

An Ax-Citing New Target for Anterior Shoulder Analgesia: Fascial Plane Between Coracobrachialis and Subscapularis Muscle (CBSS)

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Background

•Shoulder surgery pain management challenges:

- Postoperative pain can be severe.
- Interscalene block causes ~100% block of phrenic nerve leading to hemidiaphragmatic paresis.
- Traditional axillary block may not cover articular branches to the shoulder joint, which are more proximal
- Suprascapular nerve + axillary nerve blocks provide partial analgesia but may not adequately cover the anterior shoulder.

•Innervation of the shoulder:

- The anterior shoulder is primarily innervated by the axillary, subscapular, lateral pectoral, and musculocutaneous nerves.
- Subscapular nerves branch off the posterior cord proximally to the traditional axillary nerve block target and innervate anterior shoulder.

•Rationale for study:

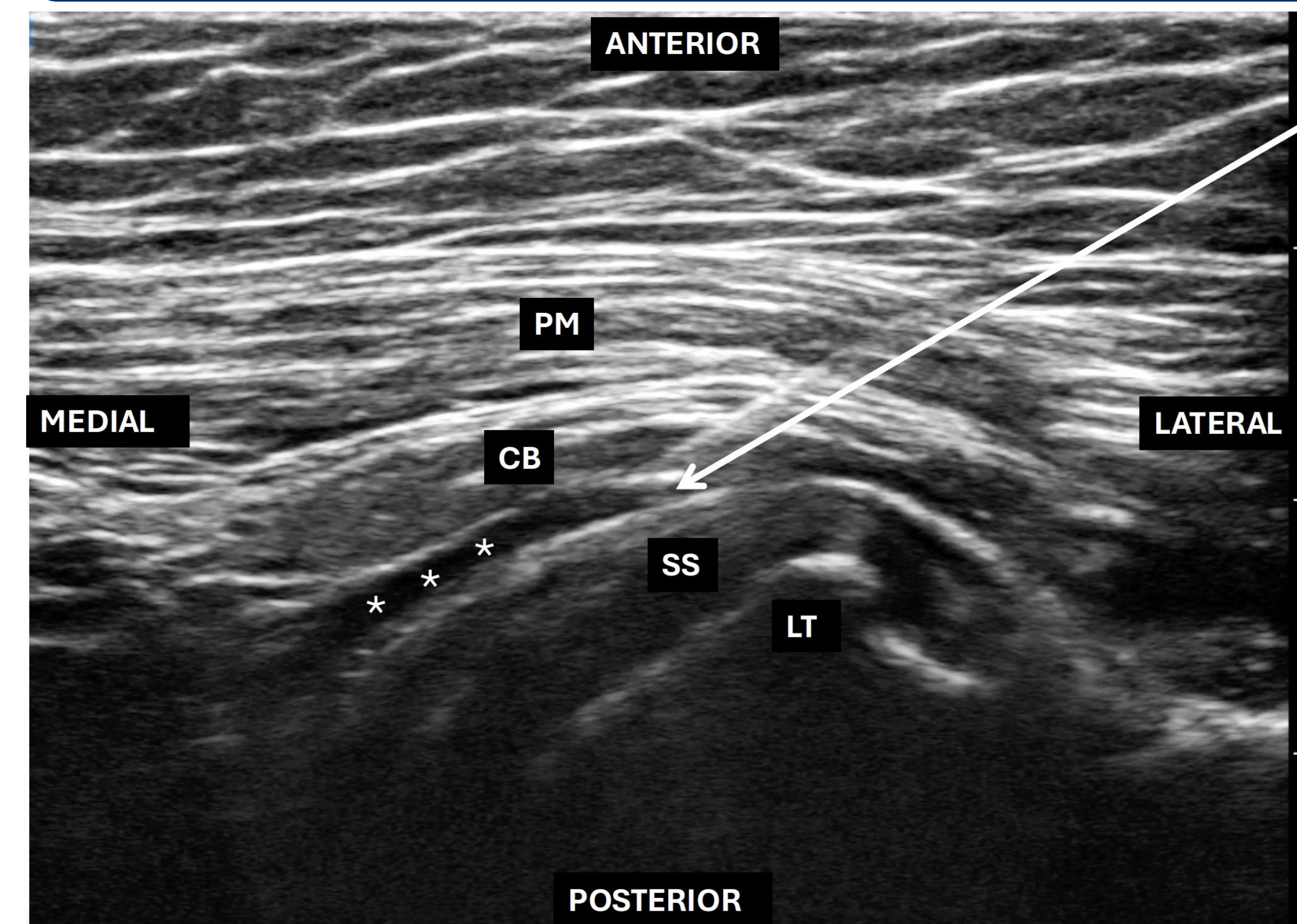
- A novel fascial plane block between the coracobrachialis and subscapularis muscles, which may contain the axillary and musculocutaneous nerves, could provide effective anterior shoulder analgesia while avoiding complications associated with interscalene block.

Methods

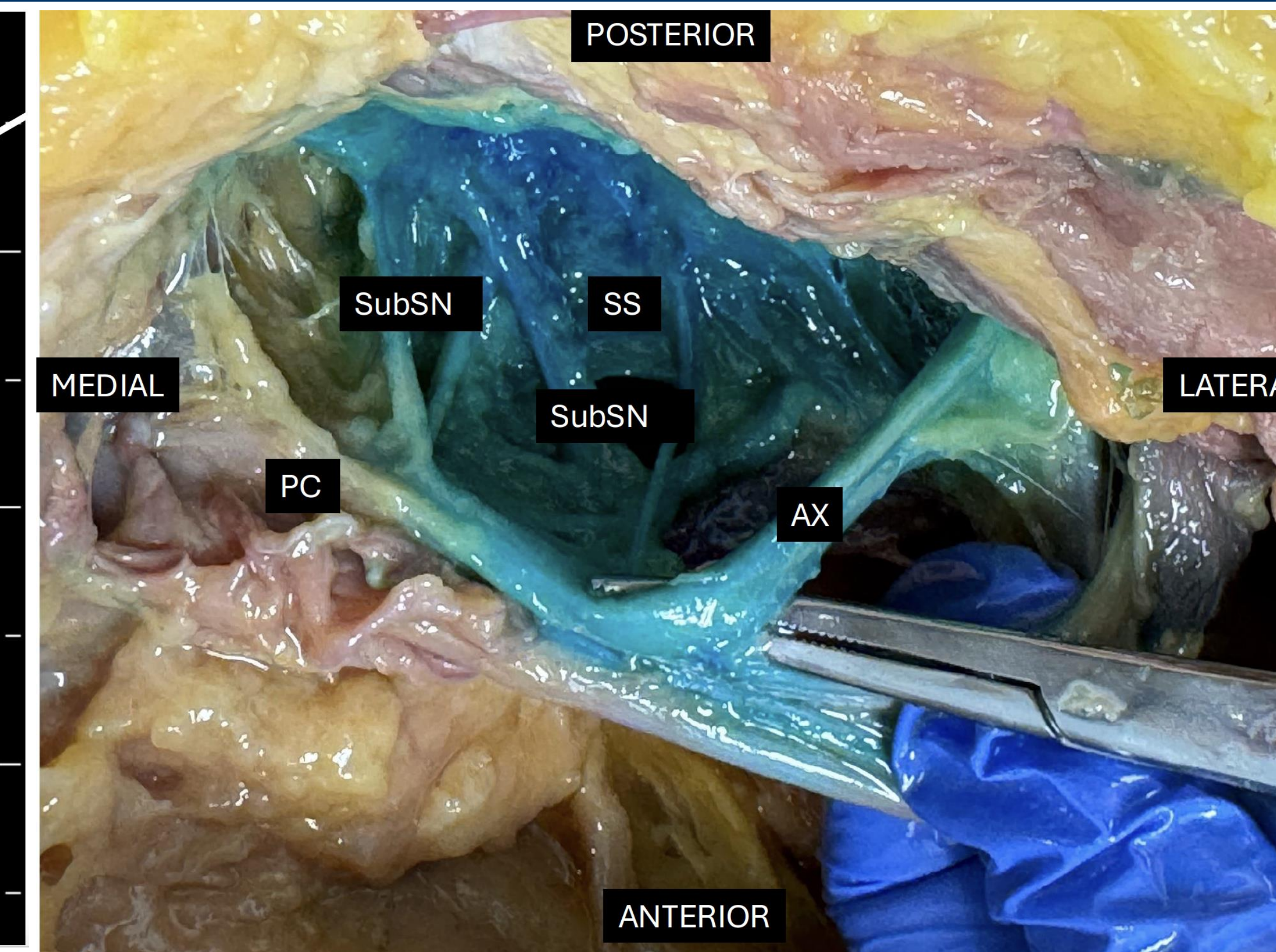
Cadaveric Study:

- Feasibility confirmation from ultrasound scanning of live volunteers
- 1 cadaveric specimen, preserved with GreenMbalm fluid, was injected with 15mL of 0.01% methylene blue dye under ultrasound guidance.
- Dissections were performed to assess the spread of injectate.

Results



AX: axillary nerve, CB: coracobrachialis, LT: lesser tuberosity of humerus, PC: posterior cord, PM: pectoralis major, SS: subscapularis muscle, SubSN: subscapularis nerve, ***: local anesthesia



Dye spread analysis:

- The anterior surface of the subscapularis muscle, axillary nerve, and subscapular nerves were widely stained.
- The posterior cord and radial nerve were partially stained posteriorly with no staining observed in the medial or lateral cords.
- The musculocutaneous nerve and the median nerve were stained along the coracobrachialis muscle.

Clinical relevance:

- Confirms that injectate reaches key nerves involved in anterior shoulder innervation – all the nerves to anterior shoulder except lateral pectoral nerve



Conclusions

Advantages of CBSS:

- Provides targeted analgesia to the anterior shoulder.
- Phrenic nerve-sparing regional technique.
- Provides a broader sensory block of the anterior shoulder and motor block involving the deltoid, subscapularis, latissimus dorsi via the thoracodorsal nerve, and potentially radial and median nerves.
- When combined with suprascapular block, this technique could provide more comprehensive analgesia after shoulder surgery than distal approaches that primarily target the axillary nerve.

Limitations:

- Small sample size.
- Tissue effects of cadaver preservation may affect dye spread – clinical correlation necessary.
- Comparative effectiveness against interscalene and suprascapular/axillary nerve blocks still uncertain.

Future Directions:

- Comparison of suprascapular block with either CBSS plane block or other axillary approaches.
- Randomized controlled trials needed to confirm efficacy.

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References

1. Chong M, Rojas Gomez MF, Peng P. Axillary nerve: what anesthesiologists and pain physicians should know. Reg Anesth Pain Med 2024.
2. Tubbs RS, Loukas M, Shahid K, et al. Anatomy and quantitation of the subscapular nerves. Clin Anat 2007;20:656-9.
3. González-Arroyo E, Jiménez-Sánchez L, García-Simón D, et al. Ultrasonography-guided anterior approach for axillary nerve blockade: An anatomical study. Clin Anat 2020;33:488-99.
4. El-Boghdady K, Wolmarans M, Stengel AD, et al. Standardizing nomenclature in regional anesthesia: an ASRA-ESRA Delphi consensus study of abdominal wall, paraspinal, and chest wall blocks. Reg Anesth Pain Med 2021;46:571-80.