Landmarks for Plexus Brachialis Blocks:

The brachial plexus is a nerve network comprising the anterior rami of the lower 4 cervical spinal nerves and the first upper thoracic spinal nerve (C5, C6, C7, C8, T1), with additional branches from C4 and T2. The spinal nerves of the brachial plexus then continue to form the roots, trunks, divisions, cords, and branches [1]. It is targetable at four distinct anatomical levels depending on the surgical site:

- **Interscalene Level:** Targetable in the interscalene groove between the anterior and middle scalene muscles, at the level of the cricoid cartilage and anterior tubercle of C₆. Key surface markers include the posterior border of the sternocleidomastoid muscle (SCM) and the external jugular vein crossing it.
- **Supraclavicular Level:** Positioned superior to the clavicle, posterior and lateral to the subclavian artery at the level of the first rib. The midpoint of the clavicle serves as the primary osseous landmark.
- **Infraclavicular Level:** Bounded by the coracoid process superiorly and the pectoralis major and minor muscles anteriorly. The needle target is the cords of the plexus surrounding the axillary artery deep to the clavipectoral fascia.
- **Axillary Level:** Located in the apex of the axilla, where the terminal nerve branches surround the axillary artery. The main palpable landmarks are the axillary arterial pulse and the margins of the biceps brachii and coracobrachialis muscles.

Anatomical Landmarks for Plexus Lumbalis Blocks:

The lumbar plexus is formed within the body of the psoas muscle by the 4 spinal nerves of L1 to L4. In 60% of people, the lumbar plexus receives a contribution from the nerve root of T12 as well [2]. It is localized predominantly within the posterior third of the psoas major muscle (the psoas compartment). Access strategies rely heavily on fixed bony landmarks due to the depth of the plexus:

- **Psoas Compartment Approach (Chayne/Winnie Landmarks):** A line connecting the highest points of both iliac crests (Tuffier's line, roughly crossing the L_4 spinous process or $L_4 - L_5$ interspace) is drawn. The injection site is mapped 4–5 cm lateral to the midline spinous processes along this line, targeting the space anterior to the L_4 transverse process.
- **Femoral / Fascia Iliaca Approaches:** For distal approach to the lumbar plexus nerves, the inguinal ligament (extending from the anterior superior iliac spine to the pubic tubercle) acts as the critical barrier. The femoral nerve lies distal to the inguinal ligament, approximately 1 cm lateral to the femoral arterial pulse, deep to the *fascia lata* and *fascia iliaca*. From medial to lateral: vein, artery, nerve.

Conclusion: Thorough mastery of classical surface anatomy, combined with contemporary real-time imaging, serves as the dual standard for modern regional anesthesia. Recognizing these landmarks minimizes the risk of vascular puncture, neuraxial misplacement, or hemo/pneumothorax, ensuring high block efficacy and maximal patient safety.

References:

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